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DMS-100 Family

Remote Switching Center

Remote Switching Center Maintenance Manual

Volume 1 of 2

XPM11 and up Standard 09.05 November 2000

NORTEL NETWORKS™

DMS-100 Family

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About this document

When to use this document

This Remote Switching Center (RSC) maintenance reference manual provides: overview and hardware information for understanding the RSC product and operation; recovery procedure for returning to service an RSC from a completely out-of-service condition; alarm clearing procedures for clearing an RSC alarm condition at the MAP; card replacement procedures for removing and replacing hardware modules in the RSC as part of maintenance, verification, or acceptance procedures; trouble locating and clearing information for locating and clearing problems beyond the scope of other maintenance procedures.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the next software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the same software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *DMS-10 and DMS-100 Family Product Documentation Directory,* 297-8991-001.

References in this document

The following documents are referred to in this document:

- *I-Meg Modem Service Network Implementation Guide,* 297-8063-200
- *North American DMS-100 Log Report Manual*

- *North American DMS-100 Translations Guide*
- *Alarm Clearing Procedures*
- *Card Replacement Procedures*
- *XPM Operational Measurements Reference Manual*
- *PMDEBUG Users Guide*, TAM-1001-004

What precautionary messages mean

The types of precautionary messages used in Nortel Networks documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION - Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER - Possibility of personal injury

DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING - Possibility of equipment damage

WARNING
Damage to the backplane connector pins
Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION - Possibility of service interruption or degradation

CAUTION
Possible loss of service
Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

```
>BSY
```

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

```
>BSY CTRL
```

Variables

Variables are shown in lowercase letters:

```
>BSY  CTRL  ctrl_no
```

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.

FP 3 Busy CTRL 0: Command passed.
```

1 RSC introduction Volume 1

This book is divided in two volumes to provide necessary information in an easy to use format. The Remote Switching Center (RSC) with Remote Cluster Controller (RCC) can be converted to an RSC equipment (RSCE) cabinet that uses the RCC2. The current remote controller equipment (RCE) frame, with the RSCE frame, is for the conversion. The first volume contains all of the printed RSC/RCC specified maintenance information. Additional procedure modules common to the RCC and RCC2 are also included. For users that have not converted to the RSCE, the first volume is the only volume these users need.

The RSCE volume of this book describes the results of the conversion from an RCE frame to an RSCE cabinet. The reasons this conversion is made and the restrictions applied to this conversion are described. The differences in architecture and use between the RCE and the RSCE and the benefits of an RCE to RSCE conversion are also described. Feature application information in this volume refers to functions associated with the RCC2.

The RCE to RSCE conversion changes the RCC to RCC2 functionality. The RCCs in the RCE frame are removed from service. Cabling routes the remote maintenance modules (RMM) to a common peripheral module (CPM) controller shelf in the RSCE. An RMM reuse method allows for the support of RSC sites that have RCEs with only one or two RMM shelves. When converted, the frame offers the functions of a remote switching center SONET (RSC-S). Other sites that do not have space for two RMM shelves must use cabinetized RSC-S products.

2 Maintenance overview

This chapter is divided into the following seven sections:

- *Functional description*

  contains an overview of the components that make up the Remote Switching Center (RSC) configurations, highlighting voice and message flows.

  Note: The information in this chapter assumes that all components and software processes are functioning normally.

- *Fault conditions*

  identifies the types of problems that occur in components (such as a card or power supply), the links that connect components, and the software that controls voice and message flow.

- *Automatic maintenance*

  explains how the Remote Switching System and the DMS (Digital Multiplex System) react to fault conditions. System actions, such as audits, try to pinpoint the fault and correct it automatically so manual intervention is not required. If manual intervention is required, this section points out the appropriate trouble indicators.

- *Escalation to manual maintenance*

  explains the trouble indicators generated when manual intervention is required.

- *Message links (links 0 and 2) and DS-1 maintenance*

  Explains the importance of the message supporting links on the C-side of the RCC and how these links are maintained by the system and by the maintenance technician responsible for link maintenance of the RSC.

- *NT6X50AB circuit card retrofit for RCC C-side application*

Explains how to retrofit an RCC with NT6X50AB cards with strapping options and different DS-1 signaling formats for either A/B bit signaling or 64kb clear channel signaling.

- *Retrofit procedure to change the DS-1 signaling format on an RCC with NT6X50AB cards*

  Explains how to change the DS-1 signaling format when NT6X50AB cards are already provisioned.

Functional description

The main component of an RSC is the remote cluster controller (RCC). The following sections present these components according to functional areas, and the functions of specific cards in each of these areas are highlighted. These RSC components are presented to the line concentrating module (LCM) and remote maintenance module (RMM).

RCC

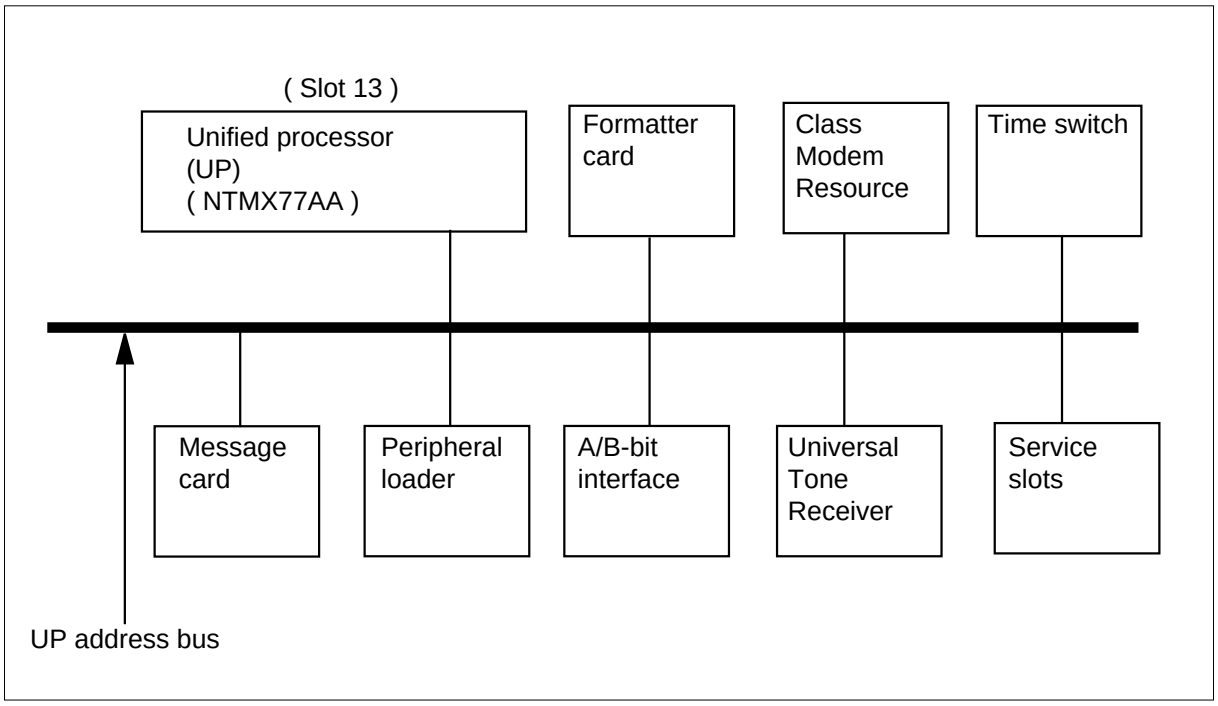
The following section describes RCC PLUS functions.

RCC PLUS shelf

The RCC with Peripheral Life Upgrade Strategy (PLUS) provides a universal processor (UP) for all units at the RSC. The RCC is supported by a host line group controller/line trunk controller (LGC/LTC).

The following figure shows the control complex section of the RCC with Peripheral Life Upgrade Strategy (PLUS).

Figure 2-1 RCC with XPM PLUS control section



Advantages of RCC with PLUS

Advantages provided by RCC with PLUS are:

- replacement of five cards with one UP card in each unit of the RCC, resulting in overall reduction of power consumption
- increase of RCC memory from 5Mb to 8Mb, with a potential expansion of up to 16Mb
- increase in real-time capacity
- downloadable firmware, electrically erasable programmable read only memory (EEPROM), on the NTMX77 card. This card is equipped with two FLASH EEPROMs, or banks, which are two 256Kbyte programmable chips. These FLASH EEPROMs allow operating company maintenance personnel to load the firmware independently of the random access memory (RAM) load on a manually-busied (ManB) RCC, or a ManB unit of the RCC, when using the following command strings:

  ```
  >LOADPM PM CC FIRMWARE
  ```

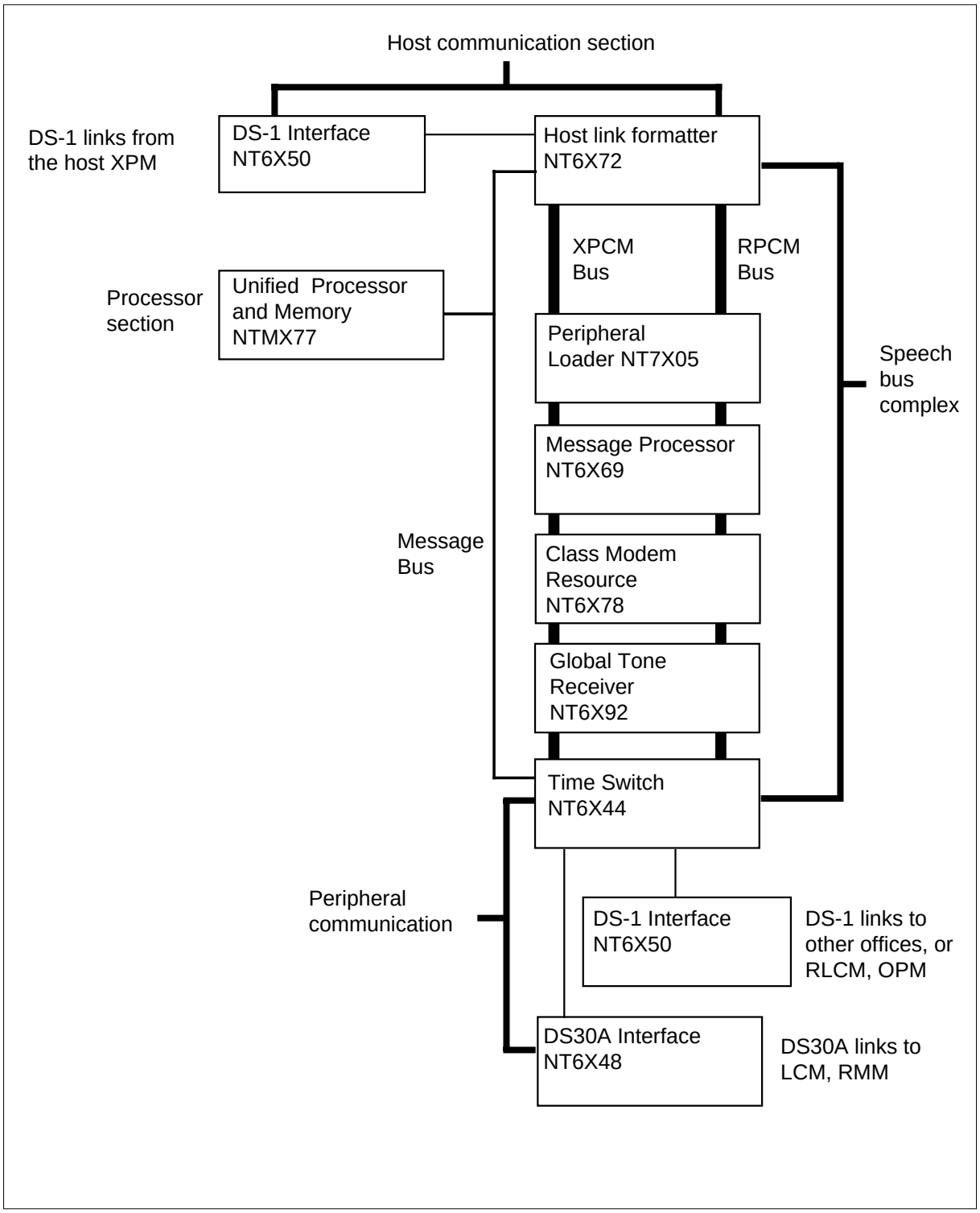
  or

  ```
  >LOADPM UNIT unit_no CC FIRMWARE
  ```

The following figure is a functional block diagram, showing the four sections which make up the RCC PLUS.

- Host communications section
  - NT6X72
  - NT6X50
- Processor section
  - NTMX77
- Speech Bus complex
  - NT6X72
  - NT6X69
  - NT7X05
  - NT6X78
  - NT6X92
  - NT6X44
- Peripheral communications section
  - NT6X44
  - NT6X48
  - NT6X50

Figure 2-2 Functional block diagram of the RCC with XPM PLUS



Host communication cards

The following cards translate between the 16 host DS-1 ports and the parallel speech bus:

- *NT6X50*

  provides the two-way voice and message interface between the 24-channel, bipolar, serial bit stream of the DS-1 links and the 32-channel serial bit stream of the NT6X72 card.

- *NT6X72*

  converts the sixteen 32-channel serial bit stream of the NT6X50 to the 512-channel parallel speech bus and vice versa. The 512 speech channels are added to the 128 internal channels.

Processor and memory cards

This section describes RCC processor and memory circuit cards.

Universal Processor (NTMX77)

The Universal Processor (UP) replaces the NT6X45, NT6X46 and NT6X47 cards in each RCC shelf. The UP provides increased memory and real-time capacity, expandable memory, and decreased power consumption.

Note: Filler face cards (NT0X50) are located in slots 08 through 12, previously occupied by the NT6X45, NT6X46 and NT6X47 cards.

Speech bus cards

The speech bus is actually two speech buses, send (XPCM) and receive (RPCM). Following are the cards on the buses:

- *NT7X05*

  provides local storage of XPM loads and images in a nonvolatile, nonmechanical-based memory card.

  Peripheral Remote Loader-16 (PRL), provides the ability to reduce XPM simplex time by allowing XPM software loads to be transferred to the XPM and stored locally within an XPM unit while the unit is in-service. This allows replacing an existing loadfile with a newer loadfile. During the process of replacing a loadfile, the last image is still available for recovery

actions if required. The local storage mechanism is the NT7X05 circuit pack

```
>LOADPM [PM] CC XPMSTOR [load_file_name]

                    [ACTIVE]

                    [INACTIVE]
```

Note: The load_file_name is optional, default is the file datafilled in field, LOAD, in the inventory table.

Loadfile or image is transferred to the XPM RAM by the enhanced LOADPM command. The XPM or unit must be manually-busy (ManB), during this procedure, use the following parameters:

```
>LOADPM [PM]

                    [ACTIVE]

                    [INACTIVE]

                    [UNIT]          LOCAL IMAGE
```

or

DANGER
Possible service interruption
The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string}], if this file_name parameter is used, the loadfile named in the parameter will be used which is not patched. Do not use this parameter unless the NOPATCH option of the loadfile is desired.

-

```
>LOADPM [PM]

                    [ACTIVE]

                    [INACTIVE]

                    [UNIT]          LOCAL LOADFILE
```

Note 1: A loadfile is a duplicate of the XPM load maintained on disk or tape and is created on the NT7X05 card in standard record form, (S2, S6

and S7). Loadfiles are created on the NT7X05 card while the XPM is InSv, using the enhanced PM MAP level command.

Note 2: An image is a snapshot of the XPM UP memory which contains the complete contents of RAM plus the latest static data and applied patches. Images are created on the NT7X05 card upon RTS of the XPM and updated through automatic audits. The IMAGE parameter is supported in non-ISDN peripherals only.

- PRL accomplishes peripheral loading improvements using imaging technology. Imaging control is provided at a very high level within the CM, by monitoring when changes occur to restart survivable objects within the XPM. The restart survivable objects are static data and code, in the form of patches. PRL dumps an image, makes a copy, of the MX77s RAM in an in-service, active or inactive, XPM unit, and copies it to the NT7X05. In the event that the XPM must be reloaded, the image is restored from the NT7X05 to the UP RAM.
- When the NT7X05 card is first installed, the loadfile is invalid and must be loaded utilizing the XPMSTOR parameter. Using the enhanced QUERYPM command with the new FILES option, operating company personnel can veiw the status of files on the NT7X05, as seen in the example here:

  >QUERYPM FILES

  and pressing the Enter key.

  Example of a MAP response:

```
Unit 0:
   NT7X05 load File: ** Mismatch **
   NT7X05 Image File: ESR05AY
   CMR LOAD:  CMR03A
Unit 1:
   NT7X05 load File: ** Mismatch **
   NT7X05 Image File: ESR05AY
   CMR LOAD:  CMR03A
```

  When loading is required, the CM will first check to see if the NT7X05 is datafilled. If NT7X05 is present, a software load referred to as the recovery software loader (RSL), the name of the desired load file and an indication of whether the image or loadfile should be loaded, will be transferred from the CM to the UP. The RSL will check for the loadfile name on the NT7X05. If the load name test passes, the RSL restores the image or load as instructed, to the UP. To avoid forcing unnecessary delays in loading in cases where the file being restored is good, the image/loadfile integrity is verified as part of the restore/loading process, then using the enhanced

QUERYPM command again, the operating company personnel can veiw the status of files on the NT7X05, as seen in this example:

>QUERYPM FILES

Example of a MAP response:

```
Unit 0:
   NT7X05 load File: ESR05AY
   NT7X05 Image File:ESR05AY
   CMR LOAD:  CMR03A
Unit 1:
   NT7X05 load File: ESR05AY
   NT7X05 Image File:ESR05AY
   CMR LOAD:  CMR03A
```

- *NT6X69*

  interfaces and processes signaling and control messages between the RCC and the CC.

- *NT6X79*

  provides tones, this card is only provided with the AA version of the NT6X69, in all other versions of the NT6X69, the tones card is on-board.

- *NT6X92*

ATTENTION

To ensure peak performance, do not install the UTR and GTR together on the same RCC2. Presently, there is no way of knowing which receiver is used to interpret tones. Some call processing tones may be degraded if designed for use with a GTR.

Universal tone receiver (UTR) The UTR (NT6X92BB, BC, CA) identifies and processes DTMF, MF, MF-socotel, CMF-forward and backward tones in 32 channels on the parallel speech bus.

Global tone receiver (GTR) The GTR, (NT6X92EA) identifies and processes DTMF, MF, MF-socotel, CMF-forward and backward tones in 64 channels on the parallel speech bus.

The GTR is LSSGR (LATA switching systems general requirements) and CCITT (International telegraph and telephone consultative committee)

compliant. The GTR is available as a replacement for all national and international versions of the UTR.

- *NT6X44*

  concentrates the 20 peripheral-side (P-side) ports to 16 central-side (C-side) ports and allows service circuits to be shared among all ports and channels.

- *NT6X72*

  serial to parallel and parallel to serial conversion, network message interface, shelf clock generation, raw T1 clock generation, time slot mapping, looping unused C-side channels for intracalling, and transparent A/B bit mapping.

- *NT6X78*

  The NT6X78 custom local area signaling service (CLASS) modem resource (CMR) card supports Calling Number Delivery (CND) and other CLASS services. The CMR card provides the Analog Display Services Interface (ADSI) protocol to transmit CLASS data between the CC and ADSI compliant customer premises equipment (CPE).

The NT6X78AB, the NT6X69AD, and the NT6X92BB,BC,EA cards are required for compliancy with ADSI protocol. ADSI protocol supports CLASS features that provide display-based information, such as deluxe spontaneous call waiting identification (DSCWID), to subscribers with ADSI-compatible customer premise equipment (CPE).

Peripheral communication cards

The following cards translate between the 20 P-side ports and the parallel speech bus:

- *NT6X44*

  translates between the parallel speech bus format and the NT6X48 and NT6X50.

- *NT6X50*

  provides the interface to DS-1 links that connect to other offices, remote line concentrating modules (RLCM), or outside plant modules (OPM).

- *NT6X48*

  provides the interface to LCMs and RMMs.

Speech and message paths in the RCC

The following figure specifies the speech and message paths of the RCC. Refer to figure, RCC speech and message paths, while reading the following paragraphs.

Note: The parallel speech bus consists of a transmit PCM bus (XPCM) and a receive PCM bus (RPCM).

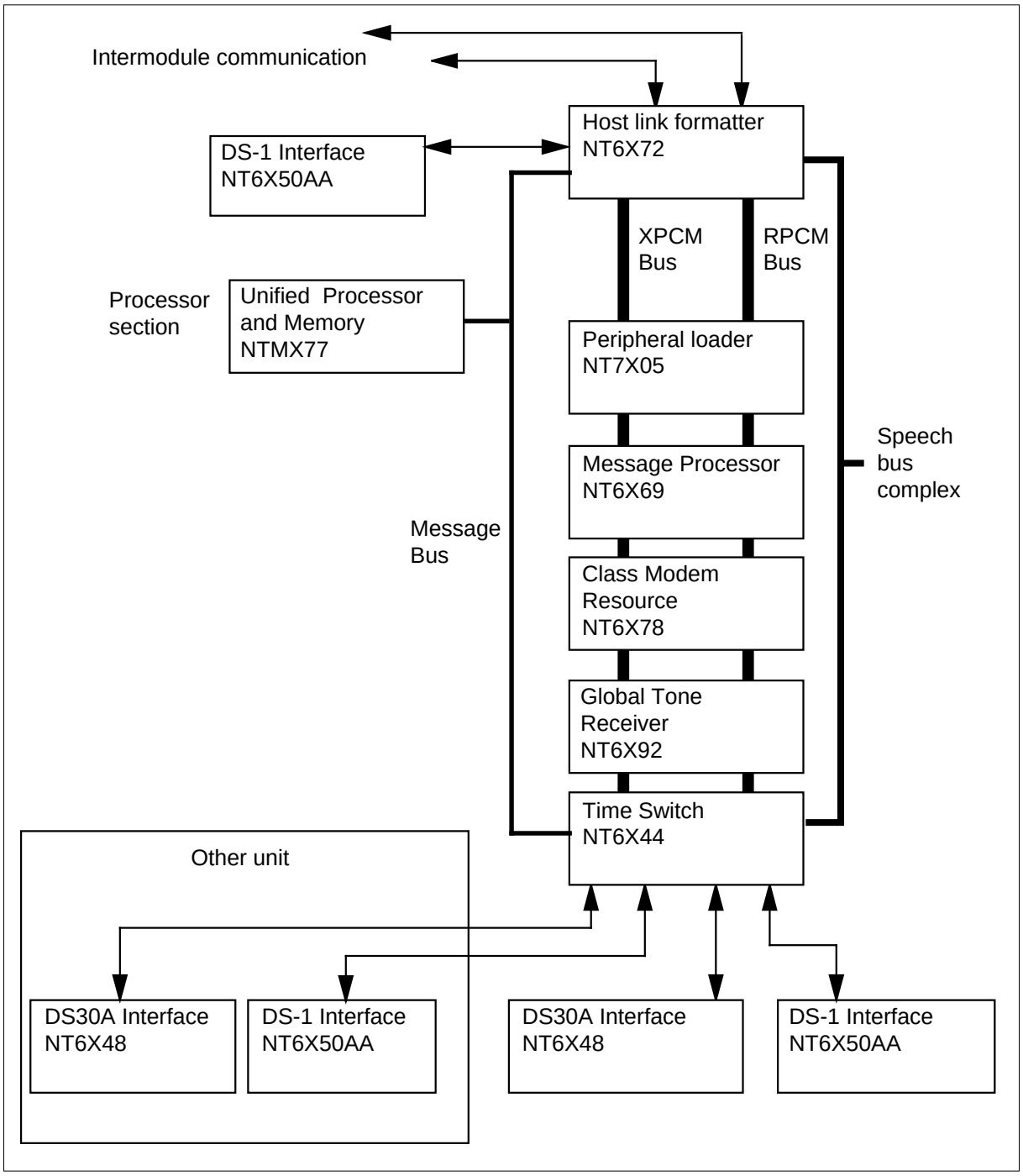
Intermodule communication

For the RCC to work effectively, there must be adequate communication between the RCC units so that, for example, the inactive unit can take over call processing if necessary. RCC units communicate over the intermodule communication links (IML). There are two IML links, one connecting NT6X69 cards (at 64 kb/s) and the other connecting NT6X45 cards between each unit (at 19.2 kb/s). The NT6X69 link allows general interunit messaging, such as updating call processing information in the inactive unit. The NT6X45 exchanges call processing data.

RCC to host communication

The RCC communicates with the host over message links 0 and 2. If both links fail, the RCC cannot communicate with the host, and emergency stand-alone (ESA) is enabled.

Figure 2-3 RCC speech and message paths



RSC_XPMESAEXIT parameter

This parameter (Remote Cluster Controller Xms-based Peripheral Module Emergency Stand Alone Exit) is required and appears only in a switching unit

with the remote cluster controller (RCC) and the emergency stand alone (ESA) feature.

The RSC_XPMESAEXIT parameter determines if the system initiates ESA exit or if manual intervention is required to exit ESA. It also determines how long the system waits to initiate the ESA exit.

Provisioning rules

Set the value of this parameter to the desired delay between links being restored (or communication with C-side peripheral recovered) and the remote service center coming out of ESA mode.

The time is defined in 10-s intervals (for example, a value of 2 indicates a delay of 20 s). The default setting of 6 (see “Range information") indicates that after a 60-s delay, the system will initiate an ESA exit. A value of N indicates that a manual RETURN TO SERVICE (RTS) is required to exit ESA.

The range of values type is RSC_ESA_EXIT_TYPE with the following multiple values:

Table 2-1

SYSTEM_ESA_EXIT	{N, Y}
EXIT_DELAY	{0 to 100}

The SYSTEM_ESA_EXIT field is a boolean that determines if the system initiates an ESA exit (Y) or if a manual ESA exit is required (N). The EXIT_DELAY field determines how long the system waits to initiate the ESA exit. The value is non-zero if the system initiates the ESA exit. The delay increases in multiples of 10-s increments. The range has a minimum of 0, a maximum of 100, and a default of 6. The activation is immediate.

Verification

Verification of the SYSTEM_ESA_EXIT field is “Y"; verification of the XPM_EXIT_DELAY field is “6".

To verify:

1. Set the parameter to its default value in table OFCENG as follows:

Table 2-2

RSC_XPMESAEXIT	Y	6

2. From the MAP (Maintenance Administration Position) display, post an InSv RCC.
3. Break RCC C-side msg links at DSX.

4. From the MAP display, observe RCC go from InSv to CBsy, then to SysB.
5. From the MAP display, observe the ESA countdown start at 60.
6. From the MAP display, observe the system warm exit RCC.

Memory requirements
This parameter value requires 1 word of memory.

Dump and restore rules
Copy the existing value of this parameter when doing a dump and restore.

If the current software release has the parameter RSC_XMPESAEXIT delay set to “0", then the new parameter will be set as follows:

Table 2-3

RSC_XPMESAEXIT	N	0

If the previous software release had the parameter RSC_XMPESAEXIT delay set to a non-zero setting, then the new parameter will be set as follows:

Table 2-4

RSC_XPMESAEXIT	Y	<dt>

where <dt> is the ESA exit delay time of the previous software release.

Testing the RCC
Operating company personnel usually test the RCC by issuing the TST command. The type of test used depends on two factors, the state of the RCC and the parameters included in the TST command.

User input: To busy the inactive unit of the RCC, enter:

```
> TST UNIT 0
```

and press the Enter key

where

0 =
the inactive unit

System response: The following message sequence appears:

```
ROM/RAM query
/Reset
/Status
Non Destr ROMtst
/RunInitializing
Testing TESTALL
ABDIAG
UTRDIAG
PSLOOP
MSGDIAG
SPCHDIAG
TS DIAG
TONESDG
CMRDIAG
Initializing
Tst Passed
```

Following is the message sequence for command testing the inactive unit. This is a subset of the TST command that performs full diagnostics.

User input: To test the inactive unit, enter:

```
> TST UNIT 0 ROM
```

System response:

```
/Status
ROM/RAM query
Non Destr ROMtst
Tst Passed
```

Testing other cards

Following are cards with special test sequences:

- *NT6X69*

  Messaging When the TST command is given and the RCC is both busy and inactive, the following tests are run:

  — *destructive* replaces the contents of RAM by resetting the card, checking the message buffer, testing the interface to the speech bus, and testing ROM

  — *nondestructive* runs when the destructive test cannot run. It tests the P-side by running a looparound test on a dedicated channel of the time switch card, checking the interface to the speech bus, and testing its ROM.

- *NT6X50AA and NT6X50AB*

  DS-1 interface When the TST command is given for an out-of-service (OOS) unit, loopback tests are performed through the DS-1 card.

Returning the RCC to service

Following are ways to return to service (RTS) the RCC:

- *manual maintenance* When a fault causes either the RCC unit or peripheral module (PM) to go system busy (SysB), the unit is usually busied and tested. When the faulty component is found, the unit or PM is RTS.
- *system audit detects a faulty component* When this occurs, an audit tries to return the component to service.

Performing an RTS without running diagnostics

If the RTS command is used with the FORCE parameter, ROM diagnostics are not performed.

CAUTION

Additional fault may be found

Operating company personnel should not use the FORCE parameter unless directed to do so. These diagnostics, are normally part of the RTS command, may find an additional fault.

The RTS FORCE command displays the following message sequence:

User input:

```
> RTS UNIT 0 FORCE
```

System response:

```
ROM/RAM query
Clear data
Initializing
Static Data
Loading:Execs
Initializing
ESA Data Load
```

A superframe sync and dynamic data sync occurs. The unit returns to service after the sync.

Switch of activity (SWACT)

The SWACT command causes the two units of an RCC to switch activity so the active unit becomes the inactive unit, and the inactive unit becomes the active unit and takes over call processing.

In the unlikely event of an error during the SWACT, errors on the RCC undergoing the SWACT are handled differently based on when, during the SWACT, the error occurred. For failures that occur:

- before the actual activity switch, the SWACT aborts and the node is in the ISTb state. The inactive unit is made SysB, and maintenance personnel can recover the unit. If left untended, the SysB unit is recovered by the system.
- after the actual activity switch, but before the full post-SWACT cleanup has completed, the entire node is made SysB. Maintenance personnel will be responsible for determining the cause of the failure and bringing the node back in service. If left untended, the SysB node is recovered by the system.
- after the actual activity switch, and after the full post-SWACT cleanup, the newly inactive unit remains out of service, for maintenance personnel to handle. If left untended, the SysB unit is recovered by the system.

Routine exercise test—RCC

The REX schedule is controlled through table OFCVAR, parameter NODEREXCONTROL. Once the table is datafilled, operating company personnel can change the REX schedule for a PM by accessing the PM at the MAP level and posting the associated PM. Following are examples of REX commands and system responses:

1. *User input:*

   ```
   > TST REX ON
   ```

   System response:

   ```
   XPM n is included in the REX schedule
   ```

2. *User input:*

   ```
   > TST REX OFF
   ```

   System response:

   ```
   XPM n is removed from the REX schedule
   ```

3. *User input:*

   ```
   > TST REX NOW
   ```

   System response:

   ```
   REX test in progress    (REX messages)
   ```

The TST REX command at the PM MAP level allows operating company personnel to perform a manual REX on an RCC or LCM. TST REX QUERY allows operating company personnel to obtain more detailed REX information

about the RCC or LCM. TST REX NOWAIT is also available. These commands are described in chapter 6.

The text for six of the PM181 logs now more accurately reflects the results of REX test failures or terminations. Refer to the PM181 log text changes for a comparison of the old text to the new text as well, as for REX failure reasons and the response actions for each reason.

Routine exercise test—LCM

The REX schedule for LCMs is controlled through the parameter LCDREX_CONTROL in table OFCVAR. REX tests are performed during a specified interval, one LCM at a time, in the order in which they were datafilled. Following are enhancements to REX for LCMs:

- The DMS system scheduler executes an LCM REX in its entirety before initiating an ESA REX on an RLCM.
- A MAP command for manual REX is available. Operating company personnel can initiate an immediate request to REX a posted LCM from the MAP terminal.
- Fault indicators alert operating company personnel if a REX fails, either a scheduled or manually-requested REX.
- A maintenance record indicates the results of recent REX tests (passes or failures) on a per LCM basis.
- MAP commands query the results of recent REX tests.

These LCM REX enhancements are described in chapter 6.

Updating static data (non-ESA)

To execute call processing and maintenance on an RCC and its subtending nodes, the RCC must know which cards, ports, execs, and terminals are present. This information, contained in tables, is *static* because it is not changed autonomously by the RCC. Conversely, the RCC can change *dynamic* data, such as call processing. Static data is downloaded to the RCC when the RCC PM is busied and returned to service.

Static data updating now provides a tracking mechanism that

- Stores the severity level of the data mismatch condition against each XPM.
- Generates a message specifying the procedure required to update static data.
- Monitors maintenance actions performed on an XPM to clear or set the ISTb condition of static data mismatch.
- Monitors ODM changes that affect static data, in order to set an ISTb condition with a static data mismatch reason.

Computing module data sync

XPMs must adhere to several requirements to maintain system sanity. One of these requirements is that node and port tables in both units remain synchronized. Common tuples to both units must be referenced by the same internal indices and contain the same data. Maintaining identical indices in both units allows processes to communicate between units. Active processes continue functioning after a warm SWACT. When XPMs were originally designed, this synchronization was not difficult to maintain. As new functionalities have been introduced, preserving the synchronization of the mate unit node and port tables has become more difficult.

For basic loads, the link states data and P-side node and port states data must be included to ensure the RCC data is successfully initialized. Management of node table synchronization is coordinated in the XPM by forcing the inactive unit to order its node table the same as the active unit. This is accomplished by having the active unit send over a map of its node table during a bulk download of configuration data. The inactive unit uses the map to datafill its node table as data is received from the CM.

The node map is not used by the inactive unit to write dynamic updates. The inactive unit expects to receive its data in exactly the same order as the active unit. This assumes that once the inactive unit is running, its node and port tables always remain in sync with the active unit. However, units could lose synchronization if one unit lost an earlier dynamic update. It is possible the active unit contains a temporary interprocessor message link (IPML), used for broadcast loading, in its node table at the time a dynamic update was made. This causes the tables to be out of sync because temporary IPMLs are added only in the active unit's node table.

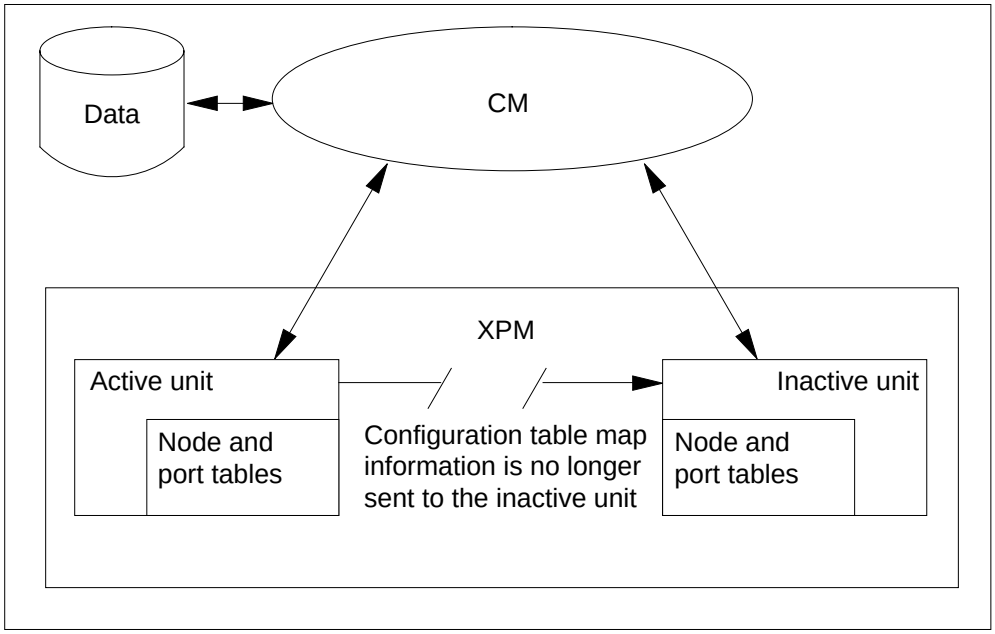
Node table sync enhancements

Table PMNODES, created by feature AF5678, XPM Node Table Sync Redesign, contains a list of all nodes in each XPM. This table transfers XPM node information to the new CM load during a software upgrade. This transfer ensures the new CM software contains the correct node order for each XPM that becomes active. The CM controls the sequence and datafill of node and port tables in both XPM units. Synchronization is maintained between the CM and the tables in both active and inactive XPM units. XPMs converted to this table management system, that no longer synchronize using mapping information sent from the active unit to the inactive unit.

Table PMNODES is a read-only table. Tuples are added and deleted by the system as related inventory tables, such as RCCINV and LCMINV, are datafilled. Attempts by a user to update this table directly are rejected. XPM resources are checked when a tuple for a subtending node is added or changed in an inventory table. Warnings are displayed when an XPM does not have the table space, port, or terminal resources to support the new requirements. For

a complete description of the datafill for table PMNODES, refer to the *XPM Translations Reference Manual*.

Figure 2-4 Enhanced XPM node table synchronization



A new software component, configuration data table (CDT) management, is added by feature AF5678. The CDT bind interface allows XPM applications to bind an aspect with their set of procedures to a CDT during initial program load (IPL). An XPM with a software load that is bound with the new CDT management system notifies the CM during an XPM node data audit. The CM starts a CDT audit every five minutes, which initiates the XPM node data audit in the XPMs.

The CDT / XPM node audits, converts XPMs that have compatible software loads into the new node table management control and verifies the sanity of XPMs that have been converted. To maintain backward compatibility XPMs with software loads, without CDT management capability, will continue to maintain mate unit synchronization as described earlier.

The CM is given control of both units of an XPM node under the following circumstances.

- The CDT / XPM node data audits have successfully updated the tuple(s) of that node in table PMNODES, to match the data and indices sequence of the tuples in the XPM node and port tables.
- The CM had control in a previous software load.
- A new XPM is added other than during a one night process (ONP) conversion. Nodes added during ONP are not new. They should be currently in service.

Note: When an office receives an initial software load with the new node table management system, the CM gains control of compatible XPM node and terminal tables during the next scheduled CDT / XPM node data audits. Even if an XPM is taken out of service (OOS), the CM does not assume control until the CDT / XPM audits successfully convert an XPM to the CDT management system and aligns the CM tables with the node tables.

The CM initiates the audit request to an XPM with a VERTUPLE message. The message has a parameter which identifies if the XPM should respond with a message with actual tuples of data or a checksum of the table. The tuples data is requested to supply the CM with the required information to convert an XPM to CDT management control. If differences exist between the active and inactive unit tables the CM aligns to the active units' table and sets the XPM in-service trouble (ISTb). After an XPM has been converted to CDT, a checksum of the table is always requested when the CDT audit is run.

Synchronization of XPM nodes under the CDT management system is verified using checksums of the node and port table data. The checksums are calculated by regenerating each tuple in the XPM table. After a tuple is formatted, the checksum is calculated for that tuple and added to the table checksum for that XPM. XPM checksums are verified against corresponding checksums generated in the CM. An out-of-sync condition, indicated by an incorrect checksum, causes that unit to be set ISTb. During the next audit cycle, if the unit checksum coincides with the CM checksum, the ISTb condition is cleared.

As the CM takes a more active role in maintaining the integrity of the node tables in XPMs, XPMs become less active. The XPM must accept the CM data as it is sent without corrections or adjustments.

- The XPM no longer derives node table data from a subset of data sent from the CM. The CM specifies all the data contained in the node and port tables and the XPM will simply store the data as it is received.
- The CM notifies operating company personnel if resources are not available on an XPM when inventory tables are changed, even if the XPM is ManB or OOS at the time the inventory tables are changed.
- The XPM no longer compares node tables between units. The CM ensures that the node tables in each unit match since it controls the content of each table. Configuration download occurs when both units are taken out-of-service and RTSed at the same time.
- Node and port table aspect and access routines were created to allow applications to access the data. Read-only access is provided to applications. Tuples in XPM tables continue to be dynamically updated from the CM while the XPM is InSv.
- A new external node number to internal node number look-up table is created in the XPM to provide fast conversion from external to internal node numbers and to eliminate the possibility of collisions.
- An enhanced messaging interface includes status information between the CM and XPM. The new interface contains:
  - — the ability to detect lost messages by adding a sequence number from 1 to 255 in the header.
  - — a byte of data transfer status information which informs the XPM if more messages are following.
  - — a count of tuples affected by the message.
  - — table format identification to identify the version of XPM table software. Backward compatibility is maintained by leaving the existing node table management software in the XPM until XPM06.

Enhanced Dynamic Data Sync (EDDS)

Dynamic data describes the link and node states, among other things, in the XPM necessary to support call processing. These states are normally set in the active unit of an XPM through the node and link RTS or state changes triggered by external stimuli. These states propagate to the inactive XPM unit through the bulk and individual messages of the XPM data sync mechanism.

EDDS is a necessary component of warm switch of activity (SWACT). A Warm SWACT preserves processing POTS calls. Warm SWACTs occur anytime the active unit of an XPM drops activity due to an XPM trap, REX test or other causes, preserving call and unit states so that calls continues without

interruption. For a warm SWACT to succeed the inactive unit must be in service (InSV).

If the inactive unit was previously out of service (OOS), either manually busy (ManB), system busy (SysB), or C-side busy (CBsy), the following events happen during a return to service (RTS).

- The inactive unit is initialized.
- OOS tests are run on the inactive unit.
- If the inactive unit static data check sum is incorrect the CM sends new static data and marks the inactive unit in-service trouble (ISTb).
- The active unit sends dynamic data to the inactive unit (bulk sync).
- The CM marks the inactive unit InSv.

Dual RCC

The following sections specify how the system ensures that the RCC can communicate to the host and how, if necessary, ESA and Dual ESA (DESA) are entered and exited.

When both RCCs of a dual pair are in ESA and the interlinks were in-service (IS) before ESA was entered, the RCC is considered to be in DESA. If a system RTS request is made for one of the RCCs in a dual pair, the request may act upon both RCCs.

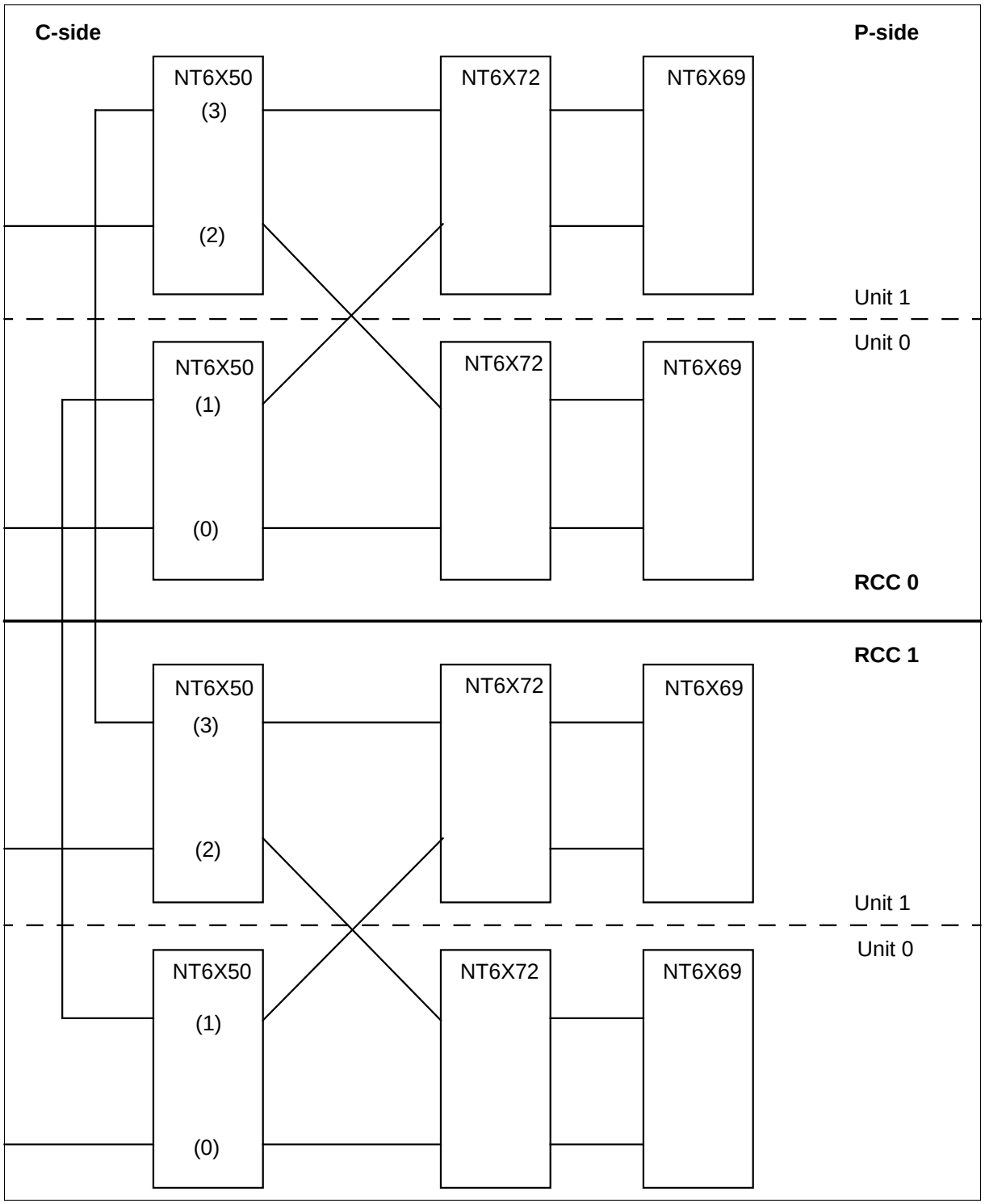
An RCC that is part of a Dual RCC (DRCC) is functionally the same as a Single RCC (SRCC) except that C-side DS-1 links include interlinks, as explained in the following section.

Overview of speech and message paths

The DRCC allows calls that originate on one RCC, and terminate on the interconnected RCC, to route directly over the interlinks once the call is set up. The two RCCs must be able to communicate with the host and with each other.

The DS-1 card (NT6X50), the formatter card (NT6X72), and the messaging card (NT6X69) are necessary for inter-RCC communication. The following figure is a functional view of inter-RCC communication. Refer to this figure while reading the following paragraphs.

Figure 2-5 Functional view of inter-RCC communication



Messaging during ESA (single and dual ESA)

When the DRCC enters DESA, the NT6X50, NT6X72, and NT6X69 cards allow both RCCs to synchronize and send messages to each other.

C-side connections to the host and interconnected RCC

The NT6X50 and NT6X72 are the host communication cards. In the DRCC, these cards also handle communication between the interconnected RCCs. On the NT6X50 cards, ports 0 and 2 handle the messaging links to the network (channel 1). On the DRCC, ports 1 and 3 handle the messaging links between the two RCCs (channel 2). These four messaging links are the minimum configuration for a DRCC.

Sending messages between the RCCs

When one RCC receives a message over a messaging link from the interconnected RCC, that message is routed to the NT6X69 of the active unit. The message card then examines the message and determines if the message is for the active or the inactive unit.

Maintenance messaging

For messaging channels, RCC software does the following:

- sends and receives messages across the interlinks, using DMSX protocol.
- handles intermessaging link faults detected by the messaging system.
- provides support when maintenance is performed on the messaging links

When a message passes from one RCC to the other, the messaging software sends the message to the firmware of the NT6X69 card to be transmitted. If the message cannot be sent to the interconnected RCC, for example, the link is closed or a timeout is in the DMSX protocol, the *rebounded* message is returned to the messaging software.

When a message rebounds, the message link is closed and the messaging software sends the message again over the other messaging link. XPM maintenance is then informed, and tries to RTS the faulty link. A PM181 log is generated.

Updating Inter-RCC link (IRlink) static data dynamically

Prior to feature AF6046, dynamic download of static data (SD) for IRLNKINV table, the interlinks information in table IRLNKINV was not dynamically downloaded to both RCCs of a dual RCC (DRCC). In order to download the interlinks information, the operating company maintenance personnel must busy and RTS the two RCCs, causing an E1 outage. The IRLNKINV table information was then downloaded to the master RCC and its spouse RCC, as part of the SD bulk download.

Feature AF6046 provides a process to dynamically reconfigure the interlinks between two in-service (InSv) RCC nodes in a dual configuration, while preserving stable interswitched calls. This feature provides the following functions:

1. Adds a new command, INTERSW, to the IRLINK MAP level in order to enable/disable interswitched calls for the posted RCC.
2. Enhances the BSY interlink MAP command to display the number of interswitched calls being reverted to the network using availavle C-side channels.
3. Enhances the QUERYIR interlink MAP command to display the status of the IRLINKS and the status of interswitching (enabled/disabled), capability of the posted RCC of a DRCC.
4. Enables dynamic downloading of IRLINKS static data to both RCCs interconnected in a dual configuration.
5. Enables dynamic downloading of ForceESA SD.

When the interlinks of a posted RCC of a DRCC are to be reconfigured (add, remove, or move), the interswitching capability must first be disabled by entering the IRLINK PM level MAP command, INTERSW DISABLE.

Example of INTERSW command to disable interswitching

```
>INTERSW DISABLE
```

and pressing the Enter key.

Confirming the disabling of the interswitching capability can be seen by entering the MAP command, QUERYIR. The QUERYIR command displays the status of the interswitching capability for the posted RCC, as shown here.

Example of enhanced QUERYIR command with interswitching disabled

```
>QUERYIR
```

Example of a MAP display:

```
Interswitching is DISABLED
IR   FROM        TO             C  ALRM SLIP FRME BER STATE
 0   RCC  0, 1   RCC  1, 1      .        0    0         OK
 1   RCC  0, 3   RCC  1, 3      .        0    0         OK
 2   RCC  0, 4   RCC  1, 7      .        0    0         OK
 3   RCC  0, 9   RCC  1, 9      .        0    0         OK
```

When the interswitching capability has been disabled, the maintenance technician is ready to begin reconfiguring the IRLINKS by entering the BSY command with the IRLINK number(s) to be reconfigured. The BSY command

is enhanced to display the number of interswitched calls to be reverted to the network using available C-side channels, as seen in the following example. Since C-side channels of the RCC is a limited resourse, reconfiguring the IRLINKS should only be performed during periods of low traffic, otherwise some interswitched calls may be lost if there is an insufficient number of available C-side channels.

Example of enhanced BSY command with interswitching disabled

```
>BSY 3
```

and pressing the Enter key.

Example of a MAP response:

```
67 interswitched calls will be reverted to the network.
Potential loss of calls on the interlink if there are no
available C-side channels.
```

If the INTERSW command is not performed before attempting to BSY a specified IRLINK, the maintenance technician will receive the following response on the MAP display.

Example of enhanced BSY command with interswitching enabled

```
>BSY 3
```

and pressing the Enter key.

Example of a MAP response:

```
interswitched calls should be disabled before an
interlink is busied.
```

With the IRLINKS manually-busied, the maintenance technician enters table IRLNKINV and enters the desired IRLINK configuration. The static data is immediately downloaded to both units of both RCCs of the DRCC, if the units are InSv.

When the DRCC IRLINKS are reconfigured, they should be RTS by use of the enhanced RTS command, which reminds the maintenance technician that interswitching is disabled. As can be seen in the following example.

Example of enhanced RTS command with interswitching disabled

```
>RTS 3
```

and pressing the Enter key.

Example of a MAP response:

```
 Be aware that Interswitching is Disabled.
```

The maintenance technician must re-enable the interswitching capability by use of the INTERSW ENABLE command as seen in the figure below.

Example of INTERSW command to enable interswitching

```
>INTERSW ENABLE
```

and pressing the Enter key.

The enabling of the interswitching capability for the posted RCC can be seen by entering the IRLINK level MAP command, QUERYIR, as shown in this example.

Example of enhanced QUERYIR command with interswitching enabled

```
>QUERYIR
```

Example of a MAP display:

```
 Interswitching is ENABLED
 IR   FROM        TO             C  ALRM SLIP FRME BER STATE
  0   RCC  0, 1   RCC  1, 1      .        0    0         OK
  1   RCC  0, 3   RCC  1, 3      .        0    0         OK
  2   RCC  0, 4   RCC  1, 7      .        0    0         OK
  3   RCC  0, 6   RCC  1, 6      .        0    0         OK
```

The IRLINKS and ForceESA static data are dynamically downloaded to both RCCs of the DRCC. However, ESA lines, trunks and ESA table control data, components of the ESA static data for both RCC must also be downloaded. For this reason, the units of both RCCs are set to in-service trouble (ISTb) with the reason `ESA STATIC DATA MISMATCH`.

The ESA static data may be manually downloaded at the PM level of the MAP display with the RCCs posted, by use of the LOADPM command with the sourse of `CC`, and file of `ESADATA`. The ESA static data may also be updated at the automatic nightly static data updates, as defined in the OFCENG table tuples, RSC_XPMESASDUPD_BOOL and RSC_XPMESASDUPD_HOUR.

Synchronization in DESA mode

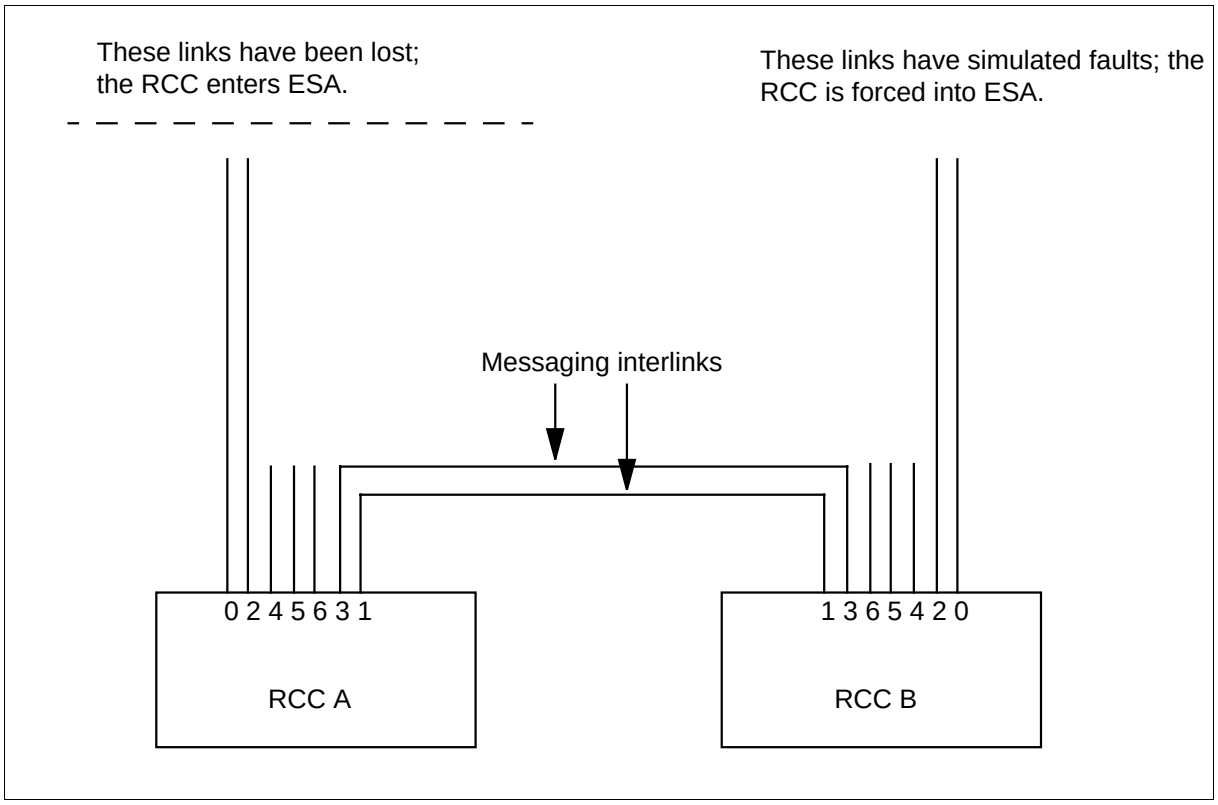
Both RCCs must be synchronized to the same source for calls to be interswitched between them. In normal operation, each RCC in the DRCC

follows the timing of its host line group controller (LGC) or line trunk controller (LTC). Because the timing element (a 125-microsecond frame pulse) is sent out to all nodes in the network, both RCCs are synchronized to the same source.

The RCC generates its own frame pulse using the NT6X72 card. This pulse is controlled by an internal XPM clock. This clock for the active unit dynamically adjusts to the network clock pulse so the RCC is in sync with the host.

When communication to the host is lost, the internal XPM clock for the active unit has no frame pulse to follow and thus goes into free-run mode. With the NTX380AA package, the RCC synchronizes to the interconnected RCC. The DRCC software determines which RCC is the source of the frame pulse. This RCC sends frame pulses over links 1 and 3 to the other RCC, as shown in the following figure.

Figure 2-6 Forced ESA



Initially, two scenarios were possible, as follows:

- *One RCC enters ESA.* As shown in the previous figure, the RCC in ESA (RCC A) synchronizes to the interconnected RCC (RCC B).

Synchronizing to the RCC still in sync with the network has the following advantages:

— If RCC B enters ESA, a DESA occurs more quickly.

— If RCC A exits ESA, the exit occurs more quickly because RCC A is already in sync to the network through RCC B.

Note: An RCC can enter ESA *and* maintain sync with the network if ESA was entered because of a loss of messaging to the host. Usually, however, the RCC enters ESA because of the complete loss of actual links.

- *Both RCCs enter ESA*. In this scenario, the DRCC enters DESA. Since the RCCs synchronize to each other, interswitched calls are allowed.

Forced ESA

The operating company can specify if RCC A enters ESA, RCC B and also enters ESA. In this case, the forced RCC sends an unsolicited message to the CC. The CC then marks that RCC SysB.

When both RCCs are in ESA, DESA is implemented and interswitched calls are allowed. Because RCC B is not truly in ESA, it can exit ESA under certain conditions. For example, if the RCCs can no longer exchange messages over the interlinks, RCC B starts a timer to prevent bouncing links. This timer is in parameter RSC_ESAENTRY_BADLINK in table OFCENG.

When the timer begins, one of the following actions occurs:

- If the interlinks resume messaging before the timer expires, the timer is cancelled and DESA is reestablished.
- If the interlinks do not resume messaging before the timer expires, RCC B exits ESA.
- If the timer expires so that RCC B exits ESA, but the interlinks then resume messaging, RCC B is forced back into ESA.

When an RCC is forced into ESA, the following occurs:

1. RCC A sends an unsolicited message to RCC B requesting a FESA. This message is sent only if RCC A and RCC B can communicate.
2. When RCC B receives the message, it checks to see it is not entering or already in ESA, that force down is enabled, and that its' CC message links are open. Should this occur, RCC B
   a. Formats and sends a message to the CC informing it of a FESA entry.
   b. Formats and sends a message to the host XPM, closing messaging to the RCC.
   c. Initiates the ESA entry process.
3. The CC takes RCC B out of service (OOS) when the unsolicited message arrives.
4. The state of RCC B is set to SysB.

When both RCCs of a DRCC are in DESA, and the force down option is enabled, both RCCs must be capable of exiting ESA before a system ESA exit is initiated. This is true for either a warm or a cold exit from ESA. When a warm ESA exit is possible, preserving calls is a higher priority than returning the DRCCs to service.

The following conditions cause a warm exit to abort:

- The configuration is in DESA, but the CC cannot communicate with one of the RCCs.
- The configuration is in DESA, but one of the RCCs is ManB or OffLine.
- Communication is lost at any point in the warm DESA process.
- DESA status is lost during the system exit timeout query loop.

When the exit is aborted, a printed log indicates that the RCCs can be RTS by manual action.

Interswitched calls are preserved over a warm exit only when the exit is system initiated and the FESA option is enabled.

The system RTSs both RCCs to determine either if the RCC with the FESA option can be enabled to be in DESA, or if RTS can be enabled for both RCCs of the dual pair. If neither scenario is possible, the system RTS request is submitted as always on the single RCC.

The dual system RTS request queries each RCC of the dual pair to determine its status. The ESA state of both RCCs determines what action is taken. The possible conditions and the corresponding actions are as follows:

- If neither RCC is in ESA, the System tries to RTS each RCC independently.
- If the RCC is in ESA, but its spouse RCC is not, the system tries to RTS both RCCs independently.
- If both RCCs are in ESA, but not in DESA, the system tries to RTS both RCCs independently. If only one RCC can exit, it will do so, leaving its spouse RCC in ESA. When the RCC cannot enter DESA, there is no advantage in either having them RTS together, or in causing the one that can exit to remain in ESA.
- If both RCCs are in DESA, both will exit or both will remain in DESA.
  - — If the CC can communicate with both RCCs and both RCCs can exit warm, the RCCs exit ESA simultaneously.
  - — If the CC can communicate with both RCCs, but one or both of the RCCs must exit cold, the RCCs are RTS independently.
  - — If the CC cannot communicate with both RCCs, two PM181 logs are generated stating the RCCs failed to RTS. The ESA exit is reattempted on the next audit cycle.

Messaging in DESA mode

While a DRCC is in DESA, messages continue to pass between the two RCCs.

1-Meg Modem Service (1MMS)

The RSC supports the IMMS from frame-based LCMs and RLCMs that connect to RSCs. The 1MMS provides high-speed, data-over-voice communications over standard telephone lines to the home or small-office subscriber. The service provides the following functionality:

- high bandwidth with line transport rates up to 1280 kilobits per second (Kbps) downstream and 320 Kbps upstream
- simultaneous data and voice connection
- continuous data connection
- data traffic routed to data networks, which reduces congestion on the voice switch

The 1MMS uses a digital subscriber line (DSL) technology to provide the increased bandwidth with current office equipment and the subscriber loop. In this document, the term xDSL refers to all the different DSL technologies.

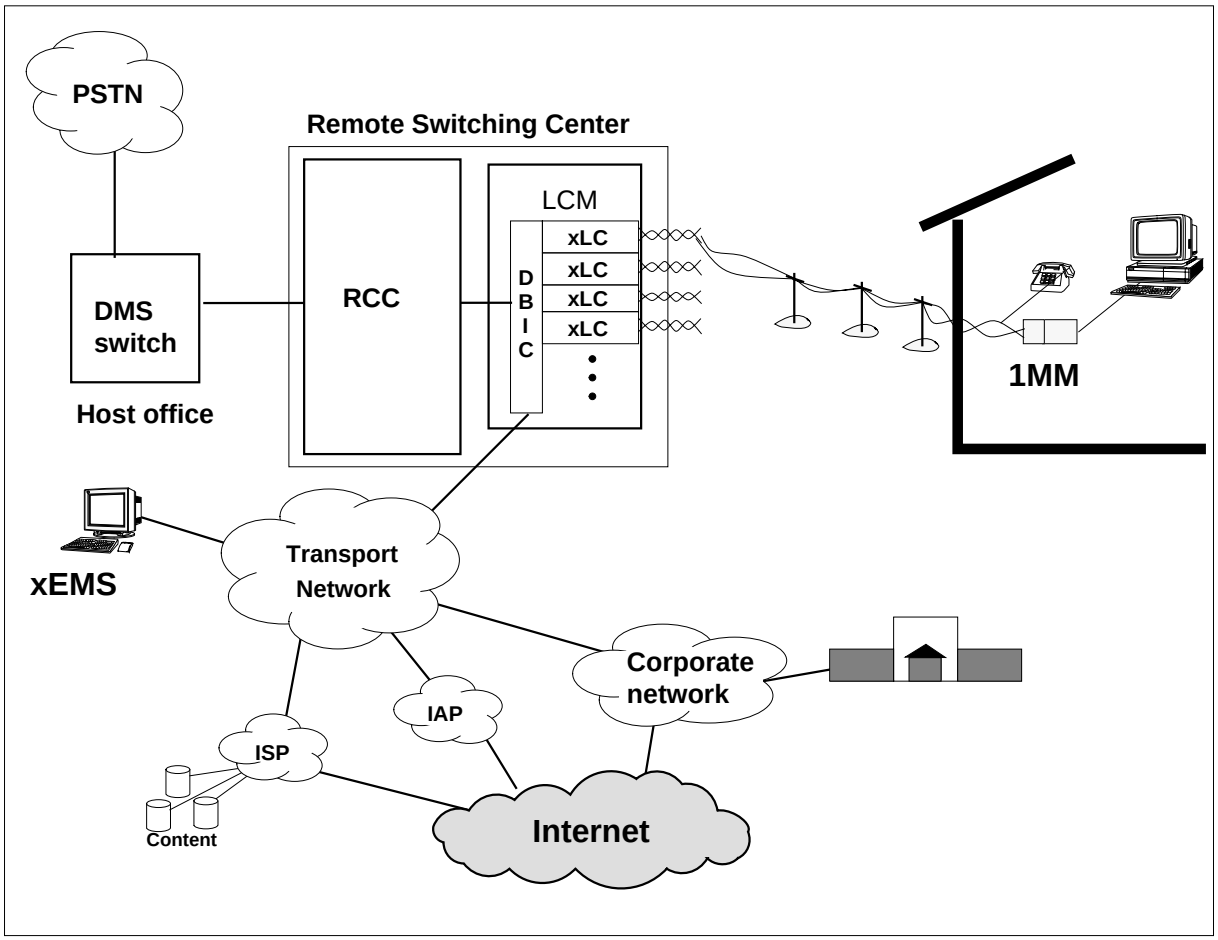
Components

The 1MMS includes the following components:

- The 1-Meg Modem (1MM) is customer premises equipment (CPE) that connects the telephone line, extension telephone, and computer. To the subscriber, the modem installs like a regular voice band modem, except the modem uses a 10BaseT Ethernet connection to the computer. Voice and data circuits are kept separate on the loop. This separation allows simultaneous voice and data traffic with no impact to other telephony features.
- The xDSL line card (xLC) (NTEX17AA or NTEX17BA) replaces the subscriber's line card in an existing line concentrating module (LCM) drawer. The card provides full voice service in parallel with high speed data communication with the 1MM.
- The data-enhanced bus interface card (DBIC) (NTEX54AA or NTEX54AB) replaces the existing bus interface card (BIC) in the existing LCM drawer. The card is a concentrator for the voice and data connections within a single LCM drawer. The card also separates the voice and data traffic for routing to the correct networks.
- The xDSL Element Management System (xEMS) provides operations, administration, maintenance, and provisioning (OAM&P) functions from a Hewlett-Packard (HP) or Sun workstation. Based on HP OpenView, the xEMS is a graphical user interface (GUI) that uses icons and pull-down menus. Refer to *1-Meg Modem Service Network Implementation Manual*, 297-8063-200, for more information on xEMS.
- The transport network provides the connection to the service providers. Refer to *1-Meg Modem Service Network Implementation Manual*, 297-8063-200, for more information on transport networks.

The following figure illustrates a network with the 1MMS.

Figure 2-7 Telephone network with 1MMS



The LCM line drawer contains the DBIC and xLCs. One LCM can hold up to 10 line drawers. Each line drawer can hold one DBIC and up to 16 xLCs. The line cards can be a mix of xLCs and plain old telephone service (POTS) line cards. Each 1MMS subscriber has an xLC. Each line drawer with xLCs must have a DBIC to provide data service. Each DBIC provides a 10BaseT Ethernet connection to the transport network for all subscribers in the LCM line drawer.

An LCM can have a maximum of ten 10BaseT connections for all its 1MMS subscribers. The configuration of the transport network can require these Ethernet interfaces to connect to a mix of network components. The flexibility of the 1MMS allows you to change the interface to public and private wide area networks (WAN) to meet your requirements. Examples of WANs are Internet access providers (IAP), Internet service providers (ISP), and corporate networks.

Potential applications

Potential applications of the 1MMS include the following:

- work-at-home

  The subscriber uses the 1MMS, including the transport network, to connect to their corporate network.

- Internet access

  The subscriber uses the 1MMS, including the transport network, to connect to their ISP.

- small office communications

  The subscriber uses the 1MMS, including the transport network, to connect to their corporate network. Two small offices can communicate through the 1MMS and depend on on the transport network for interconnection.

Compatibility

This section describes compatibility between the 1MMS and other services.

Voice services The 1MMS shares many components with the existing voice service. Some of these components are the following:

- LCE hardware, including power supplies and distribution
- the line drawer and the cards in the line drawer
- the subscriber's copper loop

Other data services The 1MMS can function with the following data services in the same binder group:

- integrated services digital network (ISDN) basic rate interface (BRI)
- asymmetric digital subscriber line (ADSL)
- high bit rate digital subscriber line (HDSL) services

The 1MMS can function with T1 services in adjacent binder groups.

Ethernet The 10BaseT interfaces at the 1MM and the DBIC meet standard *ANSI/IEEE Standard 802.3* with one exception. The 1MM does not support the truncated binary exponential backoff algorithm described in section 4.2.3.2.5 of the IEEE802.3 specification. This exception allows the best use of the bandwidth on the 10BaseT link. This exception also confirms a standard allocation between multiple users.

1MMS components

The following section describes some of the components in the 1MMS.

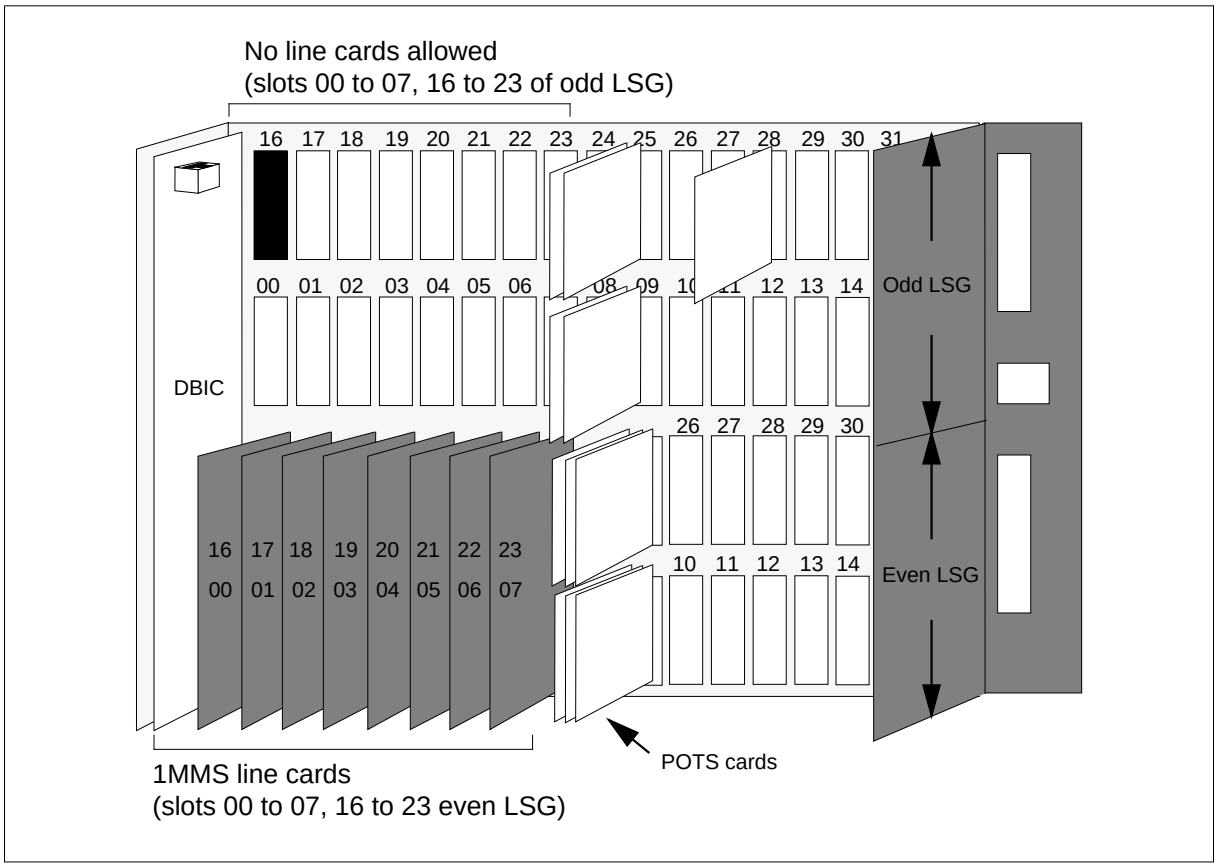
xDSL line card (NTEX17AA or NTEX17BA) The xDSL line card (xLC) provides full voice service and high speed data communication with a subscriber's 1MM.

The xLC has the following features:

- located in a standard LCM line drawer with 1MMS capability
- provides standard voice service using the world line card (WLC)
- provides xDSL modem function over loops up to 18,000 feet on 26 American wire gauge (AWG) wire and 24,000 feet on 24 AWG wire
- rate-adaptable in both downstream (DS) and upstream (US) directions
- QAM modulation in both DS and US directions
- supports both narrowband and wideband DS spectra low and high transmission levels
- raw transport downstream data rates of 1280 kbit/s to 80 kbit/s
- raw transport upstream transport data rates of 320 kbit/s to 40 kbit/s
- provides an XLBUS interface to backplane
- -48 V power to data part of card
- self-identifying to DBIC on installation
- out-of-service data loopback capability for OAM
- low power design
- occupies a two-slot form factor

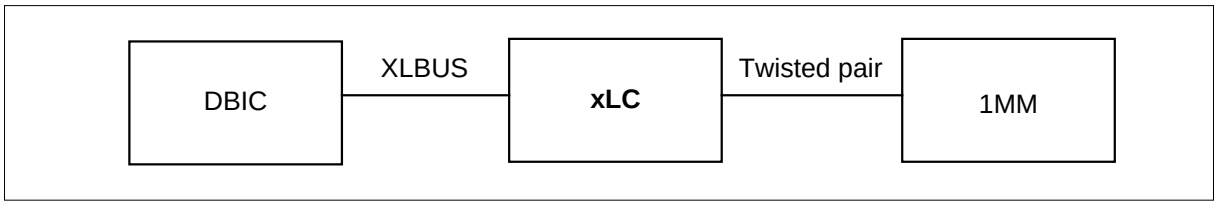
The xLC is a two-slot line card that located in the LCM line drawer. The xLC replaces the existing line card for the subscriber. The line drawer can include only xLCs or a mix of xLCs and POTS line cards. The following figure illustrates an LCM line drawer with xLCs.

Figure 2-8 LCM drawer with mix of xLCs and POTS line cards



The xLC terminates the subscriber's line and transmits the call to the DBIC for multiplexing. The following figure illustrates the xLC in the 1MMS.

Figure 2-9 xLC in 1MMS



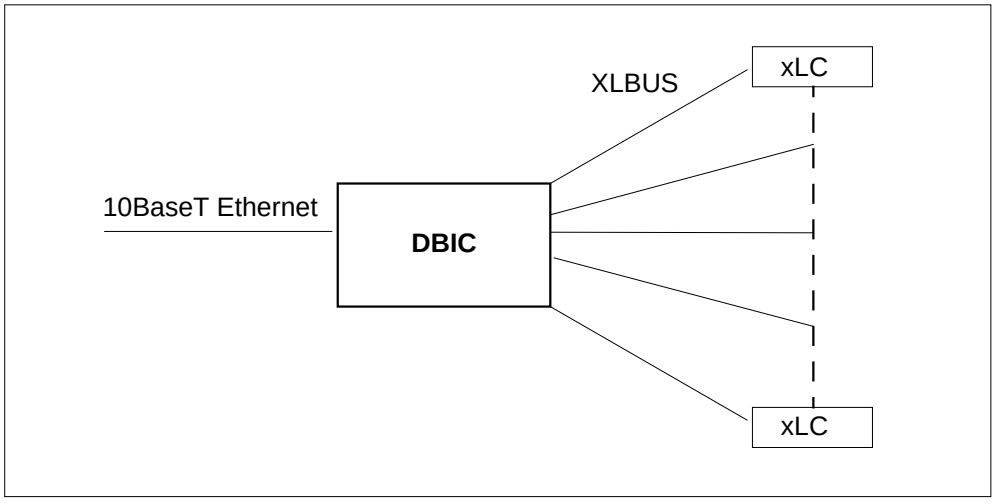
Data-enhanced bus interface card (NTEX54AA or NTEX54AB) The DBIC replaces the existing BIC in each LCM drawer with an xLC. The DBIC separates the voice and data traffic. The card multiplexes the voice traffic to standard DS-30A interfaces to the existing circuit switched voice network. The card multiplexes the data traffic to one 10BaseT Ethernet connection to the transport network.

The DBIC has the following features:

- half duplex, standard compliant 10BaseT interface
- maximum of 16 xLCs in a drawer
- connected to all line card slots through XLBUS
- backwards compatible with all POTS line cards compatible with the NT6X54AA
- different media access control (MAC) addresses for each xLC and DBIC
- demultiplex 64 voice channels from receive data (RD) links to XLBUS links
- multiplex 64 voice channels from XLBUS links to transmit data (TD) links
- +12.7v CODEC reference to all 64 line positions
- controls ring bus and automatic number identification (ANI)/COIN voltages using relays

Any LCM line drawer that contains xLCs must have a DBIC. The following figure illustrates the DBIC in the 1MMS.

Figure 2-10 DBIC in 1MMS



RSC ESA firewall

An RCC enters ESA when communication to the C-side node is lost. When this happens, the RCC node is marked CBsy. CBsy indicates that either the C-side node or C-side links are OOS. DMS system actions are not permitted on a CBsy node. This effectively provides a firewall and protects the RCC from any detrimental system actions. When communication with the C-side node is restored, the RCC is marked SysB, so that the system can restore the node fully to an InSv state, (usually through an ESA warm exit).

When a DS-1 link on the C-side of an RCC is broken, the link goes SysB and the unit goes CBsy. If no other message supporting links are available, the node also goes CBsy. This status remains until one or more message supporting links are restored. At that time, the link goes InSv and the RCC node or unit goes SysB with a SysB reason of “CSLink RTS". The node or unit is then RTSed or exits ESA by the DMS system.

Feature AF6240 prevents a CBsy node from going SysB when the C-side links are SysB and futher to prevent a SysB link from going to a state of “OK" without first verifying C-side communications. This feature alters the way in which system maintenance recovers a CBsy RCC. Instead of the CM forcing a CBsy node to SysB, the system waits for carrier maintenance to recover the DS-1 link(s) and then recovers the RCC node or unit.

Feature AF6142 enhances ESA service by the following actions:

- enhancements to the commands at the RCC level of the MAP display to prevent detrimental human machine interface (HMI) request to an RCC in ESA
- The ESA condition is displayed at the MAP terminal when an RCC is found in ESA
- new and modified log reports.

The following enhanced MAP display commands perform an ESA query prior to executing a command to an RCC that may be in ESA.

- BSY
- TST
- RTS
- LOADPM
- QUERYPM
- PMRESET
- XPMRESET
- RECOVER

The DMS system response to the above commands provide the operating company personnel better information of the RCC ESA status, thus improving RCC maintenance and preventing accidential outages through unnecessary maintenance actions.

BSY command

An RCC in ESA may still be busied however, the operating company personnel must respond to a new warning such as:

Example of a MAP response:

```
>BSY PM
WARNING – The RCC is in ESA.
A manual ESA exit is required if the RCC is
busied.

Please confirm (“YES”, “Y”, or “NO”, “N”):
>Y

A manual ESA exit is now required.
To attempt ESA exit, type RTS WARMEXIT
```

Command syntax

```
Parms: <DEVICE> {UNIT <UNIT_NO> {0 TO 1}
                      [<CMR> {CMR}],
                 PM [<CMR> {CMR}],
                 LINK <PSIDE_LINK> {0 TO 63},
                 INACTIVE}
       [<FORCE> {FORCE}]
       [<NOWAIT> {NOWAIT}]
       [<ALL> {ALL}]
```

TST command

If an RCC is in an ESA mode, enhancements to the TST command prevents the actions, such as below, from being implemented:

Example of a MAP response:

```
>TST PM
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
```

or

```
>TST UNIT 1
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
```

or

```
>TST UNIT 0
RCC 0 Unit 0    Request Invalid
                RCC is in ESA
```

The CM rejects the test request because this HMI command is detrimental to the service of the RCC operating in the ESA mode.

Command syntax

```
Parms: <DEVICE> {UNIT <UNIT_NO> {0 TO 1}
                      [<ROM> {ROM}]
                      [<CMR> {CMR}]
                      [<ALL> {ALL}],
                  PM [<ROM> {ROM}]
                     [<CMR> {CMR}]
                     [<ALL> {ALL}],
                  LINK <PSIDE_LINK> {0 TO 63},
                  REX <REX_ACTION> {ON,
```

RTS command

The enhancements replace the system driven ESA exit with a manual ESA exit driver. It halts processing when an error condition is encountered and better informs the operating company personnel regarding failures and alternative actions. The command syntax and responses are:

Example of a MAP response:

```
>RTS PM COLDEXIT
WARNING
COLDEXIT causes all stable calls to be lost
WARMEXIT allows stable calls to survive ESA exit

            or

>RTS PM EXITBYPASS
WARNING
EXITBYPASS bypasses ESA exit
All stable calls and ESA OM data will be lost
WARMEXIT allows stable calls to survive ESA exit.
```

Command syntax

```
Parms: <DEVICE> {UNIT <UNIT_NO> (0 TO 1)
                    [ <NODATASYNC> (NODATASYNC)]
                    [ <CMR> (CMR)],
                PM  [ <CMR> {CMR}],
                LINK <PSIDE_LINK> (0 TO 63),
                    ACTIVE
                    INACTIVE  [ <NODATASYNC> {NODATASYNC}],
                       SYSB)
        [<FORCE>    {FORCE}]
        [<EXIT>     {WARMEXIT,
                    COLDEXIT,
                    EXITBYPASS}]
        [<NOWAIT>  {NOWAIT}]
        [<ALL>  {ALL}]
```

Three new parameters are added to the RTS command they are:

- WARMEXIT
- COLDEXIT
- EXITBYPASS

Examples of responses to the WARMEXIT parameter include:

Example response to WARMEXIT parameter:

```
>RTS PM WARMEXIT

ESA warm exit passed
```

or

```
Request Invalid
PM not in ESA
```

or

```
Request Invalid
PM does not support warm exit
COLDEXIT option must be used
```

or

```
ESA warm exit failed
No response from PM.
Check MSG LINKS at TRKS;CARRIER level.
Attempt WARMEXIT after links are verified.
```

or

```
ESA warm exit failed
Execs are invalid
COLDEXIT option must be used.
```

or

```
ESA warm exit failed.
Static data was changed.
COLDEXIT option must be used.
```

Examples of responses to the COLDEXIT parameter include:

Example response to COLDEXIT parameter:

```
>RTS PM COLDEXIT
WARNING
COLDEXIT causes all stable calls to be lost
WARMEXIT allows stable calls to survive ESA exit.

Please confirm (“YES”, “Y”, “NO”, or “N”):
>Y

ESA COLD exit passed
```

or

```
Request Invalid
PM not in ESA
```

or

```
ESA COLD exit failed
No response from PM
Check MSG links at TRKS;CARRIER level
Attempt EXIT after links are verified
```

Examples of responses to the EXITBYPASS parameter include:

Example response to EXITBYPASS parameter:

```
>RTS PM EXITBYPASS
WARNING
EXITBYPASS bypasses ESA exit
All stable calls and ESA OM data will be lost
WARMEXIT allows stable calls to survive ESA exit.

Please confirm (“YES”, “Y”, “NO”, or “N”):
>Y

RTS passed
```

or

```
Request Invalid
PM not in ESA
```

or

```
RTS failed
No response from PM
Check MSG links at TRKS;CARRIER level
Attempt EXIT after links are verified
```

LOADPM command

The enhancements prevent a LOADPM command execution on an RCC that is known to be in ESA. It also prevents ESA static data from being loaded into an RCC operating in simplex mode with valid ESA static sata in the active unit. The command syntax and responses are:

Example of a MAP response:

```
>LOADPM PM
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 0    Request Invalid
                RCC is in ESA

Try LOADPM INACTIVE to load inactive unit or Try
RTS WARMEXIT tp force PM out of ESA then LOADPM

           or

>LOADPM UNIT 0 CC ESADATA
RCC Unit 0      Request Invalid
                Node is ISTb

ESA Data download aborted due to lack of node
redundancy.
Existing ESA static data is valid
```

Command syntax

```
Parms: <DEVICE> {UNIT <UNIT_NO> {0 TO 1},
                 PM,
                 INACTIVE,
                 ACTIVE}
       [<SOURCE> {CC [<MODE> {FULL,
                              DATA,
                              EXEC,
                              ESADATA,
                              CMR,
                              FIRMWARE,
                              XPMSTOR}]
                     [<FILE> STRING],
                  LOCAL [<MODE> {IMAGE,
                                 LOADFILE}]
                        [<FILE> STRING]}]
       [<FORCE> {FORCE}]
       [<NOWAIT> {NOWAIT}]
       [<ALL> {ALL [<RFILE> STRING]}]
```

QUERYPM command

The enhancement adds a new parameter to the QUERYPM command of ESA. The enhancement also denies QUERYPM CNTRS request when the RCC is in ESA. This prevents the reset sent down to query the counters if the RCC is SysB. The enhancement also display the current ESA status information and office parameters configuration from the office engineering table, OFCENG.

Example of a MAP response:

```
>QUERYPM CNTRS
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 0    Request Invalid
                RCC is in ESA

            or

>QUERYPM ESA
RCC ESA Subsystem Status

ESA static data is valid
Expected ESA exit is Warm
Dual ESA entry force down is Enabled
RCC 0 is in ESA

OFCENG RSC_ESA Office Parm Configuration

Nightly ESA static data downloading is Enabled
Nightly ESA static data download at 1 am
ESA exit requires manual intervention
ESA exit will be performed by the system
ESA exit timer set at 60 seconds
ESA dial tone notification is Enabled
```

Command syntax

```
Parms: [<OPTION>    {ESA,
                    FLT,
                    CNTRS,
                    FILES,
                    DIAGHIST [<OPTHIST>     {DIAG,
                                            CARD,
                                            RESET}]}]
```

PMRESET command

The enhancement allows the PMRESET command to bypass the ESA firewall on the RCC that is known to be in ESA. Resetting an RCC in ESA drops all stable calls for the ESA exit procedure.

Example of a MAP response:

```
>PMRESET PM
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 0    Request Invalid
                RCC is in ESA

Use EXITBYPASS option to force reset PM in ESA.

           or

>PMRESET PM EXITBYPASS
WARNING
EXITBYPASS allows the RCC in ESA to be reset.
The PMRESET will drop the RCC out of ESA.
All stable calls and ESA OM data will be lost.

Please confirm ("YES", "Y", "NO", or "N"):
>Y
```

Command syntax

```
Parms: <DEVICE> {UNIT <unit_no> {0 TO 1},
                     PM}
        [<OPTION>   {NORUN,
                     NODATA,
                     EXITBYPASS}]
```

XPMRESET command

The enhancement allows the XPMRESET command to bypass the ESA firewall on the RCC that is known to be in ESA. Resetting an RCC in ESA drops all stable calls and discards all ESA operational measurements data for the ESA exit procedure.

Example of a MAP response:

```
>XPMRESET PM
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 0    Request Invalid
                RCC is in ESA

Use EXITBYPASS option to force reset PM in ESA.

           or

>XPMRESET PM EXITBYPASS
WARNING
EXITBYPASS allows the RCC in ESA to be reset.
The XPMRESET will drop the RCC out of ESA.
All stable calls and ESA OM data will be lost.

Please confirm ("YES", "Y", "NO", or "N"):
>Y
```

Command syntax

```
Parms: <DEVICE> {UNIT <unit_no> {0 TO 1},
                 PM}
        [<OPTION>   {NORUN,
                     NODATA,
                     EXITBYPASS}]
```

RECOVER command

The enhancement allows the RECOVER command to bypass the ESA firewall on the RCC that is known to be in ESA. Recovering an RCC in ESA drops all stable calls and discards all ESA OM data for the recover procedure. If the RCC has NT6X45BA hardware or later this command can determine if the RCC has been loaded since power up. If the RCC has not been loaded since power up, it will be loaded and returned to service. If the RCC is in ESA and the EXITBYPASS option is not specified, an ESA exit is attempted. Otherwise an RTS is executed.

Example of a MAP response:

```
>RECOVER
RCC 0 Unit 1    Request Invalid
                RCC is in ESA
RCC 0 Unit 0    Request Invalid
                RCC is in ESA

Use EXITBYPASS option to force reset PM in ESA.

           or

>RECOVER PM EXITBYPASS
WARNING
EXITBYPASS allows the RCC in ESA to be reset.
The RECOVER will drop the RCC out of ESA.
All stable calls and ESA OM data will be lost.

Please confirm ("YES", "Y", "NO", or "N"):
>Y
```

Command syntax

```
Parms: [<NOWAIT> {NOWAIT}]
        [<ALL> {ALL}]
        [<EXITBYPASS> {EXITBYPASS}]
```

Enhanced PM log reports

Some enhancements are made to the logs generated by the ESA exit process, refer to the *DMS-100 Logs Reference Manual* and the *Extended Peripheral Module Logs Reference Manual (DS-1)* for detailed information on these log enhancements.

RSC ESA Exit simplification and recovery of the inactive unit

Feature AF6244 improves the reliability and reduses down time of single and dual RCCs by:

- Restructuring and simplifying the RSC ESA exit procedures.
- Providing a new interface to the ESA exit procedures for the RSC ESA HMI.
- Giving the single RSC ESA exit drivers the ability to recover an inactive unit prior to an ESA exit.

The ESA exit procedure and the ESA exit drivers are restructured such that the manual ESA exit driver, the system ESA exit driver and the dual ESA exit driver use the same ESA exit procedures.

A manual ESA exit driver, which uses the restructured common RSC ESA exit procedures, is provided to support the improvements to the RSC ESA exit HMI. This manual driver also returns additional error information so the RSC ESA HMI can determine what has occurred when the ESA exit fails so the operating company personnel can be advised as to what should be done next.

The ability to recover an at task inactive unit of the RCC prior to an ESA exit, permits a system warm ESA exit to proceed. When communication has not been restored to the active unit, an ESA warm SwAct is not possible. After the inactive unit is recovered an ESA warm SwAct to warm exit is possible. The RCC can be returned to service without an outage and without waiting for the message link to the active unit to be restored.

This feature also RTSes the inactive unit of the RCC when, the only unit of the RCC that the CM can communicate with, is at ROM level. After being RTSed, the ESA state of the RCC should be determinate. If the RCC is found in ESA it performs a warm exit from ESA and return the RCC to service without an outage. Previously the RCC would remain in ESA until manual actions recovered the RCC.

When the single or dual RCC is in ESA, it is queried every ten seconds as long as it remains in ESA. After it has been queried for the amount of time specified in the Office Parm RSC_XPMESAEXIT, the exit is initiated. For cold ESA exit, this is simply requesting that the ESA exit message be sent and the ESA OMs collected. The single RCC is then turned over to Base XPM Maintenance to be RTSed.

For a warm ESA exit, the instant RTS of the single or dual RCC and its subtending nodes is initiated. Once the single or dual RCC and subtending nodes are in service, the procedure to setup the ESA calls is run. The ESA OMs are then requested and the RCC is turned over to Base XPM Maintenance to be RTSed if required.

Fault conditions

This section divides the remote switching center into components and specifies the fault conditions of each component. The links used (DS-1, DS30A) are also defined as components.

- *traps* Traps are interrupts that are generated when there is a hardware or software error. Traps occur when CC receives an unsolicited gain message from the newly active unit.
- *software errors (SWERR)* A SWERR is an error attributed to software.

- *parity faults*
  - — *intermittent faults* occur when a fault is detected, but no error is found during the reread of the location.
  - — *soft faults* occur when a parity error is detected, and an error is found when the RCC tries to reread the location. However, no error is found when the RCC tries to write to the location. The error can occur in either the program store (PS) or memory store.
  - — *hard faults* occur when the RCC detects a fault and can neither reread nor write to the memory location. In this case the hardware is faulty, and the associated memory card must be replaced to correct the fault.
- *exception faults* An exception is a special condition at either the ROM or task level that preempts normal processing. Exception handling includes exception detection, data capture and recovery. Exception services include exception administration, reporting, and data access and display.

Both internal and external conditions can cause exceptions. Internal conditions that can cause an exception are

- illegal instructions
- address errors
- tracing
- breakpoints
- coprocessor protocol violations

External conditions that can cause an exception are

- interrupts from external devices
- bus errors
- coprocessor-detected errors
- resets

Exceptions which are error conditions and must be serviced are shown in the following table.

Table 2-5 XPM error type and description (Sheet 1 of 3)

Type	Fatal	Description
1	No	Value range error
2	No	Segment not present
3	No	Exit from uncalled procedure

Table 2-5 XPM error type and description (Sheet 2 of 3)

Type	Fatal	Description
4	No	Stack overflow
5	No	Floating point
6	No	Division by zero
7	No	Nil pointer reference
8	No	(Not used)
9	No	(Not used)
10	No	I/O error—result of system procedure IOCHECK
11	No	String
12	No	String indexing
13	No	Set error
14	No	Bad CSP (unimplemented standard procedure)
15	Yes	Bad P-code instruction
16	No	Task error
17	Yes	Request for reset—Trap 7
18	No	(Not used)
19	Yes	Parity error
20	No	Addressing error
21	No	Illegal instruction
22	Yes	Spurious interrupt
23	No	Bus error
24	No	MMU error
25	No	(Not used)

Table 2-5 XPM error type and description (Sheet 3 of 3)

Type	Fatal	Description
26	No	Privilege violation
27	Yes	Sanity timeout

Exception processing system

Feature AF5680, Exception Processing System Enhancements, provides enhancements in exception handling and exception services that significantly improves RCC robustness. This feature supports the following functions:

- elimination of trap data loss when multiple traps occur during a 10-second period
- accurate capture of trap-specific data
- guaranteed survival of trap data over restarts and reloads
- capture of both supervisor and user stacks at exception time
- circular buffer management at exception time
- enhanced trap administration
- expanded trap-specific error information to accommodate parity fault requirements; the exception processing system will report parity faults to the parity audit rather than to the CC
- saving the trap system version for each trap
- traceback support on patched procedures

ROM level exception processing

After initialization, the firmware maps all vectors to local exception handlers to provide:

- minimal error recording and reporting
- establish a bootstrap environment
- debug utilities
- hardware abstraction

Task level exception processing

Task level exception processing will report critical information on hardware and software states in the event of a hardware or software fault that prevents normal operation of the XPM unit. The process will then restore the task to a known point of execution, and allow the task to perform recovery actions. If recovery is not possible, the task level exception processing will initiate local maintenance to restart or reset the XPM unit.

Exception data structure improvements

Modifications are made to the processing system data structure to support

- a task eliminating loss of trap data when multiple traps occur during a 10-second period
- accurate capture of trap specific data
- guaranteed survival of trap data over restarts and reloads
- capture of both supervisor and user stacks at exception time
- circular buffer management at exception time
- enhanced trap administration functions
- expanded trap specific error information to accommodate parity fault requirements, the exception processing system will report parity faults to the parity audit rather than to the CC
- saving the trap system version for each trap
- trace-back support on patched procedures

Exception recovery action

The exception processing system interacts with the CC, PMDEBUG, and local maintenance in the CPM to recover from error exceptions and to report and display information about error exceptions. Exception recovery consists of the following operations:

- severity (fatal or recoverable)
- process fatal trap
- recover task (non-fatal trap)

When the exception processing system detects a fatal error, local maintenance action is initiated to drop activity (active unit only) and to reset or restart the XPM unit. When the XPM is in an InSv state, it will report exception errors to the CC in the form of unsolicited messages and generate a report for each unreported exception in the trap buffer. The CC receives the report, acknowledges the message, and autonomously logs into PMDEBUG to extract the exception information. The CC generates a PM185 log report for each trap. PMDEBUG provides the ability to view and delete exception data from the trap buffer at the task level. Changes are made in the display routines to accurately reflect data capture variations for required enhancements. An example of the PMDEBUG Debug, Trapinfo level display is shown in the following figure. At the ROM level, exception data can only be displayed as a hex dump.

Figure 2-11 Example exception display with enhancements

```
Ram Load name = NLT02WY
MP rom name = XPMRKA03, SP rom name = XPMRKA03
trap in MP : Div by 0
Trap was Recoverable. Unit was Active/Busy
Task: BASEMON 0009 0009 Trap Sequence #: 1 Current load
PP Time : 00:00:22:04.70
Occurred at : 001951DF DEBUG 21 DOZERODI 115 Offset: #21
Called from : 000D8A80 BASEMON 18 TDRIVBOD 30 Offset: #228
 000D8B8C BASEMON 18 TERMDRIV 11 Offset: #18
PC:000010AA SR=2100 US=0001FEB2 SS=001ABFF6 TCB=0001F00C
D0 =0000FFFF D1 =00090000 D2 =FFFF0101 D3 =0000FF00
D4 =000100FF D5 =FFFF0009 D6 =00000B0D D7 =001A0000
A0 =0001F924 A1 =0001F92C A2 =0001FEB2 A3 =001951DF
A4 =000A6F6E A5 =0001FEC2 A6 =000F9BC2 A7 =001ABFF6
System Stack:
0017ABFF6: 0004 0000 0006 0001 F00C 000A 000A 0998
0017AC006: 0004 0000 0006 0001 F00C 000A 000A 0998
User Stack:
0001FEB2: 0004 0000 0006 0001 F00C 000A 000A 0998
0001FEC2: 0004 0000 0006 0001 F00C 000A 000A 0998
0001FED2: 0004 0000 0006 0001 F00C 000A 000A 0998
```

When the recovery process is complete, the exception reporting system is notified that new trap data is available and exception handling is complete. At this stage, the recovery process will have either setup the trapped task for recovery and allow it to be resumed, or it will have initiated a maintenance action to restart or reset the unit.

In the event the trap is not fatal, the convicted task will be restored to a point of execution that will allow the task to restore itself to a known state. The process of recovery does not consist of restarting the task, but of forcing the task to perform a multilevel exit back to the task mainline.

The task recovery model specifies that a task provide a mainline, which is a continuous loop, that repeatedly calls the main body of the steady state code and follows with an optional call to a recovery procedure. When the task is resumed following a recoverable trap, it will be forced to return to the next instruction following the call to the main body of code. The next instruction should be a call to a recovery procedure or a branch back to the start of the loop.

Memory management unit error recovery

The enhanced exception processing system feature provides an enhancement to exception recovery that deals with the direct memory access memory management unit (DMA MMU). Special action must be taken when attempting to recover from an MX77 DMA MMU error. Prior to this feature, when a DMA MMU error occurred, the exception processing system convicted the task that was interrupted. This happened even though the software on the MX77 had nothing to do with the error. The determination as to whether the error was fatal depended on the task that was convicted, because an MMU error is not fatal. The processor that caused the fault was not aware that a problem had occurred.

With the enhanced feature, however, the external processor will receive invalid data if the access is for a read from MX77 memory. If the access is to write to MX77 memory, no data will be written. The processor then determines the trap to be fatal and initiates maintenance action to restart or reset the unit.

Memory allocation (AF5391)

Feature AF5391 addresses memory management issues by providing more flexibility in memory utilization. This flexibility will allow for the protection of code and critical data from corruption by errant software, and will reduce the risk of outages.

Protected memory will be allocated for protectable patches when none is available. If protected memory allocation fails, unprotected memory can be used to store the patch. Whenever possible, local patches should be stored in non-DMA memory. More non-DMA will be allocated in the unified processor (UP).

Handling a parity error fault

In most cases, if a parity fault is detected, the fault can be corrected without a loss of service. This section provides information on the types of parity faults and an overview of the actions the CM takes to deal with parity faults. Also included are the actions that operating company personnel should take.

The three types of parity faults are

- An intermittent fault, which occurs when a fault is detected, but no error is found during the reread of the location.
- A soft fault, which occurs when a parity error is detected, and an error is found when the XPM tries to reread the location. However, no error is found when the XPM tries to write to the location. The error can occur in either the program store or memory store.
- A hard fault, which occurs when an XPM detects a fault and can neither reread nor write to the memory location.

When a parity fault occurs, the CM determines what action to perform on the XPM unit, depending on the status of the unit reporting the fault (active or inactive). All three types of faults are handled the same by the CM.

Once the CM detects a parity fault in the active unit of the XPM, the CM sets the unit ISTb with a reason of `parity' and the unit will be recovered by the CM during a maintenance window. The maintenance window for recovering a parity fault on the active unit is the XPM REX test window. If the time for the XPM REX test window is the same as the current time of the switch then an audit will check to see if the active unit of the XPM has an ISTb of `parity'. If an ISTb exists, the CM will SWACT and reload the XPM if no dependencies exist. This action will clear the ISTb `parity' fault and the short term failure (STF) parity fault peg and resolve the parity fault in the XPM.

When the parity fault is reported by the active unit, a PM181 log is generated to notify operating company personnel of the problem. The recovery actions by the CM include a SWACT of the XPM and loading the newly inactive unit with the XPM software load defined in the corresponding inventory table. This loading action is considered an autoload by the CM. The ISTb is cleared by a manual or CM or mate reload of the XPM software to the affected unit.

The CM does not permit a REX test to occur

- on a P-side or C-side node of the XPM that is being recovered from a parity fault
- on the XPM if a P-side or C-side node is being recovered from a parity fault

The CM will not let two XPMs perform a parity reload that are in the same configuration. This means a P-side node cannot perform a parity reload at the same time as its C-side node, nor can a C-side parity reload occur at the same time as its P-side node. This restriction ensures that only one XPM in a configuration is in simplex at a time.

The CM informs operating company personnel of a parity fault through PM181 log reports. This log is, therefore, the primary trouble indicator. Operating company personnel can also check for associated logs, such as the PM128, to understand what actions, if any, the CM is taking. Examples of the messages associated with the PM181 and PM128 logs are provided in this section.

The XPM unit can be set ISTB with multiple reasons concurrently. When performing a QUERYPM FLT at the MAP level, all of the ISTb reasons that have occurred on the unit and that have not yet been cleared will be seen.

Hard parity fault When a hard parity fault is reported to the CM by the active unit of the XPM, a PM181 informational log is generated. This log notifies operating company personnel that

- a parity fault has occurred on the active unit, and the unit has been set ISTb
- the unit will be reloaded by the CM during the next XPM REX test window

A manual SWACT and reload can also be performed to clear the ISTb and the parity fault.

An example of a PM181 log report follows:

```
PM181 JUL23 23:29:16 7700 INFO RSC 0 Unit 0
Node: Istb, Unit0 Inact: ISTb, Unit1 Act: ISTb
Parity audit has detected a hard parity fault.
The system will autoload the unit during the next
XPM REX test window.
Monitor the system for maintenance and recovery.
Site Flr  RPos  Bay_id  Shf Description Slot  EqPEC
RAL1 00   C05   CMVI 00  18  RSC : 000   3    AX74
```

When a unit changes state to ISTb of `UP RAM parity' fault, a PM128 log report is generated. This log informs operating company personnel that the unit has changed status.

An example of a PM128 log follows:

```
*PM128 MAY09 09:49:56 9000 TBL ISTB RSC 1
 Node: ISTb (Unit ISTb)
 Unit0 Inact: InSv
 Unit1   Act: ISTb (UP RAM Parity)
```

The command string QUERYPM FLT is used to display the faults on a posted XPM. The following example MAP response shows a hard parity fault exists in unit 1 of the posted XPM:

```
>querypm flt
Node is ISTb
    One or both Units inservice trouble
Unit 0
    no fault exists
Unit 1
    The following inservice troubles exists:
        Parity audit has detected a hard parity fault.
        A reload is required to clear this fault.
        The system will autoload this unit during the next
        XPM REX test window.
```

Action by the CM: The CM will SWACT and reload the XPM during the next XPM REX test window. After the reload the XPM will be cleared of this ISTb fault.

User action: No action is required by operating company personnel. However, a manual SWACT and reload can be initiated to clear the parity fault.

Errors not specific to processor cards

Following are the types of errors that are not specific to processor cards of the RCC:

- static data mismatch faults
- intermodule communication faults

Static data is data that defines the RSC configuration and does not change as calls are connected and disconnected. When the static data contained in the host and the RCC do not match, data corruption can result. One possible outcome of such a mismatch is the host thinks a line exists, while to the RCC it does not exist, resulting in calls being lost.

When two RCC units cannot communicate with each other (intermodule communication faults), a Warm SWACT is not possible because one unit is not aware of what the other unit is processing.

Dual RCC

With DRCC, the main fault that can occur is corruption of the interlinks. When corruption occurs over the messaging interlinks (1 and 3), the two RCCs cannot communicate and interswitched calls cannot take place.

Automatic maintenance

When fault conditions occur, the remote switching system and DMS initiate system actions (such as audits) to find the fault and correct it automatically. If manual intervention is required, the appropriate trouble indicators are explained in this section.

RCC

Essential line service for the RCC

Essential line service (ELN) for nodes off of an RCC requires essential service protection (ESP) and guaranteed dial tone (GDT).

ESP is a CC feature that treats all originations equally until they reach the CC. If ESP is active, ELN originations are placed at the top of the origination queue. A call origination requires a call condense block (CCB). If an ELN call arrives and there are no CCBs available, the CC will steal a CCB from the oldest nonessential call origination. The nonessential line is treated as if it never had a CCB, and is discarded. If the queue is full and made up entirely

of ELN lines, incoming ELN originations are discarded. Discarded ELN and non-ELN calls are handled by GDT; if the subscriber stays off-hook, the subscriber eventually receives dial tone.

ESP is activated at the MAP terminal with the ESP ON command.

Operational measurements (OM) keep track of the number of originations from ELN lines, the number of times an ELN origination had to steal a CCB, and the number of times that an ELN received delayed dial tone because no CCBs were available.

ELN for the RCC

The preferential handling of ELN lines applies to the RCC as well as the CC. ELN lines are placed at a higher priority in RCC call processing and, when the RCC cannot process all incoming calls, ELN lines receive priority over non-ELN lines.

How ELN is activated

Since ESP call processing occurs in the RCC, both the CC and RCC must have the same knowledge about lines ELN capabilities. The CC stores this knowledge in its data store, while the RCC stores it as static data. The following examples show how the CC and RCC receive the same data about a line:

- *The RCC is in-service and ESP is ON.*

  If the RCC is in-service and ELN is added to an LCM line, the CC sends a message to the RCC. The RCC updates its knowledge automatically, activating ELN for that RCC line. Also, if ELN is deleted from a line, the CC sends a message to the RCC telling it to remove it from the LCM line.

- *The RCC is manually busy and ESP is ON.*

  — If ELN is added, the line configuration is not updated in the RCC until the RCC is returned to service. As part of the return-to-service sequence, static data is downloaded and, once the RCC is back in service and processing calls, lines with ELN receive preferential treatment. Also, if ELN is removed, the RCC does not update its configuration until it is returned to service. The state of ESP (OFF or ON) is not affected by any type of restart.

Note: Refer to the *XPM Operational Measurements Reference Manual*, for information on how calls are prioritized and which OMs track call traffic when the RCC enters overload.

Examples of CC versus RCC overload

With ESP, both the RCC and the CC process calls on a queue basis. These priorities are important when either the CC or the RCC enters overload. During overload, the CC and RCC work together this occurs when the RCC

becomes overloaded the RCC throttles new work for itself, and when the CC becomes overloaded the RCC throttles work for the CC. The following examples show how ELN calls are handled when either the CC or RCC goes into overload:

- *When the CC enters overload:*
  - — Non-ELN traffic is throttled and placed in the last-in-first-out (LIFO) queue. Some of these calls eventually reach the CC, while others are dropped and then handled by GDT.
  - — ELN traffic is sent immediately to the CC, even though the CC is in overload. The CC puts ELN calls at the front of its first-in-first-out (FIFO) queue.
- *When the RCC enters overload:*
  - — ELN line originations have priority over non-ELN lines.

Overload indicators (PM128, QUERYPM)

When the RCC enters overload, a PM128 (RCC is ISTb) log is generated with the following message:

```
PM Overloaded
```

At the PM MAP level, posting the RCC and entering the command QUERYPM FLT generates the same message (`PM Overloaded`).

Note: The EXT104-108 logs, produced when ESP is turned on or off, are no longer produced. Also, the tuple ESP_ALARM has been removed from table SFWALARM.

When overload occurs, operating company personnel should immediately collect all relevant OMs that track the amount and types of traffic from the RCC. In some cases, the RCC enters overload because of a maintenance problem, such as network faults. In other cases, the overload relates to an under-engineering of the RCC configuration. Therefore, OM reports should be forwarded to both maintenance and engineering personnel for analysis.

Switch of activity

A SWACT is the process in which the two units of an XPM exchange activity status so that the unit actively handling call processing becomes the inactive unit. The inactive unit simultaneously becomes the active unit and takes over call processing. All processing of active calls is maintained during a warm SWACT.

SWACTs can be either controlled or uncontrolled. Controlled SWACTs are implemented because of manual action, such as inputting the SWACT

command, or by planned system requests, such as the REX test schedule, or when the active unit is busied while the inactive is InSv.

If both units are InSv, a controlled SWACT can occur. Or, if the RCC is ISTb because of a previous REX test failure, a controlled SWACT can occur.

Uncontrolled SWACTs are implemented by the system when there is either a hardware fault or a trap in the active unit. PM181 log messages tell the operating company personnel why the active unit dropped activity.

In a controlled SWACT, the following message interchange occurs:

- The CC messages the active unit of the RCC to start an audit of the inactive unit.
- The active unit messages the inactive unit to start a pre-SWACT audit.
- The inactive unit messages back to the active unit the pre-SWACT audit results. A warm SWACT is initiated based on the audit results.
- The original active unit stays InSv and clears unstable data.
- The newly active unit sends five gain messages to the CC.
- The CC sends five gain-acknowledge messages to the RCC.
- The RCC sends three gain-acknowledge received messages to the CC.
- The CC tells the original active unit to drop activity.
- The original active unit sends the CC a drop message, and the CC expects to receive this message.

If a controlled warm SWACT fails, the following message interchange occurs:

- The CC messages the active unit of the RCC to start an audit of the inactive unit.
- The pre-SWACT audit is implemented.
- A warm SWACT is initiated based on the audit results.
- The originally active unit stays InSv and clears unstable data.
- The newly active unit does not send messages to the CC.
- The originally active unit's wait time of 5 s expires and a SWACT-back occurs.
- The originally active unit sends a SWACT-failed message to the CC.
- The CC SysB and RTS the inactive RCC unit.
- If the CC does not receive any messages, it will force a SWACT, SysB, and RTS both units of the RCC.

In an uncontrolled SWACT, the RCC initiates the pre-SWACT audit. The sequence of messages is as follows:

- The active RCC unit messages the inactive RCC unit to start a pre-SWACT audit.
- The pre-SWACT audit is implemented.
- A warm SWACT is initiated based on the audit results.
- The newly active unit messages the CC that an unsolicited gain occured.
- The originally active unit stays InSv and clears unstable data.
- The newly active unit sends five gain messages to the CC.
- The CC sends five gain-acknowledged messages to the RCC.
- The RCC sends three acknowledge-received messages to the CC.
- The CC tells the originally active unit to drop activity.
- If the CC does not receive any messages, it forces a SWACT, SysB, and RTS of both RCC units.

For both controlled and uncontrolled SWACTs, the SWACT is completed when the CC receives a gain message from the newly active unit and acknowledges the gain to the originally active unit. When a SWACT occurs, the CC and the RCC exchange a series of drop and gain messages that clarify any activity. The following table explains common phrases found in these messages.

Table 2-6 Message phrases describing CC to RCC SWACT communication (Sheet 1 of 2)

Message phrase	Explanation
Original active unit	Active unit before the SWACT (unit 0)
Original inactive unit	Inactive unit before the SWACT (unit 1)
Newly active unit	Active unit after the SWACT (unit 1)
Newly inactive unit	Inactive unit after the SWACT (unit 0)
Gain message	The message the newly active unit (unit 1) sends to the CC informing the CC it has gained activity
Gain acknowledge message	The message the CC sends to originally active unit to confirm the newly active unit is sending messages

Table 2-6 Message phrases describing CC to RCC SWACT communication (Sheet 2 of 2)

Message phrase	Explanation
Gain acknowledge received	Message originally active unit sends to CC to confirm the newly active unit passed the post-SWACT audit
Drop message	Message the originally active unit (unit 0) sends to the CC informing the CC it has dropped activity

The sequence of events performed by the REX test state machine (or controller) is enumerated as follows:

1. Test the inactive unit (includes InSv tests only).
2. SysB the inactive unit.
3. RTS the inactive unit. This includes out-of-service (OOS) tests only.
4. Wait for superframe and data sync to be achieved.
5. Perform a pre-SWACT audit.
6. Perform a Warm SWACT.
7. Maintain call processing capability on previously active unit.
8. Perform a post-SWACT audit.
9. SWACT back to previously active unit if necessary.
10. SysB the newly inactive unit.
11. RTS the inactive unit.
12. Wait for superframe and data sync to be achieved.
13. Run InSv diagnostics (TST) on the newly active unit.
14. Run InSv diagnostics (TST) on the inactive unit.

The REX test state machine (controller) actions are shown in the following figure, REX test state machine actions.

Uncontrolled switch of activity

An uncontrolled SWACT may occur when both units are InSv, the active unit is InSv and the inactive unit is ISTb, or the active unit is InSv and the inactive unit is SysB. Each of these states results in a different SWACT scenario. The sequence of events during an uncontrolled SWACT are determined by the state of the units and the reason for the activity drop.

If a hardware fault has occurred, a PM181 log is produced and may contain messages that indicate the following:

- activity timeout
- no CC links—The message links to the CC or host XPM are broken, so messaging cannot occur.
- duplicate fault—A critical hardware fault has occurred.
- jammed—The unit has been jammed, meaning that it cannot change its status (active/inactive).
- DRCC sync—The RCC when it is part of a DRCC configuration. The original active unit of a DRCC cannot continue to process calls, and it must SWACT to enable the RCC to synchronize with its spouse RCC.
- ready for ESA—This message also deals with the RCC; in this case, all CC messaging has been lost. If the original inactive unit does not send a drop message within a time period, the RCC enters ESA anyway.
- static data corruption
- The original active unit sends a drop message to the CC.
- The newly active unit should send a gain message.

As with controlled SWACTs, the XPM continues to resend the gain message up to 15 s.

An uncontrolled SWACT can also occur if the original active unit is InSv and the original inactive unit is ISTb. The critical factor in this scenario is what is causing the inactive unit to be ISTb. If the reason is because of data sync, the scenario is the same as when the active and inactive units are InSv. If the ISTb is because of data sync, the original active unit drops sync and the XPM reinitializes. In this situation all calls are dropped.

If the original active unit has been InSv less than 3 min, the unit will RTS without the OOS diagnostics. The reasoning is that there was a previous SWACT, and if it was less than 3 min ago, the active unit must have had OOS diagnostics run then. If the original unit has been active more than 3 min, the active unit will RTS with OOS diagnostics.

Regardless of the type of RTS, the active will try to come back up again and, if it cannot, both units will be SysB and the entire XPM is SysB.

Routine exercise test

A routine exercise test (REX) test includes a series of tests performed on an XPM unit, ideally initiated daily by the system scheduler or manually by operating company personnel. The REX test combines the diagnostic and

functional routines available on XPMs. Results of the REX test can be divided into four classes:

- not performed
- passed
- failed
- aborted by manual action (that is, maintenance action with the FORCE parameter or with the ABTK command from another MAP terminal with the XPM posted)

All four classes generate a log or display a message at the MAP terminal. Only passed and failed REX tests are stored in the maintenance record. Failure reasons are available only for failed REX tests.

If a REX test fails, a PM600 log is generated. The PM600 log initiates a major alarm for the XPM that failed the REX test. The major alarm appears at the MAP terminal under the PM banner at the top of the MAP display.

If an InSv or OOS diagnostic test fails, the REX test failure reason includes the mnemonic (an easy-to-remember abbreviation) of the diagnostic that failed and the unit that failed (0 or 1).

The PM600 log details the start time of each step the REX test executed, the unit affected by the REX test step, and the failure reason. REX test steps included in the log after the failed step are recovery actions the REX test initiates as a result of the failure. The unit number is included only if the REX test action is unit-specific (BSY unit, RTS unit, TST unit, sync) and not an action affecting the node (SWACT, BSY both units). The log's supplemental data consists of a card list and a mnemonic of the failed diagnostic.

The QUERYPM command and the QUERYPM FLT and TST REXCOV QUERY command strings contain information about the last REX test. Both manually and system-initiated REX tests store and display a new date, time, and status (passed or failed) in the REX test maintenance record. *Passed* means that the REX test completed with no errors. *Failed* means that the REX test did not complete because of an error. This information is available through the QUERYPM and TST REX QUERY commands. If the REX test fails, the user either performs a manual RTS, a manual REX test, or an automated REX test to return the XPM to service from ISTb.

A REX test maintenance record is stored for each XPM containing the following information:

- REX test scheduler, if the XPM is in the system
- date, time, and result (passed or failed) of the last REX test

- failure reason, diagnostics failures, and a list of faulty cards (if applicable), if the last REX test failed
- date and time of prior failed REX test
- date and time of first passed REX test following prior failure

The following restrictions apply to REX tests:

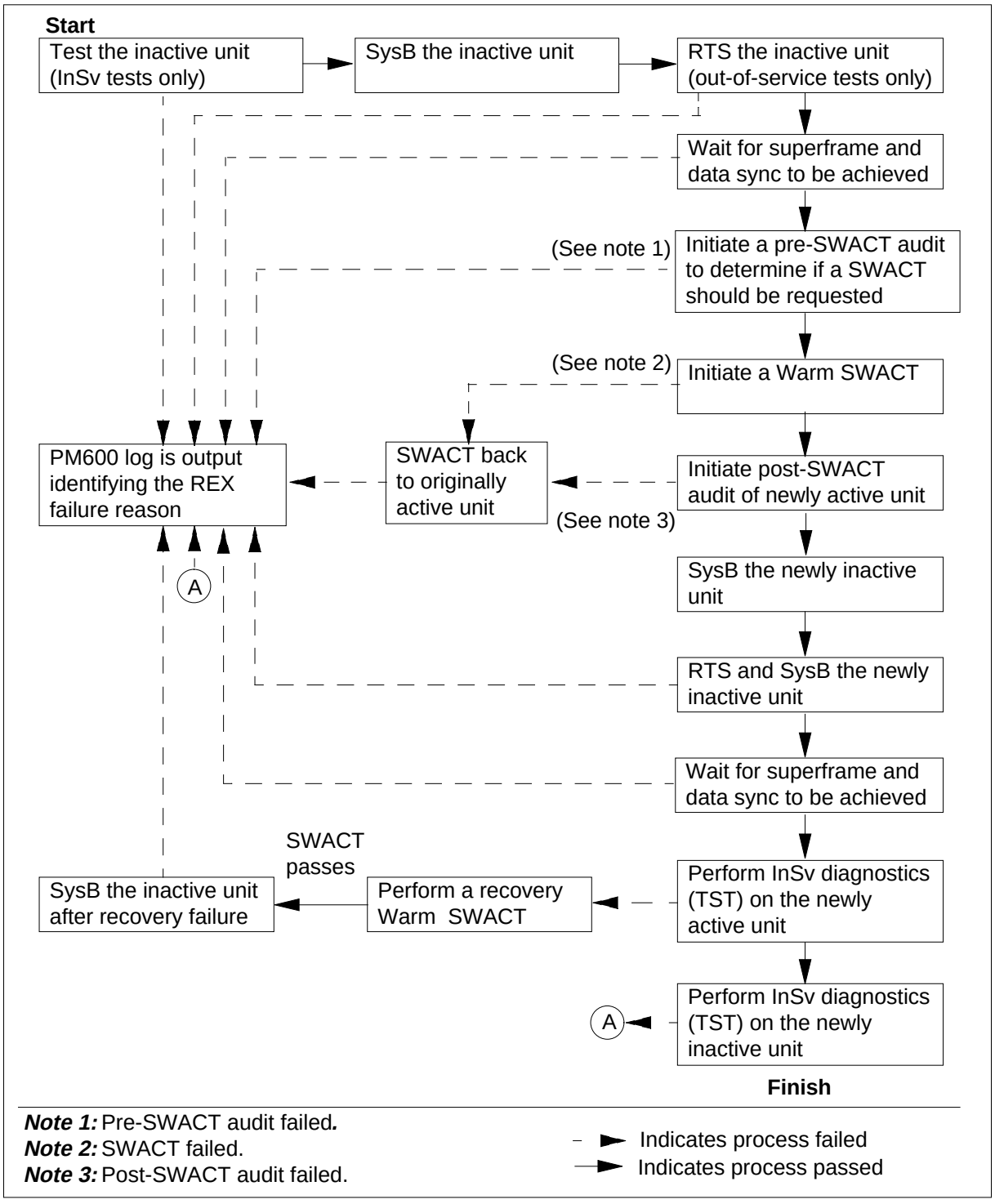
- The system REX test controller runs a REX test on only one XPM at a time if the office uses the NT-40 processor. However, SuperNode supports concurrent REX testing for up to ten XPMs with the same REX test class.
- For a REX test to run, the node must be InSv, ISTb because of a REX test failure, or ISTb because P-side DS-1 links are OOS.
- If a Warm SWACT is not possible, a REX test will terminate.
- After successful completion of a REX test, the XPM has a new active unit because of the SWACT.
- If a restart occurs while a REX test is in progress, the PM600 log is not generated because the restart deallocates the temporary DS used to build the PM600 log.
- No SWACT controller override is provided for a manual REX test.

REX test state machine interface to the pre-SWACT and post-SWACT audits

The REX test state machine or controller:

- calls the pre-SWACT audit, messages the other unit, and the Warm SWACT is performed if the audit passes
- accounts for SWACT denial and failure reasons
- terminates a REX test if a SWACT is denied
- terminates a REX test if a SWACT back occurs, but the active unit of the XPM is unchanged from the time the REX test began. The recovery is performed by a REX test and consists of a busy (BSY) and an RTS of the inactive unit.
- displays the failure reason for a SWACT denial or failure performed during a manual REX test at the MAP terminal as REX failed. The detailed reason for the failure can be obtained using the TST REX QUERY command string for the posted XPM. In addition, a PM600 log report is generated detailing the REX test failure reason.

Figure 2-12 REX test SWACT machine actions



NT6X69 audit

The NT6X69 card processes messages from both the C-side and P-side speech bus. Messages between the units are also included in the speech bus interface. To communicate with the UP, the NT6X69 interrupts the UP process. An audit determines if an interrupt occurred. The NT6X69 sent messages to the UP. If an interrupt did not occur, the audit looks for incoming messages. If the audit twice detects incoming messages and an interrupt does not occur, the audit causes the RCC to drop activity. In this case, a PM181 log is generated and an ISTb RCC occurs.

This audit regularly checks peripheral protocol (PP) sanity in order to detect faulty PP circuitry. It also diagnoses faulty NT6X44 phase comparators, thus preventing synchronization losses that can cause carrier slips. It checks both InSv and OOS states. In order to prevent interference with channels in use, this audit operates only on the C-side maintenance channel.

GTR/UTR diagnostic enhancements

Universal tone receiver (UTR) in-service (IS) and out-of-service (OOS) diagnostics perform the following tests on tone quality boundary conditions, which could result in undetected faults:

- twist test
- frequency deviation and noise test
- total power offset test

Both IS and OOS diagnostics exist for the UTR. The OOS diagnostic is a comprehensive test of the UTR board typically run on a return to service (RTS) of the peripheral unit. It can be invoked from the DIAG level of PMDEBUG or from the PM MAP level by testing the unit.

The IS diagnostic is a limited test of the UTR board that is run while the peripheral unit is in-service. It is invoked by the diagnostic driver approximately every seven minutes. It can be also invoked from the DIAG level of PMDEBUG or from the PM MAP level by testing the unit.

The operating range of the UTR for MF tone reception is set close to the expected value of the MF tones. This allows tone quality boundary conditions for MF tones to be simulated. DTMF tones cannot be tested directly. They are tested by the MF testing.

The following tests enclose the expected value of the MF tones and simulate all boundary conditions:

- *twist*

  The operating range is changed from -11dB with a power level range between -27dBm and +12dBm, to between -7.5dBm and +12dBm with a

twist of no more than +/-1.25dB. Frequency deviation is detected as a decrease in power level.

- *frequency deviation and noise*

  The total power offset range is from -1.0dB to +1.0dB. The power level range is reduced to -7.5dBm to +12dBm. Since the expected value of the tones is in the new operating range, all tones generated should be detected and reported.

- *power level increase*

  The operating range is between -5.75dBm and +12dBm. Since the expected value of the tones is not in the new operating range, the tone generated during this test should not be detected or reported.

The combination of the above tests effectively reduces the operating range around the expected value of the tones enough to simulate the boundary conditions not tested by the original UTR diagnostic.

Audit of the IML links

This audit runs sanity tests on the inter-module message links (IML) links to ensure that data passed on those links is not lost or corrupted. It runs on both the inactive and active units. If a fault is detected, the active inservice unit reports the fault to the CC. When a fault is detected on the IML link(s), the following occurs:

1. The link is closed.
2. The RCC status changes to ISTb.
3. The RCC units no longer communicate over the links, a Warm SWACT cannot occur.
4. A PM128 log is generated.
5. At the RCC level, the command QUERYPM FLT contains the following message:

   ```
   NON-CRITICAL HARDWARE FAULT
   ```

System REX Controller XPM Maintenance

Feature AF3771, System REX Controller: XPM Maintenance, provides the SuperNode switch with a system REX test (SREX) controller which coordinates all the system REX tests under a common REX test scheduler. This feature permits RSC REX tests to be scheduled while other REX tests are in progress. The SREX test controller makes it easier to perform a REX test on the whole switch, including all peripherals such as the RSC in less time. Feature AF3771 permits REX test failures to be found and resolved sooner,

thereby reducing outages in the field. The SREX test controller also enables operating company personnel to

- change the order where peripherals are tested
- coordinate between manual- and system-initiated REX tests
- receive alarms for the RSC not being REX tested in a time limit set using table REXSCHED

The SREX test scheduler permits the user to enter the CI level REXTEST command and the following parameters:

- SUSPEND suspends REX testing for one maintenance window. A maintenance window is the time period between the REX START and STOP time datafilled in table OFCVAR under the NODEREXCONTROL parameter.
- RESUME resumes REX testing after suspending REX testing.
- QUERY returns the status of the REX test (active or suspended).
- HELP returns a brief description of the REX test.

The REX test order for feature AF3771 is critical nodes first, such as computing module (CM) and message switch (MS); secondly, the number of days since the last system or manual REX test; and third, the order of internal PM (RSC) number.

Table REXSCHED must be datafilled to establish the REX test schedule for the RSC. This table contains the information required by the REX test coordinator to schedule the tests according to operating company specifications. In addition, the test can be disabled by datafilling table REXSCHED. For more information on table REXSCHED, see the data schema section of the *Translations Guide*.

The IOAU112 log report for LCMs is generated if:

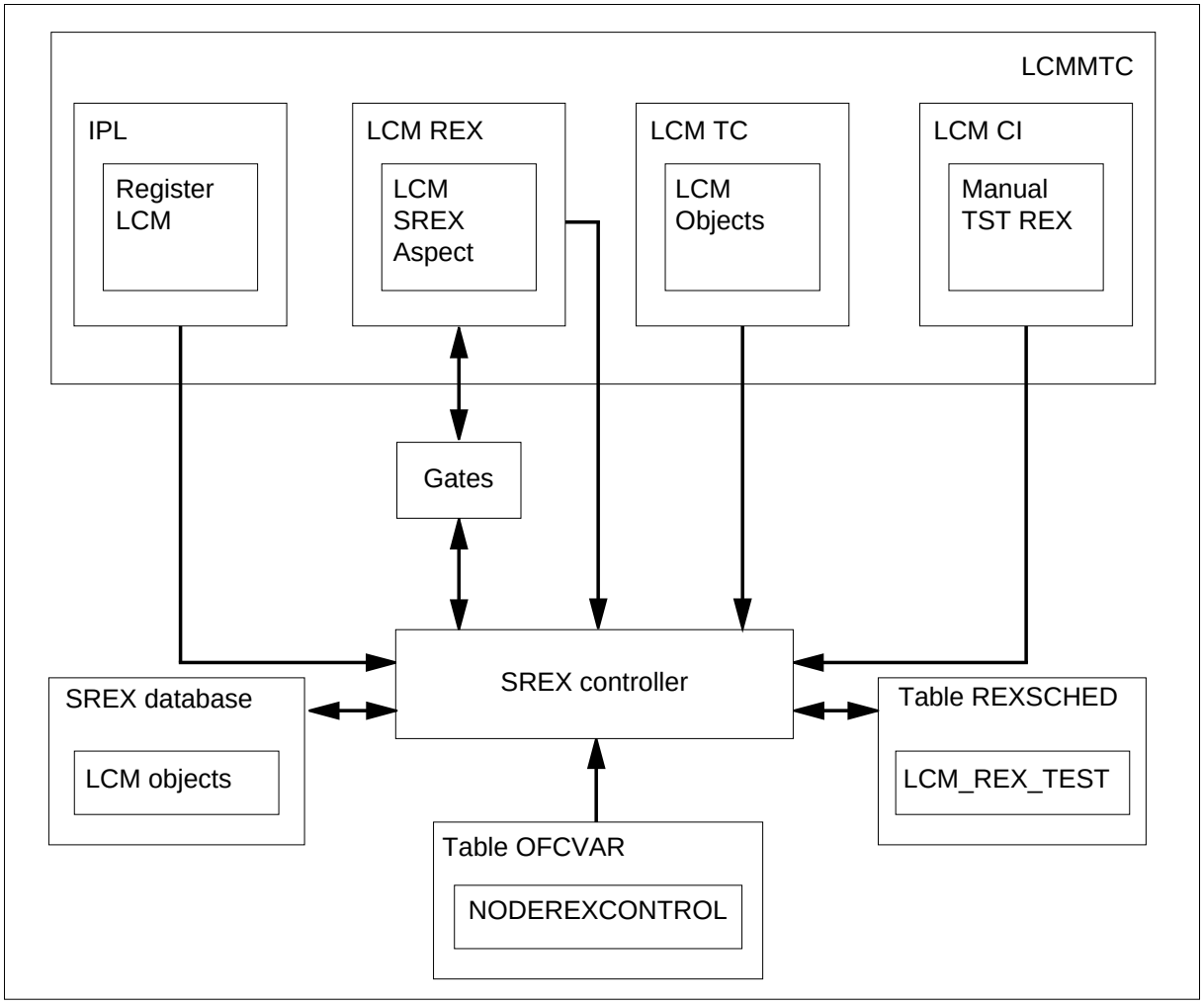
- the LCM has not been REX tested for more than seven days
- REX test takes longer than specified
- REX test could not be started after a defined number of attempts

Extended line concentrating module (LCME) REX test results

Scheduling of system REX (SREX) tests for LCMs is controlled by table REXSCHED. The LCM_REX_TEST task SREX can be executed concurrently in multiples of four, and simultaneously with REX tests of XPMs. The LGC, LTC, and the RCC XPMs can be hosts to LCMs. Conflicts arise when an XPM scheduled for REX testing is the host of an LCM scheduled for REX testing.

To avoid conflicts, all concurrent REX tests of XPMs and LCMs are scheduled by the SREX controller. The LCM SREX subsystem registers the LCM_REX_TEST class and identifies dependencies with other REX_TEST types during initial program load (IPL). As LCM nodes are added to the SREX database, the controller automatically datafills entries with defaults in table REXSCHED, see the figure SREX system dependencies for a view of the SREX dependencies.

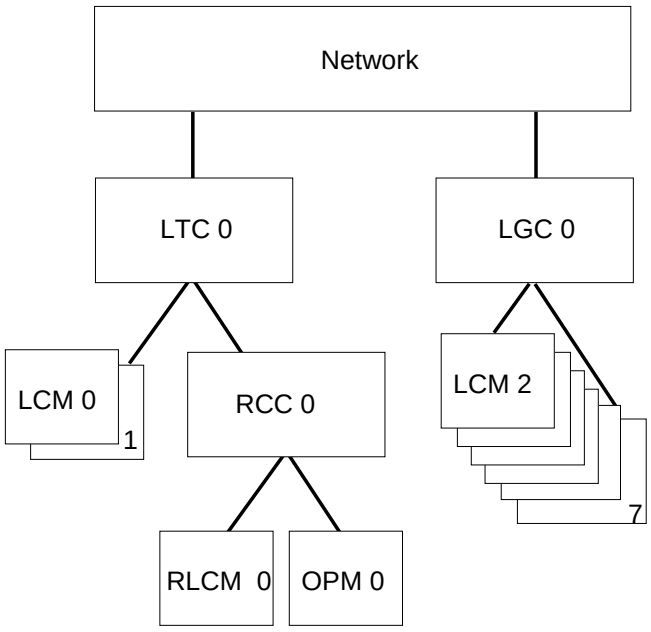
Figure 2-13 SREX system dependencies



The converter voltage and ring test portions of LCM_REX_TEST require wait states and unique test resources which cause unacceptable delays in SREX main task execution. LCMCOV_REX_TEST, running at a lower priority, implements these tests separately from the LCM_REX_TEST. LCMCOV_REX_TEST requires logical test unit (LTU) connections in the maintenance line card. An LCM unit can only access the single LTU when the other unit is out of service. This resource limitation precludes concurrent

LCMCOV_REX_TEST execution. The datafill of the PARALLEL execution field for LCMCOV_REX_TEST, in table REXSCHED, allows a maximum of one. See figure, SREX scheduling for a description of SREX scheduling.

Figure 2-14 SREX scheduling



Note: REX tests can be running on LCM 0 and LCM 1 concurrently with REX tests running on RCC 0 and LGC 0.

Note: REX tests could not be running on LCM 2 through LCM 7 if a REX test was running on LGC 0.

Separating the LCM_REX_TEST and the LCMCOV_REX_TEST allows faster completion of site REX_TEST coverage. LCM_REX_TESTs, without constraints of the converter voltage and ring tests, can be run simultaneously and scheduled separately for optimum execution periods.

Note: The LCMCOV_REX_TEST is performed only on LCMs, XLCMs, OPMs, and RLCMs.

Feature AF3234 provides the following REX test enhancements for LCM peripherals and its variants, for example LCME:

- ESA REX test
- LCM and ESA-independent REX test

- MAP command for manual REX test
- fault indicators
- REX test maintenance record
- MAP commands to access REX test failures

Emergency stand-alone REX test

The ESA REX tests the ability of RLCM units to enter and exit ESA, and their ability to message the ESA processor while in ESA. The ESA REX test begins after the LCM REX test is completed.

MAP commands for manual REX tests

XLCM diagnostics provide the capability to implement a manual LCM REX test. A manual REX test is accomplished by adding a REX or REXCOV parameter to the TST command at the PM level of the MAP display. Examples of this command are as follows:

```
>MAPCI;MTC;PM;POST LCM <site><frame><unit>
```

Note: Post the LCM

```
>QUERYPM
```

Note: Displays information about the LCM node. Feature AF5898 adds information about the LCMCOV REX test.

When the LCM is posted, manual control of scheduled LCM or LCMCOV REX tests is set by typing

```
>TST REX [ON] [OFF]
```

Note: The REX test of the posted LCM is enabled or disabled.

or

```
>TST COVREX [ON] [OFF]
```

Note: The COVREX test of the posted LCM is enabled or disabled.

LCM REX tests are set for immediate execution by typing

```
>TST REX NOW
```

Note: Performs LCM_REX_TEST on the posted LCM.

or

```
>TST COVREX NOW
```

Note: Performs LCMCOV_REX_TEST on the posted LCM.

The following message is displayed when the TST COVREX NOW command is entered.

```
LCM HOST 00 0 will be put into takeover mode during the
COV REX
Do you want to continue with the COV REX test
Please confirm ("YES", "Y", "NO", or "N")
```

Line concentrating module and ESA-independent REX test

The scheduler initiates REX tests on an LCM, and upon completion, the ESA REX test is initiated. A manually implemented LCM REX test does not implement an ESA REX test. As a result of an unsuccessful REX test, the LCM is set ISTb if InSv diagnostics fail or SysB if OOS diagnostics fail.

Fault indicators

An unsuccessful REX test sets the LCM unit either ISTb or SysB with a reason of REX failed. Audits on LCMs are performed every 10 min and run InSv tests. The ISTb flag remains with a REX failed reason. If the audit is not successful and additional failure conditions are detected, the audit contributes to the ISTb list. If the LCM is SysB and a successful system RTS is performed, the unit is returned to ISTb rather than InSv with the REX failed reason. To remove the ISTb state, the LCM must complete either a successful manual RTS or a successful manual or scheduled REX test.

The node assessment graph log (NAG400) is generated hourly, or in response to the NAG command, to list all nodes that are not InSv. The REX_INFO field of log NAG400 displays the results of the latest REX test. For LCMs, the LCM_REX_TEST result is listed first, separated by a colon from the LCMCOV_REX_TEST result.

The CI level NAG command enables the craftsperson to display all out-of-service nodes. The MAP response to the NAG command is similar to that presented in the NAG400 log report. The command and log report are part of the node assessment graph (NAG) feature which provides a snapshot of nodes in the system that are out-of-service or have a REX issue. Operating company personnel can include the offline nodes in the output by entering the command string NAG ALL. The log report function, which runs hourly, can be turned ON and OFF by entering the command string NAG ON or NAG OFF.

For a node to be included in the output or log report, it must be in one of the following states: system busy (SysB), C-side busy (CBsy), in-service trouble (ISTb), or manual busy (ManB). A node may also be included if it has failed, aborted or did not complete the last REX test. If a node has no REX problem, ATP appears in the REX column to indicate that all tests passed.

The following output depicts an abbreviated report in response to the NAG command.

```
Front End Load: FSL37AO
Level   Node        Status  REX INFO        UNTI 0  UNIT 1
   CPU      1         ACT
CM                  NORMAL
MS                  NORMAL
MS                  NORMAL
IOD                 NORMAL
NET                 NORMAL
PM RCC      0        SYSB   ATP             SYSB    SYSB
   LCM  KOPM 12 0    SYSB   PASS:   PASS    SYSB    SYSB
   RMM      1        SYSB   ----             --      --
   ESA      4        SYSB   ----             --      --
    :       :         :       :              :       :
    :       :         :       :              :       :
   SMSR     5        SYSB   ATP             SYSB    SYSB
   LTC      0        ISTB   ATP             ISTB    ISTB
   LTC      1        ISTB   ATP             ISTB    ISTB
   SMA      1        ISTB   ATP             ISTB    ISTB
   IDT      37       ISTB   ---              --      --
   IDT      38       ISTB   ---              --      --
   SMA2     0        ISTB   ATP             ISTB     .
   RCC      1        ISTB   ATP             ISTB    ISTB
    :       :         :       :              :       :
    :       :         :       :              :       :
   LCM KRCM 03  0     .     PASS:   ----      .       .
Offline Node count:  3
```

REX maintenance records

A maintenance record is generated from a REX test to indicate results of recent REX tests for each LCM datafilled. This information is available at the PM level of the MAP display for a posted LCM.

Note: Following a reload restart, the maintenance record is erased for each LCM.

ESA-independent REX

Prior to BCS33, the system scheduler initiated an ESA REX test for remote line concentrating modules, as part of its LCM REX subtests. The scheduler now initiates REX tests on an LCM and, upon completion, the ESA REX test is initiated as a separate test. A manual LCM REX test does not initiate an ESA REX test.

The LCM REX test consists of the following steps. Both units of the LCM must

either be InSv or ISTb before a REX test can be performed.

1 If both units of the LCM are either InSv or ISTb, unit 0 is set to SysB. The LCM node status is set to ISTb and a PM128 state change log is generated, stating `REX in progress`.

2 In-service (IS) diagnostics are run on unit 1 in takeover mode and, if any diagnostics fail, the unit is placed either ISTb or SysB and a PM181 log is generated. If the unit is SysB, the REX fails.

3 If preliminary tests pass, OOS diagnostics are run on unit 1. If OOS diagnostics fail, the unit is left SysB, a major alarm is raised, and REX fails. If OOS tests pass, the unit is RTS. If the RTS is successful, a PM106 state change log is generated. Otherwise, the unit is left SysB and the REX fails.

4 IS diagnostics are run on unit 0. If diagnostics fail, unit 0 is made ISTb and a PM181 log is generated.

5 Steps 1 through 4 are repeated while unit 1 is placed OOS and IS diagnostics are run on unit 0 in takeover mode.

6 Once REX tests are complete, ESA REX tests are run on any ESAs subtended from RLCMs.

Fault indicators

If the LCM REX is unsuccessful, the LCM goes ISTb if IS diagnostics fail or SysB if OOS diagnostics fail. If the LCM goes SysB, the ESA REX test is not initiated.

A PM128 log indicating a state change is generated if a REX subtest fails, leaving the LCM either ISTb or SysB with a new `REX failed` reason. The ISTb state is not altered by any subsequent successful audits. A PM181 log is generated to display the status of the REX when the test is completed. The PM181 log indicates the REX passed, failed, terminated, or was aborted.

Audits on LCMs are performed every ten minutes and run InSv tests. Prior to BCS33, a successful audit cleared the ISTb flag. XPM PLUS, however, affects only a successful audit. Therefore, the ISTb flag remains with a `REX Failed` reason. If the audit is not successful and additional failure conditions are detected, the audit contributes to the ISTb list.

If the LCM is SysB state and a successful system RTS is performed, the unit is returned to an ISTb state, rather than an InSv state, with the `REX Failed` reason. In order to remove the ISTb state, the LCM must complete either a successful manual RTS, a successful manual, or a scheduled REX.

REX maintenance record

A maintenance record is generated from a REX and stored in an internal database indicating the results of recent REX tests for each datafilled LCM. Each time there is REX activity, the maintenance record is updated. This information is available at the PM MAP level for a posted LCM using the TEST REX QUERY command. This command and the QUERYPM FLT command now include more detailed information about REX test failures.

Manual maintenance

RCC

MAP access to the REX maintenance record (non-ESA)

A maintenance record is generated from a REX and stored in an internal database to indicate the results of recent REX for each datafilled PM. Each time there is REX activity, the maintenance record is updated. This information is available from the PM MAP level for a posted RCC using the QUERYPM and TST REX QUERY commands. TST REX QUERY includes more detailed information about REX failures.

The QUERYPM command displays the following information:

- whether or not the RCC is included in the system REX
- the date, time, and result (passed/failed) of the last REX

Example of a MAP response:

```
RCC 0 is included in the REX schedule.
Last REX date was THU. 1990/11/29 at 09:53:57; FAILED
```

In addition to the information the QUERYPM command displays, the TST REX QUERY command now displays the following:

- If the last REX failed, the failure reason and faulty card list, if applicable.
- Date and time of the prior failed REX
- Date and time of the first passed REX following prior failure.

Example of a MAP response:

```
REX test Failed  –  Inactive OOS tests after SWACT
Site  Flr  RPos  Bay_id    Shf   Description  Slot  EqPEC
HOST   01   A01  RCE  00    18    RCC  :  00   17   6X69
Prior REX failure was TUE. 1990/11/27 at 10:02:47.
First pass after prior failure was WED. 1990/11/28 at
   02:15:24.
```

Following are possible REX test results:

- not performed
- passed
- failed
- aborted by manual action (maintenance action with the FORCE parameter)

All REX test here result in either print logs or display messages on the MAP terminal. However, only passed and failed REX tests are stored in the

maintenance record. Failure reasons are available only for failed REX tests. Refer to chapter 6 for changes in the text for responses generated for failed REX tests.

Dual RCC

DS-1 interlink maintenance

Maintenance functions provided for DS-1 interlinks are the same as those provided for the DS-1 links connected to the host PM. DRCC DS-1 interlink maintenance includes:

- detecting whether or not the card is present.
- monitoring the DS-1 circuits. Conditions reported include slips, frame loss, bipolar violations (BpV), remote carrier group alarms (RCGA), and local carrier group alarms (LCGA).
- reporting the state of the link.

LCM

MAP commands used to access REX failures

The TEST REX QUERY command provides the test ID of the subtest and the faulty card list for each failed REX test for each LCM unit. The QUERYPM FLT command, which already exists in the DMS system, indicates that an LCM unit in an ISTb or SysB state due to a REX failure now includes the REX `Failed` reason.

MAP command for manual REX

The TST REX parameter at the PM MAP level allows operating company personnel to run a manual LCM REX test. The subcommands of the REX option are as follows:

- TST REX ON enables the posted LCM to undergo REX testing generated by the system scheduler. This is the default for the LCMs.
- TST REX OFF disables REX testing by the system scheduler on a posted LCM. Manual REX request is still accepted.
- TST REX QUERY provides the following information about the recent REX results of a posted LCM:
  - — Whether the LCM REX is enabled or disabled for the scheduler
  - — Date and time of the last manual or scheduled REX test performed and the status (pass or fail)
  - — reason REX failed (specific subtest) see *Note*.
  - — List of cards involved in the subtest failure See *Note*.

— Date and time of the prior REX test failure.

— Date and time of the first successful REX following prior failure.

Note: This information is displayed by units only when the last REX test failed.

Following is an example display generated by a TEST REX QUERY command for an LCM:

Example of a MAP response:

```
LCM Host 00 0 is included in the list of LCM types
scheduled for a REX test.
Recent REX Results:
Last REX test was FRI. 1990/05/18 at 01:40:06;
PASSED.
Prior REX failure was WED. 1990/05/09 at 02:30:16
1st Pass following prior failure was THUR.
1990/05/10 at 01:12:10
```

- TST REX NOW requests immediate activation of a REX test. If the LCM is equipped with an ESA, the LCM does not initiate the ESA REX, and the following message is displayed on the MAP terminal:

```
Manual LCM REX will not invoke an ESA REX test.
```

NOWAIT (optional) frees the MAP terminal for other activities. However, if the LCM is undergoing maintenance, NOWAIT is rejected and the following message is displayed on the MAP terminal:

```
LCM Host 00 0 Request Denied: MTCE Already in Progress
```

Enhanced QUERYPM command

The QUERYPM command specifies whether or not the LCM is included in the scheduler, and the date and time of the last REX. Following is an example display generated by the QUERYPM command:

Example of a MAP response:

```
PM Type: LCM   Init. No.: 2   Status index: 2  Node_no: 23
Memory Size:  256K
ESA equipped:  Yes, Intraswitching is On
Loadnames: LCMINV – XLCMYY, Unit0: SLCM31E, Unit1: XLCM31E
LCM HOST 00 0 is included in the list of LCM types
 scheduled for a REX test.
REX on LCM HOST 00 0 has not been performed.
Node Status: {OK, FALSE}
Unit 0 Status: {OK, FALSE}
Unit 1 Status: {OK, FALSE}
Site   Flr   RPos   Bay_id   Shf  Description  Slot  EqPEC
HOST    05    D05    OPE 00    05   LCM  00  0      6X04AA
```

The QUERYPM FLT command displays the REX Failed reason for ISTb and SysB LCM units that fail the REX test. Following is an example display generated by the QUERYPM FLT command:

Example of a MAP response:

```
Node inservice troubles exist:
   One or both units inservice trouble
LCM UNIT 0 InSv
LCM UNIT 1 Inservice Troubles Exist:
REX Failed
```

PM181 logs for the LCM REX test

The PM181 logs are printed for each REX test passed. The following table, LCM REX related PM181 logs, shows an example of a PM181 log report. REX test failures are generated under the PM600 log report.

Table 2-7 LCM REX related PM181 logs

Example of log report	Explanation	Action
PM181 JAN02 00:02:12 4832 INFO LCM HOST 00 0 Unit 0 Node:InSv, Unit0:Insv, Unit1:InSv Routine Exercise PASSED	REX test passed	None

BIC Relay Test (BRT)

This feature tests the tip/ring reversal relay on each Bus Interface Card (BIC) of a given LCM. It allows for both the manual testing of a single drawer of a specified LCM and the scheduled testing of all LCMs in an office. The

QUERYPM FLT command is enhanced to indicate the drawers that failed the manual or system BIC relay test. This test generates a PM181 log and a new log, PM132, to indicate test results.

The levels of BRT testing are:

- Office-level loops over each LCM included in the schedule. A single BRT runs on each drawer of the given LCM and the results of the tests are displayed in a logutil report that combines the results of each drawer test.
- LCM-level runs from the scheduled BRT. The scheduled test selects an LCM that had none of its drawers tested during the BRT window, defined by the office parameters, and runs a BRT on each drawer of this LCM.
- Drawer-level runs from the LCM-level test (scheduled) or manually from the LCM MAP level. This is a single LCM drawer test.

The office-level test loops over the LCMs in an office and performs the LCM-level test. The LCM level test, in turn loops over each drawer of a given LCM and performs the drawer-level test, which actually constitutes a BRT.

Office parameters for test scheduling

Scheduling for the BRT uses the information from two new office parameters in table OFCVAR: BICRELAY_XLCM_TEST_SCHEDULE and BICRELAY_NUM_SIMUL_TESTS. These parameters allow the user the flexibility to schedule the BRT from one to seven days a week, define the window size, and define how many tests (LCM-level) run concurrently, as follows:

- BICRELAY_XLCM_TEST_SCHEDULE
  - — This parameter defines the start time (BRTST_START_TIME) and stop time (BRTST_STOP_TIME) for the office-level test. These times cannot be the same, and the test window must be at least ten minutes long. The last field of this parameter (BRTST_DAYS_OF_TST) specifies the day(s) of the week that the office-level test runs (MON, TUE, WED, THU, FRI, SAT, SUN). The user can datafill up to seven days in any combination, but cannot datafill the same day more than once.
  - — If the start and stop times are the same or if the test window is less than ten minutes, an error message is displayed.
  - — If the user tries to make a change during the defined test window (while the test is in progress), a message is displayed indicating that, if necessary, the user can stop the BRT using the BICRELAY OFF

command, make the necessary change(s), and then restart the BRT using the BICRELAY ON command.

- BICRELAY_NUM_SIMUL_TESTS
  - — This parameter indicates the number of LCM-level tests to run simultaneously.
  - — The start and stop times of BICRELAY_XLCM_TEST_SCHEDULE plus this parameter configure the number of LCMs being tested.
  - — If the user tries to make a change during the defined test window, while the test is in progress, a message is displayed indicating the user must wait until the test stops. If the change is needed immediately, the user can stop the BRT using the BICRELAY OFF command at CI level, make the necessary change(s), and then restart the BRT using the BICRELAY ON command.

Changes in table LCMINV

BICTST is a new field in table LCMINV. It is a boolean that indicates whether or not a particular LCM is included in the test schedule.

Table control for LCMINV allows the user to change the MEMSIZE of a given tuple from 64K to 256K when the LCM is still InSv. If this change is made without changing the load in the LCM to an XLCM load, the BRT does not test the LCM. The user must busy the LCM, reload it with an XLCM load, and RTS the LCM to include it in the test schedule.

If the user attempts an office-level test or manual LCM-level test on an LCM whose load is not changed, the test is not run and a log is generated indicating the LCM does not contain an XLCM load.

If the user changes the MEMSIZE field from 256K to 64K, the BICTST field must be set to N. If it is not, a message is displayed indicating that the BICTST field set to Y is valid only for the XLCM. The change is then rejected. If the MEMSIZE field is set to 256K (indicating XLCM), the user can set BICTST to Y or N. Any LCM entry in table LCMINV with the MEMSIZE field set to Y is automatically included in the test schedule.

BICRELAY command

BICRELAY allows the user to enable, disable, reset, allow, or disallow the PM181 drawer state change logs when a given LCM is undergoing the system BRT, or query the BRT for the entire office.

Note: Only PM181 logs associated with the LCM undergoing the BRT are suppressed. Any other PM181 associated with any other LCM or XPM is allowed.

The BICRELAY parameters are as follows:

- ON

  Enables the test to begin at the scheduled window. A message is displayed indicating the test is turned ON. If the current date and time are in the scheduled window, the office-level test is started immediately. If any tests are in progress when this command is issued, a message is displayed indicating the user must wait until all tests have completed before restarting the BRT. This option does not affect the operation of the manual TST command at the LCM MAP level.

- OFF

  Disallows the resumption of the office-level test. A message is displayed indicating the test is turned OFF. Any system BRTs currently in progress are allowed to complete. This is the default.

  Once the test is disabled, it does not begin again until enabled by using the ON option. Once enabled, the office-level test is resumed at the point where it was turned OFF. This option does not affect the operation of the manual TST command at the LCM MAP level.

- SUPPRESS

  When an LCM undergoes a system-initiated BRT, each drawer is busied, tested, and RTS. When these state changes take place, a PM181 is generated indicating the change. This parameter allows the user to suppress these logs for any LCM undergoing a system BRT. However, the PM181 logs for an LCM not currently undergoing a system BRT are not suppressed. Also, SUPPRESS has no effect on a manual BRT run on a single drawer. This parameter can be issued at any time. A message is displayed indicating the logs are suppressed.

- ALLOW

  Resumes the PM181 drawer state change logs during a system BRT. This parameter can be issued at any time. A message is displayed indicating the logs are resumed.

- RESET

  Enables the user to restart an office-level test as if no LCMs had been tested. The user must turn the test OFF before using this parameter. If the user attempts to reset the BRT while it is ON, a message is displayed indicating the BRT must be turned OFF before RESET can be performed and all currently running tests complete. This option can be used at any time and does not affect the operation of a manual TST command at the LCM MAP level.

- QUERY

  Displays the current ON/OFF status of the office-level test, the number of LCM-level tests currently in progress, the next LCM to be tested in the

scheduled BRT in the format of HOST 00 0 0, and the status of the SUPPRESS/ALLOW commands.

Test operation

The BRT is performed on a per LCM basis by the system or on a per drawer basis manually. On a per LCM basis, the BRT is performed on all drawers of the LCM automatically. The single drawer test is invoked manually using the TST DRWR <*drwr_no*> RELAY command at the LCM MAP level.

Office-level test The system test performs the following steps:

- Loops over each LCM included in the test schedule.
- Loops over each drawer for each LCM.
- Runs one tip/ring reversal relay test for each drawer.
- Generates one logutil report with the results of all 20 drawers.
- Sets the drawer and node ISTb status accordingly.

LCM-level test The office-level (automated) test is run when the scheduling is datafilled in the office parameter. Once an LCM is tested, it is not retested until each LCM in the office is successfully tested. When all LCMs included in the schedule are tested in the window, the BRT stops. Testing resumes when the next window arrives. If an LCM is not tested, it is skipped in the current window and a PM181 information log is generated indicating the reason the test was not performed. If an LCM test is still running when the stop time arrives, the current LCM level test is allowed to complete.

The BRT remembers which LCM was the first to be tested in a given window. Each subsequent LCM to be tested is compared to the first LCM. If they are the same and the current date and time still fall in the window, the BRT stops. If all LCMs are not tested in the window, the BRT begins where it left off during the last scheduled window.

The BRT can be scheduled to run concurrently with the Automatic Line Test (ALT) or the LCM REX. However, running the BRT and the ALT concurrently is *not* recommended for the following reasons:

- Use of necessary test equipment by both or all these tests reduces the number of LCMs that can be tested in the window.
- Completion of the ALT is slowed.

None of these tests run concurrently on the same LCM. It is up to the user to define a window that does not coincide with the scheduled REX and/or ALT.

The LCM audit, the manual REX, and the system REX cannot be run on the same LCM that is running the system BRT. Also, the LCM PM/UNIT cannot be manually busied (ManB) during the system BRT.

Drawer-level test The BRT drawer-level test requires the Metallic Test Equipment (MTE) and a single NT6X17 line card located in each drawer being tested. The line card is used to test the BIC relay and must be in a working state. The card must not indicate a diagnostics failure at the MAP terminal and cannot be indicated as missing (M).

Each drawer is placed in a ManB before the drawer-level test. When the tip/ring reversal relay test on all drawers completes, the results are displayed by a single new logutil report, PM132, that includes the results of each individual drawer test of a given LCM. If a drawer was previously out of service or call processing is currently in progress, the drawer is skipped and tested on later passes of the BRT.

Simultaneous tests (per LCM) Simultaneous LCM tests run if test equipment is available up to the number indicated in the BICRELAY_NUM_SIMUL_TESTS parameter described earlier. There must be LTUs or MTUs (MTE) provisioned to allow the number of simultaneous tests (LCM-level) to run. Due to realtime considerations, this parameter has a range of one to three. A higher number in this field allows more LCMs to be tested in a given window.

Manual test The manual test performs the tip/ring reversal relay test on a selected drawer of a posted LCM.

Single-drawer test The single-drawer test is mainly for retest purposes if a failure occurs during the system test. This test is run from the LCM MAP level and is part of the TST DRWR command. A new option, RELAY, allows the BRT to run without running the main DRWR test. BRT is not run unless the RELAY option is specified. The drawer must be ManB by the user before this test is run. The user is prompted if the drawer is InSv, ISTb, or SysB. The manual BRT cannot be run on a drawer where the LCM node is ManB, SysB, C-side busy (CBsy), or off-line (Offl). A message is displayed indicating the request is invalid and gives the current state of the node.

Office-level test The system BRT displays the results of each LCM-level test in the form of a new logutil information report, PM132.

PM132 displays a combined report of each drawer-level test in a given LCM, indicating the following:

- Test passed .
- Reversal test failed.

- Unavailable line card.
- Problems encountered using the MTE.
- Being aborted.
- Drawer previously out of service.
- Call processing currently in progress.
- Bad hardware.
- Message link problems.
- Unavailable resources.
- Invalid load in the LCM.
- Unexpected error condition.
- Drawer failed to RTS after test.
- Conflicts in maintenance software.

If an LCM-level test does not run because of unavailable equipment before the individual drawer tests, the LCM is not tested, a PM181 is generated, and the LCM node state is not changed.

If a drawer test fails to run, the drawer remains in its current state and is retested in a later window.

Manual test The single-drawer test displays a PM181 log with the results of the test. The MAP terminal also displays a response along with a card list indicating the drawer that failed, if necessary. If a single drawer test cannot run, the drawer is not set ISTb and can be RTS to its previous state.

QUERYPM FLT command

Additional information to the QUERYPM FLT command at the LCM MAP level lists all drawers that fail the BRT and are set ISTb. The node ISTb reason is set to DRAWER FAULT as before.

Restarts The following information applies to both manual restarts and system-level restarts:

- warm or cold
  - — All drawer-level tests are aborted.
  - — ISTb reasons are saved.
  - — All LCM-level tests are aborted and are system level only if they are in the window the test will resume after the restart. LCMs already tested are not retested.
- reload
  - — The BRT is reset as if the RESET option of the BICRELAY command was issued.
  - — The ON/OFF settings of the BICRELAY command are retained.
  - — The state of the SUPPRESS/ALLOW commands are retained.
  - — ISTb reasons are cleared.

Feature impact Each drawer to be tested is taken out of service for approximately ten seconds. During this time, call processing is suspended.

Interactions This feature uses the test access bus, the MTE, and a single NT6X17 card in each drawer to complete testing. Therefore, running an ALT simultaneously with a BRT can delay both tests because they are competing for the same test equipment.

If REX is running on a given LCM, BRT is not run on that LCM. The LCM remains in its current state, and a PM181 is generated indicating the BRT did not run because of REX in progress.

Restrictions and limitations

The following restrictions apply to the BRT feature:

- The system test manually busies the logical drawer before running the RELAY test. If there are lines in a call processing busy state, the drawer is skipped for this test cycle.
- Before running a manual BRT on a single drawer, the drawer should be ManB.
- If at least one NT6X17 line card is not datafilled in each logical drawer, the drawer is not tested.
- If the line card selected for testing is removed during the test, the drawer fails.
- If a drawer fails to RTS when the system BRT is completed, the drawer is placed SysB so the system audit can attempt to return it to service.

- This test is not run on an LCM concurrently with an LCM audit and a REX test.
- The BRTST_START_TIME and BRTST_STOP_TIME fields of the BICRELAY_XLCM_TEST_SCHEDULE office parameter cannot be datafilled with the same value, and must have at least a ten-minute time span between them.

Message links (links 0 and 2) and DS-1 maintenance

Message links between the RCC and the LTC are always links 0 and 2. If a maintenance request to busy either of these links is entered from the LTC peripheral side MAP level, the DMS responds with a warning that such action could take the RCC down by severing communication between the RCC and the CC. A maintenance person can override this warning if maintenance must be performed on the link.

The link state is particularly important to overall peripheral sanity when the peripheral is remote and the link is supporting messaging to the remote host. To ease maintenance in the remote peripheral, DS-1 maintenance reacts to a limited set of detected events by generating log messages. The following detected events aid peripheral maintenance software in some decision making, such as the SWACT:

- card removed
- local alarm entered
- local alarm cleared
- remote alarm detected
- remote alarm cleared

Messaging links are maintained in the same manner as any other links when DS-1 maintenance is enabled. They are subject to the same scanning, filter times, alarms, and reporting as any other link. The only unusual treatment these links receive is extended DS-1 maintenance.

Extended DS-1 maintenance utilities and routing procedures subject message links to continuous scanning, whether or not DS-1 maintenance is enabled. On each C-side DS-1 message-supporting link, in all applications except the DRCC inter-RCC IRlinks, a permanent looparound connects the outgoing side of channel 12 to the incoming side of channel 16. This looparound allows the DMS to respond with a warning when a maintenance request is entered to busy a message link between the RCC and the LTC. The idea is to prevent the DS-1 circuits from remaining in a state that cuts off the remote peripheral from its host, unless this action is clearly needed. This warning exists only when DS-1 maintenance is enabled on a message link.

NT6X50AB circuit card retrofit for RCC C-side application

Normally NT6X50AA cards are used on the C-side of the RCC which supports only the SF/ZCS signaling format. Refer to notes in the tables for RCC backplane strapping options, “NT6X50AA and NT6X50AB RCC backplane strapping options". However, for the RCC to support other signaling formats, NT6X50AB cards must be provisioned. Other signalling formats include 64-kb/s clear channel data, and cyclic redundancy code (CRC), both of which are supported through the extended superframe format (ESF),

Note: CRC is a method of performance monitoring which can be used to monitor the end-to-end quality of the speech links between the host XPM and the RCC.

The circuit card installed on each end of the link must be the same card type. Do not mix NT6X50AAs and NT6X50ABs on opposite ends of the same DS-1 span.

The backplane of the RCC units are shipped for NT6X50AA (SF/ZCS) use. When the NT6X50ABs are used, a new strapping option must be installed on slot 13, which contains either the signaling processor or unified processor of the backplane. The tables here list the RCC backplane strapping options for NT6X50AA and NT6X50AB.

Table 2-8 RCC backplane strapping options—NT6X50AA

Circuit card	Signaling format	Pin	Pin	Pin	Pin	Application
NT6X50AA	SF/ZCS(Note 1)	73B	74B	75B	76B	A/B-bit signaling
Note: SF/ZCS = Superframe/zero code suppression						

Table 2-9 RCC backplane strapping options—NT6X50AB

Circuit card	Signaling format	Pin	Pin	Pin	Pin	Application
NT6X50AA	SF/ZCS (Note 1)	73B	74B	75B	76B	A/B bit signaling
NT6X50AB	SF/ZCS (Note 1)	73B	74B	76B	—	A/B bit signaling
NT6X50AB	SF/B8ZS (Note 2)	72B	74B	76B	—	64 kb clear channel data
NT6X50AB	ESF/ZCS (Note 3)	74B	76B	—	—	A/B bit signaling
NT6X50AB	ESF/B8ZS (Note 4)	72B	73B	76B	—	64 kb clear channel data

Note 1: SF/ZCS Superframe/zero code suppression (NT6X50AA supports SF/ZCS format only)

Note 2: SF/B8ZS Superframe/bipolar 8-bit zero suppression

Note 3: ESF/ZCS Extended superframe/zero code suppression

Note 4: ESF/B8ZS Extended superframe/bipolar 8-bit zero suppression

With the strapping option, an entry must also be added into table CARRMTC for the DS-1 card code, frame format, and zero logic. These strapping options are designated for the DS-1 message supporting links. Refer to the following figure for an example of a CARRMTC table entry.

Figure 2-15 Datafill example of table CARRMTC

```
CSPMTYPE TMPLTNM RTSML RTSOL                                    ATTR
-----------------------------------------------------------------------
LTC    SF/B8ZS   255  255 DS1 (NT6X50AB) MU_LAW SF B8ZS BPV NILDL N 500
                            1000 500 500 500 1000 3  6 864 100 20
                             4000 20 200
```

Retrofit restrictions

The following conditions must be met before retrofitting an RCC on the C-side with NT6X50AB cards.

- The office must be at BCS31 or higher.
- NT6X45BA/BB or NTMX77AA cards are required in a host XPM that supports the RCCs to be retrofitted.

- NT6X45BC and higher or NTMX77AA circuit packs are required for the RCCs. NT6X50BD circuit packs are required for a dual RCC (DRCC).
- NT6X50AB cards must be installed at the host end of the DS-1 span, in both the host XPM and in the RCC. This procedure fits the AB in the remote.
- The distance from the RCC backplane to the DSX panel must be known to properly set the dip switches, as they will change. The following two tables list proper NT6X50 switch settings according to the distance to the cross-connect facility and the product engineering code (PEC) of the card.

Table 2-10 DIP switch equalization settings for NT6X50AA with 22 AWG DS-1 cable

Distance to cross-connect	S1	S2	S3	S4	S5	S6	S7	S8
0—91 meters	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
91—137 meters	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
137—228 meters	ON	OFF	OFF	OFF	ON	OFF	ON	OFF

Table 2-11 DIP switch equalization settings for NT6X50AA with 24 AWG DS-1 cable

Distance to cross-connect	S1	S2	S3	S4	S5	S6	S7	S8
0—61 meters	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
61—100 meters	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
100—137 meters	ON	OFF	OFF	OFF	ON	OFF	ON	OFF

Table 2-12 DIP switch equalization settings for NT6X50AB (Release 61 and higher) (Sheet 1 of 2)

Distance to cross-connect	DIP switch settings			
Meters	*Feet*	*S1*	*S2*	*S3*
0—41	0—133	ON	OFF	OFF
41—81	133—266	OFF	ON	ON
81—122	266—399	OFF	ON	OFF

Table 2-12 DIP switch equalization settings for NT6X50AB (Release 61 and higher) (Sheet 2 of 2)

Distance to cross-connect	DIP switch settings			
122—163	399—533	OFF	OFF	ON
163—200	533—655	OFF	OFF	OFF

NT6X50AB retrofit for an RCC in BCS31 offices

When installing this retrofit in offices at BCS31 only, the following patches must be applied:

- JCB60
- JWT69
- HSR53
- AGT73
- DRM28
- AGT78
- BMW26

Note: Patches AGT78 and BMW26 are ACT patches that must be enabled in table PATCHEDIT before starting a retrofit and being disabled in table PATCHEDIT after completing a retrofit. This ensures a WARM SWACT is supported when the nondynamic static data has been changed for the host XPM.

NT6X50AB retrofit for an RCC in BCS32 and higher offices

When installing this retrofit in offices at BCS32 or higher, the following response is received from table control when the nondynamic static data has changed:

CAUTION
LOSS OF SERVICE
Do not follow the table control instruction, or a service degradation for this PM will occur. This retrofit requires taking the inactive unit out of service. The active unit is in service but has no backup.

```
WARNING:    NON–DYNAMIC STATIC DATA HAS CHANGED FOR
{CPC} {#}.  IT IS RECOMMENDED TO BSY THE INACTIVE UNIT ON
{CPC} {#}, RTS AND SWACT THE {CPC} {#} OR, BSY AND RTS THE
NODE.
```

Retrofit procedure

DANGER
Risk of electrocution
Remove all jewelry before starting any backplane wiring. Observe all NTI and local safety precautions to prevent electrocution.

DANGER
Damage to backplane pins
Failure to use proper tools and wiring procedures can result in bending/breaking of the backplane pins.

To retrofit an RCC with NT6X50AB, perform the following steps:

1 Ensure the RCCs are not currently at the vintage this retrofit is intended to accomplish.

2 Ensure the office supports the proper BCS.

3 Ensure all circuit cards are good and available on site.

4 Ensure all required patches are applied.

5 Notify all appropriate personnel in TAC, or TAS and ETAS, or the retrofit.

6 Enable recording on a printing/recording device.

7 Perform the retrofit during a low-traffic period.

8 Cancel all REXTST, AUTOPATCH, AUTOIMAGE, ATT, ALT, LCDREX, and NETFAF/ICTS for the duration of this retrofit.

9 Capture copies of tables LTCINV, LTCPSINV, CARRMTC, RCCINV, and IRLINKINV for the affected PMs.

10 Ensure no PM or TRK logs are suppressed. PM and TRK logs should be monitored during the retrofit.

11 Ensure all PMs affected by this retrofit are in-service with no faults.

12 Ensure link assignments of affected/posted PMs correlate with step 9.

Note: If the RCC is in a dual RCC (DRCC), links from one RCC to the other RCC are datafilled in table IRLNKINV. These links can be busied at the IRLINK level of the MAP menu.

13 Post the RCC to be retrofitted first and make sure unit 1 is the active unit. Refer to the following table to determine the physical location of the NT6X50AA circuit cards to be retrofit.

Table 2-13 RCC C-side link layout

Unit number	Shelf	Slot	C-side links
0	18/51	20	0,1
0	18/51	21	4,5
0	18/51	22	8,9
0	18/51	23	12,13
1	32/65	20	2,3
1	32/65	21	6,7
1	32/65	22	10,11
1	32/65	23	14,15

14 BSY unit 0 of the first RCC and perform a SWACT if necessary.

15 Post the C-side XPM, TST, and BSY the links to be retrofit on unit 0.

16 Unseat the following cards in the order they are listed in this step:

1. NT6X48 in slots 07 and 06
2. NT6X69 in slot 17
3. NTMX77 in slot 13

17 Power down the shelf.

18 Replace NT6X50AA cards with NT6X50AB cards. Perform wiring options according to table, “RCC backplane strapping options NT6X50AB", and set dip switches according to table “DIP switch equalization settings for NT6X50AB (Release 61 and higher)".

19 Add a tuple to table CARRMTC for the new signaling format. Refer to the figure, “Datafill example of table CARRMTC".

20 Change table LTCPSINV to reflect the new signaling format for affected links.

21 Power up unit 0.

22 Reseat the cards unseated in step 16 in the following order:

1. NTMX77 in slot 13
2. NT6X69 in slot 17
3. NT6X48 in slots 06 and 07

23 Post the host XPM, TST and RTS all affected P-side links.

24 Post the RCC, LOADPM, PMRESET, RTS and TST unit 0.

25 If in DUAL configuration, enter the IRLINK MAP level and RTS IRlinks.

26 SWACT the unit.

27 Perform steps Section 1, "Ensure the RCCs are not currently at the vintage this retrofit is intended to accomplish." on page 2-94 through Section 25, "If in DUAL configuration, enter the IRLINK MAP level and RTS IRlinks." on page 2-95 on unit 1.

28 Update the change control log.

29 Perform steps 1 through 28 on all RCCs to be retrofitted with new NT6X50AB circuit packs and signaling formats.

The NT6X50AB retrofit detailed change application procedure (CAP) is also included in C-SCAN (CAP INFO).

Retrofit procedure to change the DS-1 signaling format on an RCC with NT6X50AB cards.

DANGER

Risk of electrocution

Remove all jewelry before starting any backplane wiring. Observe all NTI and local safety precautions to prevent electrocution.

DANGER

Damage to backplane pins

Failure to use proper tools and wiring procedures can result in bending/breaking of the backplane pins.

To change the DS-1 signaling format on an RCC with NT6X50AB cards, perform the following steps:

1 Notify all appropriate personnel in TAC, TAS and ETAS of the retrofit.

2 Enable recording on a printing/recording device.

3 Perform the retrofit during a low-traffic period.

4 Cancel all REXTST, AUTOPATCH, AUTOIMAGE, ATT, ALT, LCDREX, and NETFAF/ICTS for the duration of this retrofit.

5 Capture copies of tables LTCINV, LTCPSINV, CARRMTC, RCCINV and IRLINKINV for the affected PMs.

6 Ensure no PM or TRK logs are suppressed. PM and TRK logs should be monitored during the retrofit.

7 Ensure all PMs affected by this retrofit are in-service with no faults.

8 Ensure link assignments of affected/posted PMs correlate with the hard copy printed in step 5, by translating the P-side links of the posted PM and comparing the link assignments against the hard copy.

Note: If the RCC is in a dual RCC (DRCC) configuration, the interlinks connecting one RCC to the another RCC are datafilled in table IRLNKINV. These links must be busied at the IRLINK level of the MAP menu.

9 Post the RCC to be retrofitted and make sure unit 1 is the active unit. Refer to the following table to determine the physical location of the NT6X50AB cards to be restrapped.

Table 2-14 RCC C-side link layout

Unit number	Shelf	Slot	C-side links
0	18/51	20	0, 1
0	18/51	21	4, 5
0	18/51	22	8, 9
0	18/51	23	12, 13
1	32/65	20	2, 3
1	32/65	21	6, 7
1	32/65	22	10, 11
1	32/65	23	14, 15

10 BSY unit 0 of the RCC to be restrapped for the new DS-1 signaling format and perform a SWACT, if necessary.

11 Post the C-side host XPM.

12 TST and BSY the links to be restrapped on unit 0.

13 Unseat the following cards in the order they are listed in this step:

1. NT6X48 in slots 07 and 06
2. NT6X69 in slot 17
3. NTMX77 in slot 13

14 Power down the shelf.

15 Perform wiring options according to table, “RCC backplane strapping options—NT6X50AB". Set the dip switches on the NT6X50AB cards according to table, “DIP switch settings for NT6X50AB (Release 61 and higher)".

16 Add a tuple to table CARRMTC to reflect the new signaling format. Refer to the figure, “Datafill example of table CARRMTC".

17 Change table LTCPSINV to reflect the new signaling format for affected links.

18 Power up unit 0.

19 Reseat the cards unseated in step 13 in the following order:

1. NTMX77 in slot 13
2. NT6X69 in slot 17
3. NT6X48 in slots 07 and 06

20 Post the host XPM.

21 TST and RTS all affected P-side links.

22 Post the RCC.

23 LOADPM, PMRESET, RTS and TST unit 0.

24 If in DUAL configuration, enter the IRLINK MAP level and RTS the IRlinks.

25 SWACT the unit.

26 Perform steps 1 through 25 on unit 1.

27 Update the change control log.

28 Perform steps 1 through 27 on all RCCs to be restrapped for a new NT6X50AB signaling format.

3 Remote Switching Center hardware

This chapter describes the hardware components of a Remote Switching Center (RSC) as follows:

- RSC
  - — remote cluster controller (RCC)
  - — line concentrating module (LCM)
  - — remote maintenance module (RMM)
- RSC with XPM PLUS
  - — remote cluster controller (RCC) with a unified processor (UP) card (RCC with XPM PLUS [RCC PLUS])
  - — line concentrating module (LCM)
  - — remote maintenance module (RMM)

Hardware components

The following sections describe the components in all RSC configurations.

RSC

Remote cluster controller (RCC)

The RCC is the core of the RSC. The RCC is based on the host line trunk controller (LTC) or line group controller (LGC). The RCC can support DS-1 interfacing towards the host. The RCC can support interfacing towards another remote or digital central office. Most circuit packs provisioned in the RCC are the same as the circuit packs used in the host LTC. The control complex of each RCC unit is equipped with the following:

- NT6X45 master processor (MP)
- signalling processor (SP) cards
- NT6X46 signalling processor memory (SPM) card

- NT6X47 master processor memory (MPM) card
- NT6X44 time switch (TS) card

WARNING
RSC supports a maximum of eight P-side peripherals
The total amount of peripheral nodes the RSC supports cannot exceed eight. Peripheral nodes include LCMs, RLCMs, SMSRs, RMMs, and remote modules configured on an RCC2. The system rejects attempts to datafill more than eight P-side nodes in inventory tables.

The functions of the RCC include the following:

- termination of all DS-1 links from the host LTC or LGC and exchange of control messages with the host LTC. The exchange of control messages requires message channels on the primary DS-1 link.
- termination of all DS30A links from P-side LCMs and RMMs
- termination of P-side DS-1 links. These links are distinct from the host directed DS-1 links. The system uses these links for P-side trunking and to service RLCMs in the Remote-off-Remote option.

Remote cluster controller with XPM PLUS

The RCC PLUS is the master controller for all peripherals of the RSC with XPM PLUS. The design of the RCC PLUS is the same as the design of the host peripheral, the line group controller (LGC) or line trunk controller (LTC). The differences between the RCC PLUS and the LGC or the LTC follow:

- All RCC PLUS C-side links are DS-1 instead of DS30.
- The RCC PLUS does not have a channel supervision message (CSM) card. The LTC for non*intra*switched and non*inter*switched calls handles all CSM for the RCC PLUS.
- The RCC PLUS connects to another peripheral on the C-side. The RCC PLUS does not connect to the network.
- The RCC PLUS requires the global tone receiver (GTR) or universal tone receiver (UTR) card. Do not install the GTR and UTR together on the same RCC.
- The RCC PLUS has two messaging links. One messaging link serves each unit.
- The RCC PLUS supports a maximum of two RMMs.

Unified processor card The unified processor card (UP) NTMX77AA, replaces the NT6X45, NT6X46 and NT6X47 processor. This card replaces

memory cards in RCC PLUS configurations. This card assumes and improves the processing and memory functions of the cards this card replaces. Improvements include increased real-time and memory capacities.

Line concentrating module

The line concentrating module (LCM) performs the line interface functions for the RSC. An LCM connected to an RCC PLUS is the same as an LCM connected to an LTC at the host. Each LCM connects to the P-side of the RCC PLUS through DS30A links.

Remote maintenance module

The RMM is based on the maintenance trunk module (MTM). The RMM provides test equipment for diagnostics. The RMM supports other service circuits.

How to configure the RSC

When the RSC supports lines only, the RCC PLUS connects to a host LGC. The RCC PLUS is configured with a maximum of nine LCMs. Each LCM uses two DS30A links. The RCC PLUS can be configured with a maximum of three LCMs. Each LCM uses six DS30A links. The RCC RCC PLUS support outside plant modules (OPM) or remote line concentrating modules (RLCM) over DS-1 links.

The RCC PLUS connects to the DMS network by nailed-up connections through the host LGC or LTC. These connections can be from 2 through 16 DS-1 links. All RCC PLUS maintenance commands and requests for information travel through specified channels on links 0 and 2. All allocation of channels occurs in the RCC PLUS. The system maps these channels directly through the LGC or the LTC. The nailed-up connections allow direct communications between the CC and the RCC PLUS. RCC PLUS call processing uses most CC call processing software.

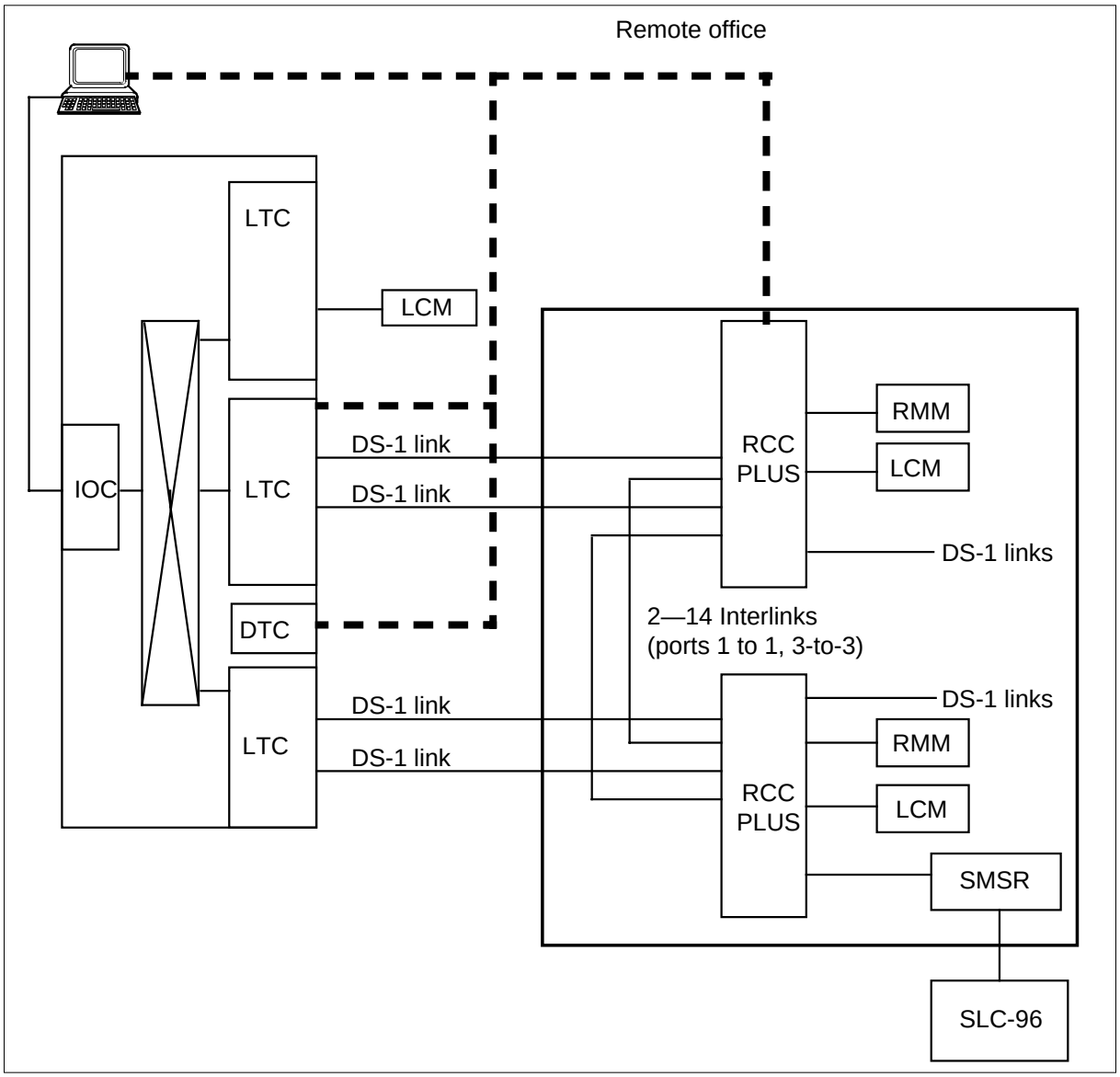
For trunking to remote community dial office (CDO) and private branch exchange (PBX) locations, a maximum of eight DS-1 trunks can be configured. Refer to the *Translations Guide,* for more details on configuration limits.

Additional components

The following figure shows the configuration that supports all improved software functionality. RCC PLUSes connected by interlinks are added to the base RSC configuration. A minimum of two interlinks is required. These links connect port 1 to port 1 and port 3 to port 3 for the interconnected RCC PLUSes of a dual RCC PLUS (DRCC PLUS).

For additional information on these components, refer to the *Translations Guide*.

Figure 3-1 Additional RSC with XPM PLUS hardware components—enhanced functionality



4 RSC signaling

Signaling for RSC

This section describes the signaling in use by the Remote Switching Center (RSC) and the Remote Switching Center Equipment (RSCE) subsystems. The following subsections describe RSC signaling format, signaling protocols, and features the format and protocols support.

Signaling and communications protocols

The RSC uses the DMS-X protocol for communications and subscriber services.

The DMS-X is a half-duplex, byte-oriented protocol, which uses a full duplex message channel. These channels are DS-1 or DS-30A links. The RSC processor handles the DMS-X message protocol on RSC message channels to the HOST, remote, or co-located equipment.

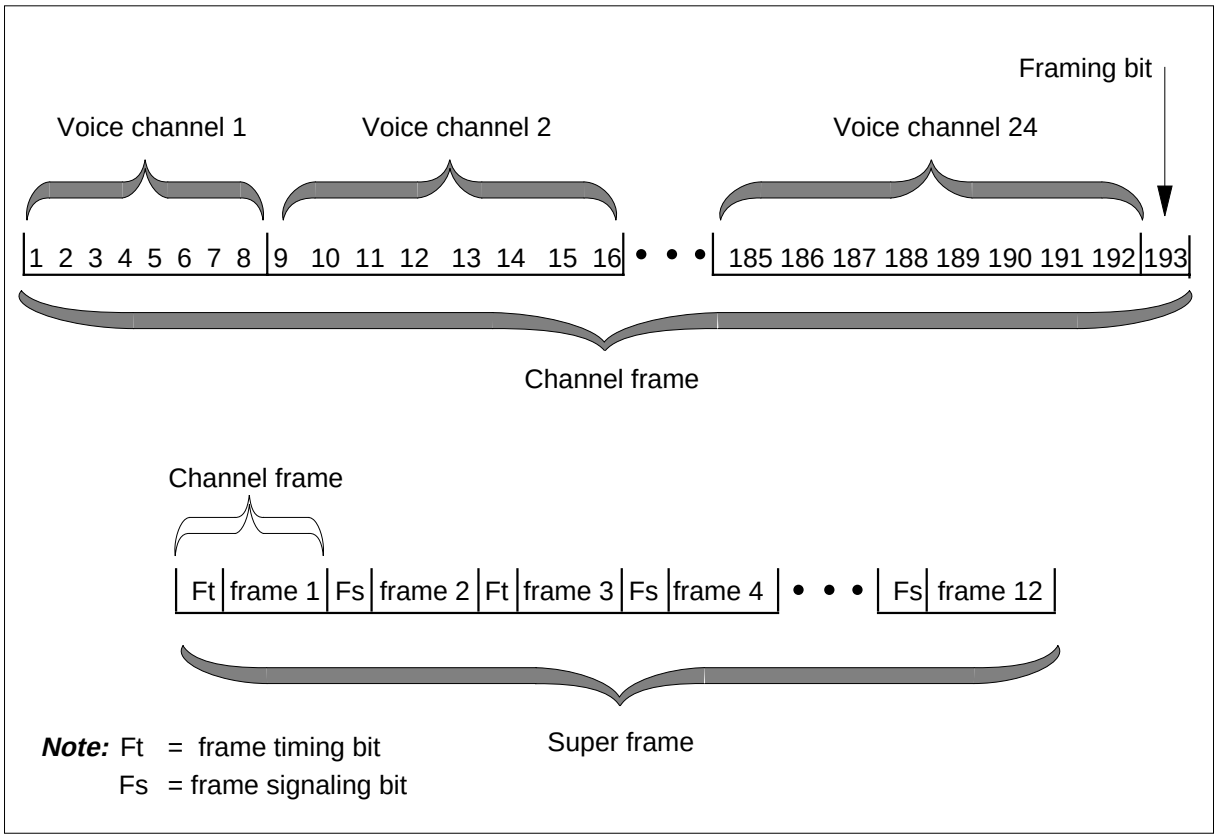
C-side links

The RSC and the HOST central controller (CC) use an extended super frame format to exchange information over 2 to 16 DS-1 C-side links. DS-1 links operate at a rate of 1.544 Mbit/s with a sample frequency of 8000 frames each second.

The DS-1 link consists of 24 channels. Each channel contains 8 bits of pulse code modulation (PCM) data. A framing bit, also known as stuffing or S-bit, is included at the end of the sequence. Include the bit to make sure the RSC and the HOST recognize the beginning of each 24 channel sequence. Send a framing bit and 192 bits of information during each 24 channel sequence.

DS-1 channel frames can carry speech information, signaling information or operations information. The following figure is the format for a DS-1 frame and a super frame. A super frame consists of 12 DS-1 frames.

Figure 4-1 DS-1 frame format



Extended frame format

The DS-1 extended super frame format (ESF) has 24 frames. The 24 sync-bits are used as follows:

- six bits for framing pattern sequence (FPS)
- 12 bits for facility data link (FDL)
- six bits for cyclic redundancy check (CRC)

Figure 4-2 Superframe alignment pattern

Frame Number	Framing bit type	Framing bit value
1	FDL	m
2	CRC	CB1
3	FDL	m
4	FPS	0
5	FDL	m
6	CRC	CB2
7	FDL	m
8	FPS	0
9	FDL	m
10	CRC	CB3
11	FDL	m
12	FPS	1
13	FDL	m
14	CRC	CB4
15	FDL	m
16	FPS	0
17	FDL	m
18	CRC	CB5
19	FDL	m
20	FPS	1
21	FDL	m
22	CRC	CB6
23	FDL	m
24	FPS	1
m = message bits CB = check bits		

The fourth bit, and each fourth framing bit, carries an FPS bit. The cyclic redundancy check (CRC) and the FPS define an in-frame condition.

The 4kbit/s facility data link (FDL) bit begins with the first framing bit. An FDL message bit is carried in each following frame.

The cyclic redundancy check (CRC) bit begins with the second bit and is carried every fourth bit. In an extended super frame, check a block check field six times. The CRC-6 check detects bits that copy an FSP bit and determines if an out-of-frame condition is present.

Signaling additions

As a part of the North America signaling, the Belcore TR-303 protocol adds a facility data link.

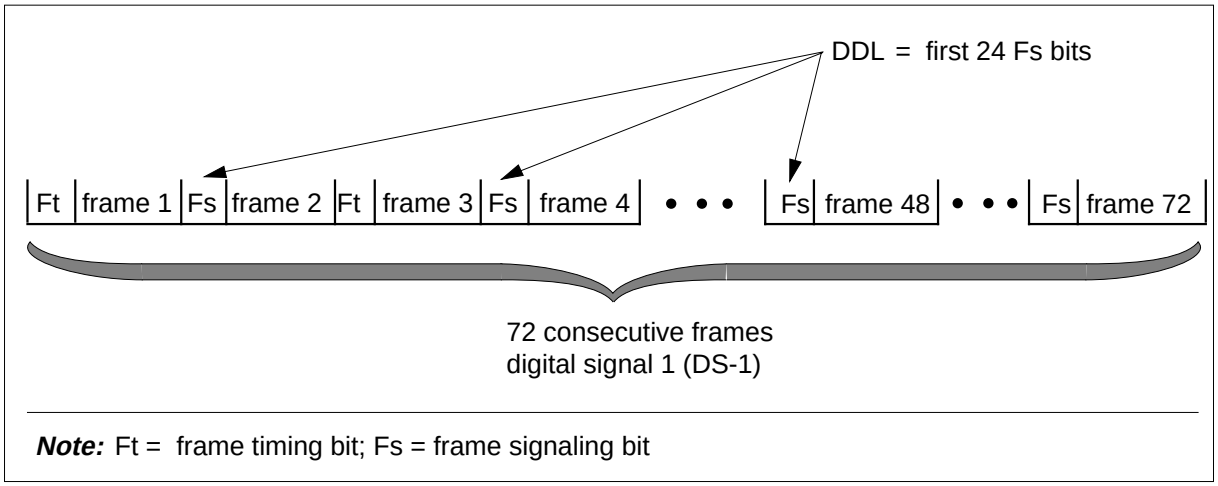
DDL signaling to SLC-96

A derived data link (DDL) frame consists of six super frames or 72 channel frames. The derived data link (DDL) connects the CC to the SLC-96. The DDL message uses the first 24 of 36 frame-signaling (Fs) bits of 72 frames. The format for the synchronization bits of 72 consecutive frames appears in the following figure.

The 24-bit pattern conveys three types of information:

- frame pattern sequence
- facility data link performance
- cyclic redundancy check

Figure 4-3 DDL signaling format



Incoming DDL

The DS-1 interface (IF) card places a string of six consecutive DDL bits from the DS-1s on the DS30 lines. The DS30 signaling protocol is like the DS30A protocol on page Section , "The DS-30A channel frames carry speech information or message information. The following figure is the format for a DS-30A frame. The DS-30A links operate at a rate of 2.56 Mbit/s with a sample frequency of 8000 frames each second. The DS-30A link frame consists of 32 channels. Each channel contains 10 bits of pulse code modulation (PCM) data." on page 4-6.

Outgoing DDL

In transmission, the CPM places a 6-bit byte in every 12th frame sent from the matrix card. Place the 6-bit byte four times in 72 frames for a total of 24 DDL bits.

DDL processing

The matrix card switches all frame output to one DS60 digroup (two DS-30s) that connects to the SIGP card. The signaling processor (SP) takes control from the point of the switch.

Table 4-1 DDL message bits and field names

DDL bits	Field name	Explanation
1 —11	Concentrator field (C-field)	Shelf groups AB and CD use the C-field when the groups operate in Mode II. This field carries information for shelves A, B, C, and D. The information includes control of subscriber assignment and deassignment to DS-1 channels, hook transitions, and activation of the PCM looping test. ***Note:*** When a C-field cannot send on the DDL link, the microprocessor sends an idle pattern on the DDL link. The RSC also sends an idle pattern when a new C-field is not present.
12—14	Spoiler bits (fixed pattern of 010)	Insert spoiler bits at positions already assigned in the DDL to make sure the DDL does not duplicate the signaling pattern.
15-17	Maintenance field (M-field)	The M-field on the A-link carries information for all shelves and controls card and customer loop tests. Refer to note 1.
18-19	Alarm data link field (A-field)	The A-field on the A-link carries alarm and system control information for all shelves. Refer to note 1.
20-23	Protection line switch field (S-field)	The S-field on the A-link controls the switching of the DS-1 protection link. Refer to note 1.
24	Spoiler bit field (fixed pattern of 1)	Insert the spoiler bit at the position assigned earlier in the DDL to make sure that the DDL does not duplicate the signaling pattern.

Note: If the M-, A-, or S-fields do not change between messages, the microprocessor sends the previous field patterns. The microprocessor sends information to the SP when a DDL field changes. Idle patterns are not transmitted.

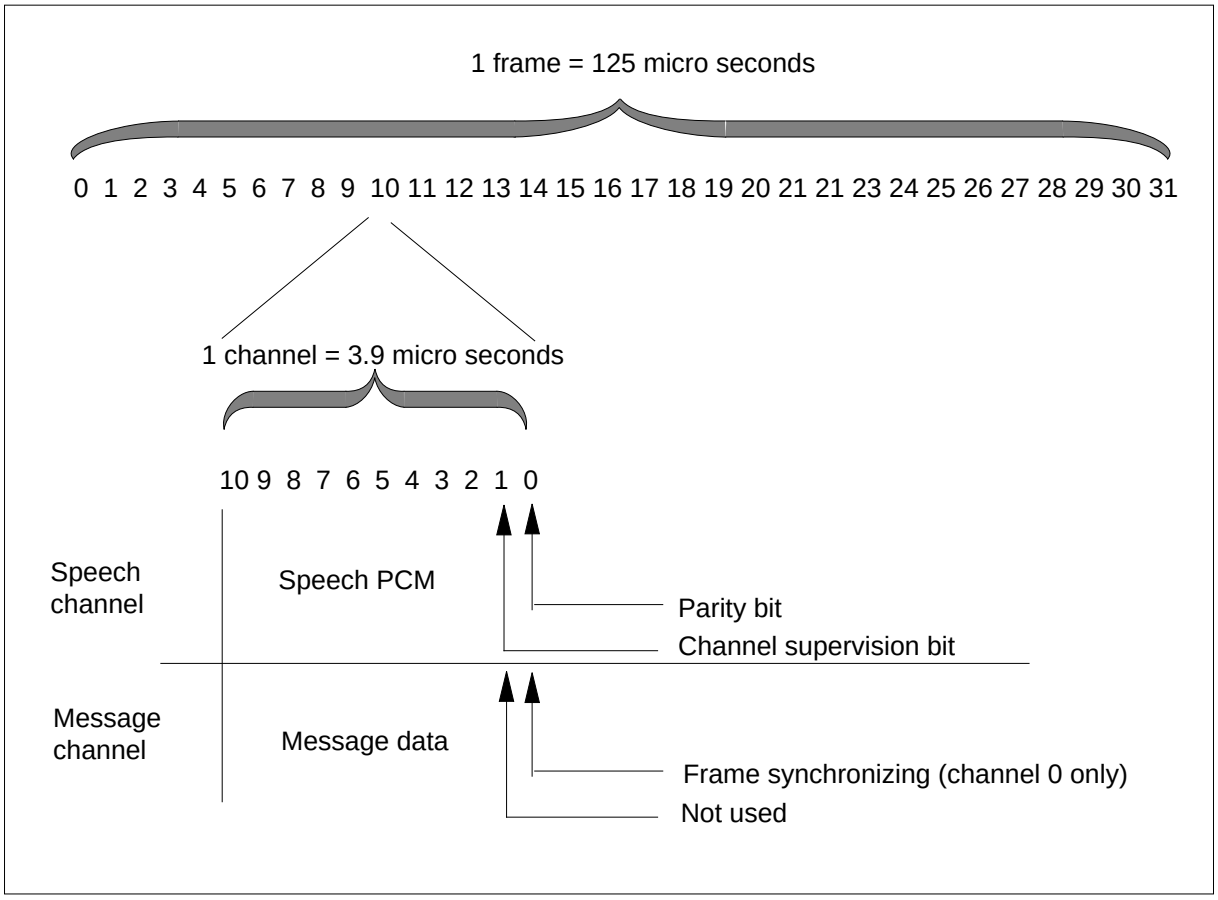
P-side links

The RSC supports a maximum of 20 P-side links. These P-side links can be configured to different groups of DS-1 links and DS-30A links. The P-side DS-1 links can be attached to remote line concentrating modules (RLCM), outside plant modules (OPM), and PBX or CDO trunks. P-side DS-1 links have the same format as C-side DS-1 links. The P-side DS-30A links can be connected to co-located equipment like line concentrating modules (LCM) or

remote maintenance modules (RMM). The DS-1 links and DS-30A links use the DMS-X protocol.

The DS-30A channel frames carry speech information or message information. The following figure is the format for a DS-30A frame. The DS-30A links operate at a rate of 2.56 Mbit/s with a sample frequency of 8000 frames each second. The DS-30A link frame consists of 32 channels. Each channel contains 10 bits of pulse code modulation (PCM) data.

Figure 4-4 DS-30A frame format



A frame synchronization bit is at channel 0 bit 0. The location of the bit allows the RCC and the LCM or RMM to recognize the start of each frame sequence.

Message links

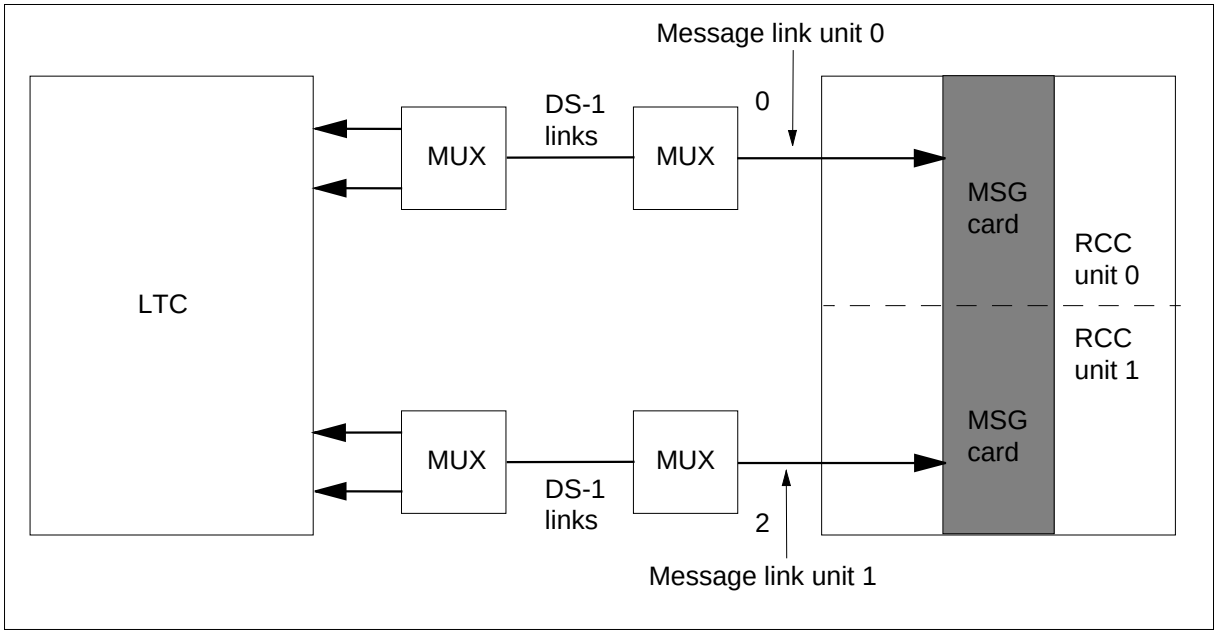
The RSC and HOST use dedicated message links to exchange system control information. The HOST uses system control messages to transfer call processing, initialization and maintenance information to the RSC. The RSC uses system control messages to inform the HOST of the RSC activities.

System control messages contain time slot assignments to off-hook subscriber lines, test requests, and alarm status information.

One message channel time slot is for the active unit message link. The other message channel is for the inactive unit message link. The active unit message link is not limited and can transmit call processing and maintenance messages. The inactive unit message link is limited to maintenance messages.

The HOST monitors both links for maintenance messages. The host responds to call processing messages from the active unit only.

Figure 4-5 RCC message links



Message channels

Communication links between the RCC and the HOST peripherals on the C-side use the DMS-X protocol. The communication links between the RCC and peripherals on the P-side use the DMS-X protocol

Messages from the CC to the RCC are first sent to the HOST XPM, like a line trunk controller (LTC+). The HOST LTC recognizes that the message is for the HOST LTC P-side node. The XPM messaging software system sends the message to its destination through a message channel between the two nodes.

The XPM messaging software system consists of the following operational layers:

- The link layer (level 1) provides the mechanism required to transfer the data bits from one node to another node. In this occurrence, the DS-1 link

that connects the HOST XPM P-side interface card and the RCC C-side interface card is the required mechanism.

The data link layer (level 2) provides the mechanism required to transfer messages from one node to another node. These nodes are connected to the mechanism. The transfer of messages uses the route selected by the network layer. The data link layer:

- performs error detection and notification
- maintains sequential order of messages
- allows the activation and deactivation of message supporting links

The network layer (level 3) provides the mechanism required to send a message from one node to another in the network. The mechanism is provided to the application software. The network layer selects a route and starts the required service from the message link layer. The route sends the message to the desired destination node.

Data link layer

The RCC converts two standard DS-1 frames into one internal DS-60 frame. The system removes timeslot 1 of links 0 and 2 from the DS-1 interface. The timeslots are wired to the first network message interface (NMIF) channel in the valid RCC message card. The speech bus interface (SBIF) directs messages along the speech bus until the messages reach the messaging card. Each timeslot on the speech bus can be used as a messaging channel to the C-side or P-side of the shelf. Use Channel 1 on each link for DMS-X protocol.

DMS-X applications

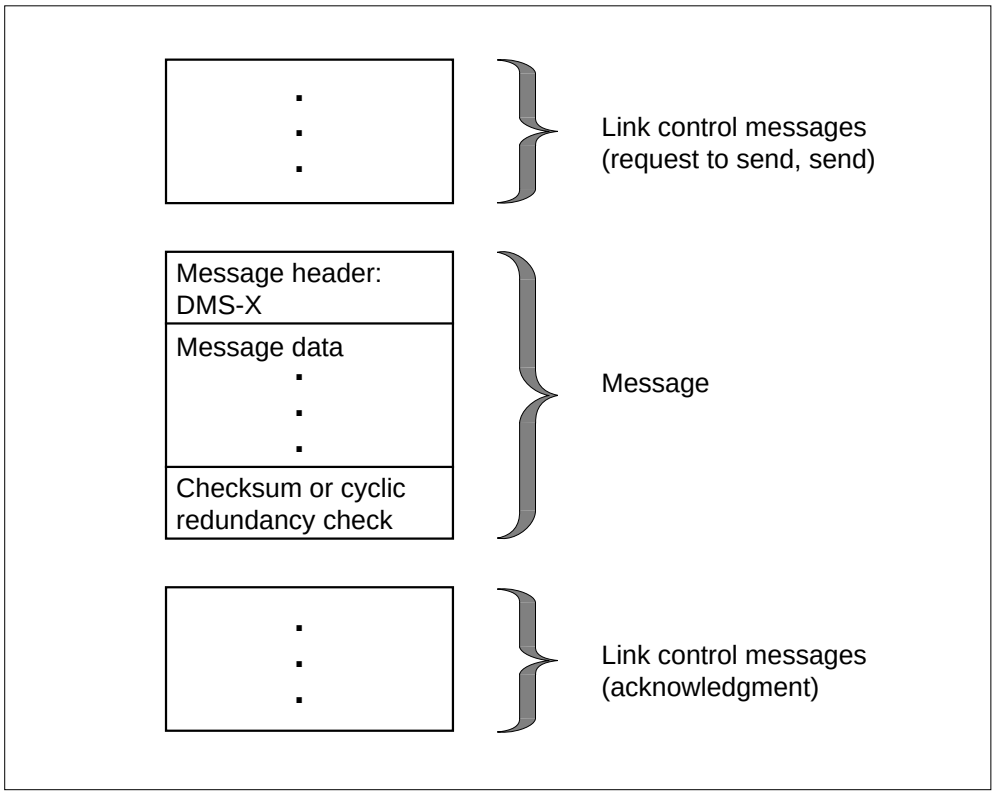
The DMS-X is the data link protocol between the LTC and the RCC. The C-side of the RCC or the P-side of the LTC is a timeslot. To apply a data link protocol to the valid timeslot, declare the specified channel as a data_link. Assign this data_link to a specified node_entity.

DMS-X protocol

A full duplex message channel, like the DS-1 links, starts the DMS-X half-duplex, byte-oriented protocol.

The DMS-X protocol is a state-driven code that requires handshake messaging between the RSC and HOST at each stage of data transfer. The handshake messaging allows the communicating terminals to delay the message transfer if one or both terminals are not ready.

Figure 4-6 DMS-X handshaking protocol



Message time-out, message checksum or CRC calculation perform message error detection. When protocol, checksum or CRC failure on an outgoing message occurs, the sending node performs the send sequence again.

On an incoming message failure, the sending node routes the message again over an alternate control side (C-side) link. Hardware redundancies provide a minimum of one other path to and from a node.

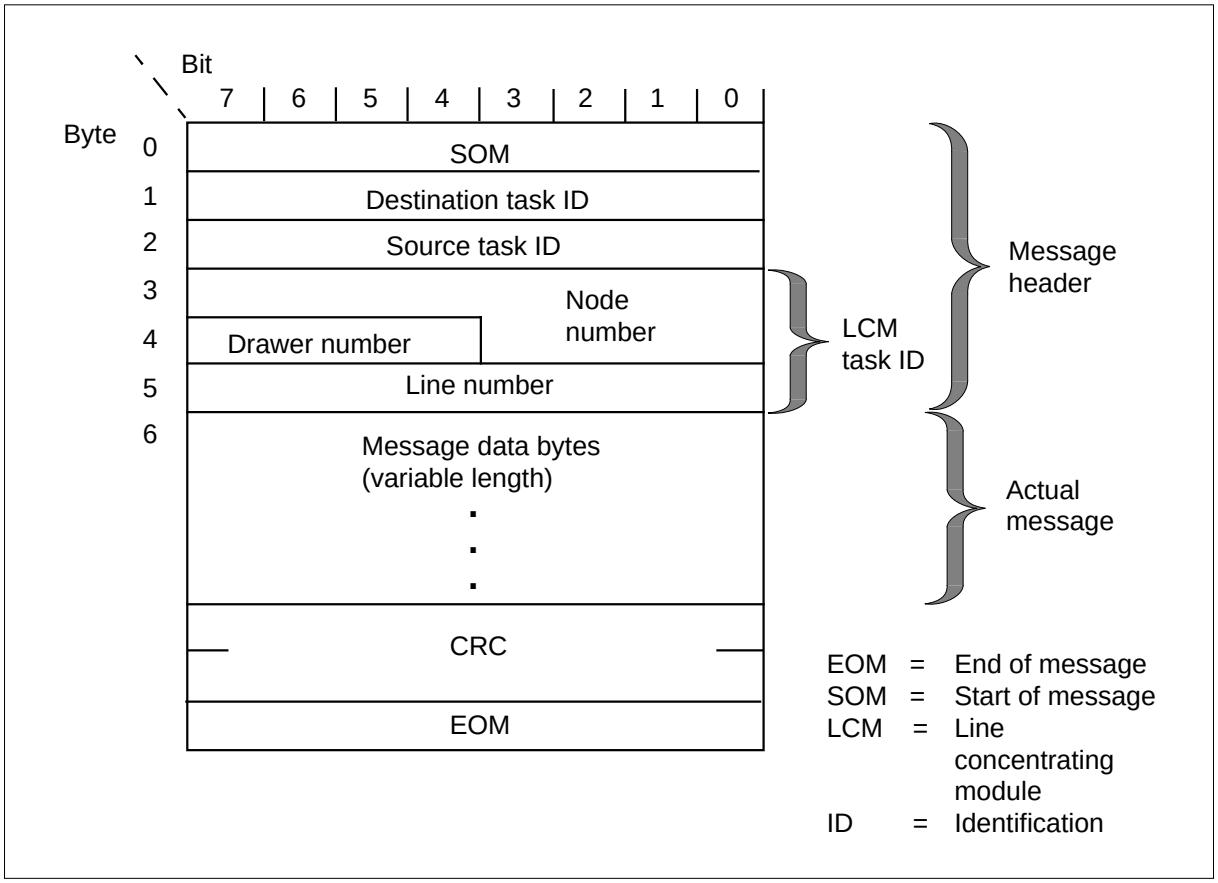
DS-1 message format

The DMS-X DS-1 message header is the first six bytes as follows:

- The first byte is the start of message.
- The second byte is the destination task identification (ID) of the message. Use this ID in an outgoing message to identify the process to receive the message.
- The third byte is the source task ID. Use this ID in an incoming message to identify the process that sent the message.
- The last three bytes are the task ID number.

The number of bytes in the sent message or data varies. The CRC occupies two bytes and detects transmission errors. The end of message occupies one byte. The DS-1 message format appears in the following figure.

Figure 4-7 DS-1 message format



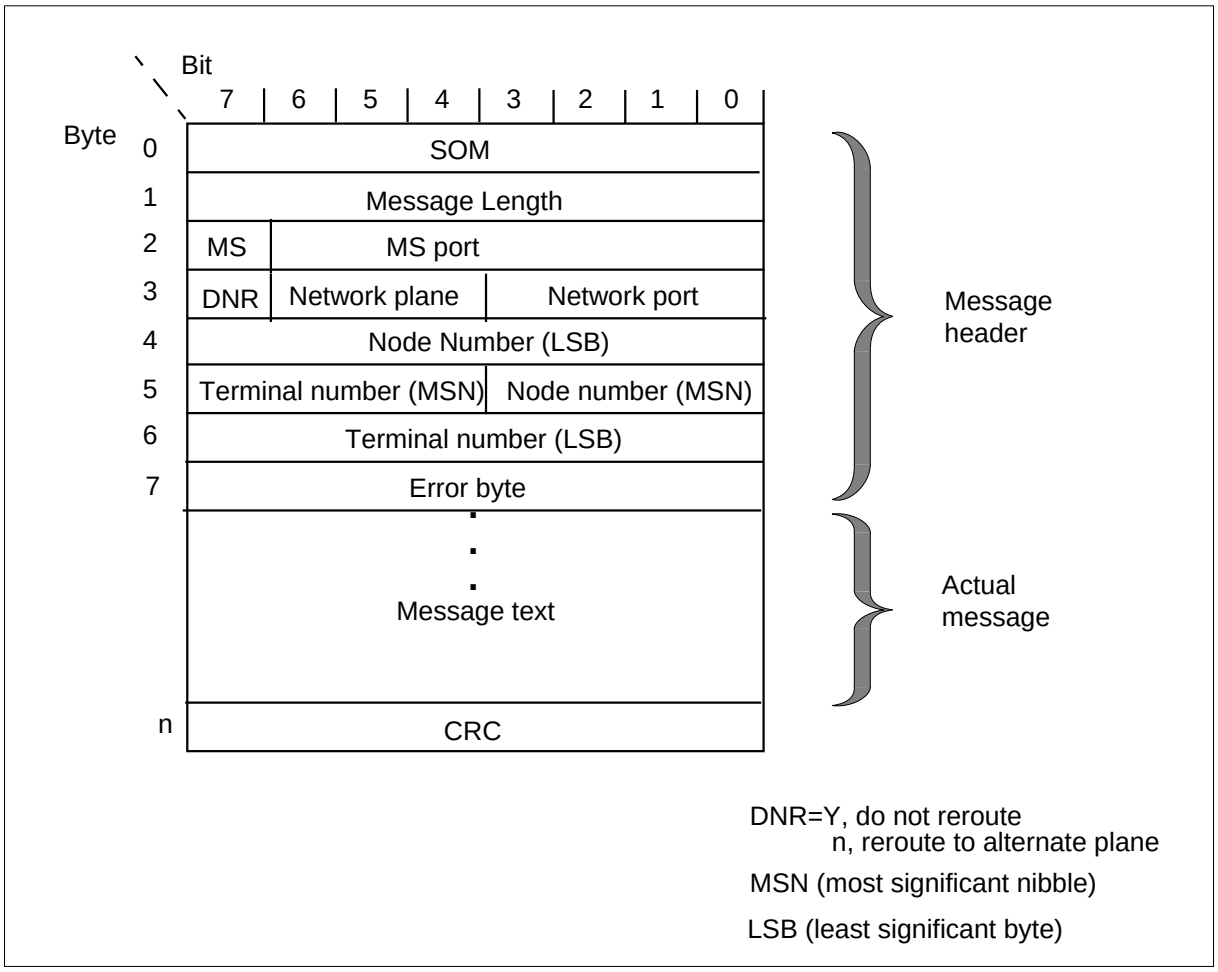
DS-30A message format

The DS30A message header is the first eight bytes as follows:

- The first byte is the start of message.
- The second byte is the message length.
- The third byte is the route message switch (MS) and port identifier.
- The fourth byte contains message network routing information.
- The fifth, sixth, and seventh bytes contain message destination node and terminal information.
- The eighth byte contains the message error emulation byte.

The number of bytes in the sent message or data varies. The checksum occupies one byte and detects transmission errors.

Figure 4-8 DS-30A message format



MBS signaling

Meridian Business Set (MBS) signaling allows call processing software to communicate with the MBS terminal. An above-voice frequency, low-speed data channel transports the sent MBS messaging over the loop. This data channel sends signaling information over a separate D-channel between the RSC DCH card and the HOST.

The data channel is an 8-kHz signal. Communicate the data if this signal is present or not available. The following MBS features are supported for the RSC:

- Automatic Answer Back
- Automatic Dial
- Automatic Line
- Executive Busy Override

- Call Back Queuing
- Call Forward All Calls
- Call Park
- Call Pickup
- Call Waiting
- End-to-End signaling
- Group Intercom
- Individual Business Line
- Intercom
- Listen on Hold
- Make Set Busy
- Malicious Call Hold
- Multiple Appearance DN
- On-Hook Dialing
- Privacy Release
- Ring Again
- Speed Calling
- 3-Way Call/Call Transfer
- 6-Port Conference
- Feature Display
- Display Called Number
- Display Calling Number
- Query Time
- Business Set Inspect Key
- Automatic Inspect Mode
- Business Set Call Forward Universal Per Key
- Call-Request Enhancement
- Direct Station/Busy Lamp Field for MBS
- Station Camp-On for MBS
- Group Intercom All Call
- MADN Cut-Off on Disconnect (COD)

- MADN Bridging - Three-Way Call
- Multiple Executive Message Waiting Keys for each DN

Global and universal tone receiver (GTR/UTR) features

ATTENTION

For peak performance, do not install the UTR and GTR on the same RCC. There is no way to determine which receiver reads tones. Some call processing tones can be degraded if designed for use with a GTR.

Subscriber lines that terminate on an RSC can use the global tone receiver (GTR) or universal tone receiver (UTR) feature. Remove a part of the processing load from the host computing module (CM). This feature starts in the PM.

With the GTR/UTR feature, the RSC performs all digit collection functions at the location of the originating terminal. The functions included are:

- the allocation of a free receiver
- determining a path to the receiver
- the collection and processing of digits
- the deallocation of the receiver

With a GTR/UTR, the RSC goes through the following steps:

1. Request a GTR/UTR channel.
2. Instruct the GTR/UTR to monitor tones.
3. When monitoring starts, the RSC is informed of digits and normally performs some translations functions on the digits.
4. When the receiver is not required, the RSC frees the allocated GTR/UTR channel.

A receiver request is required to start the sequence.

A- and B-bit signaling

The RSC basic call processing supports software for basic call processing, CLASS services and ESA. To support these activities, the RSC and HOST must transfer system control messages over the DS-1 message channel. Separate channel signaling messages use A-bits and B-bits from specified speech channels. The A-bits are transported on bit 8 of the 6th frame of each 12 frame sequence. The B-bits are transported on bit 8 of the 12th frame in the sequence.

The A-bits and B-bits are signaling bits that provide the following supervisory information:

- status of subscriber lines (on-hook or off-hook)
- ringing
- dial pulses

Use the A-bits and B-bits, each with a value 0 or 1, for signaling. The type of line card that receives or sends the bits determines how the bits are read. For dial pulses, a series of makes and breaks are sent on the subscriber loop. A=1 is a make and A=0 is a break.

Coin lines use A-bits and B-bits in specified speech channels for separate channel signaling. The coin lines use 8-bit patterns in appropriate speech channels for supervision. Use the A-bits and B-bits and 8-bit coin signaling patterns to perform supervision. The coin line card handles ground start or loop start supervisory signaling.

The following eight areas are essential to call processing:

- origination and channel allocation
- tone generation with dial tone speed recording
- digit collection
- ringing
- automatic number identification
- loss padding
- messaging loss to HOST
- busy/return to service of lines

The RSC-S uses the following protocols for communications and subscriber services:

- HDLC

  HDLC is a full duplex message protocol based on the CCITT level 2 Signaling System 7 (Q.703). Support this protocol between LTC+ and RCC2 peripherals.

Protocol change from DMS-X to HDLC

Feature AN1548, with feature AN0979, In-service Upgrade DMS-X to HDLC, supports the upgrade of DS-1 links between the LTC+ and the RCC2. Change the messaging protocol and the remote can be in-service. Download static data from the CC. A dynamic update occurs in the host and the remote peripherals.

When the HDLC protocol applies dynamically, the system scans for current calls on channels dedicated to HDLC messaging. If established calls are not present on these channels, the system displays a warning that active calls are killed. The system prompts the user to reject or confirm that these calls be killed. Free channels are channels that calls do not occupy. Reserve these channels for HDLC until the protocol is changed or until the user refuses the change.

An example of the MAP display of this process follows:

```
Enter Y to confirm, N to reject or E to edit

>Y

3 existing calls will be killed

Please confirm (“Yes", “Y", “NO", or “N")

>Y
```

In the example, make three calls. The user allows the three calls to be killed and to continue the DMS-X to HDLC protocol change. As a result, static data is sent from the CC to the LTC+ and the RCC2. The RCC2 nailed-up connections for HDLC message channels are made. Create and bind data and network links into the messaging system. Set the PM to ISTb until all HDLC links are synchronized.

The NTMX76 firmware (layer) synchronizes HDLC. The link synchronizes when the sides of the link host and remote communicate with each other. The NTMX76 audit process verifies if the new HDLC links are synchronized.

When a minimum of one HDOC link synchronizes for each unit, the audit activates the HDLC link for messaging. A message that is not solicited is sent to CC. The system generates a PM181 log when each HDLC link is synchronized. When all HDLC message links of an RCC2 unit synchronizes again, the ISTb state the synchronization problem causes clears.

When a link fails to synchronize or loses synchronization:

- each remote unit sends a message that is not solicited to the CC. To prevent problems in one-night-process (ONP), each remote unit sends the message after the version registry check.
- the system generates a PM181 log and indicates that the valid link is not synchronized.

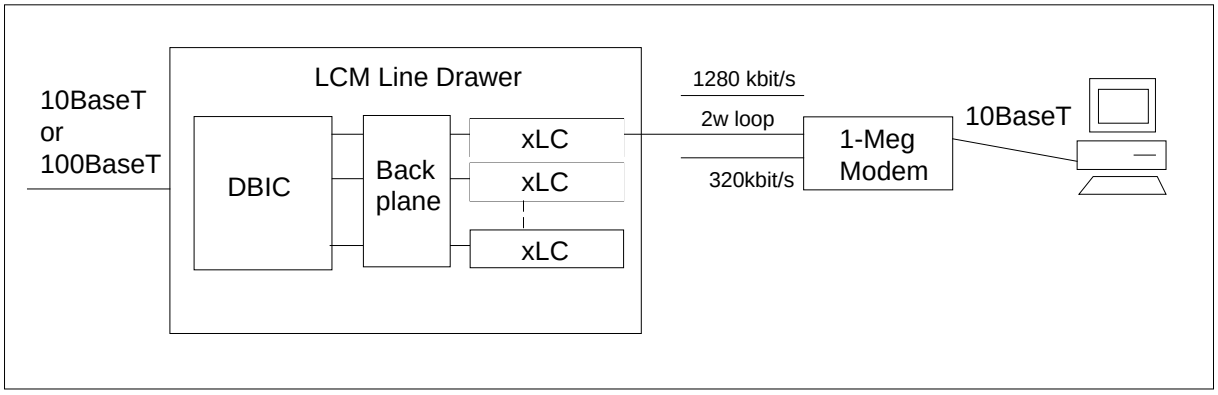
If all HDLC links lose synchronization to the active RCC2 unit, the RCC2 attempts to SWACT. If the SWACT fails, the RCC2 enters ESA. All HDLC

message links of an RCC2 unit must be synchronized after the dynamic upgrade. If the message links are not synchronized, the RCC2 unit works in the DMS-X mode.

1-Meg Modem Service supported protocols

The 1-Meg Modem Service uses several protocols to carry data from the subscriber to the service provider. The following figure illustrates the 1-Meg Modem Service architecture.

Figure 4-9 1-Meg Modem Service architecture



DBIC

The following section describes the protocols used by the DBIC, xLC, subscriber loop, and 1-Meg Modem.

Ethernet

The DBIC has a half-duplex Ethernet interface on the network side. The DBIC stores downstream frames and transmits the frames to the user. The DBIC only sends frames with MAC addresses that match the MAC addresses of the active users. Similarly, the DBIC stores frames from the user side. The DBIC sends these frames to the network when it receives the whole frame.

The DBIC sends all user traffic out at the Ethernet port. The DBIC does not route traffic between users. This method has the following advantages.

- makes sure that all traffic goes to the correct service provider
- reduces the bandwidth overhead for broadcasts
- improves network security

The 1-Meg Modem Service does not process data above Layer 2. The 1-Meg Modem Service remains at the MAC layer and only uses the Ethernet address. Since the DBIC does not look at the payload carried in the Ethernet frames, except for ARP and BOOTP messages, the DBIC can carry Layer 3 data, such as internet protocol (IP), Internet Packet Exchange (IPX), and Appletalk.

However, 1-Meg Modem Service only supports TCP/IP. The 1-Meg Modem Service can support other protocols, such as IPX, if MAC translation is turned off. When you turn MAC translation off, you reduce security and increase the configuration work for the transport network. However, this setup can be acceptable in a campus environment. The maximum transfer unit (MTU) size for the 1-Meg Modem Service is 1500 bytes, the same size that is defined in the ANSI 802.3 standard.

XLBUS

The DBIC uses a point-to-point connection to each line card to exchange voice and data with the xLCs. The extended LBUS (XLBUS) is bidirectional with a total capacity of approximately 1.5 Mbit/s for data traffic. Upstream data, downstream data, and control data share this capacity. The XLBUS carries user data, synchronization and xLC control and status information. The control data carried over the XLBUS allows the DBIC processor to access registers in the xLC. User frames passed by the XLBUS have special Start Of Frame (SOF) and End Of Frame (EOF) control bytes.

xLC and loop

The xLC and subscriber loop use the following protocols.

XDLC

The user data in the xLC is encapsulated into the XDLC protocol, which is based on HDLC.

XLINK

The XLINK frame has a fixed length for robust framing.

XLOOP

The XLOOP includes the details that relate to the modulation used to carry data over the copper loop. In the downstream direction, 256/64/16/4-QAM can be used over narrowband or wideband spectrums providing 1280, 960, 640, 320, 240, 160 or 80 kbit/s of raw data throughput. In the upstream direction, 256/64/16/4-QAM are also used providing 320, 240, 160, 120, 80 or 40 kbit/s of raw data throughput.

1-Meg Modem

The Ethernet interface at the 1-Meg Modem provides a half-duplex 10BaseT or 100BaseT connection. The interface does not filter local traffic and passes all traffic upstream. Only one Ethernet device can connect to the 1-Meg Modem.

5 RSC recovery procedures

This document contains the recovery procedures for the DMS-100 Remote Switching Center (RSC). Maintenance personnel use these procedures to return to service an RSC from a completely out-of-service condition. These conditions include Emergency Stand-Alone (ESA).

How to recover an out-of-service RCC/RCC2

Application

Use this procedure to restore call processing that central control (CC) controls on:

- a remote cluster controller (RCC) in a remote switching center (RSC) frame
- a remote cluster controller 2 (RCC2) in an RSC equipment (RSCE) cabinet

This procedure recovers an RCC or an RCC2. The name RCC refers to both of the following:

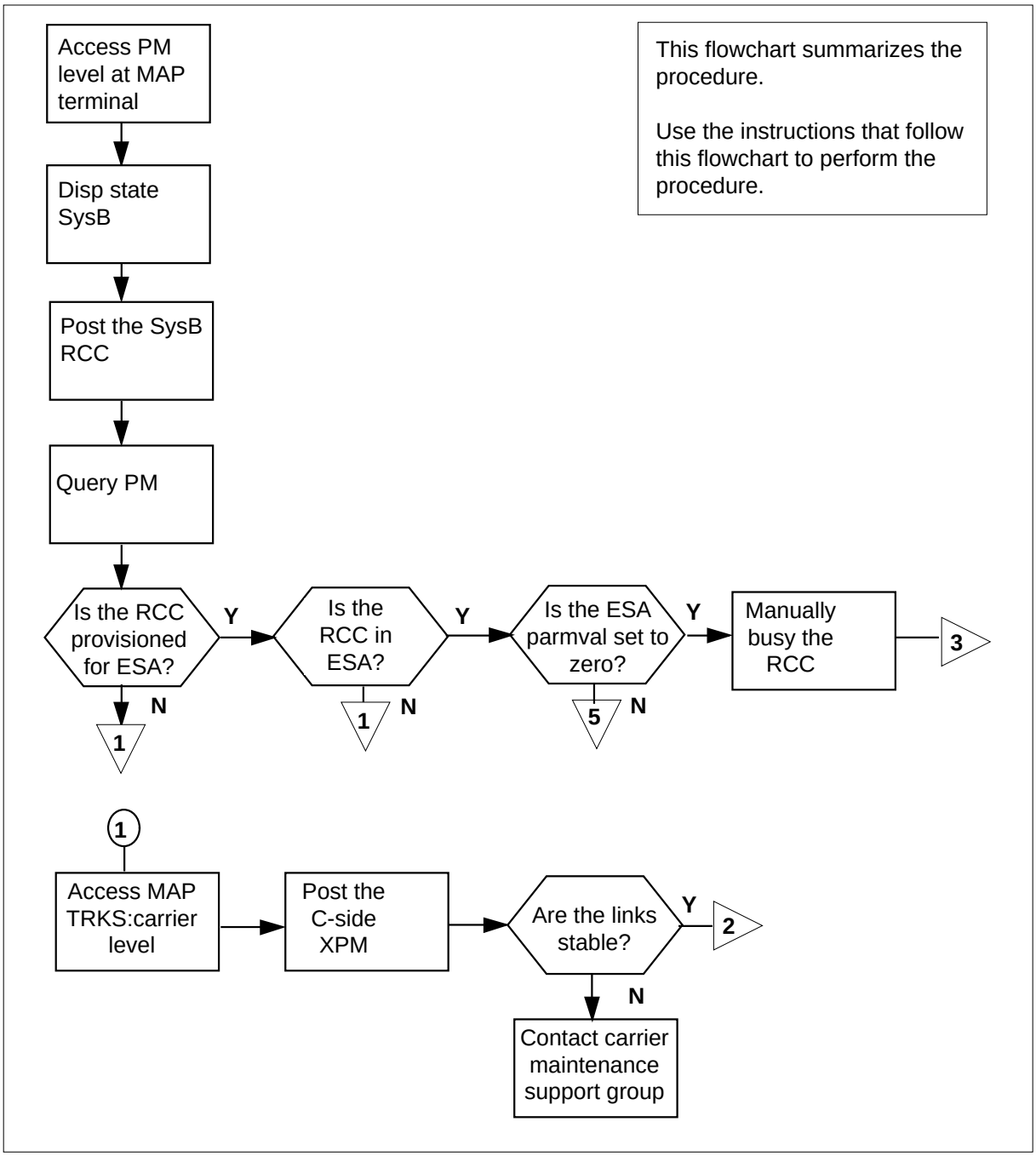
- the RCC in an RSC frame, NT6X10
- an RCC2 in an RSCE cabinet, NTMX89

Action

This recovery procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

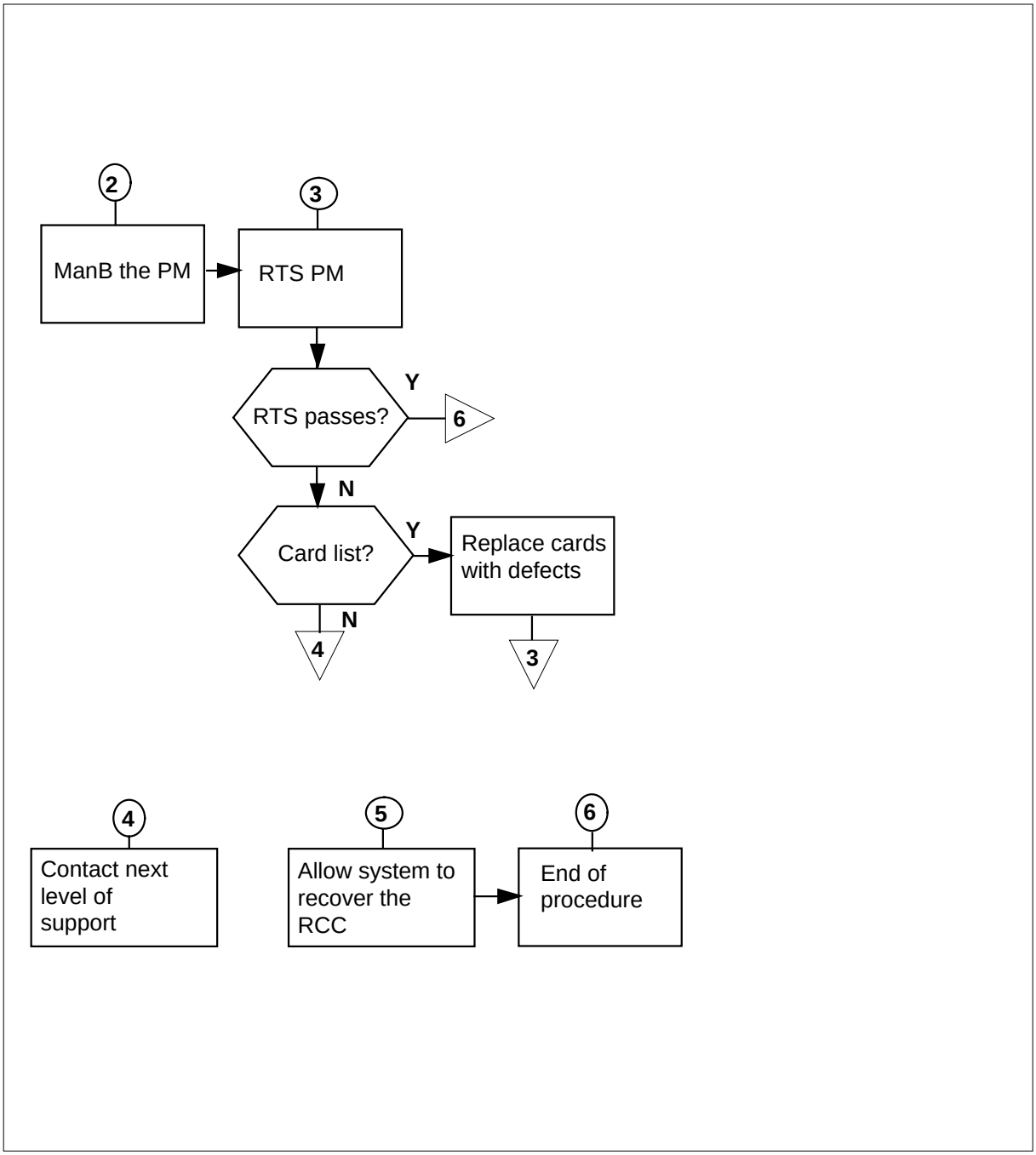
How to recover an out-of-service RCC/RCC2 (continued)

Summary of recovering an RCC



How to recover an out-of-service RCC/RCC2 (continued)

Summary of recovering an RCC



How to recover an out-of-service RCC/RCC2 (continued)

Recovering a PM RCC

At the host office

1 Proceed only if your maintenance support group or an *Alarm Clearing Procedure* directed you to this procedure.

At the MAP terminal

2 To silence an alarm that is audible, type

```
>MAPCI;MTC;SIL
```

and press the Enter key.

3 To access the peripheral module (PM) level of the MAP display and identify the defective RCC, type

```
>PM;DISP STATE SYSB RCC
```

and press the Enter key.

4 To post the SysB RCC, type

>POST RCC **rcc_no**

and press the Enter key.

where

rcc_no
is the number of the RCC identified in step 3

5 To determine the error condition, type

```
>QUERYPM FLT
```

and press the Enter key.

Example of a MAP response:
Unit 0System busy reason: Link Audit Unit 1System busy reason: Link Audit

6 To determine if the RCC is equipped with emergency stand-alone (ESA), type

```
>QUERYPM
```

and press the Enter key.

Example of a MAP response:
PM Type: RCC PM No.: 0 PM Int. No.: 1 Node_No.: 203
PMs Equipped: 309 Loadname: ESR05AY EEPRom Load: MX77NF02
ESA equipped: YES IntraSwitching is ON
WARM SWACT is supported and available.
RCC 0 is included in the REX schedule.
Last REX date was FRI. 1995/03/10 at 12:25:07; PASSED
Node Status: {OK, FALSE}
Unit 0 Act, Status: {SysB, TRUE}
Unit 1 Inact, Status: {SysB, TRUE}

How to recover an out-of-service RCC/RCC2 (continued)

```
Site Flr RPos  Bay_id   Shf  Description    Slot    EqPEC
RSC0  01  A00  RCE 00  18    RCC : 000          6X12AA
```

If RCC	Do
is equipped with ESA	step 7
is not equipped with ESA	step 13

7 Determine if the ESA exit time is set for manual recovery from ESA. To access table OFCENG, type

>TABLE OFCENG

and press the Enter key.

8 To check the RSC ESA exit time-out value, type

>POS RSC_XPMESAEXIT

and press the Enter key.

Example of a MAP response:

```
PARMNAME                                              PARMVAL

                    RSC_XPMESAEXIT                      0
```

Note: An RSC_XPMESAEXIT parameter value of zero indicates that only a manual RTS can start an ESA exit. Other parameter values are entered one digit for 10 s of extended multiprocessor system (XMS) peripheral module (XPM) ESA exit time-out. (3=30 seconds)

9 To quit table OFCENG and remain at the POST level of the MAP display, type

>QUIT

and press the Enter key.

10 To enter the logs utility, type

>LOGUTIL

11 To examine PM181 log reports that this RCC generates, type

>OPEN PM 181;BACK ALL

and press the Enter key.

Example of a PM181 log report:

```
PM181  MAR14  14:33:54  7534  INFO  RSC0  RCC  0  UNIT 0
 Node:SysB, Unit 0 Act:SysB, Unit 1 Inact:SysB
 PM in ESA, Communication restored, ready to be RTSed
```

Note 1: The system generates this log when communications are restored and office parameter RSC_XPMESAEXIT in table OFCENG is equal to zero.

Note 2: Repeat this step for the PM109, PM110, PM128 and PM179 log reports.

How to recover an out-of-service RCC/RCC2 (continued)

Note 3: The RCC can be in ESA. The carriers are not always operational. This condition can require a check for dial tone at the remote site to verify ESA.

If the RCC	Do
does not generate the PM181 log	step 12
does generate the PM181 log showing `Communication restored, ready to be RTSed`	step 18

12 To quit Logutil and remain at the POST level of the MAP display, type

`>QUIT`

and press the Enter key.

13 Monitor the MAP terminal display for system maintenance (MTCE) action through two cycles. Observe for one of two messages:

- `ROM/RAM Query` or
- `ESA T.O.`

If maintenance action	Do
stops at `ROM/RAM Query`	step 14
indicates `ESA T.O.`	Allow the system to recover the RCC. Go to step 28
continues to initialization	step 18

14 Before you manually restore the RCC, check if links to the RCC are stable. To find the host XMS-based PM (XPM) and central-side (C-side) link numbers for this RCC, type

`>trnsl c`

and press the Enter key.

Example of a MAP response:

```
                    Host XPM P-side link number
                    |
Link  0: LTC 1      0;Cap MS;Status:OK   P;MsgCond:CLS, Restrict
Link  1: LTC 1      2;Cap MS;Status:OK   P;MsgCond:CLS, Unrestricted
Link  2: LTC 1      4;Cap  S;Status:OK
Link  3: LTC 1      5;Cap  S;Status:OK
```

Note: Record the message links numbers and status for use in step 16.

15 To access the CARRIER level of the MAP display, type

`>trks;carrier`

and press the Enter key.

How to recover an out-of-service RCC/RCC2 (continued)

16 Post the host XPM peripheral-side (P-side) links that interfaces the RCC in ESA. Check the message links for slips and framing errors. To perform these actions, type

***>post* pm_type pm_no**

and press the Enter key.

where

pm_type
is the name of the host XPM, (line group controller, LGC/line trunk

controller, LTC), identified in step 14.

pm_no
is the number of the LGC/LTC (0 to 255), identified in step 14.

Standard response on the MAP display:

```
CLASS ML   OS   ALARM     SYSB    MANB     UNEQ    OFFL CBSY    PBSY     INSV
TRUNKS 0  0     0         0       0        0       0    0       0        0
REMOTE 0  0     0         5       1        0       0    0       0       10

NO  CLASS    SITE     RCC  CKT  D    ALARM    SLIP     FRAME  BER      SES STATE
0   TRUNKS   BRSC      0    0   C              0        0   1000000  0  INSV
1   REMOTE   BRSC      0    1   C              0        0   1000000  0  INSV
2   REMOTE   BRSC      0    2   C              0        0   1000000  0  INSV
                            ▲
                            |                                MORE
                           HOST XPM P-side link
                           number
```

Note: Observe the MAP display for 5 min before you continue.

If link conditions	Do
show a number of SLIP and FRME errors, or ALARMS	step 31. Leave the RCC in ESA.
do not show SLIP and FRME errors, or ALARMS for 5 min	step 17

17 To post the SysB RCC at the PM level, type

***>MAPCI;MTC;PM;POST RCC* rcc_no**

and press the Enter key.

where

rcc_no
is the number of the RCC identified in step 3

18 To manually busy the RCC, type

>bsy pm

and press the Enter key.

How to recover an out-of-service RCC/RCC2 (continued)

19 To return the RCC to service, type

>RTS PM

and press the Enter key.

Standard response on the MAP display:

```
RCC  1 MnaB    Links_OOS:  CSide 0, PSide 0
Unit0:         ManB
Unit1:         ManB
RTS PM
RCC 1 Unit 0   in ESA mode
               this action will cause an exit with 20 active calls
               A WARM exit will be attempted
               Some calls may be ABORTED

Please confirm (”YES”, ”Y”, ”NO”, ”N”
```

The RCC can be in ESA or out-of-service (OOS). To respond, type

>YES

and press the Enter key.

If system response	Do
is RTS PASSED	step 28
is RTS FAILED	step 20

Note: The system generates a PM171 log when an ESA EXIT occurs. This log details the call processing operational measurements (OM) during ESA.

20 To reset the RCC, type

>PMRESET PM

and press the Enter key.

If the PMRESET	Do
passes	step 22
fails	step 21

21 To reset the RCC to the ROM level, type

>PMRESET PM NORUN

and press the Enter key.

If the PMREST	Do
passes	step 22
fails	step 23
fails with card list	step 29

How to recover an out-of-service RCC/RCC2 (continued)

22 To return the RCC to service, type

>RTS PM

and press the Enter key.

>YES

and press the Enter key.

If system response	Do
is RTS PASSED	step 28
is RTS FAILED	step 23
is failed with card list	step 29

23 The peripheral remote loader (PRL) card (NT7X05) allows local loads of the RCC data to occur. Local data loads reduce recovery time. To check for provisioning of the NT7X05 card, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP display:

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .    .    1RCC    .      .       .      .      .

RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
0 Quit     PM     2        0        2        0        2       25
2 Post     RCC    0        1        0        0        0        1
3 ListSet
4          RCC      0 ManB  Links_OOS:  CSide  0,  PSide   0
5 TRNSL_   Unit 0:  Act   ManB
6 TST_     Unit 1:  Inact ManB
7 BSY_
8 RTS_     QUERYPM files
9 OffL
10 LoadPM_      Unit 0:
11 Disp_           NT7X05 load File: ESR06BB
12 Next_           NT7X05 Image File:ESR06BB
13 SwAct           CMR Load: CMR03A
14 QueryPM      Unit 1:
15                 NT7X05 load File: ESR06BB
16 IRLINK          NT7X05 Image File:ESR06BB
17 Perform         CMR Load: CMR03A
18
```

Note: If the NT7X05 card is not provisioned the MAP response is:

How to recover an out-of-service RCC/RCC2 (continued)

Nt7X05 not datafilled, QueryPm files invalid

If the NT7X05 card	Do
is provisioned	step 24
is not provisioned	step 26

24 To load the RCC from the local image, type

>LOADPM PM LOCAL IMAGE

and press the Enter key.

If the local image loading	Do
passes	step 27
fails	step 25

25

DANGER

Possible service interruption

The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string}]. The LOADPM command does not patch the loadfile when you use this parameter. Do not use this parameter unless you need to use the NOPATCH option of the loadfile.

To load the RCC from the local loadfile, type

>LOADPM PM LOCAL LOADFILE

and press the Enter key.

If the local loadfile loading	Do
passes	step 27
fails	step 26

26 To load the RCC from the CM, type

>LOADPM PM

and press the Enter key.

If the CM loading	Do
passes	step 27
fails	step 32

How to recover an out-of-service RCC/RCC2 (continued)

27 To return the PM to service, type

>RTS PM

and press the Enter key.

>YES

and press the Enter key.

If system response	Do
is RTS PASSED	step 28
is RTS FAILED	step 32
is RTS FAILED with card list	step 29

28 Use local operating company procedures to check for dial tone.

If dial tone	Do
is not present	step 32
is present	step 33

29 Observe the card list that appears in the MAP display.

Standard response on the MAP display for an RCC in an NT6X10 frame:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     32  RCC :  000     : 13       MX77
RSCS0    01     A00   RCE    00     32  RCC :  000     : 18       6X69
RSCS0    01     A00   RCE    00     32  RCC :  000     : 19       6X72
RSCS0    01     A00   RCE    00     32  RCC :  000     : 15       6X92
RSCS0    01     A00   RCE    00     18  RCC :  000     : 20       6X50
```

or

Standard response on the MAP display for an RCC2 in an NTMX89 cabinet:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 03       MX77
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 08       6X69
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 11       MX73
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 15       MX74
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 19       MX81
```

If card replacement for all cards on the list	Do
occurs	step 32
does not occur	step 30

30 If the system indicates that other cards with defects are present, replace the next card on the list. Go to the card replacement procedure in *Card*

How to recover an out-of-service RCC/RCC2 (end)

Replacement Procedures. When you complete the card replacement procedures, go to step 18 of this procedure.

31 Contact the carrier maintenance support group for maintenance on the open links that are not stable. When carriers are restored, go to step 10.

32 For additional help to clear this alarm, contact the next level of support.

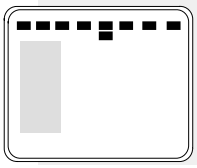
33 This procedure is complete. If other alarms appear, refer to the correct alarm clearing procedures for the indicated alarms in the *Alarm Clearing Procedures*.

6 RSC alarm clearing procedures

This document contains the alarm clearing procedures for the DMS-100 Remote Switching Center (RSC) and the DMS-100 RSC with Peripherial Life Upgrade Stategy (XPM PLUS). Maintenance personnel use these procedures to clear alarms because the alarms appear at the maintenance administration position (MAP). An alarm is the stimulus that indicates the procedure which maintenance personnel must use to clear the problem. The procedures that correspond to the alarms as the alarms appear at the MAP in alphabetical order.

PM LCM RG critical

Alarm display



CM	MS	IOD	Net	PM	Lns	Trks	Ext	APPL
.	.	.	.	**nLCM**	.	.	.	.
				C				

Indication

At the MTC level of the MAP display, *n*LCM appears under the PM subsystem header. A *C* appears under the LCM. The LCM indicates a critical alarm that involves a line concentrating module. The *n* indicates the number of LCMs with this alarm.

Meaning

The ringing generator units are in the in-service trouble (ISTb) state.

Result

If both ringing generator units fail, the system cannot switch automatically to an active ringing generator (SwRG). The system cannot generate ringing. This condition affects subscriber service.

Common procedures

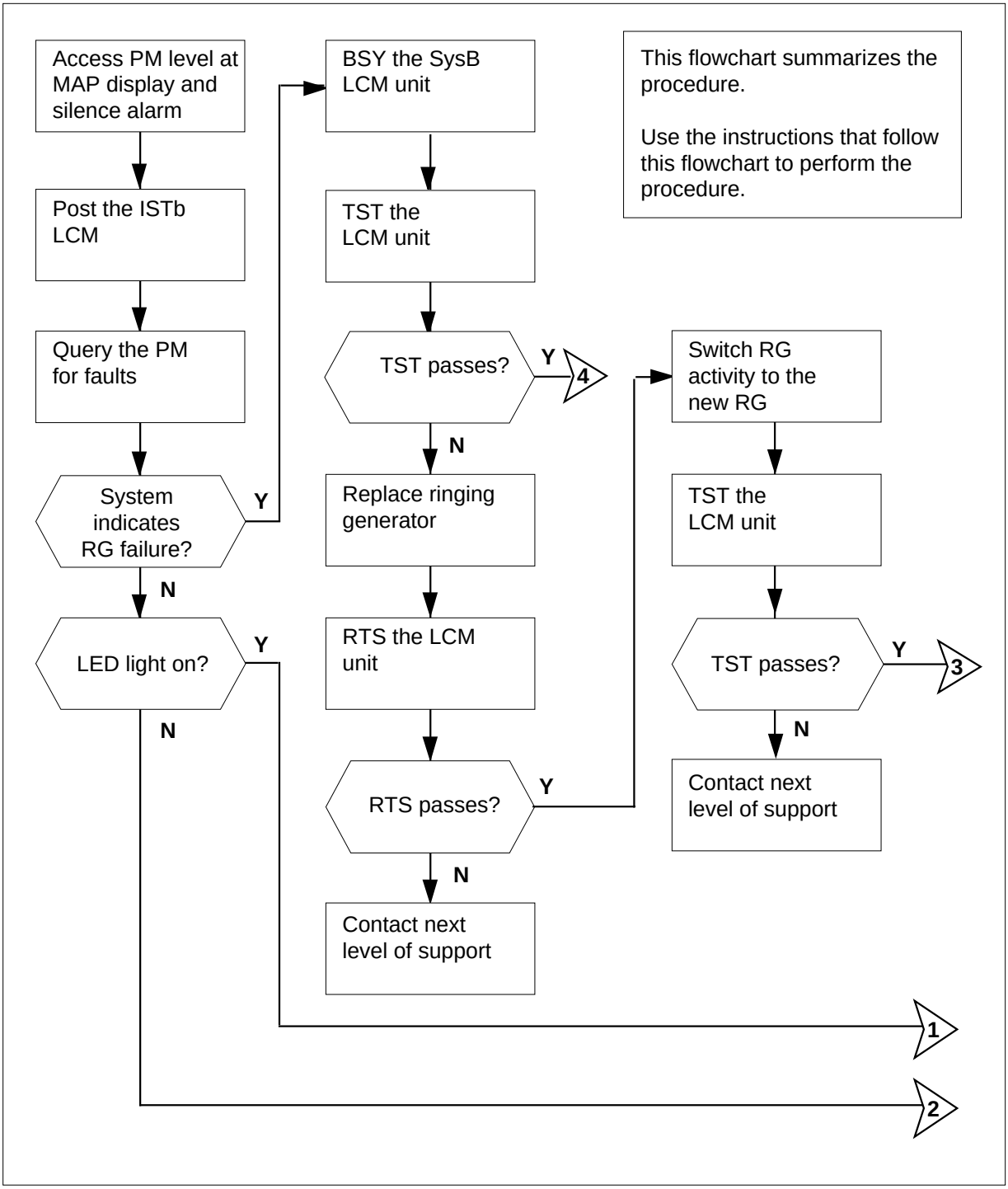
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

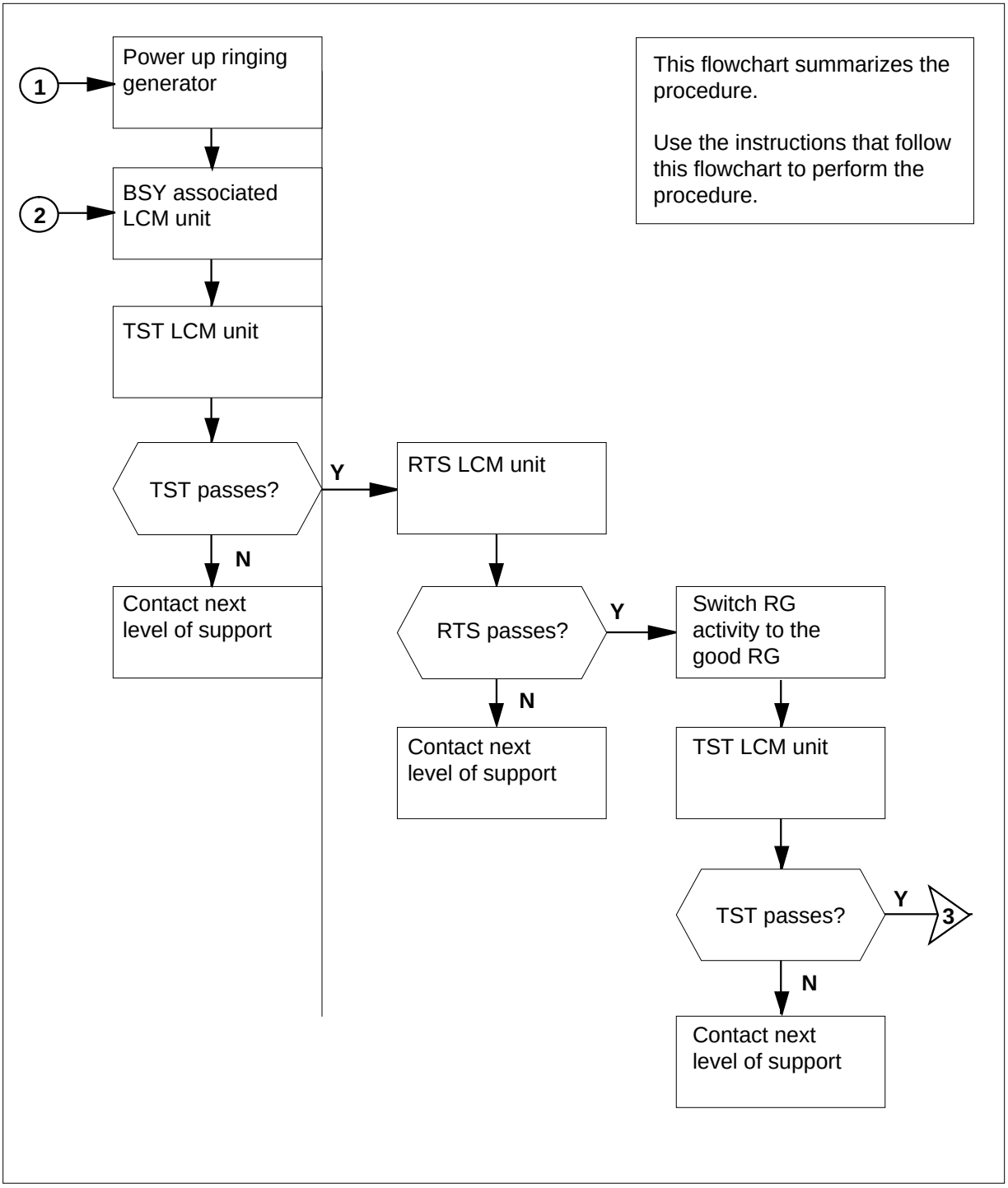
PM LCM RG
critical (continued)

Summary of a PM LCM RG Critical alarm



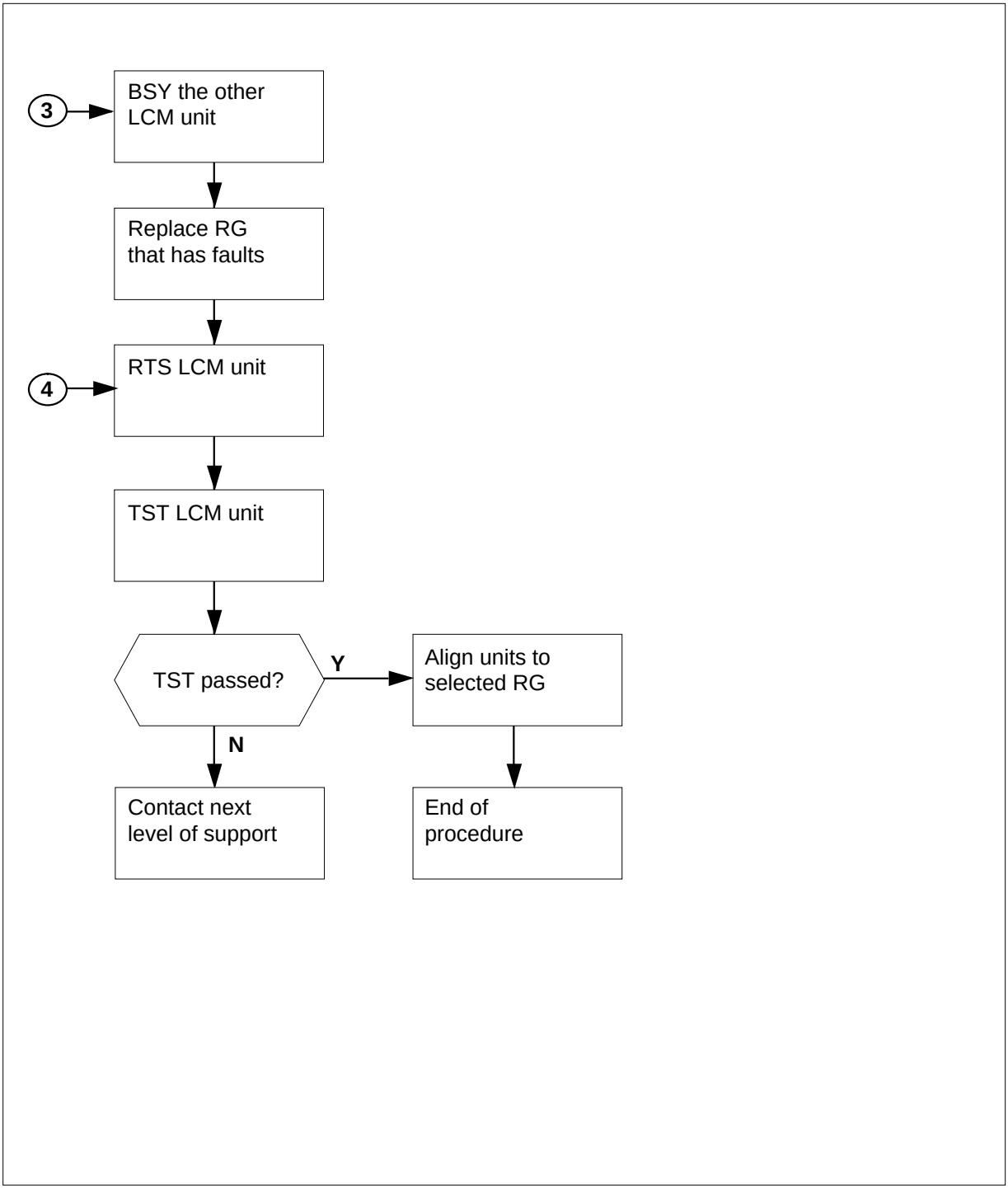
PM LCM RG
critical (continued)

Summary of a PM LCM RG Critical alarm (continued)



PM LCM RG
critical (continued)

Summary of a PM LCM RG Critical alarm (continued)



PM LCM RG
critical (continued)

Clearing a PM LCM RG Critical alarm

At the MAP display:

1

ATTENTION
Enter this procedure from the PM system level alarm clearing procedure step. This step must identify an LCM associated fault.

To silence the alarm, if required, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCM that has faults, type

>disp STATE ISTB LCM

and press the Enter key.

Example of a MAP response:

```
ISTb  REM1 00 0, REM1 00 1
```

3 To post the ISTb LCM unit identified in step 2, type

>POST LCM site frame_no lcm_no

and press the Enter key.

where

site
is the name of the site where the LCM is located

frame_no
is the number of the frame (00 to 511)

lcm_no
is the number of the LCM (0 or 1) in the frame

Example of a MAP display:

```
       SysB     ManB     OffL     CBsy     ISTb      InSv
PM      0        0        2        0        2          12
LCM     0        0        2        0        2           9

LCM   REM1  00 0 ISTb  Links_OOS:  CSide  0   PSide   0
Unit0:   ISTb                /RG: 0
Unit1:   ISTb                /RG: 0
                           11  11  11  11  11  RG:Pref 0 ISTb
 Drwr:  01  23  45  67  89  01  23  45  67  89     Stby 1 ISTb
        ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
```

PM LCM RG
critical (continued)

4 To check for fault indicators, type

>querypm flt

and press the Enter key.

Example of a MAP display:

```
 LCM   UNIT 0  Inservice troubles Exist:
Ringing Generator Failure:Ring Generator ANI/COIN Fault
 LCM   UNIT 1  Inservice Troubles Exist:
Ringing Generator Failure:Ring Generator in Excess load
```

If the system	Do
indicates RG failure	step 7
does not indicate RG failure	step 5

5 Perform a visual inspection of the ringing generator. Determine if the light-emitting diode (LED) is ON.

If the LED	Do
is ON	step 6
is OFF	step 7

6 To power up the ringing generator, move the circuit breaker on the FSP to the ON position. The LED goes OFF. These switches are:

RG 0

RG 1

If the system	Do
restores power	step 19
does not restore power	step 7

At the MAP display:

7 To manually busy one of the ISTb LCM units, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the ISTb LCM unit (0 or 1)

8 To test the ManB LCM unit, type

>TST UNIT unit_no

and press the Enter key.

PM LCM RG
critical (continued)

where

unit_no
is the number of the ManB LCM unit (0 or 1)

If the system	Do
generates the card list	step 9
does not generate the card list	step 18

9 Check the card list that appears on the MAP display.

Example of a MAP response:

```
SITE   FLR  RPOS   BAY_ID  SHF DESCRIPTION SLOT   EQPEC
REM1    01   A00   LCM 00  76    LCM   000  01     6X30
REM1    01   A00   LCM 00  04    LCM   000  04     6X51
REM1    01   A00   LCM 00  76    LCM   000  11     6X30
REM1    01   A00   LCM 00  04    LCM   000  04     6X51
```

10 Check if you replaced the NT6X30 circuit card.

If you	Do
replaced the NT6X30 card	step 18
did not replace the NT6X30 card	step 17

11 To return the LCM unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the ManB LCM unit (0 or 1)

If RTS	Do
passes	step 12
fails	step 18

12 To align RG activity to the new RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) associated with the new RG

Example of a MAP display:

PM LCM RG
critical (continued)

LCM REM1 14 1 Unit 1 SWRG Passed

If the SWRG command	Do
passes, and you must switch the RG activity must be for the other unit	step 13
passes, and RG activity is correct for both PM units	step 14
fails	step 18

13 Repeat step 12 for the other LCM units in this frame.

14 To test the new RG, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCM unit (0 or 1) associated with the new RG.

Example of a MAP response:
LCM REM1 00 0 Unit 1 InSvce Tests Initiated
LCM REM1 00 0 Unit 1 Tst Passed

If TST	Do
passes	step 15
fails	step 18

15 Your next action depends on the number of LCMs provisioned in the equipment frame.

If	Do
the frame holds one LCM	step 16
the frame holds two LCMs, and you replaced RGs for one LCM only	step 17
the frame holds two LCMs, and you replaced RGs for both LCMs	step 16

16 To align RG activity to the selected RG, type

>SWRG UNIT unit_no

PM LCM RG
critical (end)

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) associated with the new RG

Example of a MAP display:

```
LCM REM1 00 0 InSv Links  OOS: Cside 0 Pside 0
Unit 0: InSv      /RG:0
Unit 1: InSv      /RG:0
                  11  11  11 11  11  RG: Pref 0 InSv
Drwr:  01  23  45  67  89  01  23  45  67  89       Stby 1 InSv          .. .. .. ..
.. .. .. .. .. ..
```

Note: Repeat this step until all units of all LCMs in this frame are on the selected RG.

If the SWRG	Do
passes	step 19
fails	step 18

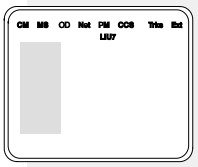
17 Go to the card replacement procedure for the NT6X30 circuit card in the *Card Replacement Procedures*. Complete the card replacement procedure. Go to step 11 of this procedure.

18 For additional help, contact the next level of support.

19 The procedure is complete. If the system displays other alarms, refer to the appropriate alarm clearing procedures for the indicated alarms.

PM LCM RG major

Alarm display



CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	**nLCM M**	.	.	.	.	.

Indication

The alarm code *n*LCM, under the PM subsystem header, indicates an alarm that involves an LCM. The header appears at the MTC level of the MAP display.

An `M` under an *n*LCM, indicates that the alarm class is major.

The number (*n*) before LCM indicates the number of LCMs with this alarm.

Meaning

One ringing generator unit is in the in-service trouble (ISTb) state.

Result

This alarm affects subscriber service. The system does not provide ringing to the subscribers.

Common procedures

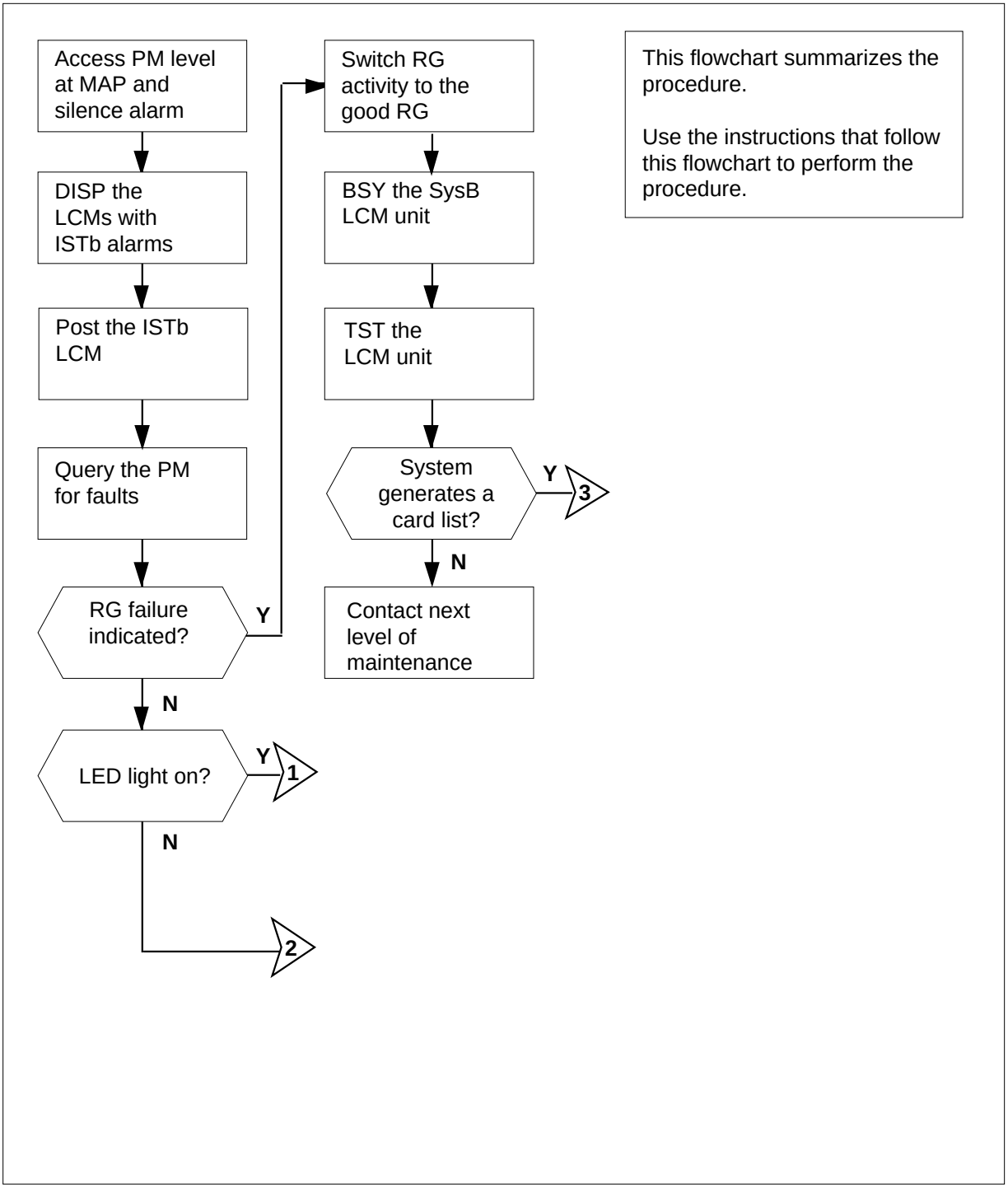
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Use the steps to perform the procedure.

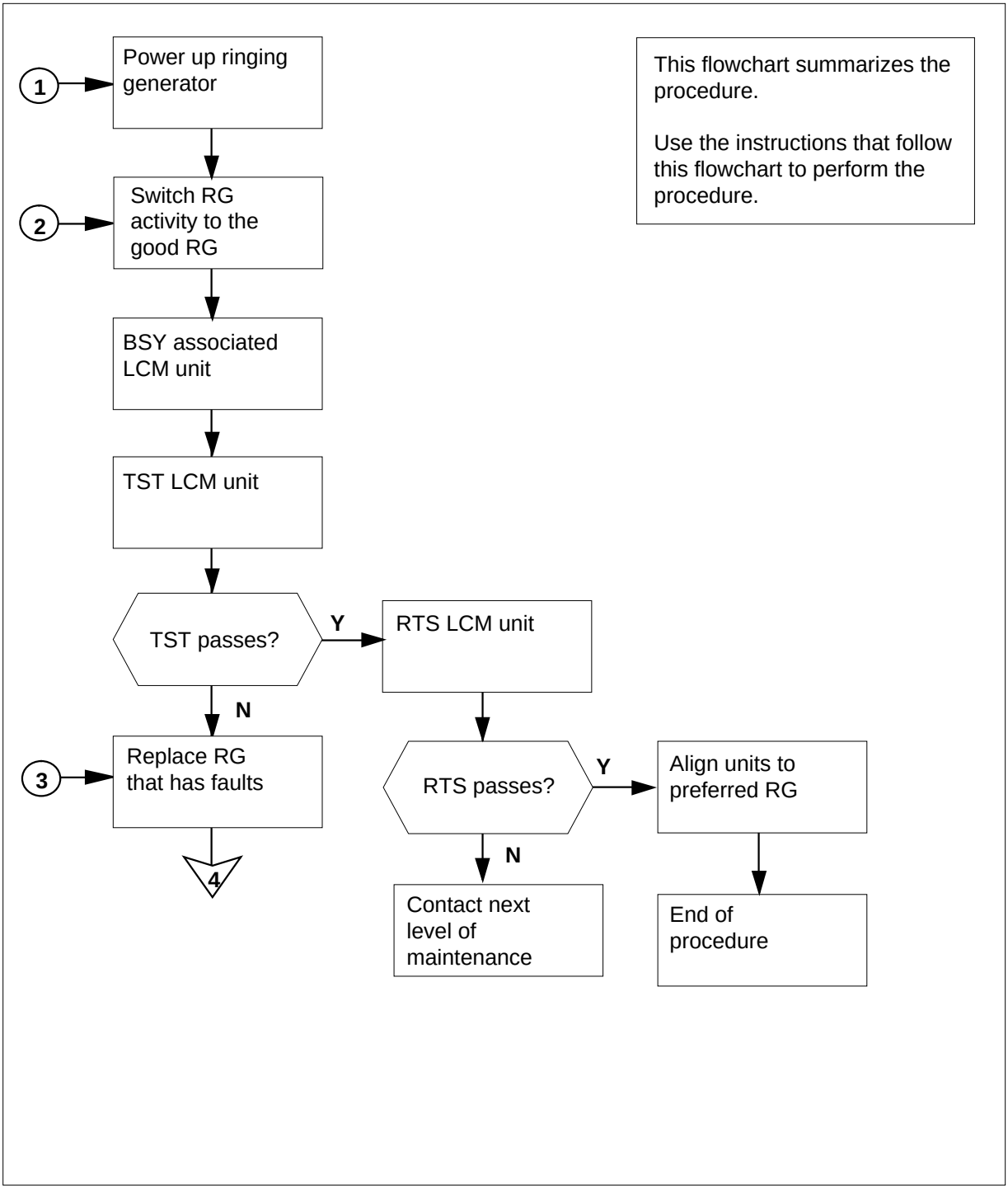
PM LCM RG
major (continued)

Summary of clearing a PM LCM (RG) major alarm



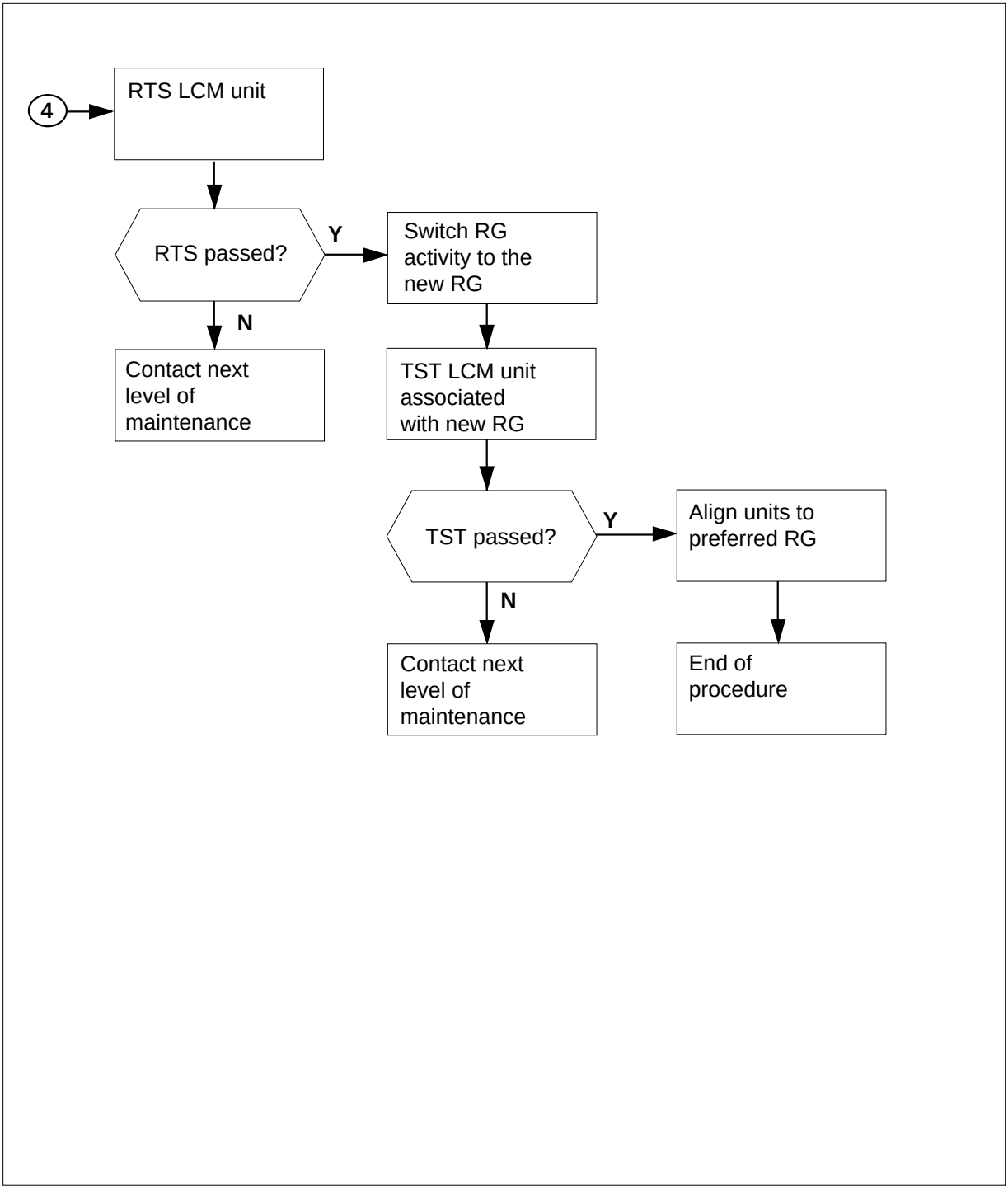
PM LCM RG
major (continued)

Summary of clearing a PM LCM (RG) major alarm (continued)



PM LCM RG
major (continued)

Summary of clearing a PM LCM (RG) major alarm (continued)



PM LCM RG
major (continued)

Clearing a PM LCM(RG) major alarm

> **ATTENTION**
> Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCM-associated fault.

At the MAP terminal

1 To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCM that has faults, type

>DISP STATE ISTB LCM

and press the Enter key.

Typical response on the MAP display:
ISTb: RSCS 14 0, RSCS 14 1

3 To post the ISTb LCM from step 2, type

>POST LCM lcm_site_name lcm_frame_no lcm_no

and press the Enter key.

where

lcm_site_name
is the site name for the LCM that has faults

lcm_frame_no
is the number of the LCM equipment frame

lcm_no
is the number of the LCM that has faults

Example of a MAP response:

```
       SysB     ManB     OffL     CBsy     ISTb      InSv
PM      0        0        2        0        2          12
LCM     0        0        2        0        2           9

LCM   RSCS  14 0 ISTb  Links_OOS:  CSide  0   PSide   0
Unit0:   ISTb                /RG: 0
Unit1:   SysB                /RG: 0
                           11  11  11  11  11  RG:Pref 0 InSv
 Drwr:  01  23  45  67  89  01  23  45  67  89     Stby 1 ISTb
        ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
```

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

PM LCM RG
major (continued)

Example of a MAP response:

```
Node inservice troubles exist:
One LCM unit is out of service
One or both Units inservice trouble
LCM   UNIT 0  Inservice Troubles Exist:
Ringing Generator Failure
LCM   UNIT 1  System Busy Reason:Diag Failed
```

If the system	Do
indicates RG failure	step 7
does not indicate RG failure	step 5

At the LCM

5 Perform a visual inspection of the ringing generator. Check if the LED is ON.

If the LED	Do
is ON	step 6
is OFF	step 7

6 To power up the ringing generator (RG), move the power switch to the ON position. The LED goes off. The switches are:

- RG 0
- RG 1

If	Do
turning ON the RG restores power	step 16
turning ON the RG does not restore power	step 7

At the MAP terminal

7 To make sure the two LCM units align to the good RG, type

`>SWRG UNIT unit_no`

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) assigned to the RG that has faults

Example of a MAP display:

PM LCM RG
major (continued)

LCM RSCS 14 0 Unit 1 SWRG Passed

Note: Repeat this step until the units of the LCMs are on the good RG.

If the SWRG command	Do
passes	step 8
fails	step 19

8 To manually-busy (ManB) the LCM unit that is SysB, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number (0 or 1) of the LCM unit to be busied

9 To test the ManB LCM, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number (0 or 1) of the LCM unit ManB in step 8

Example of a MAP response:

```
LCM    RSCS    14   0     Unit 1   OSVCE Test Initiated
LCM    RSCS    14   0     Unit 1   Tst Failed: (Reason for failure)
                          or
LCM    RSCS    14   0     Unit 1   OSVCE Test Initiated
LCM    RSCS    14   0     Unit 1   Tst passed
```

If the system	Do
generates a card list	step 10
does not generate a card list	step 19

10 Check the card list that appears on MAP display.

Example of a MAP response:

PM LCM RG
major (continued)

```
SITE   FLR  RPOS   BAY_ID  SHF DESCRIPTION SLOT   EQPEC
RSCS    01   A00   LCM 00  76    LCM   000  01     6X30
RSCS    01   A00   LCM 00  04    LCM   000  04     6X51
RSCS    01   A00   LCM 00  76    LCM   000  11     6X30
RSCS    01   A00   LCM 00  04    LCM   000  04     6X51
```

If you	Do
replaced all the cards on the list	step 11
did not replace all the cards on the list	step 18

11 Determine if the NT6X30 circuit card was replaced.

If you	Do
replaced the NT6X30 circuit card	step 19
did not replace the NT6X30 circuit card	Go to step 17 to replace the ringing generator

12 To return the ManB LCM to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCM tested in step 9

If RTS	Do
passes	step 13
fails	step 19

13 To align RG activity to the new RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) assigned to the new RG

Example of a MAP display:

PM LCM RG
major (continued)

LCM RSCS 14 0 Unit 1 SWRG Passed

If the SWRG command	Do
passes, and RG activity must be switched for the other LCM unit	step 14
passes, and RG activity is acceptable for all LCM units	step 15
fails	step 19

14 Repeat step 13 for the other LCM units in this frame.

15 To test the new RG, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCM unit (0 or 1)

Example of a MAP response:
LCM RSCS 14 0 Unit 0 InSvce Tests Initiated
LCM RSCS 14 0 Unit 0 Tst Passed

Note: Repeat this step for the other LCM units in this frame.

If TST	Do
passes	step 16
fails	step 19

16 To align RG activity to the preferred RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) assigned to the new RG

Example of a MAP display:
LCM RSCS 14 0 InSv Links OOS: Cside 0 Pside 0
Unit 0: InSv /RG:1
Unit 1: InSv /RG:1
11 11 11 RG: Pref 1 InSv
Drwr: 01 23 45 67 89 01 23 45 Stby 0 InSv
.. ..

PM LCM RG
major (end)

Note: Repeat this step until the LCM units are on the preferred RG.

If the SWRG command	Do
passes	step 20
fails	step 19

17 Refer to the card replacement procedure for the NT6X30 circuit card in *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 12.

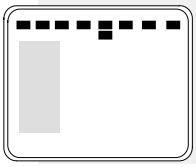
18 Refer to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the card replacement procedures, go to step 12.

19 For additional help, contact the next level of maintenance.

20 The procedure is complete. If other alarms appear at the MAP display, refer to the correct alarm clearing procedures.

PM LCM RG minor

Alarm display



CM	MS	IOD	Net	**PM**	CCS	Lns	Trks	Ext	Appl
.	.	.	.	**nLCM**	.	.	.	.	.

Indication

At the MTC level of the MAP display, an *n* LCM under the PM subsystem header indicates a minor alarm that involves an LCM.

The number (*n*) before LCM indicates the number of LCMs that have this alarm.

Meaning

One of the ringing generator units is in the in-service trouble (ISTb) state.

Impact

This condition does not affect subscriber service. The system initiates a switch of support to a backup ringing generator (SwRG). If the backup ringing generator fails, the system does not produce ringing.

Common procedures

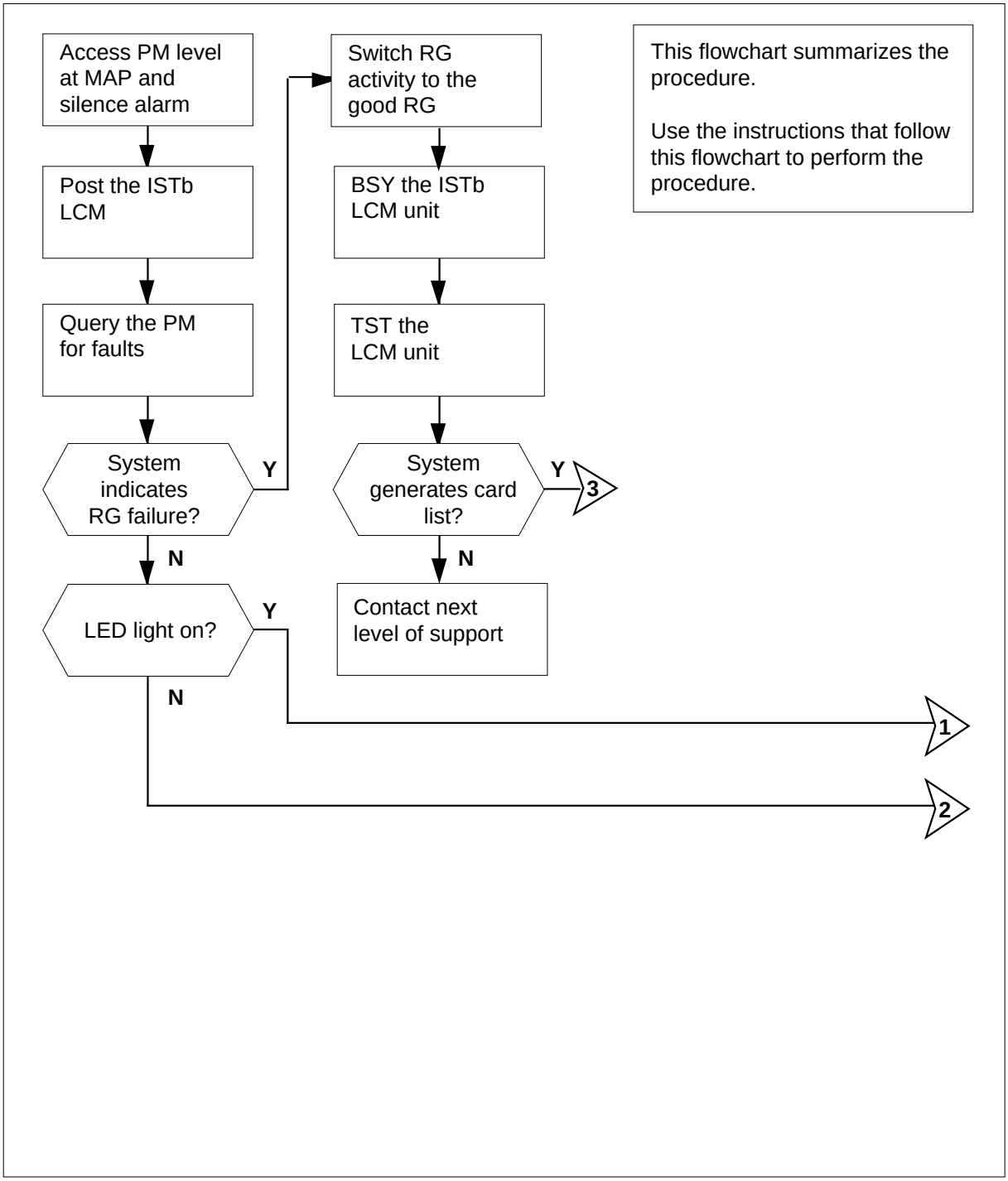
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

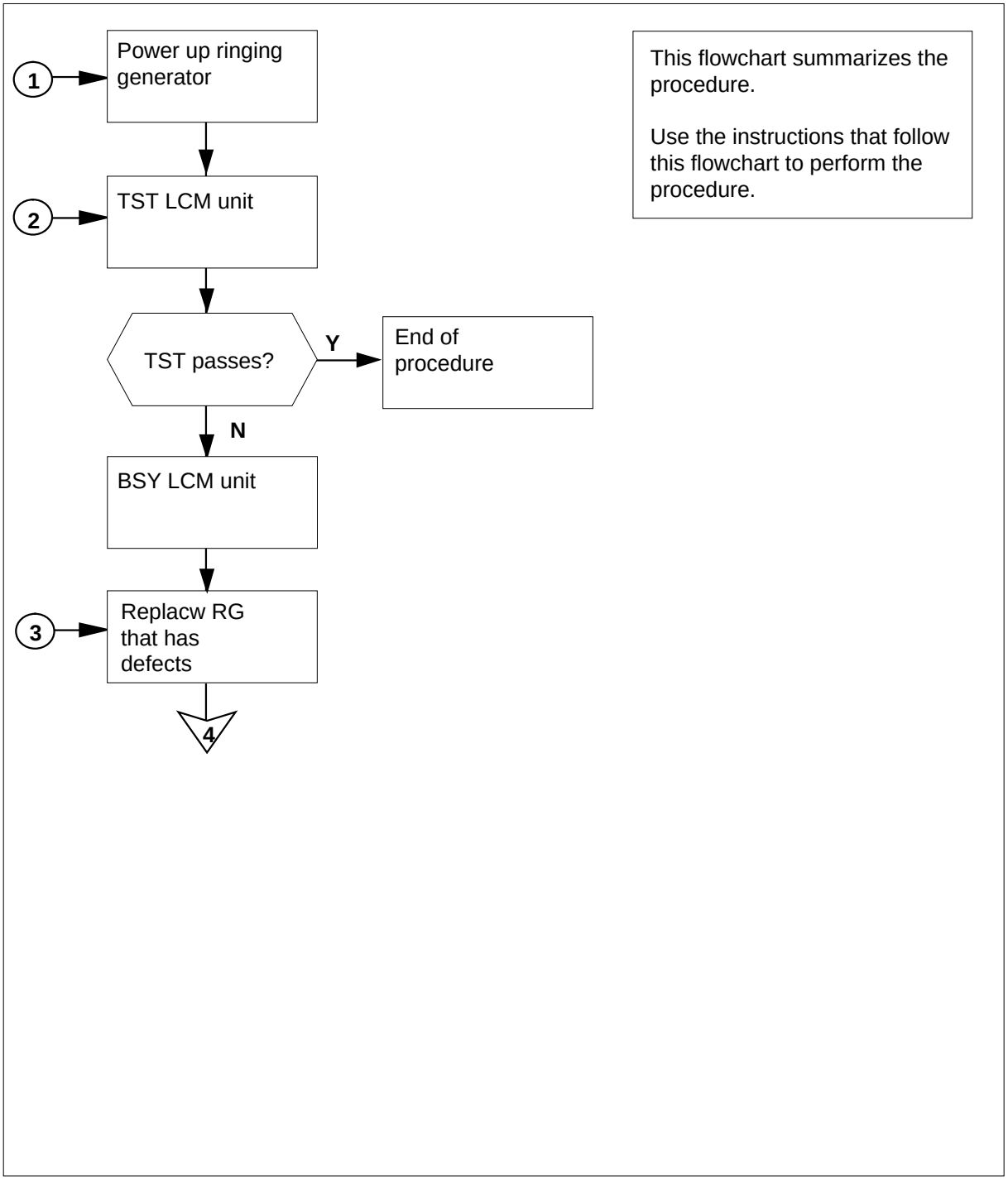
PM LCM RG
minor (continued)

Summary of a PM LCM RG minor alarm



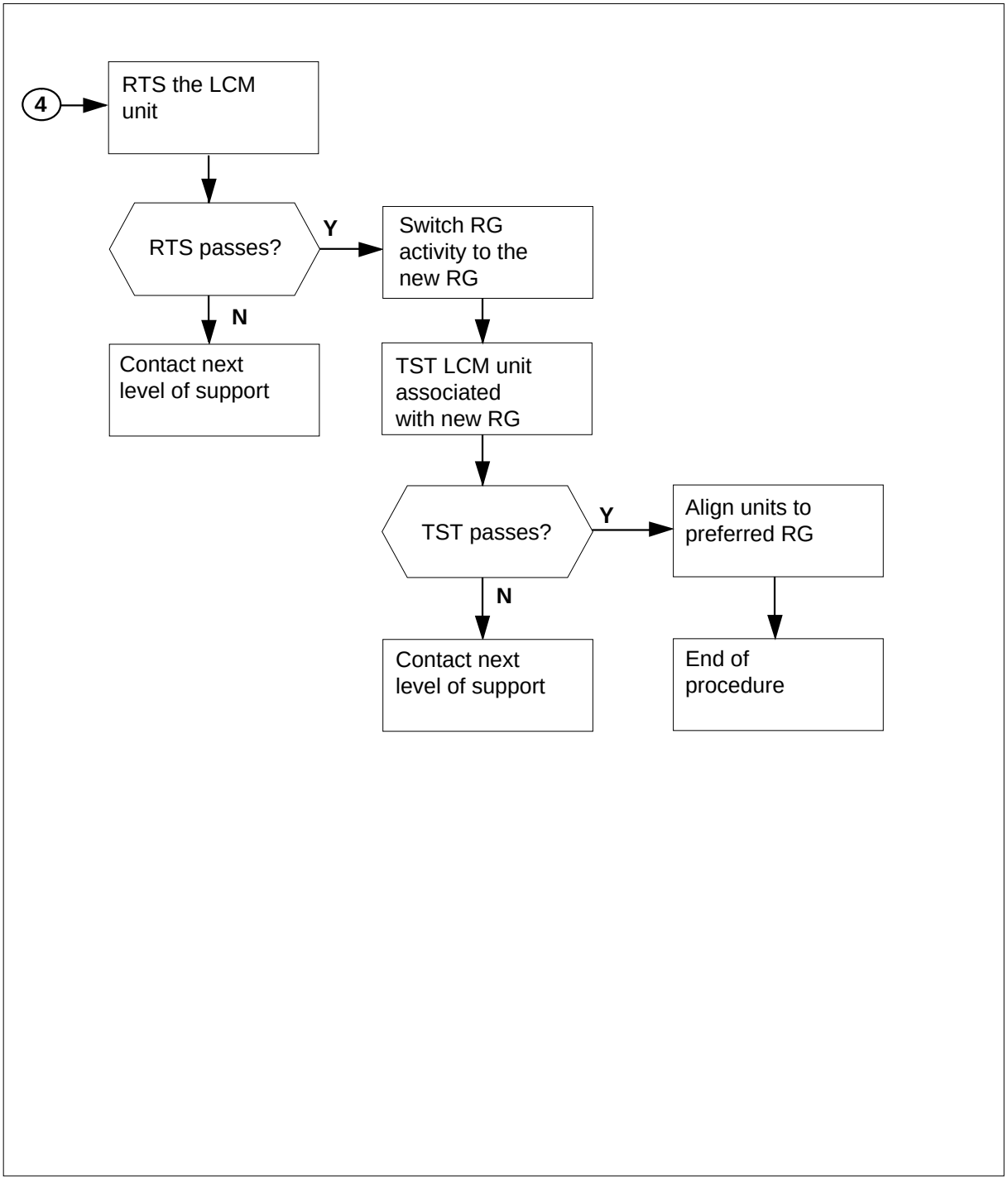
PM LCM RG
minor (continued)

Summary of a PM LCM RG minor alarm (continued)



PM LCM RG
minor (continued)

Summary of a PM LCM RG minor alarm (continued)



PM LCM RG
minor (continued)

Clearing a PM LCM RG minor alarm

At the MAP display

1

> **ATTENTION**
> Enter this procedure from the peripheral module (PM) system level alarm clearing procedure step that identifies an LCM ringing generator (RG) associated fault.

To silence the alarm, if required, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the defective LCM, type

>disp state ISTb LCM

and press the Enter key.

Example of a MAP response:

```
ISTb  LCM: 2
```

3 To post the ISTb LCM unit from step 2, type

>POST LCM lcm_site_name lcm_frame_no lcm_no

and press the Enter key.

where

lcm_site_name
is the site name for the defective LCM

lcm_frame_no
is the number of the associated LCM equipment frame

lcm_no
is the number of the defective LCM

Example of a MAP display:

PM LCM RG
minor (continued)

```
      SysB     ManB     OffL     CBsy     ISTb      InSv
PM     1        0        2        0        2         12
LCM    0        0        2        0        2          9

LCM   RSC0  14 1 ISTb  Links_OOS:  CSide  0   PSide   0
Unit0:   InsV                /RG: 0
Unit1:   ISTb                /RG: 0
                           11  11  11  11  11 RG:Pref 0 InSv
Drwr:  01  23  45  67  89  01  23  45  67  89    Stby 1 ISTb
       ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
```

4 To check for fault indicators, type

>querypm flt

and press the Enter key.

Example of a MAP response:

```
Node inservice troubles exist:
  One or both Units inservice trouble
 LCM   UNIT 0  No Inservice trouble Exist:
 LCM   UNIT 1  Inservice Troubles Exist:
Ringing Generator Failure:Ring Generator in Excess load
```

If the system	Do
indicates RG failure	step 7
does not indicate RG failure	step 5

At the LCM

5 Inspect of the ringing generator and check if the light-emitting diode (LED) is lit.

If the LED	Do
is lit	step 6
is not lit	step 7

6 To power up the ringing generator, move the power switch to the ON position. (The LED must go OFF.) The switches are:

RG 0

RG 1

If power	Do
is restored	step 16

PM LCM RG
minor (continued)

If power	Do
is not restored	step 7

At the MAP terminal

7 To align RG activity to the good RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) that associates with the RG that has defects

Example of a MAP display:

```
LCM RSC0 14 1 Unit 1 SWRG Passed
```

If the SWRG command	Do
passes, and RG activity must switch for the other unit	step 8
passes, and RG activity is acceptable for the two PM units	step 9
fails	step 19

8 Repeat step 7 for the other LCM units in this frame.

9 To manually busy (ManB) the ISTb LCM unit, type

***>BSY unit* unit_no**

and press the Enter key.

where

unit_no
is the number of the LCM unit (0 or 1) assigned to the RG that has defects

10 To test the ManB LCM unit, type

***>tst unit* unit_no**

and press the Enter key.

where

unit_no
is the number of the LCM unit manually busied in step 9

Example of a MAP response:

PM LCM RG
minor (continued)

```
LCM  RSC0 14 1 Unit 1 InSvce Test Initiated
LCM  RSC0 14 1 Unit 1 Tst Failed: (Reason for failure)
                      or
LCM  RSC0 14 1 Unit 1 InSvce Test Initiated
LCM  RSC0 14 1 Unit 1 Tst passed
```

If TST	Do
passes	step 13
fails	step 11

11 Observe the card listing in the MAP display.

Example of a MAP response:

```
SITE   FLR  RPOS   BAY_ID  SHF DESCRIPTION SLOT   EQPEC
RSC0    01   A00   LCM 00  76    LCM   000  01     6X30
RSC0    01   A00   LCM 00  04    LCM   000  04     6X51
RSC0    01   A00   LCM 00  76    LCM   000  11     6X30
RSC0    01   A00   LCM 00  04    LCM   000  04     6X51
```

12 Determine if the NT6X30 circuit card was replaced.

If the NT6X30 card	Do
was replaced	step 19
was not replaced	step 18

13 To return the LCM unit to service, type

>rts unit **unit_no**

and press the Enter key.

where

unit_no
is the number of the LCM unit manually busied in step 9

If RTS	Do
passes	step 14
fails	step 19

14 To align RG activity to the new RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

PM LCM RG
minor (continued)

unit_no
is the LCM unit (0 or 1) associated with the new RG

Example of a MAP display:

```
LCM  RSC0 14 1 Unit 1 SWRG Passed
```

If the SWRG command	Do
passes, and RG activity must switch for the other PM units	step 15
passes, and RG activity is acceptable for the two PM units	step 16
fails	step 19

15 Repeat step 14 for the other LCM units in this frame.

16 To test the new RG, type

>tst unit **unit_no**

and press the Enter key.

where

unit_no
is the number of the LCM unit (0 or 1) associated with the new RG

If TST	Do
passes	step 17
fails	step 19

17 To align RG activity to the preferred RG, type

>SWRG UNIT unit_no

and press the Enter key.

where

unit_no
is the LCM unit (0 or 1) associated with the new RG

Example of a MAP display:

```
LCM RSC0 14 1 InSv Links  OOS: Cside 0 Pside 0
Unit 0: InSv      /RG:0
Unit 1: InSv      /RG:0
                            11  11  11  11  11  RG: Pref 0 InSv
Drwr:  01  23  45  67  89  01  23  45  67  89      Stby 1 InSv
       ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
```

PM LCM RG
minor (end)

Note: Repeat this step until the units of the LCMs in this frame are on the preferred RG.

If SWRG command	Do
passes	step 20
fails	step 19

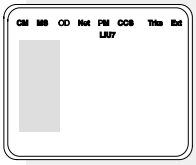
18 Perform the card replacement procedure for the NT6X30 circuit card in *Card Replacement Procedures*. Finish the card replacement procedures and go to step 13.

19 For additional help, contact the next level of support.

20 The procedure is complete. If other alarms appear at the MAP display, perform the appropriate alarm clearing procedures.

PM LCME critical

Alarm display



CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	**1LCME *C***	.	.	.	.	.

Indication

The enhanced ISDN line concentrating module (LCME) is under the peripheral module (PM) subsystem header.

A 1LCME *C* at the maintenance (MTC) level of the MAP terminal indicates a critical condition in the LCME.

Meaning

This alarm indicates the number of LCMEs in the system busy (SysB) state.

Result

Call processing ceases on the lines connected to the LCME. There is no call processing support.

Common procedures

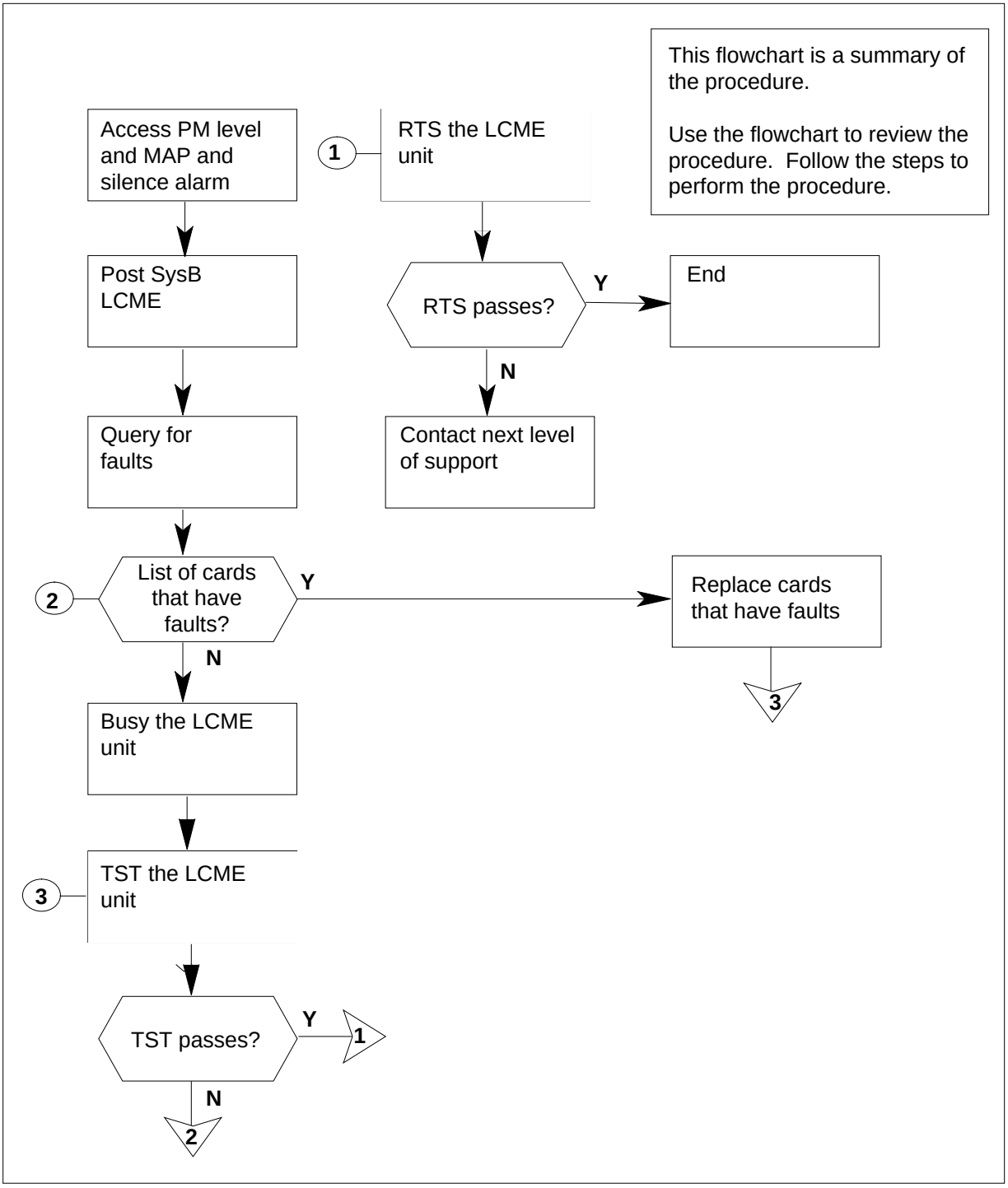
There are no common procedures.

Action

This procedure contains a summary flowchart and a series of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME
critical (continued)

Summary of clearing a PM LCME critical alarm



PM LCME
critical (continued)

Clearing a PM LCME critical alarm

At the MAP terminal

1

ATTENTION
Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCME-associated fault.

To silence the alarm, type:

```
>MAPCI;MTC;PM;SIL
```

and press the Enter key.

2 To identify the LCME that has faults, type:

```
>DISP STATE SYSB LCME
```

and press the Enter key.

Standard response on the MAP display:
SysB LCME : 2

3 To post the SysB LCME identified in step 2, type:

```
>POST LCME  LCME_site_name  LCME_frame_no  LCME_no
```

and press the Enter key.

where

LCME_site_name
is the site name for the LCME that has faults

LCME_frame_no
is the number of the associated LCME equipment frame

lcme_no
is the number of the LCME that has faults

Standard response on the MAP display:

PM LCME
critical (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .     .       .    1LCME   .      .       .      .       .
                           *C*

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM       1        0        2        0        2        12
 2 Post_    LCME     0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSC-S 14 1 SysB  Links_OOS:  CSide  2   PSide   0
 5 Trnsl_   Unit0:   SysB                /RG: 1
 6 Tst_     Unit1:   SysB                /RG: 1
 7 Bsy_                                 11  11  11  11  11 RG:Pref 1 InSv
 8 RTS_    Drwr:  01  23  45  67  89  01  23  45  67  89    Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 To check for fault indicators, type:

>QUERYPM FLT

and press the Enter key.

Standard response on the MAP display:

PM LCME
critical (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .     .       .    1LCME   .      .       .      .       .
                           *C*

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM       1        0        2        0        2        12
 2 Post_    LCME     0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSC-S 14 1 SysB  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   SysB                /RG: 1
 6 Tst_     Unit1:   SysB                /RG: 1
 7 Bsy_                                 11  11  11  11  11  RG:Pref 1 InSv
 8 RTS_   Drwr:  01  23  45  67  89  01  23  45  67  89     Stby 0 InSv
 9 OffL           ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_  QUERYPM FLT
11 Disp_    Node inservice troubles exist:
12 Next         One or both Units inservice trouble
13          LCME   UNIT 0  Out of Service Troubles Exist:
14 QueryPM  LCME   UNIT 1  Out of Service Troubles Exist:
15
16          SITE  FLR   RPOS   BAY_ID  SHF   DESCRIPTION   SLOT  EQPEC
17          RSCS0  01    A00   LCME 00  32   LCME   : 000  : 21   BX34
18          RSCS0  01    A00   LCME 00  32   LCME   : 000  : 19   BX35
            RSCS0  01    A00   LCME 00  32   LCME   : 000  : 20   BX35
```

If the system	Do
indicates a card that has faults	step 15
does not indicate a card that has faults	step 5

5 To manually busy (ManB) the LCME posted in step 3, type:

>BSY PM

and press the Enter key.

6 To test the ManB LCME, type:

>TST PM

and press the Enter key.

Standard response on the MAP display:

PM LCME
critical (continued)

```
Test Passed
    or
Test Failed
```

If TST	Do
passes	step 14
fails, and the system generates a card list	step 15
fails, and the system does not generate a card list	step 16
cannot test central-side busy (CBsy)	step 7

7 To identify central-side (C-side) links that are busied by the system, type:

>TRNSL C

and press the Enter key.

Standard response on the MAP display:

```
LINK 0    RCC2 2 ;CAP MS;STATUS:   SYSB,;MSGCOND:CLS
LINK 10   RCC2 2  CAP MS;STATUS:   SYSB,;MSGCOND:CLS
LINK 1    RCC2 2  CAP S; STATUS:   OK
LINK 11   RCC2 2  CAP S; STATUS:   OK
LINK 2    RCC2 2 ;CAP S; STATUS:   OK
```

If message that supports links are	Do
SysB	step 8
OK	step 25

8 To post the remote cluster control 2 (RCC2) unit for the LCME, type:

>POST RCC2 rcc2_no

and press the Enter key.

where

rcc2_no
is the RCC2 unit identified in step 7

Standard response on the MAP display:

PM LCME
critical (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .      .      .    1LCME   .      .       .      .       .
                            *C*

RCC2             SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM        3        0        1        0        4        12
2 Post_   RCC2      0        0        2        0        2         9
3 ListSet
4         RCC2   1 ISTb  Links_OOS:  CSide  0, PSide   2
5 Trnsl_  Unit0:   Act    InSv
6 Tst_    Unit1:   Inact  InSv
7 Bsy_
8 RTS_
9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17
18
```

9 To identify the peripheral-side (P-side) links that have faults and choose a link that has faults, type:

>TRNSL P

and press the Enter key.

Standard response on the MAP display:

```
LINK 24:LCME   1    0;CAP MS;STATUS:    SYSB;MSGCOND:CLS
LINK 25:LCME   1    1;CAP  S;STATUS:    OK
LINK 26:LCME   1    2;CAP  S;STATUS:    OK
LINK 27:LCME   1    3;CAP  S;STATUS:    OK
LINK 28:LCME   2    0;CAP  MS;STATUS:   SysB;MSGCOND:CLS
LINK 29:LCME   2    1;CAP  S;STATUS:    OK
LINK 30:LCME   2    2;CAP  S;STATUS:    OK
```

10 To busy (BSY) the link that has faults, type:

>BSY LINK link_no

and press the Enter key.

where

link_no
is the number of the P-side link chosen in step 9

11 To test the ManB link, type:

>TST LINK link_no

and press the Enter key.

PM LCME
critical (continued)

where

link_no
is the number of the link manually busied in step 10

If the system	Do
indicates a card that has faults	step 15
does not indicate a card that has faults	step 12

12 To return the ManB link to service, type:

>RTS LINK link_no

and press the Enter key.

where

link_no
is the number of the link tested in step 11

If RTS	Do
passes on all links	step 13
fails	step 25

Note: If other links that have faults are identified, perform the procedures in steps 10 through 12 for each link. Continue these links until all links are busied, tested, and returned to service.

13 To post the LCME identified in step 2, type:

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name
is the site name for the LCME that has faults

lcme_frame_no
is the number of the associated LCME

lcme_no
is the number of the LCME that has faults

14 To return to service (RTS) the ManB LCME, type:

>RTS PM

and press the Enter key.

If RTS	Do
passes	step 26
fails	step 18

PM LCME
critical (continued)

15 The following MAP example is a card list produced by the system. One or more of these cards can have faults. If this condition occurs, replace the cards. Start with the first card in the list.

Standard response on the MAP display for an LCM in an LCE cabinet:

```
SITE      FLR   RPOS  BAY_ID        SHF  DESCRIPTION     SLOT    EQPEC
REM1       01   A00   LCE    00      21  LCM   :00 0     : 04     6X51
REM1       01   A00   LCE    00      21  LCM   :00 0     : 05     6X52
REM1       01   A00   LCE    00      21  LCM   :00 0     : 01     6X53
REM1       01   A00   LCE    00      21  LCM   :00 0     :        6X54
REM1       01   A00   LCE    00      32  RCC   :00 0     : 07     6X48
```

Standard response on the MAP display for an LCME in a CLCE cabinet:

```
SITE      FLR   RPOS  BAY_ID        SHF  DESCRIPTION     SLOT    EQPEC
REM1       01   A00   CLCE   00      04  LCME  :01 0     : 21     BX34
REM1       01   A00   CLCE   00      04  LCME  :01 0     : 20     BX35
REM1       01   A00   CLCE   00      04  LCME  :01 0     : 25     BX72
REM1       01   A00   CLCE   00      04  LCME  :01 0     : 22     6X53
REM1       01   A00   CLCE   00      05  RCC2  :01 0     : 13     MX74
```

If you	Do
replaced all the cards on the list	step 16
did not replace all the cards on the list	step 23

16 The problem can be the DS30A interface (I/F) card that connects to the links that have faults that appear in step 9. The DS30A I/F is on the NTMX74 card in the RCC2 or on two NT6X48 cards in the RCC.

If you	Do
replaced the NTMX74 or the 6X48 cards	step 18
did not replace the NTMX74 or the 6X48 cards	step 17

Note: If the system indicates the NTMX74 card, check if one or several links have faults. Repeat the clearing procedure as required.

17 Determine the location of the card with links that are faulty. Each I/F chip on the NTMX74 card serves four DS30A links. The link to chip relationship appears in the following chart.

To assure the message (MS) links are redundant, separate the MS links. Make sure at least four MS links are present on an RCC2 when you enter data in table LCMINV.

PM LCME
critical (continued)

Chip to link relationship table for an RCC2

NTMX74 I/F Chip number	DS30A links
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Each I/F chip on the 6X48 cards serves two DS30A links. The card and chip to link relationship appears in the following chart.

To assure the message (MS) links are redundant, separate the MS links. Make sure that at least two MS links are present on an RSC when you enter data in table LCMINV.

Card and chip to link relationship table for an RSC

Chip number	Card Slots	DS30A links
1	7	0
1	7	1
1	6	2
1	6	3
2	7	4
2	7	5
2	6	6
2	6	7
3	7	8
3	7	9
3	6	10
3	6	11
4	7	12
4	7	13
4	6	14
4	6	15
5	7	16
5	7	17
5	6	18
5	6	19

PM LCME
critical (continued)

18 A line drawer that has faults can cause the problem. To isolate the problem to one line drawer, remove the fuses from each line drawer that services the posted LCME module. Remove the fuses in the following order:

a -48V fuse(s)

b +15V fuse

c +5V fuse

19 After you remove the fuses from all line drawers connected to the LCME that has faults, try to RTS the LCME. Type:

```
>RTS PM
```

and press the Enter key.

If RTS	Do
passes	step 20
fails	step 25

20 Insert the drawer fuses one drawer pair at a time, in the following order, and apply power. This process isolates the failing line drawer pair.

a +5V fuse

b +15V fuse

c -48V fuse(s)

21 After you insert fuses in a drawer pair, and apply power, attempt to RTS the drawer. Type:

```
>BSY DRWR drwr_no
```

and press the Enter key.

where

drwr_no
is either drawer number of a pair

Standard response on the MAP display:

PM LCME
critical (continued)

```
 CM     MS     IOD  Net     PM    CCS    Lns  Trks   Ext   Appl
CM Flt  .       .    .    4  RCS  5 RSC       17 CC  1Crit   .
  M                       *C*     *C*         *C*    *C*

LCME            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        6        2        1        0       23        39
 2 Post_   LCME      0        0        0        0        1         0
 3 ListSet
 4 SwRg    LCME RSCS 00 0 ISTb  Links_OOS:  CSide  0
 5 Trnsl_  Unit0:   IStb              /RG:  0
 6 Tst_    Unit1:   IStb              /RG:  0
 7 Bsy_                                11  11  11  RG: Pref 0 InSv
 8 RTS_    Drwr:   01  23  45  67  89  01  23  45      Stby 1 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_ bsy drwr 13
11 Disp_   Warning ... this action will affect both drwrs 12 and 13
12 Next    LCNE RSCS 00 0 Drwr 13 will be taken out of service
13         Please confirm (”YES, ”Y”, ”NO”, or ”N”):
14 QueryPM
15
16
17
18
```

Note: In a MAP display read drawer numbers greater than nine vertically, from top to bottom.

22 To RTS the line drawer, type:

>RTS DRWR drwr_no

and press the Enter key.

where

drwr_no
is the number of the drawer busied in step 21

Repeat steps 20, 21 and 22 until you have inserted fuses again in all drawers and restored service to all drawers.

Standard response on the MAP display:

PM LCME
critical (end)

```
 CM     MS     IOD  Net     PM    CCS    Lns  Trks   Ext   Appl
CM Flt  .       .    .    4  RCS  5 RSC       17 CC  1Crit   .
  M                       *C*     *C*         *C*    *C*

LCME            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        6        2        1        0       23        39
 2 Post_   LCME      0        0        0        0        1         0
 3 ListSet
 4 SwRg    LCME RSCS 00 0 ISTb  Links_OOS:  CSide  0
 5 Trnsl_  Unit0:   IStb              /RG:  0
 6 Tst_    Unit1:   IStb              /RG:  0
 7 Bsy_                                11  11  11  RG: Pref 0 InSv
 8 RTS_    Drwr:   01  23  45  67  89  01  23  45      Stby 1 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_ rts drwr 13
11 Disp_   Warning ... this action will affect both drwrs 12 and 13
12 Next    OSvce Tests Initiated
13         LCME RSCS 00 0 Drwr 13 Tst Passed
14 QueryPM LCME RSCS 00 0 Drwr 13 Rts Passed
15
16
17
18
```

If RTS	Do
passes	step 26
fail	step 24

23 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the card replacement procedures, go to step 6.

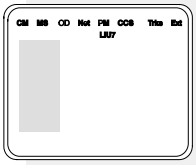
24 Isolate the problem to a line drawer pair. Diagnose the problem to a card, shelf, frame or cable. Make the necessary replacement. After you correct the problem, return to step 20 of this procedure. Insert all fuses again, BSY and RTS all drawers.

25 For additional help to clear this alarm, contact the next level of support.

26 This procedure is complete. If other alarms appear, refer to the correct alarm clearing procedures for the indicated alarms.

PM LCME major

Alarm display



CM	MS	IOD	Net	PM	CCS	Lns	Trks	Ext	APPL
.	.	.	.	**1LCME M**	.	.	.	.	.

Indication

The alarm code 1LCME (enhanced ISDN line-concentrating module) under the peripheral module (PM) subsystem header indicates an alarm affecting an LCME. This alarm code appears at the maintenance (MTC) level of the MAP display. The letter M below the 1LCME code indicates that the alarm class is major.

Meaning

The indicated number of LCME units are the in-service (INSV) or system-busy (SysB) state.

Result

This condition affects subscriber service. Local LCME backup is not available if the other LCME units fail.

Common procedures

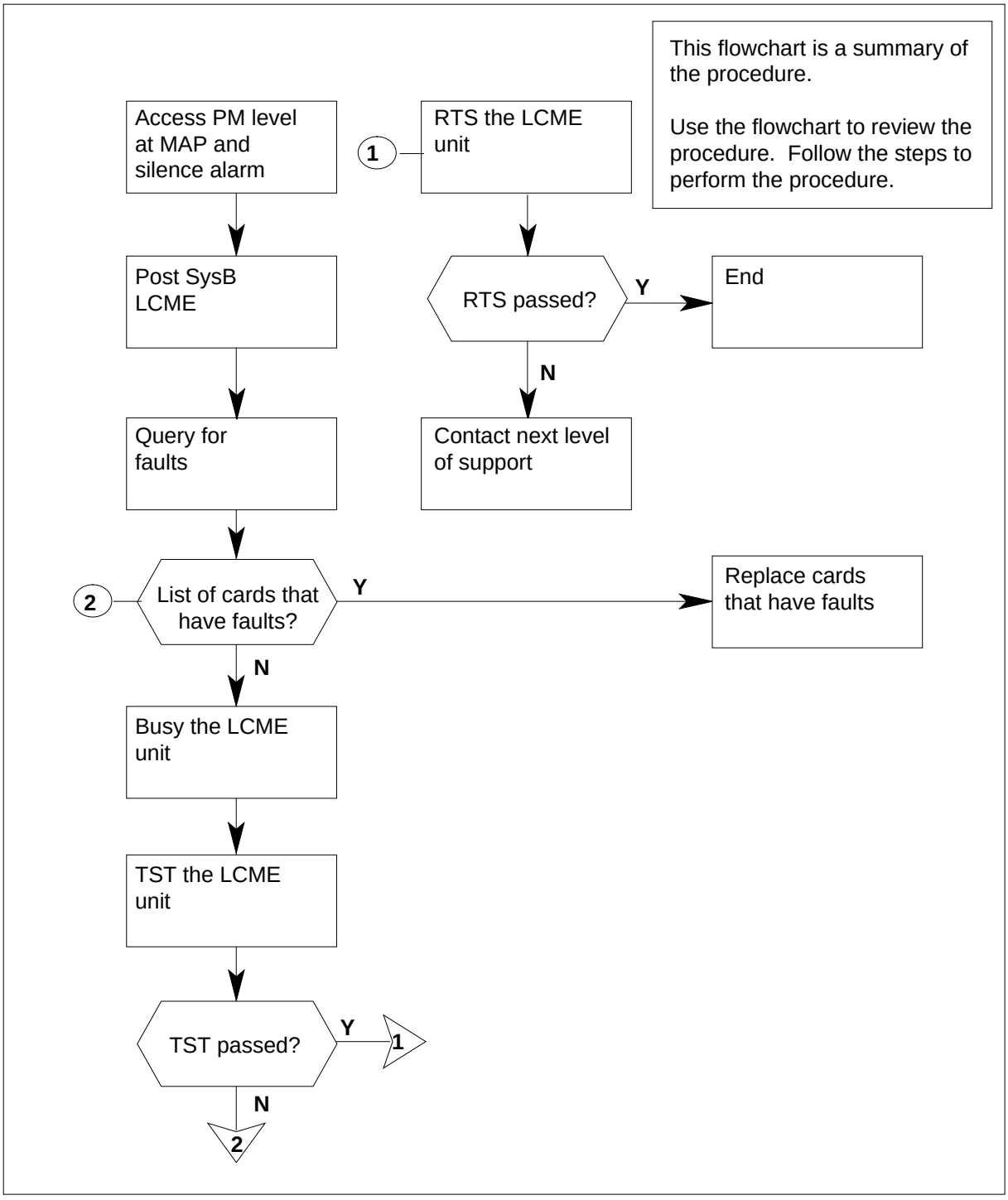
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME
major (continued)

Summary of clearing a PM LCME major alarm



PM LCME
major (continued)

Clearing a PM LCME major alarm

At your current location

1 Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCME-associated fault.

At the MAP terminal

2 To silence the alarm, type

```
>MAPCI;MTC;PM;SIL
```

and press the Enter key.

3 To identify the SysB LCME, type

```
>DISP STATE ISTB LCME
```

and press the Enter key.

Sample response on the MAP display:
SysB LCME : 2

4 To post the SysB LCME identified in step 3, type

```
>POST LCME lcme_site_name lcme_frame_no lcme_no
```

and press the Enter key.

where

lcme_site_name
is the site name for the LCME that has faults

lcme_frame_no
is the number of the associated LCME equipment frame

lcme_no
is the number of the LCME that has faults

Sample response on the MAP display:

PM LCME
major (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .      .      .    1LCME   .      .       .      .       .
                            M

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM       1        0        2        0        2        12
 2 Post_    LCME     1        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSCS 14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv  Takeover       /RG: 1
 6 Tst_     Unit1:   SysB                 /RG: 1
 7 Bsy_                                 11  11  11    RG:Pref 1 InSv
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45       Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

5 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

PM LCME
major (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .      .      .    1LCME   .      .       .      .       .
                            M

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM      1        0        2        0        2        12
 2 Post_    LCME    1        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSCS 14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv  Takeover       /RG: 1
 6 Tst_     Unit1:   SysB                 /RG: 1
 7 Bsy_                                 11  11  11    RG:Pref 1 InSv
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45       Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_  QUERYPM FLT
11 Disp_    Node inservice troubles exist:
12 Next         One or both Units inservice trouble
13          LCME   UNIT 0  Inservice No Troubles Exist:
14 QueryPM  LCME   UNIT 1  Out of service Troubles Exist:
15
16       SITE  FLR   RPOS   BAY_ID     SHF   DESCRIPTION   SLOT  EQPEC
17       RSCS0  01    A00   LCME   00   32   LCME   : 000  : 19   BX35
18       RSCS0  01    A00   LCME   00   32   LCME   : 000  : 20   BX35
```

If the system	Do
indicates cards with faults	step 17
does not indicate cards with faults	step 6

6 To manually busy (ManB) the LCME posted in step 4, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the SysB LCME

7 To test the LCME, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCME unit ManB in step 6

Sample response on the MAP display:

```
Test Passed
    or
Test Failed
```

If TST	Do
passed	step 16
fails	step 17
cannot test central-side busy (CBsy) links	step 8

8 To identify central-side (C-side) links in a SysB condition, type

>TRNSL C

and press the Enter key.

Sample response on the MAP display:

```
LINK 0    RCC2 2 ;CAP MS;STATUS:   SYSB,;MSGCOND:CLS
LINK 1    RCC2 2  CAP S; STATUS:   OK
LINK 2    RCC2 2  CAP S; STATUS:   OK
LINK 3    RCC2 2  CAP S; STATUS:   OK
LINK 4    RCC2 2 ;CAP MS;STATUS:   OK,;MSCOND:OPN,
```

If links are	Do
SysB	step 9
open	step 21

9 To post the RCC2 unit associated with the LCME, type

>POST RCC2 rcc2_no

and press the Enter key.

where

rcc2_no
is the RCC2 unit identified in step 8

Sample response on the MAP display:

PM LCME
major (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
 .      .      .      .    1LCME   .      .       .      .       .
                            M

RCC2             SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       3        0        1        0        4        12
 2 Post_   RCC2     0        0        2        0        2         9
 3 ListSet
 4         RCC2   1 ISTb  Links_OOS:  CSide  0, PSide   1
 5 Trnsl_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17
18
```

10 To identify the peripheral-side (P-side) links that have faults, and to choose a link that has faults, type

>TRNSL P

and press the Enter key.

Sample response on the MAP display:

```
LINK 23:LCME   1    0;CAP MS;STATUS:    SYSB;MSGCOND:CLS
LINK 24:LCME   1    1;CAP  S;STATUS:    OK
LINK 25:LCME   1    2;CAP  S;STATUS:    OK
LINK 26:LCME   1    3;CAP  S;STATUS:    OK
LINK 27:LCME   2    0;CAP MS;STATUS:    OK;MSGCOND:OPN
LINK 28:LCME   2    1;CAP  S;STATUS:    OK
LINK 29:LCME   2    2;CAP  S;STATUS:    OK
```

11 To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no
is the number of the P-side link chosen in step 10

12 To test the ManB link, type

>TST LINK link_no

and press the Enter key.

where

link_no
is the number of the link ManB in step 11

If system	Do
indicates a card that has faults	step 17
does not indicate a card that has faults	step 13

13 To return the ManB link to service, type

>RTS LINK link_no

and press the Enter key.

where

link_no
is the number of the link tested in step 12

Note: If the system identifies other links that have faults, perform the procedures in steps 11 through 13. Perform this procedure for each link until all links are busy, tested, and returned to service.

If RTS	Do
passes	step 14
fails	step 21

14 To post the LCME identified in step 3, type

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name
is the site name for the LCME that has faults

lcme_frame_no
is the number of the associated LCME

lcme_no
is the number of the LCME that has faults

15 To test the LCME unit, type

>TST UNIT unit_no

and press the Enter key.

where

PM LCME
major (continued)

unit_no
is the number of the LCME unit posted in step 14

If TST	Do
passes	step 16
fails	step 17

16 To return the LCME to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCME tested in step 15

If RTS	Do
passes	step 22
fails	step 21

17 Check the card list that appears in the following MAP display

Sample response on the MAP display:

```
SITE   FLR     RPOS   BAY_ID        SHF      DESCRIPTION    SLOT   EQPEC
RSCS0   01      A00   LCME   00      32      LCME  :000      : 21   BX34
RSCS0   01      A00   LCME   00      32      LCME  :000      : 19   BX35
RSCS0   01      A00   LCME   00      32      LCME  :000      : 20   BX35
```

Note: If the system does not generate a card list, check the logs. Contact the next level of maintenance support. Go to step 21.

If all cards on the list have	Do
been replaced	step 18
not replaced	step 20

18 The trouble can be the NTMX74 DS30A interface card in the RCC2. This interface card connects to the links that have faults shown in step 10.

If you	Do
replaced the NTMX74 card	step 21
did not replace the NTMX74 card	step 19

Note: If the system indicates the NTMX74 card, check if one or more links have faults. Repeat clearing procedure as necessary.

19 Each interface (I/F) chip on the NTMX74 card serves 4 DS30A links. The following chart illustrates the link to chip relationship. Message (MS) links must be separated by a minimum of 4 in table LCMINV.

Chip number	DS30A links			
1	22,	23,	24,	25
2	26,	27,	28,	29
3	30,	31,	32,	33
4	34,	35,	36,	37
5	38,	39,	40,	41
6	42,	43,	44,	45
7	46,	47,	48,	49
8	50,	51,	52,	53

Go to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. Perform the procedure. When you complete the card replacement procedures, go to step 12 of this procedure.

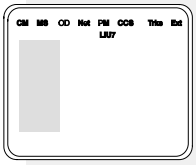
20 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Perform the procedure. When you complete the card replacement procedures, go to step 15 of this procedure.

21 Obtain additional help in clearing this alarm by contacting the personnel responsible for higher level support.

22 This procedure is complete. If other alarms appear, refer to the correct alarm clearing procedures for the indicated alarms.

PM LCME
minor

Alarm display



CM	MS	IOD	Net	**PM**	CCS	Lns	Trks	Ext	APPL
.	.	.	.	**1LCME**	.	.	.	.	.

Indication

The alarm code 1LCM(E) under the PM subsystem header indicates an LCM(E) minor alarm. This header appears at the MTC level of the MAP display.

Meaning

One of the LCM(E) units is in the in-service trouble (ISTb) state.

Result

This condition does not affect subscriber service. Local backup is not available if the other LCM(E) units fail.

Common procedures

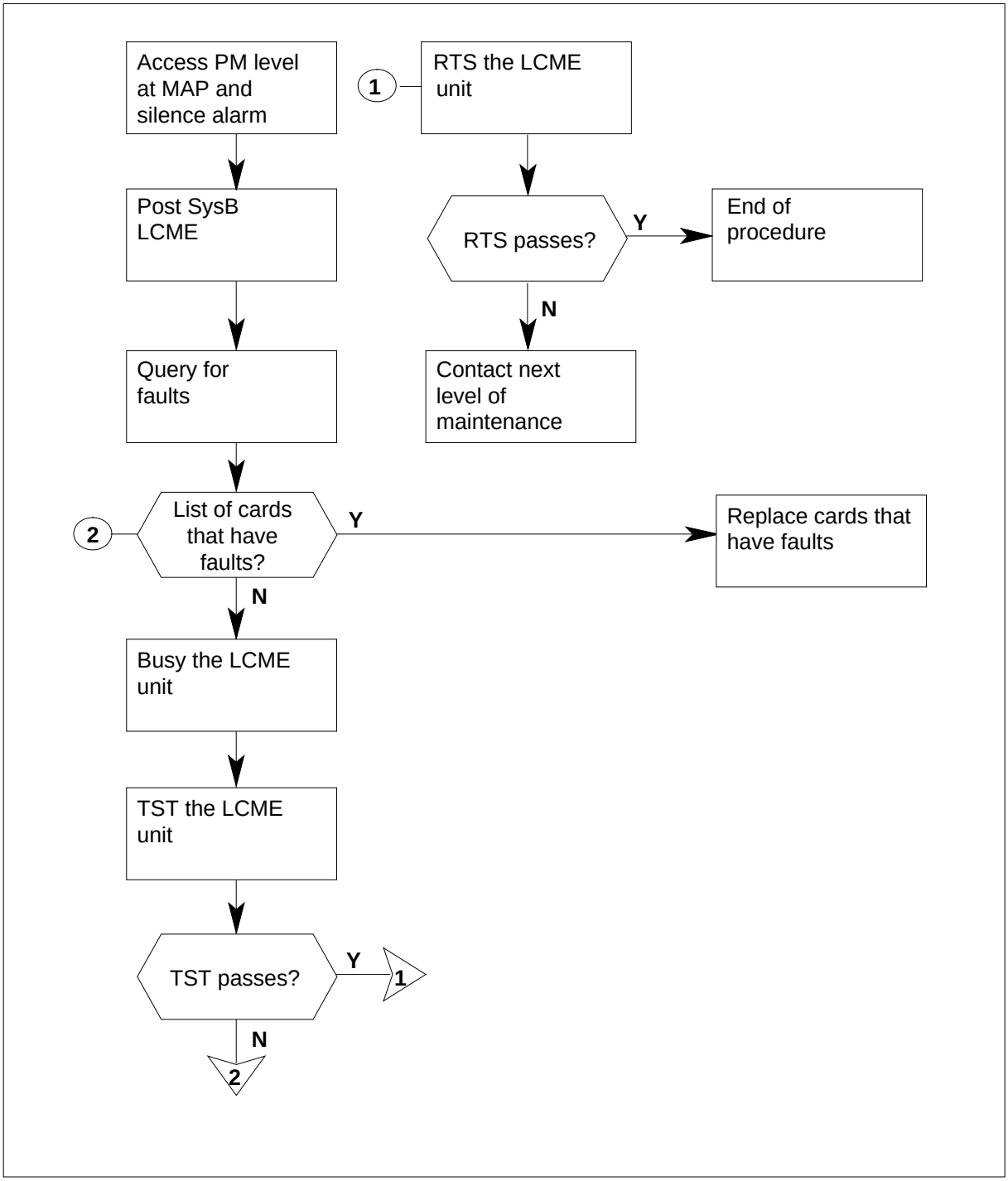
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM LCME
minor (continued)

Summary of Clearing a PM LCME minor alarm



PM LCME
minor (continued)

Clearing a PM LCME minor alarm

At the MAP terminal

1

> **ATTENTION**
> Enter this procedure from a PM system-level alarm clearing procedure step that identified an LCME-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the LCME that has faults, type

>DISP STATE ISTB LCME

and press the Enter key.

Sample response on the MAP display:

```
ISTb  LCME : 2
```

3 To post the ISTb LCM(E) from step 2, type

>POST LCME lcme_site_name lcme_frame_no lcme_no

and press the Enter key.

where

lcme_site_name
is the site name for the LCME that has faults

lcme_frame_no
is the number of the associated LCME equipment frame

lcme_no
is the number of the LCME that has faults

Sample response on the MAP display:

PM LCME
minor (continued)

```
CM     MS     IOD     Net     PM     CCS    Lns    Trks    Ext  APPL
.      .       .       .    1LCME     .       .       .        .      .


LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM        1        0        2        0        2        12
 2 Post_    LCME      0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSCS 14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv  Takeover       /RG: 1
 6 Tst_     Unit1:   ISTb                 /RG: 1
 7 Bsy_                                 11  11  11    RG:Pref 1 InSv
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45       Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

PM LCME
minor (continued)

```
CM     MS     IOD     Net     PM     CCS    Lns    Trks    Ext  APPL
.      .       .       .    1LCME     .       .       .        .      .


LCME              SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        1        0        2        0        2       12
 2 Post_    LCME      0        0        2        0        2        9
 3 ListSet
 4 SwRG     LCME   RSCS 14 1 ISTb  Links_OOS:  CSide  1   PSide   0
 5 Trnsl_   Unit0:   InSv  Takeover       /RG: 1
 6 Tst_     Unit1:   ISTb                 /RG: 1
 7 Bsy_                                 11  11  11    RG:Pref 1 InSv
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45       Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_  QUERYPM FLT
11 Disp_    Node inservice troubles exist:
12 Next         One or both Units inservice trouble
13          LCME   UNIT 0  Inservice No Troubles Exist:
14 QueryPM  LCME   UNIT 1  Inservice Troubles Exist:
15
16
17
18
```

If the system	Do
indicates a card that has faults	step 17
does not indicate a card that has faults	step 5

5 To manually busy the LCME posted in step 3, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the ISTb LCME unit

6 To test the ManB LCM(E), type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCME unit manually busied in step 5

Sample response on the MAP display:

```
Test Passed
    or
Test Failed
```

If TST	Do
passes	step 16
fails	step 17
cannot test CBsy	step 7

7 To identify C-side links in a SysB condition, type

>TRNSL C

and press the Enter key.

Sample response on the MAP display:

```
LINK 0    RCC2 2 ;CAP MS;STATUS:   OK,;MSGCOND:OPN
LINK 1    RCC2 2  CAP S; STATUS:   SysB
LINK 2    RCC2 2  CAP S; STATUS:   OK
LINK 3    RCC2 2  CAP S; STATUS:   OK
LINK 4    RCC2 2 ;CAP MS;STATUS:   OK,;MSCOND:OPN
```

If links	Do
are SysB	step 8
are open	step 21

8 To post the RCC2 unit associated with the LCM(E), type

>POST RCC2 rcc2_no

and press the Enter key.

where

rcc2_no
is the RCC2 unit from step 7

Sample response on the MAP display:

PM LCME
minor (continued)

```
CM     MS     IOD     Net     PM     CCS    Lns    Trks    Ext  APPL
.      .       .       .    1LCME     .      .      .       .     .


RCC2             SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM        0        0        0        0        4        12
2 Post_   RCC2      0        0        0        0        2         9
3 ListSet
4         RCC2   2 ISTb  Links_OOS:  CSide  0, PSide   1
5 Trnsl_  Unit0:   Act InSv
6 Tst_    Unit1:   Inact InSv
7 Bsy_
8 RTS_
9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17
18
```

9 To identify the P-side links that have faults and choose a link that has faults, type

>TRNSL P

and press the Enter key.

Sample response on the MAP display:

```
 LINK 23:LCME   1    0;CAP MS;STATUS:    OK;MSGCOND:OPN
 LINK 24:LCME   1    1;CAP  S;STATUS:    SysB
 LINK 25:LCME   1    2;CAP  S;STATUS:    OK
 LINK 26:LCME   1    3;CAP  S;STATUS:    OK
 LINK 27:LCME   2    0;CAP MS;STATUS:    OK;MSGCOND:OPN
 LINK 28:LCME   2    1;CAP  S;STATUS:    OK
 LINK 29:LCME   2    2;CAP  S;STATUS:    OK
```

10 To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no
is the number of the defective P-side link manually busied in step 9

11 To test the ManB link, type

>TST LINK link_no

and press the Enter key.

where

link_no
is the number of the defective link manually busied in step 10

If TST	Do
passes	step 16
fails	step 12

12 Read the following table to determine your next action.

If the system	Do
indicates a card that has faults	step 17
does not indicate a card that has faults	step 13

13 To return the ManB link to service, type

`>RTS LINK link_no`

and press the Enter key.

where

link_no
is the number of the link tested in step 11

If RTS	Do
passes	step 22
fails	step 21

Note: The system can identify other links that have faults. Execute the procedures in steps 10 through 13 until the links are busied, tested, and returned to service.

14 To post the LCM(E) identified in step 2, type

`>POST LCME lcme_site_name lcme_frame_no lcme_no`

and press the Enter key.

where

lcme_site_name
is the site name for the LCME that has faults

lcme_frame_no
is the number of the associated LCME

lcme_no
is the number of the LCME that has faults

PM LCME
minor (continued)

15 To test the LCM(E) unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCME unit posted in step 14

If TST	Do
passes	step 16
fails	step 17

16 To return the LCM(E) unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the LCME unit tested in step 15

If RTS	Do
passes	step 22
fails	step 21

17 Check the card listing that appears in the MAP display.

Sample response on the MAP display:

```
SITE      FLR  RPOS BAY_ID    SHF       DESCRIPTION    SLOT      EQPEC
RSCS0      01   A00 LCME   00  32       LCME  :000      : 19      BX35
RSCS0      01   A00 LCME   00  32       LCME  :000      : 20      BX35
RSCS0      01   A00 LCME   00  32       LCME  :000      : 21      BX34
```

If you	Do
replaced the cards on the list	step 18
did not replace the cards on the list	step 20

18 The trouble can be the NTMX74 DS30A interface card in the RCC2 that connects to the links that have faults listed in step 9.

If you	Do
replaced the NTMX74 DS30A interface card	step 21
did not replace the NTMX74 DS30A interface card	step 19

Note: If the system indicates the NTMX74 card, check if one link or several links have faults. Repeat the alarm clearing procedure.

19 Each interface (I/F) chip on the NTMX74 card serves 4 DS30A links. The following chart illustrates the Link to chip relationship. A minimum of 4 links must separate message (MS) links when you enter data in table LCMINV.

Chip number	DS30A links
1	22, 23, 24, 25
2	26, 27, 28, 29
3	30, 31, 32, 33
4	34, 35, 36, 37
5	38, 39, 40, 41
6	42, 43, 44, 45
7	46, 47, 48, 49
8	50, 51, 52, 53

Go to the card replacement procedure for the NTMX74 circuit card in *Card Replacement Procedures*. Complete with the card replacement procedures. Go to step 11.

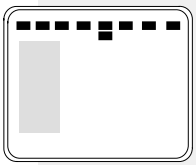
20 Go to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Complete with the card replacement procedures. Go to step 15.

21 For additional help, contact the next level of maintenance.

22 The procedure is complete. If other alarms appear at the MAP display, refer to the appropriate alarm clearing procedures.

PM RCC/RCC2 critical

Alarm display



CM	MS	IOD	Net	**PM**	Lns	Trks	Ext	APPL
.	.	.	.	**nRCC**	.	.	.	.
				C				

Indication

The following text beneath the PM header at the MTC level of the MAP display indicates an alarm in a remote cluster controller (RCC):

- an *n* next to the RCC indicates the number of RCC modules affected
- a *C* indicates that the alarm class is critical

Note: Use this procedure to clear alarm conditions in an RCC or a remote cluster controller 2 (RCC2). In this procedure RCC refers to the RCC in a remote switching center (RSC) frame, NT6X10. The name RCC can refer also to an RCC2 in an RSCE cabinet, NTMX89.

Meaning

Both RCC units are in the system-busy (SysB) or in the C-side busy (CBsy) state.

Result

Call processing ceases. The RCC can be in emergency stand-alone (ESA).

Common procedures

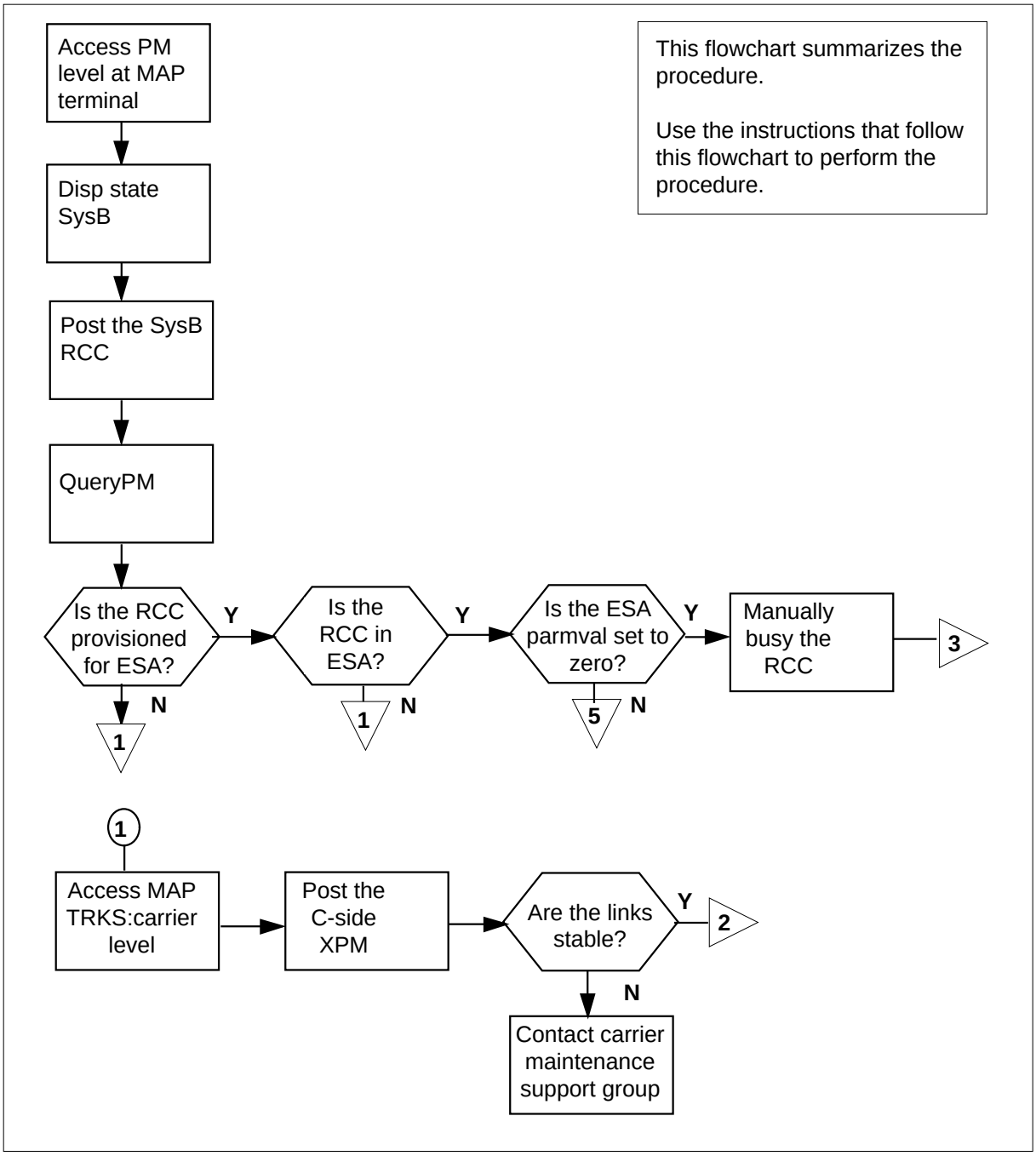
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

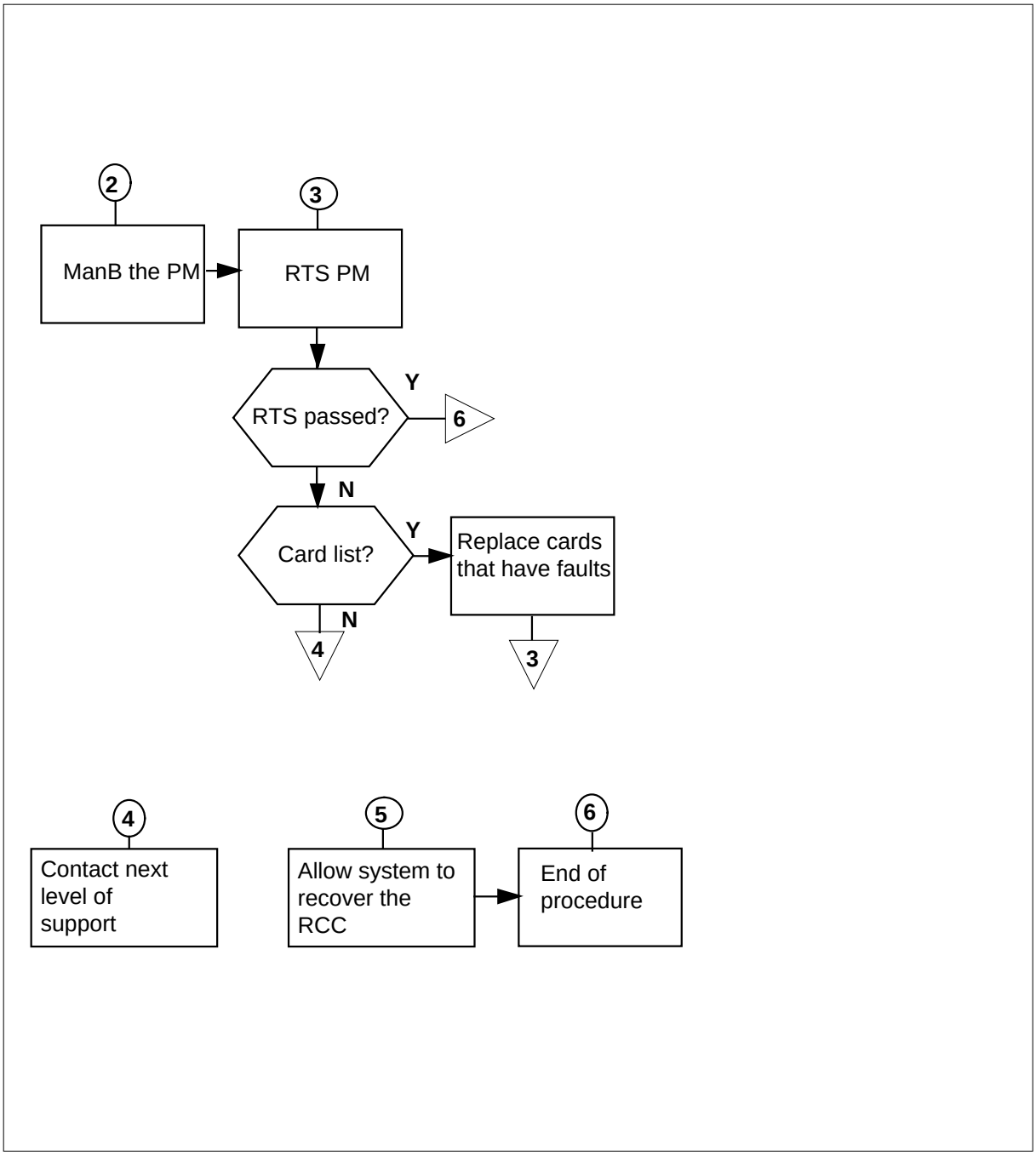
PM RCC/RCC2 critical (continued)

Summary of a PM RCC/RCC2 critical alarm



PM RCC/RCC2 critical (continued)

Summary of a PM RCC/RCC2 critical alarm



PM RCC/RCC2
critical (continued)

Clearing a PM RCC/RCC2 critical alarm

At the MAP terminal

1

> **ATTENTION**
> Enter this procedure from the PM system-level alarm clearing procedure step that identified an RCC-associated fault.

To silence the alarm, type

>MAPCI;MTC;SIL

and press the Enter key.

2 To access the PM level of the MAP display and to identify the RCC that has faults, type

>PM;DISP STATE SYSB RCC

and press the Enter key.

3 To post the SysB RCC, type

>POST RCC **rcc_no**

and press the Enter key.

where

rcc_no
is the number of the RCC identified in step 2

4 To determine the type of fault, type

>QUERYPM FLT

and press the Enter key.

Example of a MAP response:
Unit 0
System busy reason: Link Audit
Unit 1
System busy reason: Link Audit

5 To determine if the RCC has ESA, type

>QUERYPM

and press the Enter key.

Example of a MAP response:
PM Type: RCC PM No.: 0 PM Int. No.: 1 Node_No.: 203
PMs Equipped: 309 Loadname: ESR05AY EEPRom Load: MX77NF02
ESA equipped: YES IntraSwitching is ON

PM RCC/RCC2
critical (continued)

```
WARM SWACT is supported and available.
RCC 0 is included in the REX schedule.
Last REX date was FRI. 1995/03/10 at 12:25:07; PASSED.
Node Status: {OK, FALSE}
Unit 0   Act, Status: {SysB, TRUE}
Unit 1 Inact, Status: {SysB, TRUE}
Site Flr RPos  Bay_id   Shf  Description    Slot    EqPEC
 RSC0  01  A00  RCE 00  18    RCC : 000           6X12AA
```

If RCC	Do
has ESA	step 6
does not have ESA	step 12

6 Determine if the ESA exit time is set for manual recovery from ESA. To access table OFCENG, type

>TABLE OFCENG

and press the Enter key.

7 To check the RSC ESA exit time-out value, type

>POS RSC_XPMESAEXIT

and press the Enter key.

Example of a MAP response:

```
   PARMNAME                                                  PARMVAL

                 RSC_XPMESAEXIT                                 0
```

> ***Note:*** A RSC_XPMESAEXIT parameter value of zero indicates that you can exit ESA only by a manual RTS. Other parameter values are entered one digit for ten seconds of XPM ESA exit time-out (3=30 seconds).

8 To quit table OFCENG and to remain at the POST level of the MAP display, type

>QUIT

and press the Enter key.

9 To enter the logs utility, type

>LOGUTIL

10 The PM18 log indicates that the RCC is in ESA. To examine PM181 log reports generated by this RCC, type

>OPEN PM 181;BACK ALL

and press the Enter key.

Example of a PM181 log report:

PM RCC/RCC2 critical (continued)

```
PM181  MAR14  14:33:54  7534  INFO  RSC0  RCC  0  UNIT 0
 Node:SysB, Unit 0 Act:SysB, Unit 1 Inact:SysB
 PM in ESA, Communication restored, ready to be RTSed
```

Note 1: The system generates this log when:

- office parameter RSC_XPMESAEXIT in table OFCENG has a value of zero
- the user restores communications

Note 2: Repeat this step for the PM109, PM110, PM128 and PM179 log reports.

Note 3: The RCC can be in ESA. To check for ESA, check for dial tone at the remote site because the carriers are not always operational.

If the system	Do
did not generate the PM181 log	step 12
did generate the PM181 log and indicates `Communication restored, ready to be RTSed`	step 18

11 To quit Logutil and remain at the POST level of the MAP display, type

`>QUIT`

and press the Enter key.

12 Monitor the MAP terminal display for system maintenance (MTCE) action through two cycles. Observe for MTCE output that indicates `ROM/RAM Query` or `ESA T.O.`.

If maintenance action	Do
stops at `ROM/RAM Query`	step 13
indicates `ESA T.O.`	Allow the system to recover the RCC, go to step 27
continues to initialization	step 17

13 Before manually restoring the RCC, check to see if links to the RCC are stable. To find the host XPM and C-side link numbers for this RCC, type

`>trnsl c`

and press the Enter key.

Example of a MAP response:

PM RCC/RCC2

critical (continued)

```
                         ┌─Host XPM P-side link number
                         ▼
Link  0: LTC 1     0;Cap MS;Status:OK   P;MsgCond:CLS, Restrict
Link  1: LTC 1     2;Cap MS;Status:OK   P;MsgCond:CLS, Unrestricted
Link  2: LTC 1     4;Cap  S;Status:OK
Link  3: LTC 1     5;Cap  S;Status:OK
```

Note: Record the message links (MS) numbers and status for use in step 15.

14 To access the CARRIER level of the MAP, type

>trks;carrier

and press the Enter key.

15 Post the host XPM P-side links that interface the RCC in ESA. Check the message links for slips and framing errors.

To post the XPM P-side links and to check the message links, type

>post **pm_type pm_no**

and press the Enter key.

where

pm_type
is the name of the host XPM, (LGC/LTC), identified in step 13.

pm_no
is the number of the LGC/LTC (0 to 255), identified in step 13.

Typical response on the MAP display:

```
CLASS ML  OS  ALARM    SYSB   MANB    UNEQ   OFFL CBSY   PBSY    INSV
TRUNKS 0  0    0         0       0       0      0    0      0       0
REMOTE 0  0    0         5       1       0      0    0      0      10

NO  CLASS   SITE    RCC  CKT  D   ALARM   SLIP    FRAME    BER   SES STATE
0   TRUNKS  BRSC     0    0   C             0       0   1000000  0  INSV
1   REMOTE  BRSC     0    1   C             0       0   1000000  0  INSV
2   REMOTE  BRSC     0    2   C             0       0   1000000  0  INSV
                          ▲
                          │                              MORE
                         HOST XPM P-side link
 ....                    number
```

Note: Check the MAP display for 5 min before you continue.

If link conditions	Do
show a number of SLIP and FRME errors, or ALARMS	Leave the RCC in ESA. Go to step 30.
do not show SLIP and FRME errors, or ALARMS for 5 min	step 16

PM RCC/RCC2
critical (continued)

16 To post the SysB RCC at the PM level, type

>MAPCI;MTC;PM;POST RCC **rcc_no**

and press the Enter key.

where

rcc_no
is the number of the RCC identified in step 2

17 To manually busy the RCC, type

>bsy pm

and press the Enter key.

18 To return the RCC to service, type

>RTS PM

and press the Enter key.

Typical response on the MAP display:

```
RCC  1 MnaB    Links_OOS:  CSide 0, PSide 0
Unit0:         ManB
Unit1:         ManB
RTS PM
RCC 1 Unit 0   in ESA mode
               this action will cause an exit with 20 active calls
               A WARM exit will be attempted
               Some calls may be ABORTED

Please confirm ("YES", "Y", "NO", "N"
```

The RCC can be in ESA or out-of-service (OOS). To respond, type

>YES

and press the Enter key.

If system response	Do
is RTS PASSED	step 27
is RTS FAILED	step 19

Note: The system generates a PM171 on ESA EXIT. The PM171 details the call processing operational measurements (OM) during ESA.

19 To set the RCC again, type

>PMRESET PM

and press the Enter key.

If the PMRESET	Do
passed	step 21

PM RCC/RCC2
critical (continued)

If the PMRESET	Do
failed	step 20

20 To set the RCC again to the ROM level, type

>PMRESET PM NORUN

and press the Enter key.

If the PMREST	Do
passed	step 21
failed	step 22
failed and the system generates a card list	step 28

21 To return the RCC to service, type

>RTS PM

and press the Enter key.

>YES

and press the Enter key.

If system response	Do
is `RTS PASSED`	step 27
is `RTS FAILED`	step 22
is `failed with card list`	step 28

22 The peripheral remote loader (PRL) card (NT7X05) allows local loading of the RCC data. Local data loading reduces recovery time. To check if the NT7X05 card is provisioned, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP display:

PM RCC/RCC2
critical (continued)

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .    .    1RCC    .      .       .      .      .

 RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM     2        0        2        0        2       25
 2 Post     RCC    0        1        0        0        0        1
 3 ListSet
 4          RCC      0 ManB  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_   Unit 0:  Act   ManB
 6 TST_     Unit 1:  Inact ManB
 7 BSY_
 8 RTS_     QUERYPM files
 9 OffL     Unit 0:
10 LoadPM_      NT7X05 load File: ESR06BB
11 Disp_        NT7X05 Image File:ESR06BB
12 Next_        CMR Load: CMR03A
13 SwAct
14 QueryPM  Unit 1:
15              NT7X05 load File: ESR06BB
16 IRLINK       NT7X05 Image File:ESR06BB
17 Perform      CMR Load: CMR03A
18
```

Note: If provisioning of the NT7X05 card did not occur, the MAP response is: `Nt7X05 not datafilled, QueryPm files invalid`

If the NT7X05 card	Do
is provisioned	step 23
is not provisioned	step 25

23 To load the RCC from the local image, type

`>LOADPM PM LOCAL IMAGE`

and press the Enter key.

If the local image loading	Do
passed	step 26
failed	step 24

PM RCC/RCC2
critical (continued)

24

DANGER
Possible service interruption
The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string}]. If you use this file_name parameter, the system will use the loadfile named in the parameter. The loadfile is not patched. Do not use this parameter unless you want the NOPATCH option of the loadfile.

To load the RCC from the local loadfile, type

>LOADPM PM LOCAL LOADFILE

and press the Enter key.

If the local loadfile loading	Do
passed	step 26
failed	step 25

25 To load the RCC from the computing module (CM), type

>LOADPM PM

and press the Enter key.

If the CM loading	Do
passed	step 26
failed	step 31

26 To return the PM to service, type

>RTS PM

and press the Enter key.

>YES

and press the Enter key.

If system response	Do
is RTS PASSED	step 27
is RTS FAILED	step 31
is RTS FAILED with card list	step 28

PM RCC/RCC2 critical (end)

27 Check for dial tone according to local operating company procedures.

If dial tone	Do
is not restored	step 31
is restored	step 32

28 Check the card list shown in the MAP display.

Typical response on the MAP display for an RCC in an NT6X10 frame:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     32  RCC :  000     : 13       MX77
RSCS0    01     A00   RCE    00     32  RCC :  000     : 18       6X69
RSCS0    01     A00   RCE    00     32  RCC :  000     : 19       6X72
RSCS0    01     A00   RCE    00     32  RCC :  000     : 15       6X92
RSCS0    01     A00   RCE    00     18  RCC :  000     : 20       6X50
```

or

Typical response on the MAP display for an RCC2 in an NTMX89 cabinet:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 03       MX77
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 08       6X69
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 11       MX73
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 15       MX74
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 19       MX81
```

If you	Do
replaced all cards on the list	step 31
did not replace all cards on the list	step 29

29 Refer to *Card Replacement Procedures* for the next card on the card list if the system indicates other cards that have faults. Follow the card replacement procedures and go to step 18 of this procedure.

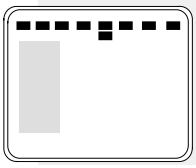
30 Contact the carrier maintenance support group for maintenance on the open links or links that are not stable. When carriers are restored, go to step 9.

31 For additional help to clear this alarm, contact the next level of support.

32 The procedure is complete. If the system displays other alarms, refer to the appropriate procedures to clear the indicated alarms in the *Alarm Clearing Procedures*.

PM RCC/RCC2 major

Alarm display



CM	MS	IOD	Net	**PM**	Lns	Trks	Ext	APPL
.	.	.	.	**1RCC**	.	.	.	.
				M				

Indication

The alarm code 1RCC under the peripheral module (PM) subsystem header at the MTC level of the MAP display indicates an alarm involving a remote cluster controller (RCC). The number preceding the alarm code indicates the number of RCCs affected by the alarm. The letter M below the alarm code indicates that the alarm class is major.

Note: This procedure clears alarm conditions in an RCC or a remote cluster controller 2 (RCC2). In this procedure the name RCC refers to the RCC in an remote switching center (RSC) frame, NT6X10. The name RCC can also refer to an RCC2 in an RSCE cabinet, NTMX89.

Meaning

The indicated number of RCC units are in the system-busy (SysB) state.

Result

This alarm does not affect subscriber service. If both RCC units fail, a loss of subscriber service occurs.

Common procedures

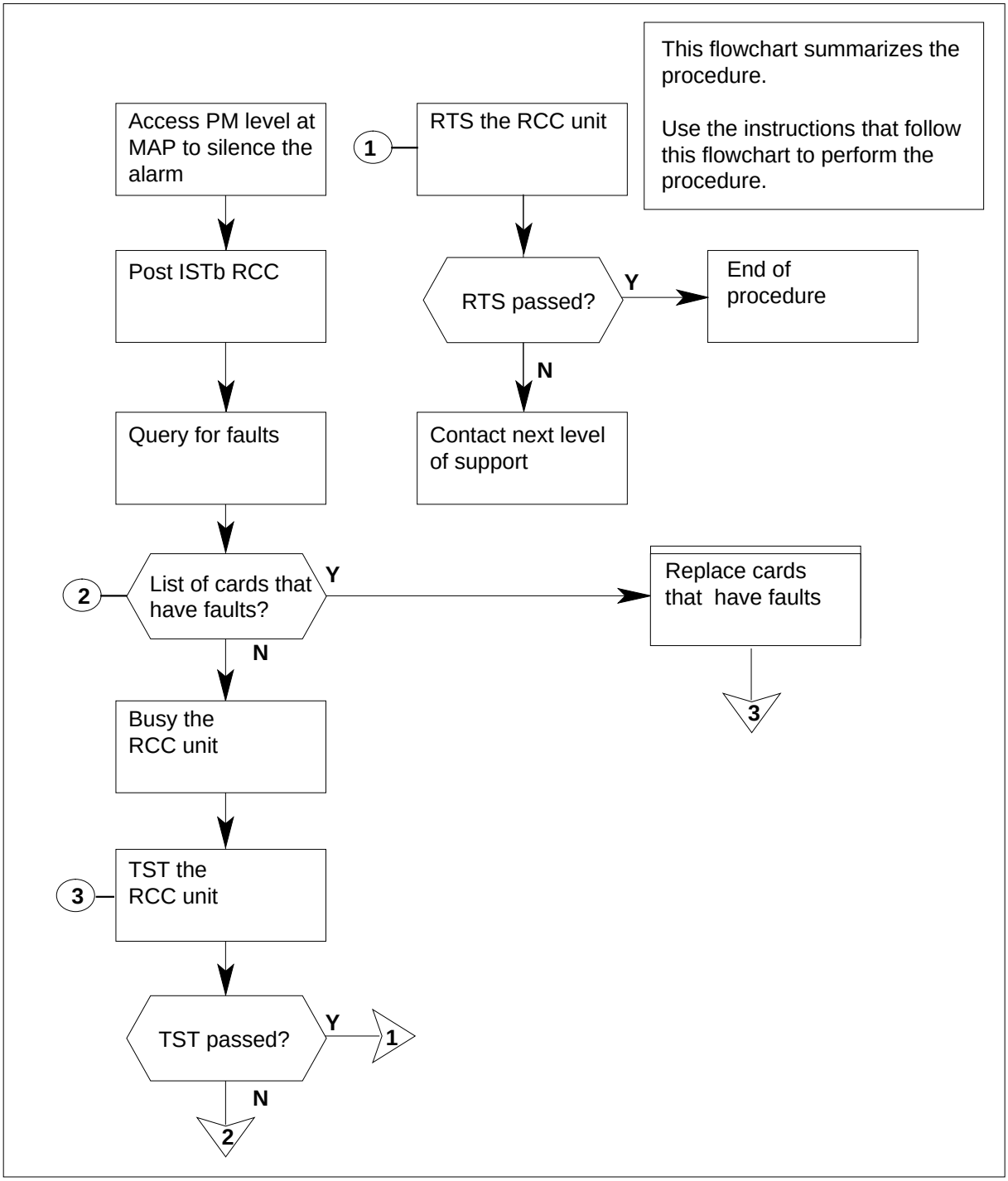
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RCC/RCC2 major (continued)

Summary of clearing a PM RCC/RCC2 major alarm



PM RCC/RCC2
major (continued)

Clearing a PM RCC/RCC2 major alarm

At the MAP display

1

> **ATTENTION**
> Enter this procedure from a PM system-level alarm clearing procedure step that identified an RCC-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RCC that has faults, type

>DISP STATE ISTB RCC

and press the Enter key.

Sample response on the MAP display:

```
ISTb  RCC : 2
```

3 To post the in-service trouble (ISTb) RCC, type

>POST RCC rcc_no

and press the Enter key.

where

rcc_no
is the number of the RCC displayed in step 2

Sample response on the MAP display:

```
RCC          SysB    ManB    Offl    CBsy    ISTb    InSv
        PM    3       0        1       0       4      12
        RCC   0       0        0       0       1       9
```

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Sample response on the MAP display:

PM RCC/RCC2
major (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext   APPL
 .      .      .      .    1RCC    .      .       .      .      .
                            M

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        1        0        1        0        0        12
 2 Post_   RCC       0        0        0        0        1         9
 3 ListSet
 4         RCC   0  ISTb   Links_OOS: CSide  1, PSide   0
 5 TRNSL_  Unit0:   Act    InSv
 6 Tst_    Unit1:   Inact  SysB
 7 Bsy_    QUERYPM FLT
 8 RTS_         Unit0  No fault exists
 9 OffL         Unit1  Link Audit
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

If the system	Do
indicates a card that has faults	step 27
does not indicate a card that has faults	step 5

5 To manually busy the system busy (SysB) RCC unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the SysB RCC unit identified in step 4

6 To return the manual busy (ManB) RCC unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

PM RCC/RCC2
major (continued)

unit_no
is the number of the RCC unit manually busied in step 5

If RTS	Do
passed	step 33
failed and the system generated a card list	step 27
failed and the system did not generate a card list	step 7

7 Check for central side (C-side) message (MS) supporting links that are SysB. These links connect to the host PM. To identify the links that have faults, type

```
>TRNSL C
```

and press the Enter key.

Sample response on the MAP display:

```
LINK 0:   LTC  1 0;CAP MS;STATUS:  OK,;MSGCOND:OPN,Restricted
LINK 1:   LTC  1 1;CAP  S;STATUS:  OK
LINK 2:   LTC  1 2;CAP MS;STATUS:  SysB,;MSGCOND:CLS,Unrestricted
LINK 4:   LTC  1 4;CAP  S;STATUS:  OK
LINK 5:   LTC  1 4;CAP  S;STATUS:  OK
LINK 6:   LTC  1 4;CAP  S;STATUS:  OK
LINK 7:   LTC  1 4;CAP  S;STATUS:  OK
```

If link	Do
is not SysB	step 32
is SysB	step 8

8 To post the host PM, type

```
>POST host_pm  host_pm_no
```

and press the Enter key.

where

host_pm
is either an LGC or an LTC

host_pm_no
is the number of the LGC or LTC

Sample response on the MAP display:

```
 CM     MS     IOD     Net     PM     CCS     Lns     Trks      Ext
 .      .       .       .     1RCC     .       .       .         .
                               M

LTC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        1        0        1        0        1        12
 2 Post_   LTC       0        0        2        0        1         9
 3 ListSet
 4         LTC  1 ISTb  Links_OOS:  CSide  0, PSide   1
 5 Trnsl_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

9 To identify the peripheral side (P-side) links that have faults, type

>TRNSL P

and press the Enter key.

Sample response on the MAP display:

```
 LINK 0:   RCC  1    0;CAP MS;STATUS:OK,;MSGCOND:OPN,Restricted
 LINK 1:   RCC  1    1;CAP  S;STATUS:OK
 LINK 2:   RCC  1    2;CAP MS;STATUS:SysB,;MSGCOND:CLS,Unrestricted
 LINK 4:   RCC  1    4;CAP  S;STATUS:OK
 LINK 5:   RCC  1    4;CAP  S;STATUS:OK
 LINK 6:   RCC  1    4;CAP  S;STATUS:OK
 LINK 7:   RCC  1    4;CAP  S;STATUS:OK
```

10 To busy the link that has faults, type

>BSY LINK link_no

and press the Enter key.

where

link_no
is the number of the P-side link identified in step 9

11 To test the defective link, type

>RTS LINK link_no

and press the Enter key.

PM RCC/RCC2
major (continued)

where

link_no
is the number of the link manually busied in step 10

If RTS	Do
passed and alarm persists	step 31
passed and alarm clears	step 21
failed	step 12

12 To access the carrier level of the MAP display and to post the host XPM, type

>TRKS;CARRIER;POST pm_type pm_no

and press the Enter key.

where

pm_type
is the LGC or LTC identified in step 7

pm_no
is the number of the LGC or LTC identified in step 7

Sample response on the MAP display:

```
CLASS ML  OS  ALARM    SYSB    MANB    UNEQ    OFFL CBSY   PBSY    INSV
TRUNKS 0  0    0         0       0       0       0    0      0       0
REMOTE 0  0    0         0       1       0       0    0      0      10

NO  CLASS    SITE    LTC  CKT  D   ALARM   SLIP    FRAME  BER     ES  STATE
0   REMOTE   BRSC     1    0   C              0       0  1995262  0    INSV
1   REMOTE   BRSC     1    1   C              0       0  1995262  0    INSV
2   REMOTE   BRSC     1    2   C    LCGA      0       0  3162278  0    MANB

                                                        MORE ....
```

Note: The MORE at the bottom of the display indicates you can observe more links. To observe more links, type

>NEXT

and press the Enter key.

13 To test the ManB link, type

>TST link_no

and press the Enter key.

where

link_no
is the number of the ManB link. The NO column lists the link number as displayed in the MAP terminal example in step 12. The number

for the ManB link in the example is 2.

If TST	Do
passed and alarm clears	step 14
failed	step 31

14 Perform out the repair or corrective procedure on the links indicated by the MAP display in step 12.

Note: The MAP display can indicate message links that have faults. These links must be in the ManB state before you can return the links to service.

15 To access the PM level of the MAP display and to post the host PM, type

`>PM;POST  pm_type pm_no`

and press the Enter key.

where

pm_type
is the host PM (LGC or LTC) posted in step 8

pm_no
is the number of the host PM (LGC or LTC)

16 To return the link to service, type

`>RTS LINK link_no`

and press the Enter key.

where

link_no
is the number of the link identified in step 7

If RTS	Do
passed	step 17
failed	step 32

17 To post the RCC, type

`>POST RCC rcc_no`

and press the Enter key.

where

rcc_no
is the number of the RCC identified in step 2

18 To return the ManB unit to service, type

`>RTS UNIT unit_no`

and press the Enter key.

PM RCC/RCC2
major (continued)

where

unit_no
is the number of the RCC unit busied in step 5

If RTS	Do
passed	step 33
failed	step 19

19 To reset the RCC unit, type

>PMRESET UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If PMRESET	Do
passed	step 21
failed	step 20

20 To reset the RCC unit to the ROM level, type

>PMRESET UNIT unit_no NORUN

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If PMRESET	Do
passed	step 21
failed	step 32
failed and the system generated a card list	step 27

21 To return the RCC unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

PM RCC/RCC2
major (continued)

unit_no
is the number of the RCC unit busied in step 5

If RTS	Do
passed	step 33
failed	step 22
failed and the system generated a card list	step 27

22 The peripheral remote loader (PRL) card (NT7X05) allows local loading of the RCC data. Local data loading reduces recovery time. To check if the NT7X05 card is provisioned, type

>QUERYPM FILES

and press the Enter key.

Example of a MAP display:

```
  CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
   .    .     .    .    1RCC    .      .       .      .      .

RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
0 Quit     PM     2        0        2        0        2        25
2 Post     RCC    0        1        0        0        0         1
3 ListSet
4          RCC      0 ManB  Links_OOS:  CSide  0,  PSide   0
5 TRNSL_   Unit 0:  Act   ManB
6 TST_     Unit 1:  Inact ManB
7 BSY_
8 RTS_     QUERYPM files
9 OffL     Unit 0:
10 LoadPM_    NT7X05 load File: ESR06BB
11 Disp_      NT7X05 Image File:ESR06BB
12 Next_      CMR Load: CMR03A
13 SwAct
14 QueryPM Unit 1:
15            NT7X05 load File: ESR06BB
16 IRLINK     NT7X05 Image File:ESR06BB
17 Perform    CMR Load: CMR03A
18
```

Note: If the NT7X05 card is not provisioned the MAP response is:
`Nt7X05 not datafilled,  QueryPm files invalid`

If the system	Do
includes the NT7X05 card	step 23

PM RCC/RCC2
major (continued)

If the system	Do
does not include the NT7X05 card	step 25

23 To load the RCC unit from the local image, type

>LOADPM UNIT unit_no LOCAL IMAGE

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If the local image loading	Do
passed	step 26
failed	step 24

24

DANGER
Possible service interruption
The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string}]. The LOADPM command does not patch the loadfile when you use this parameter. Do not use this parameter unless you need to use the NOPATCH option of the loadfile.

To load the RCC unit from the local loadfile, type

>LOADPM UNIT unit_no LOCAL LOADFILE

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If the local loadfile loading	Do
passed	step 26
failed	step 25

25 To load the RCC unit from the computing module (CM), type

>LOADPM UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If the CM loading	Do
passed	step 26
failed	step 32

26 To return the RCC unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 5

If system response	Do
is RTS PASSED	step 33
is RTS FAILED	step 32
is RTS FAILED with card list	step 27

27 Check the card listing as shown in the following MAP display.

Sample response on the MAP display for an RCC in an NT6X10 frame:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     32  RCC :  000     : 13       MX77
RSCS0    01     A00   RCE    00     32  RCC :  000     : 18       6X69
RSCS0    01     A00   RCE    00     32  RCC :  000     : 19       6X72
RSCS0    01     A00   RCE    00     32  RCC :  000     : 15       6X92
RSCS0    01     A00   RCE    00     18  RCC :  000     : 20       6X50
```

or

Sample response on the MAP display for an RCC2 in an NTMX89 cabinet:

```
SITE    FLR    RPOS   BAY_ID       SHF  DESCRIPTION    SLOT      EQPEC
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 03       MX77
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 08       6X69
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 11       MX73
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 15       MX74
RSCS0    01     A00   RCE    00     05  RCC2 :  000    : 19       MX81
```

If you	Do
replaced all the cards on the list	step 28

PM RCC/RCC2
major (end)

If you	Do
did not replace all the cards on the list	step 30

28 Determine if the RSC NT6X50 or RSCE NTMX81 C-side interface circuit card was replaced.

If you	Do
replaced the C-side interface card	step 32
did not replace the C-side interface card	step 29

29 Refer to the card replacement procedure for the C-side interface card (NT6X50/NTMX81) in the *Card Replacement Procedures*. When you complete the card replacement procedures, go to step 10 of this procedure.

30 Refer to the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. When you complete the card replacement procedures, go to step 6 of this procedure.

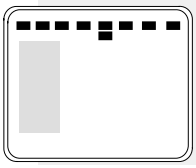
31 Contact the carrier maintenance support group for maintenance on the open or unstable links. When carriers are restored, go to step 12.

32 For additional help to clear this alarm, contact the next level of support.

33 The procedure is complete. If other alarms appear, refer to the appropriate procedures on how to clear alarms for the indicated alarms.

PM RCC/RCC2 minor

Alarm display



CM	MS	IOD	Net	**PM**	Lns	Trks	Ext	APPL
.	.	.	.	**1RCC**	.	.	.	.

Indication

At the MTC level of the MAP display, a 1RCC under the PM subsystem header indicates an RCC minor alarm.

Note: This procedure clears alarm conditions in a remote cluster controller (RCC) or an RCC2. In this procedure, the term RCC refers to the RCC in an RSC frame, NT6X10, or an RCC2 in an remote switching center equipment (RSCE) cabinet, NTMX89.

Meaning

The indicated number of RCC units are in the in-service trouble (ISTb) state.

Impact

This condition does not affect subscriber service.

Common procedures

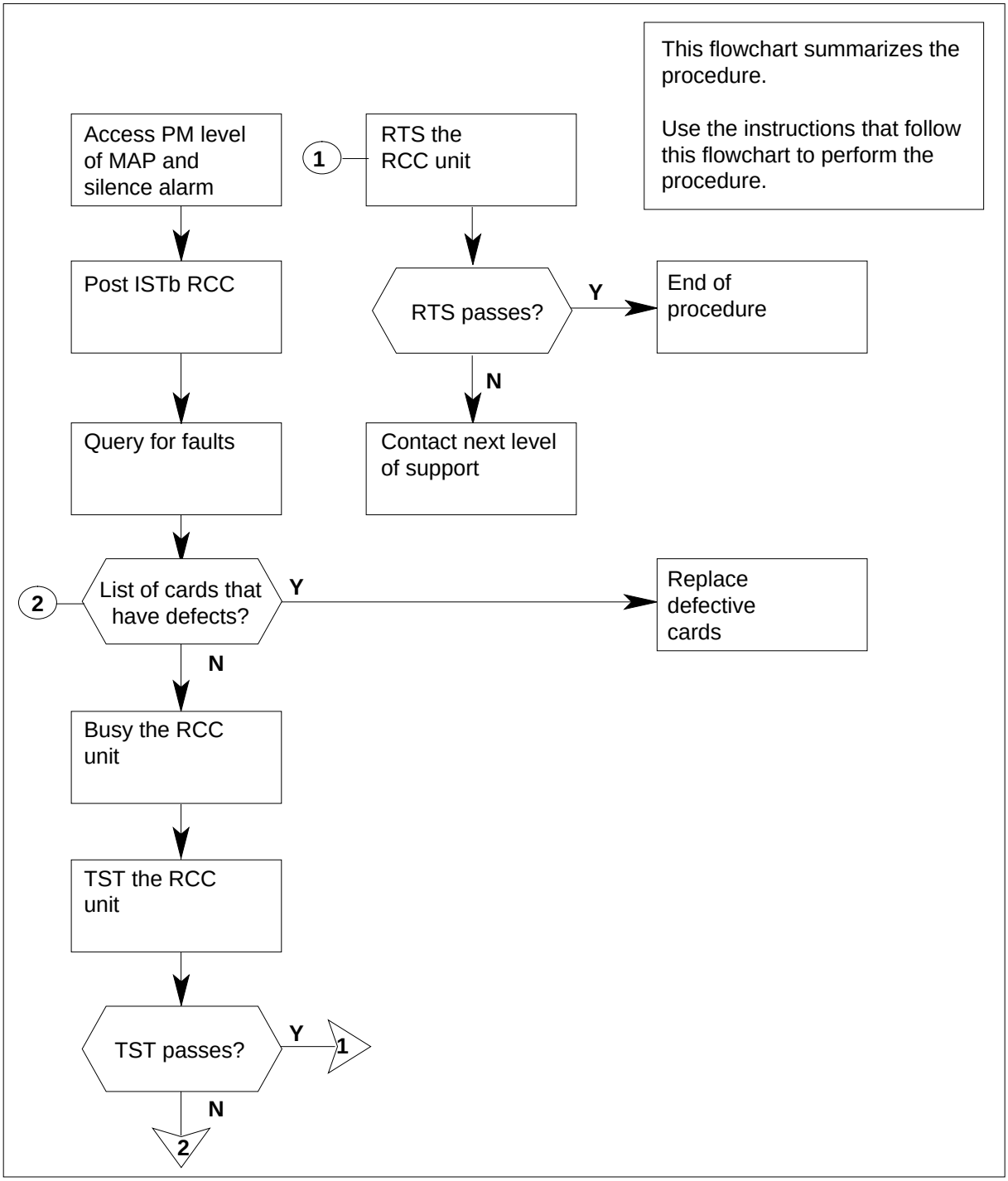
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RCC/RCC2
minor (continued)

Summary of clearing a PM RCC/RCC2 minor alarm



PM RCC/RCC2 minor (continued)

Clearing a PM RCC/RCC2 minor alarm

At the MAP display

1

> **ATTENTION**
> Enter this procedure from a PM system-level alarm clearing procedure step that identifies an RCC-associated fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RCC that has defects, type

>DISP STATE ISTB RCC

and press the Enter key.

Typical response on the MAP display:

```
ISTb  RCC : 2
```

3 To post the ISTb RCC, type

>POST RCC rcc_no

and press the Enter key.

where

rcc_no
is the number of the RCC in step 3

Typical response on the MAP display:

```
RCC        SysB      ManB      Offl      CBsy      ISTb      InSv
       PM         0         0         1         0         4        12
       RCC       0     0         2         0         2         9
```

4 To check for fault indicators, type

>QUERYPM FLT

and press the Enter key.

Typical response on the MAP display:

PM RCC/RCC2
minor (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext   APPL
 .      .      .      .    1RCC   .      .       .      .      .


RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        1        0        1        12
 2 Post_   RCC       0        0        2        0        1         9
 3 ListSet
 4         RCC   2 ISTb  Links_OOS:  CSide  1, PSide   0
 5 TRNSL_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact ISTb
 7 Bsy_    QUERYPM FLT
 8 RTS_         Unit0  No fault exists
 9 OffL         Unit1  C-side links out of service
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

If the system	Do
indicates a card that has defects	step 27
does not indicate a card that has defects	step 5

5 To manually busy (ManB) the ISTb RCC unit, type

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the ISTb RCC from step 4

6 To test the ManB RCC, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit manually busied in step 5

Typical response on the MAP display:

```
Test Passed
    or
Test Failed
```

If TST	Do
passes	step 26
fails, and the system produces a card list	step 27
fails, and the system does not produce a card list	step 7

7 To identify central-side (C-side) links to the host PM in a system busy (SysB) condition, type

>TRNSL C

and press the Enter key.

A host PM can be:

- a line group controller (LGC)
- and a line group controller with ISDN (LGCI)
- a line trunk controller (LTC)
- a line trunk controller with an ISDN (LTCI)

In the following example, the host PM is an LTCI.

Typical response on the MAP display:

```
LINK 0:   LTC(I)    1    0;CAP MS;STATUS:    OK,;MSGCOND: OPN,Restricted
LINK 1:   LTC(I)    1    1;CAP  S;STATUS:    OK
LINK 2:   LTC(I)    1    2;CAP MS;STATUS:    OK,;MSGCOND:OPN,Unrestricted
LINK 4:   LTC(I)    1    4;CAP  S;STATUS:    SysB
LINK 5:   LTC(I)    1    4;CAP  S;STATUS:    OK
LINK 6:   LTC(I)    1    4;CAP  S;STATUS:    OK
LINK 7:   LTC(I)    1    4;CAP  S;STATUS:    OK
```

8 To post the host PM, type

>POST host_pm host_pm_no

and press the Enter key.

where

host_pm
is an LGCI or an LTCI

host_pm_no
is the number of the LGCI or LTCI

Typical response on the MAP display:

PM RCC/RCC2
minor (continued)

```
 CM     MS    IOD    Net    PM    CCS    Lns    Trks    Ext   APPL
 .      .      .      .    1RCC   .      .       .      .      .


LTC(I)            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        1        0        4        12
 2 Post_   LTC(I)    0        0        2        0        2         9
 3 ListSet
 4         LTC(I) 1 ISTb  Links_OOS:  CSide  0, PSide   1
 5 Trnsl_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

9 To identify the peripheral-side (P-side) links that have defects, type

>TRNSL P

and press the Enter key.

Typical response on the MAP display:

```
 LINK 0:   RCC  1    0;CAP MS;STATUS:    OK,;MSGCOND: OPN,Restricted
 LINK 1:   RCC  1    1;CAP  S;STATUS:    OK
 LINK 2:   RCC  1    2;CAP MS;STATUS:    OK,;MSGCOND:OPN,Unrestricted
 LINK 4:   RCC  1    4;CAP  S;STATUS:    ISTb
 LINK 5:   RCC  1    4;CAP  S;STATUS:    OK
 LINK 6:   RCC  1    4;CAP  S;STATUS:    OK
 LINK 7:   RCC  1    4;CAP  S;STATUS:    OK
```

10 To manually busy (ManB) the link that has defects, type

>BSY LINK link_no

and press the Enter key.

where

link_no
is the number of the P-side link from step 9

11 To test the defective link, type

>TST LINK link_no

and press the Enter key.

where

link_no
is the number of the link manually busied in step 10.

If TST	Do
passes and alarm persists	step 31
passes and alarm clears	step 17
fails	step 12

12 To display links that can have defects, type

>TRKS;CARRIER;POST;MANB

and press the Enter key.

Typical response on the MAP display:

```
CLASS ML  OS   ALARM     SYSB  MANB     UNEQ  OFFL     CBSY  PBSY  INSV
TRUNKS 0  0    0         0        0     0     0        0        0    0
REMOTE 0  0    0         5        0     0     0        0        0   10

NO  CLASS  SITE     RCC  CKT  D  ALARM  SLIP FRAME     BER  SES   STATE
0   TRUNKS BRSCS    0    0    C         0    0         <-.7  0     INSV
1   REMOTE BRSCS    0    1    C         0    0         <-.7  0     INSV
2   REMOTE BRSCS    0    2    C         0    0         <-.7  0     MANB
                                                    MORE . . .
```

Note: The `MORE ...` at the bottom of the display indicates that you can observe more links. To observe more links, type

>NEXT

and press the Enter key.

13 To test the ManB link, type

>TST link_no

and press the Enter key.

where

link_no
is the number of the ManB link. This link number appears under the NO column on the MAP display in step 12. The number for the ManB link in the example is 2.

If TST	Do
passes and alarm clears	step 16
fails	step 31

PM RCC/RCC2
minor (continued)

14 Carry out the repair/corrective procedure the MAP display indicates in step 12.

Note: If the system indicates message links that have defects, these links must be in a ManB state before these links can be returned to service (RTS).

15 To post the host PM, type

`>PM;POST host_pm host_pm_no`

and press the Enter key.

where

host_pm
is the host PM (LGCI or LTCI) in step 8

host_pm_no
is the number of the host PM (LGCI or LTCI)

16 Use the information that appears in step 7 to determine that the RCC unit associates with the SysB link. The unit must be *inactive* to continue.

If RCC unit	Do
is inactive	step 28
is active	step 17

17 To RTS the link, type

`>RTS LINK link_no`

and press the Enter key.

where

link_no
is the number of the link from step 9

18 To post the RCC, type

`>POST rcc_no`

and press the Enter key.

where

rcc_no
is the number of the RCC from step 2

Note: This RCC must be SysB.

19 To RTS the *inactive* unit, type

`>RTS UNIT unit_no`

and press the Enter key.

where

unit_no
is the number of the RCC in step 18

PM RCC/RCC2
minor (continued)

20 To post the host PM, type

>POST host_pm host_pm_no

and press the Enter key.

where

host_pm
is an LGCI or an LTCI

host_pm_no
is the number of the LGCI or LTCI

21

CAUTION
Loss of service
All calls this PM handles, including data calls, can be lost. Perform this step only during a period of low traffic.

To switch activity (SwAct) of the RCC units, to make sure the unit that you test is *inactive*, type

>SWACT

and press the Enter key.

Typical response on the MAP display:

```
RCC   1 A Warm SwAct will be performed
Please confirm (“YES” or “NO”)
```

22 Refer to the next step to continue this procedure.

23 To confirm the SwAct initiated in step 21, type

>YES

and press the Enter key.

After both units are in-service, proceed to the next step.

If SWACT	Do
passes	step 24
fails	step 31

24 To busy the *inactive* RCC unit, type

>BSY UNIT unit_no

and press the Enter key.

where

PM RCC/RCC2
minor (continued)

unit_no
is the number of the *inactive* RCC unit from step 19

25 To perform an out-of-service (OOS) test on the *inactive* RCC unit, type

>TST UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit busied in step 24

If TST	Do
passes	step 26
fails	step 27

26 To return the *inactive* RCC unit to service, type

>RTS UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the RCC unit tested in step 25

If RTS	Do
passes	step 32
fails	step 31

27 Observe the card listing in the following MAP display.

Typical response on the MAP display:

```
 SITE     FLR       RPOS BAY_ID         SHF  DESCRIPTION    SLOT EQPEC
RSCS0      01        A00 RCE    00       32  RCC :  000     : 09  MX81
RSCS0      01        A00 RCE    00       32  RCC :  000     : 08  6X69
```

If all cards on the list	Do
are replaced	step 28
are not replaced	step 30

28 Determine if the NTMX81 circuit card was replaced.

If the NTMX81 card	Do
was replaced	step 31

PM RCC/RCC2 **minor** (end)

If the NTMX81 card	Do
was not replaced	step 29

29 Perform the card replacement procedure for the NTMX81 circuit card in *Card Replacement Procedures*. Finish with the card replacement procedures and go to step 25.

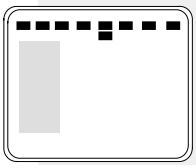
30 Perform the card replacement procedure in *Card Replacement Procedures* for the next card on the card list. Finish with the card replacement procedures and go to step 25.

31 For additional help, contact the next level of support.

32 The procedure is complete. If other alarms appear at the MAP display, perform the appropriate alarm clearing procedures.

PM RMM major

Alarm display



CM	MS	IOD	Net	PM	Lns	Trks	Ext	APPL
.	.	.	.	**nSysB M**	.	.	.	.

Indication

At the MTC level of the MAP, the alarm code *n*SysB under the PM subsystem header indicates an alarm involving a remote maintenance module (RMM). The letter *M* under the alarm code indicates that the alarm class is major.

Meaning

The indicated number (*n*) of RMM units are in the system busy (SysB) state.

Result

If the RMM unit fails, the system discontinues maintenance and line testing. The condition does not affect subscriber service.

Common procedures

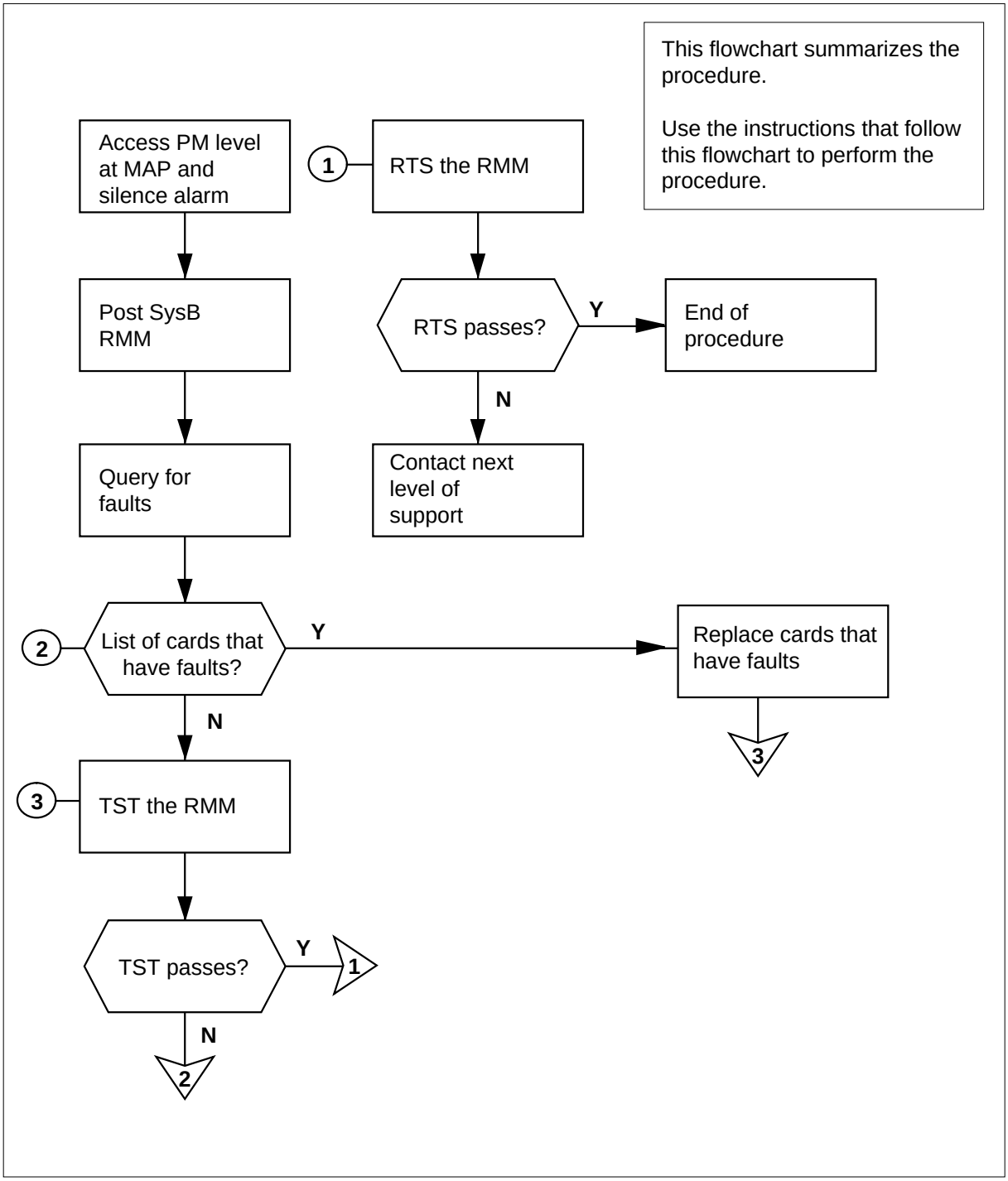
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RMM
major (continued)

Summary of clearing a PM RMM major alarm



PM RMM
major (continued)

Clearing a PM RMM major alarm

At the MAP display

1

> **ATTENTION**
> Enter this procedure from the PM system level alarm clearing procedure step that identified an RMM fault.

To silence the alarm, type

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RMM that has faults, type

>disp STATE Sysb RMM

and press the Enter key.

Example of a MAP response:

```
SysB  RMM: 2
```

3 To post the SysB RMM from step 2, type

>POST RMM **rmm_no**

and press the Enter key.

where

rmm_no
is the number of the RMM that has faults

Example of a MAP display:

PM RMM
major (continued)

```
   CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
   .     .      .      .   1SysB    .      .       .      .      .
                            M

RMM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM     3        0        1        1        4        12
 2 Post_   RMM    0        0        2        1        2         9
 3
 4         RMM    1     SysB
 5 Trnsl_
 6 Tst_
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 To check for fault indicators or cards with faults, type

>querypm flt

and press the Enter key.

Example of a MAP display:

PM RMM
major (continued)

```
   CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
   .     .      .      .   1SysB    .      .       .      .      .
                              M
RMM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM     3        0        1        1        4        12
 2 Post_   RMM    0        0        2        1        2         9
 3
 4         RMM 0 SysB
 5 Trnsl_
 6 Tst_
 7 Bsy_    QUERYPM
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

If the system	Do
indicates a card that has faults	step 16
does not indicate a card that has faults	step 5

5 To manually busy the RMM in step 3, type

>BSY

and press the Enter key.

6 To perform an in-service test on the RMM that has faults, type

>tst

and press the Enter key.

Example of a MAP response

```
Test Passed
     or
Test Failed
```

If TST	Do
passes	step 15

PM RMM
major (continued)

If TST	Do
fails because of C-Side links	step 7
fails and the system generates a card list	step 16

7 To identify C-side links to the RCC in a busy condition, type

>trnsl C

and press the Enter key.

Example of a MAP response:

```
LINK 0:   RCC 1     0;CAP MS;STATUS:    SysB,;MSGCOND: CLS
LINK 1:   RCC 1     1;CAP MS;STATUS:    SYSB,;MSGCOND: CLS
```

8 To post the RCC unit associated with the RMM, type

>post RCC **rcc_no**

and press the Enter key.

where

rcc_no
is the number of the RCC unit from step 7.

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
   .     .      .      .   1SysB    .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      3        0         1        1        4         12
 2 Post_   RCC     0        0         2        1        2          9
 3 ListSet
 4         RCC    1 ISTb  Links_00S:  CSide  0, PSide   1
 5 TRNSL_  Unit0:   Act   InSv
 6 TST_    Unit1:   Inact InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 PERFORM
18
```

PM RMM
major (continued)

9 To identify the P-side links that have faults and choose a link that has faults, type

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 0:   RMM  1    0;CAP MS;STATUS:    SysB,;MSGCOND: CLS
LINK 1:   RMM  1    1;CAP MS;STATUS:    SYSB,;MSGCOND: CLS
```

10 To manually busy the link that has faults, type

>bsy link **link_no**

and press the Enter key.

where

link_no
is the number of the link from step 9 (0 or 1)

11 To test the ManB link, type

>TST link **link_no**

and press the Enter key.

where

link_no
is the number of the link (0 or 1) manually busied in step 10

If TST	Do
passes	step 12
fails	step 20

12 To return the link to service, type

>RTS link **link_no**

and press the Enter key.

where

link_no
is the number of the link (0 or 1) tested in step 11

If RTS	Do
passes	step 13
fails	step 16

13 To post the ManB RMM, type

>POST RMM **rmm_no**

and press the Enter key.

where

rmm_no
is the number of the link (0 or 1) manually busied in step 5

14 To test the RMM, type

>tst

and press the Enter key.

If TST	Do
passes	step 15
fails	step 16

15 To return the ManB RMM to service, type

>RTS

and press the Enter key.

If RTS	Do
passes	step 21
fails	step 20

16 Check the card listing that appears on the MAP display.

Example of a MAP response:

```
SITE FLR RPOS BAY_ID    SHF DESCRIPTION SLOT EQPEC
RSC0 01   A00 RCE    00  51 RMM:001     : 04  6X74
RSC0 01   A00 RCE    00  51 RMM:001     : 01  2X59
RSC0 01   A00 RCE    00  32 RMM:001     : 07  6X48
RSC0 01   A00 RCE    00  18 RMM:001     : 07  6X48
```

If you	Do
replaced all the cards on the list	step 17
did not replace all the cards on the list	step 19

17 Determine if the NT6X48 peripheral interface card was replaced in the RCC unit from step 7.

If you	Do
replaced the NT6X48 card	step 19
did not replace the NT6X48 card	step 18

PM RMM
major (end)

Note: If the system indicates the NT6X48 card, check if one link or several links have faults. Repeat the clearing procedure.

18 Perform the card replacement procedure for the NT6X48 peripheral interface card in the *Card Replacement Procedures*. Finish the card replacement procedures. Go to step 11.

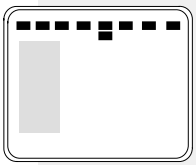
19 Perform the correct procedure in the corresponding *Card Replacement Procedures* for the next card on the card list. Finish the card replacement procedures. Go to step 14.

20 For additional help, contact the next level of support.

21 The procedure is complete. If other alarms appear at the MAP display, perform the appropriate alarm clearing procedure.

PM RMM minor

Alarm display



CM	MS	IOD	Net	**PM**	Lns	Trks	Ext	APPL
.	.	.	.	**nISTb**	.	.	.	.

Indication

An *n*ISTb under the peripheral module (PM) subsystem header indicates a minor alarm associated with a remote maintenance module (RMM). This *n*ISTb is at the maintenance (MTC) level of the MAP display.

Meaning

The indicated number of units that are in the in-service trouble (ISTb) state.

Impact

This ISTb state does not affect subscriber service. You do not have local RMM backup if the remote controller equipment (RCE) unit(s) fail.

Common procedures

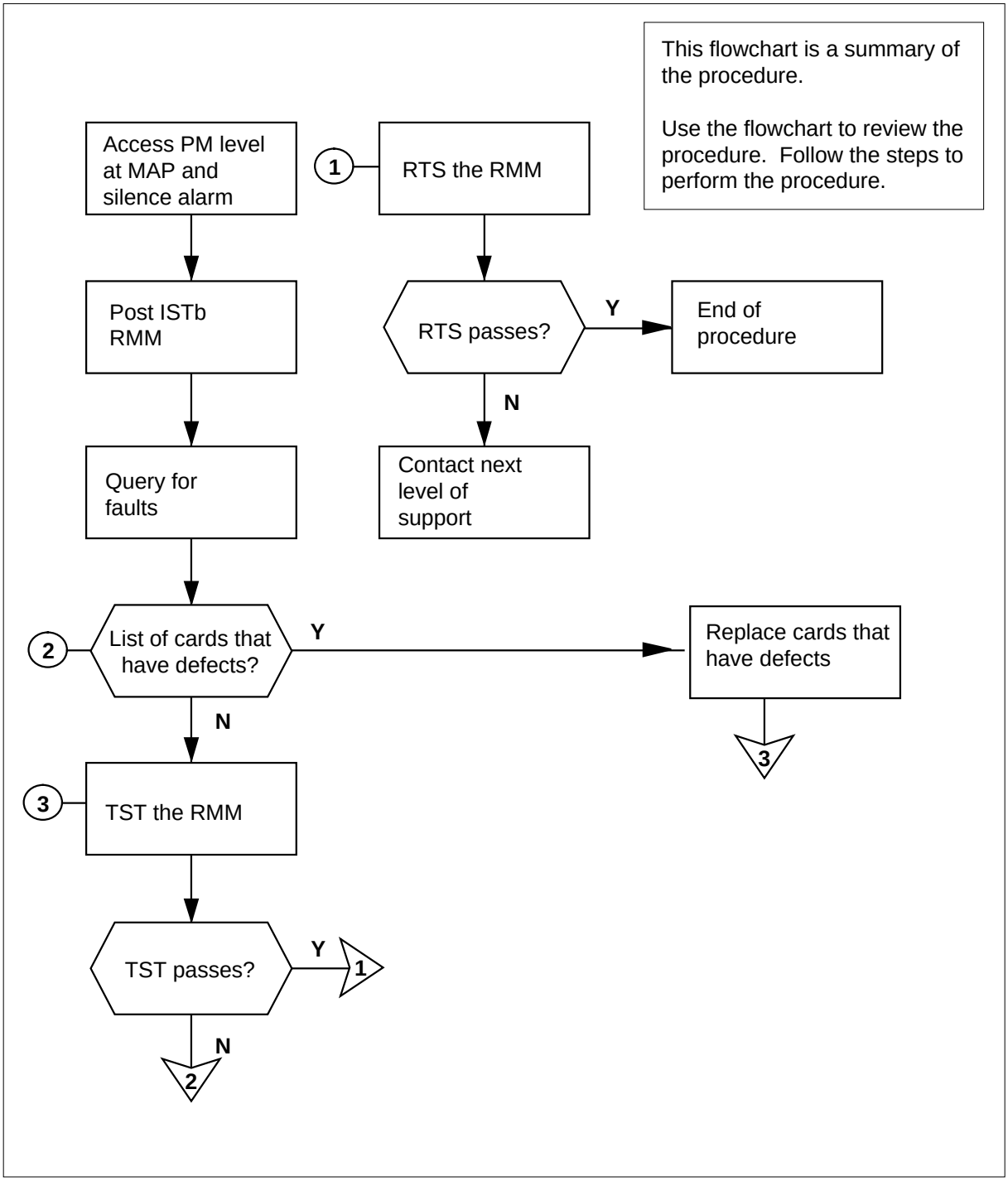
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

PM RMM
minor (continued)

Summary of a PM RMM minor alarm



PM RMM
minor (continued)

Clearing a PM RMM minor alarm

At the MAP display

1

> **ATTENTION**
> Enter this procedure from the peripheral module (PM) system-level alarm clearing procedure step that identifies an RMM associated fault.

To silence the alarm, type:

>MAPCI;MTC;PM;SIL

and press the Enter key.

2 To identify the RMM that has defects, type:

>disp state ISTb RMM

and press the Enter key.

Example of a MAP response:

```
ISTb  RMM: 1
```

3 To post the central-side busy (CBsy) RMM identified in step 2, type:

>POST RMM **rmm_no**

and press the Enter key.

where

rmm_no
is the number of the defective RMM

Example of a MAP display:

PM RMM
minor (continued)

```
   CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
   .     .      .      .    1ISTb   .      .       .      .      .


RMM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM     3        0        0        1        4        12
 2 Post_   RMM    0        0        0        1        2         9
 3
 4         RMM    1     ISTb
 5 Trnsl_
 6 Tst_
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 To check for fault indicators or cards that have defects, type:

>querypm flt

and press the Enter key.

Example of a MAP display:

PM RMM
minor (continued)

```
   CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    APPL
   .     .      .      .    1ISTb   .      .       .      .      .


RMM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM     3        0        0        0        4        12
 2 Post_   RMM    0        0        0        0        2         9
 3
 4         RMM    1    ISTb
 5 Trnsl_
 6 Tst_
 7 Bsy_    QUERYPM FLT
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

If the system	Do
indicates a card that has defects	step 16
does not indicate a card that has defects	step 5

5 To busy the RMM posted in step 3, type:

>BSY

and press the Enter key.

6 To perform an in-service (INSV) test on the RMM that has defects, type:

>tst

and press the Enter key.

Example of a MAP response:

```
Test Passed
    or
Test Failed
```

If TST	Do
passes	step 15

PM RMM
minor (continued)

If TST	Do
fails because of central-side (C-side) links	step 7
fails and the system produces a card list	step 16

7 To identify C-side links to the RCC in a busy condition (SysB), type:

>trnsl C

and press the Enter key.

Example of a MAP response:

```
LINK 0: RCC 1 0;CAP  MS;STATUS: OK,  ;Msgcond  OPN
LINK 1: RCC 1 1;CAP  MS;STATUS: CBsy,;Msgcond: CLS
```

8 To post the RCC unit associated with the RMM, type:

>post RCC **rcc_no**

and press the Enter key.

where

rcc_no
is the RCC unit identified in step 7

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1ISTb   .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         0        0        4         12
 2 Post_   RCC     0        0         0        0        2          9
 3 ListSet
 4         RCC    1 ISTb  Links_00S:  CSide  0, PSide   1
 5 TRNSL_  Unit0:   Act   InSv
 6 TST_    Unit1:   Inact InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 PERFORM
18
```

PM RMM
minor (continued)

9 To identify the peripheral-side (P-side) links that have defects and to choose a link that has defects, type:

>TRNSL P

and press the Enter key.

Example of a MAP response:

```
LINK 0: RMM 1 0;CAP MS;STATUS: OK, ;MSGCOND: OPN
LINK 1: RMM 1 1;CAP MS;STATUS: CBSY;MSGCOND: CLS
```

10 To manually busy (ManB) the link that has defects, type:

>bsy link **link_no**

and press the Enter key.

where

link_no
is the number of the link (o or 1) identified in step 9

11 To test the ManB link, type:

>TST link **link_no**

and press the Enter key.

where

link_no
is the number of the link (0 or 1) manually busied in step 10

If TST	Do
passes	step 12
fails	step 16

12 To return to service (RTS) the ManB link, type:

>RTS link **link_no**

and press the Enter key.

where

link_no
is the number of the link (0 or 1) tested in step 11

If RTS	Do
passes	step 13
fails	step 16

13 To post the ManB RMM, type:

>POST RMM **rmm_no**

and press the Enter key.

PM RMM
minor (continued)

where

rmm_no
is the number of the RMM (0 or 1) manually busied in step 5

14 To test the RMM unit, type:

>tst

and press the Enter key.

If TST	Do
passes	step 15
fails	step 16

15 To RTS the ManB RMM, type:

>RTS

and press the Enter key.

If RTS	Do
passes	step 21
fails	step 20

16 Check the card list that appears on the MAP display.

Example of a MAP response:

```
SITE FLR RPOS BAY_ID    SHF DESCRIPTION SLOT EQPEC
RSC0  01 A00  RCE    00 51  RMM:001     : 02 6X74
RSC0  01 A00  RCE    00 51  RMM:001     : 01 2X59
RSC0  01 A00  RCE    00 32  RMM:001     : 07 6X48
RSC0  01 A00  RCE    00 18  RMM:001     : 07 6X48
```

If all cards on the list are	Do
replaced	step 17
not replaced	step 19

17 Determine if the NT6X48 peripheral interface card is replaced in the RCC unit identified in step 7.

If NT6X48	Do
was replaced	step 20
was not replaced	step 18

PM RMM
minor (end)

Note: If the system indicates the NT6X48 card, check if one link or several links are defective. Repeat the alarm clearing procedure as required.

18 Go to the card replacement procedure for the NT6X48 peripheral interface card in the *Card Replacement Procedures*. When the card replacement procedures are complete, go to step 11 of this procedure.

19 Go to the correct procedure in the *Card Replacement Procedures* for the next card on the card list. When the card replacement procedures are complete, go to step 14 of this procedure.

20 For additional help to clear this alarm, contact the next level of support.

21 This procedure is complete. If the system displays other alarms, reference the correct alarm clearing procedures for the indicated alarms.

Updating static data RCC

Application

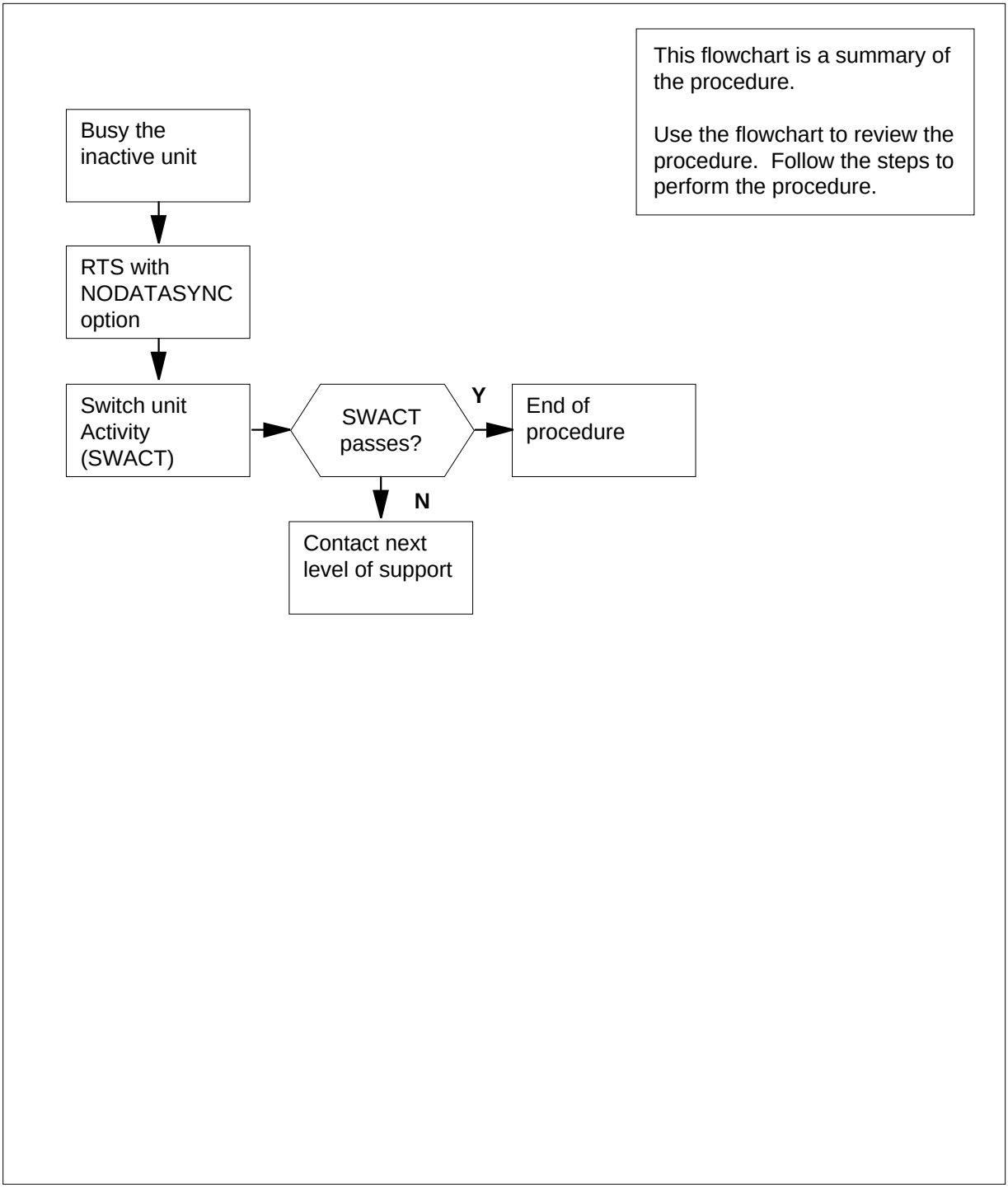
Use this procedure to update static data in the remote cluster controller (RCC).

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Updating static data
RCC (continued)

Summary of Updating static data in an RCC alarm



Updating static data
RCC (continued)

Updating static data in an RCC

At the MAP display

1

ATTENTION
Proceed if a step in a maintenance procedure directed you to this procedure. The independent use of this procedure can cause equipment damage or loss of service.

To busy the inactive unit, type:

>BSY UNIT unit_no

and press the Enter key.

where

unit_no
is the number of the inactive unit

2 To return the inactive unit to service, type:

>RTS UNIT unit_no NODATASYNC

and press the Enter key.

where

unit_no
is the number of the inactive unit

3

WARNING
Loss of service
Perform the next step during a period of low traffic. The system will lose all calls, including data calls, that this peripheral module (PM) handles.

To perform a SWACT, type:

>SWACT UNIT unit_no

and press the Enter key.

unit_no
is the number of the inactive unit

MAP response:

Updating static data
RCC (end)

```
A Cold SwAct will be performed
This action will take this PM and all of
Its Subtending Nodes temporarily out of service
and <n> active terminals may be affected
Please confirm (“YES” or “NO”):
```

To respond to the request for confirmation, type:

>YES

and press the Enter key.

Example of a MAP response:

```
RCC 0    SwAct Passed
```

If SWACT	Do
passes	step 5
fails	step 4

4 For additional help to resolve this problem, contact the next level of support.

5 This common procedure is complete. Return to the main procedure that sent you to this procedure and continue as directed.

7 RSC card replacement procedures

This chapter contains card replacement procedures for the Remote Switching Center (RSC) and Remote Switching Center Equipment (RSCE). These procedures are used by maintenance personnel to remove and replace hardware modules. Unless these procedures are part of verification or acceptance procedures, use them only when instructed to do so by some other maintenance procedure, such as an alarm clearing procedure.

NT0X10 in an RSC RMM

Application

Use this procedure to replace the following card in an RMM.

PEC	Suffixes	Name
NT0X10	AA	Miscellaneous scan card (MSC)

Common Procedures

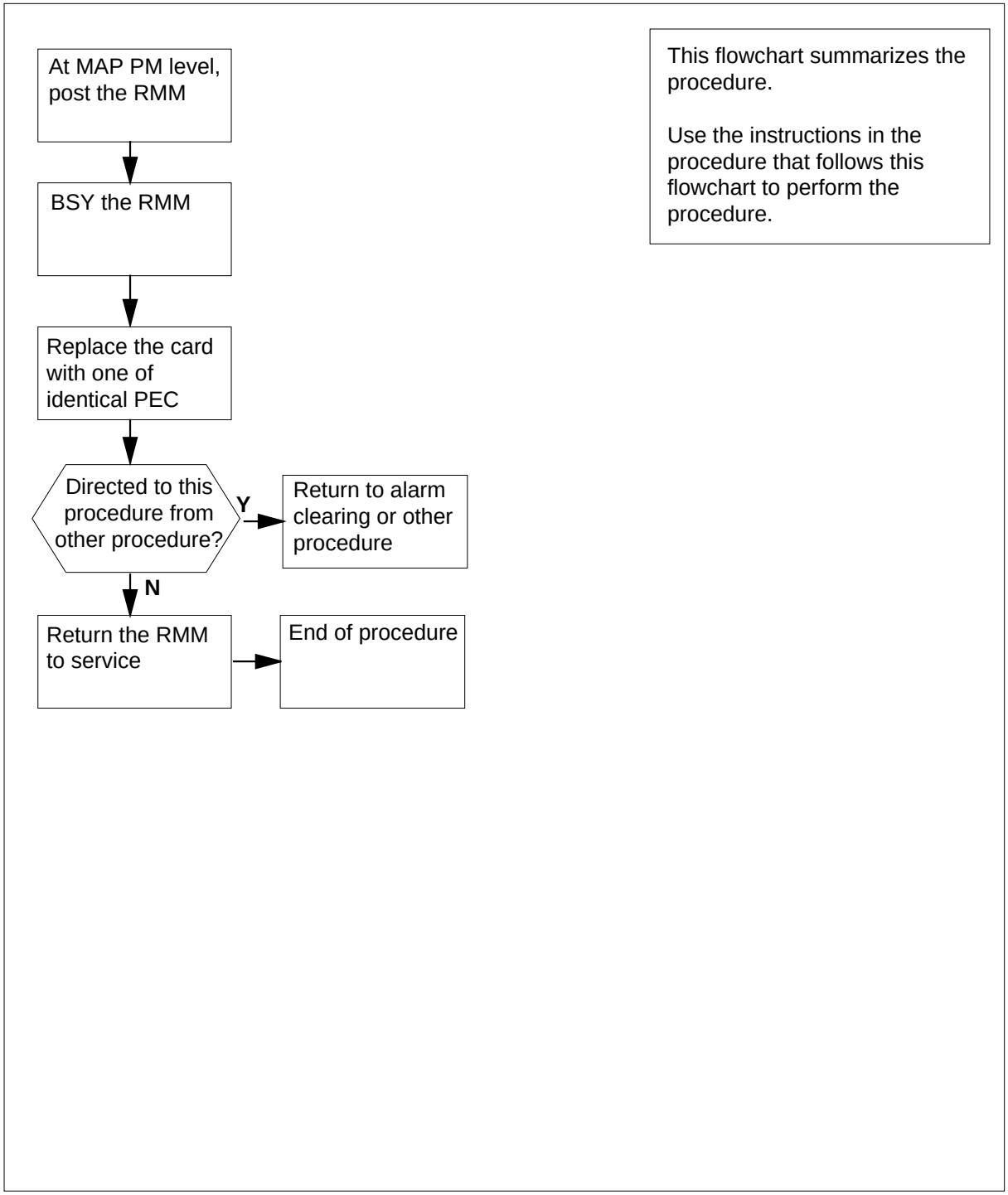
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT0X10 in an RSC RMM (continued)

Summary of card replacement procedure for NT0X10 in an RSC RMM



NT0X10 in an RSC RMM (continued)

Replacing an NT0X10 card in RSC RMM

At your current location:

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display response:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
    .     .      .      .   4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display response:

NT0X10
in an RSC RMM (continued)

```
   CM     MS     IOD     Net     PM     CCS     LNS     Trks     Ext     APPL
   .      .       .       .    4SysB    .       .        .       .       .

RMM                SysB      ManB      OffL      CBsy      ISTb       InSv
 0 Quit    PM         4         0        10         3         3        130
 2 Post_   RMM        0         1         1         0         0          2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

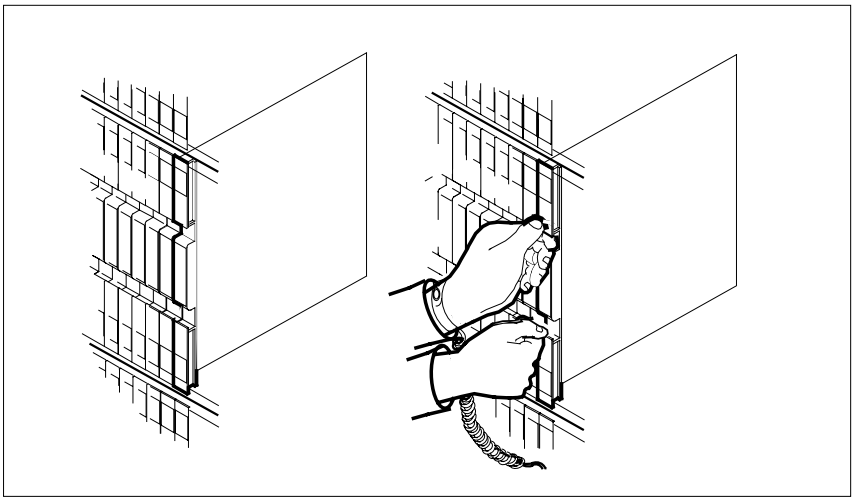
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

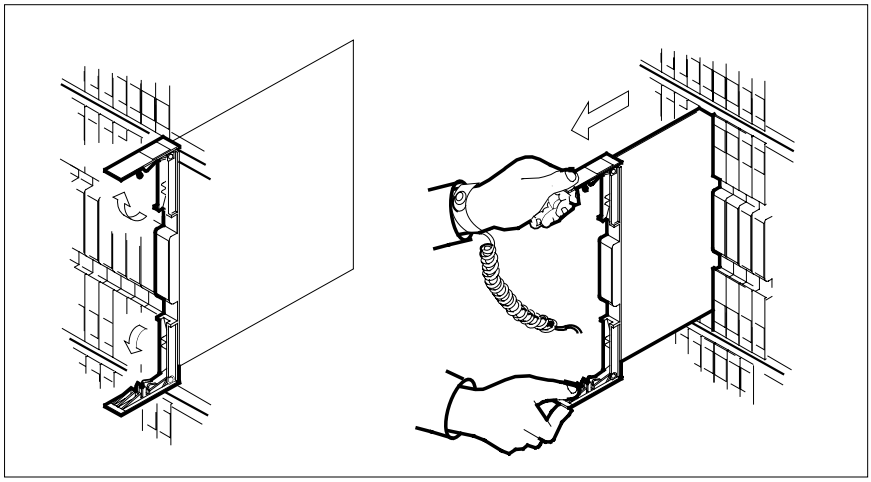
Remove the NT0X10 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT0X10
in an RSC RMM (continued)



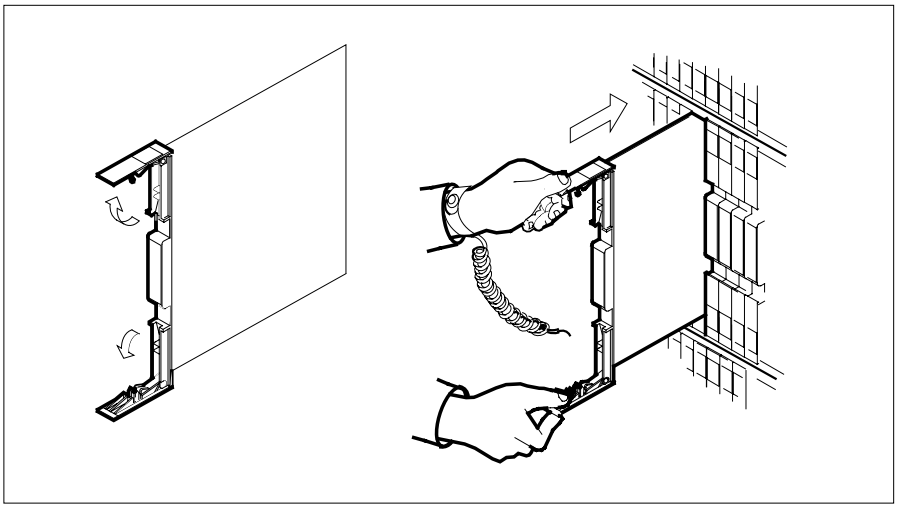
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

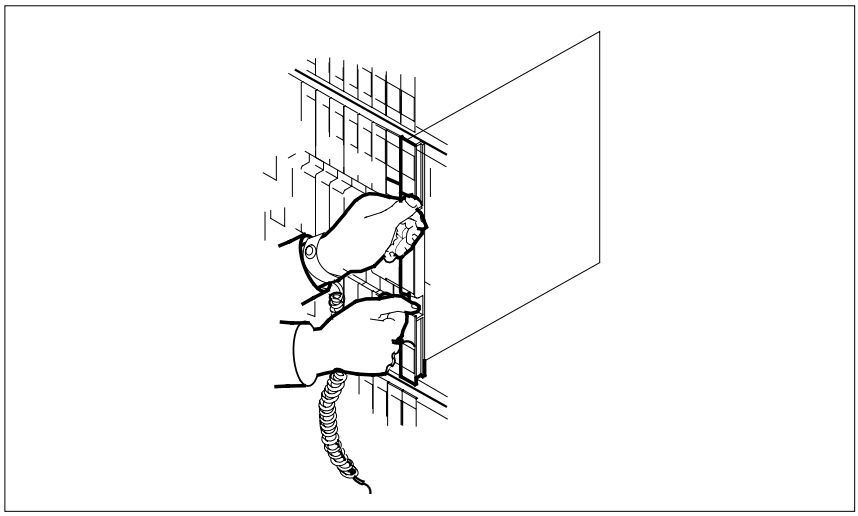
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure	Do
from an alarm clearing procedure	step 15
from other	step 10

NT0X10 in an RSC RMM (end)

At the MAP display

10 Test the RMM by typing

>TST

and pressing the Enter key.

Example of a MAP display response:

```
Test Passed
    or
Test Failed
```

If the TST	Do
passed	step 11
failed	step 15

11 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 12
failed	step 16

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

14 Go to step 17.

15 Return to the procedure that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT0X91 in an RSC

Application

Use this procedure to replace the following card in an RCE frame.

PEC	Suffixes	Name
NT0X91	AA	FSP alarm and converter drive circuit pack
NT0X91	AE	FSP drive and protection circuit pack

Common procedures

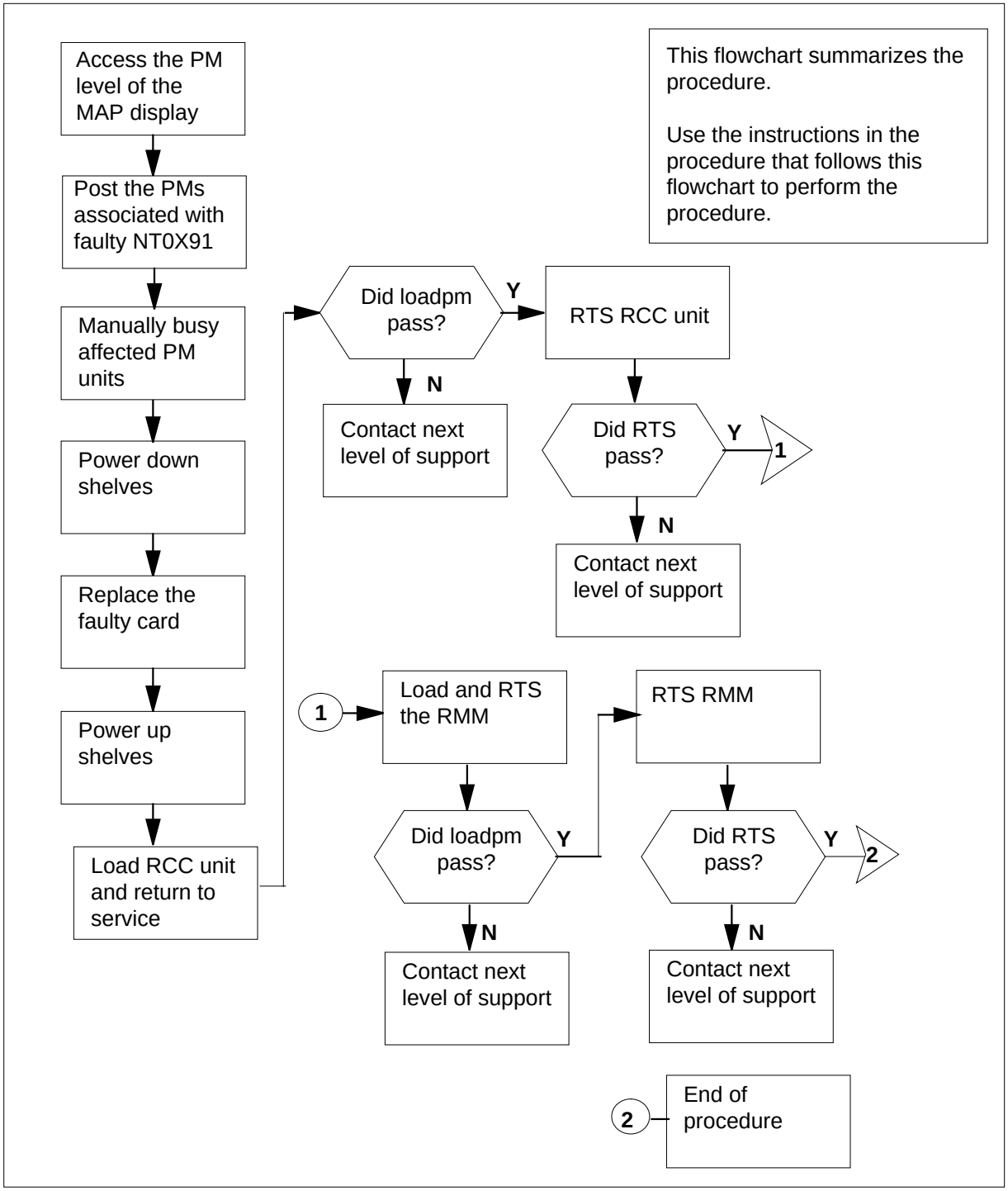
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NT0X91 in an RSC (continued)

Summary of replacing an NT0X91 in RCE



NT0X91 in an RSC (continued)

CAUTION
Loss of service
This procedure includes directions to manually busy one or more peripheral module (PM) units. Since manually busying a PM unit can cause service degradation, perform this procedure only if necessary to restore out of service components. Otherwise. carry out this procedure during periods of low traffic.

Replacing an NT0X91 in an RCE FSP

At your current location

1 Obtain a replacement card. Ensure that the replacement card has the same product engineering code (PEC), including suffix, as the card being removed.

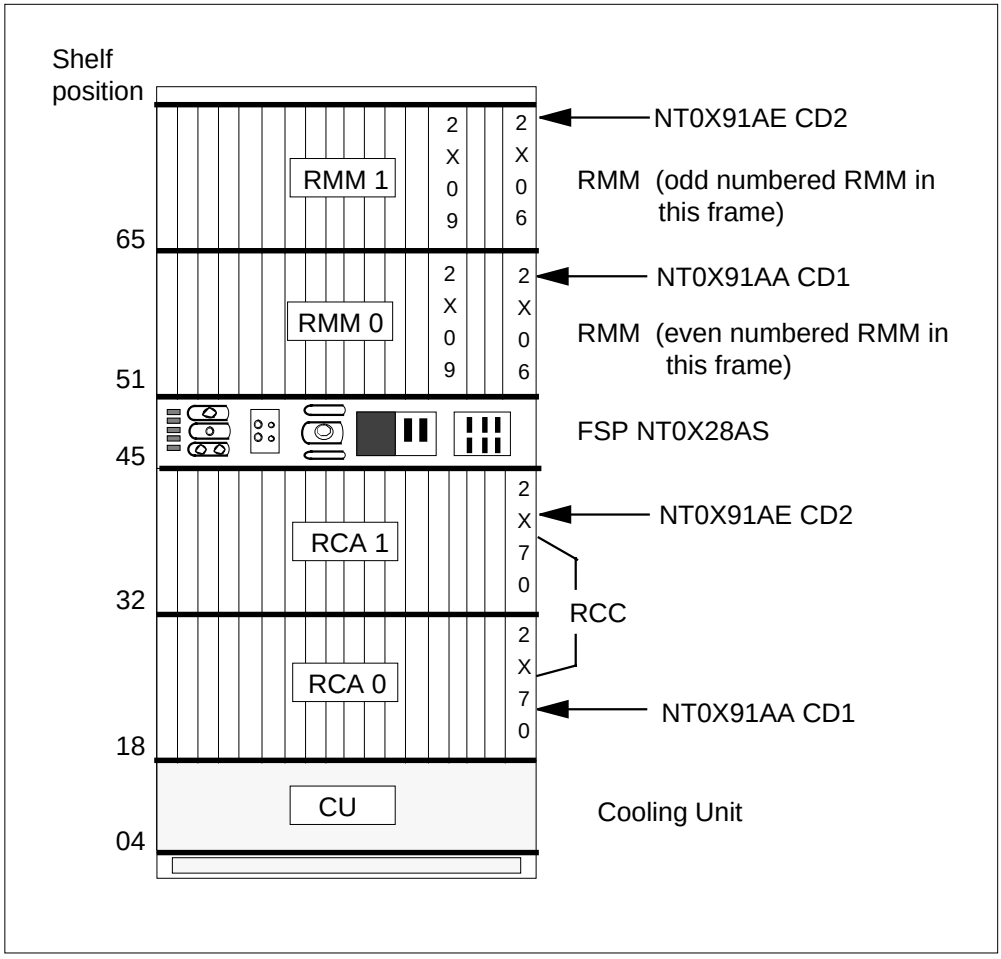
At the RCE frame

2 Record the frame supervisory panel (FSP) slot, frame circuit breakers (CB), shelves, PM location and units, and power converter slots that are associated with the faulty NT0X91 card you are replacing. Use the following table and figure “RCE frame layout for NT0X91 alarm, converter drive and protection circuit distribution" to obtain this information.

Card	FSP Slot	CB	Shelf and PM information	PC slot
NT0X91AA	CD1	CB5	shelf 18 (RCC unit 0)	25
NT0X91AA	CD1	CB4	shelf 51 (RMM 0)	17
NT0X91AE	CD2	CB2	shelf 32 (RCC unit 1)	25
NT0X91AE	CD2	CB1	shelf 65 (RMM 1)	17

NT0X91
in an RSC (continued)

RCE frame layout for NT0X91 alarm, converter drive and protection circuit distribution



3 Record the PM_type and PM_number of PMs associated with the NT0X91 you are replacing.

At the MAP terminal

4 Access the PM level and post the RCC associated with the faulty NT0X91 card by typing

`>MAPCI;MTC;PM;POST RCC rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC associated with the faulty NT0X91 card.

Example of a MAP display:

NT0X91
in an RSC (continued)

```
   CM    MS    IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .     .      .     .    1RCC    .      .       .      .       .

 RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM     0        0        2        0        2         25
 2 Post_    RCC    0        0        0        0        1          1
 3 ListSet
 4                RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_         Unit 0:  Inact SysB
 6 TST_           Unit 1:   Act  InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

5 By observing the MAP display, be sure the card to be removed is on the inactive unit.

If the faulty card is on an	Do
ACTIVE unit	step 6
INACTIVE unit	step 10

6

CAUTION
Service disruption: calls may be dropped!
If you are prompted to confirm a cold SwAct, perform this activity only during a period of low traffic. All calls being handled by this PM, including data calls, will be dropped.

Switch the processing activity to the inactive unit by typing

>SWACT

and pressing the Enter key.

NT0X91
in an RSC (continued)

The system determines the type of SwAct it can perform, a warm SwAct or a cold SwAct, and displays a confirmation prompt for the selected SwAct.

If SwAct	Do
cannot continue at this time	step 7
can continue at this time	step 8

7 Do not switch activity of the units. Reject the switch by typing

>NO

and pressing the Enter key.

The system discontinues the switch of activity.

Return to step 6 during a period of low traffic.

8 Switch the activity of the unit by typing

>YES

and pressing the Enter key.

The system runs a pre-SwAct audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding with the next maintenance action.

If the message is	Do
SwAct passed	step 10
SwAct failed	step 9
SwAct refused by SwAct controller	step 9

9 Return to the *Alarm Clearing Procedure* to clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this procedure.

At the RCE frame

10 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP terminal

11 Busy the inactive RCC unit by typing

>BSY UNIT rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit (0 or 1) associated with thefaulty NT0X91

12 Unseat the NT6X48 DS30A interface cards in slots 6 and 7.

13 Post the RMM associated with the faulty NT0X91 by typing

>POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM associated with the faulty NT0X91 card.

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     1RMM    .      .       .        .      .
                            *C*
RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        4        0       10       3        3       130
 2 Post_    RMM       1        0        0       0        0         2
 3
 4          RMM  0  SysB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

14 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NT0X91
in an RSC (continued)

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     1RMM    .      .        .       .       .

RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        4        0       10       3        3       130
 2 Post_    RMM       0        1        0       0        0         2
 3
 4          RMM  0  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RCC

15 Pull and set the toggle switch handle of the power converter NT2X70AE POWER switch downward to the OFF position.

At the FSP

16 Turn OFF the CBs for the power converters identified in step 2 associated with the faulty NT0X91 you are replacing.

At the RMM

17 Repeat step 15 and 16 for the NT2X09AA power converter in the RMM shelf associated with the faulty NT0X91 card.

At the FSP

18 Unscrew the slotted nut on the left-hand side of the FSP.

19

DANGER
Risk of electrocution
Some of the terminals inside the frame supervisory panel (FSP) have an electrical potential of -48 V dc. Remove all jewelry before replacing a card in the FSP. Do not touch any terminal in the FSP.

NT0X91
in an RSC (continued)

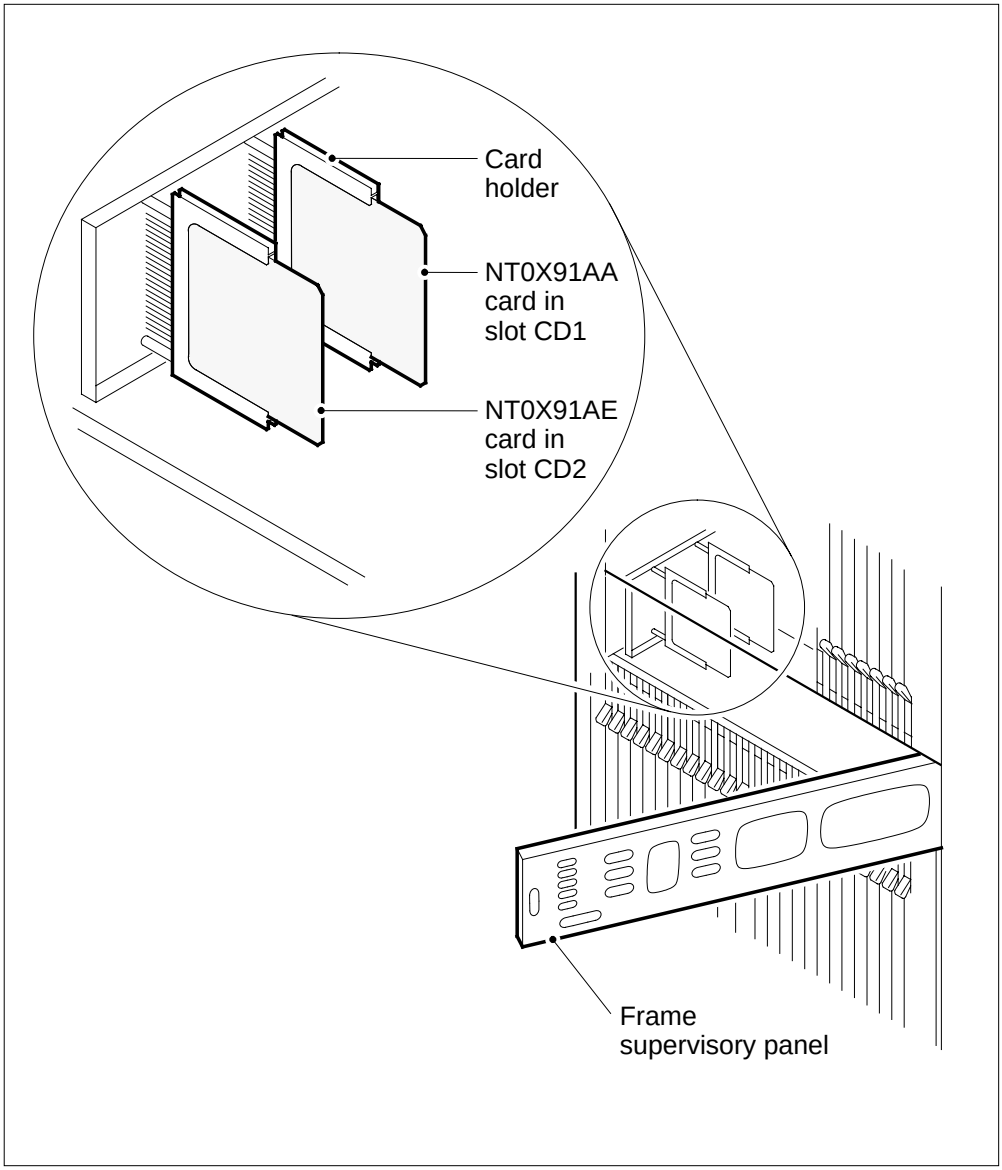
DANGER
Static electricity damage
Wear a wrist strap connected to the wrist-strap grounding point of a frame supervisory panel (FSP) while handling circuit cards. This protects the cards against damage caused by static electricity.

CAUTION
Loss of service
Ensure that the alarm and control card that you are about to remove is the one that controls the PM units that you have just busied. Removing the wrong card causes a loss of service. Reference the following figure and step Section 2, "Record the frame supervisory panel (FSP) slot, frame circuit breakers (CB), shelves, PM location and units, and power converter slots that are associated with the faulty NT0X91 card you are replacing. Use the following table and figure “RCE frame layout for NT0X91 alarm, converter drive and protection circuit distribution" to obtain this information." on page -11 of this procedure to ensure unseating the correct NT0X91 card..

Open the FSP panel.

NT0X91 in an RSC (continued)

FSP circuit pack layout



20 Remove the NT0X91 card from the card slot in the FSP. Refer to the figure, “FSP circuit pack layout" for card slot positions.

21 Place the card you have removed in an electrostatic discharge (ESD) protective container.

22 Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

23 Insert the replacement card.

24 Close the FSP panel.

NT0X91 in an RSC (continued)

25 Tighten the slotted nut on the left side of the FSP.

At the RCC

26 Power up the NT2X70AE power converter.

27 Toggle the ON/OFF/RESET switch on the NT2X70AE power converter faceplate, identified in step 2, to the RESET position and hold while setting the CB, identified in step 2, on the FSP to the ON position. Release the handle and toggle switch.

At the RMM

28 Set the power switch on the NT2X09AA and NT2X06AB power converters on the RMM shelf to the ON position.

a Press the RESET button on the NT2X09AA power converter while setting the CB, identified in step 2, to the ON position. Both the CONVERTER FAIL led and FRAME FAIL lamp on the FSP will go OFF.

b Release the circuit breaker and RESET button.

29 Reseat the NT6X48 DS30A interface cards in slots 6 and 7 unseated in step 12.

30 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 42
other	step 31

At the MAP terminal

31 Post the RCC associated with the new NT0X91 card by typing

```
>POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the unit number of the RCC associated with the faulty NT0X91 card.

Example of a MAP display:

NT0X91
in an RSC (continued)

```
   CM   MS   IOD   Net   PM   CCS   LNS   Trks   Ext   APPL
    .    .     .     .  1RCC   .     .      .     .      .

 RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM     0        0        2        0        2         25
 2 Post_    RCC    0        0        0        0        1          1
 3 ListSet
 4                RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_         Unit 0:  Inact ManB
 6 TST_           Unit 1:   Act  InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

32 The peripheral loader card (NT7X05) allows local loading of the RCC data. Local data loading reduces recovery time. Check if the NT7X05 card is provisioned by typing:

>QUERYPM FILES

and pressing the Enter key.

Example of a MAP display:

NT0X91 in an RSC (continued)

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .    .    1RCC    .      .       .      .      .

 RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM     2        0        2        0        2       25
 2 Post     RCC    0        0        0        0        1        1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_   Unit 0:  Inact ManB
 6 TST_     Unit 1:  Act   InSv
 7 BSY_
 8 RTS_     QUERYPM files
 9 OffL     Unit 0:
10 LoadPM_     NT7X05 load File: ESR05AY
11 Disp_       NT7X05 Image File:ESR05AY
12 Next_       CMR Load: CMR03A
13 SwAct
14 QueryPM Unit 1:
15             NT7X05 load File: ESR05AY
16 IRLINK      NT7X05 Image File:ESR05AY
17 Perform     CMR Load: CMR03A
18
```

Note: If the NT7X05 card is not provisioned the MAP response is:

Example of a MAP response:

```
Nt7X05 not datafilled,  QueryPm files invalid
```

If the NT7X05 card is	Do
provisioned	step 33
not provisioned	step 35

33 Load the RCC from the local image by typing

`>LOADPM UNIT unit_no LOCAL IMAGE`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If the load	Do
passed	step 36
failed	step 34

NT0X91
in an RSC (continued)

34 Load the RCC from the local loadfile by typing

>LOADPM UNIT unit_no LOCAL LOADFILE

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If the load	Do
passed	step 36
failed	step 35

35 Load the inactive RCC unit from the CM by typing

>LOADPM UNIT rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

36 Return the inactive unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1)

If the RTS command	Do
passed	step 37
failed	step 43

37 Post the RMM associated with the new NT0X91 by typing

>POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM associated with the new NT0X91 card.

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     1RMM    .      .       .        .       .

RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        4        0       10       3        3       130
 2 Post_    RMM       0        1        1       0        0        2
 3
 4          RMM  0  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

38 Load the RMM associated with the new NT0X91 by typing

>LOADPM

and pressing the Enter key.

where

rmm_no
is the number of the RMM associated with the new NT0X91 card.

If the loadpm	Do
passed	step 39
failed	step 43

39 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 40
failed	step 43

40 Send any faulty cards for repair according to local procedure.

NT0X91 in an RSC (end)

41 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card.

Go to step 44.

42 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

43 For further assistance, contact the personnel responsible for the next level of support.

44 You have completed this procedure.

NT2X06 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X06	AB	5V/40A power converter

Common Procedures

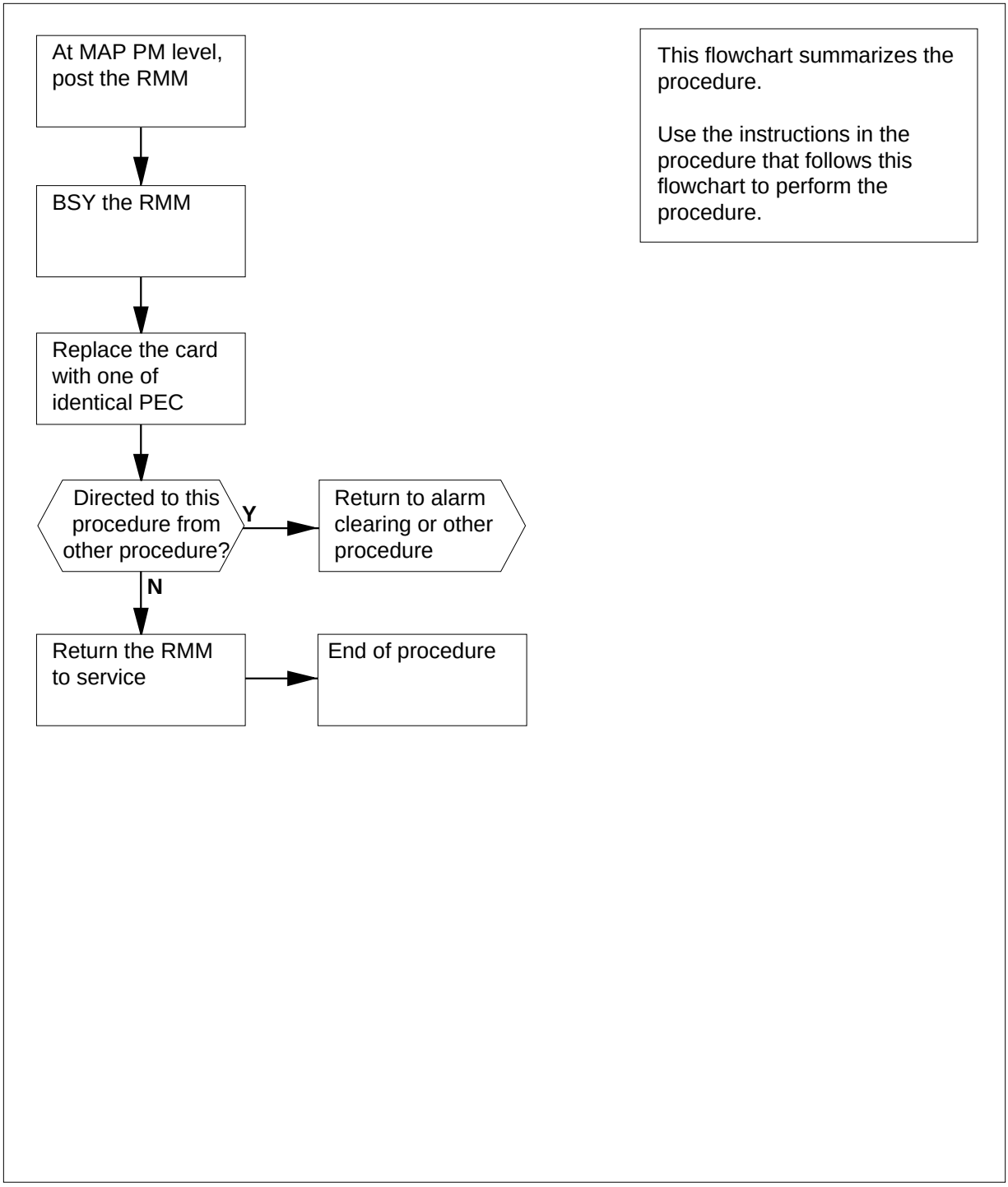
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X06 in an RSC RMM (continued)

Summary of card replacement procedure for an NT2X06 card in RSC RMM



NT2X06 in an RSC RMM (continued)

Replacing an NT2X06 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
 CM     MS     IOD    Net    PM     CCS    LNS   Trks    Ext   Appl
 .      .       .      .      .      .      .      .      .     .
RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NT2X06
in an RSC RMM (continued)

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON. An audible alarm may sound. If an alarm does sound, silence it by typing

`>SIL`

and pressing the Enter key.

NT2X06
in an RSC RMM (continued)

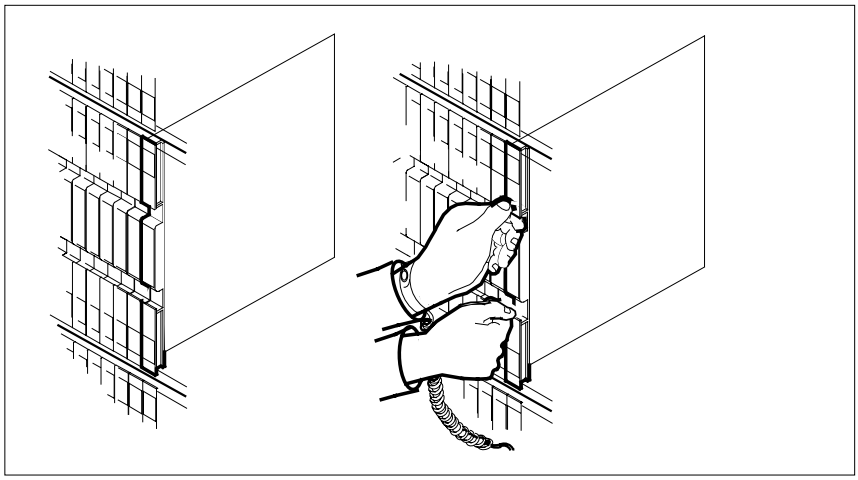
7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

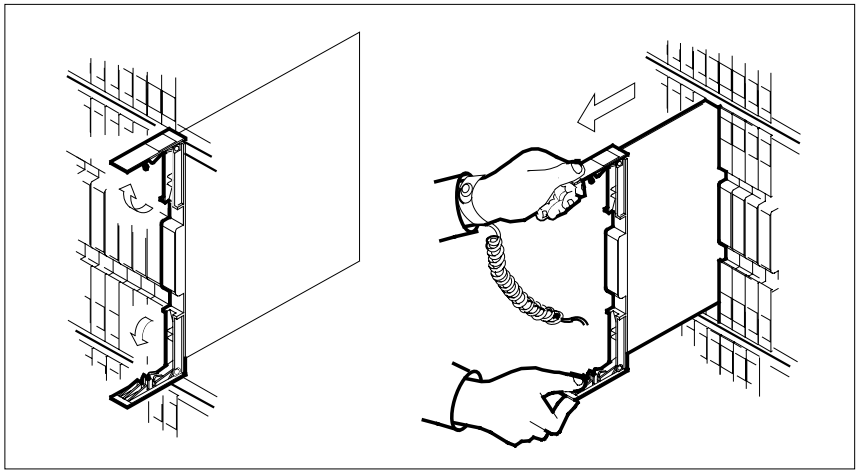
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NT2X06 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

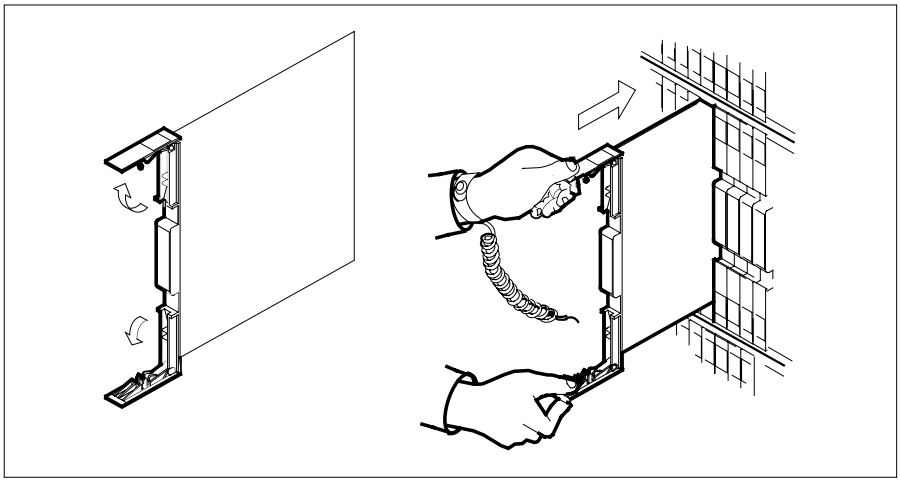


NT2X06
in an RSC RMM (continued)

c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

8 Open the locking levers on the replacement card.

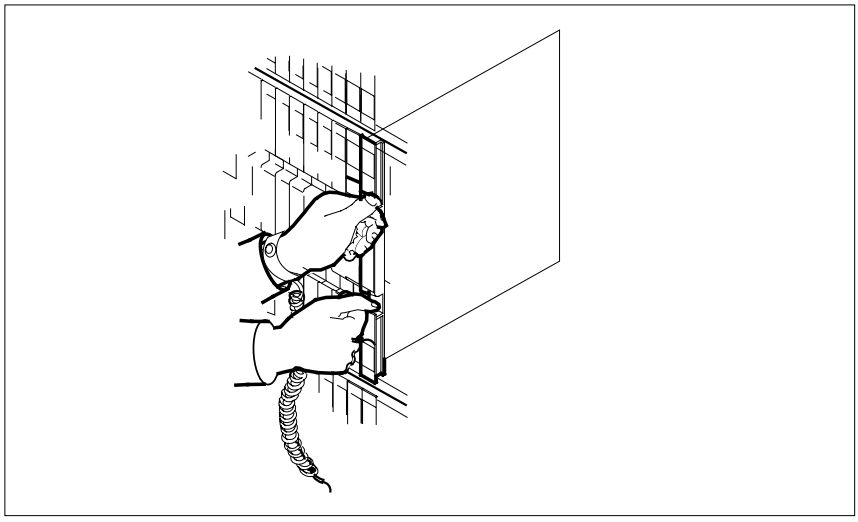
Align the card with the slots in the shelf and gently slide the card into the shelf.



9 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



NT2X06 in an RSC RMM (continued)

10 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 20
other	step 11

At the RMM shelf

11 Power up the RMM as follows:

a Ensure the converter (NT2X06) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

b Set the POWER switch to the ON position.

If FSP is equipped with	Do
fuses	step 12
circuit breakers	step 13

12 Press and hold the RESET button for one second. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be OFF. Go to step 14.

At the MAP display

13 Press the RESET button while setting the circuit breaker to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON.

14 Reload the RMM by typing

>LOADPM

and pressing the Enter key.

If load	Do
passed	step 15
failed	step 21

15 Test the RMM by typing

>TST

and pressing the Enter key.

Example of a MAP response:

```
Test Passed
```

or

NT2X06 in an RSC RMM (end)

```
Test Failed
```

If the TST	Do
passed	step 16
failed	step 20

16 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 17
failed	step 21

17 Send any faulty cards for repair according to local procedure.

18 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

19 Go to step 22.

20 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

21 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

22 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X09 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X09	AD	Multi-output power converter

Common Procedures

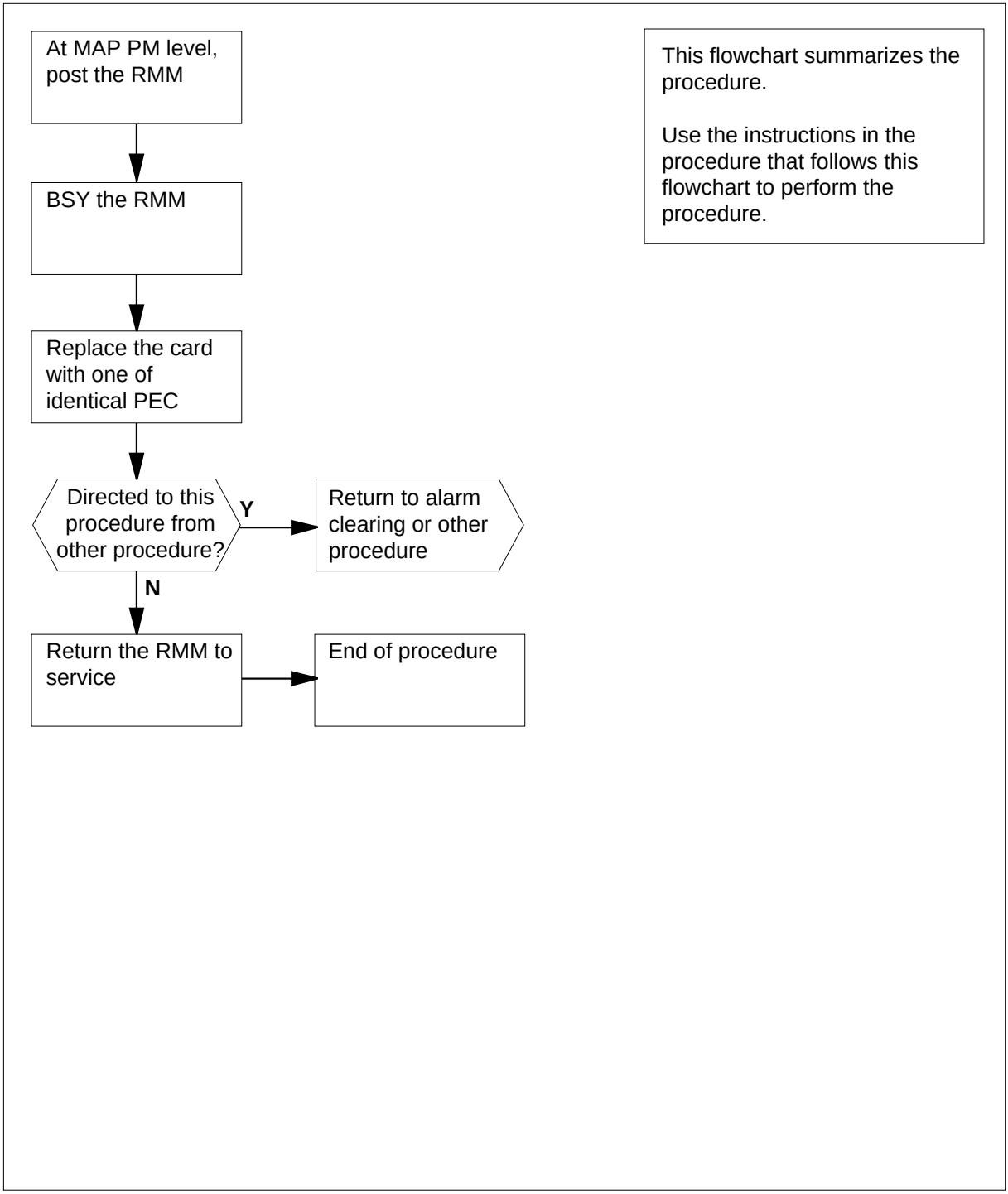
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X09 in an RSC RMM (continued)

Summary of card replacement procedure for an NT2X09 card in an RSC RMM



Replacing an NT2X09 card in an RSC RMM

At your current location:

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
 CM     MS     IOD     Net     PM     CCS     LNS     Trks     Ext
 .      .       .       .       .      .       .       .        .
RMM              SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit    PM      4        0       10       3        3        130
 2 Post_   RMM     0        1        1       0        0          2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NT2X09
in an RSC RMM (continued)

```
 CM      MS      IOD      Net      PM      CCS      LNS      Trks      Ext
 .       .        .        .     1ManB     .        .        .         .
RMM                SysB      ManB      OffL      CBsy      ISTb      InSv
 0 Quit    PM       4         0         10        0         0         130
 2 Post_   RMM      0         1          0        0         0           0
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON. An audible alarm may sound. If an alarm does sound, silence it by typing

`>SIL`

and pressing the Enter key.

NT2X09
in an RSC RMM (continued)

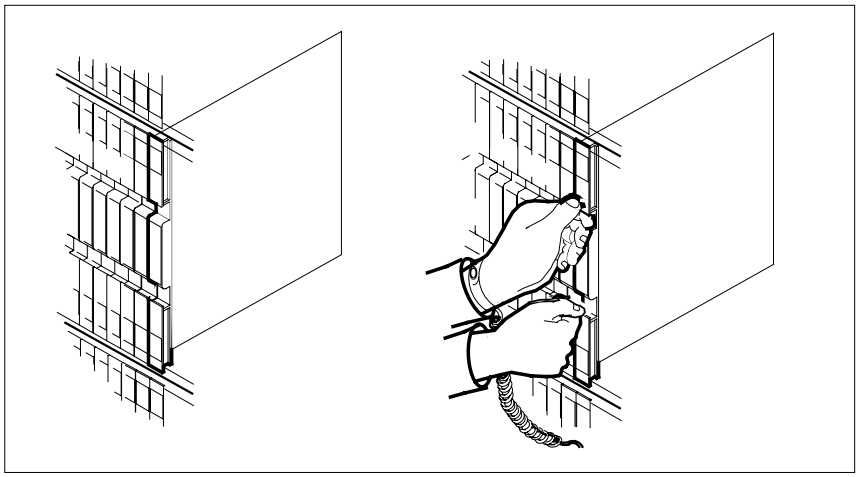
7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

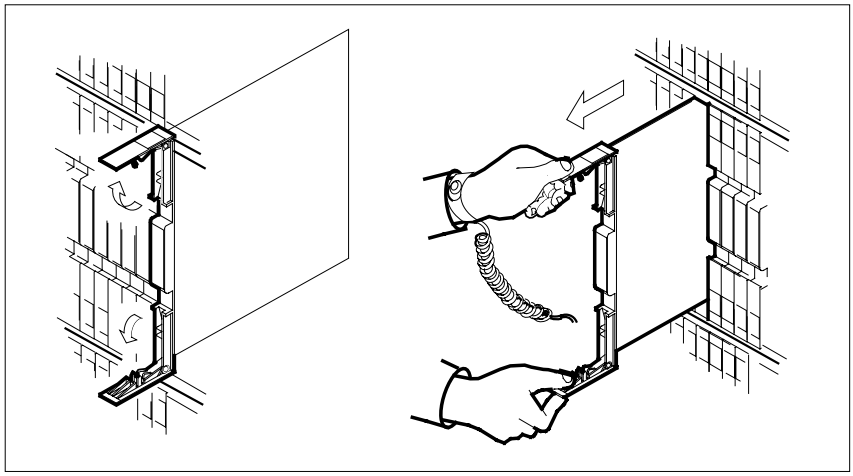
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NT2X09 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

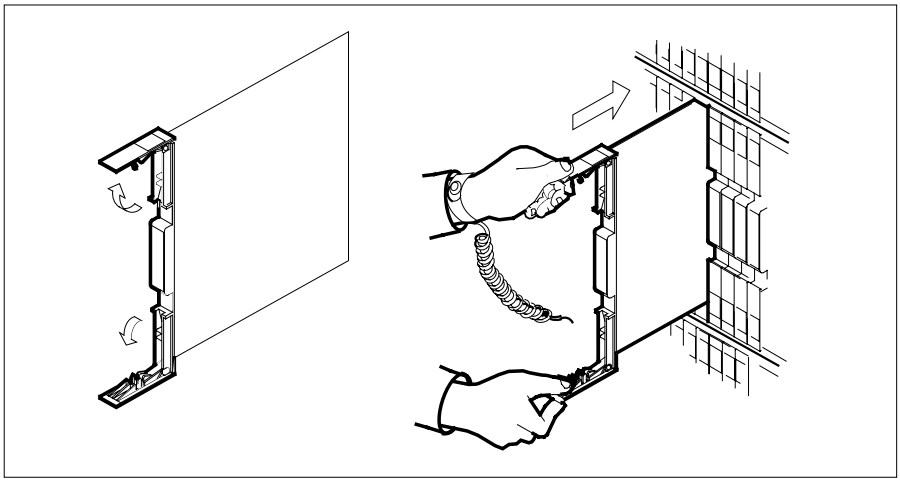


NT2X09
in an RSC RMM (continued)

c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

8 Open the locking levers on the replacement card.

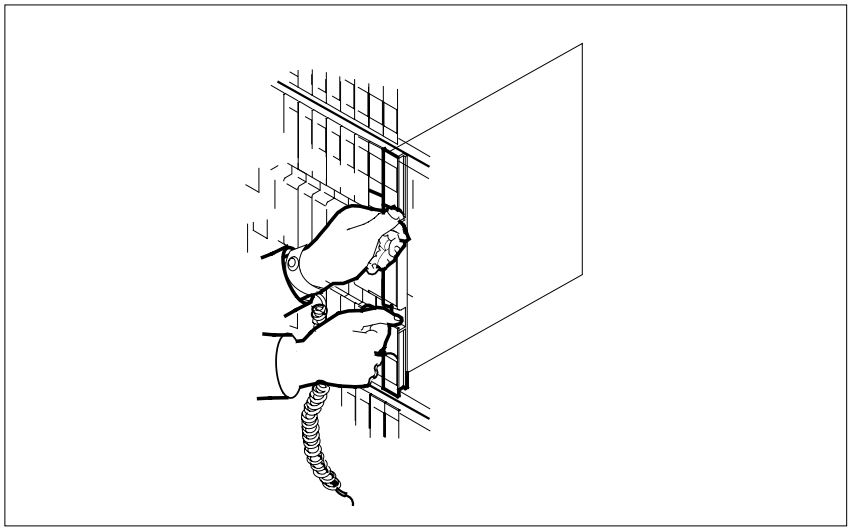
Align the card with the slots in the shelf and gently slide the card into the shelf.



9 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



NT2X09
in an RSC RMM (continued)

10 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 20
other	step 11

11 Power up the RMM as follows:

a Ensure that the converter (NT2X09) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

b Set the POWER switch to the ON position.

If FSP is equipped with	Do
fuses	step 12
circuit breakers	step 13

12 Press and hold the RESET button for one second. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be OFF. Go to step 14.

At the MAP display

13 Press the RESET button while setting the circuit breaker to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON.

14 Reload the RMM by typing

>LOADPM

and pressing the Enter key.

If load	Do
passed	step 15
failed	step 21

15 Test the RMM by typing

>TST

and pressing the Enter key.

Example of a MAP display response:

```
Test Passed
```

or

NT2X09 in an RSC RMM (end)

```
Test Failed
```

If the TST	Do
passed	step 16
failed	step 21

16 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 17
failed	step 21

17 Send any faulty cards for repair according to local procedure.

18 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

19 Go to step 22.

20 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

21 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

22 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X10 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X10	AB	Line test unit (LTU) analog test and measurement card
NT2X10	BA	Multi line test unit (MTU) analog test and measurement card

Common Procedures

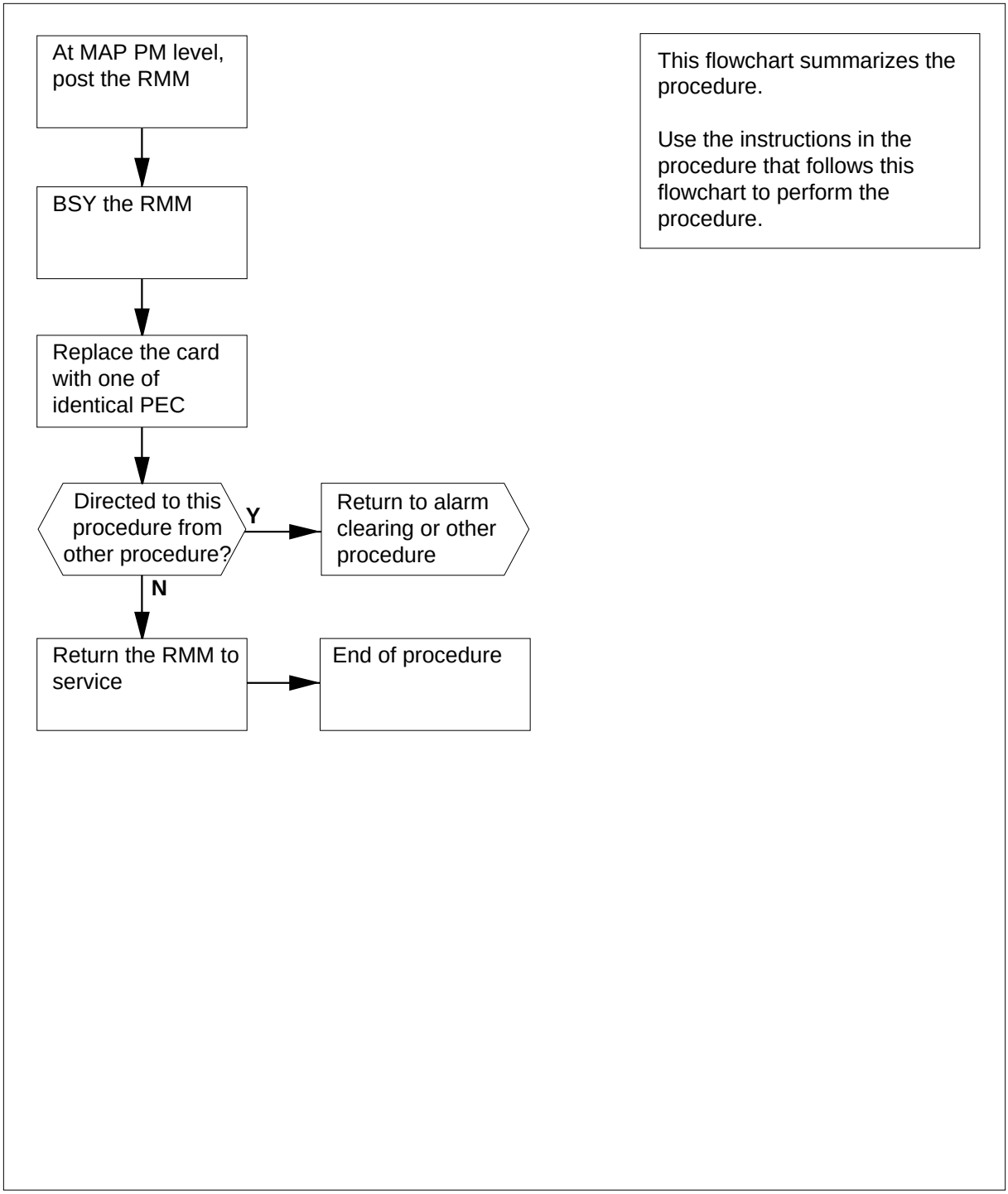
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X10 in an RSC RMM (continued)

Summary of card replacement procedure for an NT0X10 card in an RSC RMM



NT2X10 in an RSC RMM (continued)

Replacing an NT2X10 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .      .       .      .

RMM              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        0       10        3        3       130
 2 Post_   RMM      0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NT2X10 in an RSC RMM (continued)

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

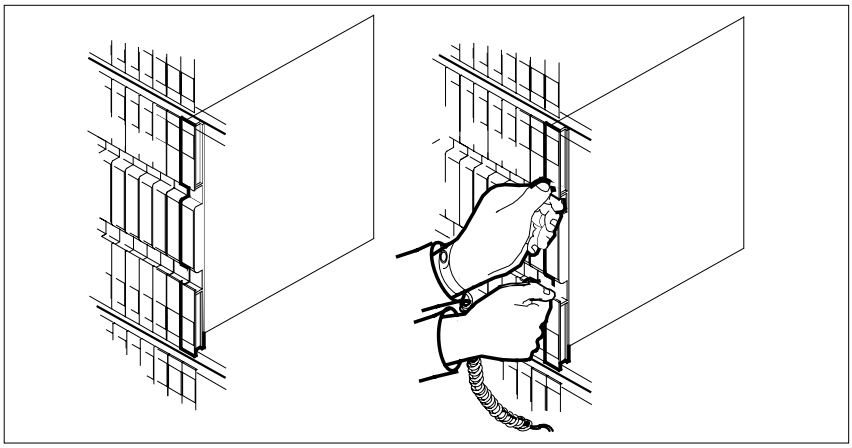
6

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

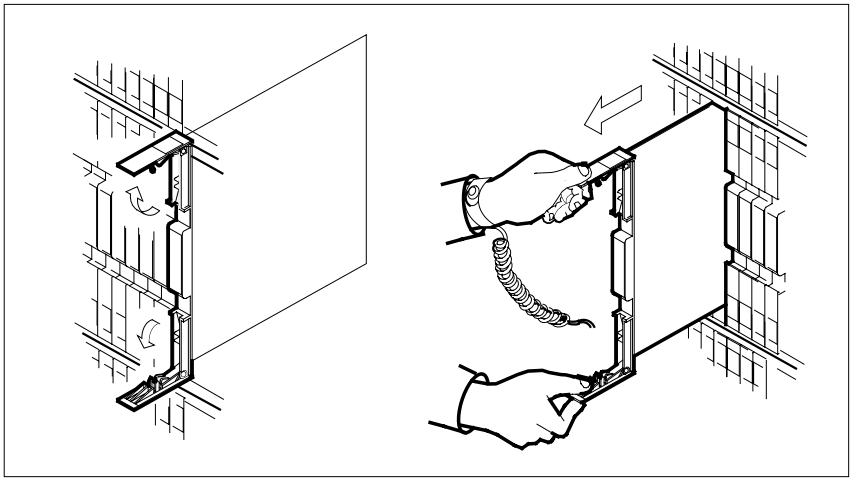
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NT2X10 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

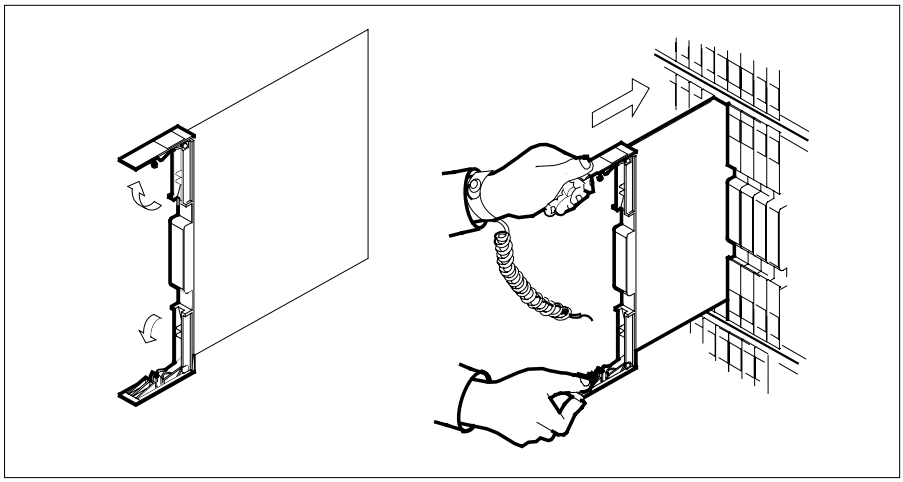


c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

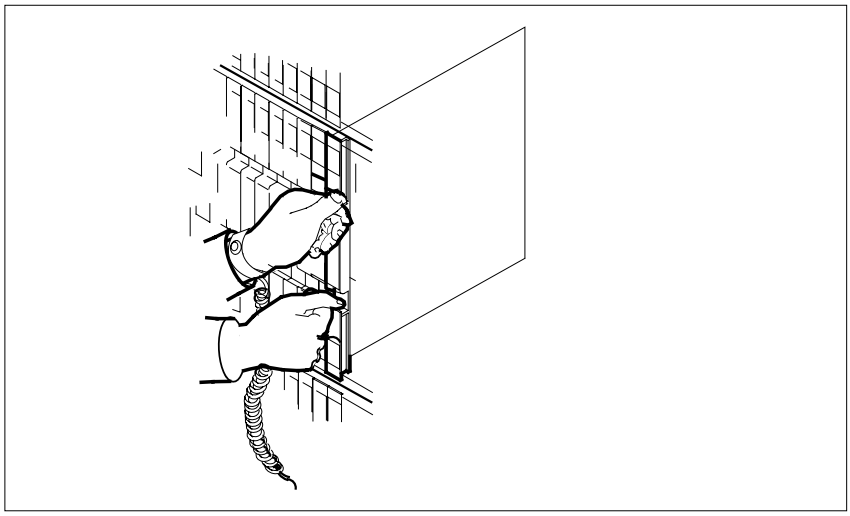
NT2X10
in an RSC RMM (continued)



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 15
other	step 10

NT2X10 in an RSC RMM (end)

At the MAP display

10 Test the RMM by typing

>TST

and pressing the Enter key.

Example of a MAP response:

```
Test Passed
```

or

```
Test Failed
```

If the TST	Do
passes	step 11
fails	step 15

11 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passes	step 12
fails	step 16

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

14 Go to step 17.

15 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X11 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X11	BA	Line test unit (LTU) control card
NT2X11	BA	Multi-line test unit (MTU) control card

Common Procedures

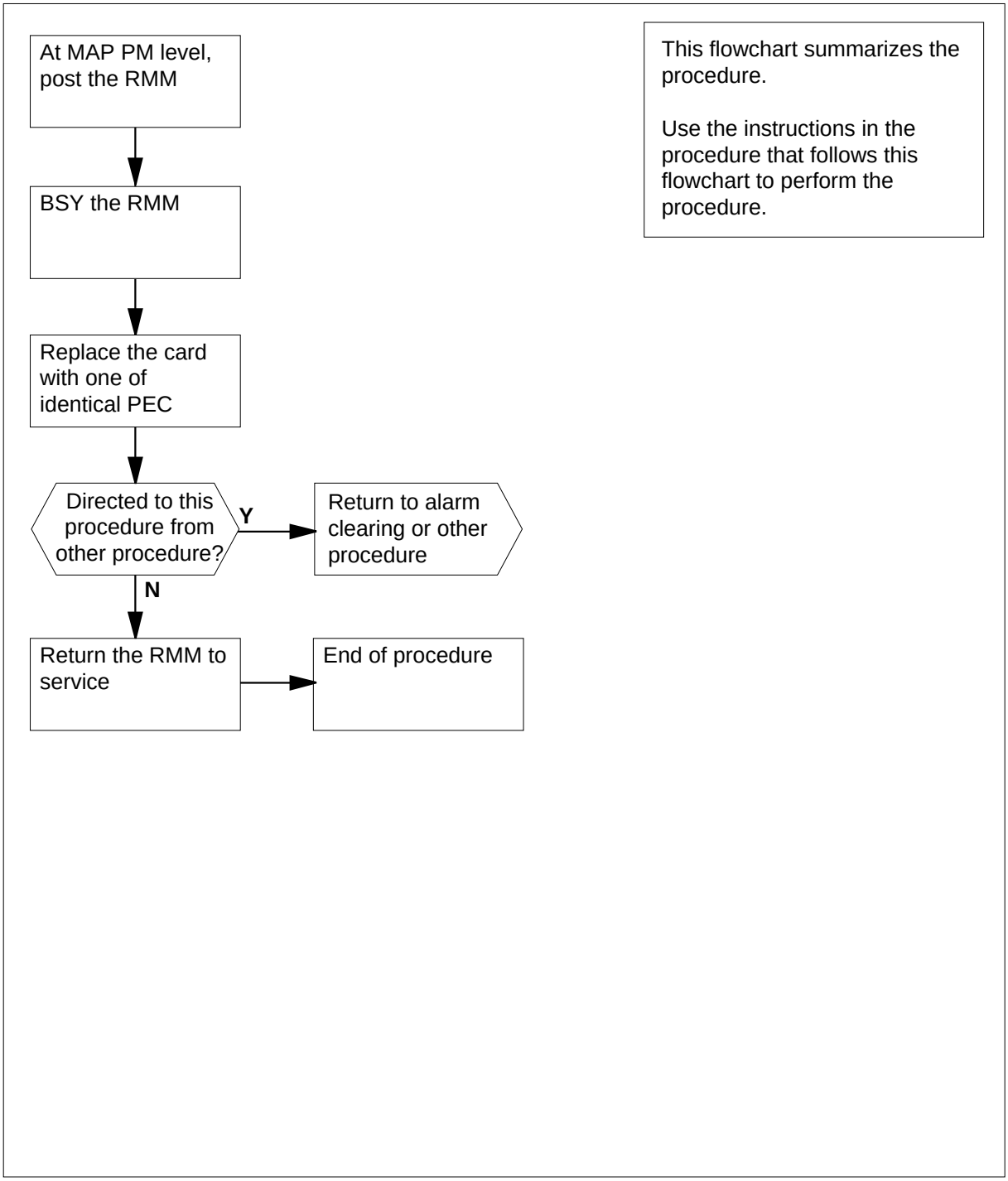
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X11 in an RSC RMM (continued)

Summary of card replacement procedure for an NT2X11 card in RSC RMM



NT2X11
in an RSC RMM (continued)

Replacing an NT2X11 card in an RSC RMM

At your current location:

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT2X11 in an RSC RMM (continued)

Example of a MAP display:

```
   CM     MS     IOD     Net     PM     CCS     LNS     Trks     Ext     APPL
   .      .       .       .    4SysB    .       .        .       .       .

RMM                SysB      ManB      OffL      CBsy      ISTb       InSv
 0 Quit    PM         4         0        10         3         3        130
 2 Post_   RMM        0         1         1         0         0          2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

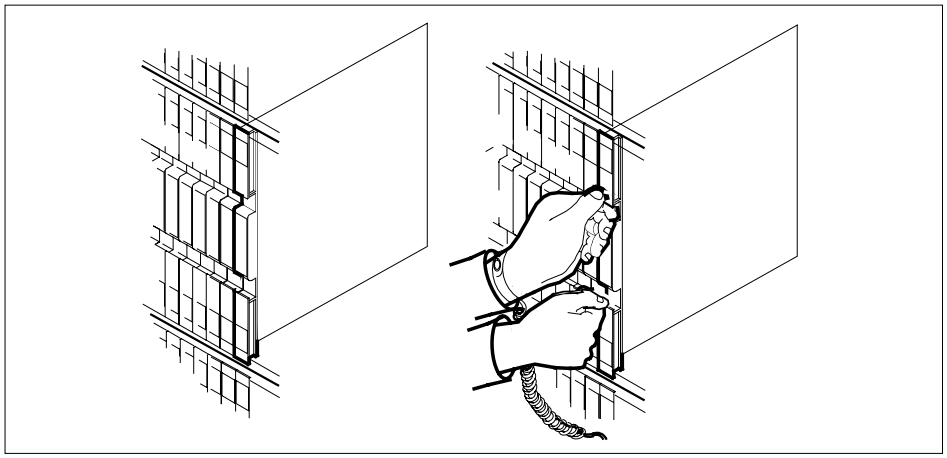
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

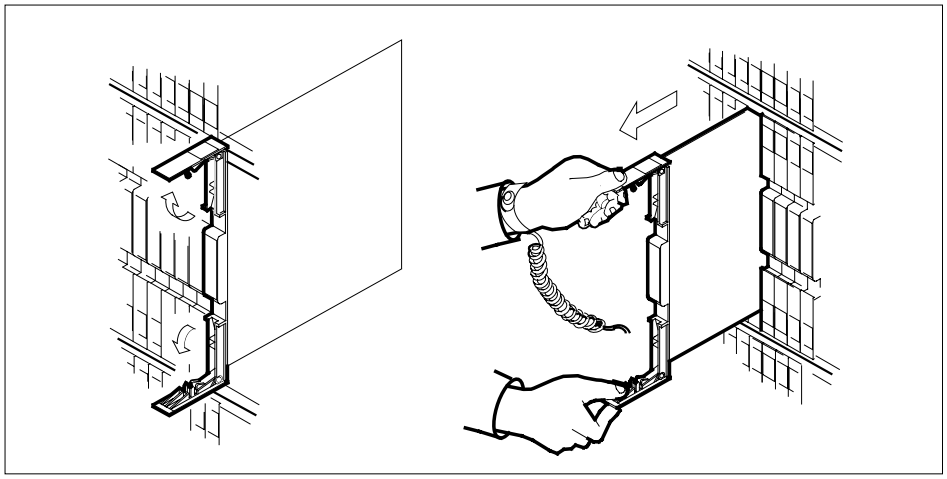
Remove the NT2X11 card as shown in the following figures.

NT2X11
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



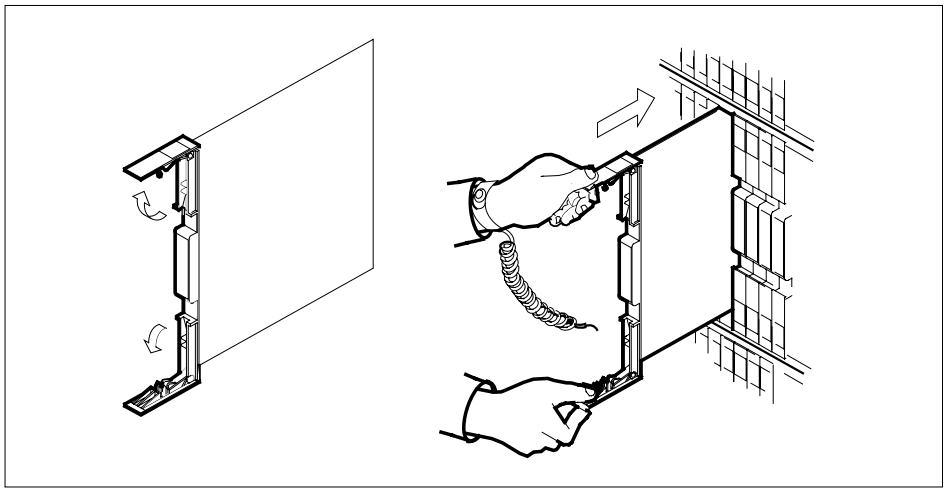
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

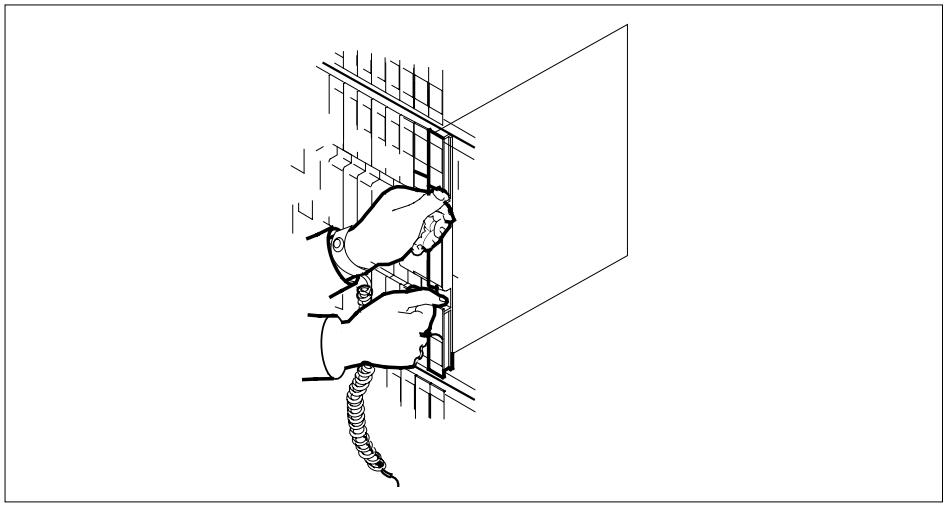
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 15
other	step 10

NT2X11 in an RSC RMM (end)

At the MAP display

10 Test the RMM by typing

>TST

and pressing the Enter key.

Example of a MAP response:

```
Test Passed
```

or

```
Test Failed
```

If the TST	Do
passed	step 11
failed	step 15

11 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 12
failed	step 16

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

14 Go to step 17.

15 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X55 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X55	AA	Signaling distribution (SD) card type 2

Common Procedures

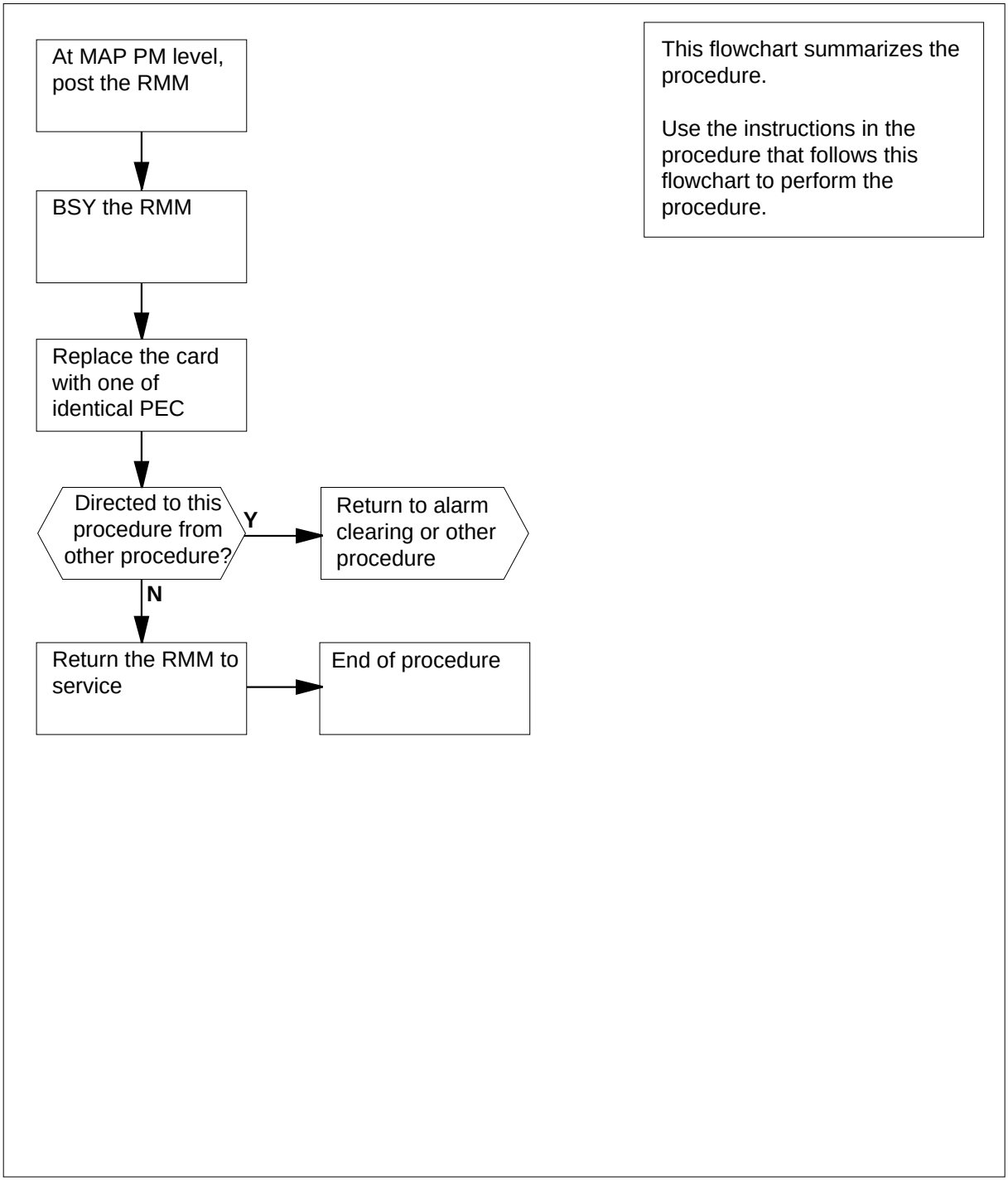
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X55 in an RSC RMM (continued)

Summary of card replacement procedure for NT2X55 card in RSC RMM



Replacing an NT2X55 card in an RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .       .

RMM                SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM       4        0        10       3        3       130
 2 Post_    RMM      0        1         1       0        0        2
 3
 4          RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT2X55
in an RSC RMM (continued)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130

 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

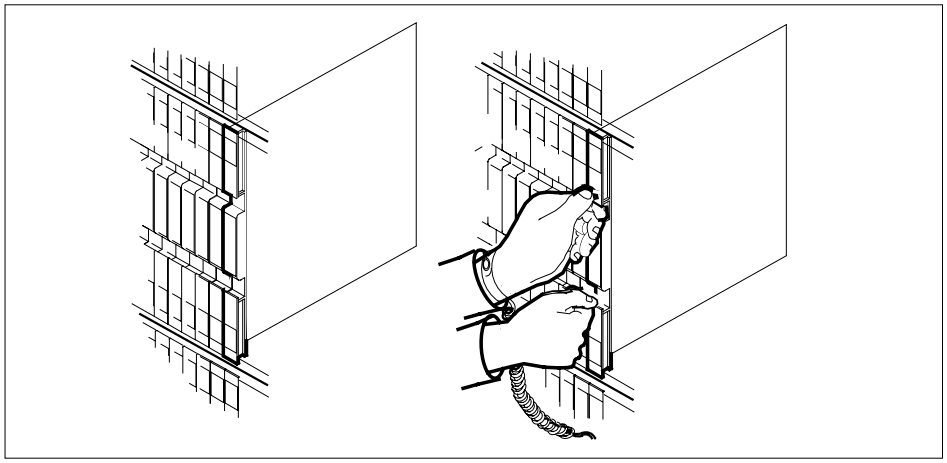
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

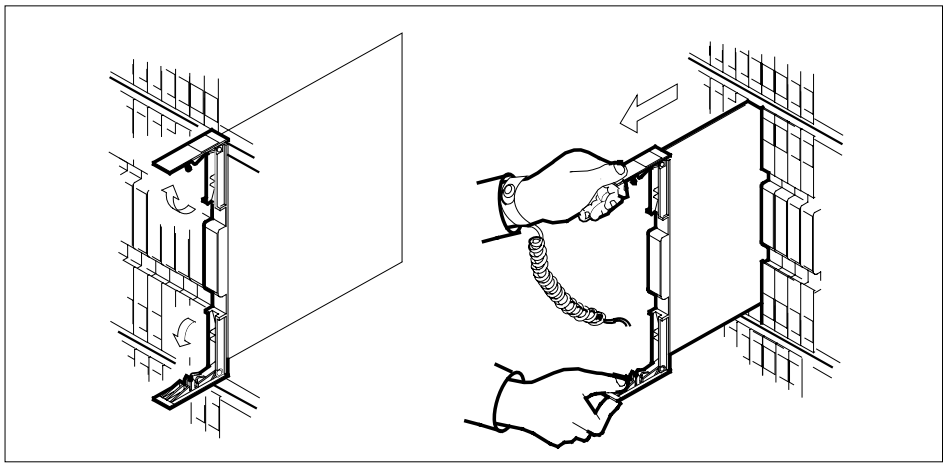
NT2X55
in an RSC RMM (continued)

Remove the NT2X55 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

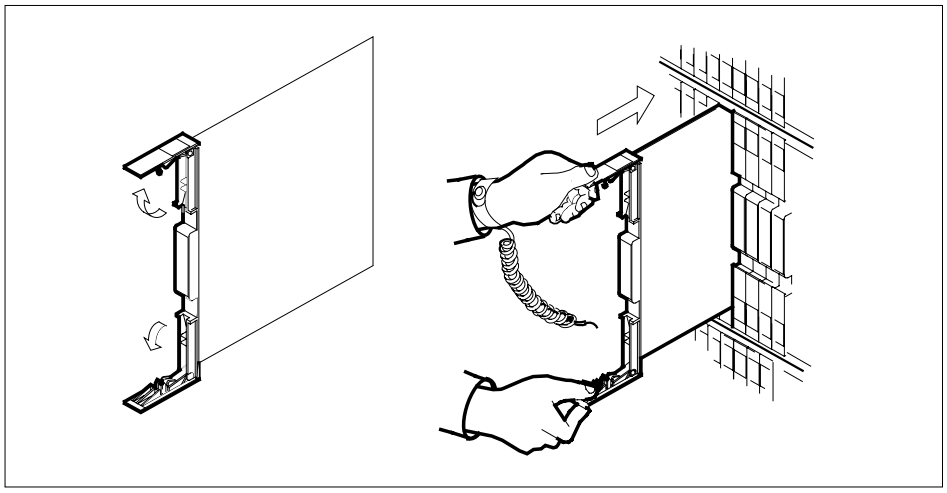


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

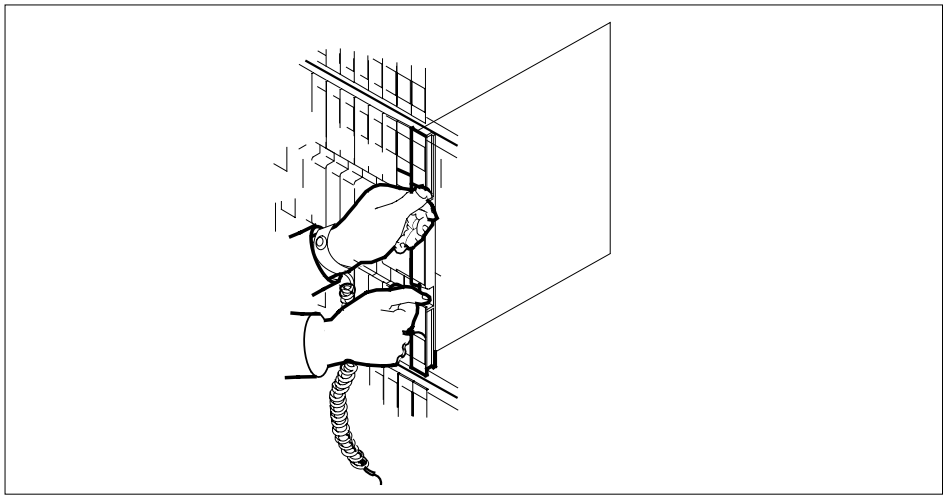
NT2X55
in an RSC RMM (continued)



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 14
other	step 10

NT2X55 in an RSC RMM (end)

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passes	step 11
fails	step 15

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

13 Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

15 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X57 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X57	AA	Signal distribution (SD) card

Common Procedures

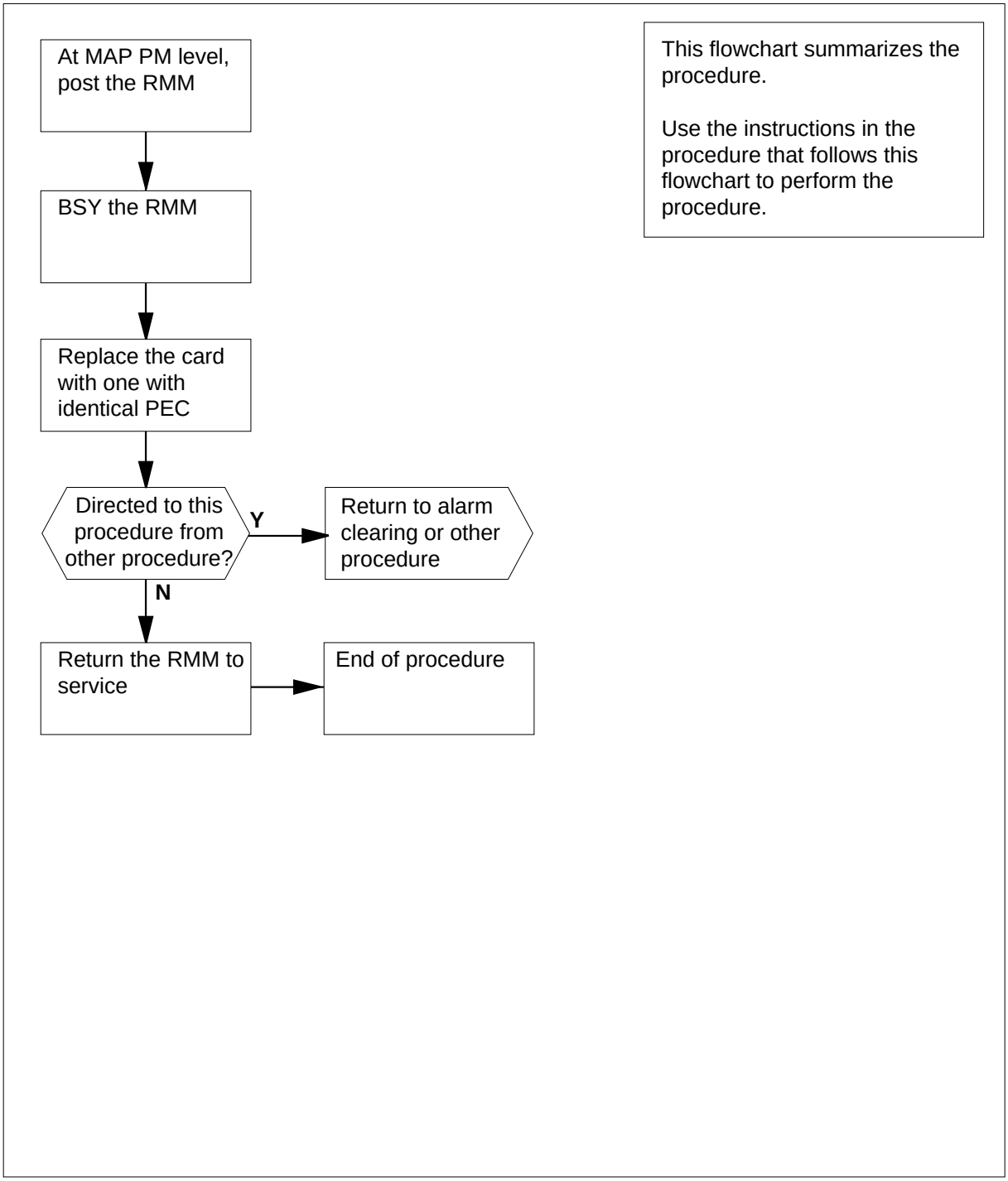
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X57 in an RSC RMM (continued)

Summary of card replacement procedure for NT2X57 card in an RSC RMM



NT2X57
in an RSC RMM (continued)

Replacing an NT2X57 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT2X57 in an RSC RMM (continued)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

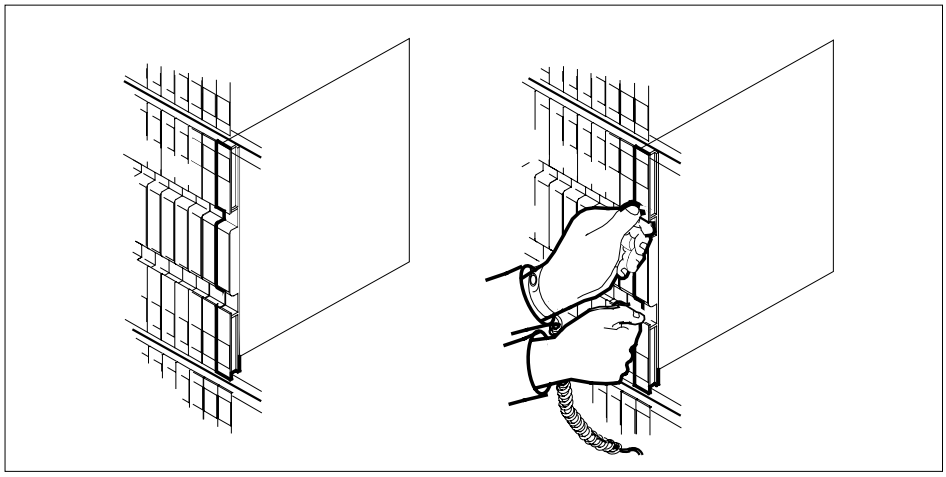
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

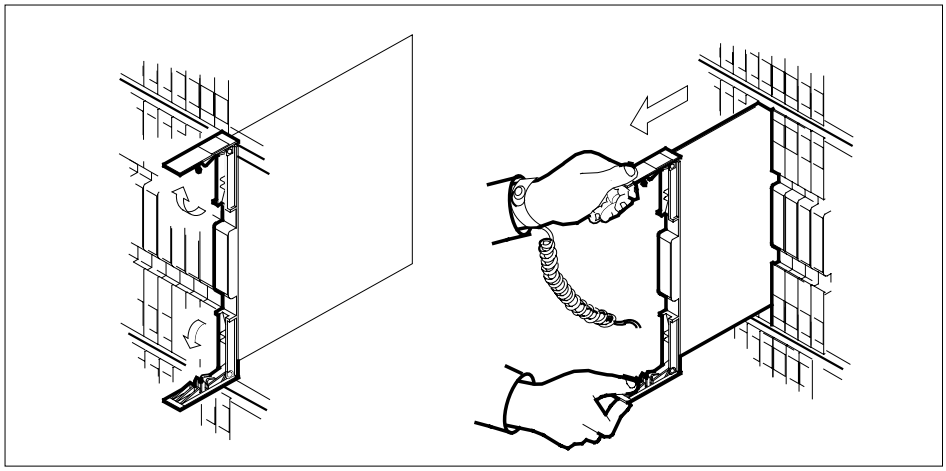
Remove the NT2X57 card as shown in the following figures.

NT2X57
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

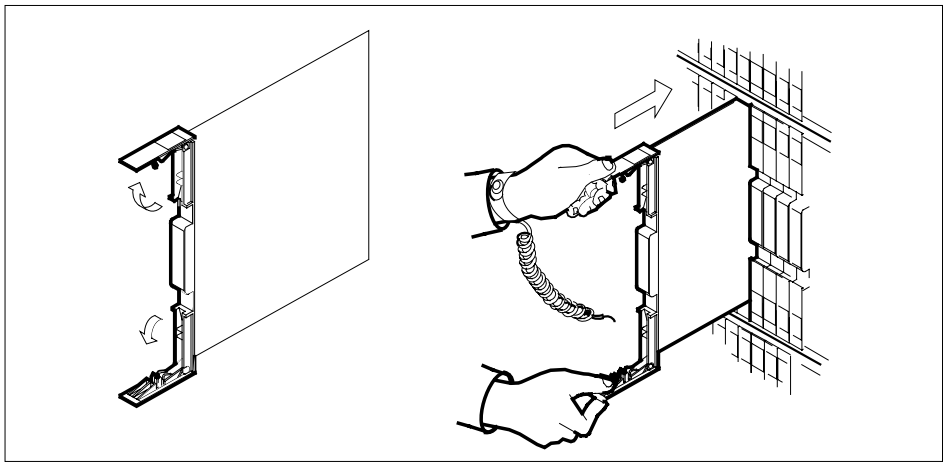


c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

d Set the switch settings on the card to match those of the card you are replacing.

7 Open the locking levers on the replacement card.

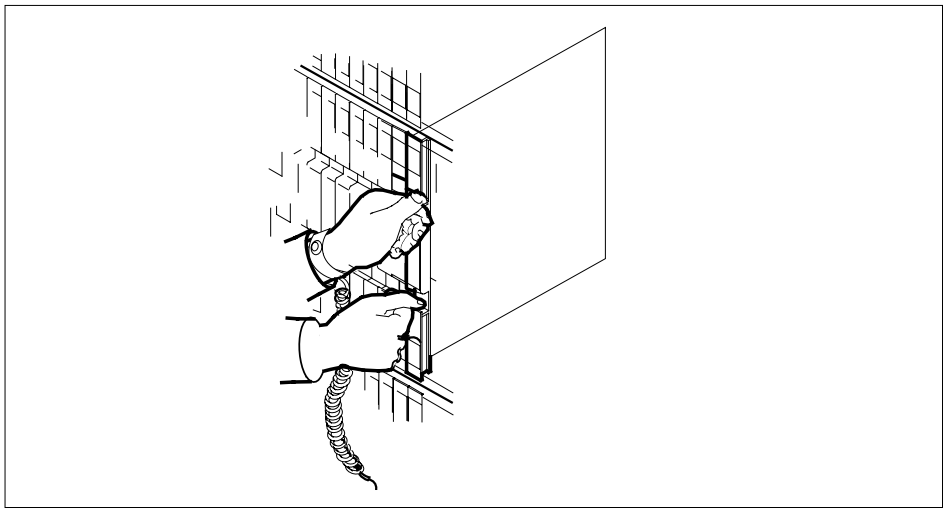
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure	Do
from an alarm clearing procedure	step 14
from other	step 10

NT2X57 in an RSC RMM (end)

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 15

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

13 Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

15 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X59 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X59	AA	Group CODEC card

Common Procedures

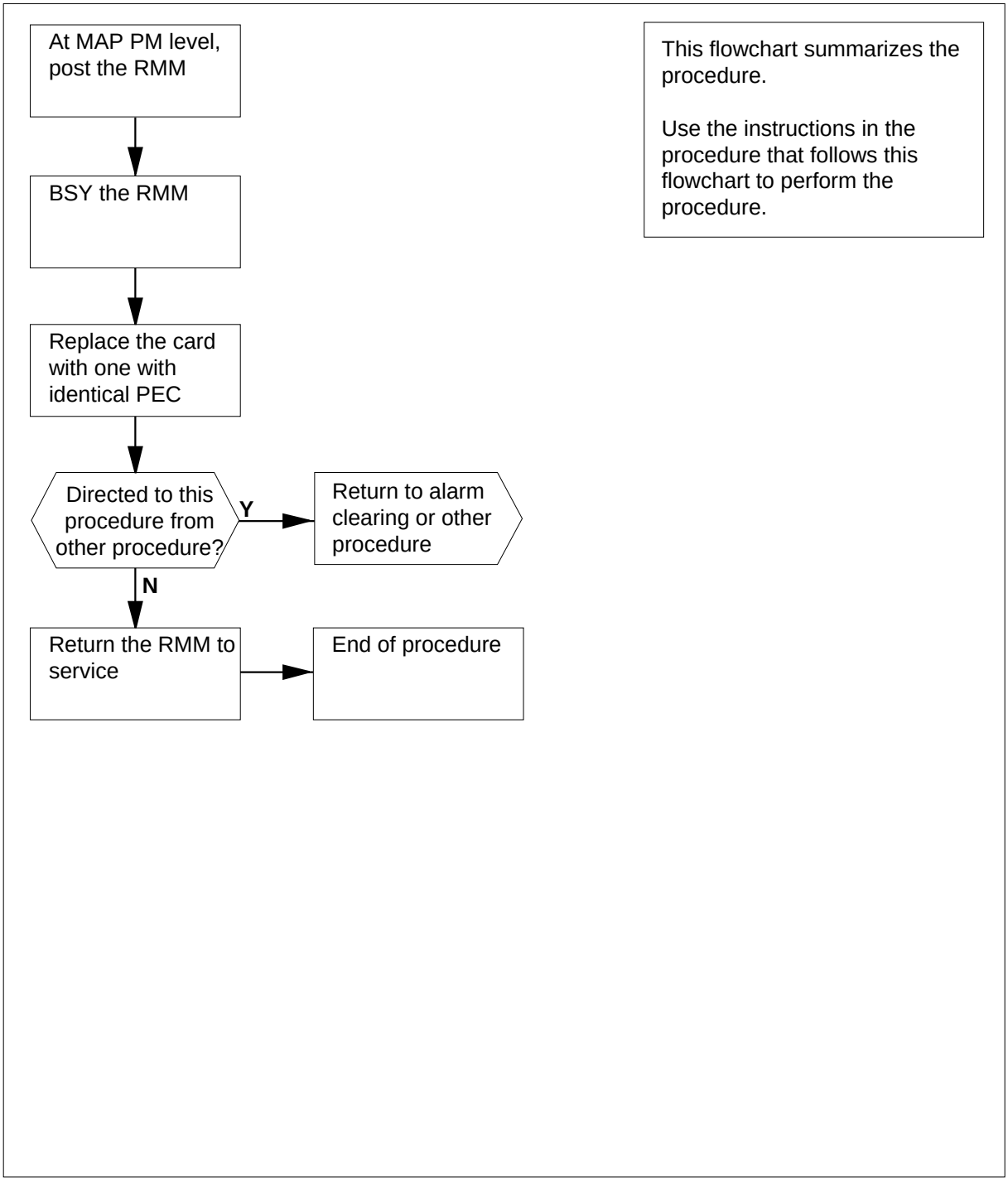
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X59 in an RSC RMM (continued)

Summary of card replacement procedure for an NT2X59 card in an RSC RMM



Replacing an NT2X59 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT2X59
in an RSC RMM (continued)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        0       10        3        3       130
 2 Post_   RMM      0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

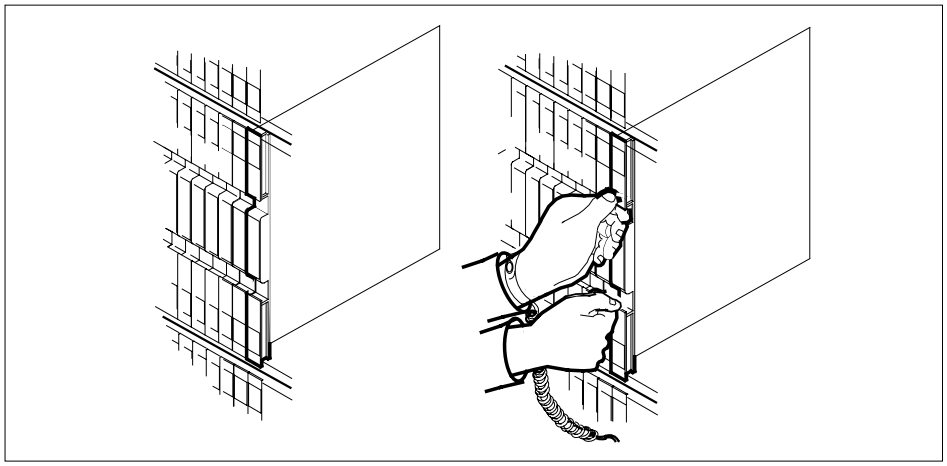
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

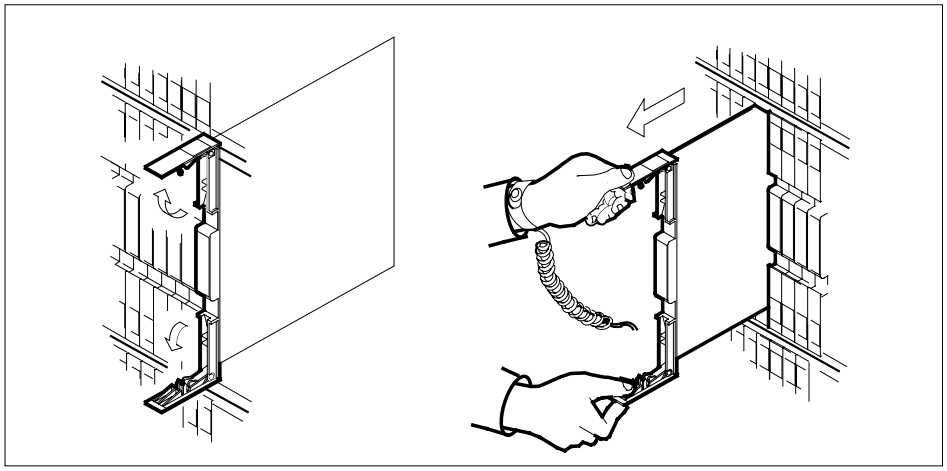
Remove the NT2X59 card as shown in the following figures.

NT2X59
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

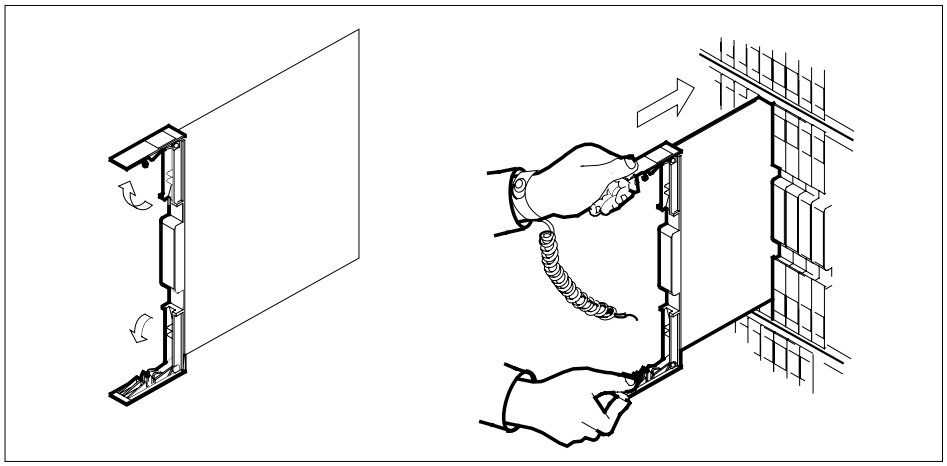


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

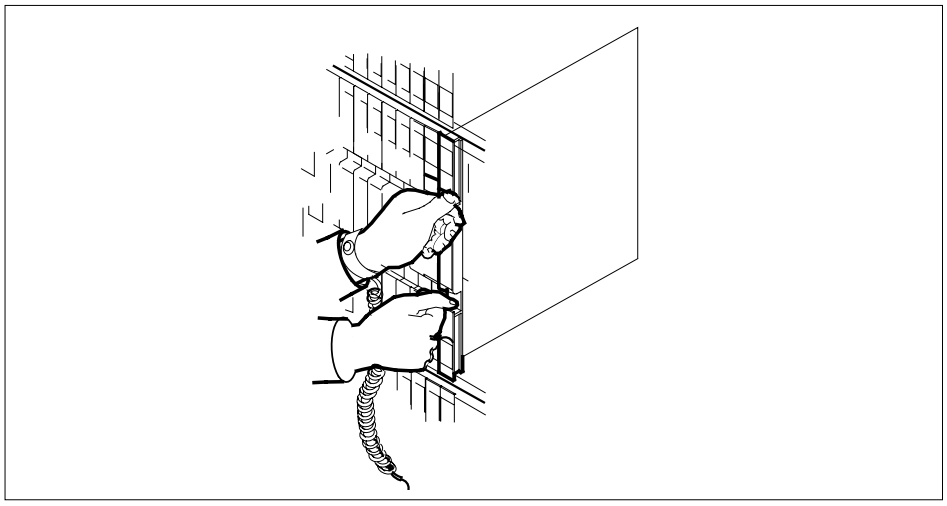
NT2X59
in an RSC RMM (continued)



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure	Do
from an alarm clearing procedure	step 15
from other	step 10

NT2X59 in an RSC RMM (end)

At the MAP display

10 Load the RMM by typing

>LOADPM

and pressing the Enter key.

11 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 12
failed	step 16

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

14 Go to step 17.

15 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X70 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC.

PEC	Suffixes	Name
NT2X70	AD, AE, AF	Power converter

Common Procedures

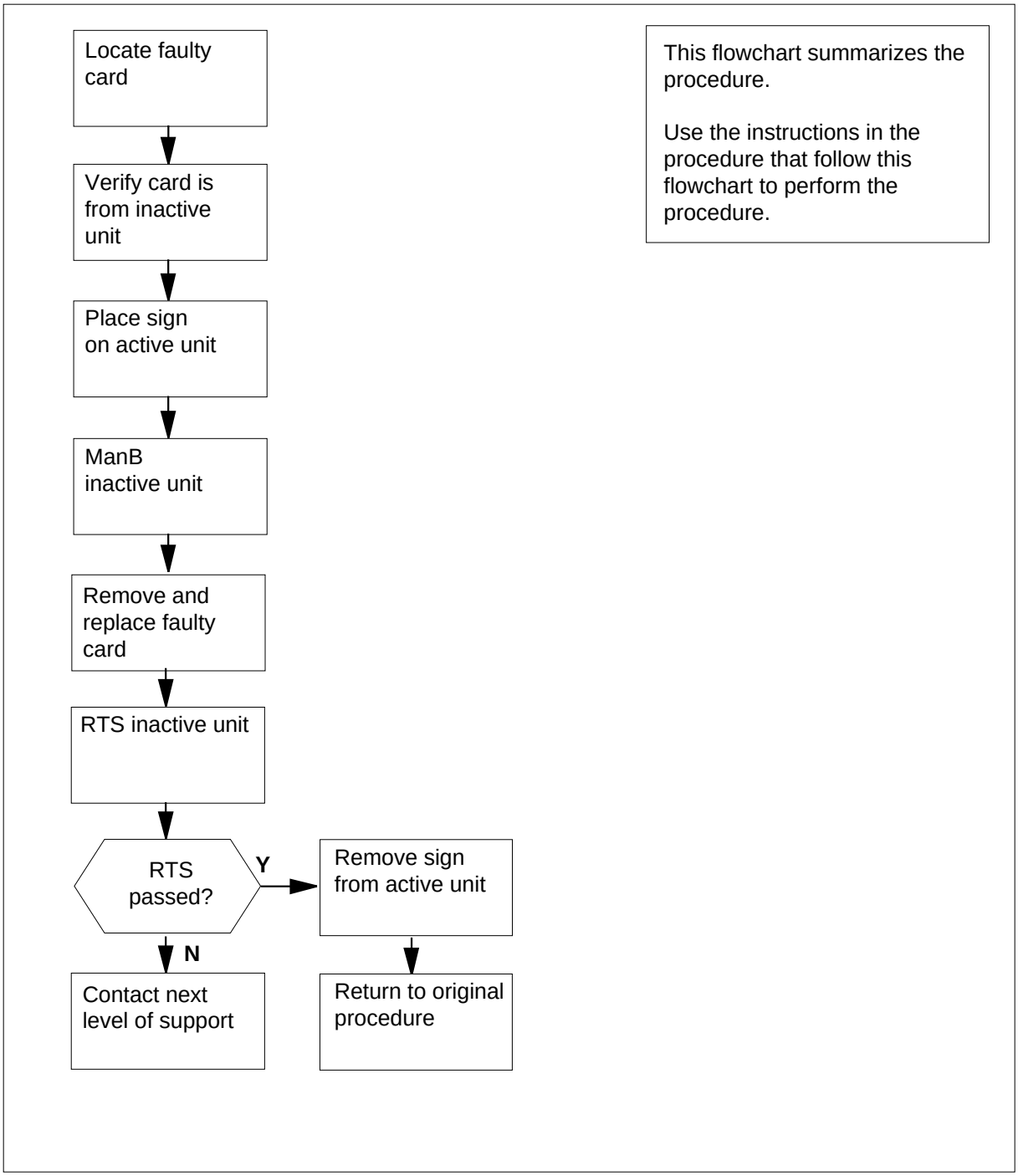
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X70 in an RSC (continued)

Summary of card replacement procedure for an NT2X70 card in RSC RCC



NT2X70 in an RSC (continued)

Replacing an NT2X70 card in an RSC RCC

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC, ensure the unit where you are replacing the card is INACTIVE and the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 To access the PM level and post the RCC, type

```
>MAPCI;MTC;PM;POST RCC rcc_no
```

and press the Enter key.

where

rcc_no
is the number of the RCC unit being posted (0-255)

Example of a MAP display:

```
   CM    MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .     .     .     .   1RCC    .      .       .       .       .

 RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM     0        0        2        0        2         25
 2 Post_    RCC    0        0        0        0        1          1
 3 ListSet
 4                RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_         Unit 0:  Inact SysB
 6 TST_           Unit 1:   Act  InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card is to be removed is on the inactive unit.

If the faulty card is on an	Do
ACTIVE unit	step 5
INACTIVE unit	step 8

5 To switch the processing activity to the inactive unit, type

>SWACT

and press the Enter key.

The system determines the type of SwAct it can perform and displays a confirmation prompt for the selected SwAct.

If SWACT	Do
can continue at this time	step 6
cannot continue at this time	step 25

6 To switch the activity of the unit, type

>YES

and press the Enter key.

NT2X70
in an RSC (continued)

The system runs a pre-SwAct audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding with the next maintenance action.

If the message is	Do
SwAct passed	step 8
SWACT failed	step 7
SwAct failed Reason: XPM SwAct back	step 7
SwAct refused by SwAct controller	step 7

7 Return to the alarm clearing procedure that directed you to this card replacement procedure and clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this card replacement procedure.

At the RCE frame

8 Put a sign on the ACTIVE unit bearing the words *Active unit—Do not touch*.

At the MAP display

9 To busy the inactive RCC unit, type

>BSY INACTIVE

and press the Enter key.

10 To reset the inactive PM unit, type

>PMRESET UNIT unit_no NORUN

and press the Enter key.

where

unit_no
is the PM unit number (0 or 1)

Example of a MAP response:

```
RCC 0 Unit 0    PMReset Passed
```

NT2X70 in an RSC (continued)

At the RCE frame:

11

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

12 Power down the unit by setting the ON/OFF/RESET switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the frame supervisory panel (FSP) will be ON. An audible alarm may sound. To silence the alarm, type

```
>SIL
```

and press the Enter key.

13

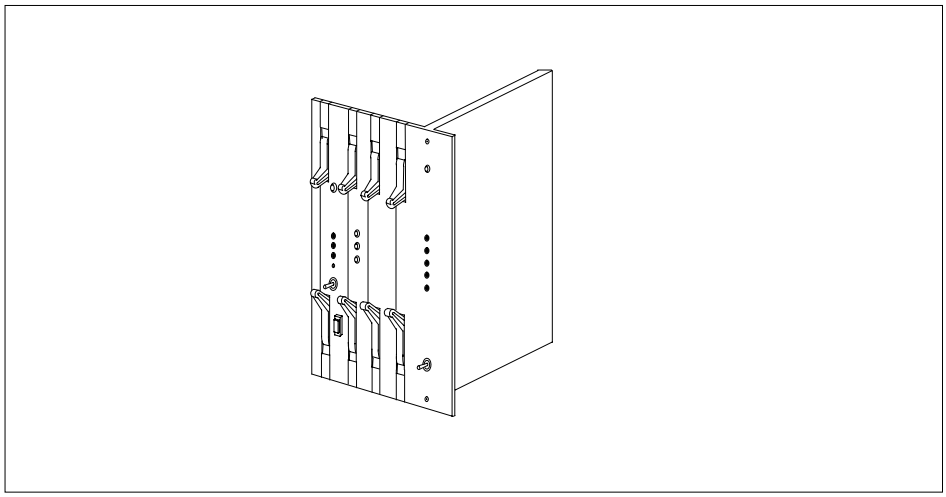
DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

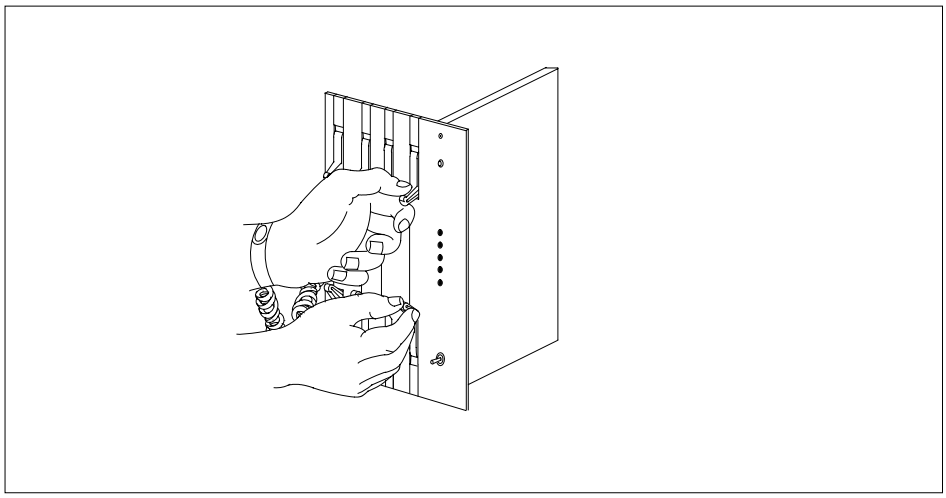
Remove the NT2X70 power converter card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT2X70
in an RSC (continued)

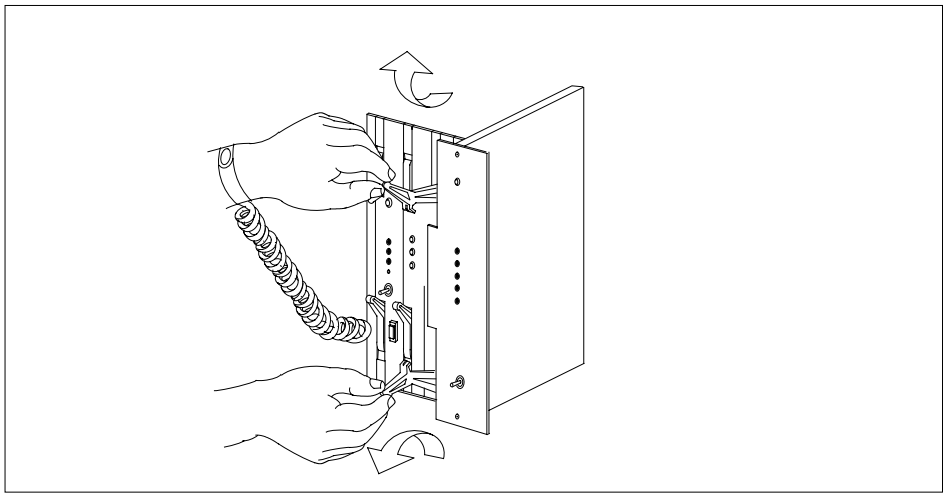


b Grasp the top and the bottom latch assemblies.

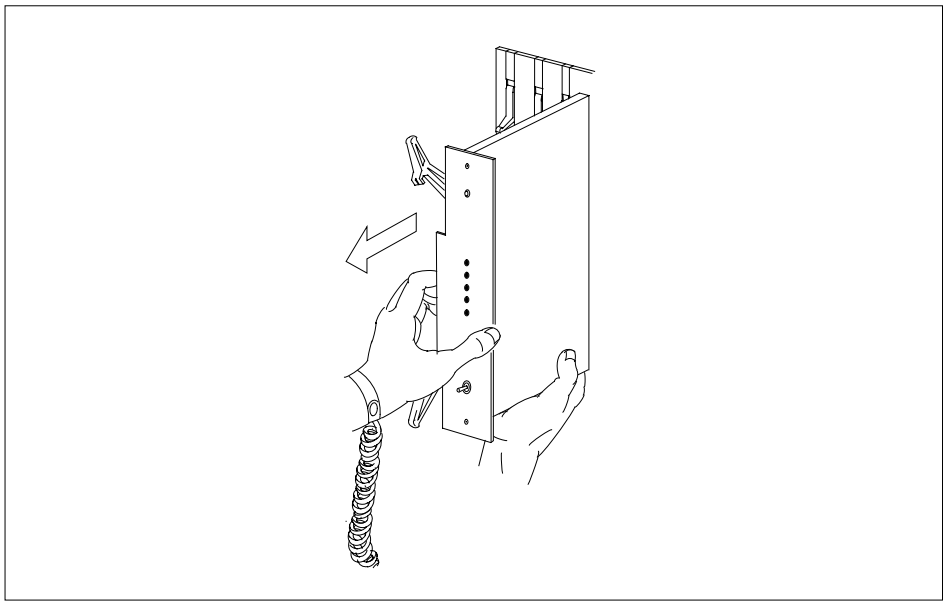


c Simultaneously rotate the top latch upward and the bottom latch downward until the latches are in the horizontal position. This will move the card 1/2 inch from the shelf backplane.

NT2X70
in an RSC (continued)



d Holding the card by the face plate, slide the card along the guides until the card is free from the shelf.



e Immediately place the card into an approved electro-static discharge (ESD) protective container.

f Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NT2X70 in an RSC (continued)

14

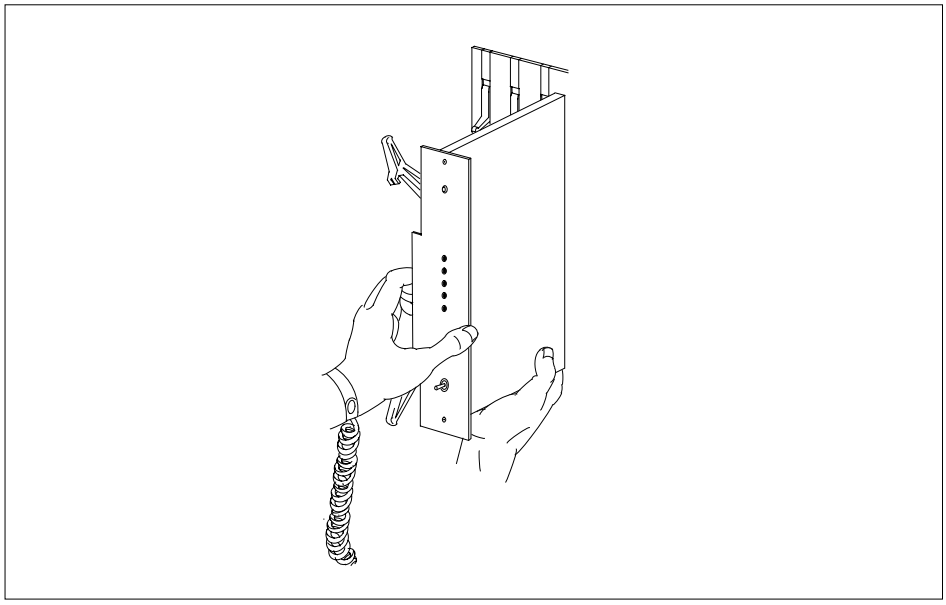
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

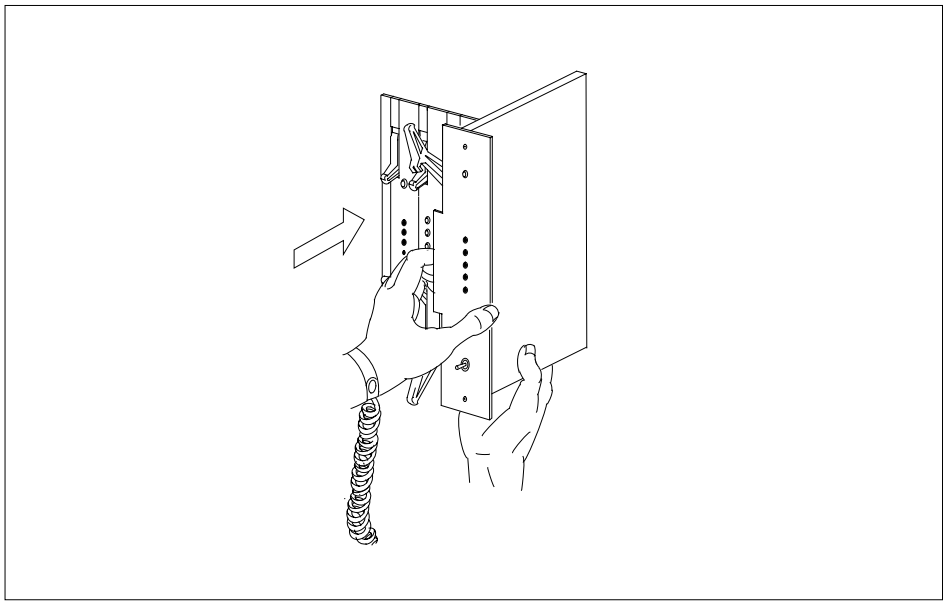
Insert the NT2X70 power converter replacement card as shown in the following figures.

a Hold the card by the face plate with the components visible on the right-hand side.

b With the locking levers on the replacement card in the open position, place the back edge of the card into the upper and lower guides of the desired slot position on the shelf.

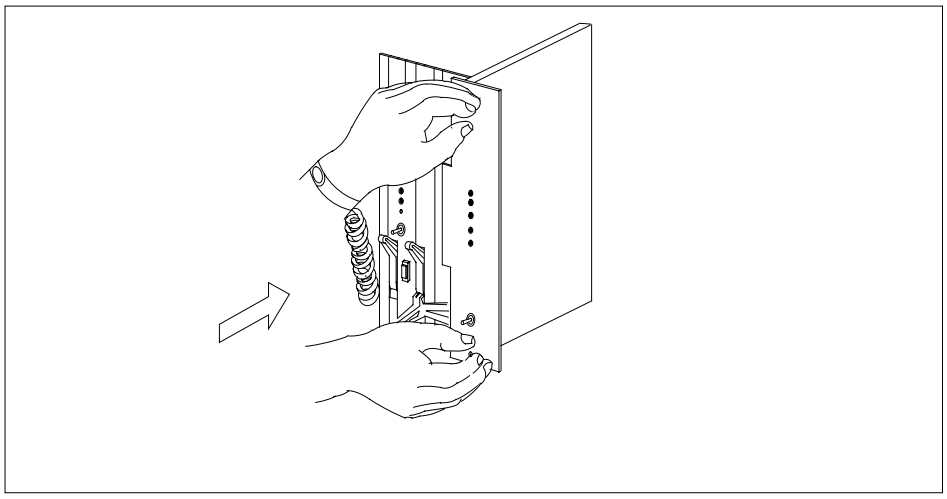


c Gently slide the card into the shelf.



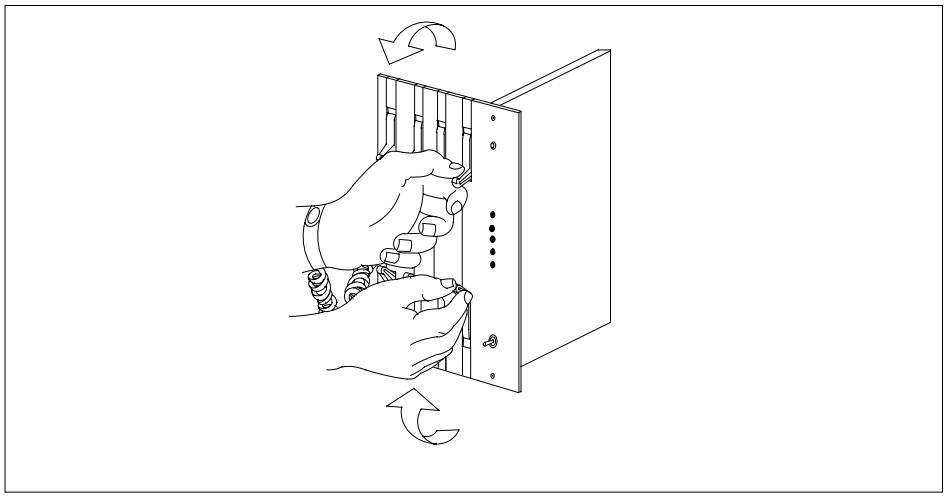
15 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.



b Simultaneously rotate the top latch downward and the bottom latch upward. The card will lock into position when the lock-latches are flush with the face plate of the card.

NT2X70
in an RSC (continued)



16 Power up the inactive RCC unit as follows:

a Ensure the NT2X70 power converter is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

b Set the POWER switch to the ON position.

If the NT2X70 suffix is	Do
AE or AF	step 17
AD	step 18

17 Toggle the ON/OFF/RESET switch on the power converter faceplate to the RESET position and hold while setting the circuit breaker on the FSP to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will go OFF. Release the ON/OFF/RESET switch. Go to step 19.

18 Press the RESET button on the power converter faceplate while setting the circuit breaker on the FSP to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the FSP will go OFF. Release the RESET button.

19 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 24
other	step 20

NT2X70 in an RSC (end)

At the MAP display

20 After you replace the faulty card, load the inactive RCC unit. To load the inactive RCC unit, type

`>LOADPM INACTIVE`

and press the Enter key.

If load	Do
passed	step 21
failed	step 25

21 To return the INACTIVE RCC unit to service, type

`>RTS INACTIVE`

and press the Enter key.

If the RTS	Do
passed	step 22
failed	step 25

22 Send any faulty cards for repair according to local procedure.

23 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card.

Go to step 26.

24 Return to the Alarm Clearing Procedure that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

25 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

26 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT2X90 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT2X90	AD	Test Trunk Circuit
NT2X90	AD	Talk monitor with NT2X77AA

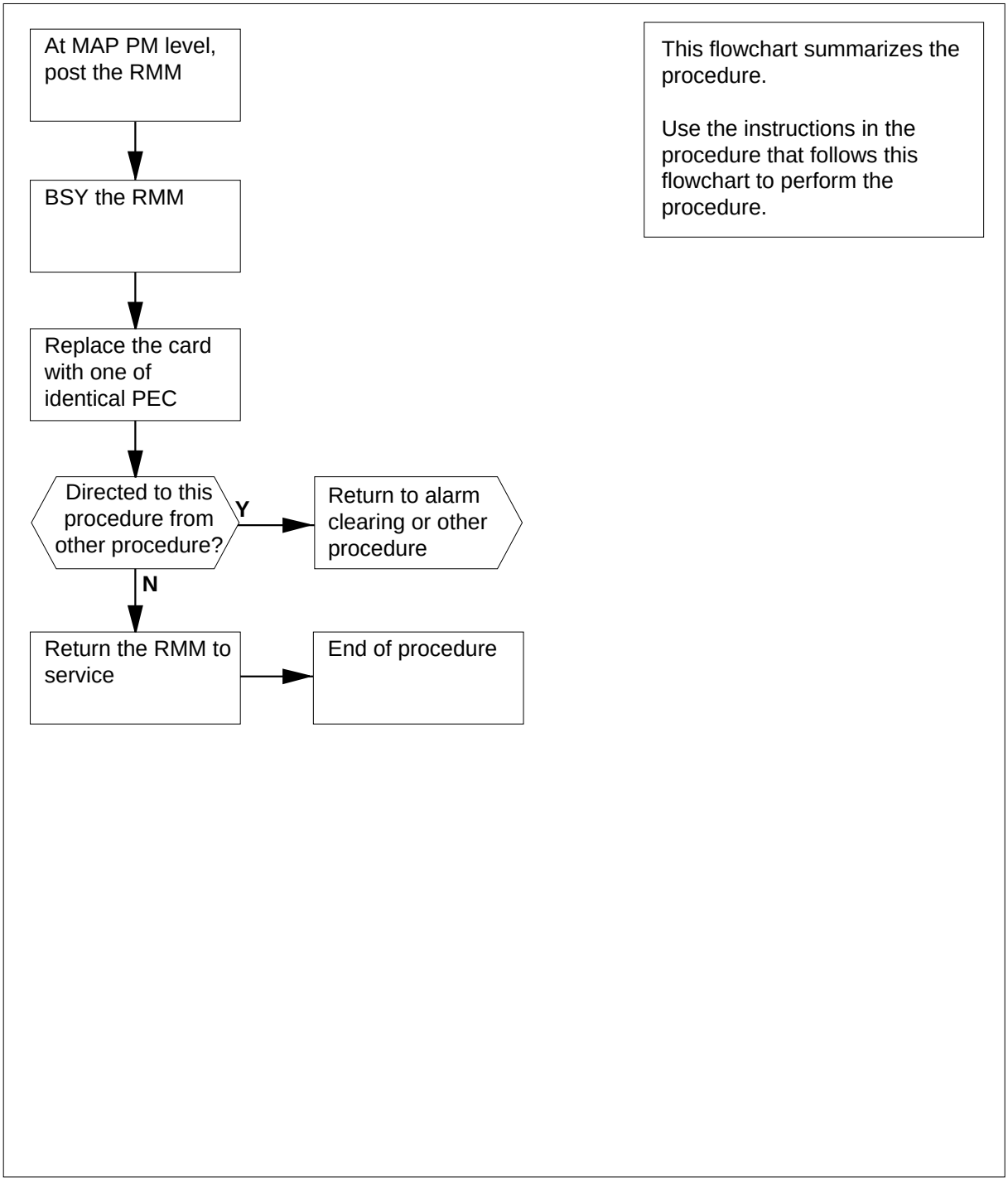
Common Procedures

None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT2X90
in an RSC RMM (continued)



NT2X90
in an RSC RMM (continued)

Replacing an NT2X90 card in an RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT2X90
in an RSC RMM (continued)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        0       10        3        3       130
 2 Post_   RMM      0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

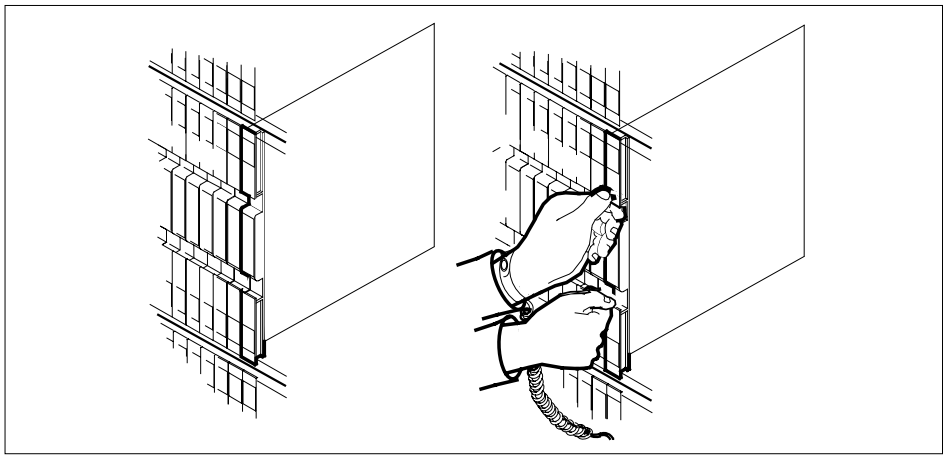
CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

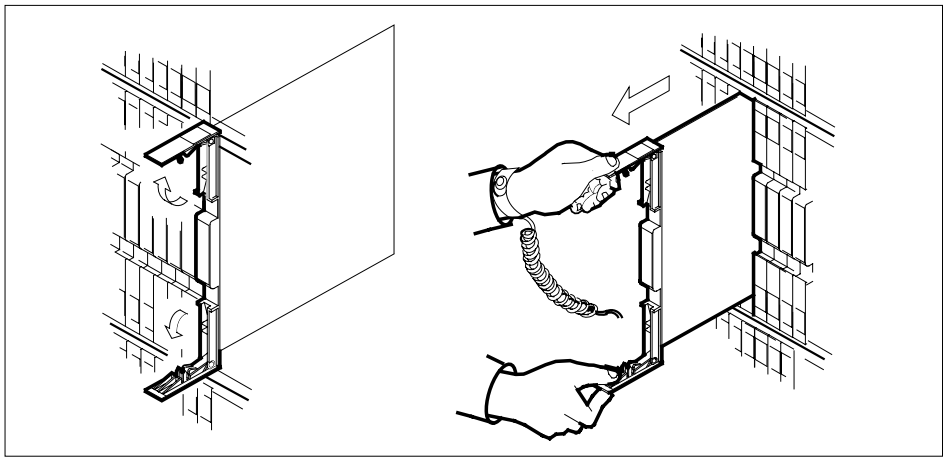
6 Remove the NT2X90 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT2X90
in an RSC RMM (continued)



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7

DANGER

Equipment damage

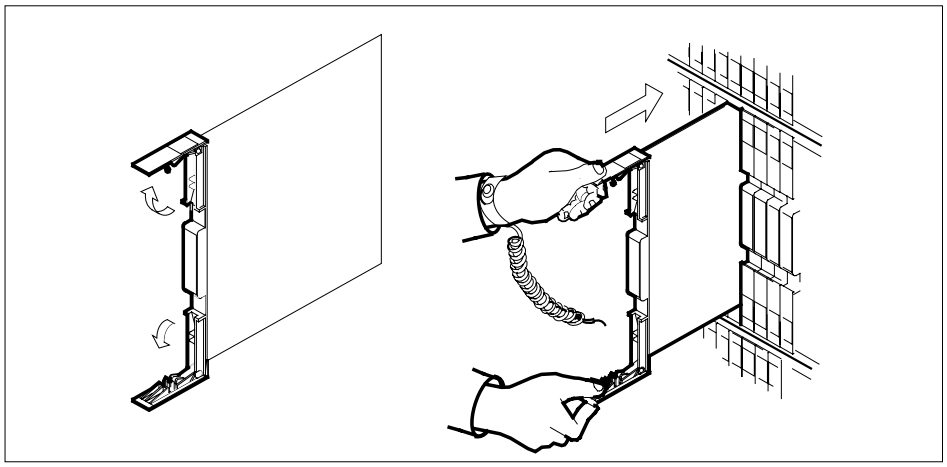
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Open the locking levers on the replacement card.

NT2X90
in an RSC RMM (continued)

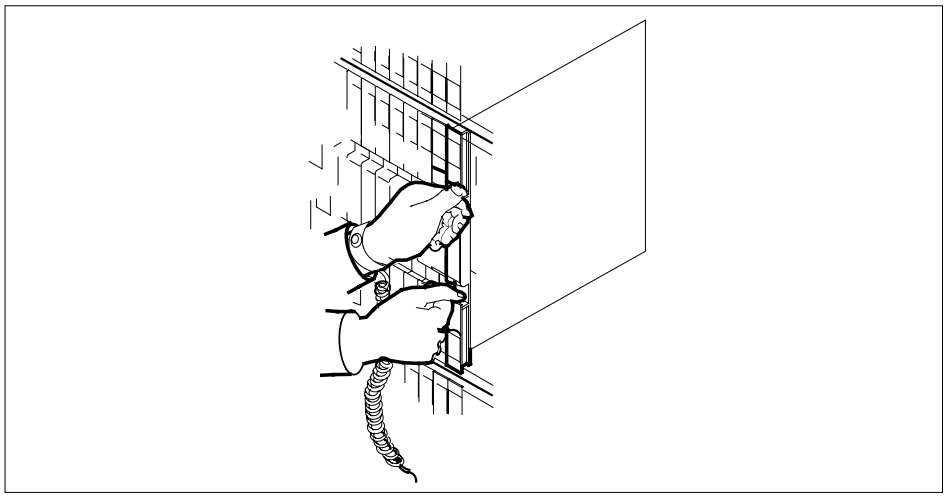
a Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 14
other	step 10

NT2X90
in an RSC RMM (end)

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 15

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card.

13 Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

15 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT3X04 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT3X04	AA	Incoming test trunk for AECO local test board interface

Common Procedures

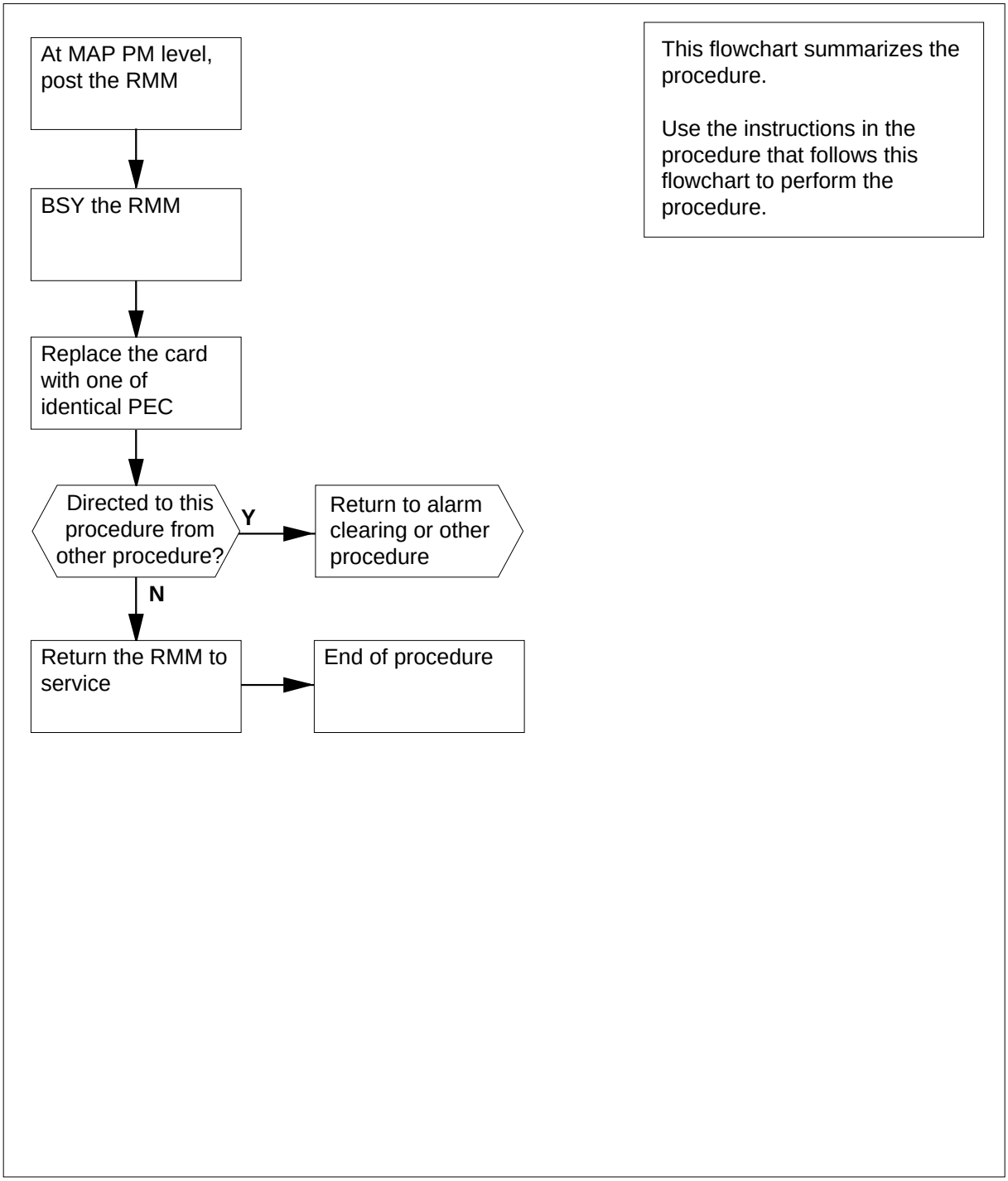
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT3X04 in an RSC RMM (continued)

Summary of card replacement procedure for an NT3X04 card in an RSC RMM



Replacing an NT3X04 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
    .     .     .      .    4SysB    .      .       .      .       .
                                                  *C*
RMM                   SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit          PM      4        0       10        3        3      130
 2 Post_        RMM      4        1        1        0        0        2
 3
 4                  RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

NT3X04
in an RSC RMM (continued)

and pressing the Enter key.

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .     .      .   4SysB    .      .      .       .      .
                                                *C*
RMM                     SysB     ManB     OffL     CBsy     ISTb    InSv
 0 Quit          PM       4        0        10        3        3     130
 2 Post_        RMM       0        1         1        0        0       2
 3
 4                  RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

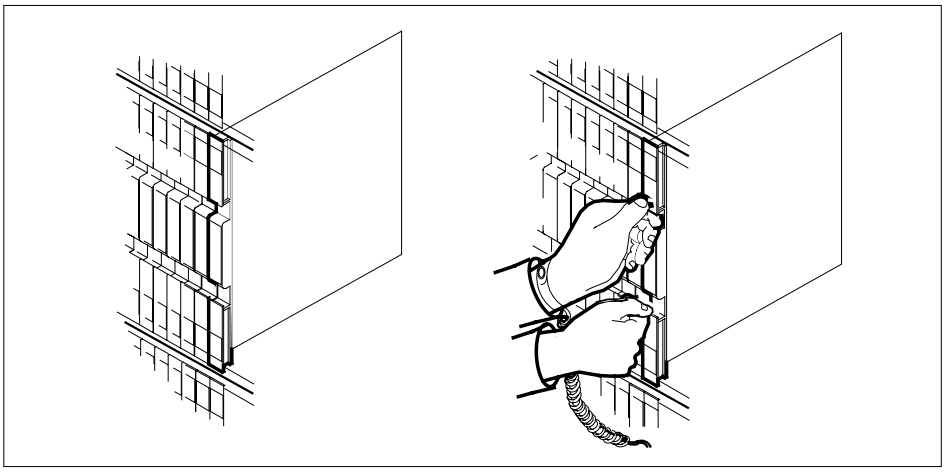
CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

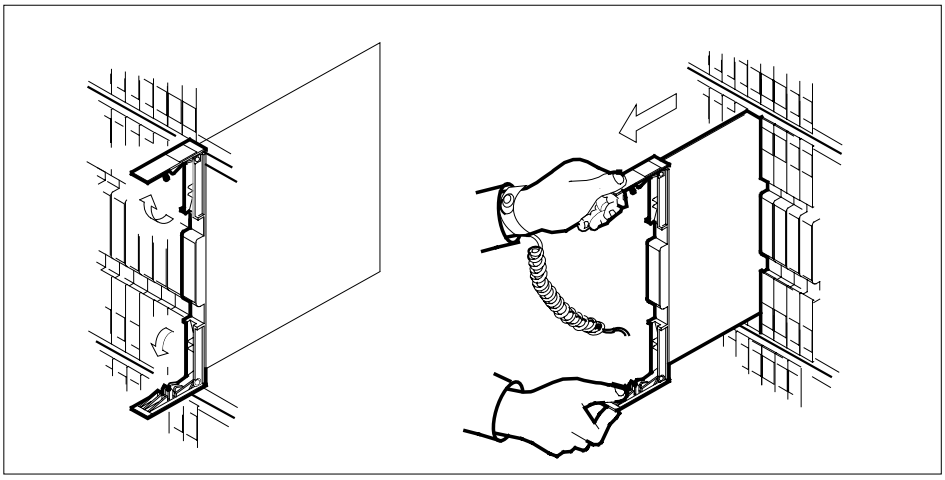
6 Remove the NT3X04 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT3X04
in an RSC RMM (continued)



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

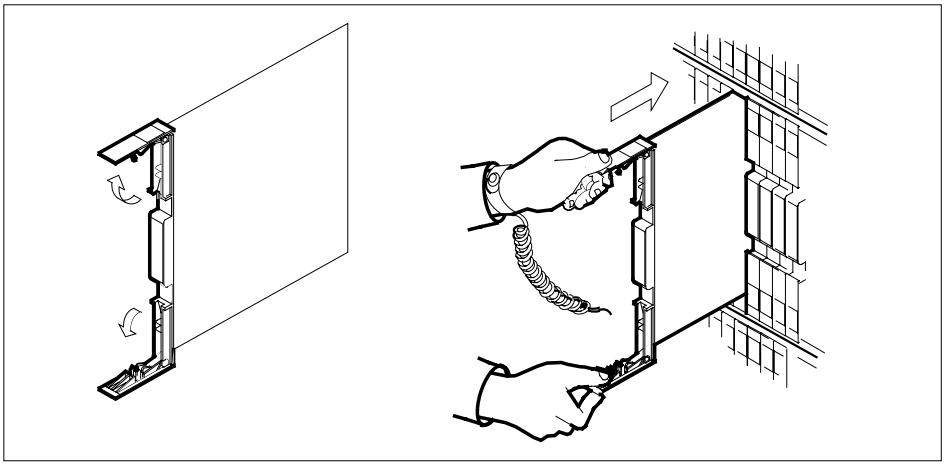
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

NT3X04
in an RSC RMM (continued)

Open the locking levers on the replacement card.

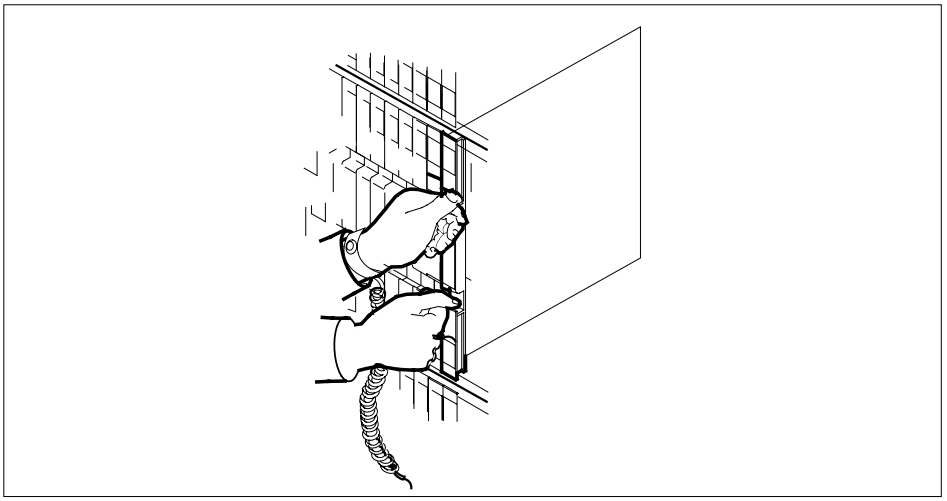
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 13

If you entered this procedure from	Do
other	step 10

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 14

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 15.

13 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

14 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

15 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT3X09 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT3X09	AA, BA	Remote metallic access (MTA) card

Common Procedures

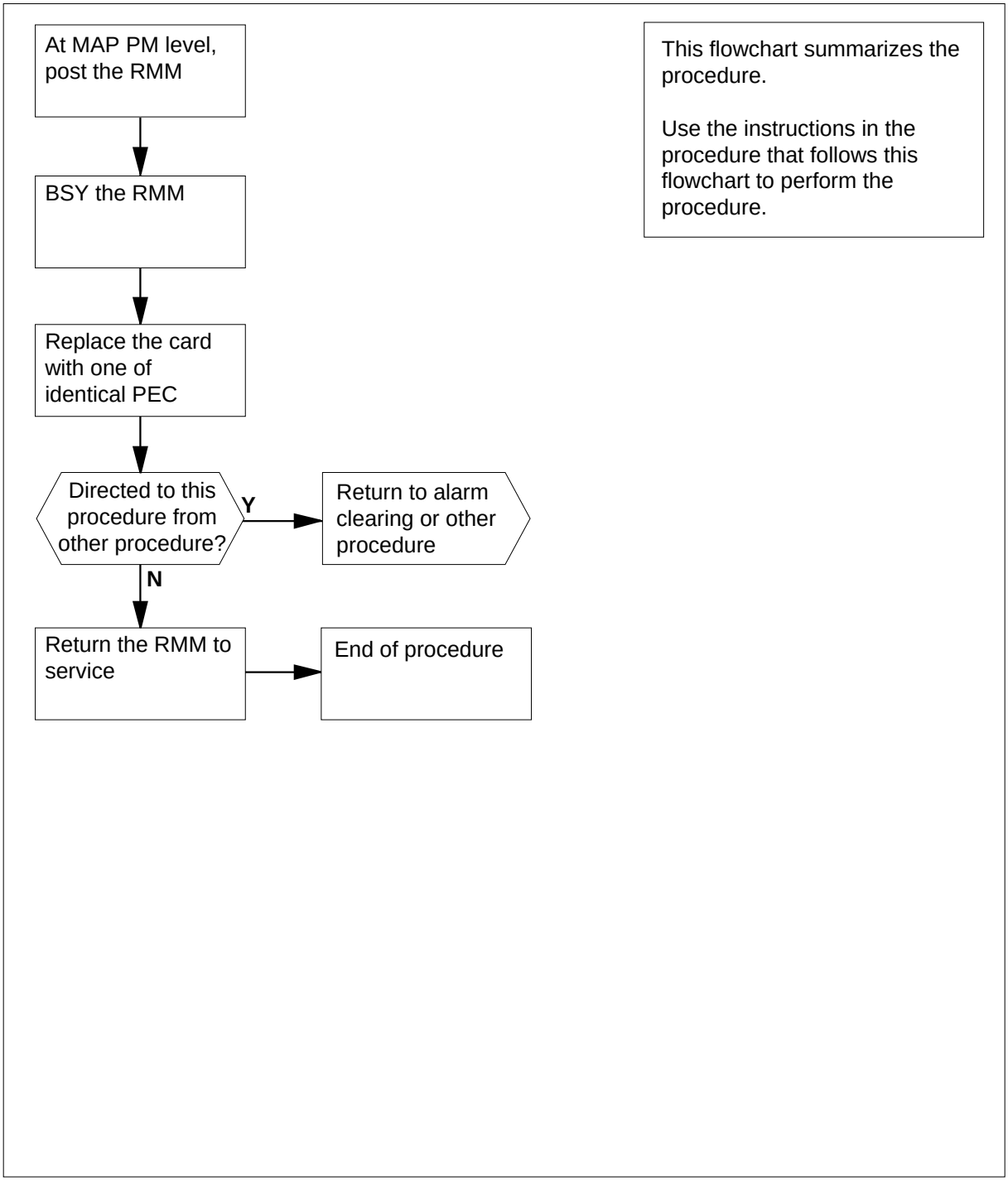
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT3X09 in an RSC RMM (continued)

Summary of card replacement procedure for an NT3X09 card in an RSC RMM



NT3X09
in an RSC RMM (continued)

Replacing an NT3X09 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT3X09 in an RSC RMM (continued)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    4SysB   .      .       .      .      .

RMM               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   RMM       0        1        1        0        0         2
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

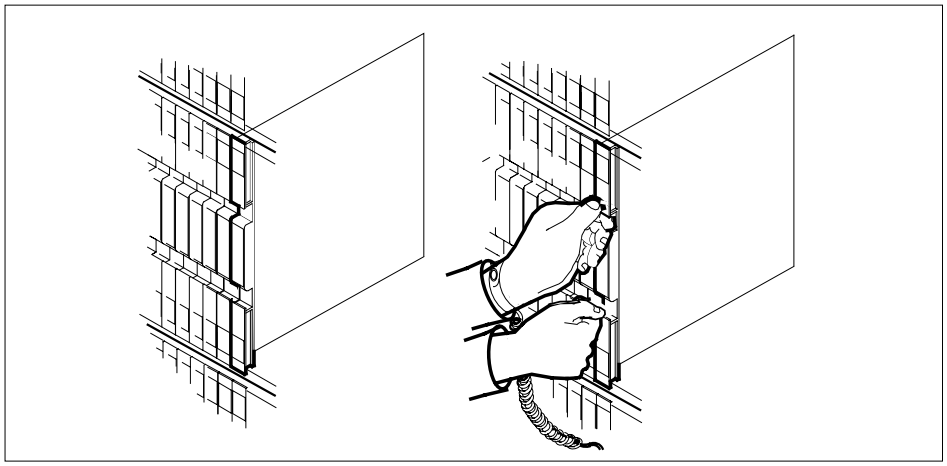
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

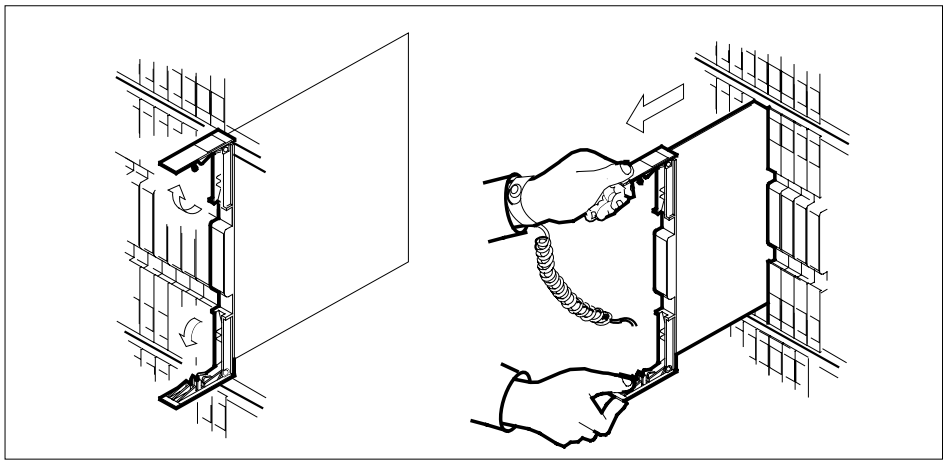
Remove the NT3X09 card as shown in the following figures.

NT3X09
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

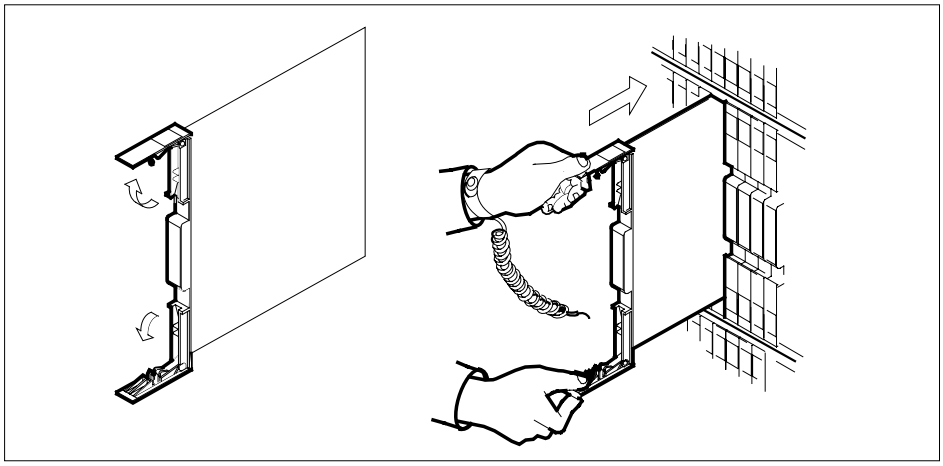
1. Do not apply direct pressure to the components.

2. Do not force the card into its slot.

NT3X09
in an RSC RMM (continued)

Open the locking levers on the replacement card.

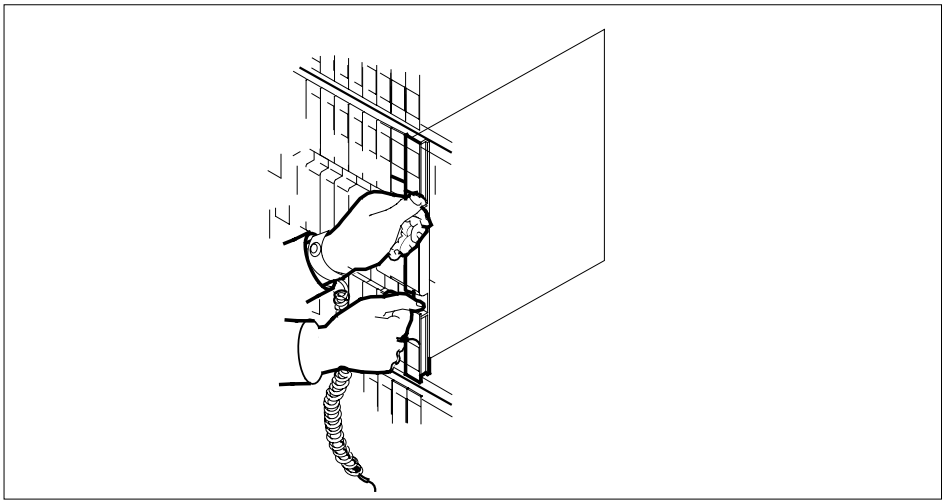
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 13

NT3X09 in an RSC RMM (end)

If you entered this procedure from	Do
other	step 10

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 14

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 15.

13 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

14 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

15 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT3X82 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT3X82	AA, AC	OAU Dead System with unique audibles
NT3X82	AA, AD	OAU Dead System with common audibles

Common Procedures

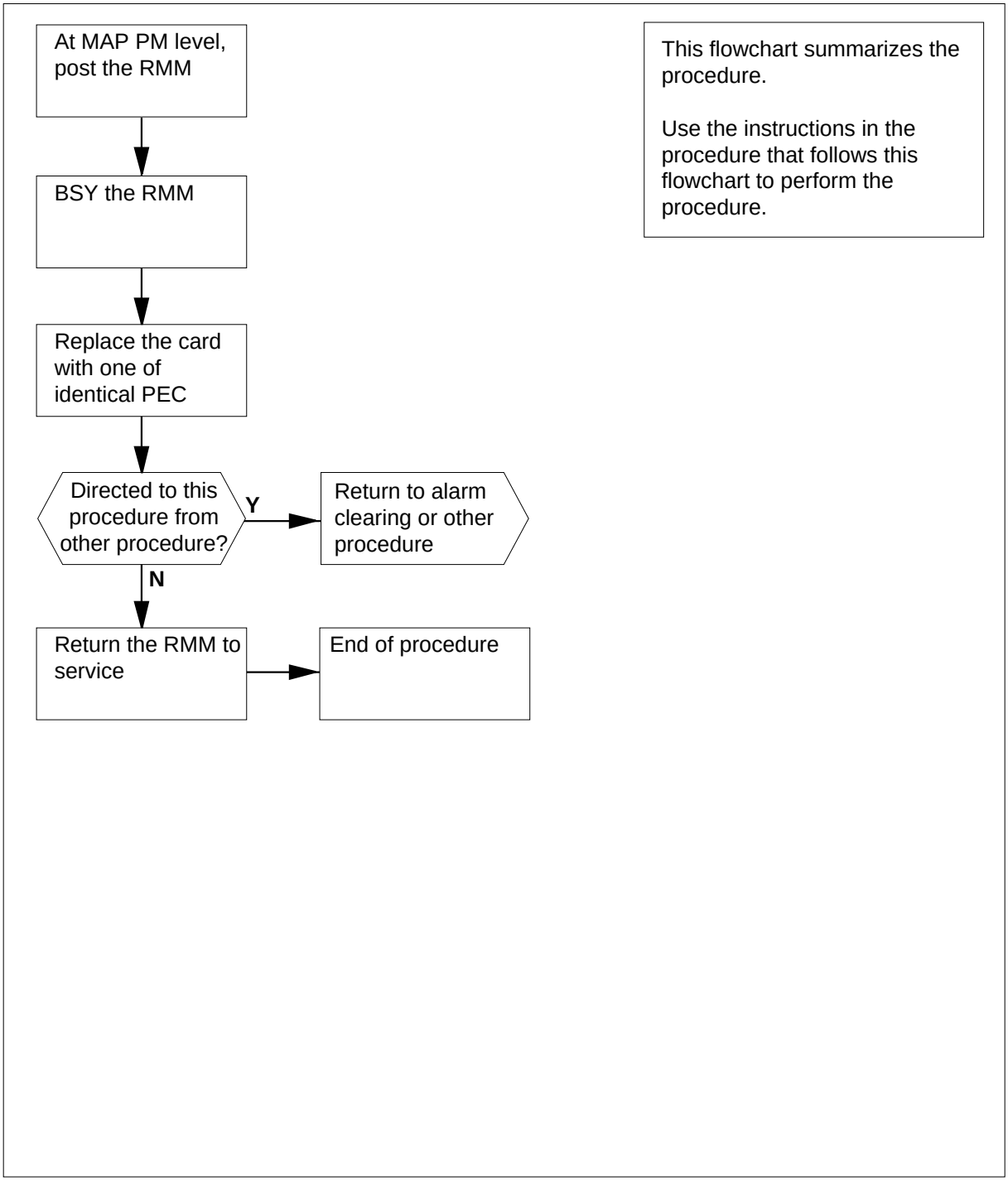
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT3X82 in an RSC RMM (continued)

Summary of card replacement procedure for an NT3X82 card in an RSC RMM



Replacing an NT3X82 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .       .

RMM                SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM       4        0        10       3        3       130
 2 Post_    RMM      0        1         1       0        0        2
 3
 4          RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT3X82
in an RSC RMM (continued)

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .       .

RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        4        0        10       3        3       130
 2 Post_    RMM       0        1         1       0        0        2
 3
 4          RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

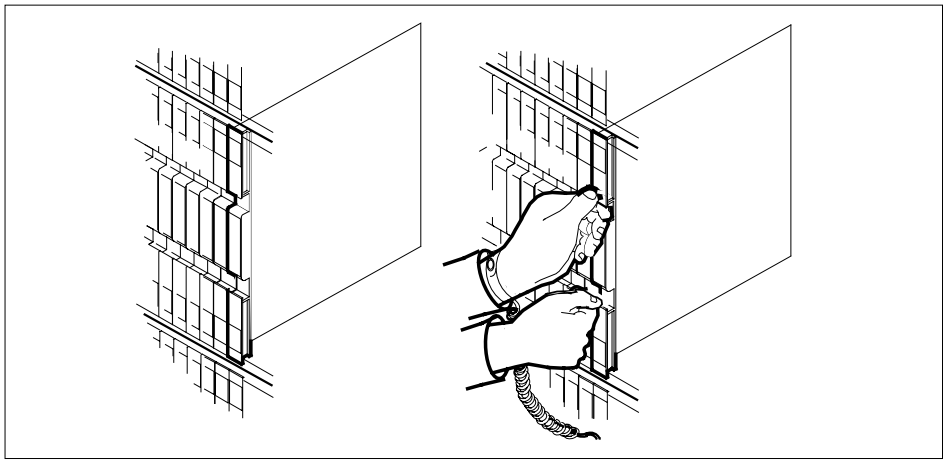
1. Do not apply direct pressure to the components.

2. Do not force the card into its slot.

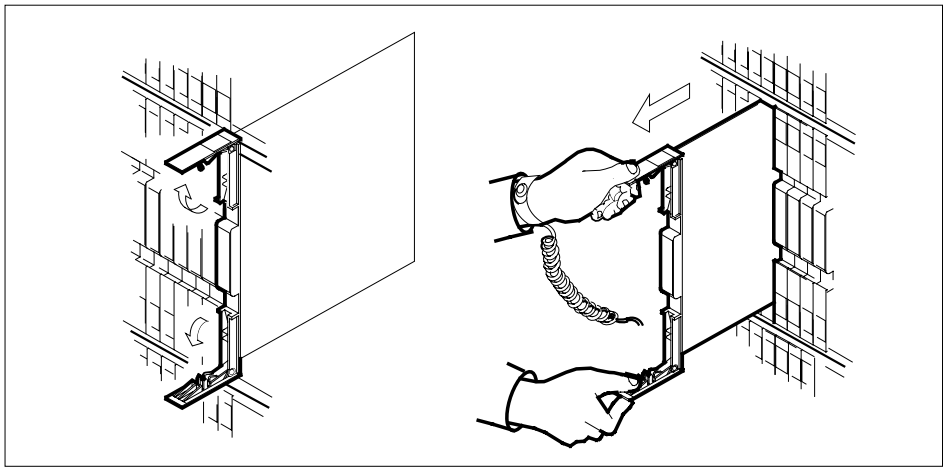
Remove the NT3X82 card as shown in the following figures.

NT3X82
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

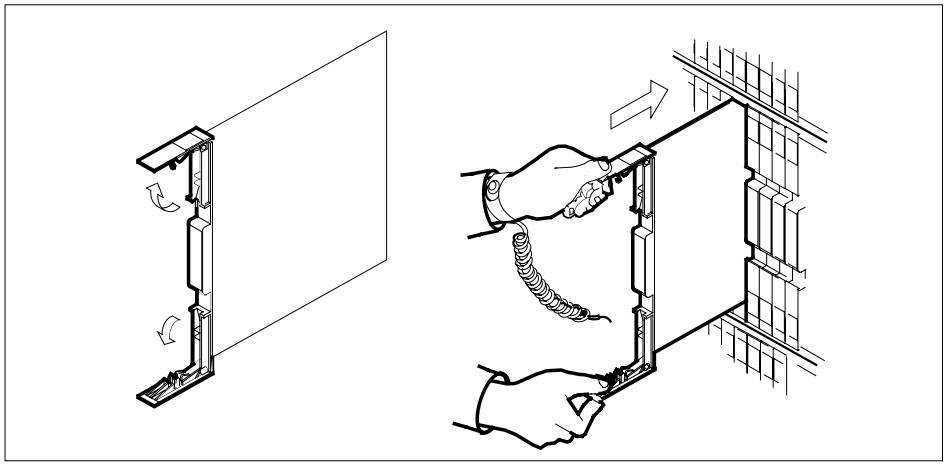
1. Do not apply direct pressure to the components.

2. Do not force the card into its slot.

NT3X82 in an RSC RMM (continued)

Open the locking levers on the replacement card.

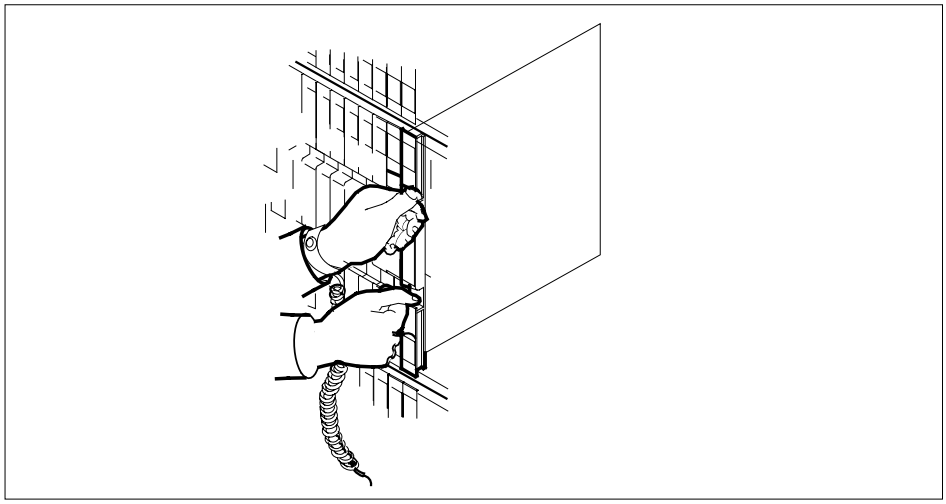
Align the card with the slots in the shelf and gently slide the card into the shelf.



8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



9 Use the following information to determine the next step in this procedure.

If you entered this procedure as	Do
an alarm clearing procedure	step 13
other	step 10

NT3X82 in an RSC RMM (end)

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 14

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 15.

13 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

14 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

15 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT3X83 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT3X83	AA	OAU alarm transfer

Common Procedures

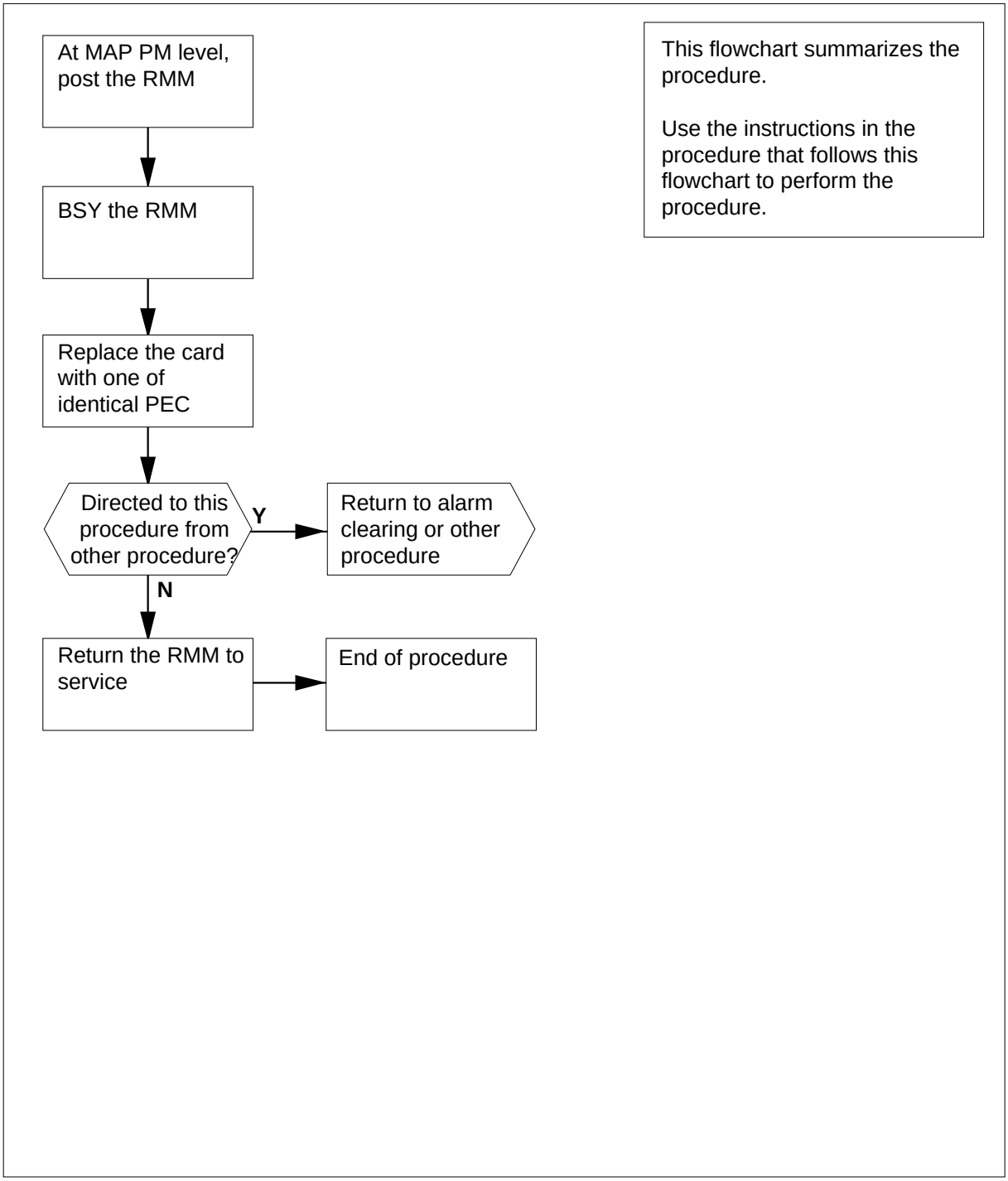
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT3X83 in an RSC RMM (continued)

Summary of card replacement procedure for an NT3X83 card in an RSC RMM



NT3X83
in an RSC RMM (continued)

Replacing an NT3X83 card in RSC RMM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM rmm_no

and pressing the Enter key.

where

rmm_no
is the number of the RMM where the card is to be removed

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .      .

RMM                SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM       4        0        10       3        3       130
 2 Post_    RMM      0        1         1       0        0        2
 3
 4          RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the RMM by typing

>BSY

and pressing the Enter key.

NT3X83 in an RSC RMM (continued)

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .       .

RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM       4        0        10       3        3        130
 2 Post_    RMM      0        1         1       0        0         2
 3
 4          RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

5

CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing or inserting any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

6

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

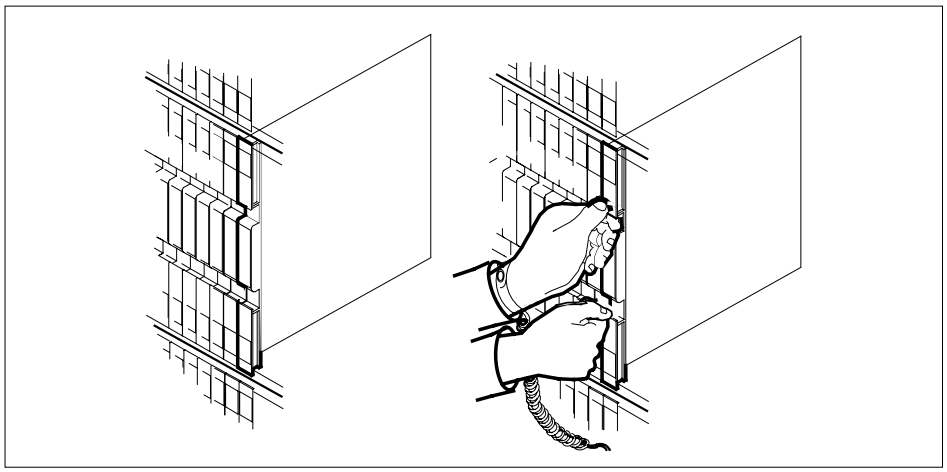
1. Do not apply direct pressure to the components.

2. Do not force the card into its slot.

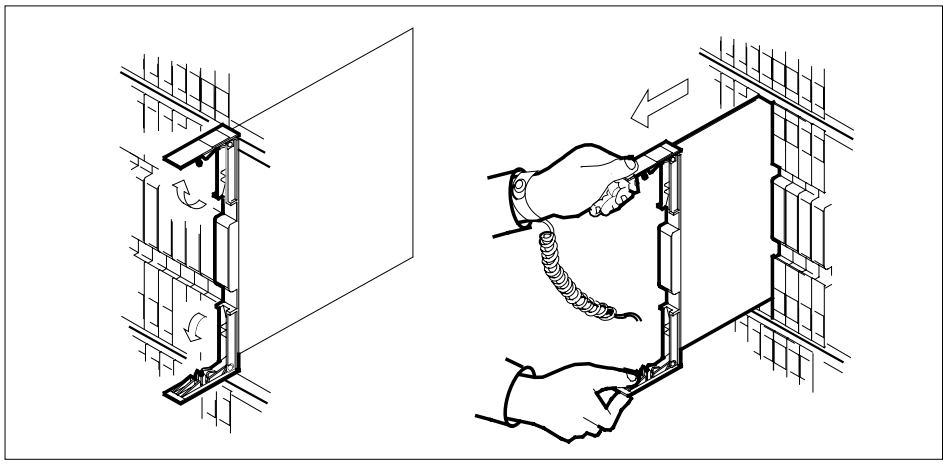
Remove the NT3X83 card as shown in the following figures.

NT3X83
in an RSC RMM (continued)

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

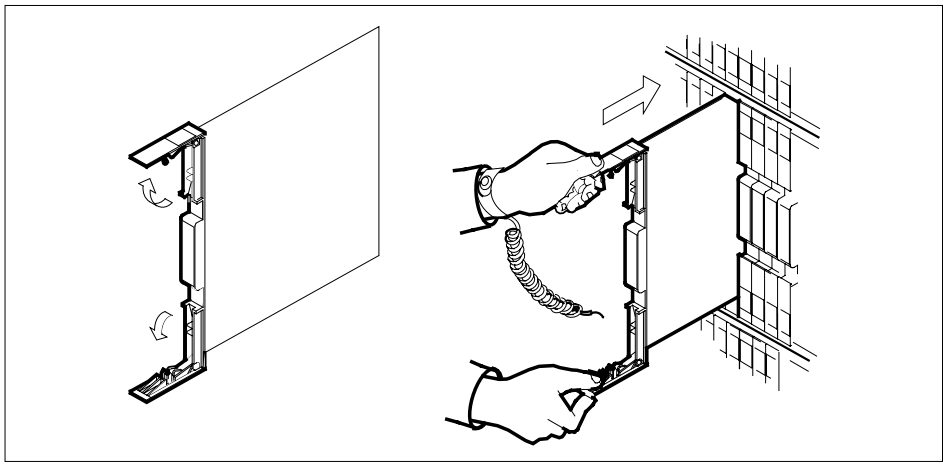
7

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

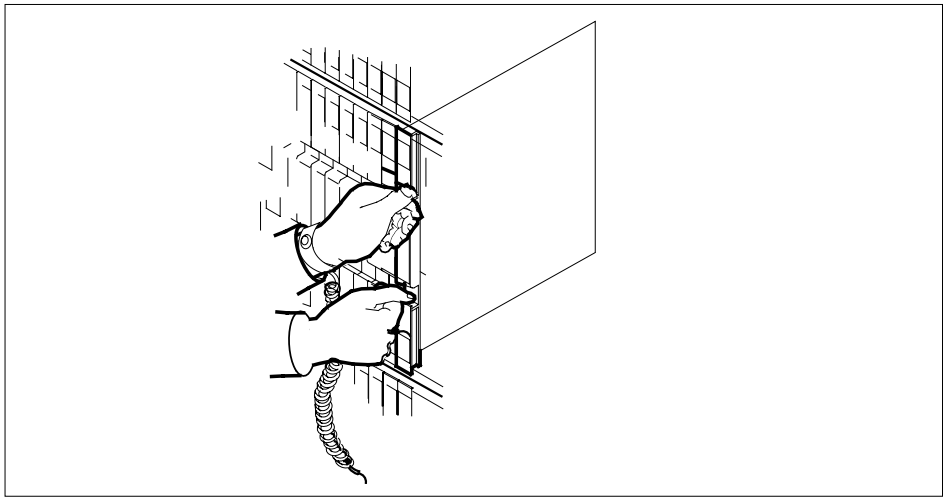


8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT3X83
in an RSC RMM (continued)



9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 13
other	step 10

At the MAP display

10 Return the RMM to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
passed	step 11
failed	step 14

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 15.

13 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list

NT3X83
in an RSC RMM (end)

was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

14 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

15 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X17 in an RSC LCM

Application

Use this procedure to replace the following card in RSC LCM.

PEC	Suffixes	Name
NT6X17	AC	Standard line card type A (POTS)
NT6X17	BA	World line card type A

Common procedures

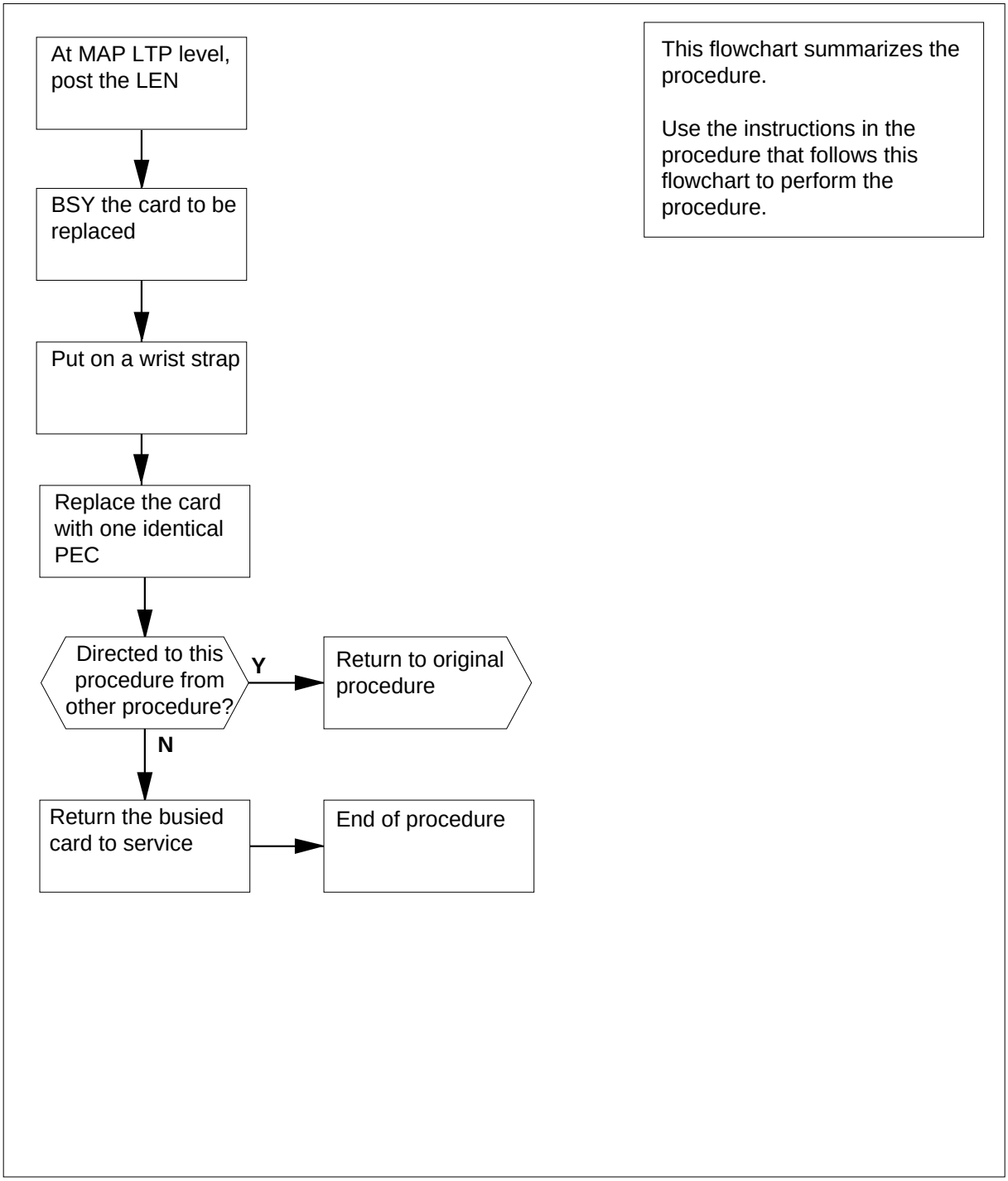
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X17 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X17 card in RSC LCM



NT6X17 in an RSC LCM (continued)

Replacing an NT6X17 card in RSC LCM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP display

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site lcm_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the site name given to the remote location

lcm_no
is the number of the LCM with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .     .      .      .     .      .      .       .      .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN.. ...DN     STA F S LTA TE RESULT
 4            CKT TYPE FL REM1 00 0 03 03 4931082 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X17 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext   Appl
 .     .     .      .      .     .      .      .       .     .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN......DN     STA F S LTA TE RESULT
 4            CKT TYPE FL REM1 00 0 03 03 4931082 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X17 in an RSC LCM (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take these precautions to protect circuit cards from electrical and mechanical damage during transport:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected through a 1-megohm resistor, to a suitable grounded object such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

NT6X17
in an RSC LCM (continued)

DANGER
Hot materials
Exercise care when handling a line card. The line feed resistor may be hot.

Put on a wrist strap.

Conduct the following procedure.

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

Note: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with three-inch and/or six-inch cards.

Descriptions of these shrouds are as follows:

- Line card insertion/withdrawal tool (3")
  - — QTH56A (apparatus code)
  - — A0298291 (common product code)
- Line card insertion/withdrawal tool (6")
  - — QTH58A (apparatus code)
  - — A0313317 (common product code)
- Card removal tools are required for removing cards from line drawers. Two sizes are available.
- Descriptions of these tools are as follows:
- Card removal tool (3-inch or larger)
  - — QTH57A (apparatus code)
  - — A0298292 (common product code)
- Large grip tool for 4-inch or larger cards is NT tool ITA9953

6 Remove the line card to be replaced by using the following steps:

NT6X17
in an RSC LCM (continued)

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it with your left hand.

e Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the removed card into ESD container and store per local procedures.

7 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots towards the drawer backplane.

c Hold the front cover of the line drawer with your left hand, to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card towards the backplane until it plugs fully into the backplane socket.

8 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 13
other	step 9

At the MAP display

9 Test the NT6X17 line card by typing

```
>DIAG
```

and pressing the Enter key.

If DIAG	Do
passed	step 10
failed	step 15

10 Return the NT6X17 card to service by typing

```
>RTS
```

and pressing the Enter key.

If RTS	Do
passed	step 11
failed	step 15

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

13 Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X18 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X18	AA, AB	Line Card Type B (Coin/Ground Start)
NT6X18	BA	World Line Card Type B

Common procedures

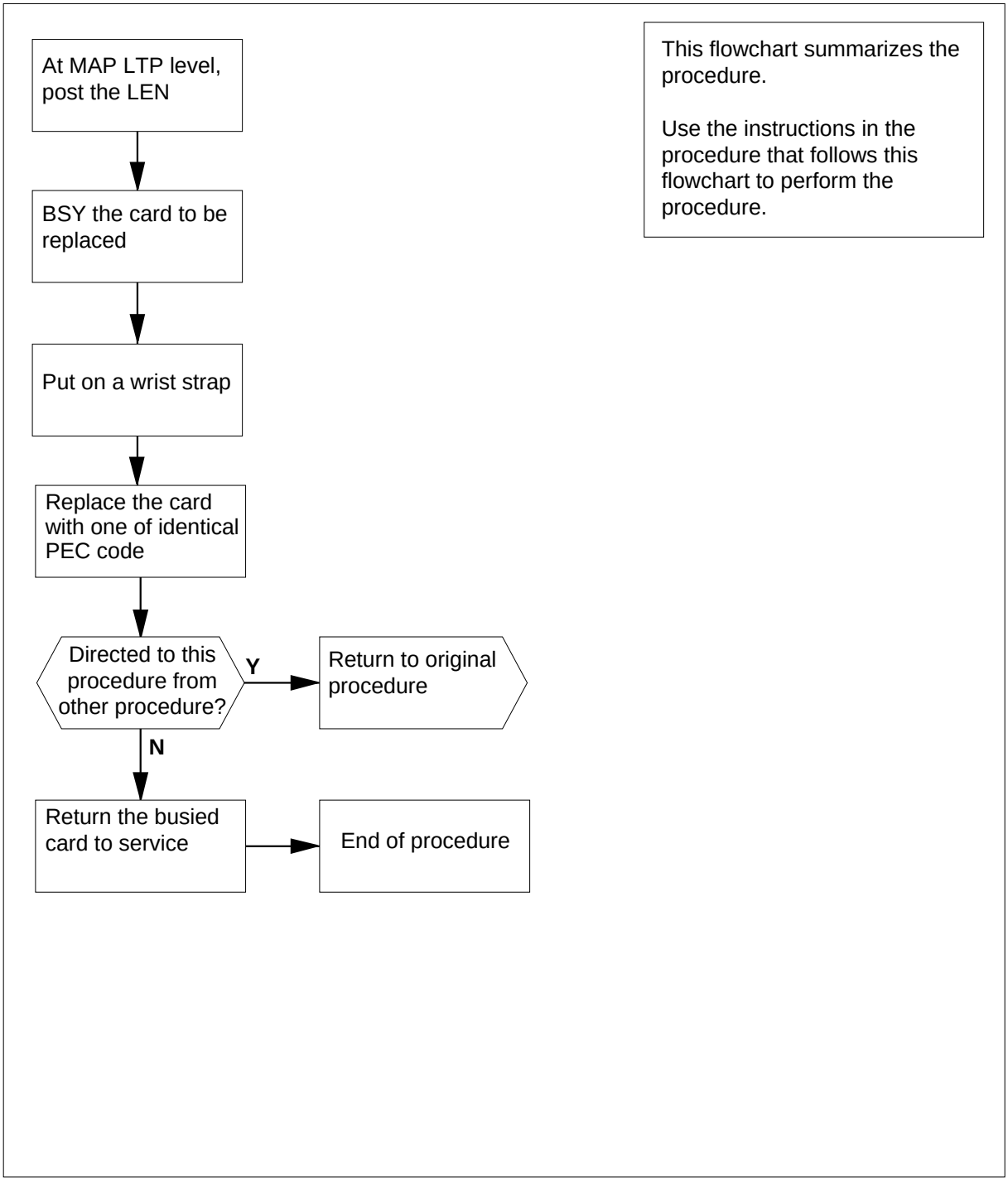
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X18 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X18 card in an RSC LCM



NT6X18 in an RSC LCM (continued)

Replacing an NT6X18 card in an RSC LCM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L SITE lcm_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the site name given to the remote location

lcm_no
is the number of the LCM with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3           LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
 4           CKT TYPE FL   REM1 00 0 03 03 4931082 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X18 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3           LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
 4           CKT TYPE FL   REM1 00 0 03 03 4931082 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X18
in an RSC LCM (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage when transporting them.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

6

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be hot.

Open the line drawer using the following steps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure that a card shroud and line card extractor are available.

Note: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards, as shown in the following table.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available, as shown in the following table.

Card removal tool for	Apparatus code	Common product code
3—4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X18 in an RSC LCM (continued)

7 Remove the line card to be replaced by using the following steps:

Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

Squeeze the handles of the extractor together to grasp the card tightly.

Hold the front cover of the line drawer to steady it with your left hand.

Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.

Continue pulling the card with the extractor until the card is clear of the shroud.

Insert the removed card into ESD container and store per local procedures.

8 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots towards the drawer backplane.

c Hold the front cover of the line drawer with your left hand, to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card towards the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step14
other	step10

At the MAP terminal

10 Test the NT6X18 line card by typing

`>DIAG`

and pressing the Enter key.

If DIAG	Do
passed	step11
failed	step14

Note: If the suffix of the NT6X18 card is -AA or -AB, and the line is identified as ground start (GND=Y in table LNINV), run the diagnostics again if the initial diagnostics fails. This action is possible by adding the Service order (Servord) option NPGD, Negate Partial Ground Start

NT6X18 in an RSC LCM (end)

Diagnostics. This option allows the line to be tested against a smaller subset of ground start diagnostics. Therefore, when option NPGD is set in table LENLINES, loop detector, reversal relay, and ground start relay tests are skipped.

11 Return the NT6X18 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of card

Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this procedure. At the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X19 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X19	AA, AB	Message waiting line circuit

Common procedures

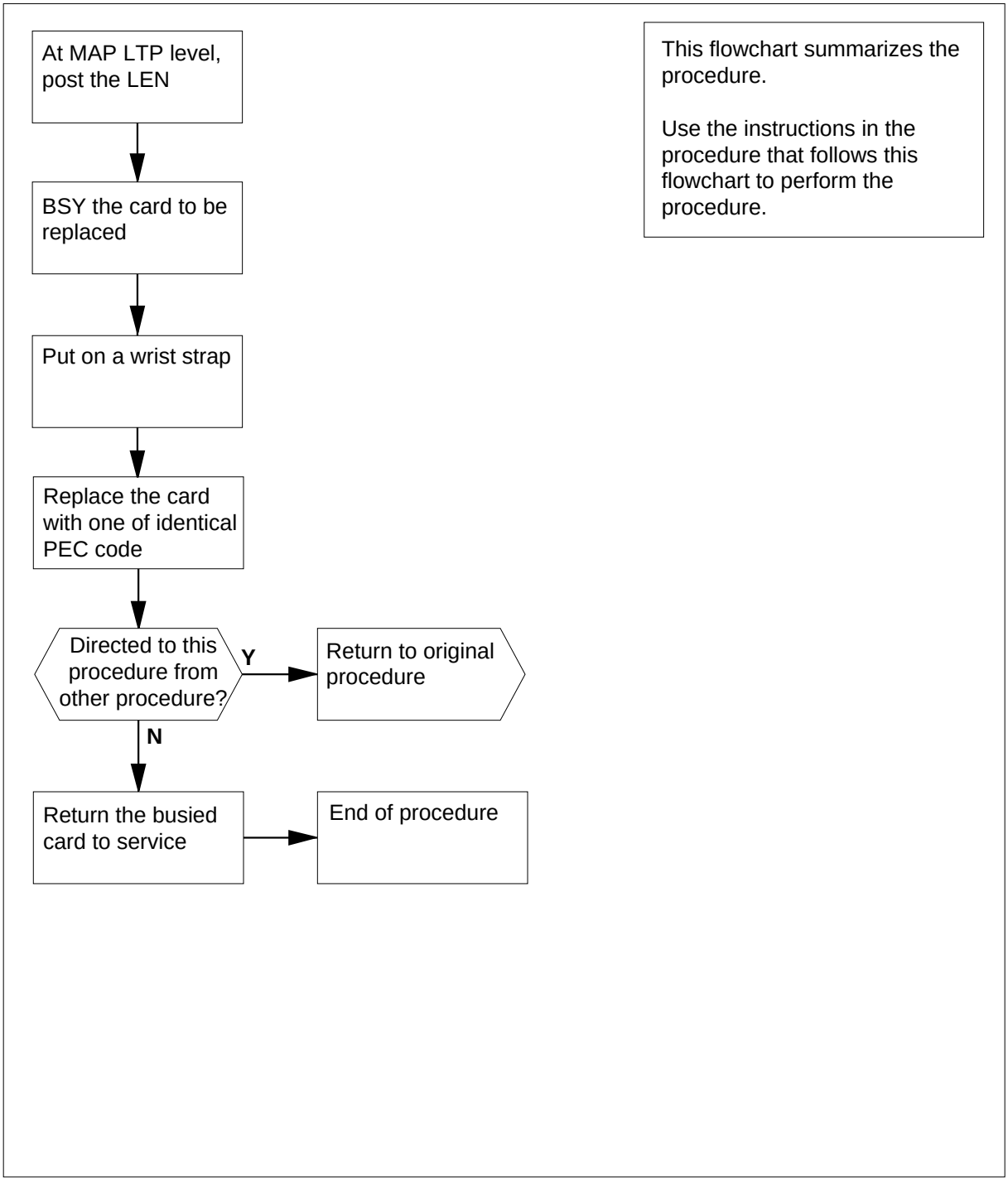
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X19 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X19 card in an RSC LCM



NT6X19 in an RSC LCM (continued)

Replacing an NT6X19 card in an RSC LCM

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site lcm_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the site name given to the remote location

lcm_no
is the number of the LCM with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
      CKT TYPE FL REM1 00 0 03 03 4931082 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X19 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
      CKT TYPE FL REM1 00 0 03 03 4931082 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X19
in an RSC LCM (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage when transporting them:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

6

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be hot.

Open the line drawer using the following steps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

Note: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards, as shown in the following table.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available, as shown in the following table.

Card removal tool for	Apparatus code	Common product code
3—4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X19
in an RSC LCM (continued)

7 Remove the line card to be replaced by using the following steps:

- **a** Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.
- **b** Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.
- **c** Squeeze the handles of the extractor together to grasp the card tightly.
- **d** Hold the front cover of the line drawer to steady it with your left hand.
- **e** Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.
- **f** Continue pulling the card with the extractor until the card is clear of the shroud.
- **g** Insert the removed card into an ESD container and store per local procedures.

8 Replace the faulty card by using the following steps:

- **a** Remove the replacement card from the ESD container.
- **b** Slide the card in the shroud guide slots towards the drawer backplane.
- **c** Hold the front cover of the line drawer with your left hand to steady it.
- **d** Grasp the top and bottom edges of the card with the fingers of your righ hand.
- **e** Push the card towards the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step14
other	step10

At the MAP terminal

10 Test the NT6X19 line card by typing

`>DIAG`

and pressing the Enter key.

If DIAG	Do
passed	step11
failed	step14

11 Return the NT6X19 card to service by typing

`>RTS`

NT6X19 in an RSC LCM (end)

and pressing the Enter key.

If RTS	Do
passed	step12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of card

Go to step 16.

14 Return to the *Alarm Clearing Procedures* that directed you to this procedure. At the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X20 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X20	AA	Message waiting converter

Common procedures

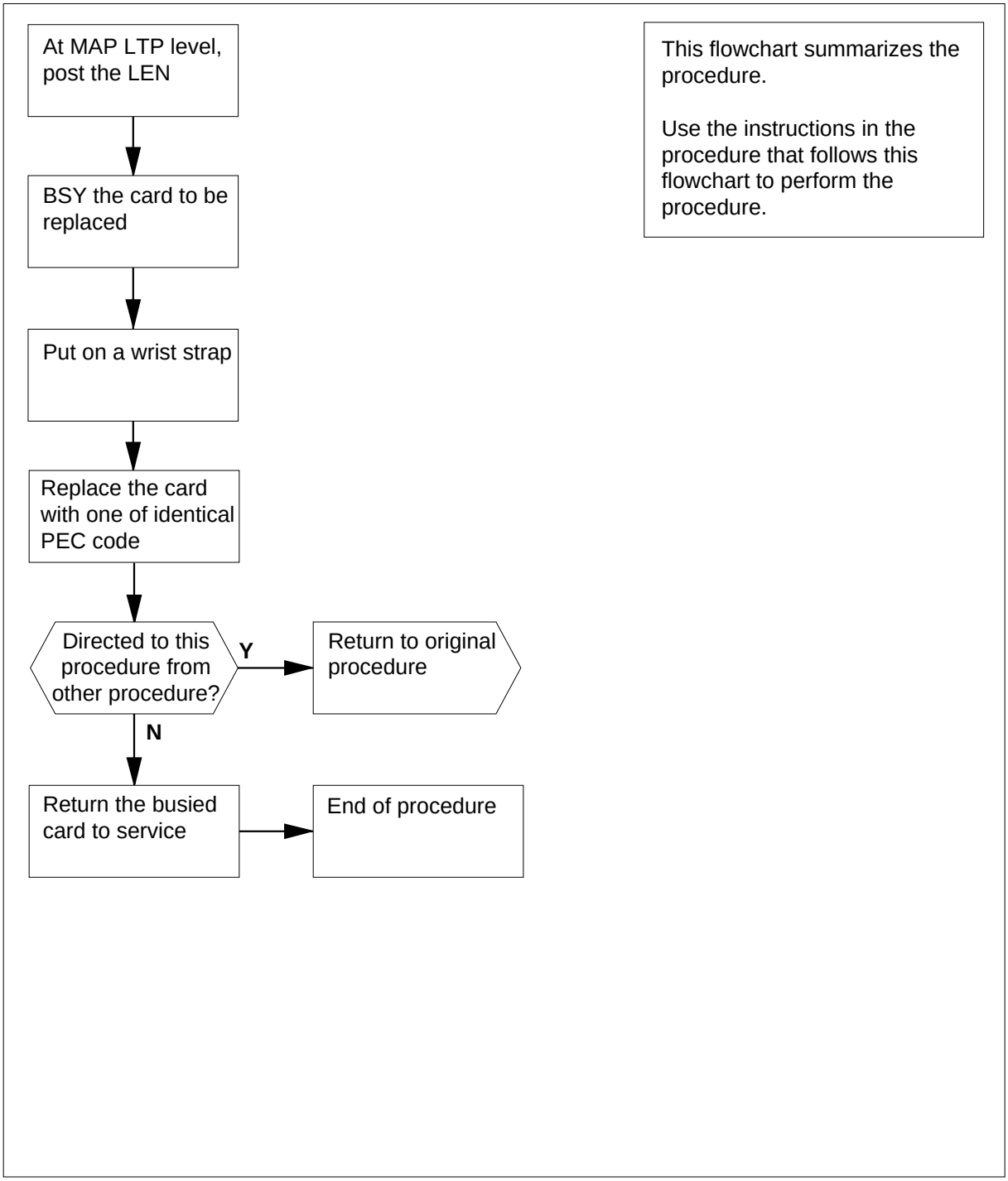
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X20 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X20 card in an RSC LCM



NT6X20 in an RSC LCM (continued)

Replacing an NT6X20 card in an RSC LCM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site lcm_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the site name given to the remote location

lcm_no
is the number of the LCM with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
     CKT TYPE FL REM1 00 0 03 03 4931082 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X20 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
     CKT TYPE FL REM1 00 0 03 03 4931082 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X20
in an RSC LCM (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage when transporting them.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

6

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be hot.

Open the line drawer using the following steps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out untilfully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure that a card shroud and line card extractor are available.

Note: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards, as shown in the following table.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note: Card removal tools are required for removing cards from line drawers. Two sizes are available, as shown in the following table.

Card removal tool for	Apparatus code	Common product code
3—4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

NT6X20
in an RSC LCM (continued)

7 Remove the line card to be replaced by using the following steps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it with your left hand.

e Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the removed card into ESD container and store per local procedures.

8 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots towards the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card towards the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 14
other	step 10

At the MAP terminal

10 Test the NT6X20 line card by typing

`>DIAG`

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

11 Return the NT6X20 card to service by typing

`>RTS`

NT6X20 in an RSC LCM (end)

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 16.

14 Return to the *Alarm Clearing Procedures* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X21 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X21	AA, AB, AC, AD	Line card type C, Meridian Digital Centrex (MDC), Electronic business set

Common Procedures

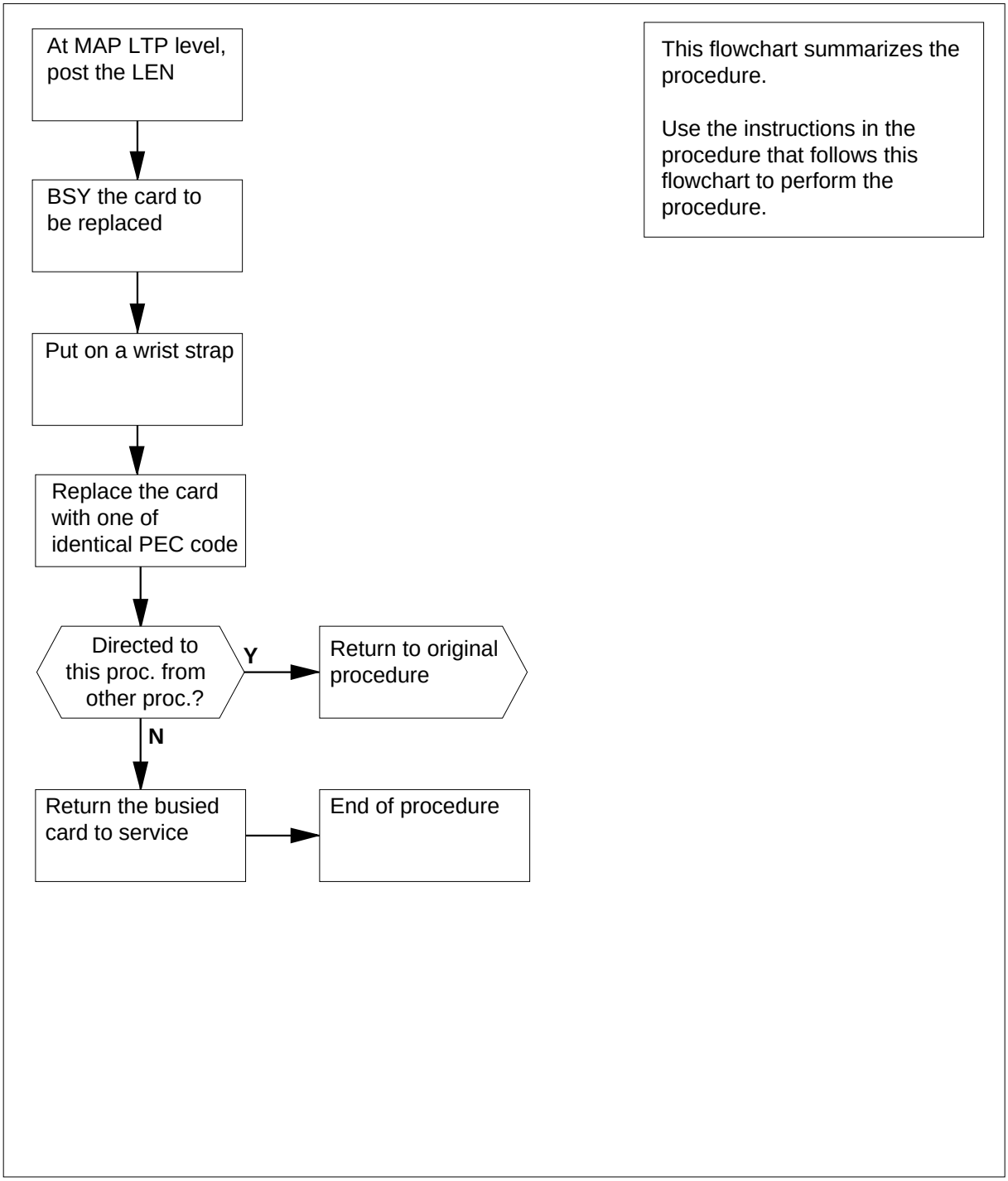
None

Action

A summary of the card replacement procedure for the NT6X21 in an RSC LCM is shown below. The procedure used to perform the task follows the flowchart.

NT6X21 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X21 card in an RSC LCM



NT6X21 in an RSC LCM (continued)

Replacing an NT6X21 card in an RSC LCM

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site_name lcm_no lsg_no ckt_no
```

and pressing the Enter key.

where

site_name
is the site name given to the remote location

lcm_no
is the number of the LCM with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
      CKT TYPE FL REM1 00 0 03 03 4931082 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X21 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM     CCS     LNS   Trks    Ext    Appl
  .     .     .      .      .      .       .      .      .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA  F  S  LTA  TE RESULT
      CKT TYPE FL REM1 00 0 03 03 4931082 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X21
in an RSC LCM (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage when transporting them.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

6

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be hot.

Open the line drawer using the following steps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure that a card shroud and line card extractor are available.

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with three-inch and/or six-inch cards.

Descriptions of these shrouds are as follows:

- Line card insertion/withdrawal tool (3")
  - — QTH56A (apparatus code)
  - — A0298291 (common product code)
- Line card insertion/withdrawal tool (6")
  - — QTH58A (apparatus code)
  - — A0313317 (common product code)

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available.

Descriptions of these tools are as follows:

- Card removal tool (3-inch or larger)
  - — QTH57A (apparatus code)
  - — A0298292 (common product code)
- Large grip tool for 4-inch or larger cards is NT tool ITA9953

7 Remove the line card to be replaced by using the following steps:

NT6X21
in an RSC LCM (continued)

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.)

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it with your left hand.

e Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the removed card into ESD container and store per local procedures.

8 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

If the line card suffix is	Do
AA, AB, AC	step c.c
AD	step b.b

b Make DIP switch changes to the new replacement NT6X21AD line card to match the DIP switch settings of the card being replaced or as defined in the following table:

Recommended NT6X21AD S1 DIP switch settings (Sheet 1 of 2)

	D/A voice S1		Balance S2		Signaling level S3 and S4			
	switch position ON	OFF	switch position ON	OFF	Both ON	Only S4 ON	Only S3 ON	Both OFF
Recommended application	**0dB**	**-3.5dB**	**NL**	**9+2**	**1.3Vpp**	**0.8Vpp**	**0.6Vpp**	**0.14Vpp**
P-phone sets long loop: 19-24dB EML	X		X		X			
P-phone sets medium loop: 17-19dB EML	X		X			X		

Note: dB=decibel, NL = non-loaded, 9+2=loaded (900 ohm + 2.16 micro-farads) network, Vpp=voltage peak to peak, EML= estimated measured loss, as defined in NTP 297-2011-180 BCS35 version 01.02

NT6X21 in an RSC LCM (continued)

Recommended NT6X21AD S1 DIP switch settings (Sheet 2 of 2)

Recommended application	D/A voice S1		Balance S2		Signaling level S3 and S4			
	switch position ON	OFF	switch position ON	OFF	Both ON	Only S4 ON	Only S3 ON	Both OFF
	0dB	-3.5dB	NL	9+2	1.3Vpp	0.8Vpp	0.6Vpp	0.14Vpp
P-phone sets medium loop: 4-17dB EML		X		X			X	
P-phone sets short loops: 0-4dB EML		X		X				X
Northern Telecom UDLCs		X	X					X
Other vendors UDLCs	X			X			X	
6X21AC equivalent mode		X	X		X			

Note: dB=decibel, NL = non-loaded, 9+2=loaded (900 ohm + 2.16 micro-farads) network, Vpp=voltage peak to peak, EML= estimated measured loss, as defined in NTP 297-2011-180 BCS35 version 01.02

c Slide the card in the shroud guide slots towards the drawer backplane.

d Hold the front cover of the line drawer with your left hand, to steady it.

e Grasp the top and bottom edges of the card with the fingers of your right hand.

f Push the card towards the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 14
other	step 10

NT6X21 in an RSC LCM (end)

At the MAP terminal

10 Test the NT6X21 line card by typing

```
>DIAG
```

and pressing the Enter key.

If DIAG	Do
passes	step 11
fails	step 15

11 Return the NT6X21 card to service by typing

```
>RTS
```

and pressing the Enter key.

If RTS	Do
passes	step12
fails	step15

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 16.

14 Return to the *Alarm Clearing Procedures* that directed you to this procedure. At the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X30 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X30	AA, CA	Ringing generator

Common procedures

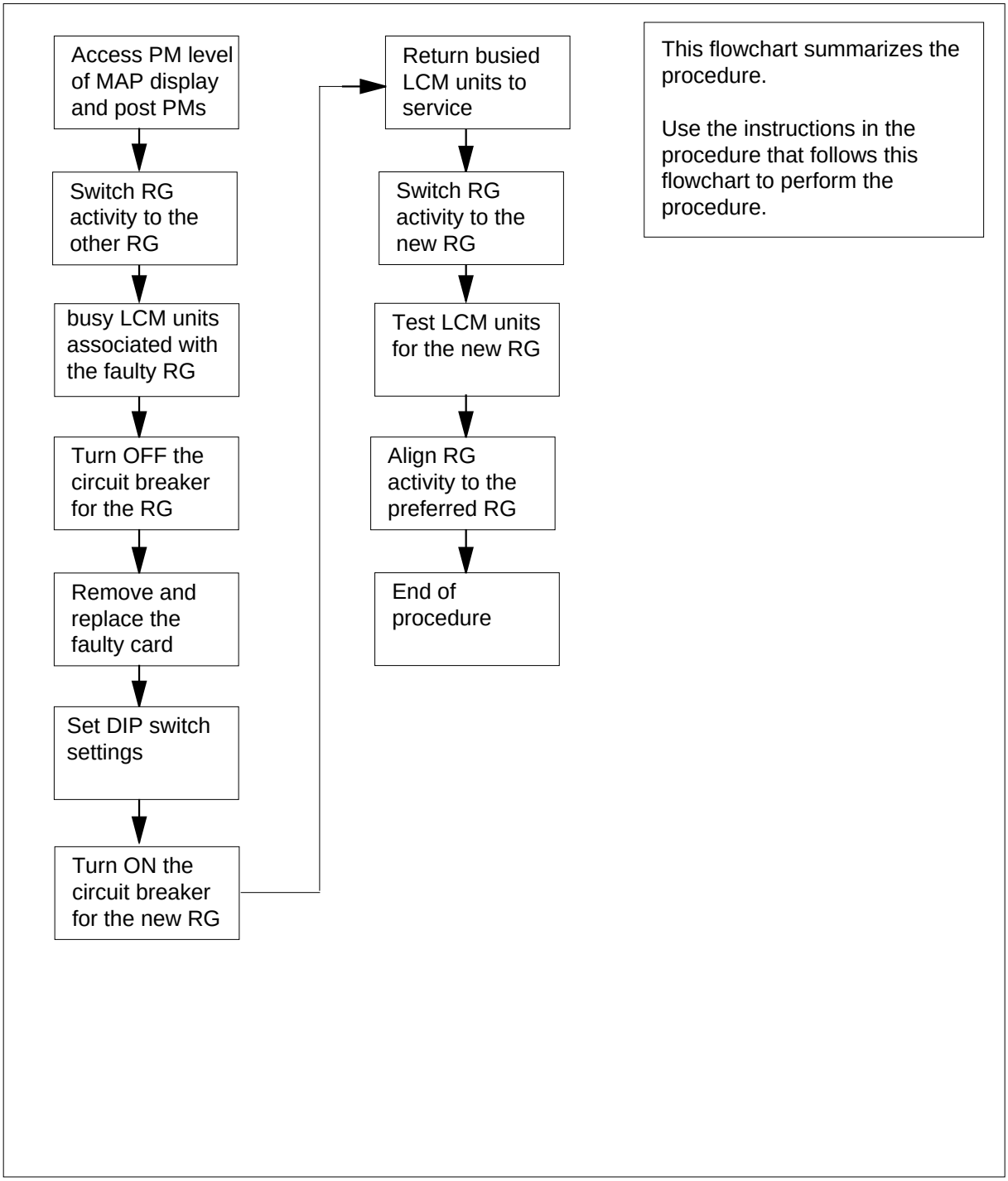
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X30 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X30 card in RSC LCM



NT6X30 in an RSC LCM (continued)

Replacing an NT6X30 card in RSC LCM

At your Current Location

1

CAUTION
Loss of service
This procedure includes directions to manually busy one or more peripheral module (PM) units. Since manually busying a PM unit can cause service degradation, perform this procedure only if necessary to restore out-of-service components. Otherwise, carry out this procedure during periods of low traffic.

Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure.

2 Obtain an approved replacement card.

At the MAP terminal

3 Access the PM level and post the LCM by typing

`>MAPCI;MTC;PM;POST LCM site frame_no lcm_no`

and pressing the Enter key.

where

site
is the name of the site at which the LCM is located

frame_no
is the number of the frame (00 to 511)

lcm_no
is the number of the LCM (0 or 1) in the frame

Example of a MAP response:

```
LCM REM1 00 0 ISTb Links  OOS: Cside 0 Pside 0
Unit 0: ISTb       /RG:0
Unit 1: InSv      /RG:0
                           1111  11  11  11  RG: Pref 0 ISTb
Drwr:  01  23  45  67  8901  23  45  67  89      Stby 1 InSv
       ..  ..  ..  ....   ..  ..  ..  ..  ..
```

4 Check the state of the PM units.

If the PM or PM units are	Do
Offl or SysB	step 5

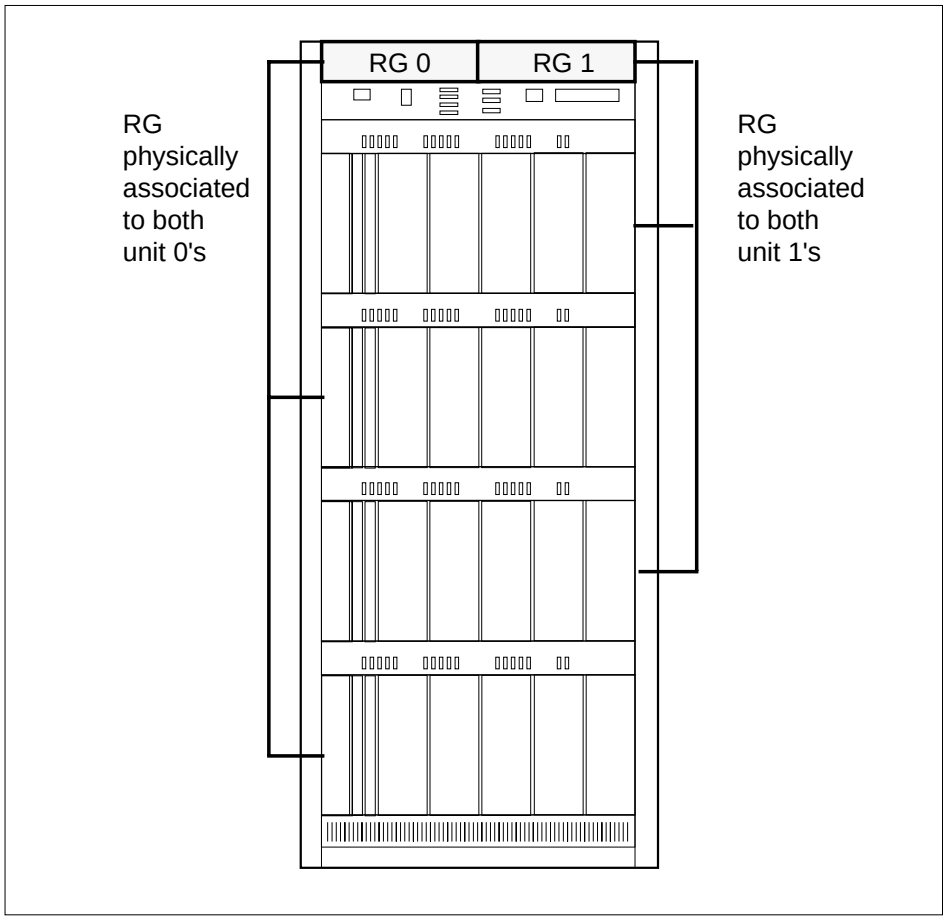
NT6X30
in an RSC LCM (continued)

If the PM or PM units are	Do
One unit is `InSv or ISTb` the other unit is `ISTb or SysB`	step 6

5 Check the state of the other PM in the frame.

If the other PM is	Do
`Offl or SysB`	step 37
`InSv or ISTb`	step 6

6 Record the numbers of the PM units serviced by the faulty RG you are replacing.



NT6X30
in an RSC LCM (continued)

7 The next action depends on the type of LCM alarm indicated.

If the alarm is	Do
critical	step 9
major or minor	step 8

8 Switch RG activity for the PM unit assigned to the faulty RG by typing

>SWRG UNIT unit_no

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1)

Example of a MAP response:

```
LCM REM1 00 0 Unit 0 SWRG Passed
```

Note: Repeat this command for the other PM units assigned to the faulty RG.

If the SWRG	Do
passed	step 9
failed	step 38

9 Manually-busy (ManB) the PM unit associated with the faulty RG by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1) associated with the faulty RG

Note: If clearing a critical alarm choose either unit to work on.

Example of a MAP response:

```
LCM REM1 00 0 Unit 0 Bsy Passed
```

Note: Repeat this command for the other PM in the frame.

If the BSY command	Do
passed	step 11

NT6X30
in an RSC LCM (continued)

If the BSY command	Do
failed	step 38

10 The next action depends on the type of PM alarm indicated.

If the alarm is	Do
critical	step 15
major or minor	step 11

11 The next action depends on how many LCMs are provisioned in the equipment frame.

If there	Do
is one LCM provisioned in the frame	step 15
two LCMs provisioned in the frame, and you have not switched RG activity for both LCMs	step 12
two LCMs provisioned in the frame, and you have switched RG activity for both LCMs	step 13

12 Repeat steps 3 to 11 for the other LCM provisioned in the equipment frame.

13 Post both PMs in the frame and ensure all units are now on the good RG by typing

```
>POST LCM site frame_no lcm_no site frame_no lcm_no
```

and pressing the Enter key.

where

site
is the PM location (alphanumeric) of the first LCM

frame_no
is the frame number (00 to 511) of the first LCM

lcm_no
is the number of the first LCM (0 or 1) in the frame,

site
is the LCM location (alphanumeric) of the second LCM

frame_no
is the frame number (00 to 511) of the second LCM

lcm_no
is the number of the second LCM (0 or 1) in the frame,

Example of command

```
>POST LCM REM1 00 0 REM1 00 1
```

Example of a MAP display:

```
LCM REM1 00 0 ISTb Links  OOS: Cside 0 Pside 0
Unit 0: ISTb       /RG:1
Unit 1: InSv      /RG:1
                          1111  11  11  11  RG: Pref 0 ISTb
Drwr:01  23  45  67  89 01  23  45  67  89      Stby 1 InSv
     ..  ..  ..  .. ..  ..  ..  ..  ..  ..
```

Examine the other PM in the frame by typing

>NEXT

and pressing the Enter key.

Example of a MAP display:

```
LCM REM1 00 1 ISTb Links  OOS: Cside 0 Pside 0
Unit 0: ISTb       /RG:1
Unit 1: InSv      /RG:1
                           1111  11  11  11  RG: Pref 0 ISTb
Drwr:  01  23  45  67  8901  23  45  67  89      Stby 1 InSv
       ..  ..  ..  .. ..  ..  ..  ..  ..  ..
```

If both PMs are	Do
on the good RG	step 15
not on the good RG	step 14

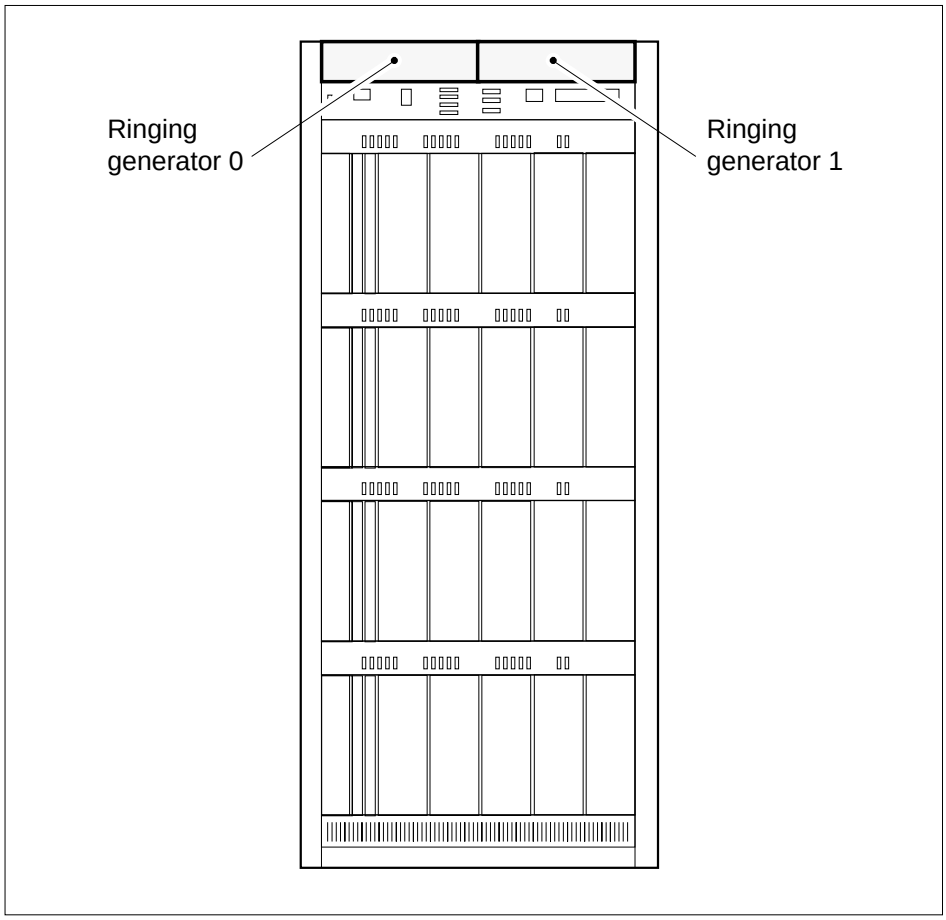
14 Repeat steps 3 to 13 for the other PM provisioned in the equipment frame.

At the RCE frame

15 Locate the RG you are replacing.

Note: RG 0 is located on the left side of the frame at slot 01, RG 1 is located on the right side of the frame at slot 11, shelf position 76.

NT6X30
in an RSC LCM (continued)



16

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the LCM. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

NT6X30
in an RSC LCM (continued)

17

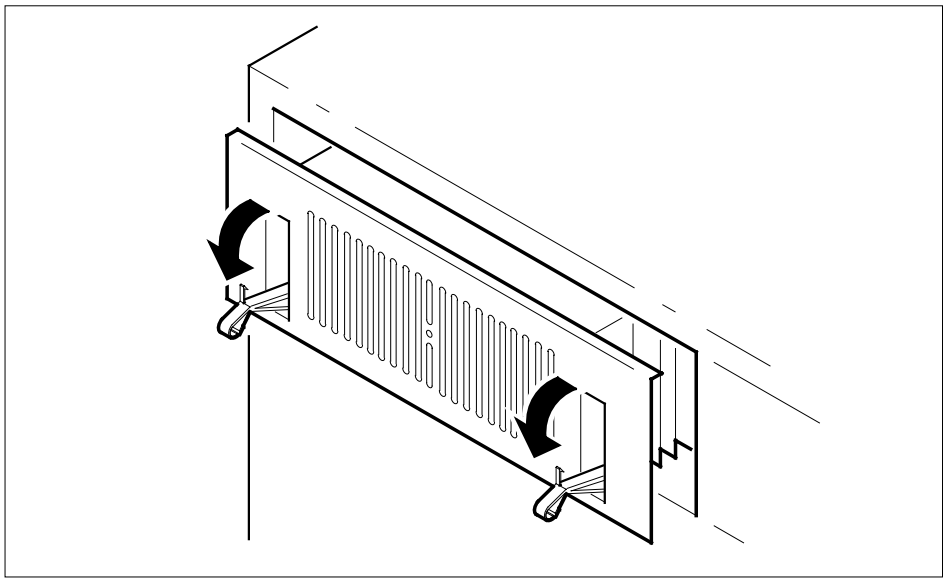
WARNING
Risk of personal injury
Ensure that you switch off the correct circuit breaker on the FSP as described in the following steps. Do not proceed until you have located and switched OFF the correct circuit breaker for the RG you are replacing.

Switch OFF the circuit breaker on the FSP that powers the faulty RG card you are replacing.

18

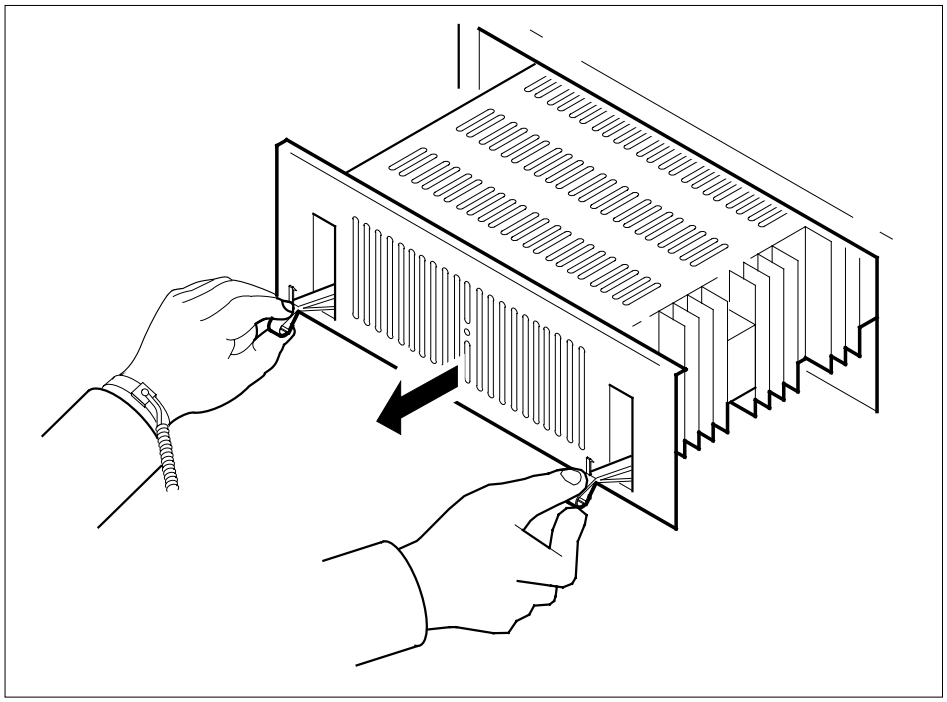
DANGER
Do not hold the card by the levers only
Holding a card by the locking levers only may break one or both levers. Once the card has been pulled half way out of the shelf, carefully grasp the card underneath for more secure support and continue to remove the card from the shelf. Avoid touching any wires or internal parts on the card.

Open the locking levers on the face of the card.



19 While grasping the locking levers, gently pull the card towards you until it protrudes approximately halfway out of the shelf.

NT6X30
in an RSC LCM (continued)



20 While grasping the card by the face plate with one hand and supporting the card from the bottom with the other hand, gently pull the card towards you until it clears the shelf.

21 Place the card you have removed in an electrostatic discharge (ESD) protective container.

22

CAUTION
Loss of service
Incorrect DIP switch setting can result in a service outage. Check the DIP switch layout for the switch numbering and for the ON and OFF position.

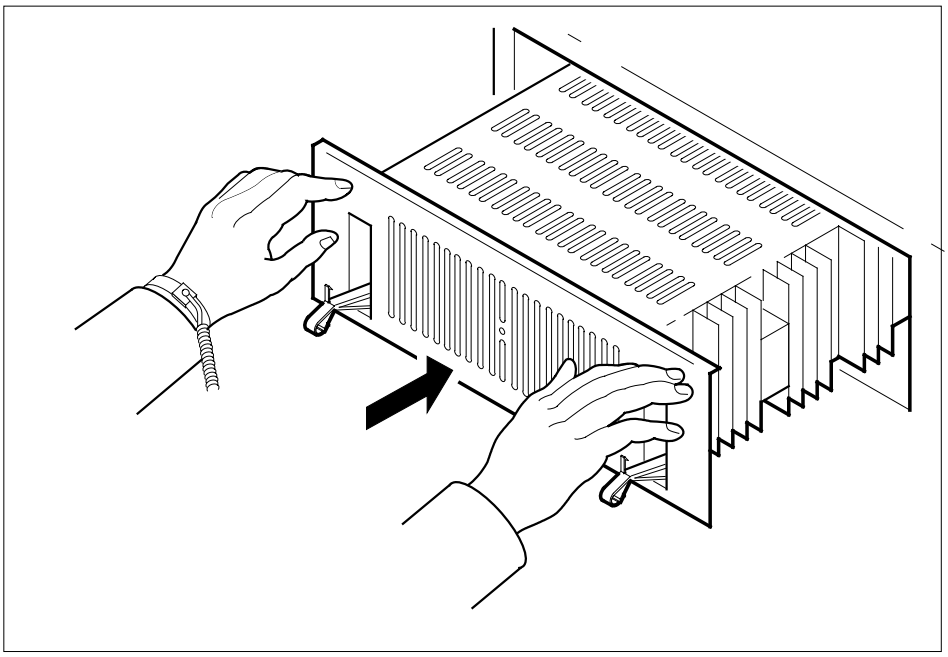
DANGER
Potential equipment damage
The newer versions of the ringing generator (versions with suffixes BB, CA, DB, HA, or JA) use switch 8. Ensure that switch 8 is in the ON position on the replacement card.

NT6X30
in an RSC LCM (continued)

Set the DIP switch settings on the replacement card.

Note: If you are replacing an older version of the NT6X30 with a newer version (newer versions have suffixes BB, CA, DB, HA, or JA), switch 8 must be in the ON position on the replacement card. If in doubt, contact your next level of support.

23 Open the locking levers on the replacement card. Align the card with the right slot in the shelf and gently slide the card into the shelf.

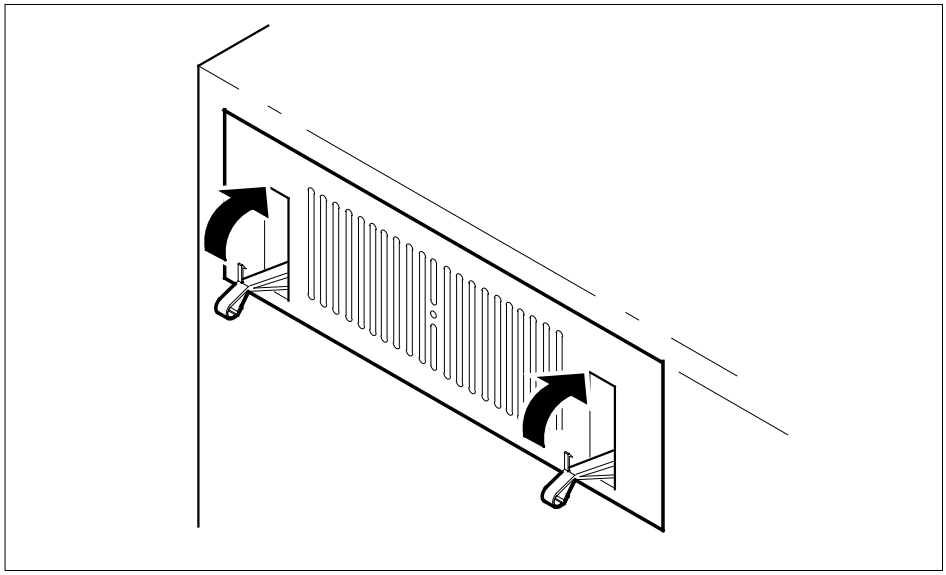


24 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b Close the locking levers to secure the card.

NT6X30
in an RSC LCM (continued)



25 Switch the circuit breaker to the ON position that you switched to the OFF position on the FSP at step 17.

If	Do
the circuit breaker remains switched and the LED light on the FSP goes out	step 26
the circuit breaker trips or the LED light on the FSP does not go out	step 38

26 The next action depends on your reason for performing this procedure.

If you were	Do
directed to this procedure from a maintenance procedure	step 27
not directed to this procedure from a maintenance procedure	step 28

27 Return to the maintenance procedure that sent you to this procedure and continue as directed.

NT6X30
in an RSC LCM (continued)

At the MAP terminal

28 Post a LCM in the frame by typing

`>POST LCM site frame_no lcm_no`

and pressing the Enter key.

where

site
is the PM location (alphanumeric)

frame_no
is the frame number (00 to 511)

lcm_no
is the number of the LCM (0 or 1) in the frame

29 Wait until there is no system-initiated maintenance on the unit.

30 Return the ManB unit to service by typing

`>RTS UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the number (0 or 1) of the LCM unit

31 Switch RG activity to the new RG by typing

`>SWRG UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1)

Example of a MAP display:

```
LCM REM1 00 0 InSv Links  OOS: Cside 0 Pside 0
Unit 0: InSv       /RG:1
Unit 1: InSv      /RG:1
                            1111  11  11  11  RG: Pref 0  InSv
Drwr:  01  23  45  67  89 01  23  45  67  89      Stby 1 InSv
       ..  ..  ..  .. ..  ..  ..  ..  ..  ..
```

If the SWRG command	Do
passed, and RG activity must be switched for the other unit	step 32
passed, and RG activity is acceptable for both PM units	step 33

NT6X30
in an RSC LCM (continued)

If the SWRG command	Do
failed	step 38

32 Repeat step 31 for the other PM unit.

33 Test the new RG by typing

>TST PM

and pressing the Enter key.

Example of a MAP response:

```
LCM REM1 00 0 Unit 1  InSvce Tests Initiated
LCM REM1 00 0 Unit 0  InSvce Tests Initiated
LCM REM1 00 0 Unit 1  Tst Passed
LCM REM1 00 0 Unit 0  Tst Passed
```

If the TST	Do
passed	step 34
failed	step 38

34 Align RG activity to the preferred RG by typing

>SWRG UNIT unit_no

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1)

Example of a MAP display:

```
LCM REM1 00 0 InSv Links  OOS: Cside 0 Pside 0
Unit 0: InSv       /RG:0
Unit 1: InSv      /RG:0
                          1111  11  11  11  RG: Pref 0 InSv
Drwr:  01  23  45  67  8901  23  45  67  89      Stby 1 InSv
       ..  ..  ..  .. ..  ..  ..  ..  ..  ..
```

35 The next action depends on how many LCMs are provisioned in the equipment frame.

If there	Do
one LCM provisioned in the frame	step 39
two LCMs provisioned in the frame, and you have not switched RG activity for both LCMs	step 36

NT6X30 in an RSC LCM (end)

If there	Do
two LCMs provisioned in the frame, and you have switched RG activity for both LCMs	step 39

36 Repeat steps 28 to 35 for the other LCM provisioned in the equipment frame.

37 Consult office personnel to determine why the component is offline. Continue as directed by office personnel.

38 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

39 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X44 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC.

PEC	Suffixes	Name
NT6X44	AA, EA	Time switch

Common procedures

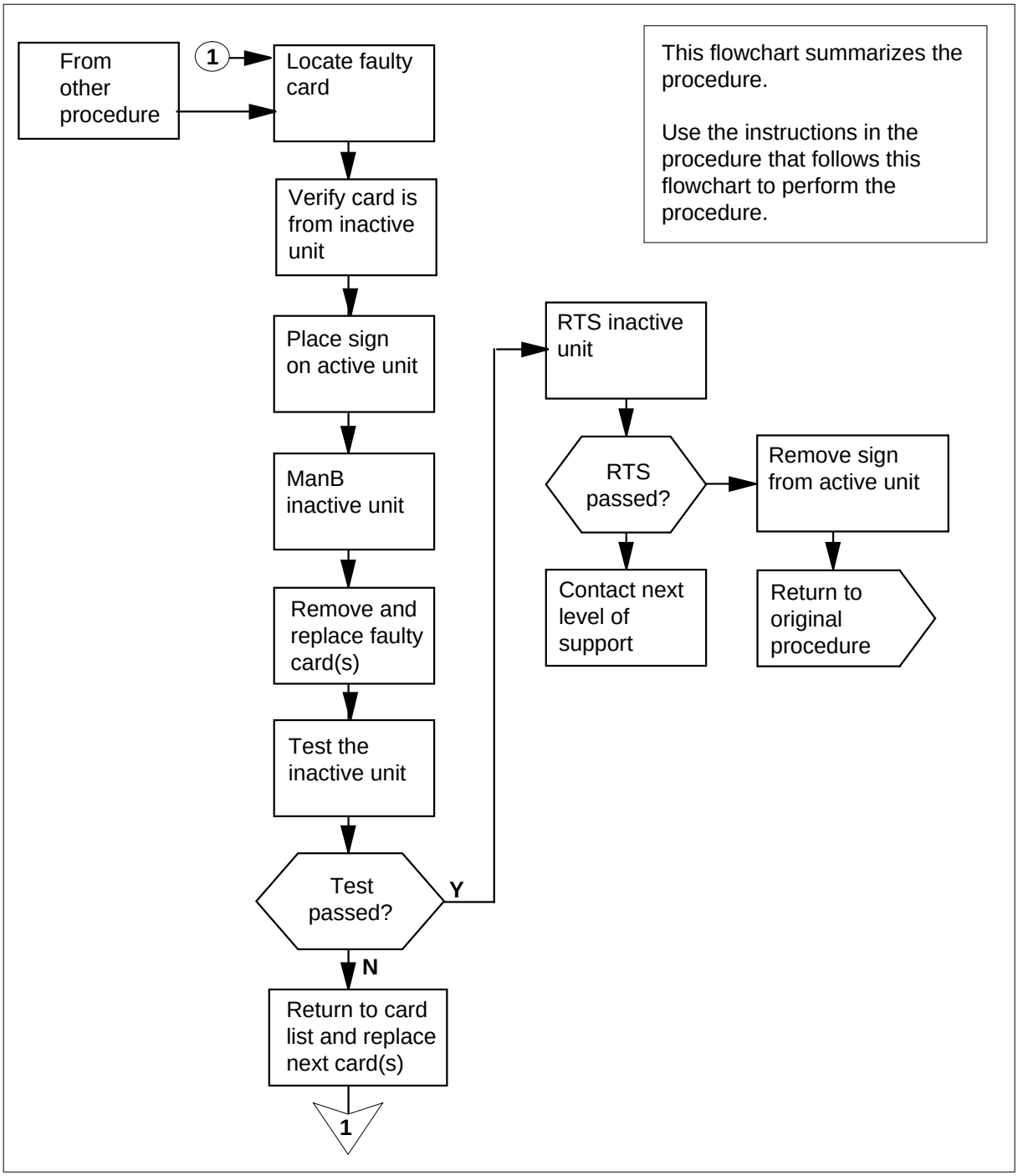
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X44 in an RSC (continued)

Summary of card replacement procedure for an NT6X44 card in an RSC RCC



NT6X44 in an RSC (continued)

Replacing an NT6X44 card in an RCC

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure that the unit where you are replacing the card is INACTIVE and that the mate unit is ACTIVE.

Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP terminal

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
    .     .     .      .    1RCC    .      .       .       .      .

RCC           SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit        PM        0        0        2        0        225
 2 Post_       RCC       0        0        0        1         11
 3 ListSet
 4               RCC      0 ISTb  Links_OOS:  CSide  0, PSide   1
 5 TRNSL_        Unit0:   Inact InSv
 6 TST_          Unit1:   Act   InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the INACTIVE unit.

At the RCE frame

5 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP terminal

6 Busy the inactive RCC unit by typing

`>BSY UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

NT6X44 in an RSC (continued)

At the RCE frame

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

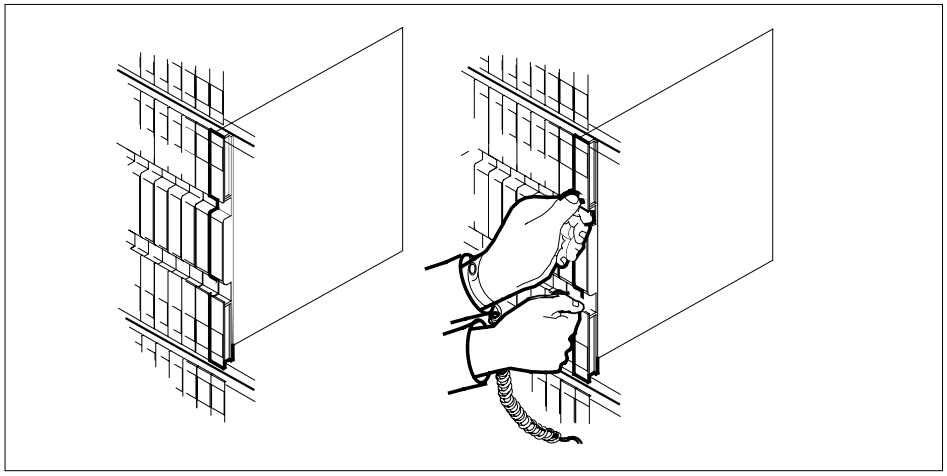
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

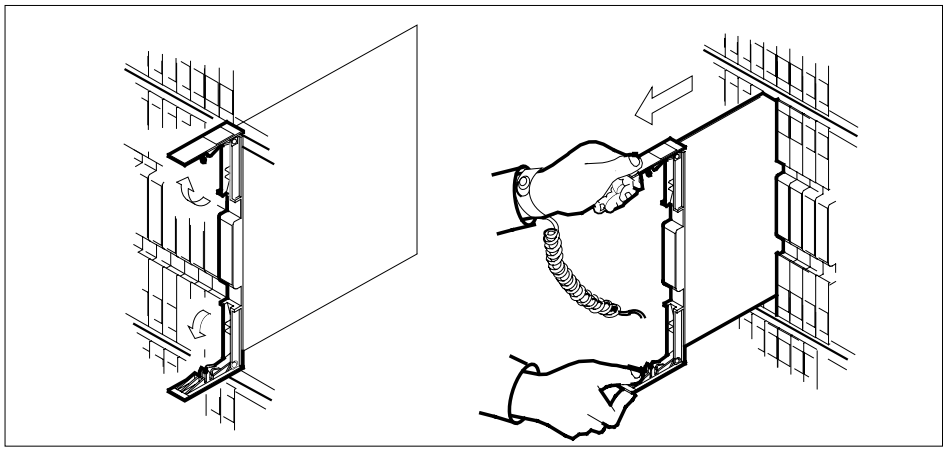
Put on a wrist strap.

8 Remove the NT6X44 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



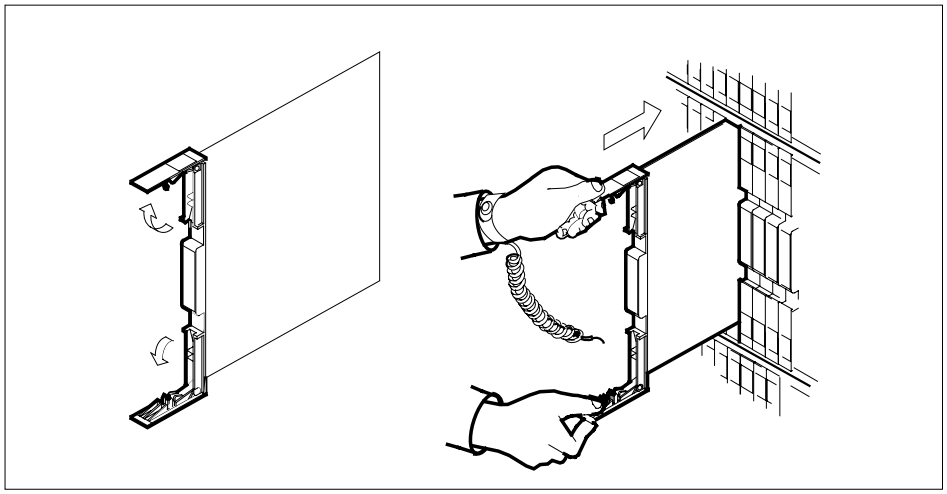
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

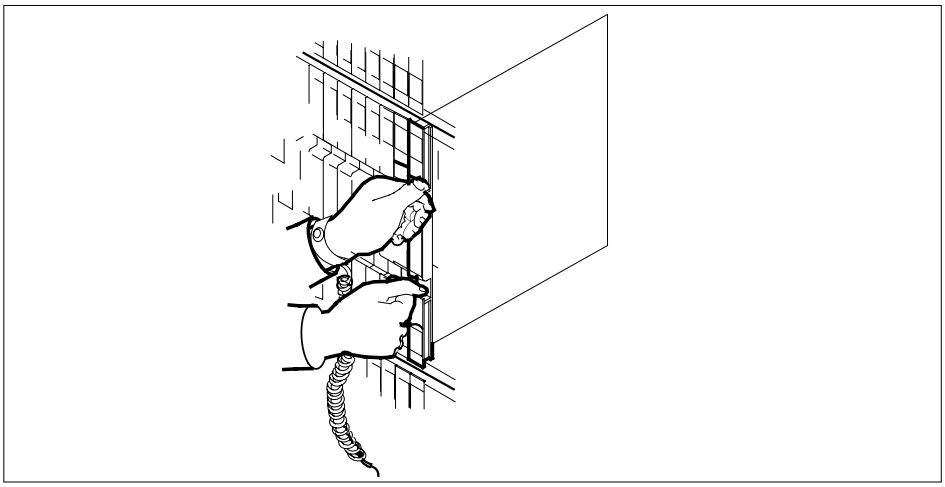


10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT6X44
in an RSC (continued)



At the MAP terminal

11 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 15
other	step 12

12 Return the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit busied in step 6.

If RTS	Do
passed	step 13
failed	step 16

13 Send any faulty cards for repair according to local procedure.

14 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

NT6X44 in an RSC (end)

Go to step 17.

15 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X48 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC.

PEC	Suffixes	Name
NT6X48	AA	DS-30A interface card

Common Procedures

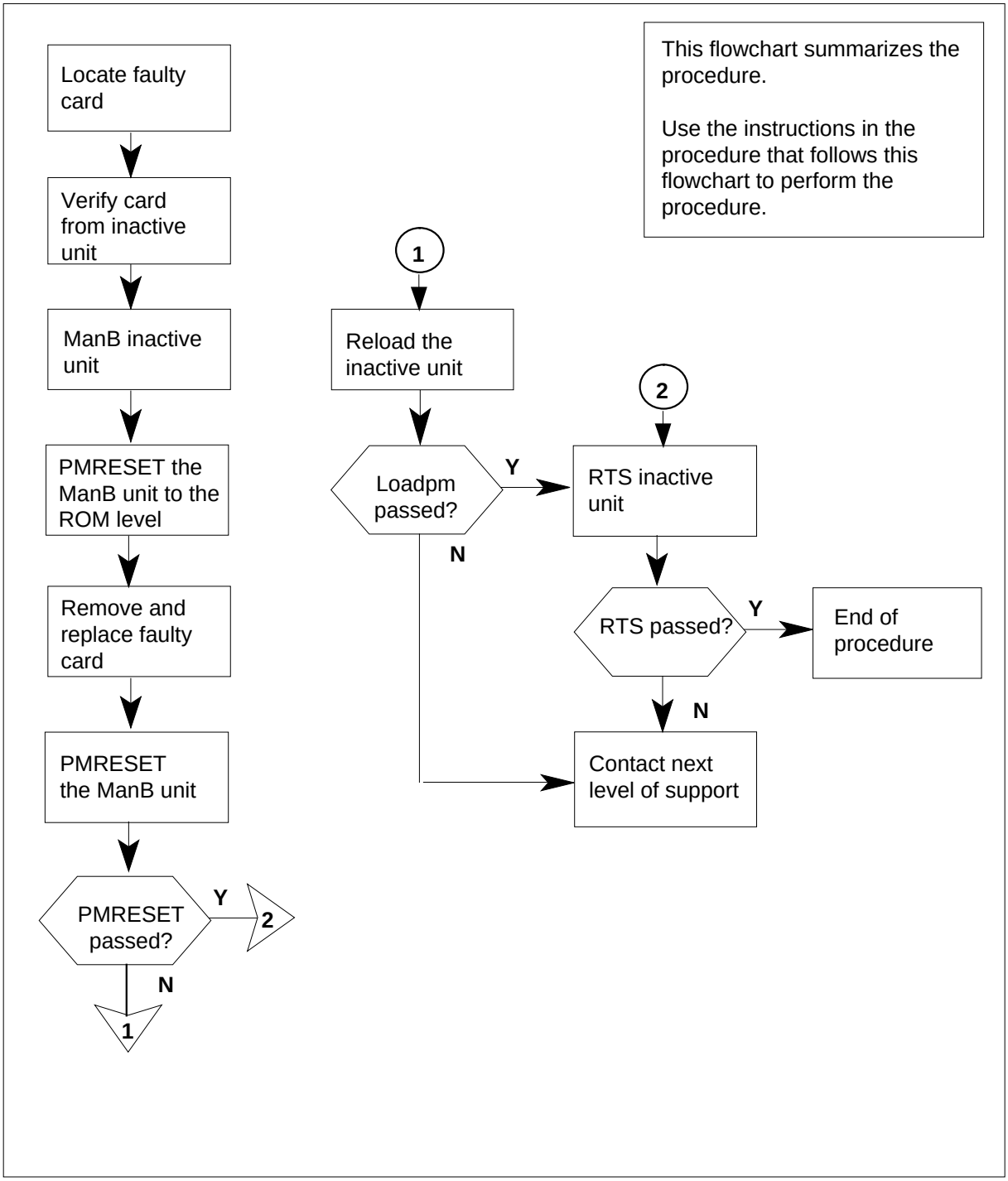
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X48 in an RSC (continued)

Summary of replacing an NT6X48 card in an RSC RCC



NT6X48 in an RSC (continued)

Replacing an NT6X48 card in an RSC RCC

At the current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit where you are replacing the card is INACTIVE and that the mate unit is ACTIVE.

Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RCC by typing

`>MAPCI;MTC;PM;POST RCC rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1RCC    .      .       .      .      .
RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       0        0        2        0        2        25
 2 Post_   RCC      0        0        0        0        1         1
 3 ListSet
 4         RCC      0 ISTb  Links_OOS:  CSide  0, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act   InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the INACTIVE unit.

At the RCE frame

5 Put a sign on the ACTIVE unit bearing the words *Active unit—Do not touch*.

At the MAP display

6 Busy the inactive RCC unit by typing

>BSY INACTIVE

and pressing the Enter key.

7 Reset the inactive RCC unit to the ROM level by typing

>PMRESET UNIT unit_no NORUN

and pressing the Enter key.

where

unit_no
is the inactive RCC unit number (0 or 1)

Example of a MAP response:

```
RCC 0 Unit 0    PMReset Passed
```

NT6X48
in an RSC (continued)

At the RCE frame

8

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

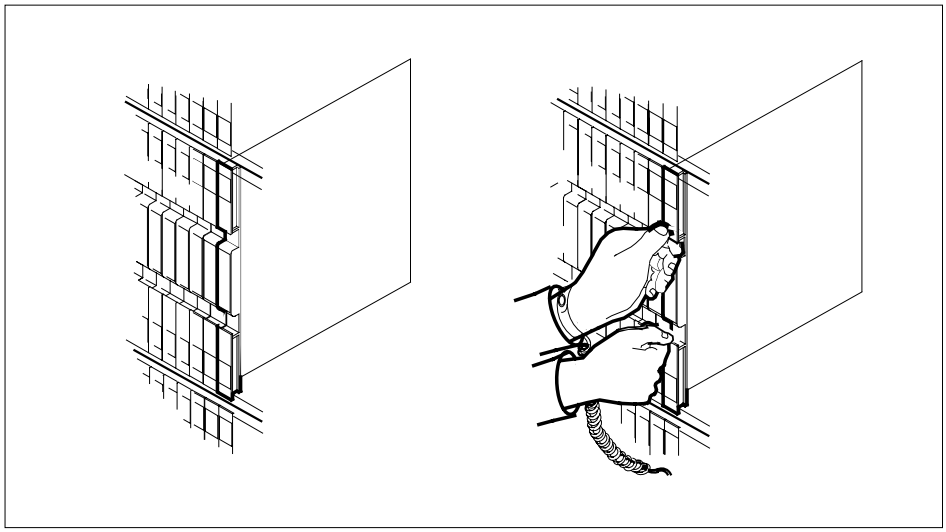
9

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

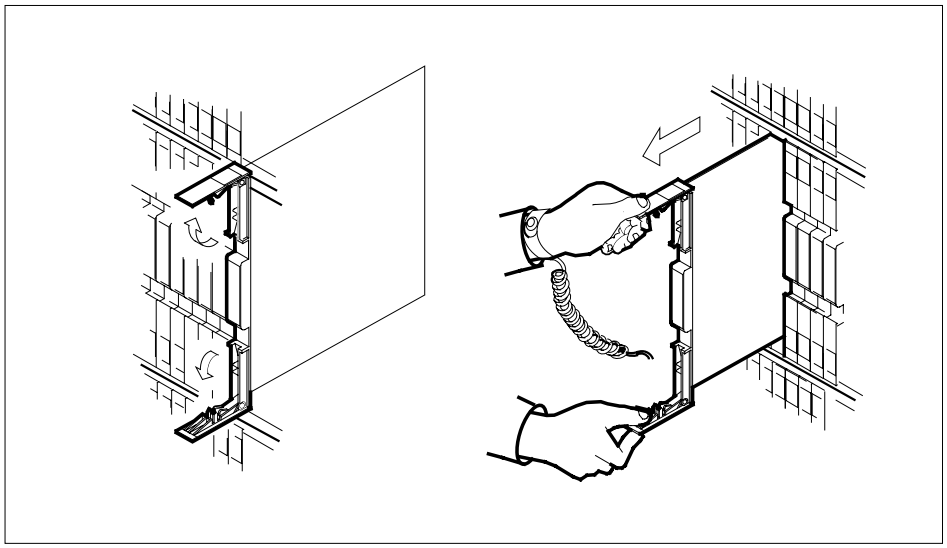
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Replace the NT6X48 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



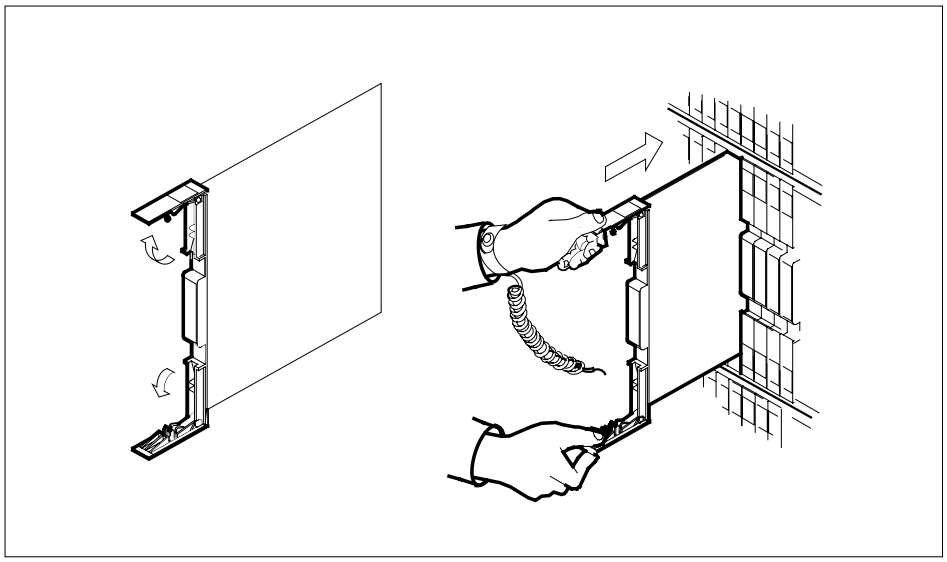
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

d Open the locking levers on the replacement card.

e Align the card with the slots in the shelf and gently slide the card into the shelf.

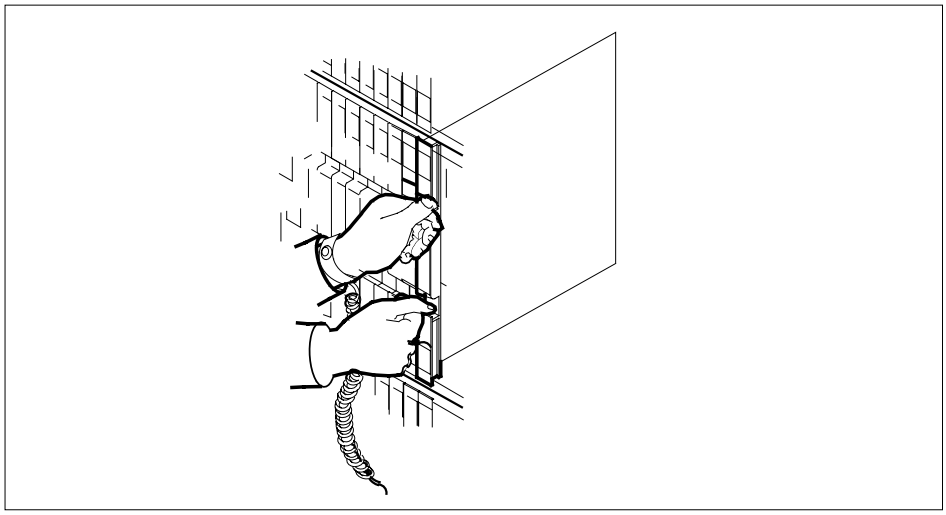


10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

NT6X48
in an RSC (continued)

b Close the locking levers.



At the MAP display

11 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 17
other	step 12

12 Reset the inactive RCC unit by typing

`>PMRESET UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the PM unit number (0 or 1)

Example of a MAP response:
RCC 0 Unit 0 PMReset Passed

If PMRESET command	Do
passed	step 14
failed	step 13

13 Reload the inactive RCC unit by typing

`>LOADPM UNIT unit_no`

NT6X48 in an RSC (end)

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC unit (0 or 1)

If the LOADPM command	Do
passed	step 14
failed	step 18

14 Return the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit busied in step 6

If RTS command	Do
passed	step 15
failed	step 18

15 Send any faulty cards for repair according to local procedure.

16 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 19.

17 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

18 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

19 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X50 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC.

PEC	Suffixes	Name
NT6X50	AA, AB	DS-1 interface

Common Procedures

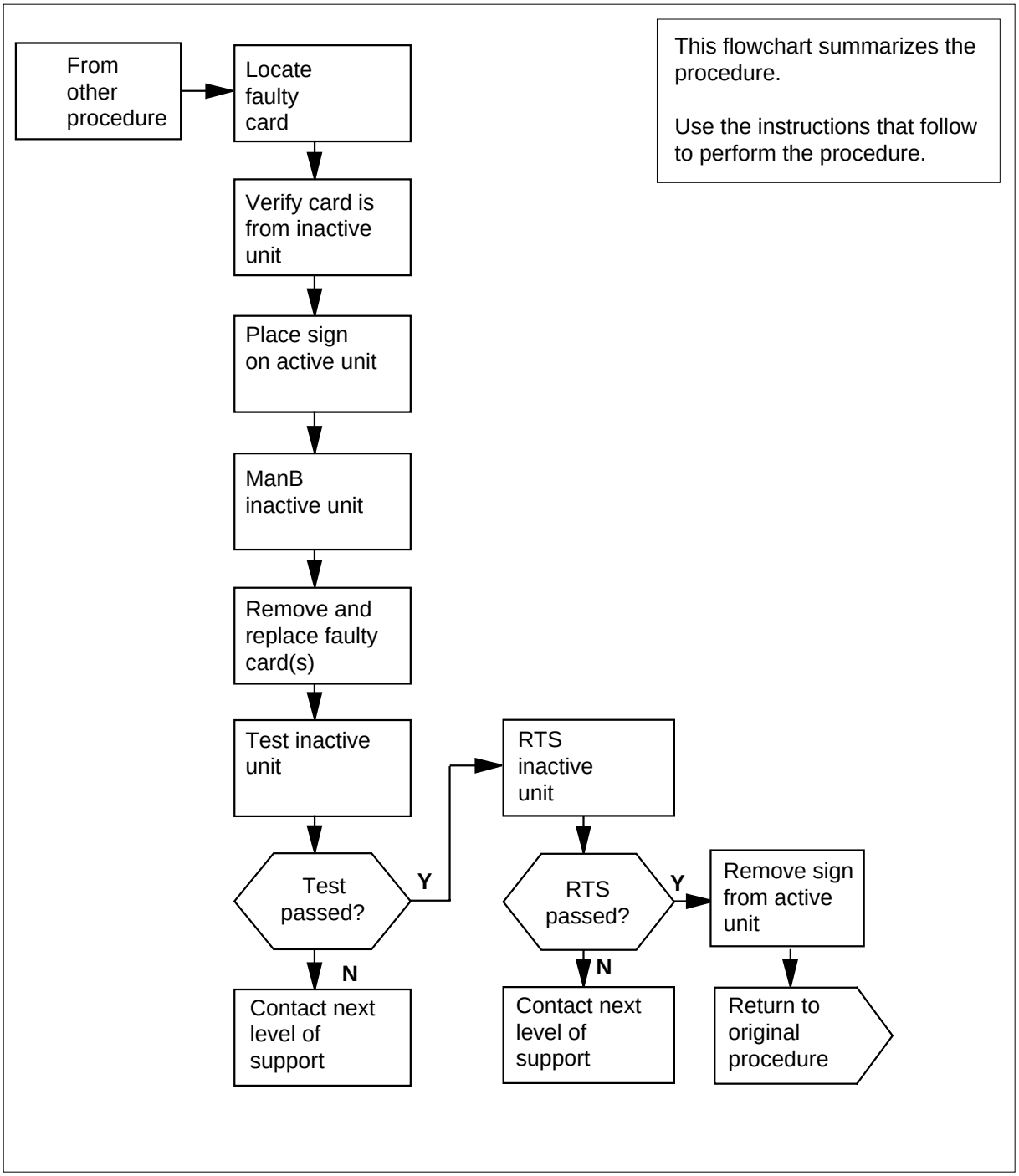
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X50 in an RSC (continued)

Summary of replacing an NT6X50 card in an RSC RCC



NT6X50 in an RSC (continued)

Replacing an NT6X50 card in RSC RCC

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit where you are replacing the card is INACTIVE and that the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level of the MAP display and post the RCC with the faulty NT6X50 card by typing

>MAPCI;MTC;PM;POST RCC **rcc_no**

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC associated with the faulty NT6X50 card.

Example of a MAP display:

```
 CM   MS   IOD   Net   PM  CCS  LNS  Trks  Ext   APPL
  .    .    .    .   1RCC  .    .     .    .     .

RCC            SysB   ManB  OffL  CBsy  ISTb     InSv
 0 Quit     PM   0      0     2     0    2        25
 2 Post_    RCC  0      0     0     0    1         1
 3 ListSet
 4          RCC 0 ISTb Links_OOS:  CSide  1, PSide 1
 5 TRNSL_   Unit0: Act   InSv
 6 TST_     Unit1: Inact SysB
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE

5 Put a sign on the active unit bearing the words, *Active unit—Do not touch* .

At the MAP display

6 Display the C-side links associated with the faulty NT6X50 card by typing

`>TRNSL C`

and pressing the Enter key.

Note: Identify the host PM and its associated P-side and C-side links for later reference.

Example of a MAP response:

NT6X50
in an RSC (continued)

```
LINK 0    LTC  0         1;CAP     MS:STATUS OK        MSGCOND   OPN
LINK 1    LTC  0         2;CAP     MS:STATUS OK
LINK 2    LTC  0         3;CAP     MS:STATUS SBsy MSGCOND   CLS
LINK 3    LTC  0         4;CAP     MS:STATUS OK
LINK 4    LTC  0         5;CAP     MS:STATUS OK
LINK 5    LTC  0         6;CAP     MS:STATUS OK
```

If the C-side links are	Do
faulty	step 8
not faulty	step 7

7 Display the P-side links associated with the DS-1 card by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response:

```
LINK 0    RMM  5           0;CAP   MS:STATUS OK        MSGCOND   OPN
LINK 1    LCM REM1  00 0   0;CAP   MS:STATUS OK        MSGCOND   OPN
LINK 2    LCM REM1  00 0   1;CAP   MS:STATUS OK        MSGCOND   OPN
LINK 3    LCM REM1  00 0   2;CAP    S:STATUS OK
LINK 4    CARRIER OF CLASS – TRUNK   :STATUS OK
LINK 5    CARRIER OF CLASS – TRUNK   :STATUS SysB
```

If the P links are	Do
faulty	step 11
not faulty	step 34

8 Busy the inactive RCC unit by typing

>BSY UNIT rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

9 Post the host PM by typing

>POST host_pm host_pm_no

and pressing the Enter key.

where

host_pm
is a line group controller (LGC) or line trunk controller (LTC) in the host office

host_pm_no
is the number of an LGC or LTC

Example of a MAP display:

```
CM   MS   IOD   Net  PM  CCS  Lns  Trks   Ext   APPL
 .    .     .      .  1RCC  .   .    .      .     .

LTC              SysB   ManB  OffL   CBsy  ISTb  InSv
0 Quit     PM       0      0    1       0    4    22
2 Post_    LTC      0      0    2       0    2     9
3 ListSet
4         LTC  0  ISTb  Links_OOS: CSide 0, PSide  1
5 Trnsl_  Unit0: Act     InSv
6 Tst_    Unit1: Inact   InSv
7 Bsy_
8 RTS_
9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

10 Identify the faulty link number(s) of the host PM by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response:

```
LINK 1    RCC  0         0;CAP MS:STATUS    OK        MSGCOND   OPN
LINK 2    RCC  0         1;CAP MS:STATUS    OK
LINK 3    RCC  0         2;CAP  S:STATUS    SBsy      MSGCOND   CLS
LINK 4    RCC  0         3;CAP  S:STATUS    OK
LINK 5    RCC  0         4;CAP  S:STATUS    OK
LINK 6    RCC  0         5;CAP  S:STATUS    OK
```

11 Manually busy (ManB) the links connected to the faulty card by typing

>BSY LINK link_no

and pressing the Enter key.

where

link_no
is the number of the links associated with the faulty NT6X50 card from step 7

NT6X50 in an RSC (continued)

Note: Each NT6X50 card has two links associated with it. Therefore, each link must be ManB. Possible link number pairs are as follows: 0,1; 2,3; 4,5; or 6,7.

12 The system displays a prompt on the MAP screen requesting a confirmation of the command to BSY the link. Confirm the BSY command by typing

>YES

and pressing the Enter key.

13 Use the following information to determine the next step in this procedure.

If link is on P-side of	Do
host XPM	step 14
RCC	step 15

14 Type the following command

>TRKS; CARRIER; POST host_pm host_pm_no

and press the Enter key.

where

host_pm
is either a line group controller (LGC) or a line trunk controller (LTC)

host_pm_no
is the number of an LGC or LTC

Example of a MAP response;

```
CLASS     ML   OS   ALARM     SYSB MANB UNEQ OFFL CBSY PBSY INSV
TRUNKS    4    0    0         0    0    0    0    0    0    0
REMOTE    3    0    7         5    1    0    0    1    0    10

N   CLASS  SITE   LTC    CKT  D  ALARM  SLIP   FRAME  BER   SES  STATE
0   REMOTE BRSC   0      2    C  SLIP    ML       1    ML     0  ManB
1   REMOTE BRSC   0      3    C           0       0  <-.7     0  InSv
2   REMOTE BRSC   0      4    C           0       0  <-.7     0  InSv

                                                          MORE ....
```

Note: The MORE .... at the bottom of the display indicates that more links can be observed by typing

>NEXT

and pressing the Enter key.

Go to step 17 .

15 Type the following command

>TRKS; CARRIER; POST RCC rcc_no

and press the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP response;

```
CLASS     ML   OS   ALARM   SYSB   MANB UNEQ OFFL CBSY PBSY INSV
TRUNKS    2    0    4       1      0    22   5    0    0    255
REMOTE    1    1    3       5      1    0    0    1    0    10

N   CLASS   SITE  RCC  CK  D ALARM  SLIP FRME   BER  ES  SES  STATE
0   TRUNKS BRSC  0    4   C          0    0     5   0    0    InSv
1   TRUNKS BRSC  0    5   C          0    0     5   0    0    InSv
2   TRUNKS BRSC  0    6   C   LCGA  11   OS     ML  0    0    SysB–T

                                                          MORE ....
```

Note: `MORE ....` at the bottom of the display indicates that more links can be observed by typing:

>NEXT

and pressing the Enter key

16 Identify the link number(s) associated with any faulty link(s) by referring to the *N* column (as shown in the map displays in steps 14 and 15). Busy the faulty links by typing

>BSY n

and pressing the Enter key.

where

n
is the number of the faulty link(s) associated with the NT6X50 card. Remember that at CARRIER level, links must be addressed by the number under the *n* column.

17 Test any faulty link(s) by typing

>TST n

and pressing the Enter key

where

n
is the number of the faulty link(s) associated with the NT6X50 card. Remember that at CARRIER level, links must be addressed by the number under the n column.

If	Do
carrier test passed	step 22
carrier test failed	step 18

NT6X50 in an RSC (continued)

At the RCE frame

18

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

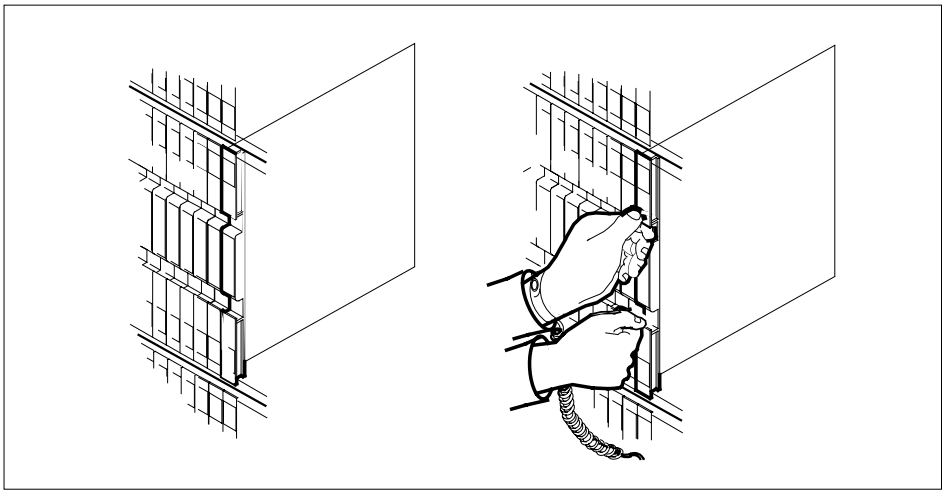
19

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

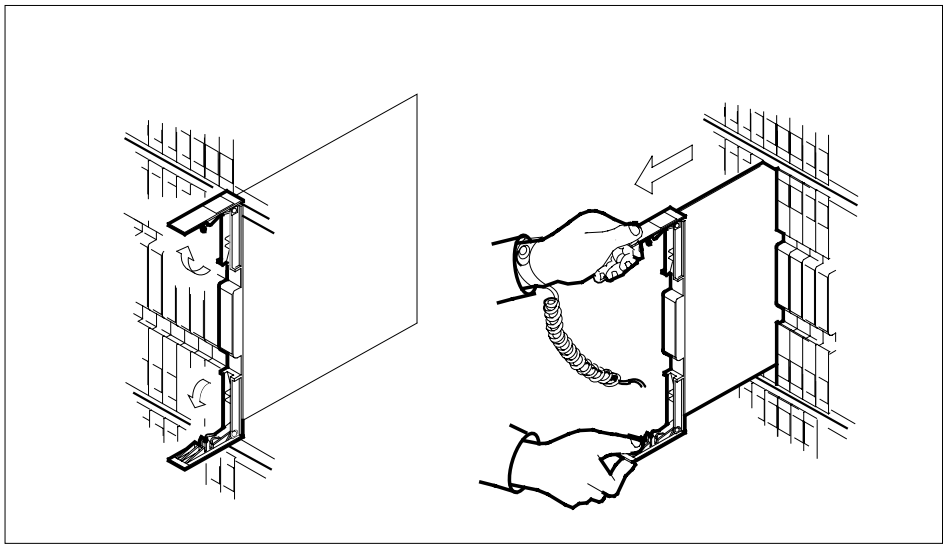
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Replace the NT6X50 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



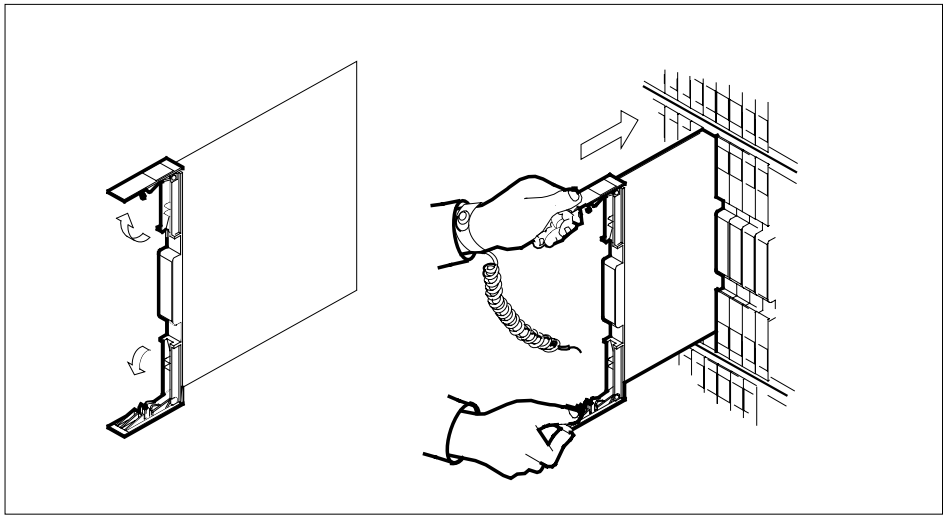
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

20 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

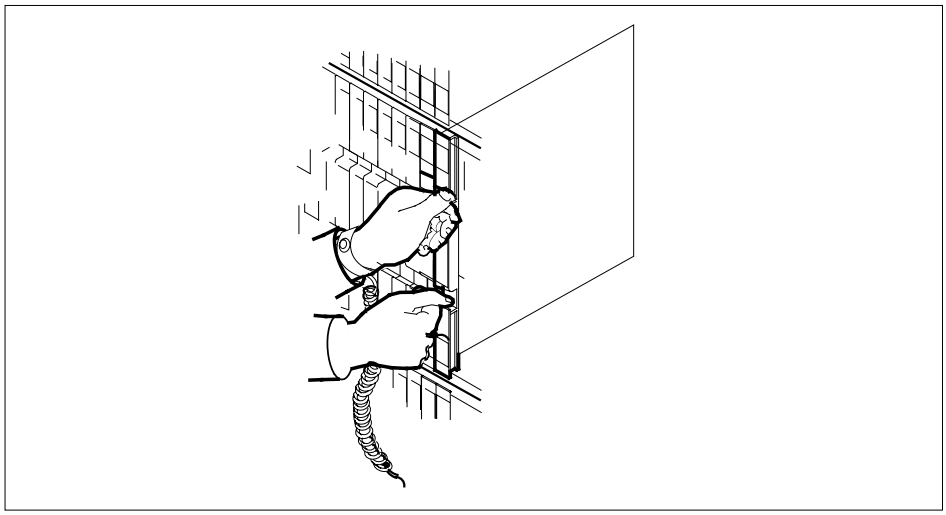


21 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b Close the locking levers.

NT6X50 in an RSC (continued)



At the MAP display

22 Return all carrier links busied in step 16 to service by typing

`>RTS n`

and pressing the Enter key

where

n
is the number of the faulty link(s) associated with the new NT6X50 card. Remember that at CARRIER level, links must be addressed by the number under the n column.

If	Do
RTS PASSED	step 23
RTS FAILED	step 33

23 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 32
other	step 24

24 Post the RCC associated with the new NT6X50 card by typing

`>PM; POST RCC rcc_unit_no`

and pressing the Enter key

where

rcc_unit_no
is the number of the RCC unit associated with the new NT6X50 card

Example of a MAP display:

```
 CM   MS   IOD   Net   PM  CCS  LNS  Trks  Ext   APPL
  .    .    .    .    1RCC  .    .     .    .     .

RCC            SysB   ManB  OffL  CBsy  ISTb     InSv
 0 Quit     PM   0      0     2     0    2         25
 2 Post_    RCC  0      0     0     0    1          1
 3 ListSet
 4          RCC 0 ISTb Links_OOS:  CSide  1, PSide   0
 5 TRNSL_   Unit0: Act   InSv
 6 TST_     Unit1: Inact ManB
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

25 Test the inactive RCC unit by typing

>TST UNIT rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

If	Do
TEST PASSED	step 26
TEST FAILED	step 33

26 Post the host PM by typing

>POST host_pm host_pm_no

and pressing the Enter key.

Allow 15 minutes for messaging to clear between the CC and the RCC.

NT6X50 in an RSC (continued)

where

host_pm
is a line group controller (LGC) or line trunk controller (LTC)

host_pm_no
is the number of an LGC or LTC

Example of a MAP display:

```
CM   MS   IOD   Net  PM  CCS  Lns  Trks   Ext   APPL
 .    .     .      .  1RCC  .   .    .      .     .

LTC              SysB   ManB  OffL   CBsy  ISTb  InSv
0 Quit     PM       0      0    1       0    4    22
2 Post_    LTC      0      0    2       0    2     9
3 ListSet
4         LTC  0  ISTb  Links_OOS: CSide 0, PSide  1
5 Trnsl_  Unit0: Act     InSv
6 Tst_    Unit1: Inact   InSv
7 Bsy_
8 RTS_
9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

27 RTS the links busied in step 11 by typing

>RTS LINK link_no

and pressing the Enter key.

where

link_no
is the number of the links associated with the new NT6X50 card.

If	Do
RTS PASSED	step 30
RTS FAILED	step 33

28 Post the RCC associated with the new NT6X50 card by typing

>PM; POST RCC rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit associated with the new NT6X50 card

Example of a MAP display:

```
 CM   MS   IOD   Net   PM  CCS  LNS  Trks  Ext   APPL
  .    .    .    .    1RCC  .    .     .    .     .

RCC            SysB   ManB  OffL  CBsy  ISTb     InSv
 0 Quit     PM   0      0     2     0    2        25
 2 Post_    RCC  0      0     0     0    1         1
 3 ListSet
 4          RCC 0 ISTb Links_OOS:  CSide  1, PSide   0
 5 TRNSL_   Unit0: Act   InSv
 6 TST_     Unit1: Inact ManB
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

29 Return the inactive RCC unit to service by typing

>RTS UNIT rcc_unit_no

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit tested in step 25

If	Do
RTS PASSED	step 30
RTS FAILED	step 33

30 Send any faulty cards for repair according to local procedure.

NT6X50 in an RSC (end)

31 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card.

Go to step 34.

32 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

33 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

34 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X51 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X51	AA, AB,AC	Line concentrating module processor card

Common Procedures

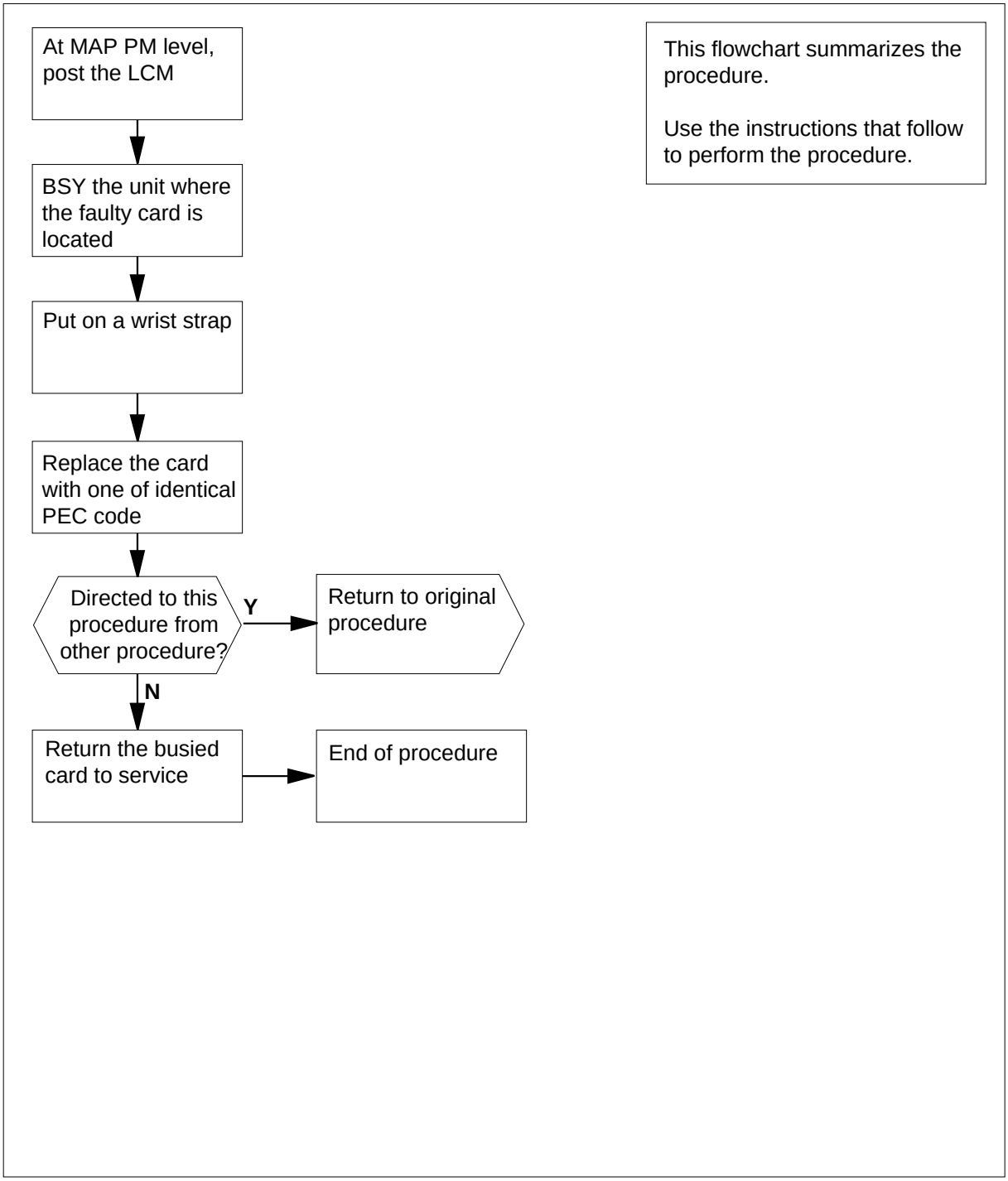
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X51 in an RSC LCM (continued)

Summary of replacing an NT6X51 card in an RSC LCM



NT6X51 in an RSC LCM (continued)

Replacing an NT6X51 card in RSC LCM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be replaced.

At the MAP display

3 Access the PM level and post the LCM by typing

`>MAPCI;MTC;PM;POST LCM lcm_site_name lcm_frame_no lcm_no`

and pressing the Enter key.

where

lcm_site_name
is the name of the site where the LCM is located

cm_frame_no
is the number of the frame where the LCM is located

lcm_no
is the number of the LCM unit with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
  .     .     .      .    1LCM   .     .     .       .      .

LCM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM    0        1        0        0        0        130
 2 Post_   LCM   0        1        0        0        0          0
 3
 4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 1 PSide 0
 5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
 6 Tst           Unit-1:  SysB  Mtce             /RG:  0
 7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
 8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
 9 OffL         .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

NT6X51
in an RSC LCM (continued)

4 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

5 Busy the LCM unit by typing

>BSY UNIT lcm_unit_no

and pressing the Enter key.

where

lcm_unit_no
is the number of the LCM unit posted in step 3

Example of a MAP display:

```
CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
 .     .     .      .    1LCM   .     .     .       .      .

LCM           SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM    0        1        0        0        0        130
2 Post_   LCM   0        1        0        0        0          0
3
4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 1 PSide 0
5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
6 Tst           Unit-1:  ManB  Mtce             /RG:  0
7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
9 OffL         .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

NT6X51 in an RSC LCM (continued)

At the LCE frame

6

DANGER
Card damage—transport
Take these precautions to protect circuit cards from electrical and mechanical damage during transport:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected through a 1-megohm resistor, to a suitable grounded object such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects equipment against damage caused by static electricity.

Put on a wrist strap.

7

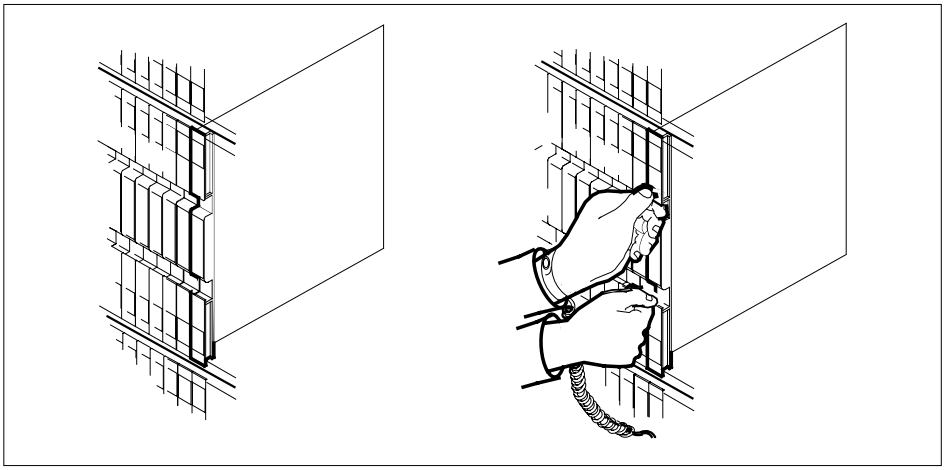
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

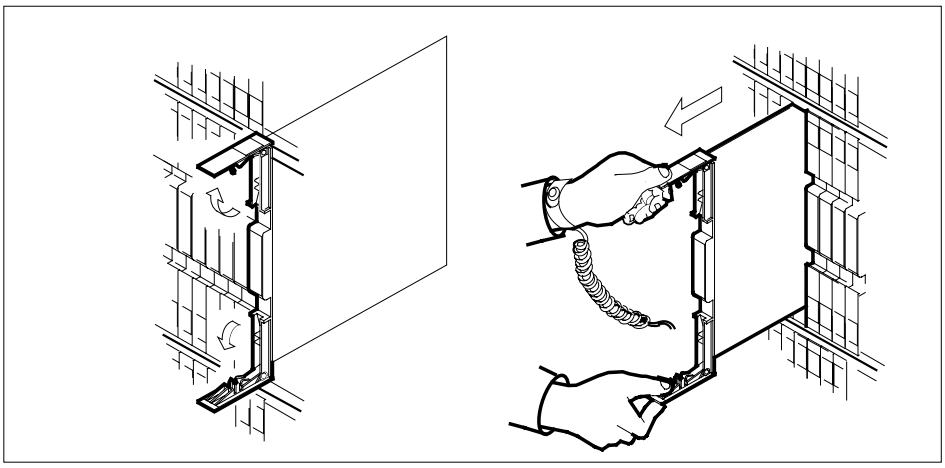
Remove the NT6X51 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT6X51
in an RSC LCM (continued)



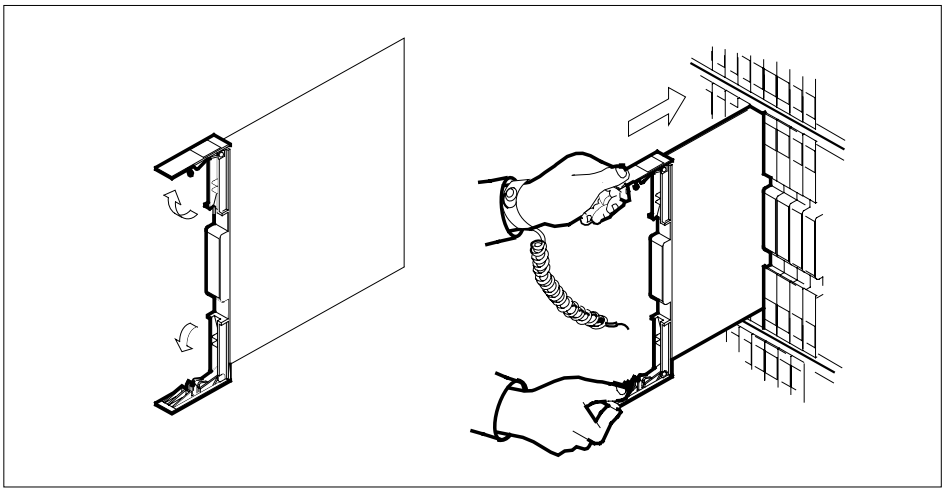
8 Ensure the replacement card has the same PEC, including suffix, as the card you just removed.



9 Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

10 Open the locking levers on the replacement card.

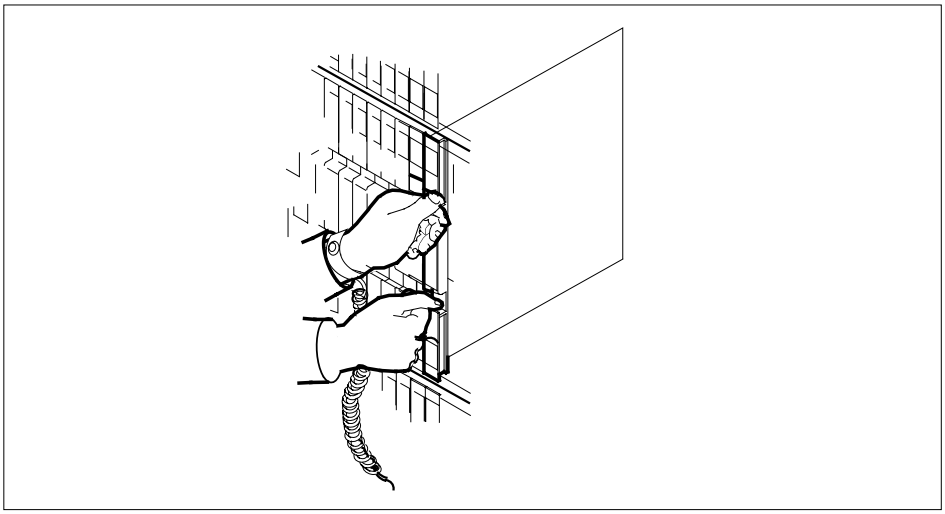
Align the card with the slots in the shelf and gently slide the card into the shelf.



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



12 Use the following information to determine the next step.

If you entered this procedure from	Do
an alarm clearing procedure	step 36
other	step 13

NT6X51
in an RSC LCM (continued)

At the MAP display

13 Load the LCM unit by typing

`>LOADPM UNIT lcm_unit_no CC`

and pressing the Enter key.

where

lcm_unit_no
is the number of the LCM unit busied in step 5

If	Do
message `loadfile not found in directory` is not received	step 14
load pases	step 32
load fails	step 37

14 Determine the type of device on which the PM load files are located.

If load files are located on	Do
tape	step 15
IOC disk	step 21
SLM disk	step 26

15 Locate the tape that contains the PM load files.

At the IOE frame

16 Mount the tape on a magnetic tape drive.

At the MAP display

17 Download the tape by typing

`>MOUNT tape_no`

and pressing the Enter key.

where

tape_no
is the number of the tape drive containing the PM load files

18 List the contents of the tape in your user directory by typing

`>LIST T tape_no`

and pressing the Enter key.

where

NT6X51
in an RSC LCM (continued)

tape_no
is the number of the tape drive containing the PM load files

19 Demount the tape disk by typing

```
>DEMOUNT T tape_no
```

and pressing the Enter key.

where

tape_no
is the number of the tape drive containing the PM load files

20 Go to step 31.

21 From office records, determine and note the number of the input/output controller (IOC) disk and the name of the volume that contains the PM load files.

22 Access the disk utility level of the MAP by typing

```
>DSKUT
```

and pressing the Enter key.

23 List the IOC file names into your user directory by typing

```
>LISTVOL volume_name ALL
```

and pressing the Enter key.

where

volume_name
is the name of the volume that contains the PM load files, obtained in step 21

24 Leave the disk utility by typing

```
>QUIT
```

and pressing the Enter key.

25 Go to step 31.

26 From office records, determine and note the number of the system load module (SLM) disk and the name of the volume that contains the PM load files.

27 Access the disk utility level of the MAP display by typing

```
>DISKUT
```

and pressing the Enter key.

28 List the SLM disk volume names by typing

```
>LV CM
```

and pressing the Enter key.

29 List the SLM file names into your user directory by typing

```
>LF volume_name
```

and pressing the Enter key.

NT6X51
in an RSC LCM (continued)

where

volume_name
is the name of the volume that contains the PM load files, obtained in step 26

30 Leave the disk utility by typing

```
>QUIT
```

and pressing the Enter key.

31 Reload the LCM unit by typing

```
>LOADPM UNIT lcm_unit CC
```

and pressing the Enter key.

where

lcm_unit
is the LCM unit to be loaded (0 or 1)

If	Do
load fails	step 37
load passes	step 32

32 Test the LCM unit by typing

```
>TST UNIT lcm_unit_no
```

and pressing the Enter key.

where

lcm_unit_no
is the number of the LCM unit loaded in step 13

If the TST	Do
passes	step 33
fails	step 37

33 Return the LCM unit to service by typing

```
>RTS UNIT lcm_unit_no
```

and pressing the Enter key.

where

lcm_unit_no
is the number of the LCM unit tested in step 32

If the RTS	Do
passes	step 34

NT6X51 in an RSC LCM (end)

If the RTS	Do
fails	step 37

34 Send any faulty cards for repair according to local procedure.

35 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 38.

36 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure for that card in this manual.

37 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

38 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X52 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X52	AA, AB	Digital control card (DCC)

Common procedures

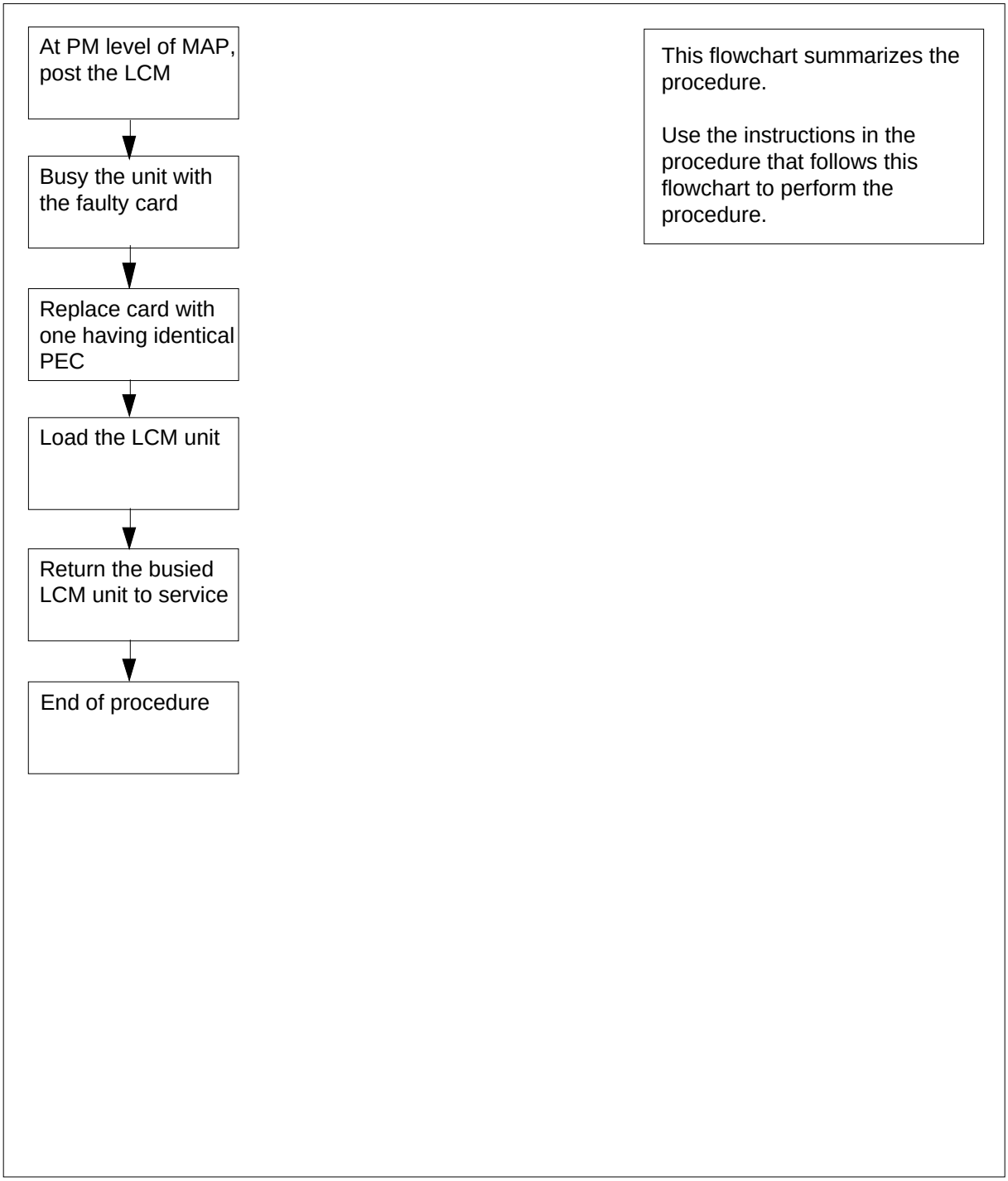
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X52 in an RSC LCM (continued)

Summary of replacing an NT6X52 card in an in RSC LCM



NT6X52
in an RSC LCM (continued)

Replacing an NT6X52

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level of the MAP and post the LCM by typing

`>MAPCI;MTC;PM;POST LCM site frame lcm`

and pressing the Enter key.

where

site
is the name of the RSC site

frame
is the frame number of the LCE frame (0 to 511)

lcm
is the number of the LCM (0 or1) in the LCE frame

Example of a MAP display:

```
 CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
  .     .     .      .    1LCM   .     .     .       .      .

LCM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM    0        1        0        0        0        130
 2 Post_   LCM   0        1        0        0        0          0
 3
 4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 1 PSide 0
 5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
 6 Tst           Unit-1:  SysB  Mtce              /RG:  0
 7 Bsy                                  11 11 11 11 11 RG:Pref:0 InSv
 8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
 9 OffL          .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the LCM unit containing the faulty card by typing

`>BSY UNIT lcm_unit`

and pressing the Enter key.

where

lcm_unit
is the LCM unit to be busied (0 or 1)

Example of a MAP display:

```
CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
 .     .     .      .    1LCM   .     .     .       .      .

LCM           SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM    0        1        0        0        0        130
2 Post_   LCM   0        1        0        0        0          0
3
4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 1 PSide 0
5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
6 Tst           Unit-1:  ManB  Mtce             /RG:  0
7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
9 OffL          .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

NT6X52 in an RSC LCM (continued)

At the LCE frame

5

DANGER
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage during transportation:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

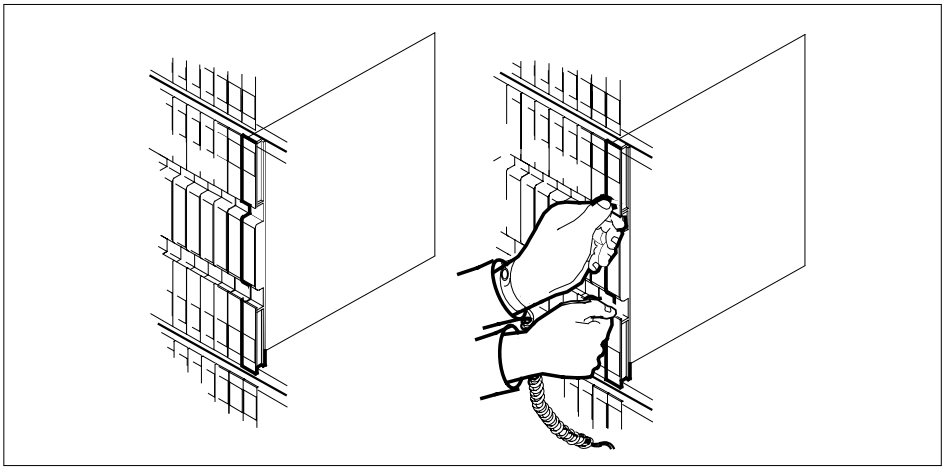
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

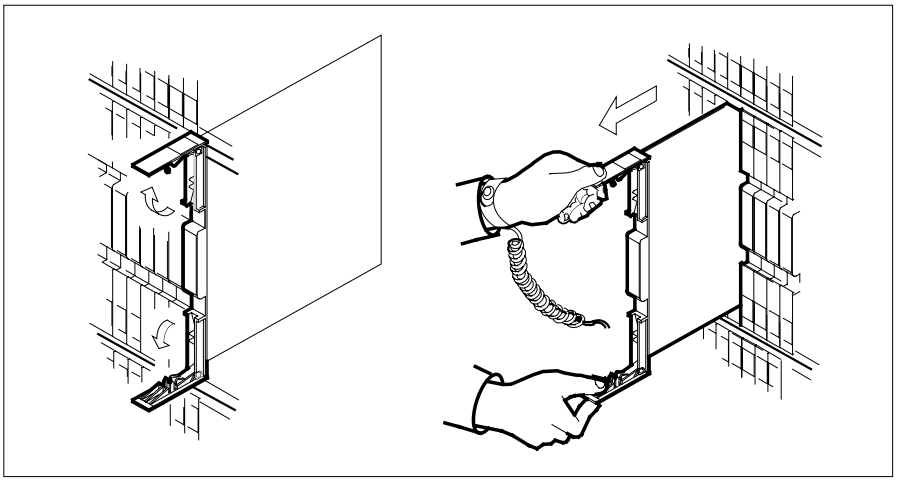
6 Remove the NT6X52 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT6X52
in an RSC LCM (continued)



7 Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

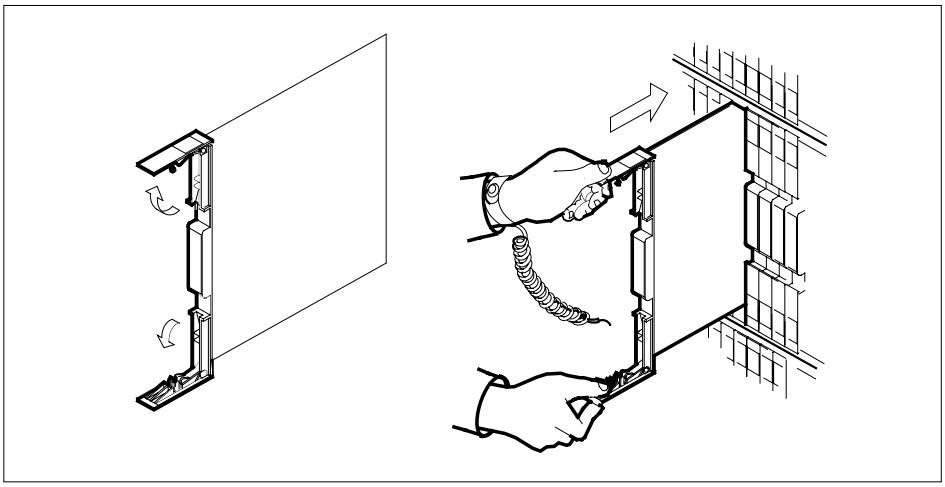


8 Ensure the replacement card has the same PEC including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

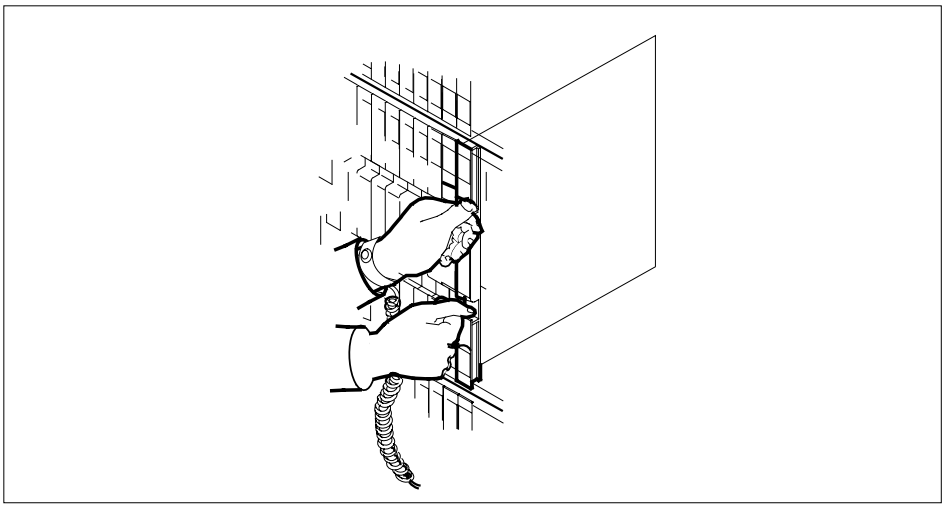
NT6X52
in an RSC LCM (continued)



10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplace to ensure that the card is fully seated in the shelf.

b Close the locking levers.



11 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedure	step 16

NT6X52 in an RSC LCM (end)

If you entered this procedure from	Do
other	step 12

12 Load the LCM unit by typing

`>LOADPM UNIT lcm_unit CC`

and pressing the Enter key.

where

lcm_unit
is the LCM unit to be loaded (0 or 1)

If	Do
load passed	step 13
load failed	step 17

13 Return the LCM unit to service by typing

`>RTS UNIT lcm_unit`

and pressing the Enter key.

where

lcm_unit
is the LCM unit, (0 or 1) busied in step 4

If RTS	Do
passed	step 14
failed	step 17

14 Send any faulty cards for repair according to local procedure.

15 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 18.

16 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

17 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

18 You have successfully completed this procedure.

NT6X53 in an RSC LCM

Application

Use this procedure to replace the following card in an in RSC LCM.

PEC	Suffixes	Name
NT6X53	AA, BA, CA	Power converter card (5V/15V)

Common procedures

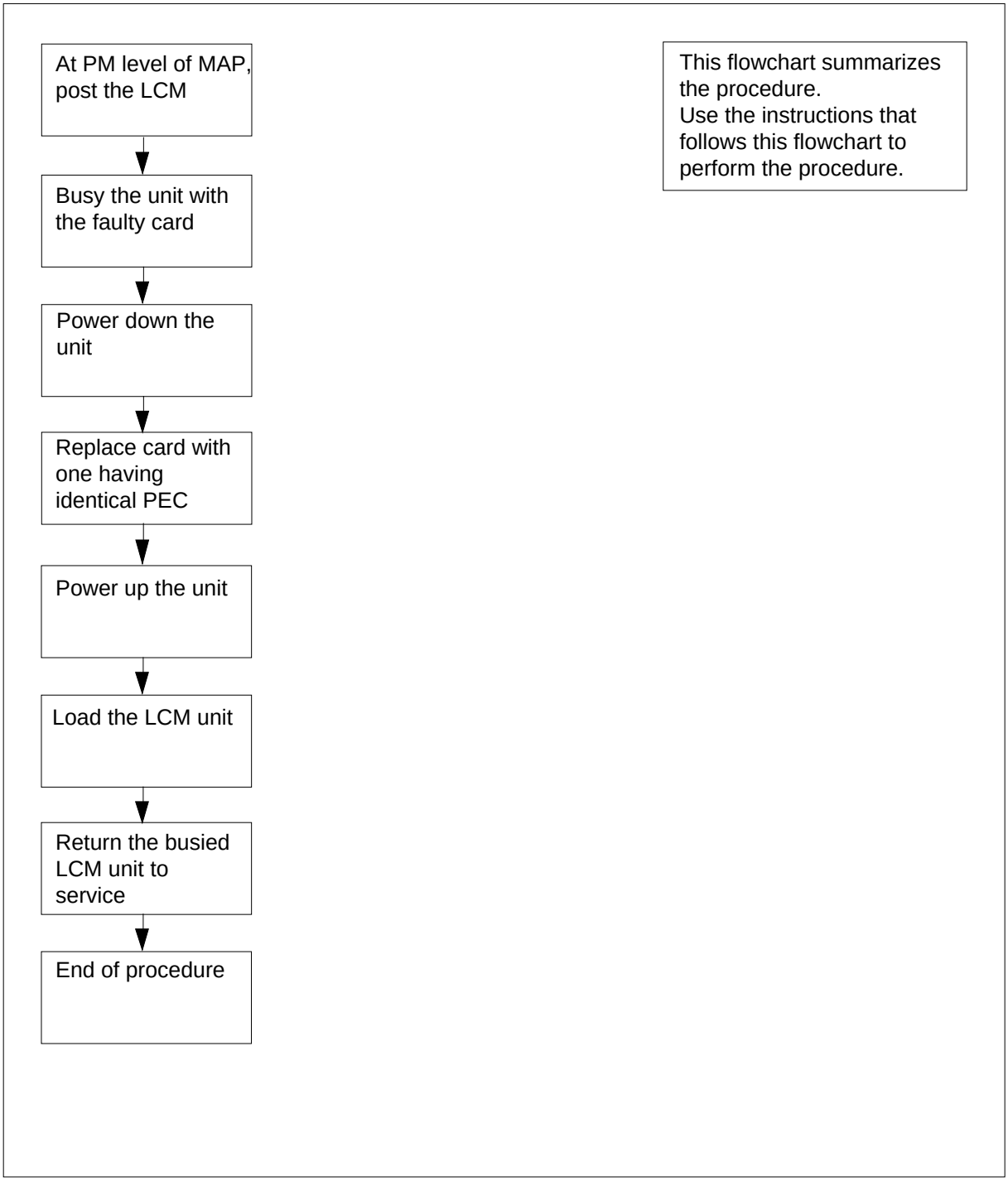
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X53 in an RSC LCM (continued)

Summary of card replacement procedure for NT6X53 card in RSC LCM



NT6X53 in an RSC LCM (continued)

Replacing an NT6X53 in an RSC LCM

At your Current Locaction

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP display

3 Access the PM level of the MAP display and post the LCM by typing

`>MAPCI;MTC;PM;POST LCM site frame lcm`

and pressing the Enter key.

where

site
is the name of the RSC site

frame
is the frame number of the LCE frame (0 to 511)

lcm
is the number of the LCM (0 or 1)

Example of a MAP display:

```
 CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
  .     .     .      .    1LCM   .     .     .       .      .

LCM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM    0        1        0        0        0        130
 2 Post_   LCM   0        1        0        0        0          0
 3
 4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 0 PSide 0
 5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
 6 Tst           Unit-1:  SysB  Mtce             /RG:  0
 7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
 8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
 9 OffL         .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the LCM unit containing the faulty card by typing

`>BSY UNIT lcm_unit`

and pressing the Enter key.

where

lcm_unit
is the LCM unit (0 or 1)to be busied

Example of a MAP display:

```
CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
 .     .     .      .    1LCM   .     .     .       .      .

LCM           SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM    0        1        0        0        0        130
2 Post_   LCM   0        1        0        0        0          0
3
4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 0 PSide 0
5 Trnsl         Unit-0:  InSv  Mtce TakeOver    /RG:  0
6 Tst           Unit-1:  ManB  Mtce             /RG:  0
7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
9 OffL          .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the LCE frame

5 Turn the circuit breaker OFF for the unit where the power converter is being replaced. Use the table below to determine which FSP circuit breaker serves the unit.

Circuit breaker	Unit FED	Locations
CB1	LCA 0 LCM 0	Shelf 04 slot 01
CB2	LCA 1 LCM 0	Shelf 21 slot 01
CB3	LCA 0 LCM 1	Shelf 38 slot 01
CB4	LCA 1 LCM 1	Shelf 55 slot 01

NT6X53
in an RSC LCM (continued)

6 Replace the NT6X53 card as shown in the following figures.

7

DANGER
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage during transportation:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

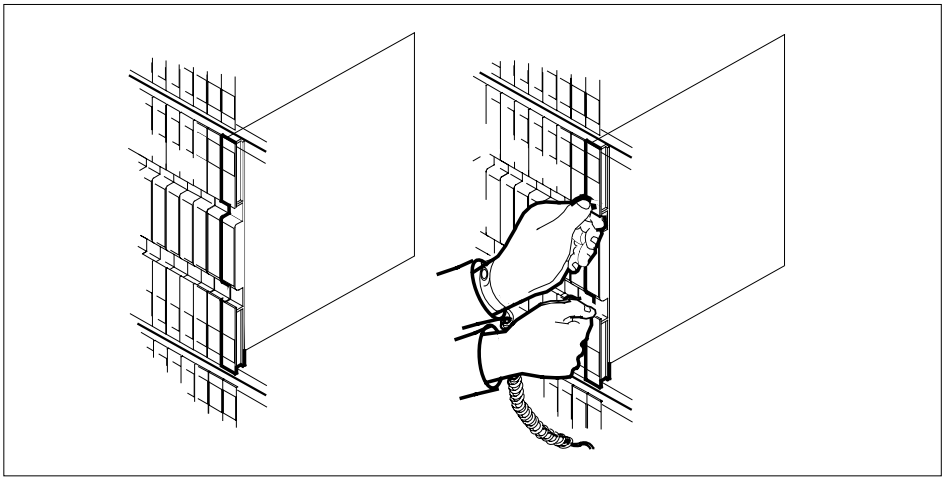
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

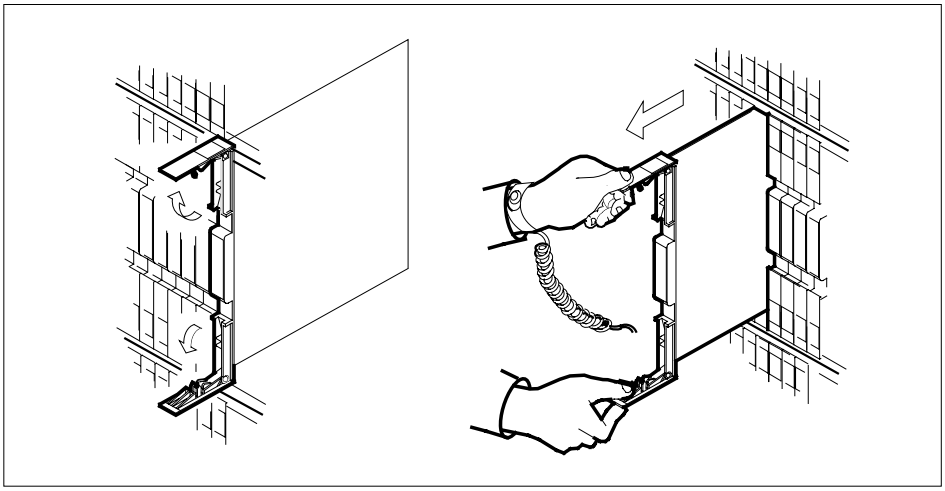
Put on a wrist strap.

8 Remove the NT6X53 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

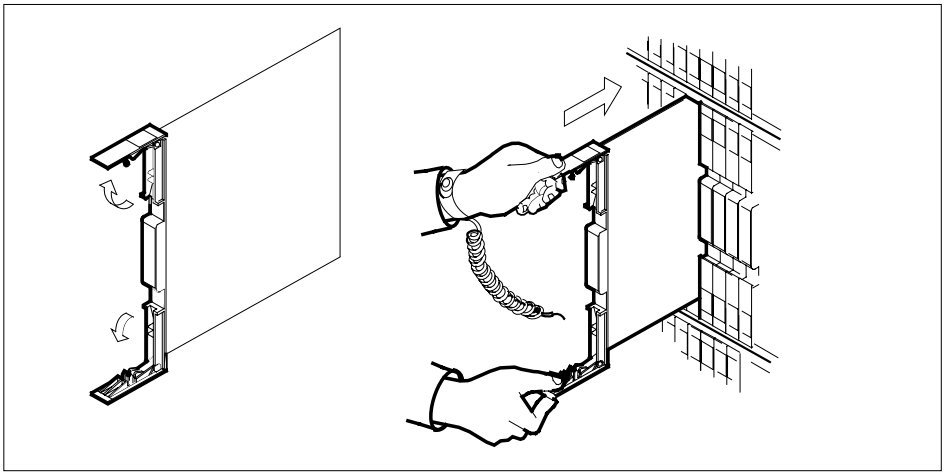


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf and gently slide the card into the shelf.

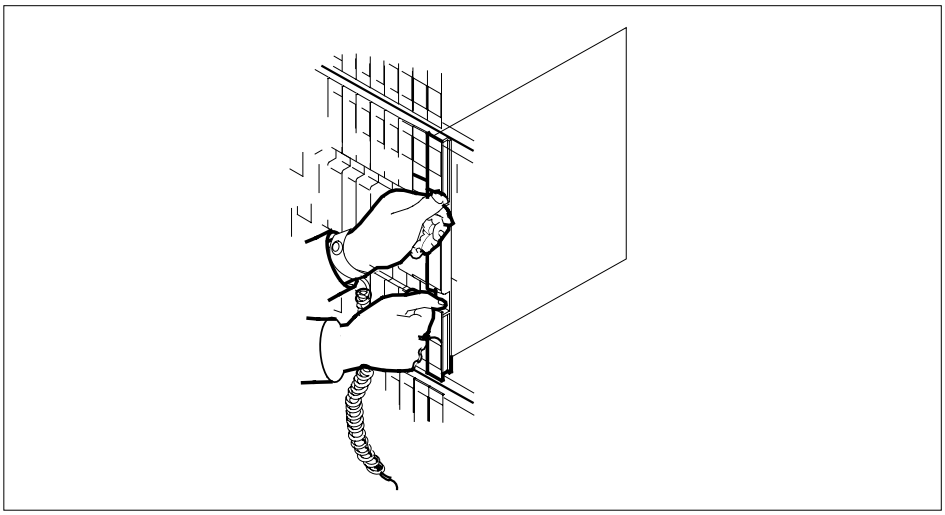
NT6X53
in an RSC LCM (continued)



10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



11 Power up the LCM unit as follows:

a Ensure the power converter (NT6X53) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

b Set the circuit breaker to the ON position. The converter fail LED and frame fail lamp on the FSP will be extinguished.

NT6X53
in an RSC LCM (continued)

Determine the correct FSP switch for the shelf where the power converter was replaced from the diagram below. The switches are numbered corresponding to the shelf position.

Circuit breaker	Unit FED	Locations
CB1	LCA 0 LCM 0	Shelf 04 slot 01
CB2	LCA 1 LCM 0	Shelf 21 slot 01
CB3	LCA 0 LCM 1	Shelf 38 slot 01
CB4	LCA 1 LCM 1	Shelf 55 slot 01

At the MAP display

12 Load the LCM unit by typing

`>LOADPM UNIT lcm_unit CC`

and pressing the Enter key.

where

lcm_unit
is the LCM unit (0 or 1) busied in step 4.

If	Do
load pases	step 13
load fails	step 18

13 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 17
other	step 14

14 Return the LCM unit to service by typing

`>RTS UNIT lcm_unit`

and pressing the Enter key.

where

NT6X53 in an RSC LCM (end)

lcm_unit
is the LCM (0 or 1) busied in step 4

If RTS	Do
passed	step 15
failed	step 18

15 Send any faulty cards for repair according to local procedure.

16 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 19.

17 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

18 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

19 You have successfully completed this procedure.

NT6X54 in an RSC

Application

Use this procedure to replace the following card in a line concentrating module (LCM).

PEC	Suffixes	Name
NT6X54	AA	Bus interface card (BIC)
NT6X54	DA	ISDN drawer controller (IDC) card (BIC) ***Note:*** Peripherals with ISDN line drawer for remotes (ILDR) must use the NT6X54DA card. ILDR is first available for remote switching center-SONET (RSC-S) and remote switching center (RSC) configurations in the NA007/XPM08 timeframe. ILDR is first available for remote line concentrating module (RLCM), outside plant module (OPM), and outside plant access cabinet (OPAC) configurations in the NA008/XPM81 timeframe.

Common Procedures

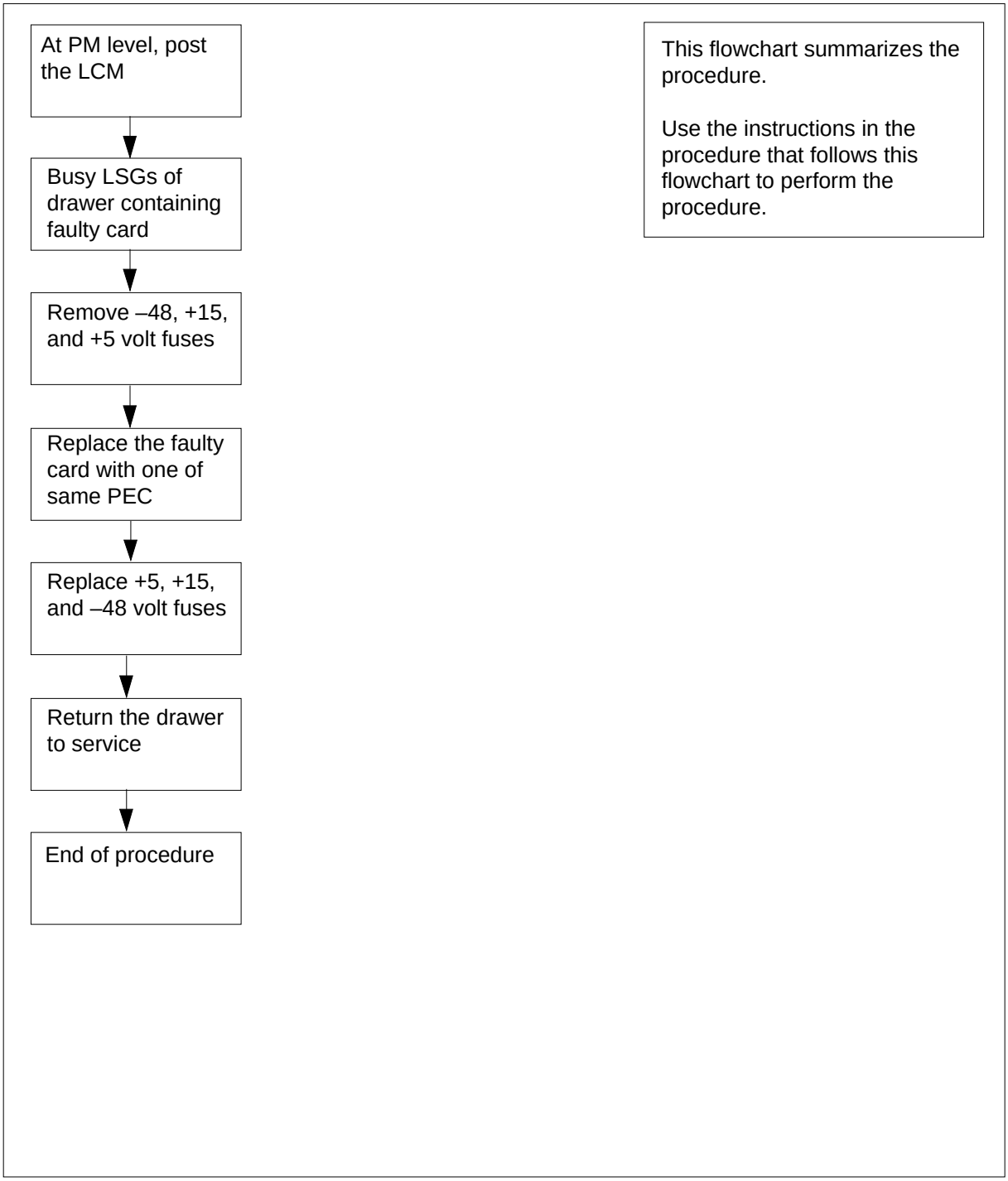
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NT6X54 in an RSC (continued)

Summary of card replacement procedure for NT6X54 card in an RSC LCM



Replacing an NT6X54 in an RSC LCM

At your Current Location

1

ATTENTION
If you are entering this procedure due to a loss of power in the LCM's controller (LGC/LTC/RCC). Check logutil for PM181 log with reason text of: DCC BIC Looparound and go to step 10.

Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

3 If you were directed to this procedure from the *Alarm Clearing Procedures*, go to step 10. Otherwise, continue with step 4.

At the MAP terminal

4 Access the peripheral module (PM) level of the MAP (maintenance and administration position) display and post the LCM by typing

```
>MAPCI;MTC;PM;POST LCM site frame lcm
```

and pressing the Enter key.

where

site
is the site name (alphanumeric) of the RSC

frame
is the frame number (0 through 511) of the LCE

lcm
is the number (0 through 511) of the LCM

Example of a MAP display:

NT6X54
in an RSC (continued)

```
 CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
  .     .     .      .    1LCM   .     .     .       .      .

LCM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM    0        1        0        0        0        130
 2 Post_   LCM   0        1        0        0        0          0
 3
 4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 0 PSide 0
 5 Trnsl         Unit-0:  InSv  Mtce       /RG:  0
 6 Tst           Unit-1:  InsV  Mtce       /RG:  0
 7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
 8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
 9 OffL              .. .. SS .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

Note: ILDR drawers are identified in reverse video on the MAP display.

5 Determine whether or not you need to access the ILD level on the MAP terminal.

If the card you are replacing is	Do
NT6X54DA	step 6
NT6X54AA	step 9

6 Access the ILD level on the MAP terminal by typing

`>ILD`

and pressing the Enter key.

7 Post the ILDR drawer in which the card is being replaced by typing

`>POST drawer_no`

and pressing the Enter key.

where

drawer_no
is the ILD drawer number (0 through 19) in the LCM

8 Busy both line subgroups associated with the LCM drawer in which the card is being replaced by typing

`>BSY DRWR`

and pressing the Enter key.

Example of a MAP response;

```
Please confirm (“YES,” “Y,” “NO,” or “N”):
```

Confirm the system prompt by typing

>YES

and pressing the Enter key.

Go to step 10.

9 Busy both line subgroups associated with the LCM drawer where the card is being replaced by typing

>BSY DRWR lsg

and pressing the Enter key.

where

lsg
is one of two line subgroups (0 through 19) associated with the drawer

Example of a MAP response;

```
LCM REM1 00 0  Drwr 4 will be taken out of service
Please confirm (“YES,” “Y,” “NO,” or “N”):
```

Confirm the system prompt by typing

>YES

and pressing the Enter key.

Note: Repeat this step for the other line subgroup associated with the line drawer.

Example of a MAP display:

NT6X54
in an RSC (continued)

```
 CM    MS    IOD    Net    PM   CCS   LNS   Trks    Ext    Appl
  .     .     .      .    1LCM   .     .     .       .      .

LCM            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM    0        1        0        0        0        130
 2 Post_   LCM   0        1        0        0        0          0
 3
 4 SwRg          LCM   Rem1  OO O ISTb   Links_OOS: CSide 0 PSide 0
 5 Trnsl         Unit-0:  InSv  Mtce       /RG:  0
 6 Tst           Unit-1:  InsV  Mtce       /RG:  0
 7 Bsy                                 11 11 11 11 11 RG:Pref:0 InSv
 8 RTS           Drwr: 01 23 45 67 89 01 23 45 67 89    Stby:1 InSv
 9 OffL                .. .. MM .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the LCE frame

10 Remove the -48V fuse for the line drawer containing the faulty bus interface card.

11 Remove the +15V fuse for the line drawer containing the faulty bus interface card.

12 Remove the +5V fuse for the line drawer containing the faulty bus interface card.

If entry into this procedure is due to	Do
replacement of BIC	step 13
loss of power in LCM's controller	step 17

13

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the LCM. This protects the equipment against damage caused by static electricity.

NT6X54
in an RSC (continued)

DANGER
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage during transport:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat. Wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch cabinet (Nortel [Northern Telecom] Corporate Standard 5028). Store and transport circuit cards in an ESD protective container.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

Put on a wrist strap.

14 Open the line drawer using the following steps:

a Face the drawer shelf and grasp the lip at the bottom of the drawer.

b Push up on the drawer latch with your thumb and pull the drawer out approximately 15 cm (about 6 inches).

15 Remove the BIC to be replaced by following these substeps:

a Open the locking levers on the BIC.

b Grasping the open locking levers, remove the card from the line drawer in one steady motion. The card will unplug from its socket.

Note: Do not use a rocking motion to remove the card.

16 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

NT6X54
in an RSC (continued)

b Close the locking levers on the card.

c Position the card in its backplane socket. In one steady motion, push against the closed locking levers with your thumbs until the card plugs fully into the backplane socket.

Note: Do not use a rocking motion to insert the card.

d Close the line drawer.

17 Replace the +5V fuse for the line drawer containing the faulty bus interface card.

18 Replace the +15V fuse for the line drawer containing the faulty bus interface card.

19 Replace the -48V fuse for the line drawer containing the faulty bus interface card.

20 If you were directed to this procedure from the *Alarm Clearing Procedures,* return now to the alarm clearing procedure that directed you here. Otherwise, continue with step 21.

At the MAP terminal

21 Determine which procedure to use to return the line subgroups to service.

If the card you are replacing is	Do
NT6X54AA	step 22
NT6X54DA	step 23

22 Return the line subgroups to service by typing

```
>RTS DRWR  lsg
```

and pressing the Enter key.

where

lsg
is one of two line subgroups (0 through 19) associated with the drawer

Note: Repeat this step for the other line subgroup associated with the line drawer.

If RTS	Do
passed	step 24
failed	step 26

23 Return the line subgroups to service by typing

```
>RTS DRWR
```

and pressing the Enter key.

If RTS	Do
passed	step 24
failed	step 26

24 Send any faulty cards for repair according to local procedure.

25 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 27.

26 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

27 You have successfully completed this procedure.

NT6X69 in an RSC RCC/RCC2

Application

Use this procedure to replace an NT6X69 in an RSC RCC.

Note: This procedure is used to replace a card in an RCC or an RCC2. In this procedure the term RCC refers to both the RCC in an RSC frame, NT6X10, and an RCC2 in an RSCE cabinet, NTMX89.

PEC	Suffixes	Name
NT6X69	AB, AC, AD, QA	Message and tone card

Common Procedures

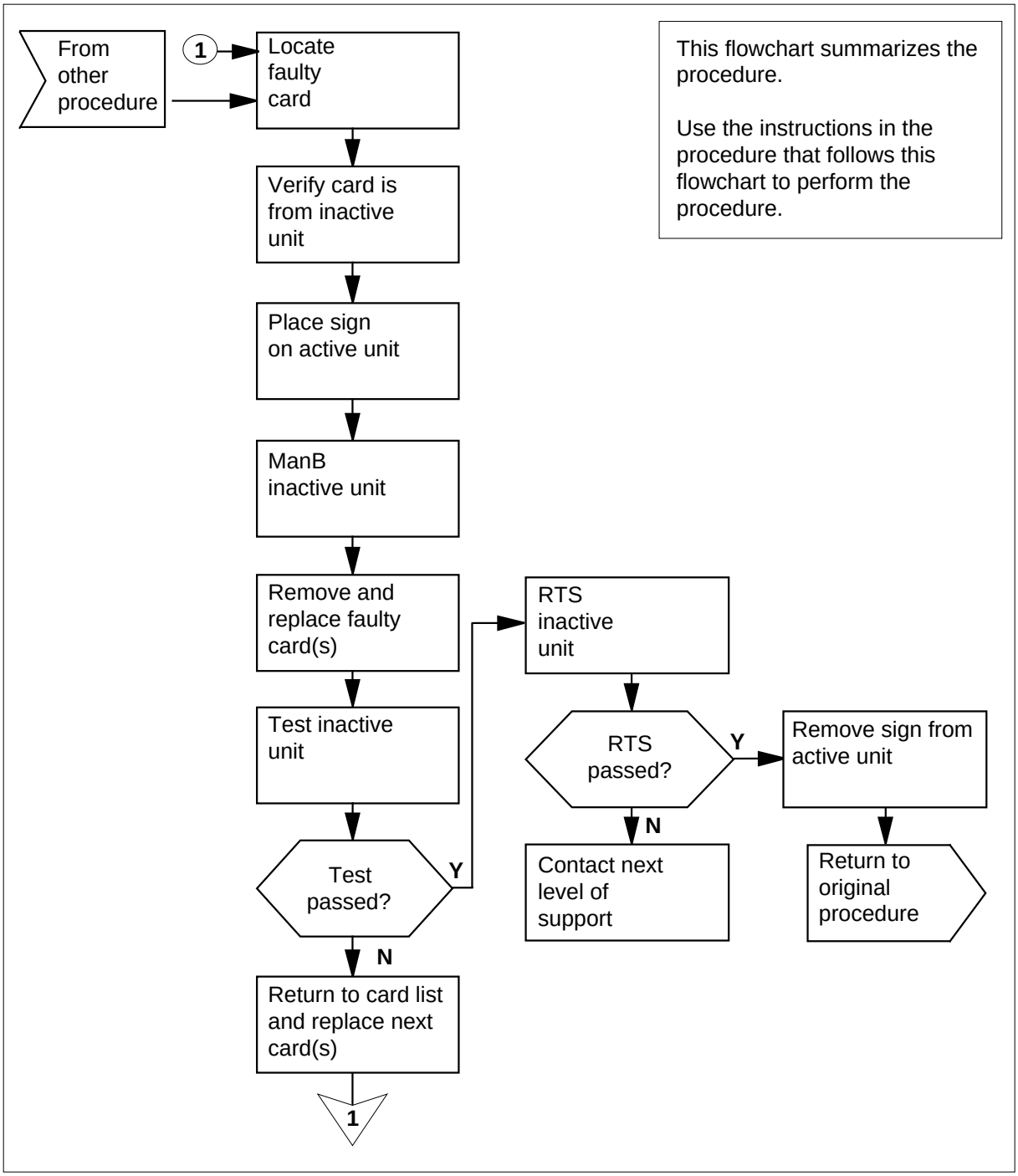
None

Action

The following flowchart is a summary of this procedure. Use the instructions in the step-action table that follows the flowchart to perform the procedure.

NT6X69
in an RSC RCC/RCC2 (continued)

Summary of card replacement procedure for an NT6X69 card in an RSC RCC



NT6X69 in an RSC RCC/RCC2 (continued)

Replacing an NT6X69 card in RSC RCC

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in an RCC, ensure the unit where you are replacing the card is INACTIVE and that the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1RCC    .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        2        0        2        25
 2 Post_   RCC       0        0        0        0        1         1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL_   Unit0:   Inact SysB
 6 TST_     Unit1:   Act   InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE frame

5 Put a sign on the ACTIVE unit bearing the words *Active unit—Do not touch*.

At the MAP display

6 Busy the inactive RCC unit by typing

`>BSY UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

7 Prevent the PM from trapping by typing

`>PMRESET UNIT rcc_unit_no NORUN`

and pressing the Enter key.

where

rcc_unit_no is
the number of the inactive RCC unit

NT6X69 in an RSC RCC/RCC2 (continued)

At the RCE frame

8

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

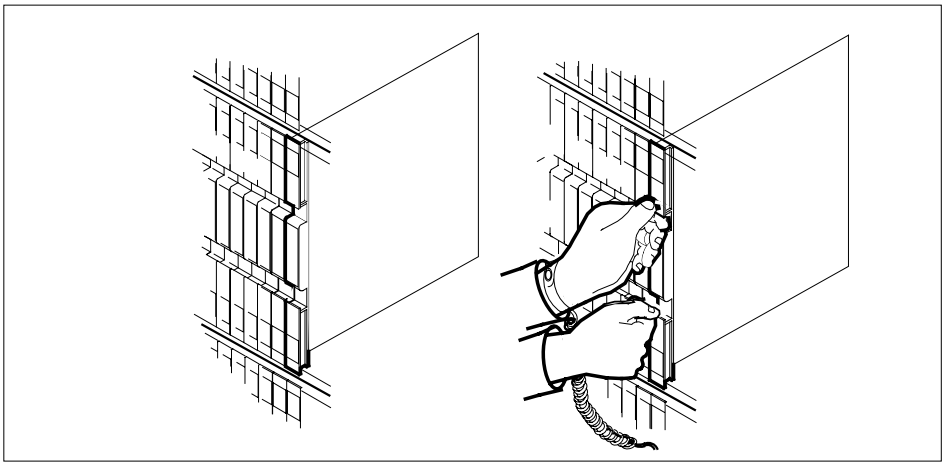
9

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

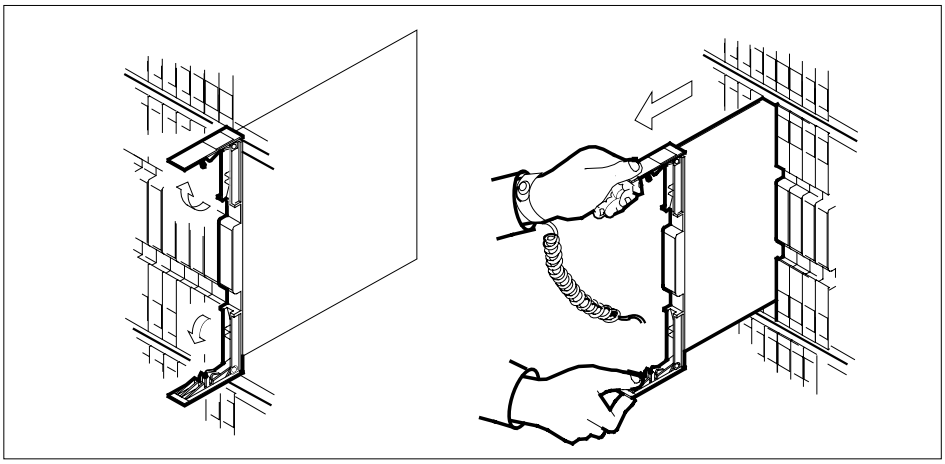
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NT6X69 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

10

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

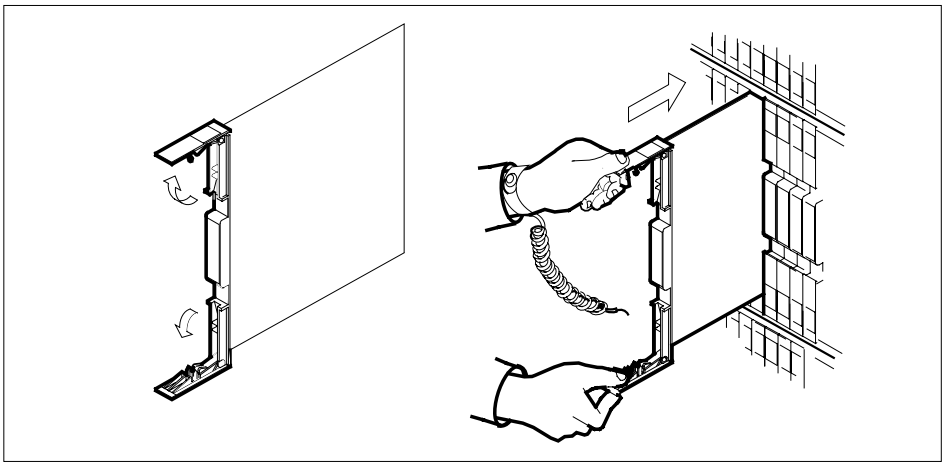
CAUTION
Loss of subscriber service
Subscriber service may be lost in the active unit when reseating the NT6X69 card in slot 17.

It is recommended this procedure be performed during low traffic periods.

Open the locking levers on the replacement card.

Align the card with the slots in the shelf and gently slide the card into the shelf.

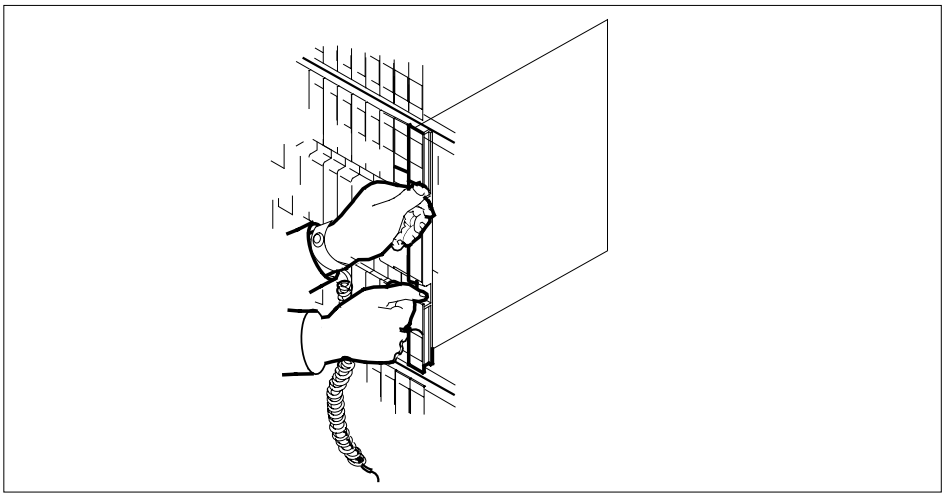
NT6X69
in an RSC RCC/RCC2 (continued)



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b Close the locking levers.



At the MAP display

12 Perform a full reset of the inactive unit by typing

```
>PMRESET UNIT rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

NT6X69 in an RSC RCC/RCC2 (end)

13 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 17
other	step 14

14 Return the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit reset in step 12.

If the RTS	Do
passes	step 15
fails	step 18

15 Send any faulty cards for repair according to local procedure.

16 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 19.

17 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

18 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

19 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X71 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffixes	Name
NT6X71	AA	Data line card (DLC) type D

Common procedures

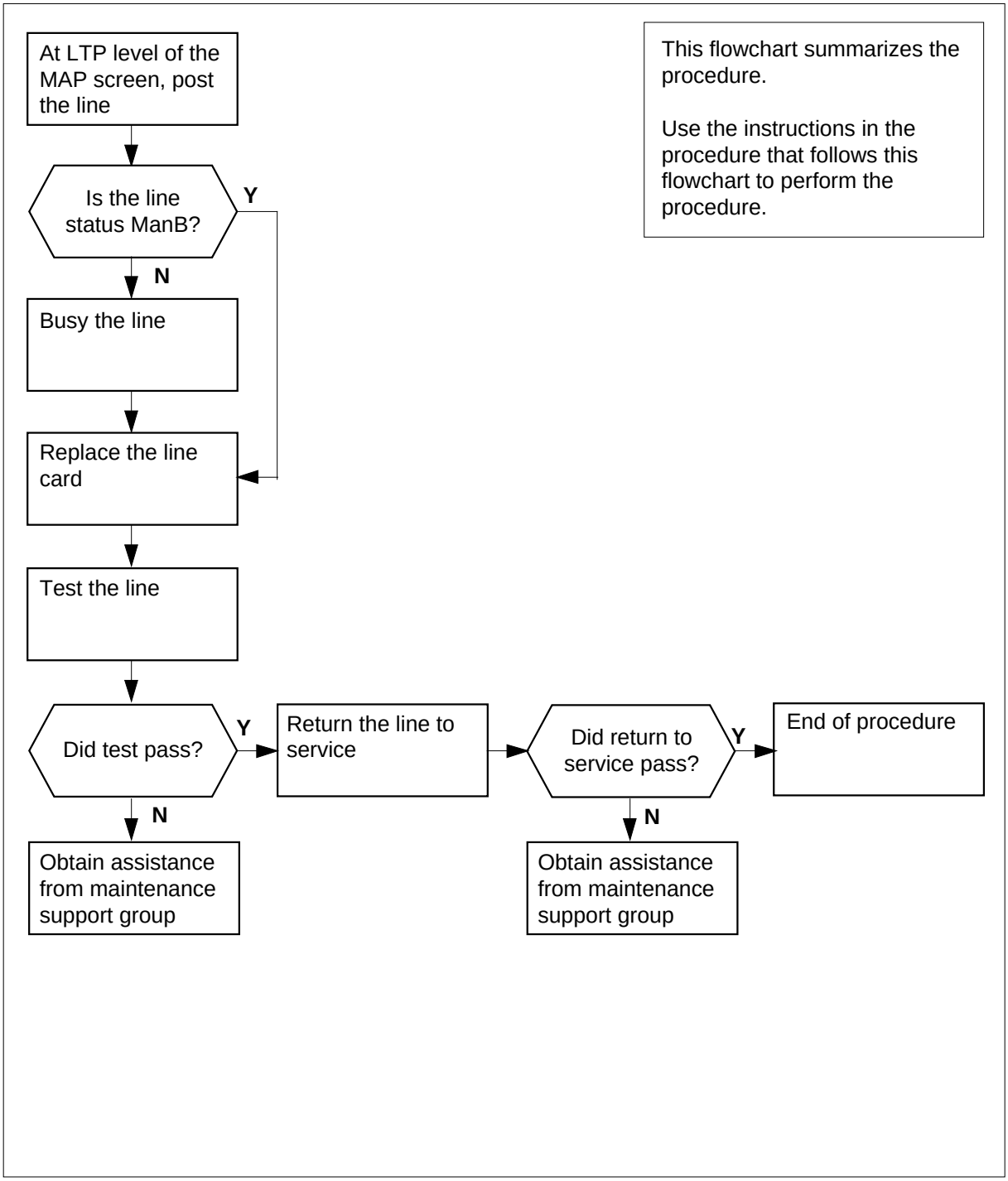
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X71 in an RSC LCM (continued)

Summary of card replacement procedure for an NT6X71 card in an in RSC LCM



NT6X71 in an RSC LCM (continued)

Replacing an NT6X71 card in an in RSC LCM

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP terminal

3 Access the line test position (LTP) level of the MAP display and post the line associated with the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site frame lcm lsg ckt
```

and pressing the Enter key.

where

site
is the name of the RSC site where the LCM is located

frame
is the number of the LCE frame (0 to 511)

lcm
is the number of the LCM with the faulty card

lsg
is the number of the line subgroup with the faulty card

ckt
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS     LNS     Trks     Ext   Appl
  .     .     .       .      .     .       .       .        .      .
LTP
 0 Quit        Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA F S LTA TE RESULT   4
 CKT TYPE FL REM1 00 0 03 03 7213355 IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Check the status of the posted line.

If the line status is	Do
manual busy (ManB)	step 6
not ManB	step 5

5 Busy the line by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NT6X71
in an RSC LCM (continued)

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext    Appl
  .     .     .       .     .      .      .       .       .
LTP
 0 Quit        Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN     STA F S LTA TE RESULT   4
CKT TYPE FL REM1 00 0 03 03 7213355 MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

At the LCEI frame

6

DANGER
Card damage—transport
Take the following precautions to protect circuit cards from electrical and mechanical damage when transporting them:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the LCM. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

NT6X71
in an RSC LCM (continued)

7

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be hot.

Open the line drawer using the following steps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawe nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure that a card shroud and line card extractor are available.

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with three-inch and/or six-inch cards.

Descriptions of these shrouds are as follows:

- Line card insertion/withdrawal tool (3")
  - — QTH56A (apparatus code)
  - — A0298291 (common product code)
- Line card insertion/withdrawal tool (6")
  - — QTH58A (apparatus code)
  - — A0313317 (common product code)

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available.

Descriptions of these tools are as follows:

- Card removal tool (3-inch or larger)
  - — QTH57A (apparatus code)
  - — A0298292 (common product code)
  - — Large grip tool for 4-inch or larger cards is NT tool ITA9953

  Remove the line card to be replaced by using the following steps:

  Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

g Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

h Squeeze the handles of the extractor together to grasp the card tightly.

i Hold the front cover of the line drawer to steady it with your left hand.

j Pull the extractor away from the drawer and the card will become unplugged from its socket on the drawer backplane.

k Continue pulling the card with the extractor until the card is clear of the shroud.

l Insert the removed card into ESD container and store per local procedures.

8 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots towards the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card towards the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 13
other	step 10

NT6X71 in an RSC LCM (end)

At the MAP terminal

10 Test the new NT6X71 line card by typing

`>DIAG`

and pressing the Enter key.

If the DIAG	Do
passed	step 11
failed	step 15

11 Return the line card to service by typing

`>RTS`

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step .16

14 Return to the *Alarm Clearing Procedure* that directed you to this procedure. At the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

16 You have successfully completed this procedure.

NT6X72 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC.

PEC	Suffixes	Name
NT6X72	AB, BA	host link formatter

Common procedures

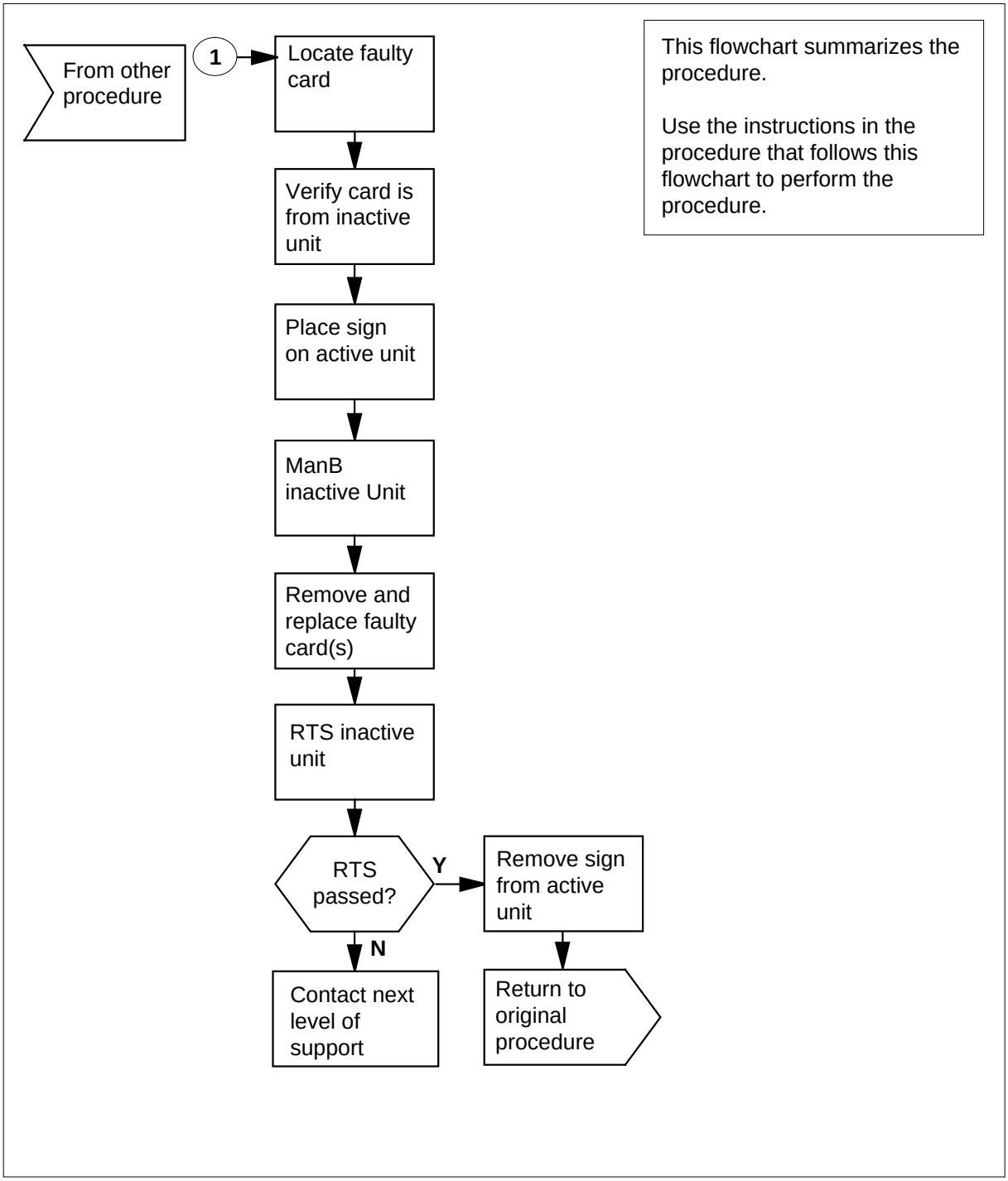
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X72
in an RSC (continued)

Summary of card replacement procedure for an NT6X72 card in an RSC RCC



NT6X72 in an RSC (continued)

Replacing an NT6X72 card in an RSC RCC

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit where you are replacing the card is INACTIVE and the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP terminal

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

NT6X72
in an RSC (continued)

```
  CM     MS    IOD   Net    PM    CCS    LNS    Trks    Ext   APPL
  .       .      .     .   1RCC    .      .       .       .      .
RCC           SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit  PM      0         0        2        0        2       25
 2 Post_ RCC     0         0        0        0        1        1
 3 ListSet
 4                RCC      0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL_   Unit0:  Inact   SysB  Mtce
 6 TST_        Unit1:  Act     InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE frame

5 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP terminal

6 Busy the inactive RCC unit by typing

`>BSY UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

7 Prevent the PM from trapping by typing

`>PMRESET UNIT rcc_unit_no NORUN`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

At the RCE frame

8

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

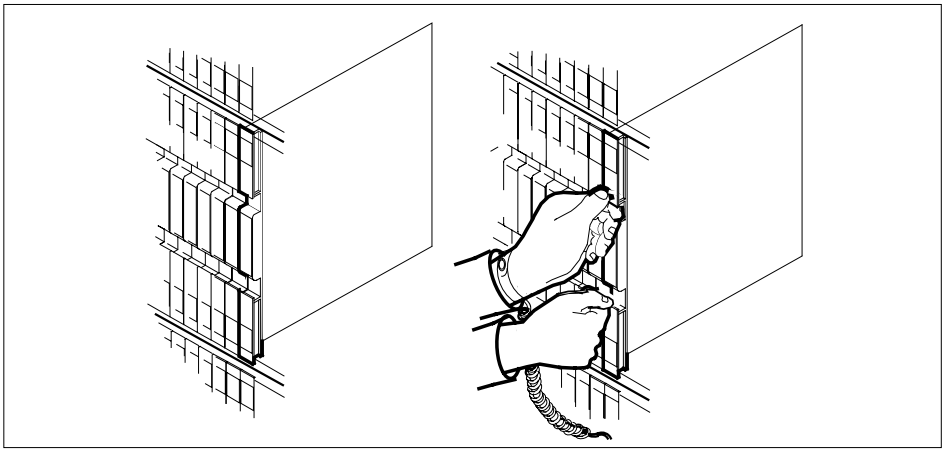
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

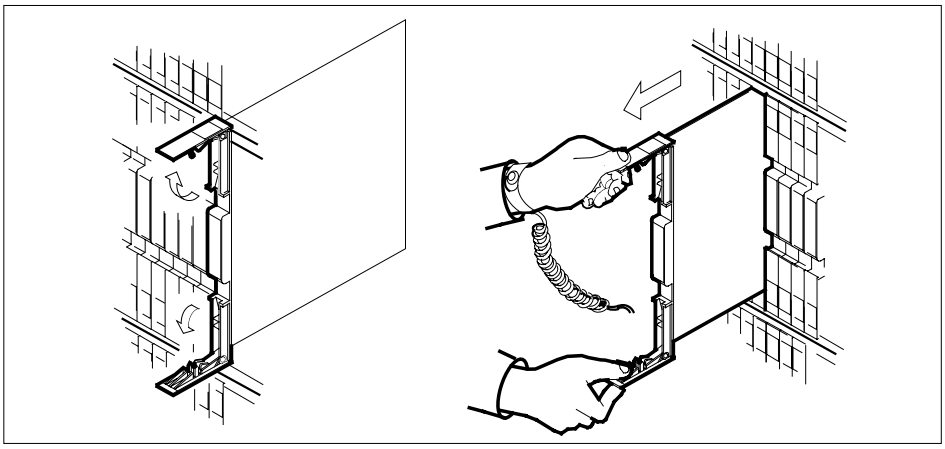
9 Remove the NT6X72 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

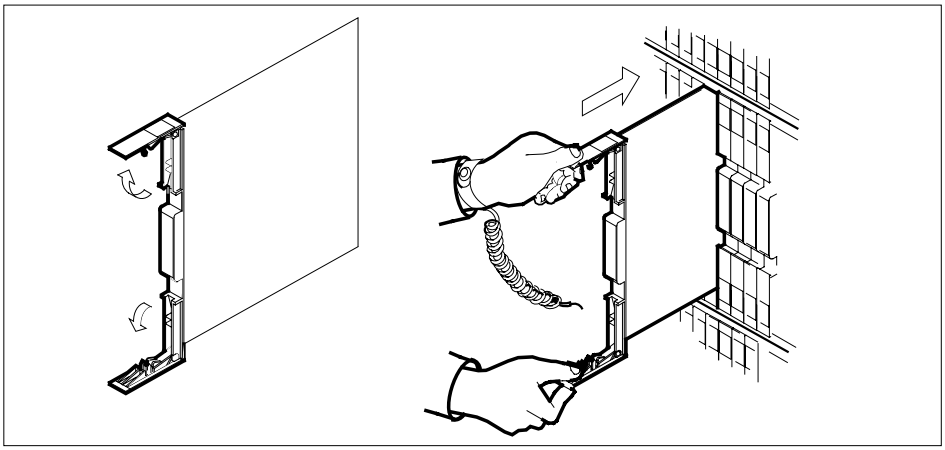
NT6X72
in an RSC (continued)



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

10 Open the locking levers on the replacement card.

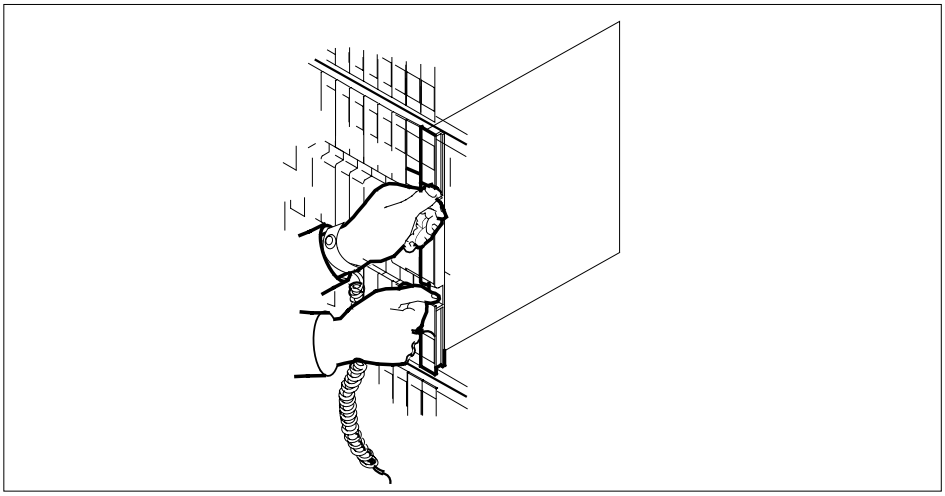
a Align the card with the slots in the shelf and gently slide the card into the shelf.



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



12 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 18
other	step 13

At the MAP terminal

13 Return to service the inactive RCC unit by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

Example of a MAP response:

```
Test Passed
```

or

```
Test Failed
```

If RTS	Do
passed	step 16

NT6X72
in an RSC (continued)

If RTS	Do
failed	step 14

14 Load the inactive RCC unit by typing

`>LOADPM  UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If load	Do
passed	step 15
failed	step 19

15 Return the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If the RTS	Do
passed	step 16
failed	step 19

16 Send any faulty cards for repair according to local procedure. Remove sign from active unit.

17 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 20.

18 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

19 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

NT6X72 in an RSC (end)

20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X74 in an RSC RMM

Application

Use this procedure to replace the following card in an RSC RMM.

PEC	Suffixes	Name
NT6X74	AB	RMM control card

Common procedures

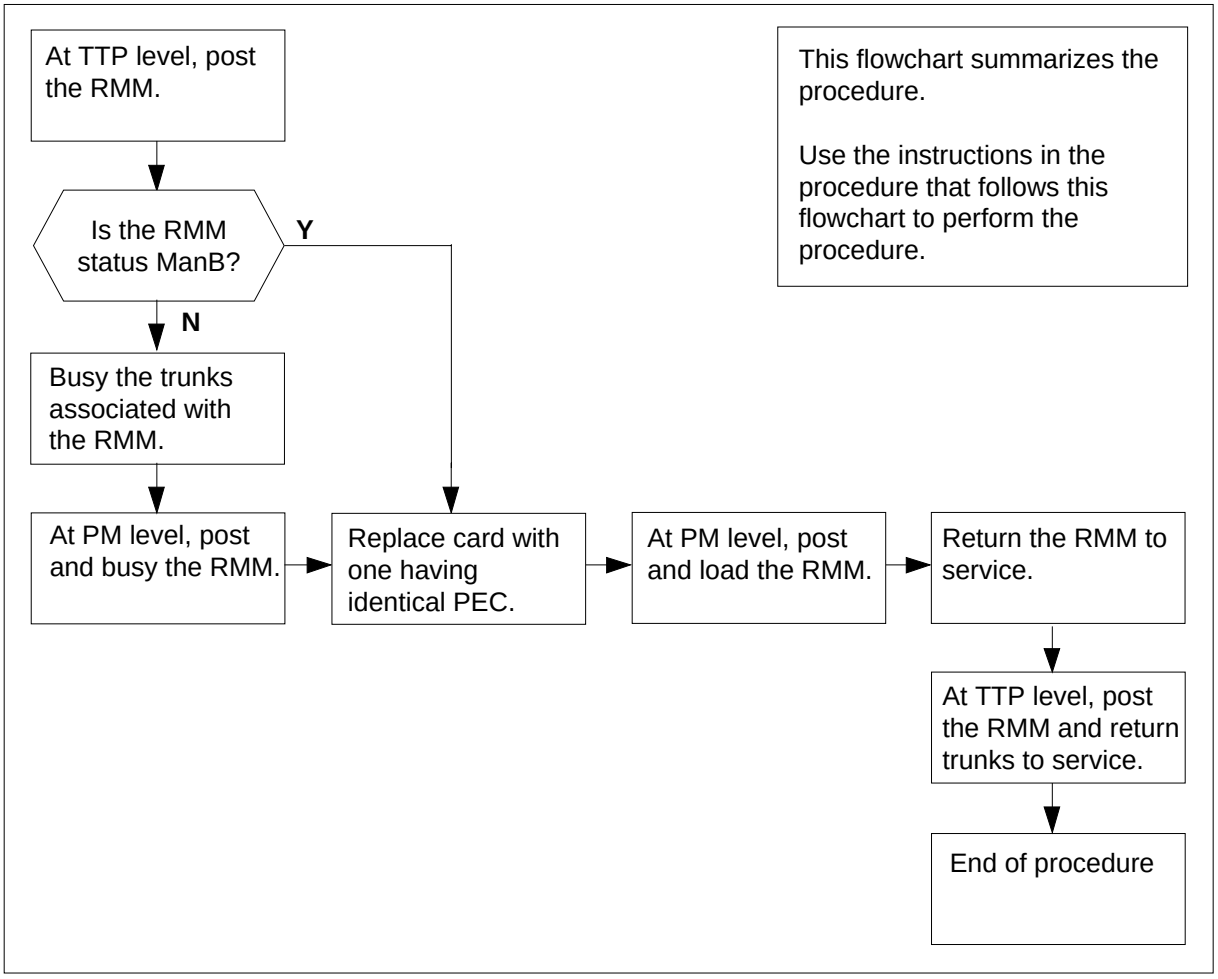
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X74 in an RSC RMM (continued)

Summary of card replacement procedure for NT6X74 card in an RSC RMM



Replacing an NT6X74 card in an RSC RMM

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

NT6X74
in an RSC RMM (continued)

At the MAP terminal

3 Access the TTP level of the MAP and post the RMM by typing

`>MAPCI;MTC;TRKS;TTP;POST P RMM rmm_no`

and pressing the Enter key.

where

rmm_no
is the number of the RMM shelf in which the card is to be replaced

4 Installation busy all the RMM circuits by typing

`>BSY INB ALL`

and pressing the Enter key.

5 Access the PM level and post the RMM by typing

`>PM;POST RMM rmm_no`

and pressing the Enter key.

where

rmm_no
is the number of the RMM from which the card is to be removed

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .       .

RMM                SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM       4        0        10       3        3       130
 2 Post_    RMM      0        1         1       0        0        2
 3
 4          RMM  5  SysB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

6 Busy the RMM by typing

`>BSY`

and pressing the Enter key.

Example of a MAP display:

```
CM    MS     IOD    Net     PM    CCS    LNS     Trks     Ext    APPL
 .     .      .      .     4SysB   .      .       .        .      .

RMM                 SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM        4        0       10       3        3       130
 2 Post_    RMM       0        1        1       0        0        2
 3
 4          RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

7

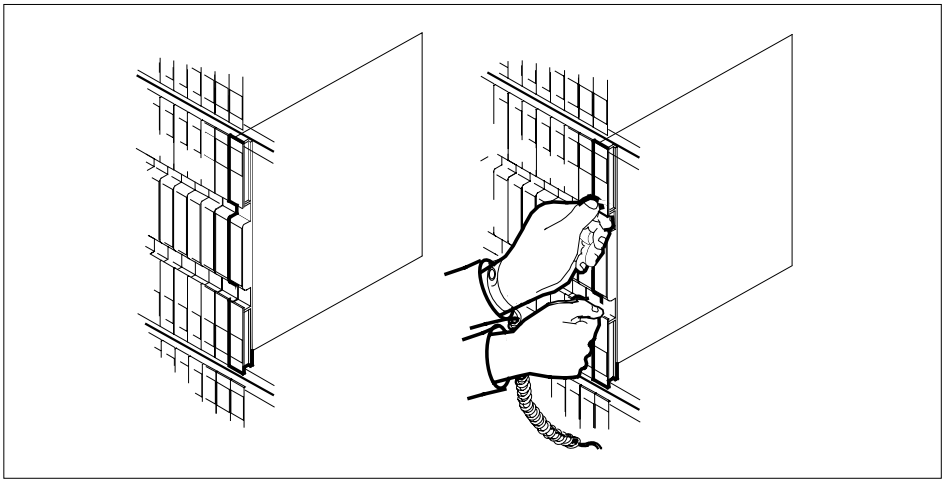
CAUTION
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

Put on a wrist strap.

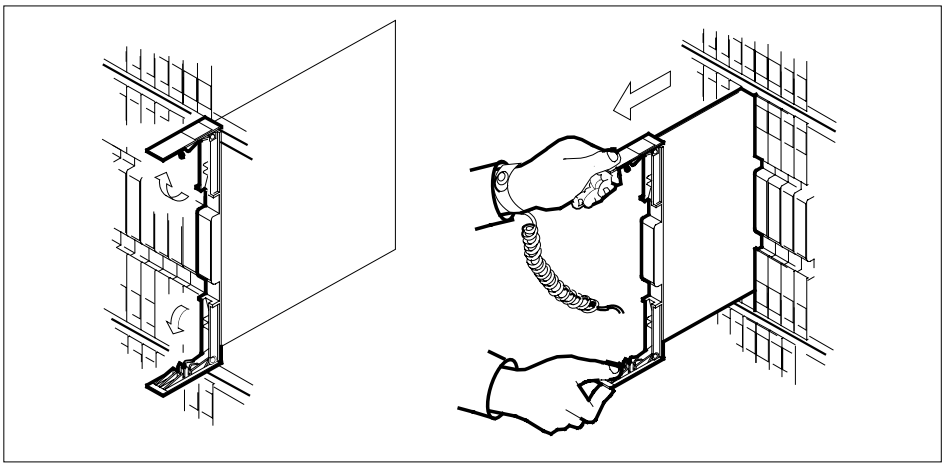
8 Remove the NT6X74 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NT6X74
in an RSC RMM (continued)



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

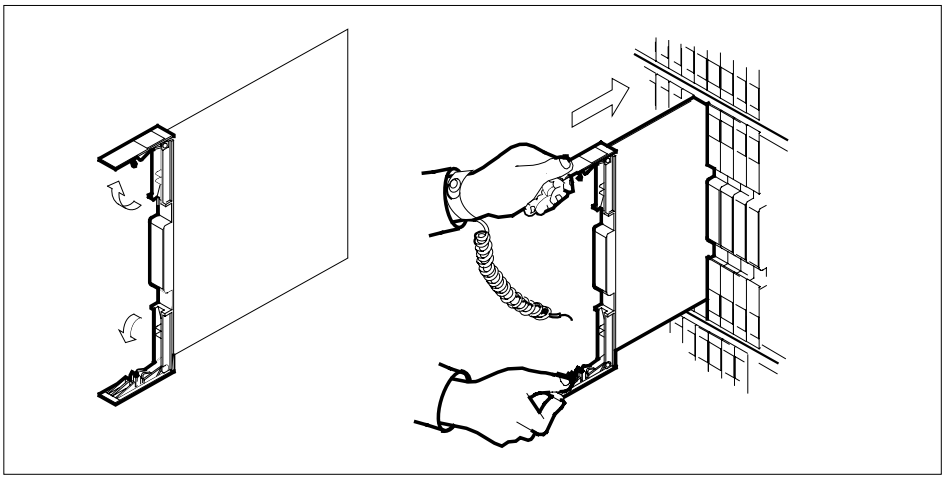


c Ensure the replacement card has the same PEC including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf and gently slide the card into the shelf.

NT6X74
in an RSC RMM (continued)



10

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.

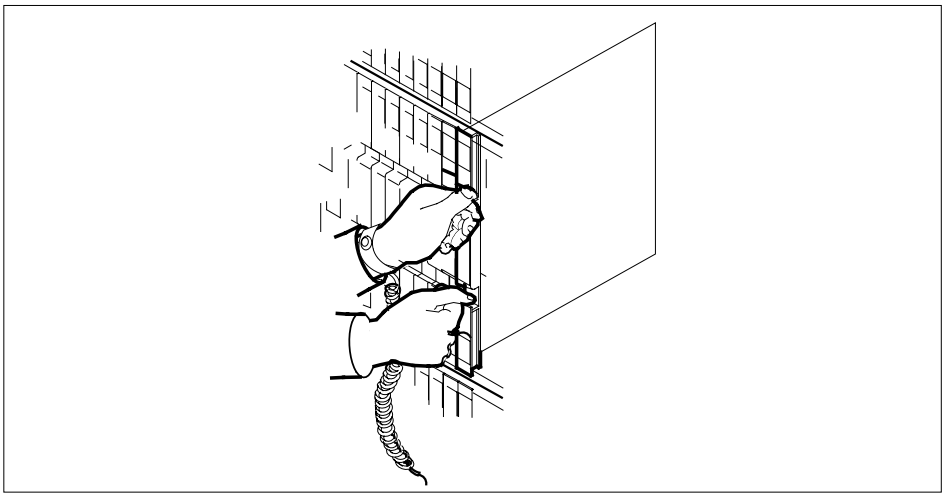
2. Do not force the cards into the slots.

Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT6X74
in an RSC RMM (continued)



11 Reload the RMM by typing

`>loadpm`

and pressing the Enter key.

If load	Do
passed	step 12
failed	step 19

12 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 13

13 Return the RMM shelf to service by typing

>RTS

and pressing the Enter key.

If the RTS	Do
failed	step 19
passed	step 14

NT6X74 in an RSC RMM (end)

At the MAP terminal

14 Access the TTP level of the MAP display and post the RMM by typing

`>TRKS;TTP;POST P RMM rmm_no`

and pressing the Enter key.

where

rmm_no
is the number of the RMM associated with the new NT6X74 card

15 Return to service the circuits busied in step 4 by typing

`>RTS ALL`

and pressing the Enter key.

If the RTS	Do
failed	step16
passed	step19

16 Send any faulty cards for repair according to local procedure.

17 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 20.

18 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

19 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X76 in an RSC LCME

Application

Use this procedure to replace an NT6X76 card in an RSCE LCME.

PEC	Suffixes	Name
NT6X76	AC	Asynchronous Interface Line card

Common procedures

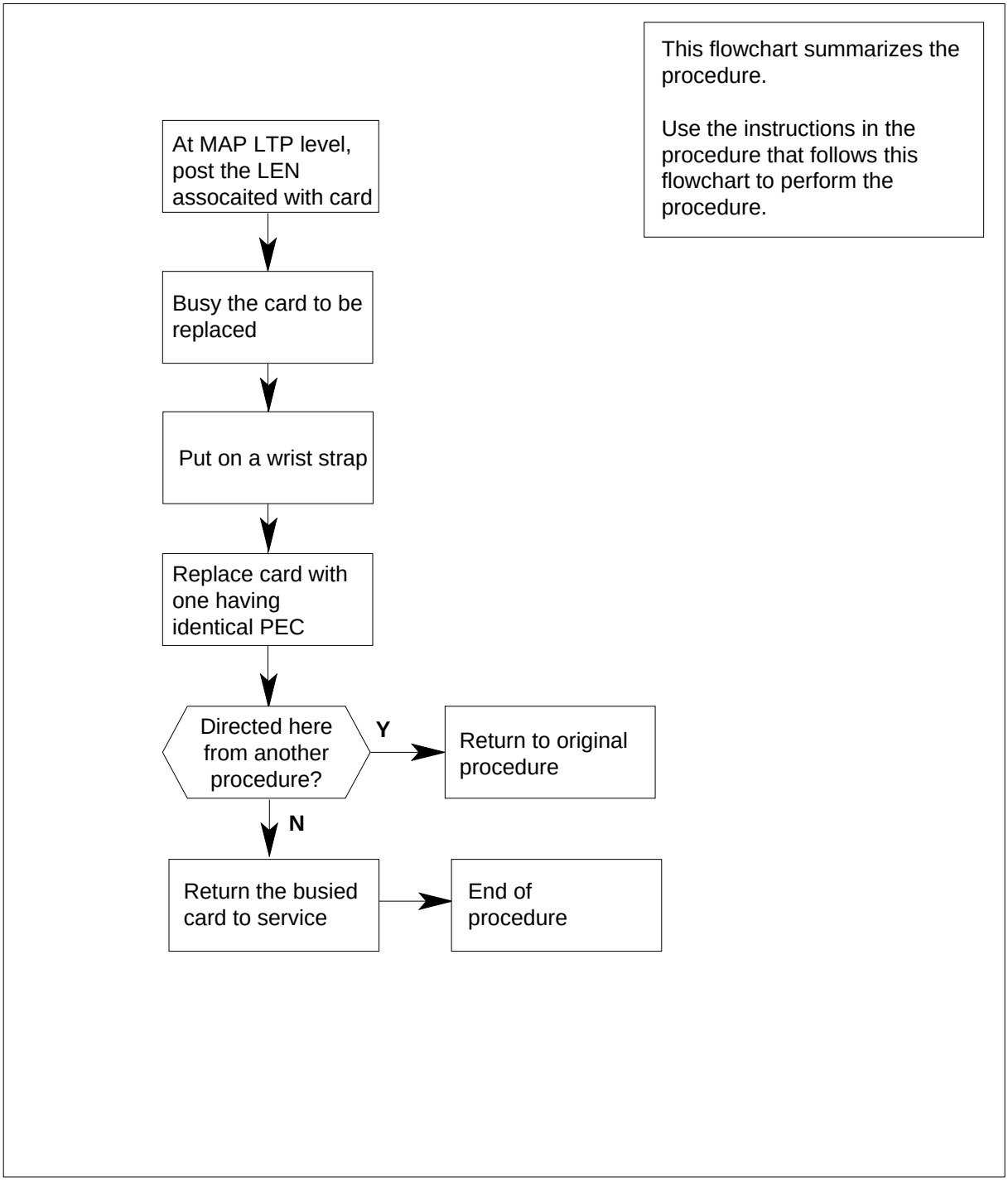
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X76 in an RSC LCME (continued)

Summary of card replacement procedure for an NT6X76 card in RSC LCME



NT6X76
in an RSC LCME (continued)

Replacing an NT6X76 card in RSC LCME

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST LCME site lcm(e)_no unit_no
lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the location name of the LCME with the faulty card

lcm(e)_no
is the number of the LCME with the faulty card

unit_no
is the number of the LCME unit with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP response:

```
 CM     MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .      .      .      .      .     .      .      .       .      .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN...      DN     STA F S LTA TE RESULT
 4            CKT TYPE FL    HOST 00 0 03 03
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X76 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM     MS    IOD    Net    PM    CCS    LNS    Trks     Ext     Appl
 .      .      .      .      .     .      .      .        .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN......   DN     STA F S LTA TE RESULT
 4            CKT TYPE FL  HOST 00 0 03 03
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X76
in an RSC LCME (continued)

At the LCE frame

5

DANGER
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3-4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

6 Prepare to remove the faulty card by opening the line drawer and following these substeps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).

d While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

NT6X76 in an RSC LCME (continued)

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

10 Test the NT6X76 line card by typing

`>DIAG`

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

11 Return the NT6X76 card to service by typing

`>RTS`

and pressing the Enter key.

If RTS	Do
passed	step 12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

NT6X76 in an RSC LCME (end)

13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

14 Return to the procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X78 in an RSC RCC/RCC2

Application

Use this procedure to replace the following card in a Remote Swicthing Center (RSC) Remote Cluster Controller (RCC).

Note: This procedure is used to replace a card in an RCC or an RCC2. In this procedure the term RCC refers to both the RCC in an RSC frame, NT6X10, and an RCC2 in an RSCE cabinet, NTMX89.

PEC	Suffixes	Name
NT6X78	AB , BA	CLASS modem resource (CMR)

Common procedures

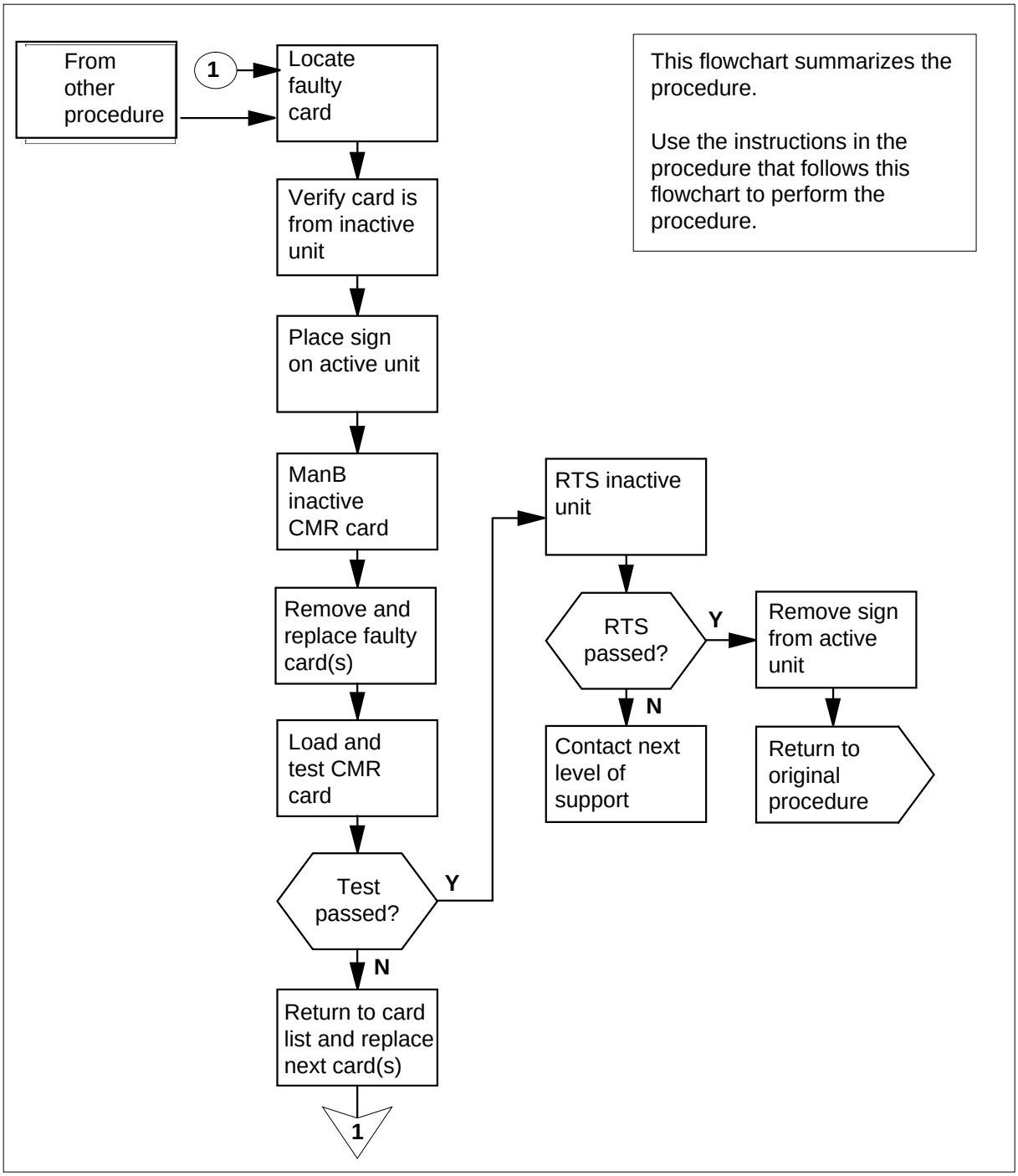
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X78 in an RSC RCC/RCC2 (continued)

Summary of card replacement procedure for an NT6X78 card in an RSC RCC



NT6X78 in an RSC RCC/RCC2 (continued)

Replacing an NT6X78 card in an RSC RCC

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit in where you are replacing the card is INACTIVE and that the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

NT6X78
in an RSC RCC/RCC2 (continued)

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1RCC    .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        2        0        2        25
 2 Post_   RCC       0        0        0        0        1         1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL_   Unit0:   Inact InSv
 6 TST_     Unit1:   Act   InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE frame

5 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP display

6 Busy the CMR card on the inactive RCC unit by typing

`>BSY UNIT  rcc_unit_no CMR`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

NT6X78 in an RSC RCC/RCC2 (continued)

At the RCE frame

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

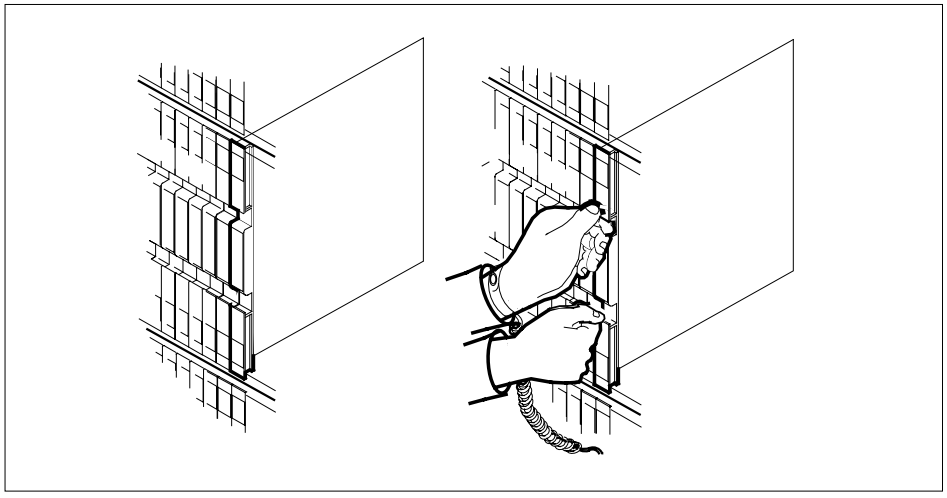
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

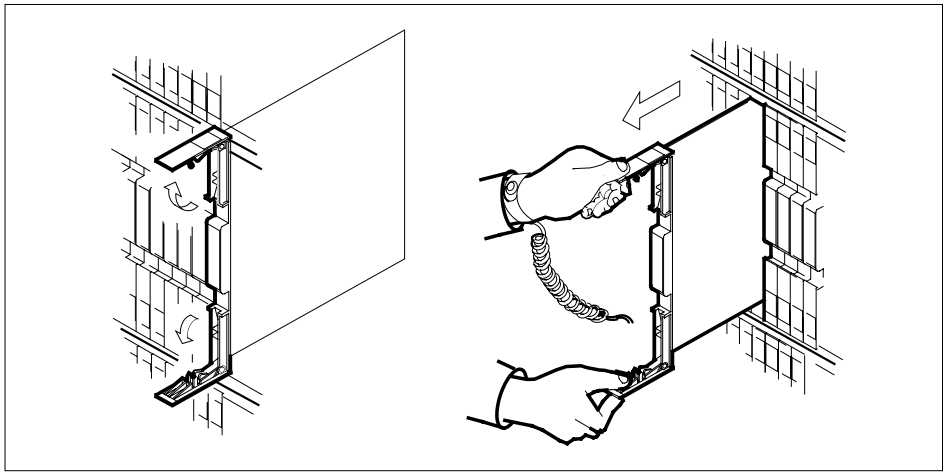
Put on a wrist strap.

8 Remove the NT6X78 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



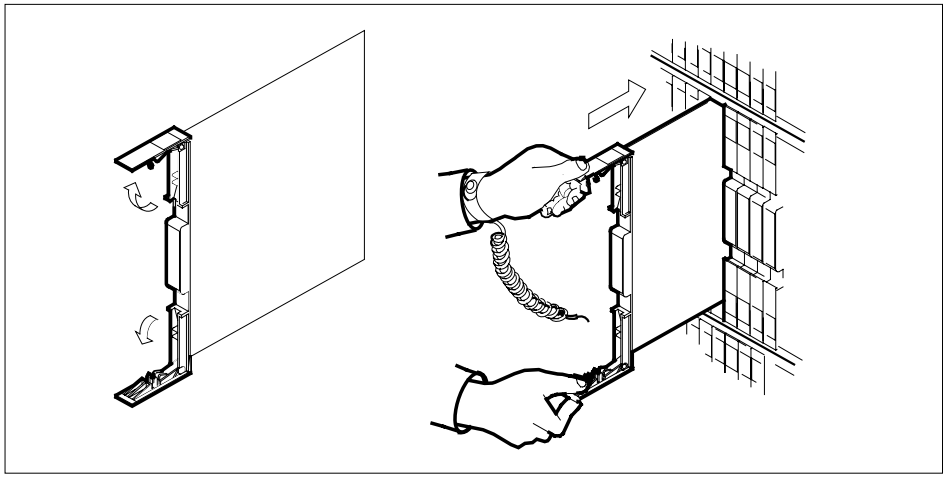
b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf and gently slide the card into the shelf.

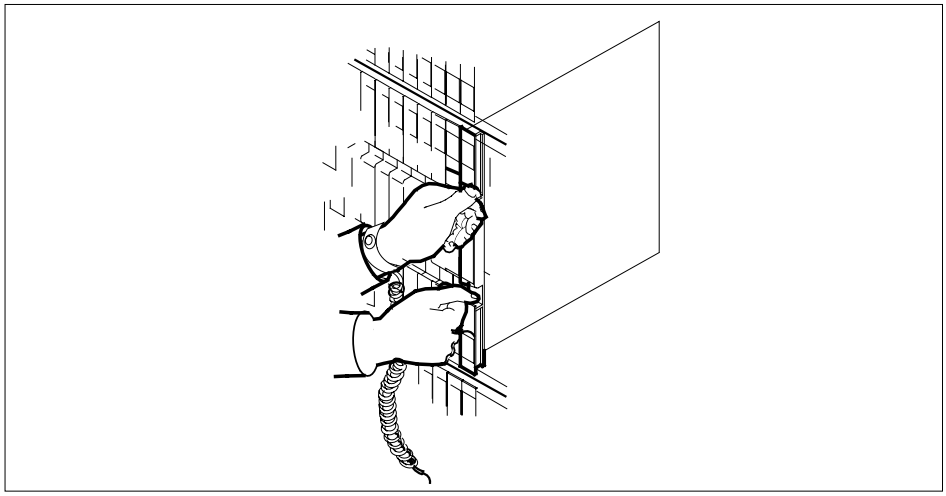


10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT6X78
in an RSC RCC/RCC2 (continued)



At the MAP display

11 After replacing the faulty card, load the CMR card on the inactive RCC unit by typing

`>LOADPM UNIT rcc_unit_no CC CMR`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit busied in step 6

If load	Do
passed	step12
failed	step 16

12 Return the CMR card on the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no CMR`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit where the CMR was loaded in step 11 .

If the RTS	Do
passed	step13
failed	step 16

NT6X78 in an RSC RCC/RCC2 (end)

13 Send any faulty cards for repair according to local procedure.

14 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 17.

15 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X87 in an RSC LCME

Application

Use this procedure to replace an NT6X87 card in an RSCE LCME.

PEC	Suffixes	Name
NT6X87	AA	Data Voice Line card

Common procedures

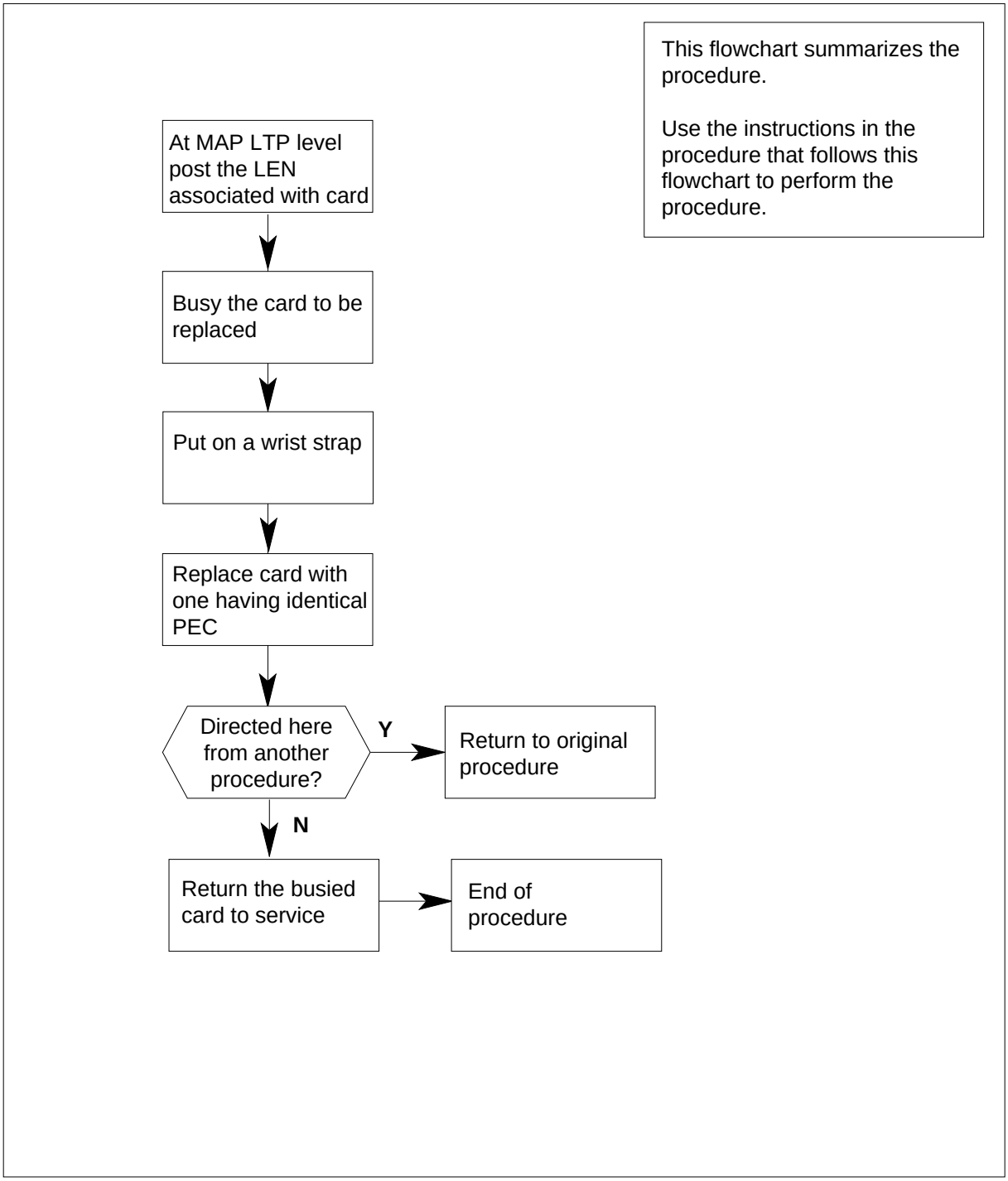
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X87 in an RSC LCME (continued)

Summary of card replacement procedure for an NT6X87 card in in RSC LCME



NT6X87
in an RSC LCME (continued)

Replacing an NT6X87 card in an in RSC LCME

At your Current location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the line equipment number (LEN) of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the location name of the LCME with the faulty card

lcme_no
is the number of the LCME with the faulty card

unit_no
is the number of the LCME unit with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP response:

```
 CM     MS     IOD    Net    PM    CCS    LNS    Trks     Ext    Appl
 .      .       .      .      .     .      .      .        .      .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN......    DN    STA F S LTA TE RESULT
 4            CKT TYPE FL    HOST 00 0 03 03  4931082  IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NT6X87 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net     PM    CCS    LNS    Trks     Ext     Appl
 .      .     .      .       .     .      .      .        .       .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3            LCC PTY RNG....LEN......   DN      STA F S LTA TE RESULT
 4            CKT TYPE FL  HOST 00 0 03 03 4931082  IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X87
in an RSC LCME (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, see the following notes.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3-4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

6 Prepare to remove the faulty card by opening the line drawer and following these substeps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).

d While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

NT6X87 in an RSC LCME (continued)

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 10

At the MAP terminal

10 Test the NT6X87 line card by typing

`>DIAG`

and pressing the Enter key.

If DIAG	Do
passed	step 11
failed	step 15

11 Return the NT6X87 card to service by typing

`>RTS`

and pressing the Enter key.

If RTS	Do
passed	step 12

NT6X87 in an RSC LCME (end)

If RTS	Do
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

14 Return to procedure that directed you to this procedure. If necessary, go to the point where a faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X92 in an RSC RCC/RCC2

Application

Use this procedure to replace the following card in an RSC RCC.

Note: This procedure is used to replace a card in an RCC or an RCC2. In this procedure the term RCC refers to both the RCC in an RSC frame, NT6X10, and an RCC2 in an RSCE cabinet, NTMX89.

ATTENTION

To ensure peak performance, do not install the UTR and GTR on the same RCC/RCC2. Presently, there is no way of knowing which receiver is used to interpret tones. Some call processing tones may be degraded if designed for use with a GTR.

PEC	Suffixes	Name
NT6X92	BB, BC	Universal tone receiver (UTR)
NT6X92	EA	Global tone receiver (GTR)

Common procedures

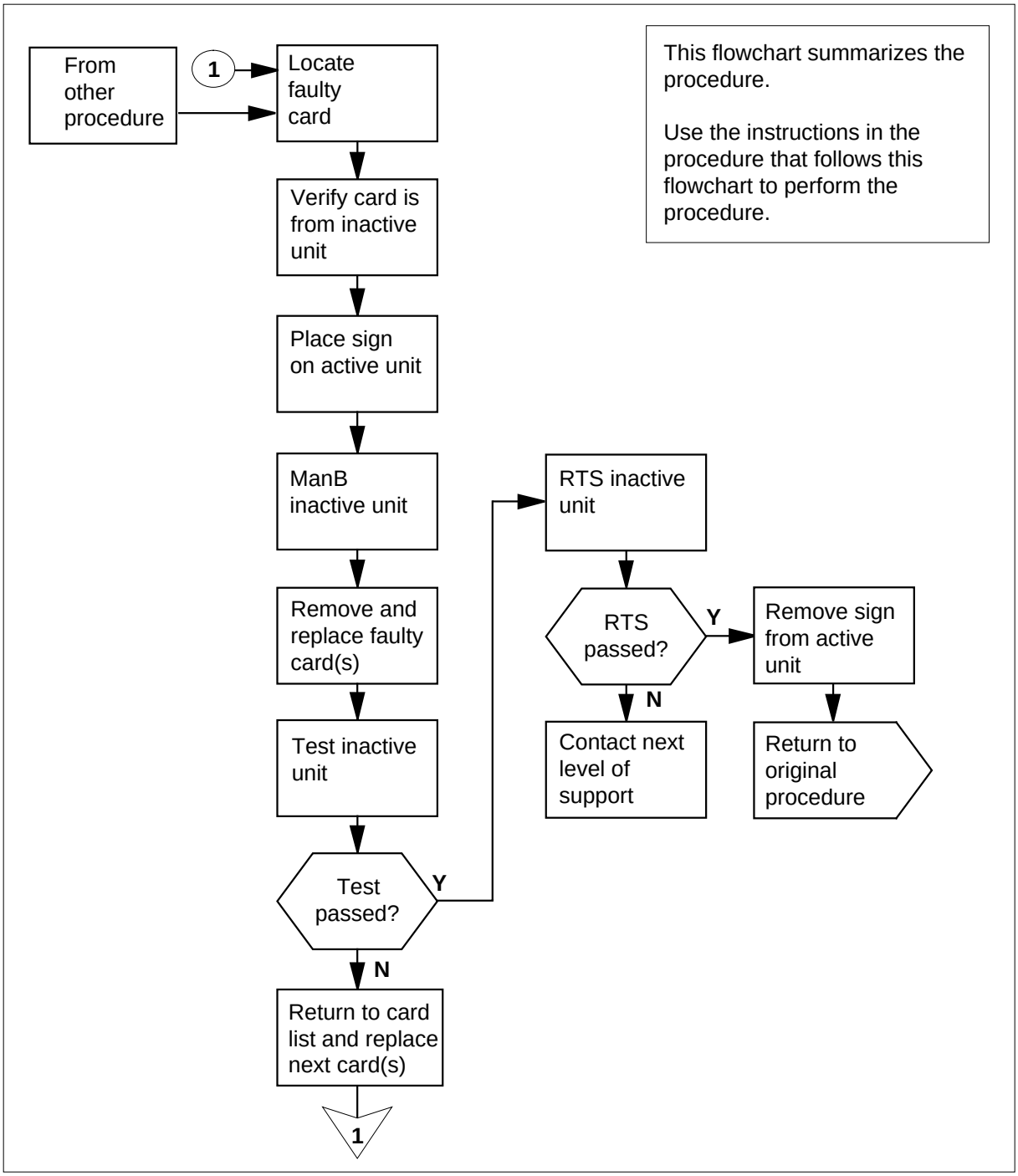
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT6X92 in an RSC RCC/RCC2 (continued)

Summary of card replacement procedure for an NT6X92 card in an RSC RCC



NT6X92 in an RSC RCC/RCC2 (continued)

Replacing an NT6X92 card in an RSC RCC

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit where you are replacing the card is INACTIVE and the mate unit is ACTIVE.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1RCC    .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        2        0        2        25
 2 Post_   RCC       0        0        0        0        1         1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL_   Unit0:   Inact SysB
 6 TST_     Unit1:   Act   InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE frame

5 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP display

6 Busy the inactive RCC unit by typing

`>BSY UNIT  rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

NT6X92 in an RSC RCC/RCC2 (continued)

At the RCE frame

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

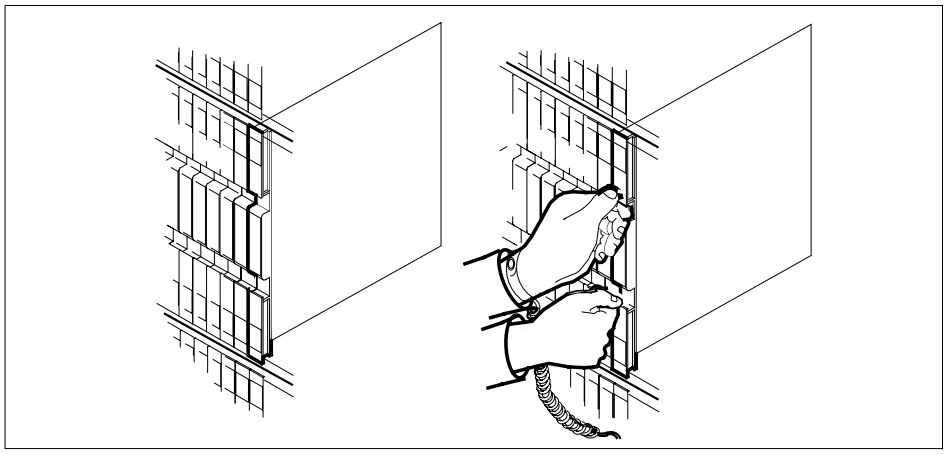
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

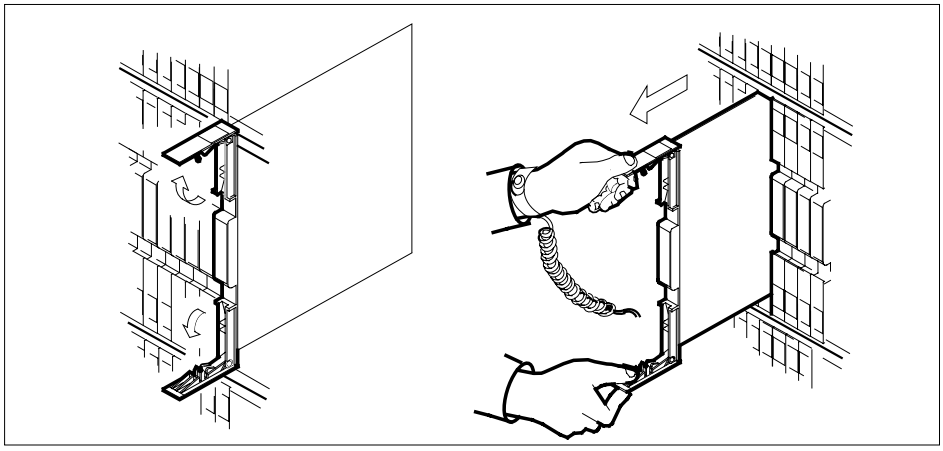
8 Remove the NT6X92 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

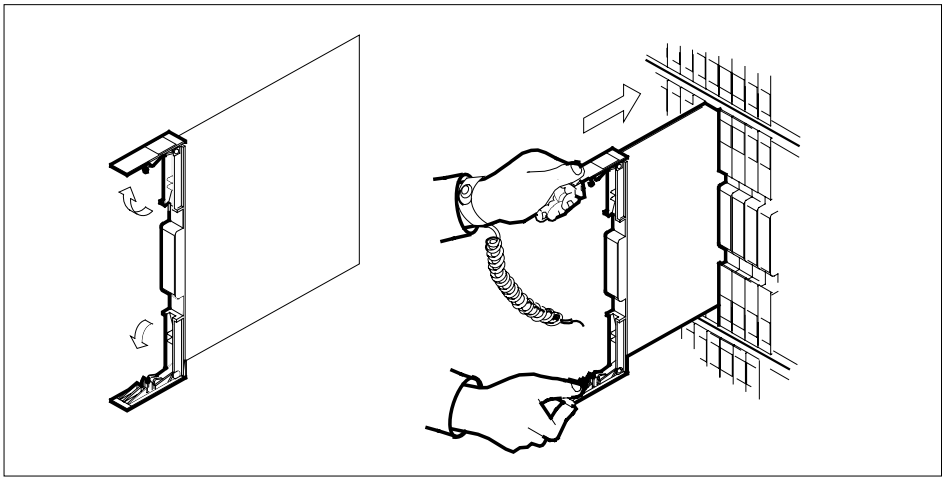
NT6X92
in an RSC RCC/RCC2 (continued)



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf and gently slide the card into the shelf.

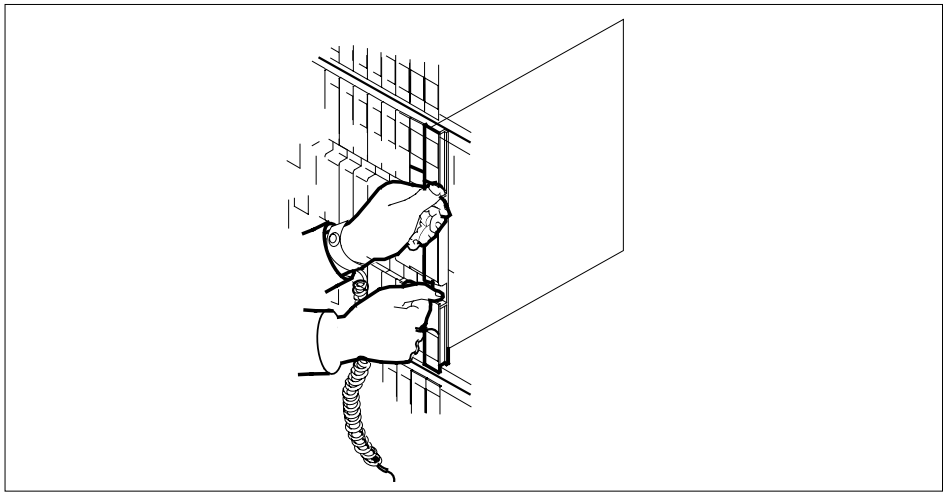


10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT6X92
in an RSC RCC/RCC2 (continued)



11 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 15
other	step12

At the MAP display

12 Return the inactive RCC unit to service by typing

`>RTS UNIT rcc_unit_no`

and pressing the Enter key.

where

rcc_unit_no
is the number of the RCC unit in step 6

If the RTS	Do
passed	step 13
failed	step 16

13 Send any faulty cards for repair according to local procedure.

14 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

NT6X92
in an RSC RCC/RCC2 (end)

Go to Step 17

15 Return to the *Alarm Clearing Procedure* that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT6X99 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM.

PEC	Suffix	Name
NT6X99	AA	Datapath bit error rate tester line card (2 slot)

Common procedures

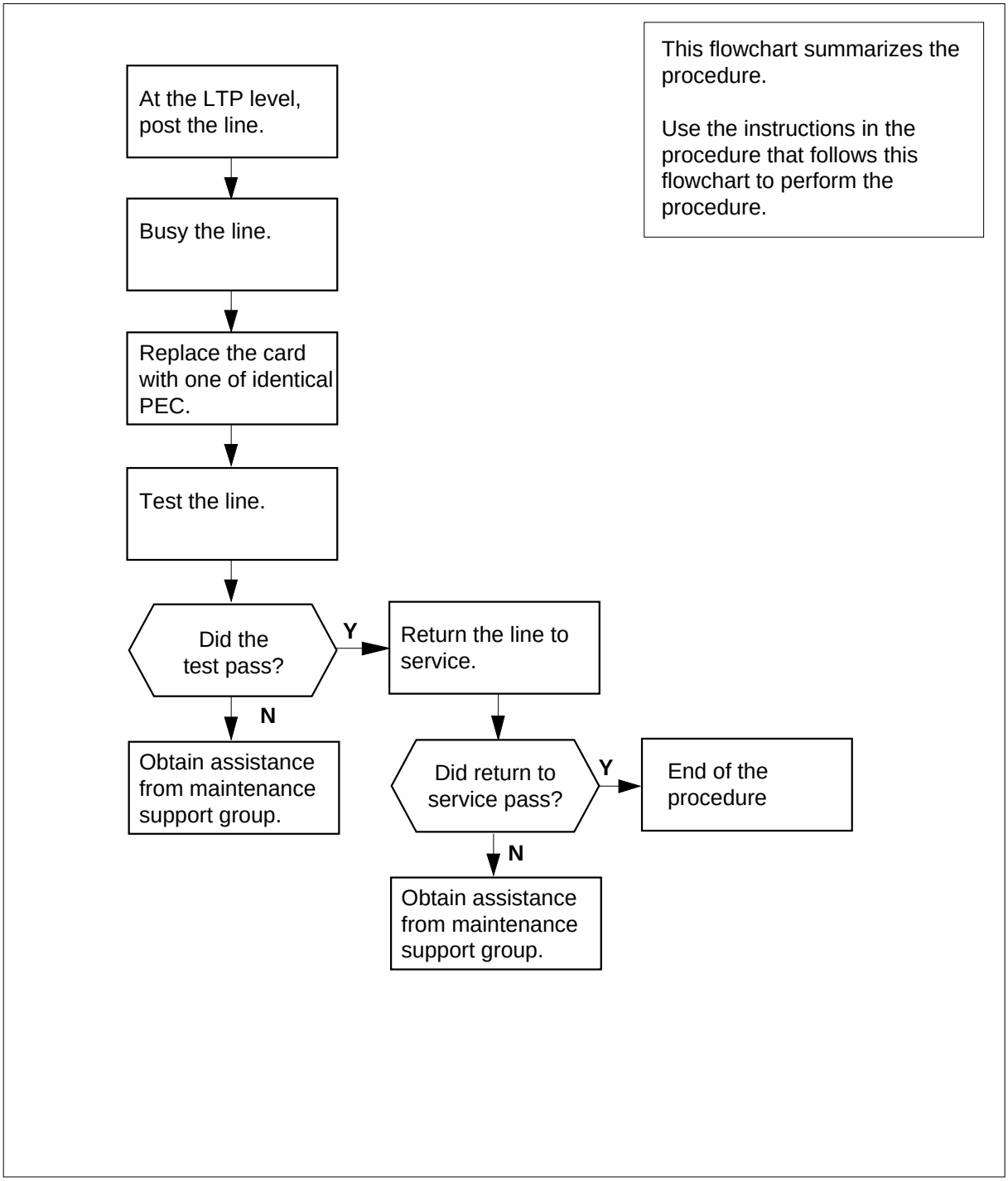
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NT6X99
in an RSC LCM (continued)

Summary of card replacement procedure for NT6X99 card in an RSC LCM



NT6X99
in an RSC LCM (continued)

Replacing an NT6X99 in an LCM

1 Obtain a replacement card.

Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.

At the MAP terminal

2 Access the line test position (LTP) level of the MAP display and post the line associated with the card to be replaced by typing

`>MAPCI;MTC;LNS;LTP;POST L site lcm_no lsg_no ckt_no`

and pressing the Enter key.

where

site
is the name of the site where the RSC LCM is located

lcm_no
is the number of the RSC LCM with the faulty card

lsg_no
is the number of the line subgroup with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .     .      .      .     .      .      .       .      .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3       LCC PTY RNG....LEN.. ...      DN     STA F S LTA TE RESULT
 4       CKT TYPE FL REM1 00 0 03 03  IBERT   SB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

3 Busy the NT6X99 card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .     .      .      .     .      .      .       .      .
LTP
 0 Quit       Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3       LCC PTY RNG....LEN.. ...      DN     STA F S LTA TE RESULT
 4       CKT TYPE FL REM1 00 0 03 03  IBERT   MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NT6X99
in an RSC LCM (continued)

At the LCE frame

4

WARNING
Card damage—transport
Take these precautions to protect circuit cards from electrical and mechanical damage during transport:

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected through a 1-megohm resistor, to a suitable grounded object such as a metal workbench or a DMS frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RSC LCM. This protects equipment against damage caused by static electricity.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers. For descriptions of these tools, refer to the notes at the end of this procedure.

Put on a wrist strap.

5

DANGER
Hot materials
Exercise care when handling a line card. The line feed resistor may be hot.

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop is at the top, to prevent further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 inch).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand, to a position about one 1 cm (.5 inch) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with three-inch and/or six-inch cards.

Descriptions of these shrouds are as follows:

- Line card insertion/withdrawal tool (3")
  - QTH56A (apparatus code)
  - A0298291 (common product code)
- Line card insertion/withdrawal tool (6")
  - QTH58A (apparatus code)
  - A0313317 (common product code)

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available.

Descriptions of these tools are as follows:

- Card removal tool (3-inch or larger)
  - QTH57A (apparatus code)
  - A0298292 (common product code)
- Large grip tool for 4-inch or larger cards is NT tool ITA9953

6 Remove the line card to be replaced by using the following steps:

NT6X99
in an RSC LCM (continued)

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it with your left hand.

e Pull the extractor away from the drawer and the card will come unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the removed card into ESD container and store per local procedures.

7 Replace the faulty card by using the following steps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots towards the drawer backplane.

c Hold the front cover of the line drawer with your left hand, to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card towards the backplane until it plugs fully into the backplane socket.

8 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 14
other	step 9

9 Test the NT6X99 card by typing

>DIAG

and pressing the Enter key.

If DIAG	Do
passed	step 10
failed	step 15

10 Return the NT6X99 card to service by typing

>RTS

and pressing the Enter key.

If RTS	Do
passed	step 11
failed	step 15

At the MAP display

11 Send any faulty cards for repair according to local procedure.

12 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

13 Go to step 16.

14 Return to the *Alarm Clearing Procedure* that directed you to this card replacement procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list, and go to the appropriate replacement procedure in this manual for that card.

15 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NT7X05 in an RSC RCC/RCC2

Application

Use this procedure to replace the following card in an RSC RCC.

Note: This procedure is used to replace a card in an RCC or an RCC2. In this procedure the term RCC refers to both the RCC in an RSC frame, NT6X10, and an RCC2 in an RSCE cabinet, NTMX89.

PEC	Suffixes	Name
NT7X05	AA	Peripheral/Remote Loader-16 (PRL)

Common procedures

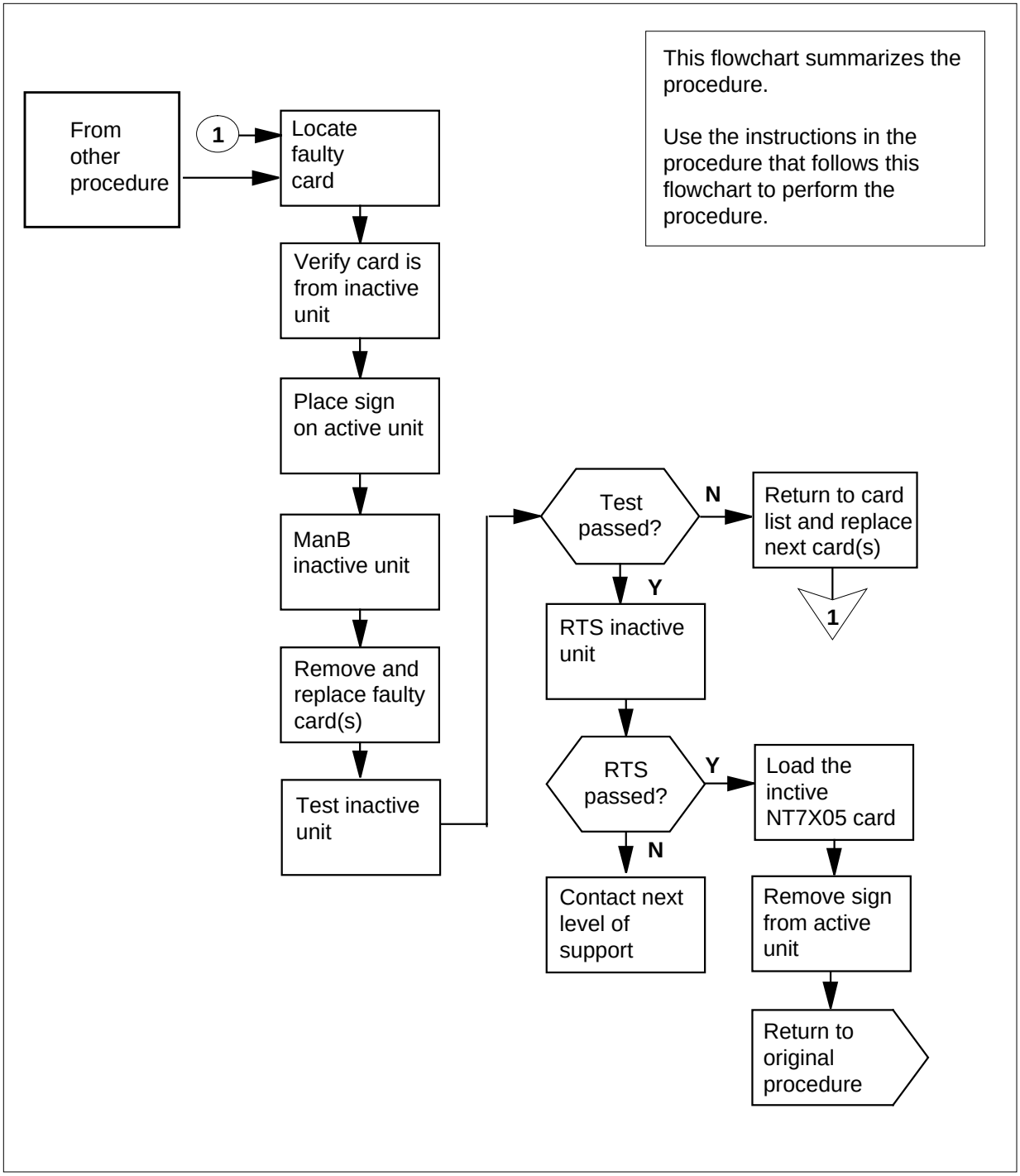
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NT7X05 in an RSC RCC/RCC2 (continued)

Summary of card replacement procedure for an NT7X05 card in an RSC RCC



NT7X05 in an RSC RCC/RCC2 (continued)

Replacing an NT7X05 card in an RSC RCC

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC ensure the unit where you are replacing the card is INACTIVE and the mate unit is ACTIVE by observing the INSV and ACTIVE LEDs on each NTMX77 card.

Obtain a replacement card. Ensure the replacement card has the same product equipment code (PEC) including suffix, as the card to be removed.

At the MAP display

3 Access the PM level and post the RCC by typing

```
>MAPCI;MTC;PM;POST RCC rcc_no
```

and pressing the Enter key.

where

rcc_no
is the number of the RCC to be busied

Example of a MAP display:

```
   CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    APPL
   .     .      .      .    1RCC    .      .       .      .      .

RCC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        2        0        2        25
 2 Post_   RCC       0        0        0        0        1         1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL_   Unit0:   Inact ISTb
 6 TST_     Unit1:   Act   InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 By observing the MAP display, be sure the card to be removed is on the inactive unit.

At the RCE frame

5 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP display

6 Busy the inactive RCC unit by typing

`>BSY INACTIVE`

and pressing the Enter key.

NT7X05 in an RSC RCC/RCC2 (continued)

At the RCE frame

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

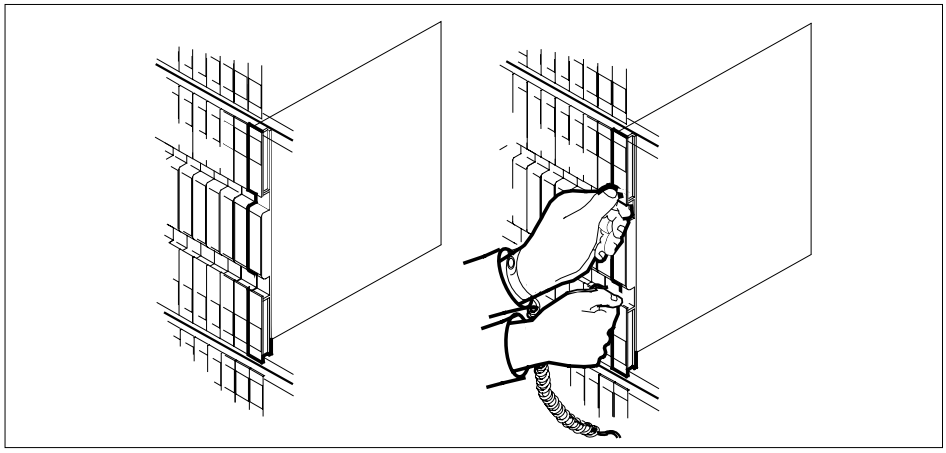
1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

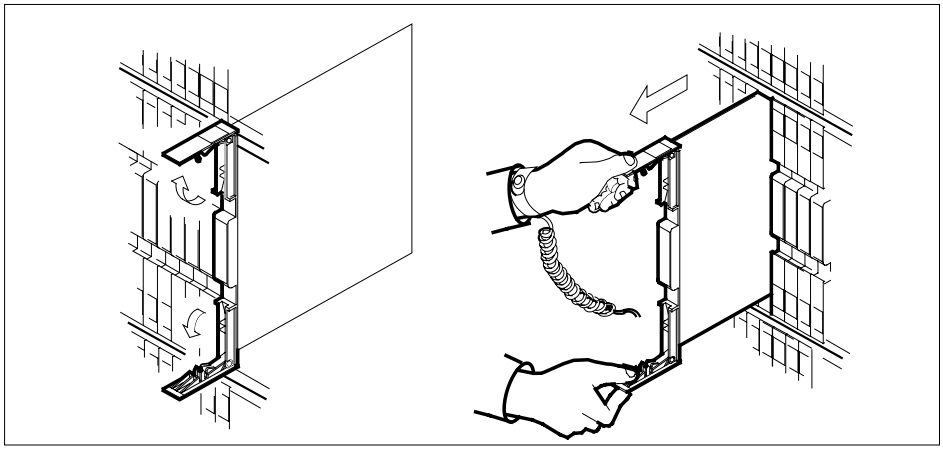
8 Remove the NT7X05 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.

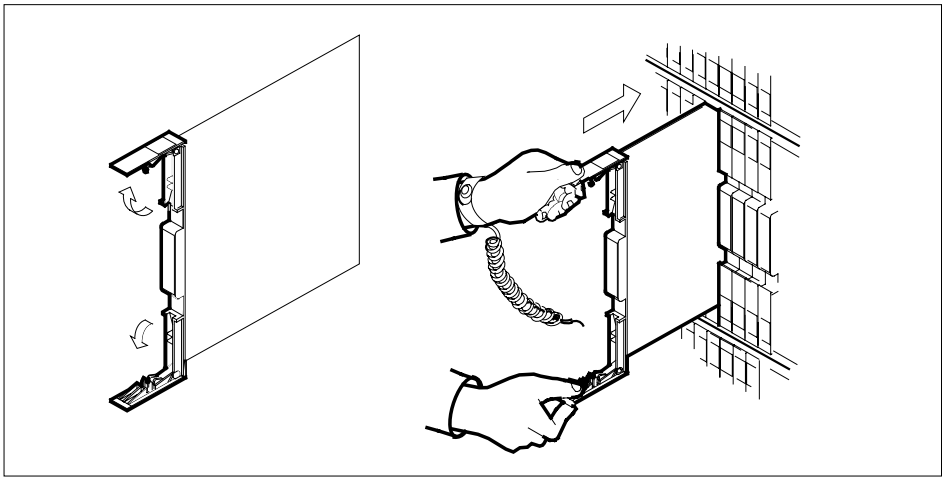
NT7X05 in an RSC RCC/RCC2 (continued)



c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf and gently slide the card into the shelf.

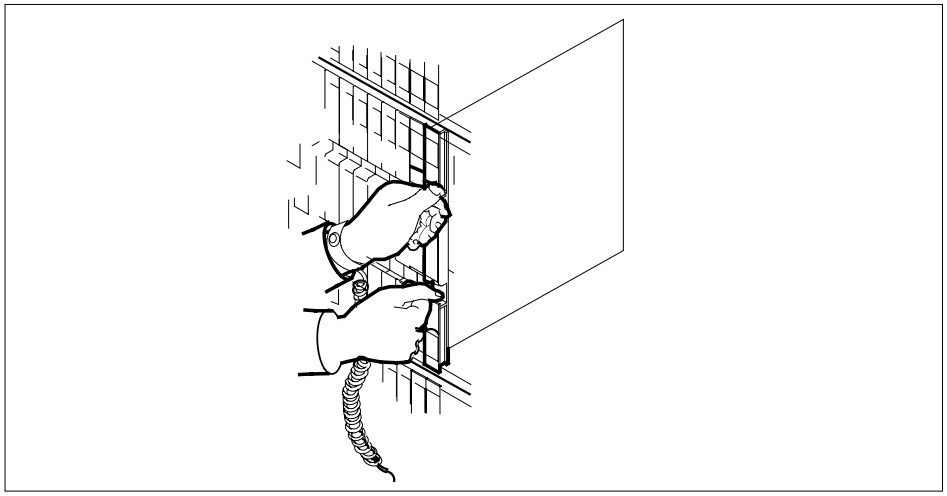


10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NT7X05 in an RSC RCC/RCC2 (continued)



At the MAP display

11 Return the inactive RCC unit to service by typing

`>RTS UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the number of the RCC unit (0 or 1) busied in step 6

If the RTS	Do
passed	step 12
failed	step 15

12 Load the inactive NT7X05 card by typing

`>LOADPM INACTIVE CC XPMSTOR [file_name]`

and pressing the Enter key.

where

file_name
is the name of the file datafilled in field, LOAD, of the inventory table.

If load	Do
passed	step 13
failed	step 15

NT7X05 in an RSC RCC/RCC2 (end)

13 Send any faulty cards for repair according to local procedure. Remove the sign from the active unit.

14 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to Step 16

15 Obtain further assistance in replacing this card by contacting personnel responsible for higher level of support.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX01 in an RSC RCC2

Application

Use this procedure to replace NTBX01 card in RSCE RCC2.

PEC	Suffixes	Name
NTBX01	AB	ISDN Preprocessor

Common procedures

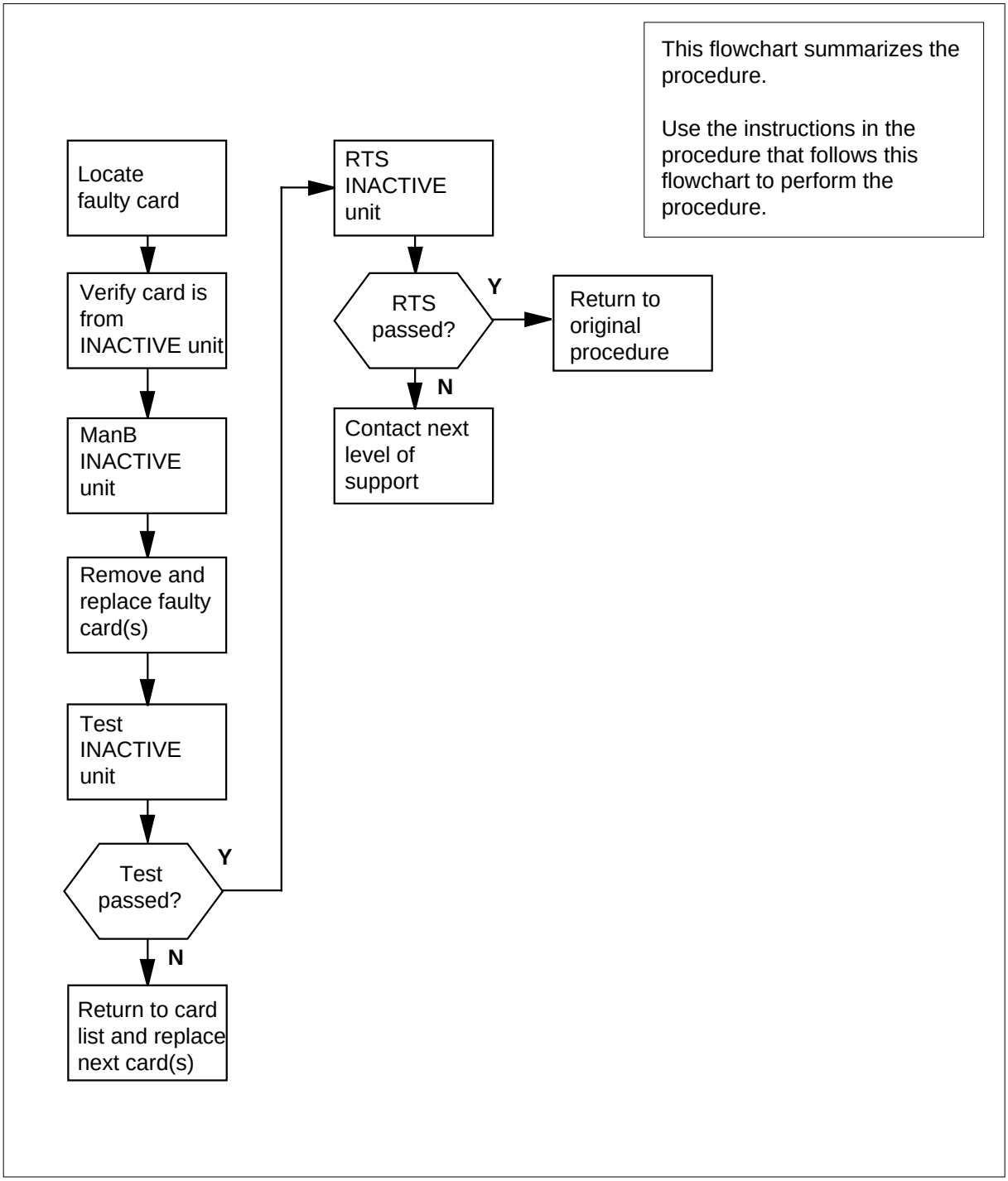
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX01 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTBX01 card in RSCE RCC2



NTBX01 in an RSC RCC2 (continued)

Replacing an NTBX01 card in RSCE RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTBX01 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Ensure the PM level of the MAP display is currently displayed and the RCC2 is posted by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_unit_no
```

and pressing the Enter key.

where

rcc2_unit_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .       .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0        25
 2 Post_   RCC2      0        0        0        0        0         0
 3 ListSet
 4         RCC2    0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 By observing the MAP display, ensure that the card to be removed is on the inactive unit.

At the RSCE frame

5 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

6 Busy the inactive PM unit by typing

`>bsy unit rcc2_unit_no`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit (0 or 1)

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC2. This protects the equipment against damage caused by static electricity.

NTBX01
in an RSC RCC2 (continued)

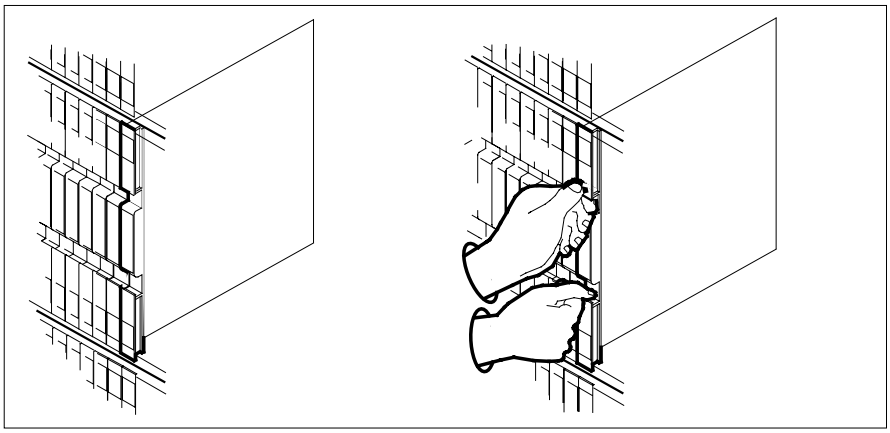
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.2. Do not force the card into its slot.

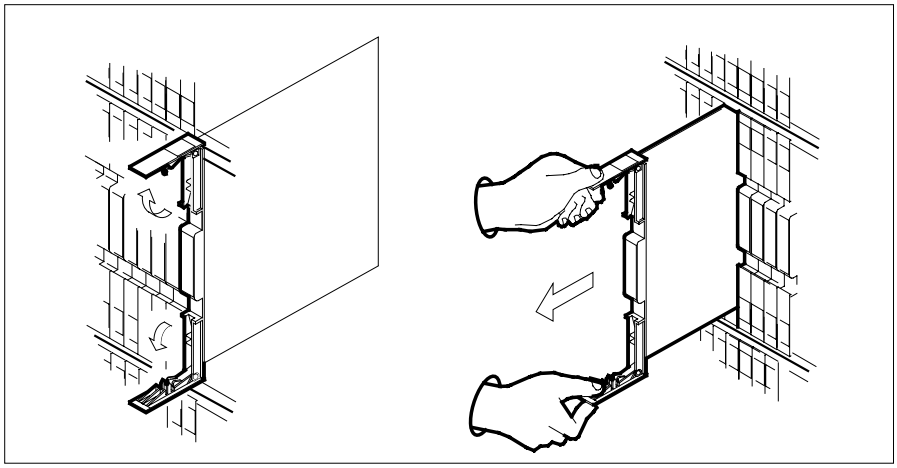
Put on a wrist strap.

8 Remove the NTBX01 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



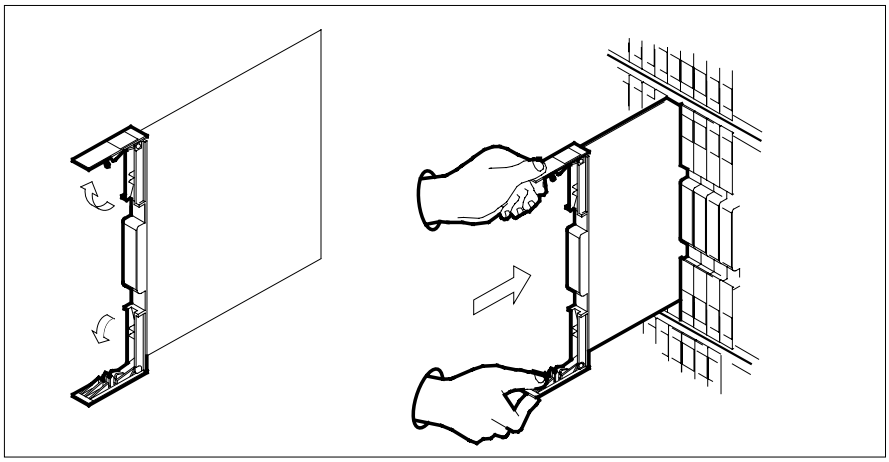
c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

NTBX01
in an RSC RCC2 (continued)

9 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

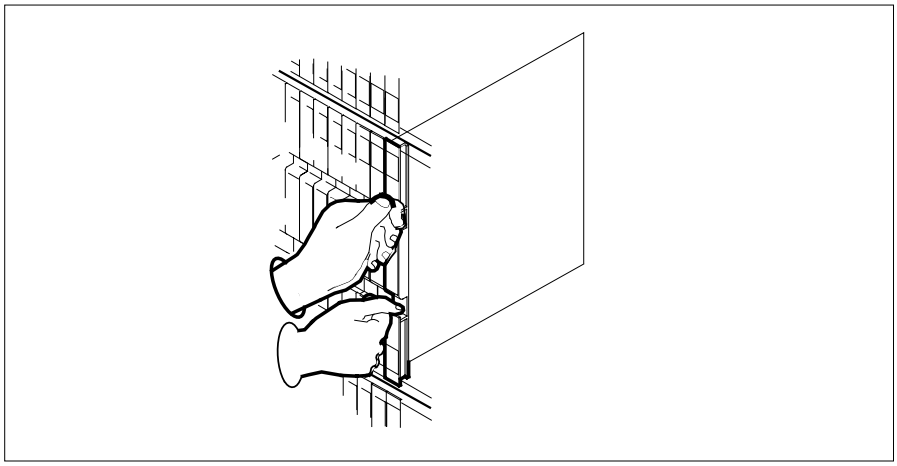
b Gently slide the card into the shelf.



10 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



At the MAP terminal

11 After replacing the faulty card, load the inactive RCC2 unit by typing

`>LOADPM UNIT rcc2_unit_no CC`

and pressing the Enter key.

where

NTBX01 in an RSC RCC2 (end)

rcc2_unit_no
is the number of the RCC2 unit busied in step 6

12 Use the following information to determine where to proceed.

If load	Do
passed	step 13
failed	step 19

13 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 14

14 Return the inactive RCC2 unit to service by typing

`>RTS UNIT rcc2_unit_no`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the RCC2 unit busied in step 6

15 Use the following information to determine where to proceed.

If RTS	Do
passed	step 16
failed	step 19

16 Send any faulty cards for repair according to local procedure.

17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

18 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in *Card Replacement Procedures*.

19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

20 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX02 in an RSC RCC2

Application

Use this procedure to replace an NTBX02 card in an RSCE RCC2.

PEC	Suffixes	Name
NTBX02	AA, BA	D-Channel Handler

Common procedures

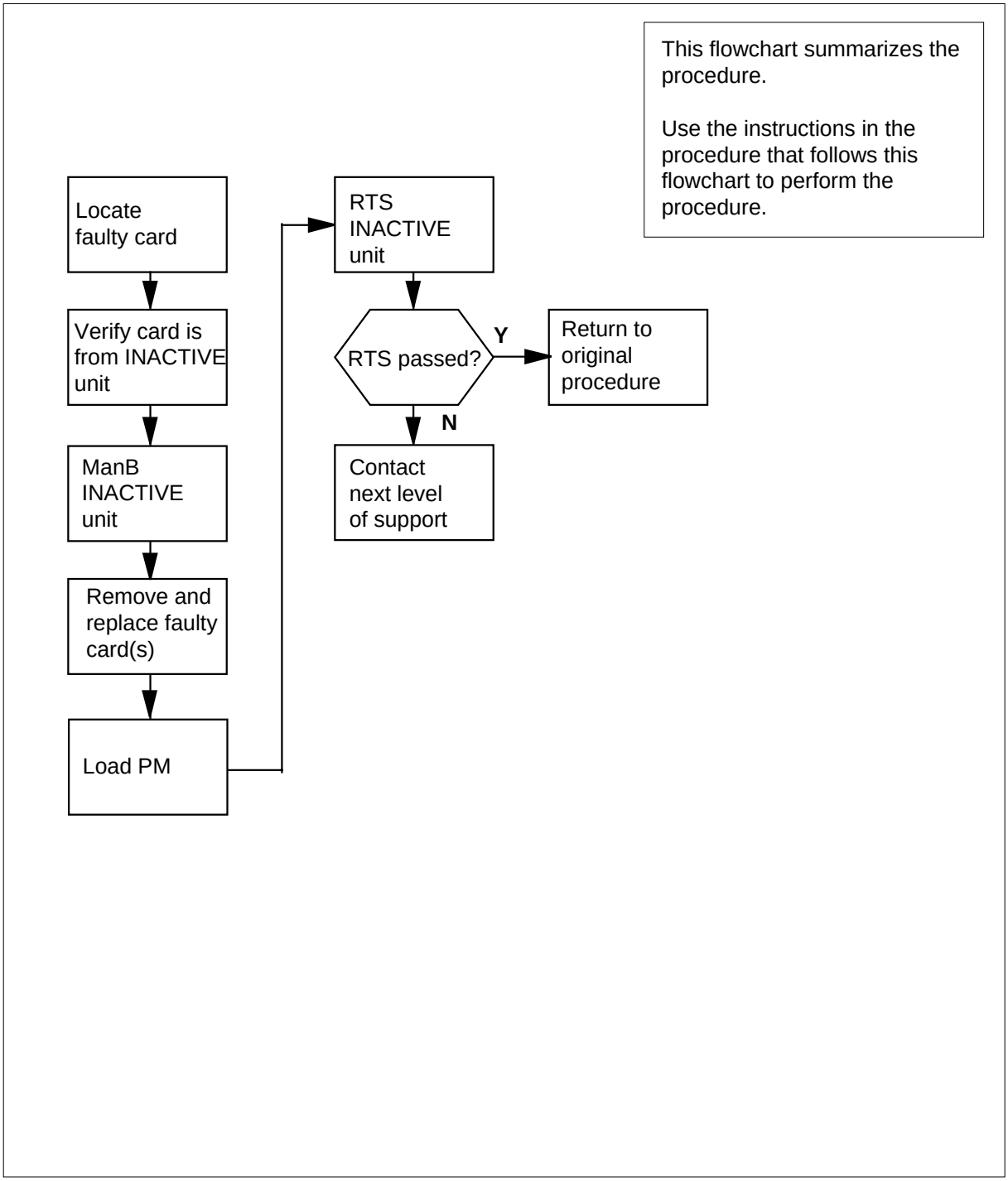
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX02 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTBX02 card in an RSC-S RCC2



NTBX02 in an RSC RCC2 (continued)

Replacing an NTBX02 card in an RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

If the faulty card is	Do
in an extension (EXT) shelf	step 3
not in an EXT shelf	step 4

At the MAP terminal

3 For an extension shelf, refer to the slot positions in the following table to determine which unit contains the faulty NTBX02 card, and proceed to step 4.

IfEXT shelf slot number	DoCPM unit number
3 / 24	0
4 / 23	0
5 / 22	0
6 / 21	0
7 / 20	0
8 / 19	1
9 / 18	1

NTBX02 in an RSC RCC2 (continued)

If EXT shelf slot number	DoCPM unit number
10 / 17	1
11 / 16	1
12 / 15	1

4 Ensure the PM level of the MAP display is currently displayed and the RCC2 with the faulty DCH card is posted by typing

`>MAPCI;MTC;PM;POST RCC2 rcc2_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
.     .      .      .     .     .      .      .       .      .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0        25
 2 Post_   RCC2      0        0        0        0        0         0
 3 ListSet
 4         RCC2   0     Links_OOS:  CSide  0, PSide   0
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15 DCH
16
17
18
```

5 Refer to the MAP display posted in step 4 to see if the faulty NTBX02 card is in the active or inactive unit.

If faulty card is in	Do
active unit	step 6
inactive unit	step 10

NTBX02
in an RSC RCC2 (continued)

6 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

If SWACT	Do
cannot continue at this time	step 7
can continue at this time	step 8

7 Do not switch activity of the units. Reject the SWACT by typing

>NO

and pressing the Enter key.

The system discontinues the SWACT.

Return to step 6 during a period of low traffic.

8 Confirm the system prompt by typing

>YES

and pressing the Enter key.

The system runs a pre-SWACT audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding to the next maintenance action.

If the message is	Do
SWACT passed	step 10
SWACT failed	step 9
SWACT refused by SWACT controller	step 9

9 Return to the *Alarm Clearing Procedures* to clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this procedure.

At the RSCE frame

10 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

11 Busy the inactive PM unit by typing

>bsy unit unit_no

and pressing the Enter key.

where

NTBX02 in an RSC RCC2 (continued)

unit_no
is the number of the inactive RCC2 unit (0 or 1) containing the faulty BX02 card

12 Access the DCH level of the MAP display by typing

>DCH

and pressing the Enter key.

Example of a MAP display:

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .      .     .      .      .       .      .

 DCH              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0        25
 2 Post_   RCC2      0        0        0        0        0         0
 3
 4         RCC2  0     Links_OOS:  CSide  0, PSide   0
 5 TRNSL   Unit0:   InSv
 6 TST     Unit1:   InSv
 7 BSY
 8 RTS       DCH     0        0        0        1        0         0
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15 DCH
16
17 Perform
18
```

13 Using the information in the MAP display in step 12, identify and post the faulty DCH card state by typing

>POST dch_card_state

and pressing the Enter key.

where

dch_card_state
is either CBsy, SysB or ISTb. The example in step 12 shows the DCH card as being CBsy.

Example of a MAP display:

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl    .
  .     .      .      .      .      .

DCH              SysB     ManB     OffL     CBsy     ISTb      InSv
0 Quit    PM        0        0        0        0        0        25
2 Post_   RCC2      0        0        0        0        0         0
3
4         RCC2  0    Links_OOS:  CSide  0, PSide   0
5 TRNSL   Unit0:   InSv
6 TST     Unit1:   InSv
7 BSY
8 RTS        DCH    0        0        0        1        0         0
9 OffL
10 LoadPM_    DCH   0  ISG   1   CBSY   RCC2     2  PORT  15
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15 DCH
16
17 Perform
18
```

14 Identify the DCH load file name by typing

>QUERYPM

and pressing the Enter key.

Example of a MAP response

```
Site  Flr  RPos  Bay_id   Shf  Description    Slot  EqPEC
HOST  01    R09 LTEI 00   32   LTC : 002      02    BX02

Loadnames : DCHINV – DCH32BT  : INTL INDEX : 8
```

The DCH load file name in the example is *DCH32BT*.

15 Use the following information to determine the next step in this procedure.

If system load module is	Do
version 1	step 16
version 2	step 17

16 List the loadfile in the directory by typing

>DSKUT;LISTVOL D000 DCH load_file_name ALL

and pressing the Enter key.

or

>DSKUT;LISTVOL D010 DCH_load_file_name ALL

NTBX02
in an RSC RCC2 (continued)

and pressing the Enter key.

Local operating company policy determines which disk, D000 or D010, the loadfile will be on.

Example of a MAP response
TAPE$DIR
DCH32BT

Proceed to step 18.

17 List the loadfile in the directory by typing

>DISKUT;LV S00D

and pressing the Enter key.

>LF S00D file_name

and pressing the Enter key.

or

>DISKUT;LV S01D

and pressing the Enter key.

>LF S01D file_name

and pressing the Enter key.

18 Leave the disk utility by typing

>quit

and pressing the Enter key.

19 Compare the information in the example in step 14 with the information in the example in step 16 to verify the DCH file name exists. For instance, the file name in step 16 is *DCH32BT*, which corresponds to the file name in step 14.

20 Busy the faulty card by typing

>BSY

and pressing the Enter key.

NTBX02 in an RSC RCC2 (continued)

At the RSCE frame

21

WARNING
Static discharge may cause damage to circuit packs
Put on a wrist strap and connect it to the frame of the RMM before removing any cards. This protects the RMM against service degradation caused by static electricity.

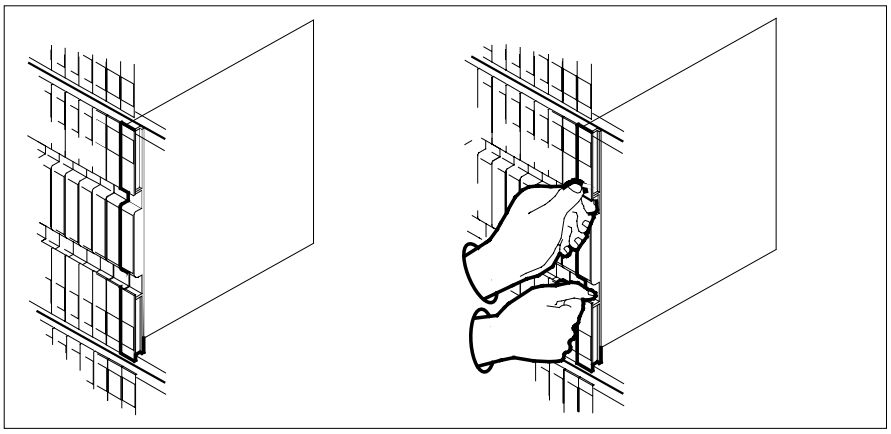
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

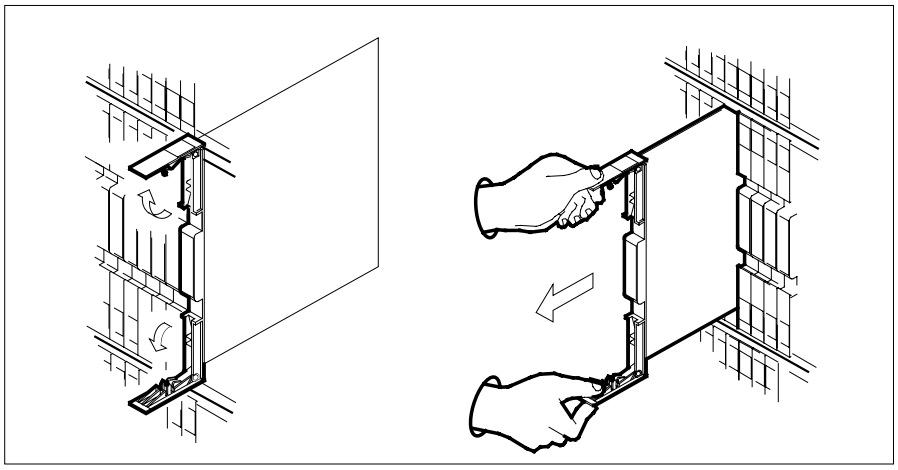
22 Remove the NTBX02 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

NTBX02
in an RSC RCC2 (continued)

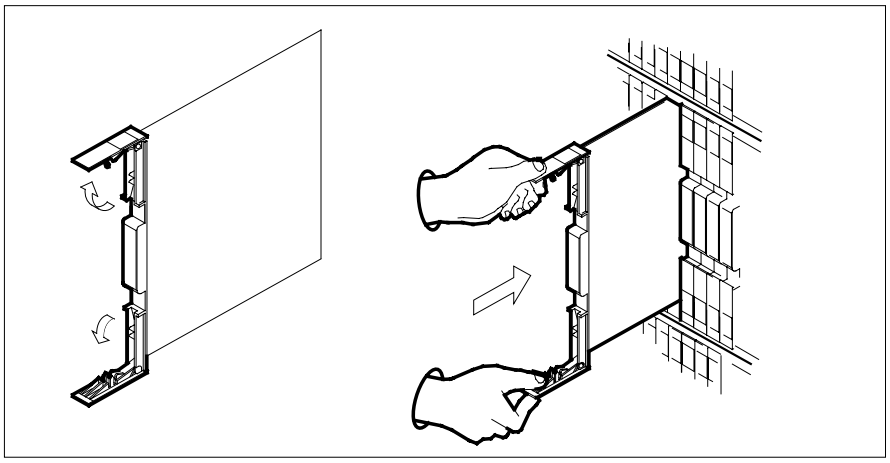


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

23 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Gently slide the card into the shelf.



24

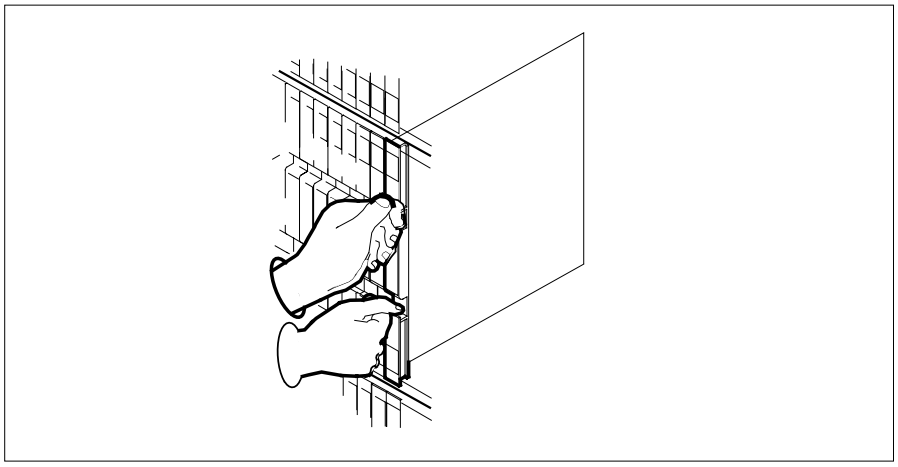
CAUTION
Loss of subscriber service
Subscriber service may be lost in the active unit when reseating the NTBX02 card.

It is recommended that this procedure be performed during low traffic periods.

Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure that the card is fully seated in the shelf.

b Close the locking levers.



At the MAP terminal

25 Load the DCH card by typing

>LOADPM

and pressing the Enter key.

26 Use the following information to determine the next step in this procedure.

If load	Do
passed	step 27
failed	step 34

27 Return the DCH card to service by typing

>RTS

NTBX02 in an RSC RCC2 (continued)

and pressing the Enter key.

If RTS	Do
passed	step 28
failed	step 34

28 Leave the DCH level of the MAP display and return to the RCC2 level by typing

>QUIT

and pressing the Enter key.

29 Return to service the PM unit busied in step 11 by typing

***>RTS unit* unit_no**

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit (0 or 1) containing the new BX02 card

30 Ensure that the RCC2 unit is in service by typing

>QUERYPM FLT

and pressing the Enter key.

Example of a MAP display:

```
CM    MS    IOD    Net    PM    CCS    Lns    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .      .

RCC2              SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit    PM        0        0        0        0        0       25
 2 Post_   RCC2      0        0        0        0        0        1
 3 ListSet
 4         RCC2  0  InSv  Links_OOS:  CSide  0, PSide   0
 5 TRNSL_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_    QUERYPM FLT
 8 RTS_         Unit0  No troubles exist
 9 OffL         Unit1  No troubles exist
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15 DCH
16
17
18
```

NTBX02 in an RSC RCC2 (end)

Use the following information to determine the next step in this procedure.

If faults are	Do
not indicated	step 31
indicated	step 34

31 Send any faulty cards for repair according to local procedure.

32 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

If you entered this procedure from	Do
alarm clearing procedures	step 33
other	step 35

33 Return to *Alarm Clearing Procedures* or other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

34 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

35 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX26 in an RSC LCME

Application

Use this procedure to replace an NTBX26 card in an RSCE LCME.

PEC	Suffixes	Name
NTBX26	AA	ISDN S/T Interface Line card

Common procedures

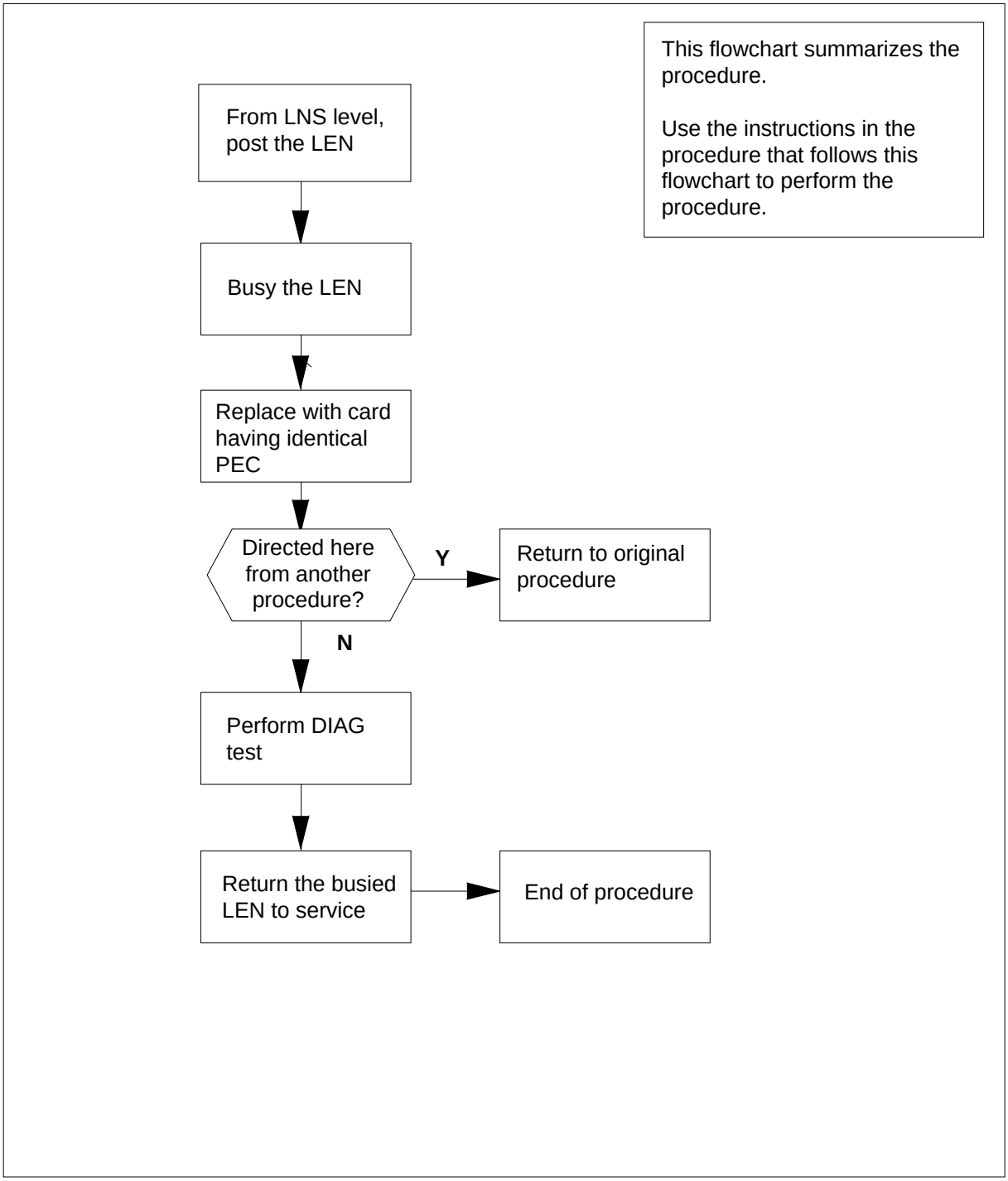
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX26 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX26 card in an RSCE LCME



NTBX26 in an RSC LCME (continued)

Replacing an NTBX26 card in an RSCE LCME

At your current location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain an NTBX26 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the line equipment number (LEN) of the card to be replaced by typing

```
>MAPCI;MTC;LNS;POST L site lcme_no unit_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the location name of the LCME with the faulty card

lcme_no
is the number of the LCME with the faulty card

unit_no
is the number of the LCME unit with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .     .      .      .     .      .      .       .      .

LTP
 0 Quit      Post     DELQ      BUSYQ      PREFIX
 2 Post_
 3           LCC PTY RNG....LEN......DN      STA F S LTA TE RESULT
 4           ISDN Loop HOST 00 0 03 03  4931082  IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NTBX26 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .     .      .      .     .      .      .       .      .

LTP
 0 Quit     Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN       STA F S LTA TE RESULT
 4          ISDN Loop  HOST 00 0 03 03 4931082  MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NTBX26 in an RSC LCME (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers.

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3-4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

6 To prepare to remove the faulty card, open the line drawer and do the following substeps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).

d While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

NTBX26 in an RSC LCME (continued)

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 10

At the MAP terminal

10 Test the NTBX26 line card by typing

```
>DIAG
```

and pressing the Enter key.

11 Use the following information to determine where to proceed.

If DIAG	Do
passed	step 12
failed	step 15

12 Return the NTBX26 card to service by typing

```
>RTS
```

NTBX26 in an RSC LCME (end)

and pressing the Enter key.

If RTS	Do
passed	step 13
failed	step 16

13 Send any faulty cards for repair according to local procedure.

14 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.

15 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX27 in an RSC LCME

Application

Use this procedure to replace an NTBX27 card in an RSCE LCME.

PEC	Suffixes	Name
NTBX27	AA	ISDN 2B1Q U Interface Line card

Common procedures

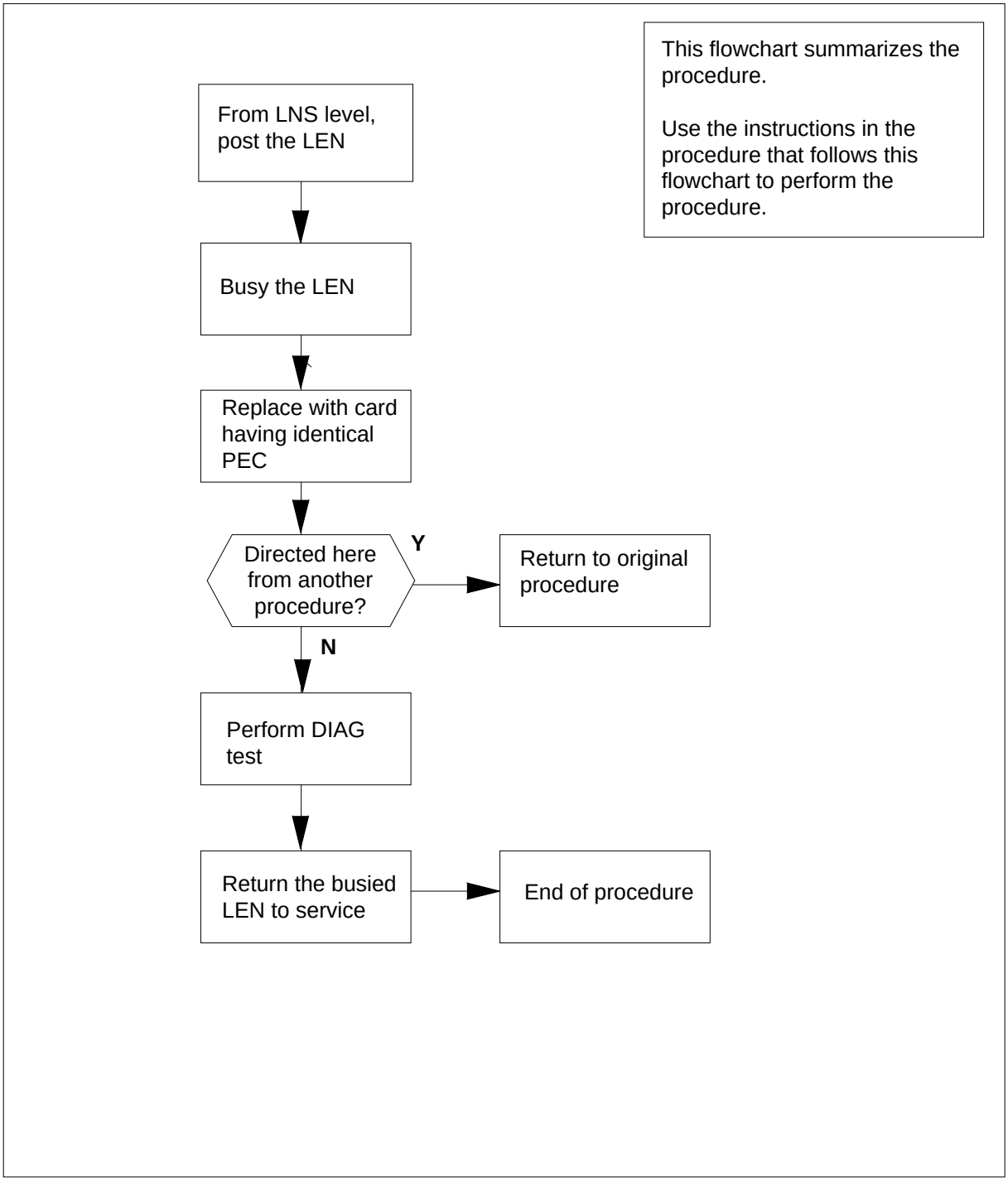
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX27 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX27 card in an RSC LCME



NTBX27 in an RSC LCME (continued)

Replacing an NTBX27 card in an RSCE LCME

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain an NTBX27 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Post the LEN of the card to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site lcme_no unit_no lsg_no ckt_no
```

and pressing the Enter key.

where

site
is the location name of the LCME with the faulty card

lcme_no
is the number of the LCME with the faulty card

unit_no
is the number of the LCME unit with the faulty card

lsg_no
is the number of the LSG with the faulty card

ckt_no
is the number of the circuit associated with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .      .     .      .      .       .       .

LTP
 0 Quit     Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN       STA F S LTA TE RESULT
 4          ISDN Loop    HOST 00 0 03 03  4931082  IDL
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

4 Busy the NTBX27 line card by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .      .     .      .      .       .       .

LTP
 0 Quit     Post       DELQ       BUSYQ        PREFIX
 2 Post_
 3          LCC PTY RNG....LEN......DN       STA F S LTA TE RESULT
 4          ISDN Loop  HOST 00 0 03 03 4931082  MB
 5 BSY
 6 RTS
 7 DIAG
 8
 9 AIMStat
10 CKTLOC
11 Hold
12 Next_
13
14
15
16 Prefix
17 LCO
18 Level
```

NTBX27
in an RSC LCME (continued)

At the LCE frame

5

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers.

NTBX27
in an RSC LCME (continued)

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3-4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

6 To prepare to remove the faulty card, open the line drawer and follow these substeps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).

d While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

7 Remove the line card to be replaced by following these substeps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

NTBX27
in an RSC LCME (continued)

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

8 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

9 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 10

At the MAP terminal

10 Test the NTBX27 line card by typing

```
>DIAG
```

and pressing the Enter key.

11 Use the following information to determine where to proceed.

If DIAG	Do
passed	step 12
failed	step 16

12 Return the NTBX27 card to service by typing

```
>RTS
```

NTBX27 in an RSC LCME (end)

and pressing the Enter key.

If RTS	Do
passed	step 13
failed	step 16

13 Send any faulty cards for repair according to local procedure.

14 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 17.

15 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

17 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX34 in an RSC LCME

Application

Use this procedure to replace an NTBX34 card in RSCE LCME.

PEC	Suffixes	Name
NTBX34	BA	ISDN Enhanced LCM Processor

Common procedures

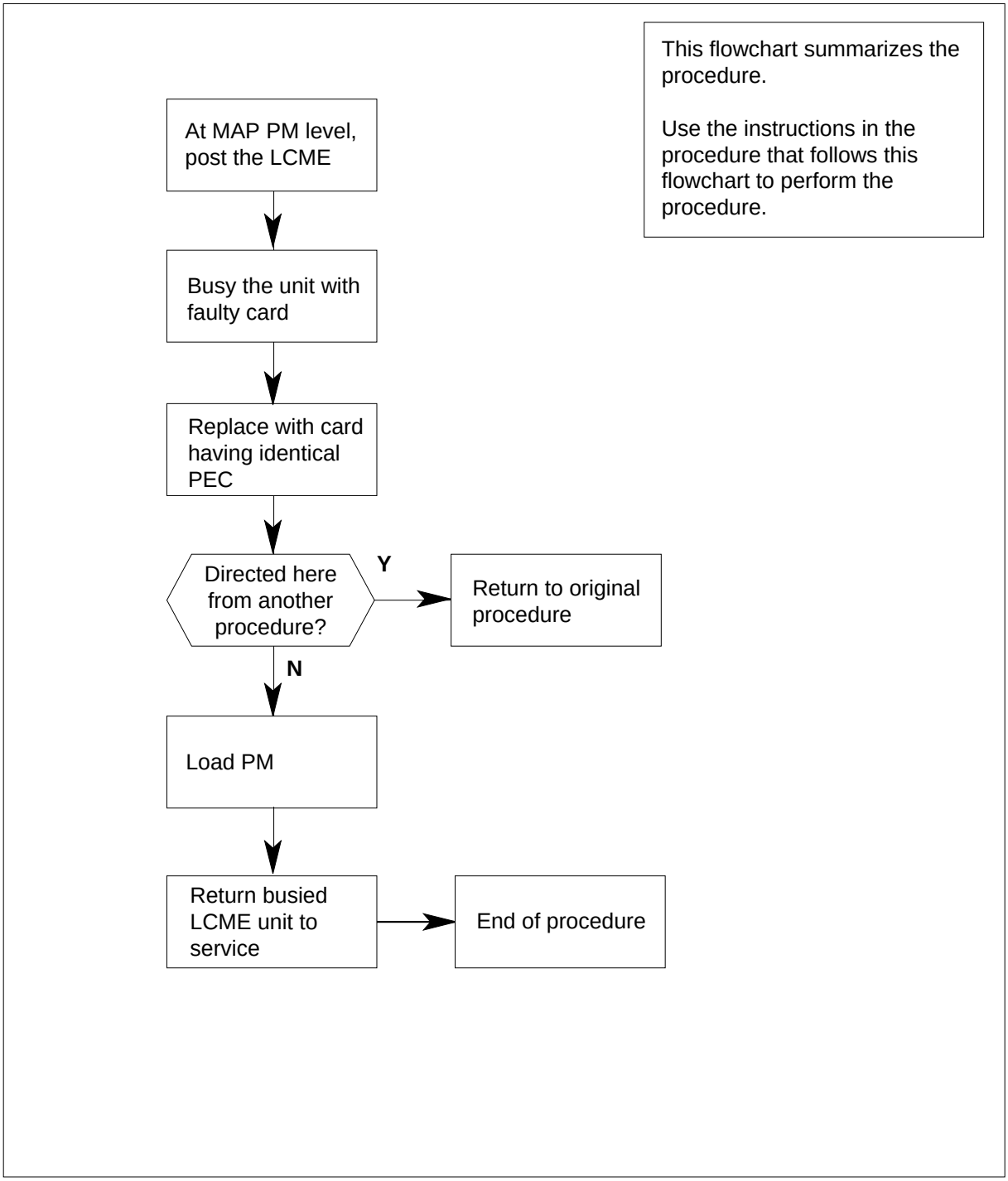
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX34 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX34 card in an RSC LCME



NTBX34
in an RSC LCME (continued)

Replacing an NTBX34 card in an RSC-S LCME

At your current location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain an NTBX34 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

3 Set the MAP display to the PM level and post the LCME by typing

`>MAPCI;MTC;PM;POST LCME site frame_no lcme_no`

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame at which the LCME is located

lcme_no
is the number of the LCME with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .      .

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0       130
 2 Post_   LCME      0        0        0        0        0         0
 3
 4 Swrg_      LCME  RemL  00 0   Links_OOS:  CSide 0
 5 Trnsl_     Unit-0:   InSv              /RG:  0
 6 Tst_       Unit-1:   InSv              /RG:  0
 7 Bsy_      RG: Preferred 0:  InSv  Standby1:  InSv
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 Busy the LCME unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no
is the number of the LCME unit with the faulty card

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .      .

LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0       130
 2 Post_   LCME      0        1        0        0        0         0
 3
 4 Swrg_      LCME  RemL  00 0   Links_OOS:  CSide 0
 5 Trnsl_     Unit-0:   InSv Mtce Takeover /RG:  0
 6 Tst_       Unit-1:   ManB Mtce          /RG:  0
 7 Bsy_      RG: Preferred 0:  InSv  Standby1:  InSv
 8 RTS_
 9 OffL_
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

NTBX34 in an RSC LCME (continued)

At the LCE frame

5

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

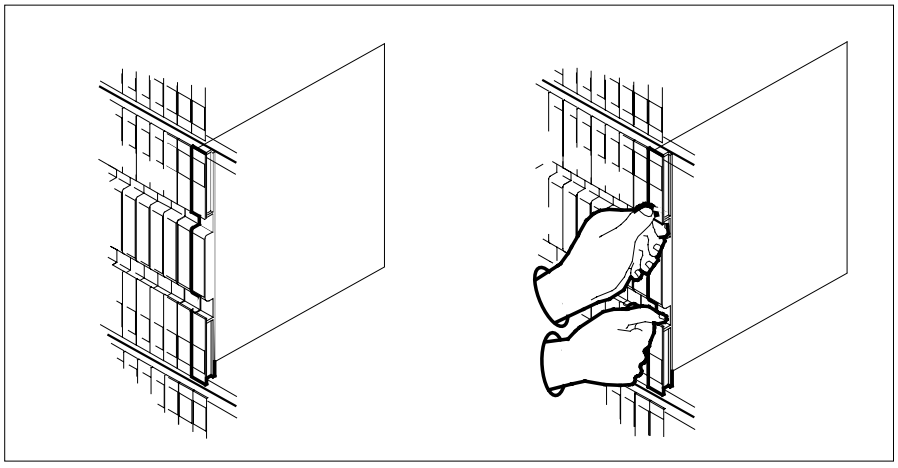
When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

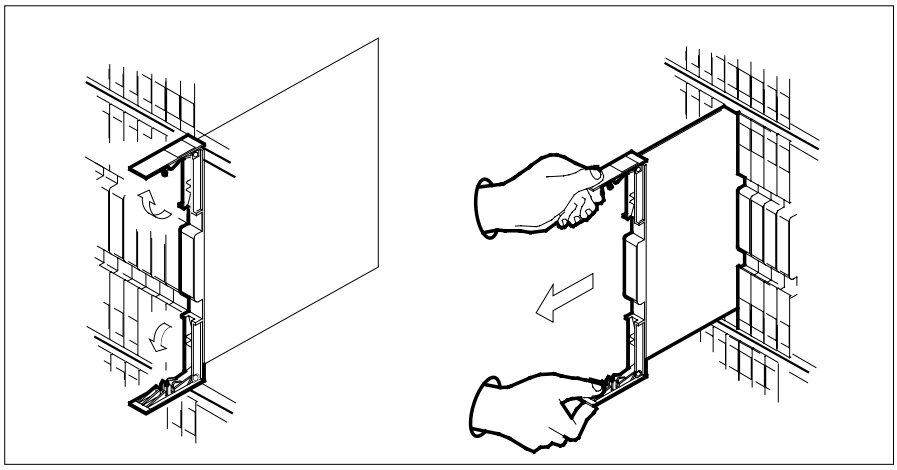
Put on a wrist strap.

6 Remove the NTBX34 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

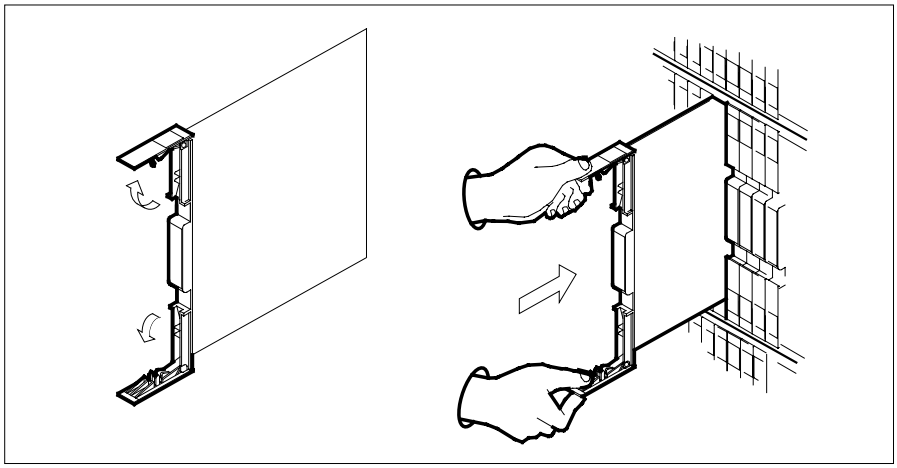


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Gently slide the card into the shelf.

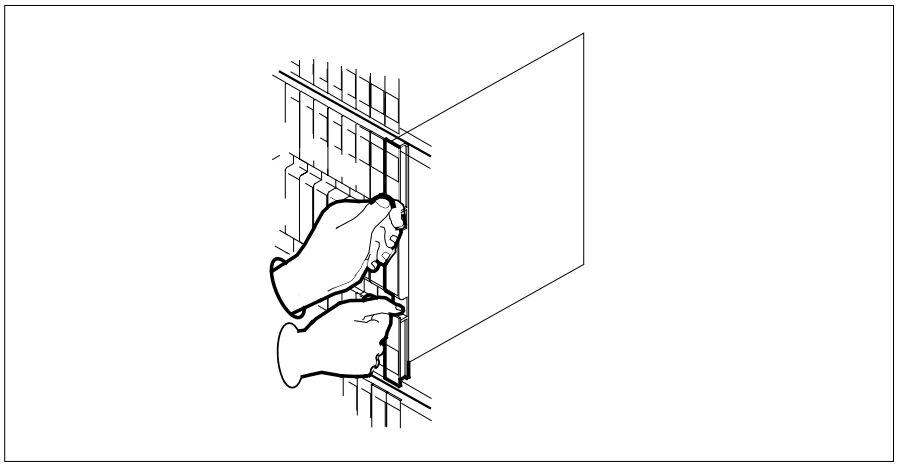


8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NTBX34 in an RSC LCME (continued)



At the MAP terminal

9 Load the LCME unit by typing

`>loadpm unit unit_no CC`

and pressing the Enter key.

where

unit_no
is the number of the LCME unit busied in step 4

10 Use the following information to determine where to proceed.

If load	Do
passed	step 11
failed	step 17

11 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 16
other	step 12

12 Return the LCME unit to service by typing

`>RTS UNIT lcme_unit_no`

and pressing the Enter key.

where

NTBX34 in an RSC LCME (end)

lcme_unit_no
is the number of the LCME unit busied in step 4

13 Use the following information to determine where to proceed.

If RTS	Do
passed	step 14
failed	step 17

14 Send any faulty cards for repair according to local procedure.

15 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 18.

16 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

17 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

18 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX35 in an RSC LCME

Application

Use this procedure to replace an NTBX35 card in an RSCE LCME.

PEC	Suffixes	Name
NTBX35	AA	ISDN LCM Digroup Controller

Common procedures

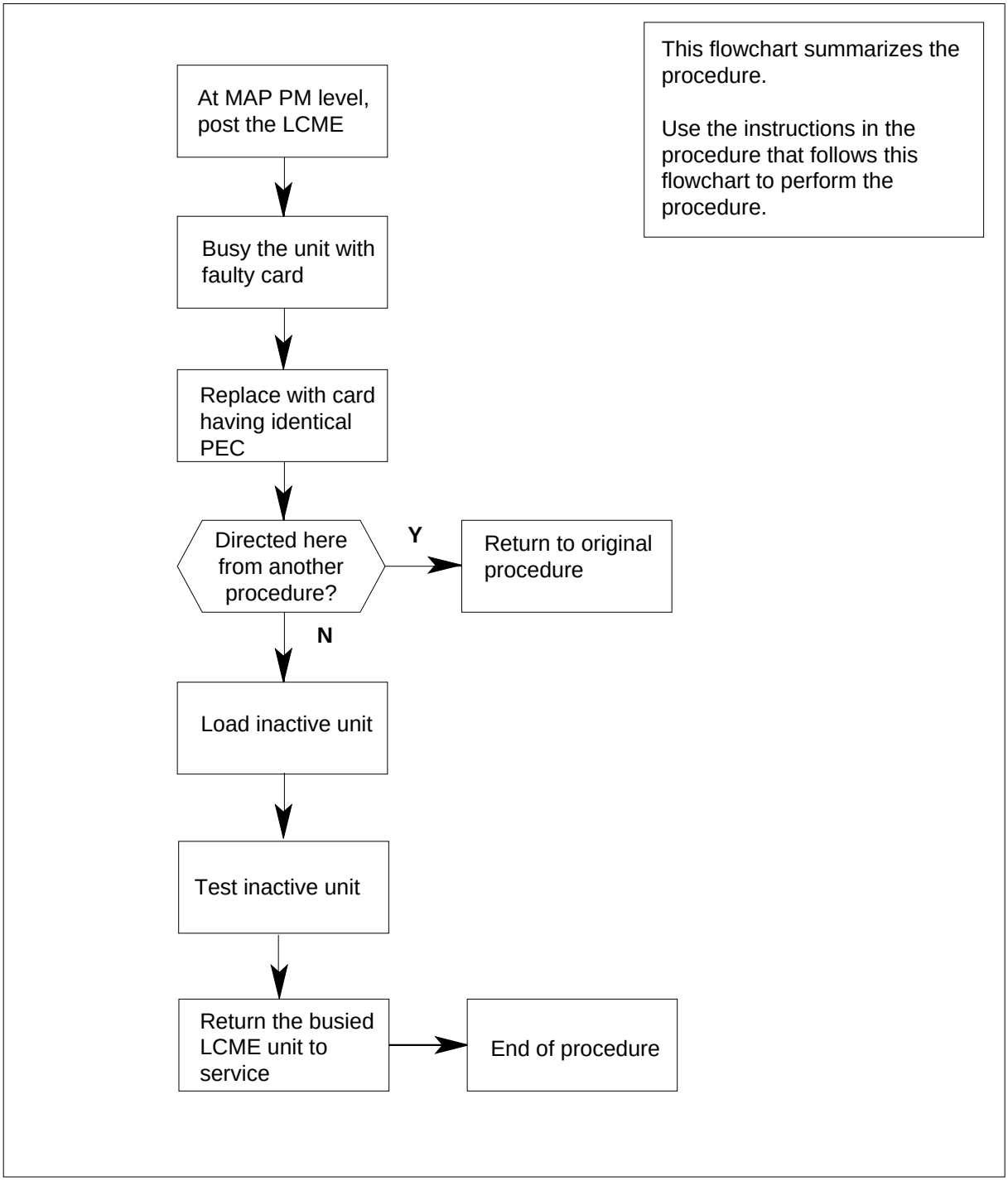
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTBX35 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX35 card in an RSC-S LCME



NTBX35 in an RSC LCME (continued)

Replacing an NTBX35 card in an RSCE LCME

At your current location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain an NTBX35 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

3 Set the MAP to the PM level and post the LCME by typing

`>MAPCI;MTC;PM;POST LCME site frame_no unit_no`

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME with the faulty card

Example of a MAP display:

```
 CM     MS     IOD    Net    PM    CCS    LNS    Trks     Ext       Appl
 .      .       .      .     .      .      .       .       .         .
LCME             SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       o        0        0        0        0       130
 2 Post_   LCME     0        0        0        0        0         0
 3
 4 Swrg_
 5 Trnsl_                     LCME   RemL  OO O   Links_OOS:  CSide 0
 6 Tst_                       Unit-0:  InSv               /RG:  0
 7 Bsy_                       Unit-1:  InSv               /RG:  0
 8 RTS_                     RG: Preferred 0:  InSv   Standby1: InSv
 9 OffL_
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 Busy the LCME unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no
is the number of the LCME unit with the faulty card

Example of a MAP display:

```
 CM     MS     IOD   Net    PM    CCS    LNS    Trks     Ext      Appl
 .      .       .     .      .     .      .       .       .        .
LCME             SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       0        0        0        0        0       130
 2 Post_   LCME     0        1        0        0        0         0
 3
 4 SwRg              LCME   RemL  OO O   Links_OOS:  CSide 0
 5 Trnsl             Unit-0:  InSv  Mtce TakeOver /RG:  0
 6 Tst               Unit-1:  ManB Mtce           /RG:  0
 7 Bsy              RG: Preferred 0:  InSv   Standby1: InSv
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

NTBX35 in an RSC LCME (continued)

At the LCE frame

5

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

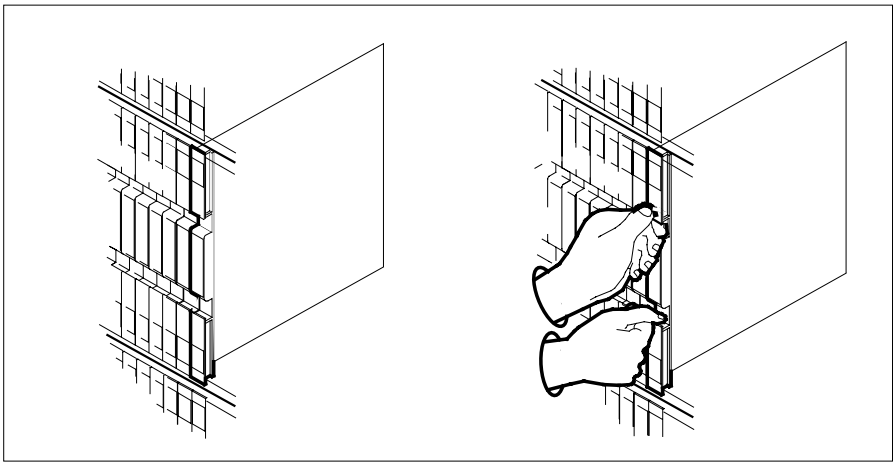
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

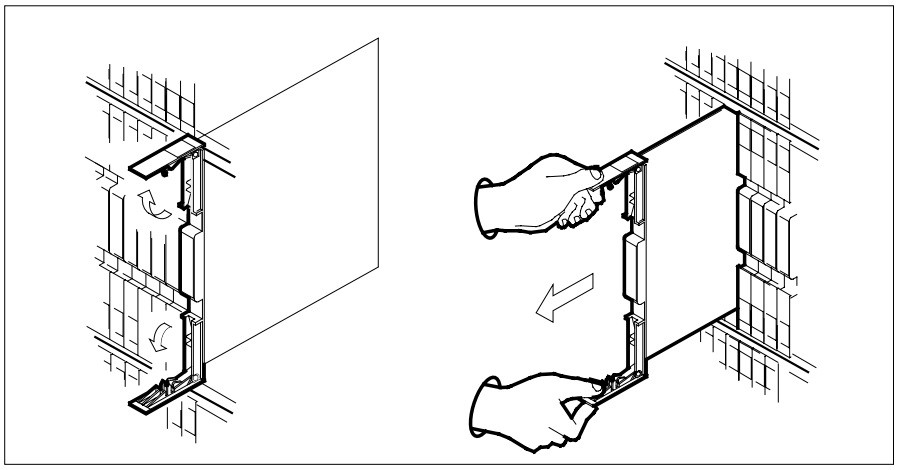
Put on a wrist strap.

6 Remove the NTBX35 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

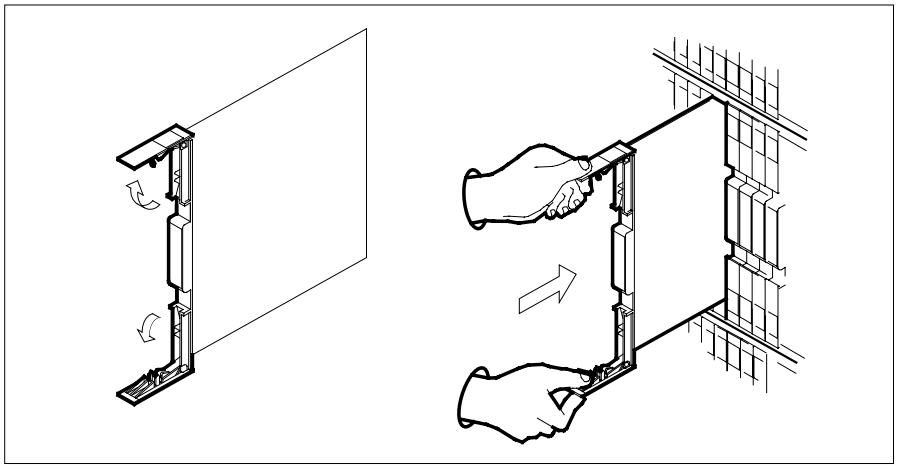


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

7 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Gently slide the card into the shelf.

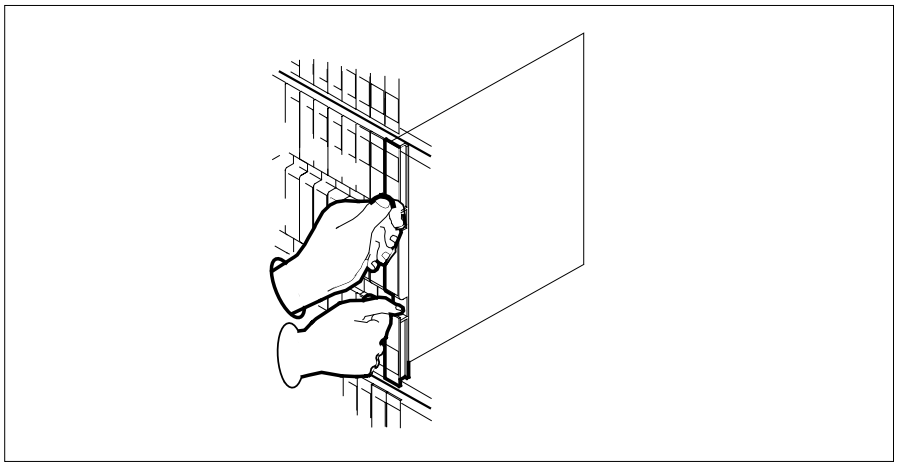


8 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NTBX35
in an RSC LCME (continued)



At the MAP terminal

9 Load the LCME unit by typing

`>loadpm uNIT unit_no CC`

and pressing the Enter key.

where

unit_no
is the number of the LCME unit busied in step 4

If load	Do
passed	step 10
failed	step 15

10 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 14
other	step 11

11 Return the LCME unit to service by typing

`>RTS UNIT lcme_unit_no`

and pressing the Enter key.

where

NTBX35 in an RSC LCME (end)

lcme_unit_no
is the number of the LCME unit busied in step 4

If RTS	Do
passed	step 12
failed	step 15

12 Send any faulty cards for repair according to local procedure.

13 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 16.

14 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

15 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

16 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX36 in an RSC LCME

Application

Use this procedure to replace an NTBX36 card in an RSCE LCME.

PEC	Suffixes	Name
NTBX36	BA	Bus Interface Card (BIC)

Common procedures

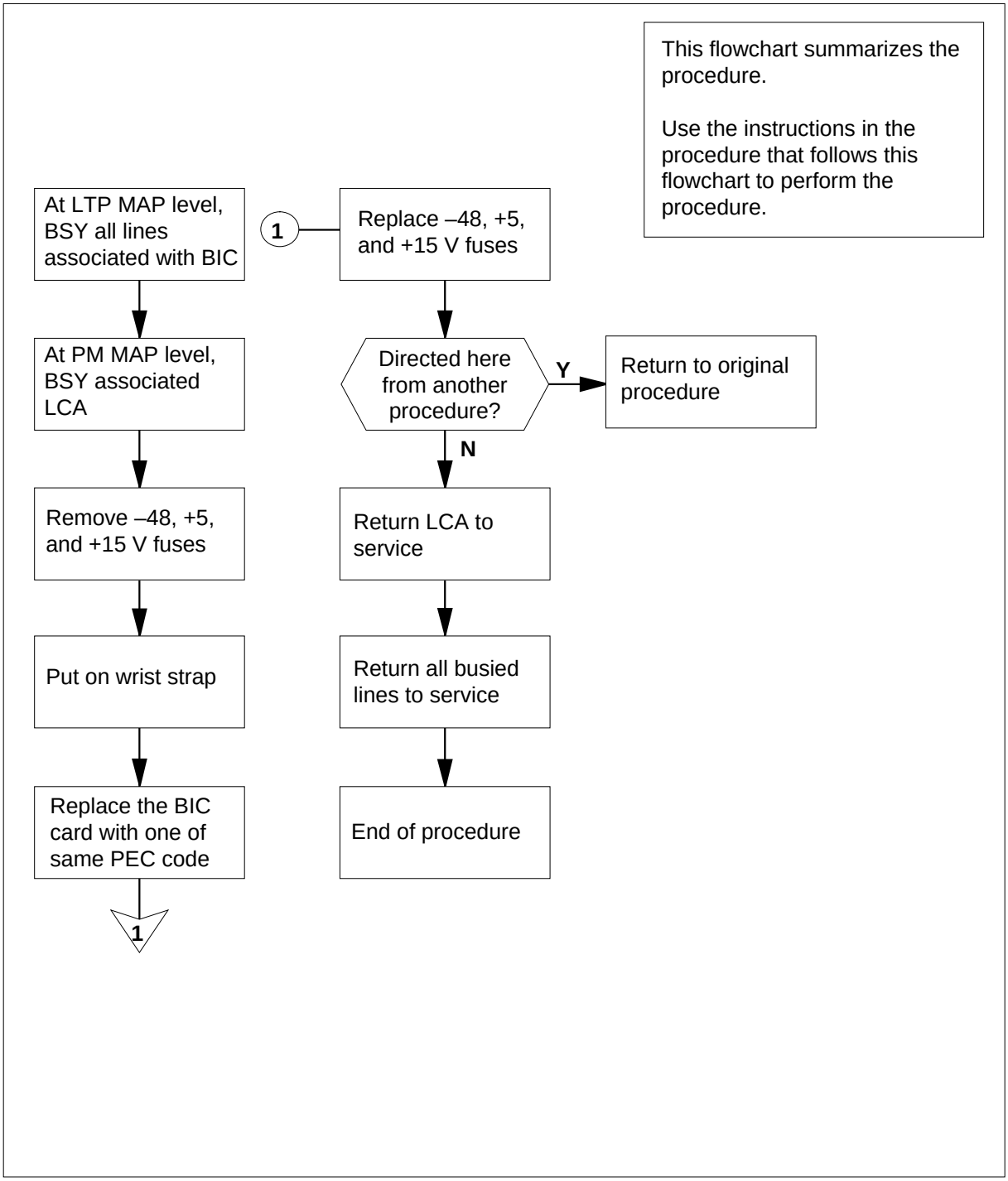
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX36 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX36 card in RSC LCME



NTBX36 in an RSC LCME (continued)

Replacing an NTBX36 card in RSC LCME

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC) including suffix, as the card that is to be removed.

At the MAP terminal

3 Access the LTP level and post the first line subgroup (LSG) of the line drawer that contains the bus interface card (BIC) to be replaced by typing

```
>MAPCI;MTC;LNS;LTP;POST L site frame_no unit_no lcm_dr
LSG
```

and pressing the Enter key.

where

site_
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME unit with the faulty card

lcm_dr
is the number of the drawer with the faulty card

4 Busy all lines in the first LSG by typing

```
>BSY ALL
```

and pressing the Enter key.

5 Post the next LSG of the same line drawer by typing

```
>NEXT D
```

and pressing the Enter key.

6 Repeat step 4 and step 5 until all LSGs of the same line drawer are busied.

7 Post the LCME with the LCA shelf containing the card to be replaced by typing

```
>PM;POST LCME site frame_no unit_no
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME unit with the faulty card

Example of a MAP display:

```
 CM     MS     IOD    Net     PM    CCS     LNS    Trks    Ext   Appl
 .      .       .      .     1LCME    .       .       .       .     .
LCME              SysB    ManB    OffL    CBsy    ISTb     InSv
 0 Quit    PM        0       0       0       0       0      130
 2 Post_   LCME      0       0       0       0       0        0
 3
 4 SwRg       LCME    Reml   00  0  ISTb   Links_OOS:  CSide 1
 5 Trnsl      Unit0:   InSV                  /RG:  0
 6 Tst        Unit1:   InSv                  /RG:  0
 7 Bsy                                 11 11 11      RG:Pref 0 InSv
 8 RTS        Drwr: 01 23 45 67 89 01 23 45         Stby:1 InSv
 9 OffL             .. .. .. .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

8 Busy all LSGs associated with the LCME drawer in which the card is being replaced by typing

>BSY DRWR x

and pressing the Enter key.

>BSY DRWR y

and pressing the Enter key.

>BSY DRWR z

and pressing the Enter key.

where

x
is the first line subgroup

y
is the next line subgroup

z
is the next line subgroup (if an LCMI)

Example of a MAP response:
Please confirm ("YES" or "NO")

NTBX36
in an RSC LCME (continued)

9 Confirm the busied LSGs by typing

>YES

and pressing the Enter key.

Example of a MAP display:

```
 CM     MS    IOD     Net    PM     CCS    LNS    Trks    Ext   Appl
 .      .       .       .     1LCME   .      .       .       .     .
LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        1        0        0        0       130
 2 Post_   LCME      0        1        0        0        0         0
 3
 4 SwRg       LCME      RemL   00  0  ISTb   Links_OOS:   CSide 1
 5 Trnsl      Unit 0:    InSv                  /RG:  0
 6 Tst        Unit 1:    InSv                  /RG:  0
 7 Bsy                                 11 11 11      RG:Pref 0 InSv
 8 RTS        Drwr: 01 23 45 46 67 89 01 23 45         Stby:1 InSv
 9 OffL             .. .. MM .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

NTBX36
in an RSC LCME (continued)

At the LCE frame

10

WARNING
Card damage—transport
Take these precautions to protect the circuit cards from electrical and mechanical damage while transporting cards.

When handling a circuit card not in an electrostatic discharge (ESD) protective container, stand on a conductive floor mat and wear a wrist strap connected, through a 1-megohm resistor, to a suitably grounded object, such as a metal workbench or a DMS switch frame (Northern Telecom Corporate Standard 5028).

Store and transport circuit cards in an ESD protective container.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

DANGER
Hot materials
Exercise care when handling the line card. The line feed resistor may be very hot.

CAUTION
Special tools required
Card shrouds and removal tools are required for removing cards from the line drawers.

Remove the -48V fuse for the line drawer containing the BIC to be replaced.

Remove the +5V fuse for the line drawer containing the BIC to be replaced.

Remove the + 15V fuse for the line drawer containing the BIC to be replaced.

NTBX36
in an RSC LCME (continued)

Put on a wrist strap.

Line card insertion / withdrawal tool for	Apparatus code	Common product code
3-inch cards	QTH56A	A0298291
6-inch cards	QTH58A	A0313317

Note 1: Card shrouds are required for inserting or removing cards in line drawers. Two sizes are available for use with 3-inch and 6-inch cards. Descriptions of these shrouds follow.

Note 2: Card removal tools are required for removing cards from line drawers. Two sizes are available. Descriptions of these tools follow.

Card removal tool for	Apparatus code	Common product code
3-4 inch cards	QTH57A	A0298292
Note: For 4-inch or larger cards, use the large grip tool ITA9953.		

11 To prepare to remove the faulty card, open the line drawer and follow these substeps:

a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with the thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1 in).

d While holding the drawer in this position, push the bottom of the drawer, nearest the shelf with your left hand, to a position about 1 cm (.5 in) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

f Ensure a card shroud and line card extractor are available.

12 Remove the line card to be replaced by following these substeps:

a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

13 Replace the faulty card by following these substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

f Close the line drawer.

14 Replace the -48V fuse for the line drawer containing the BIC that was replaced.

Replace the +5V fuse for the line drawer containing the BIC that was replaced.

Replace the +15V fuse for the line drawer containing the BIC that was replaced.

15 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 25
other	step 16

At the MAP terminal

16 Return the LSGs to service by typing

`>RTS DRWR x`

and pressing the Enter key.

`>RTS DRWR y`

and pressing the Enter key.

where

x
is the first line subgroup busied in step 8

NTBX36
in an RSC LCME (continued)

y
is the next line subgroup busied in step 8

17 Access the PM level of the MAP display and post the first LSG of the line drawer that contains the BIC to be replaced by typing

```
>MAPCI;MTC;PM;LNS;LTP;POST L site frame_no unit_no lcm_dr
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME unit with the faulty card

lcm_dr
is the number of the drawer with the faulty card

18 Return the busied lines in the first LSG to service by typing

```
>RTS ALL
```

and pressing the Enter key.

19 Post the next LSG of the same line drawer by typing

```
>NEXT D
```

and pressing the Enter key.

20 Repeat step 18 and step 19 until all busied lines in the drawer are returned to service.

21 Post the LCME with the LCA shelf containing the replaced card by typing

```
>PM;POST LCME site frame_no unit_no
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME unit with the faulty card

22 Return the LCME unit to service by typing

```
>RTS lcm_unit_no
```

and pressing the Enter key.

where

NTBX36 in an RSC LCME (end)

lcm_unit_no
is the number of the LCME unit posted in step 21

If RTS	Do
passed	step 23
failed	step 26

23 Send any faulty cards for repair according to local procedure.

24 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 27.

25 Return to the Alarm Clearing or other procedure that directed you to this procedure. If necessary, go to the point where the faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

26 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

27 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTBX72 in an RSC LCME

Application

Use this procedure to replace an NTBX72 card in an RSCE LCME.

PEC	Suffixes	Name
NTBX72	AA	ISDN LCME Battery and Ring Router

Common procedures

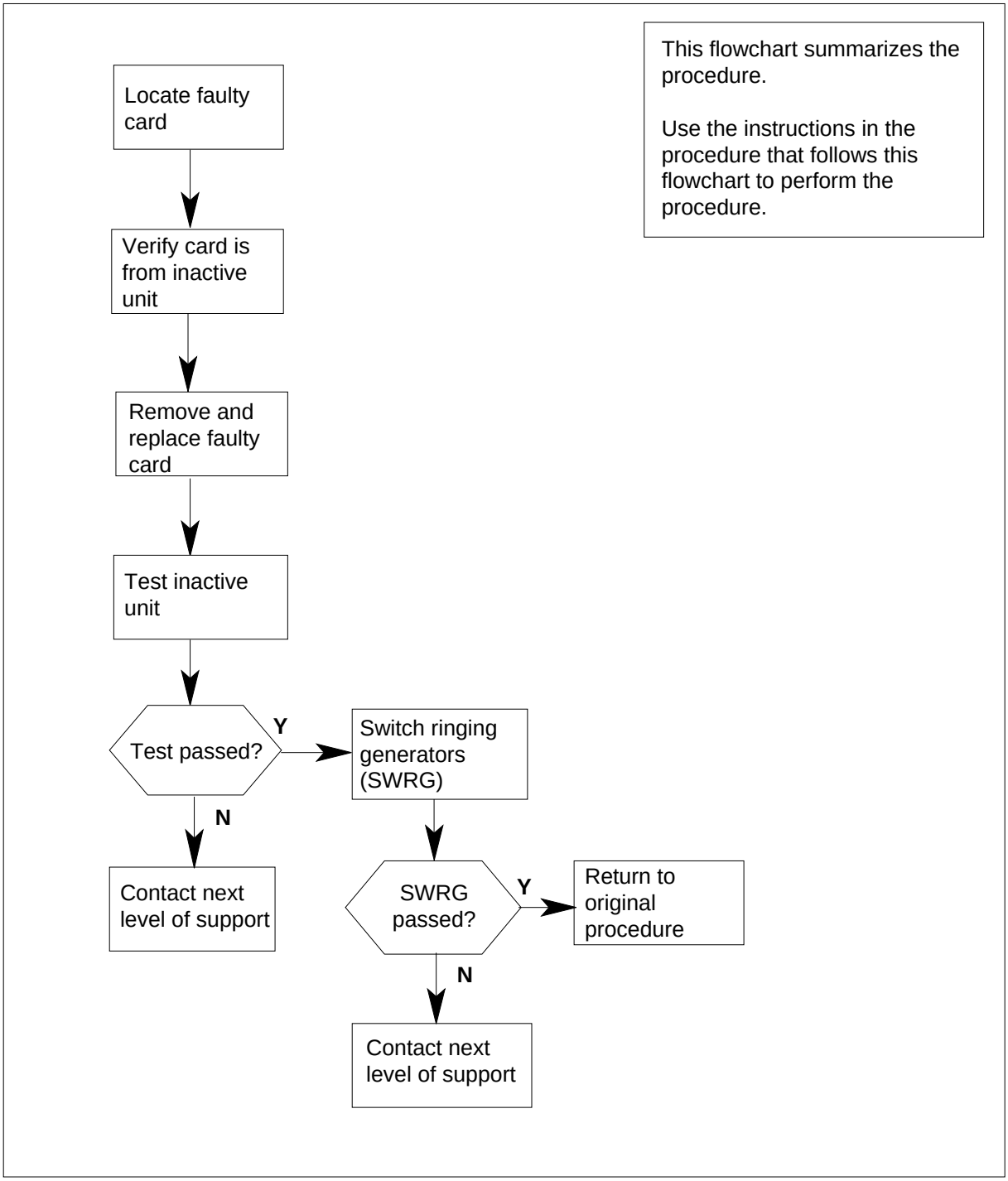
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTBX72 in an RSC LCME (continued)

Summary of card replacement procedure for an NTBX72 card in an RSCE LCME



NTBX72 in an RSC LCME (continued)

Replacing an NTBX72 card in an RSCE LCME

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain an NTBX72 replacement card. Ensure the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the LCME by typing

```
>MAPCI;MTC;PM;POST LCME site frame_no unit_no
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

frame_no
is the number of the frame in which the LCME is located

unit_no
is the number of the LCME with the faulty card

Example of a MAP display:

NTBX72
in an RSC LCME (continued)

```
 CM     MS     IOD    Net     PM    CCS    Lns    Trks    Ext     Appl
 .      .       .       .    1LCME     .       .       .       .       .

LCME               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM        1        0        2        0        2        12
 2 Post_    LCME      0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSCE  14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv                /RG: 1
 6 Tst_     Unit1:   InSv                /RG: 1
 7 Bsy_                                 11  11  11  11  11  RG:Pref 1 ISTB
 8 RTS_     Drwr: 01 23  45  67  89  01  23  45  67  89     Stby 0 InSv
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Check for fault indicators by typing

>QUERYPM FLT

and pressing the Enter key.

Example of a MAP display:

NTBX72
in an RSC LCME (continued)

```
 CM     MS     IOD    Net    PM    CC     Lns    Trks    Ext    Appl
 .      .       .       .    1LCME     .       .

LCME               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM        1        0        2        0        2        12
 2 Post_    LCME      0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSCE  14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv  Takeover       /RG: 1
 6 Tst_     Unit1:   ISTb                 /RG: 1
 7 Bsy_                                 11  11  11   RG:Pref 1 ISTb
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45      Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_  QUERYPM FLT
11 Disp_    Node inservice troubles exist:
12 Next         One or both Units inservice trouble
13          LCME   UNIT 0  Inservice
14 QueryPM  LCME   UNIT 1  Inservice
15          Ringing Generator 1 failure
16
17
18
```

5 Switch ringing generator activity from the unit with the faulty NTBX72 card by typing

>SWRG PM

and pressing the Enter key.

If SWRG	Do
passed	step 6
failed	step 19

6 Busy the LCME unit by typing

>BSY UNIT lcme_unit_no

and pressing the Enter key.

where

lcme_unit_no
is the number of the LCME unit with the faulty card

NTBX72 in an RSC LCME (continued)

At the RCE

7

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the LCME. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

8

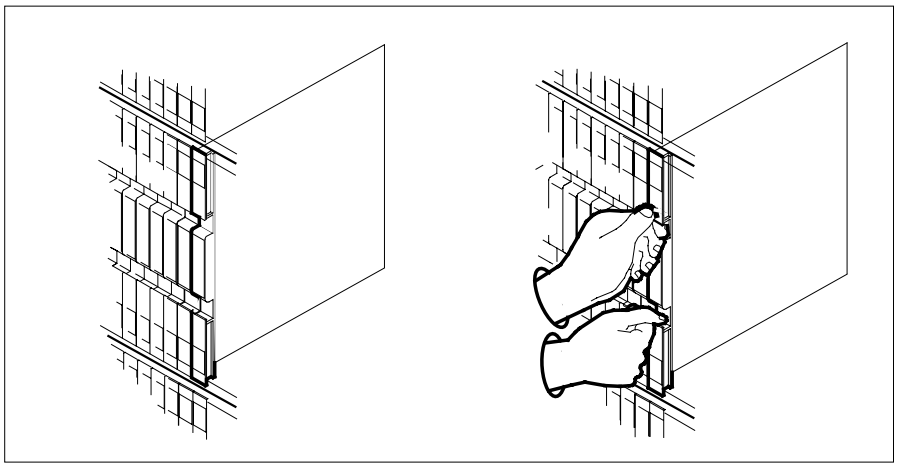
DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Power down the NT6X53 power converter by setting the POWER switch to the OFF position.

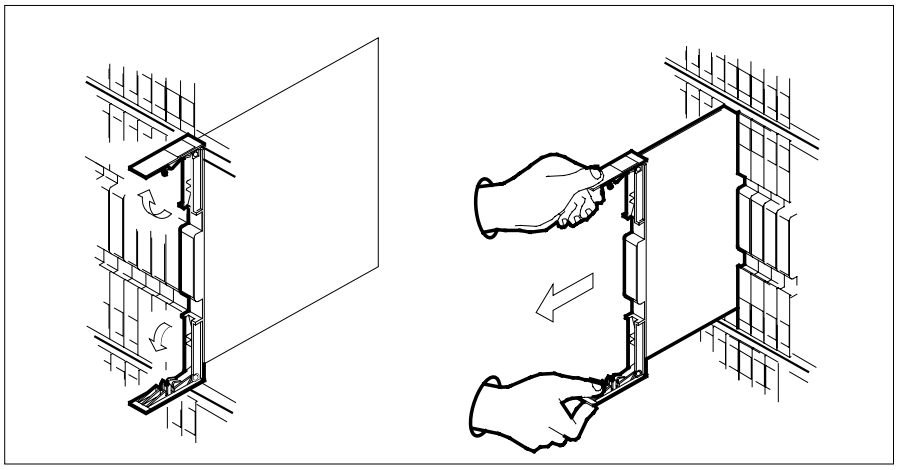
9 Remove the NTBX72 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

NTBX72
in an RSC LCME (continued)

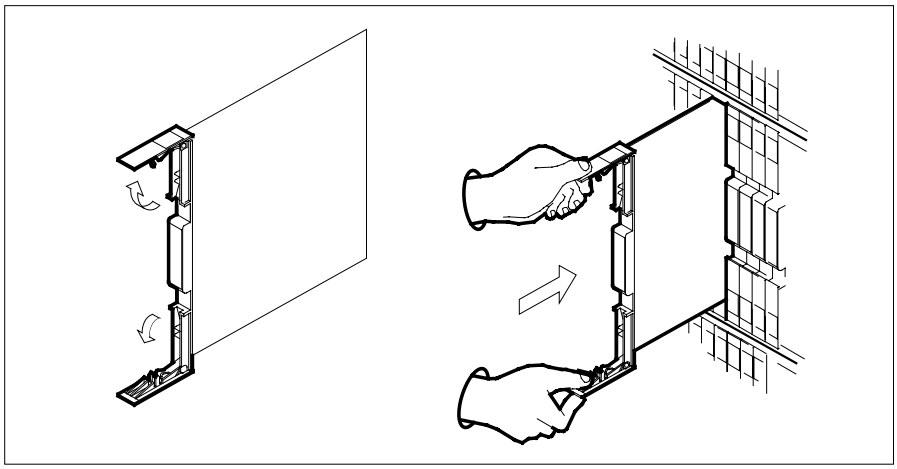


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

10 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

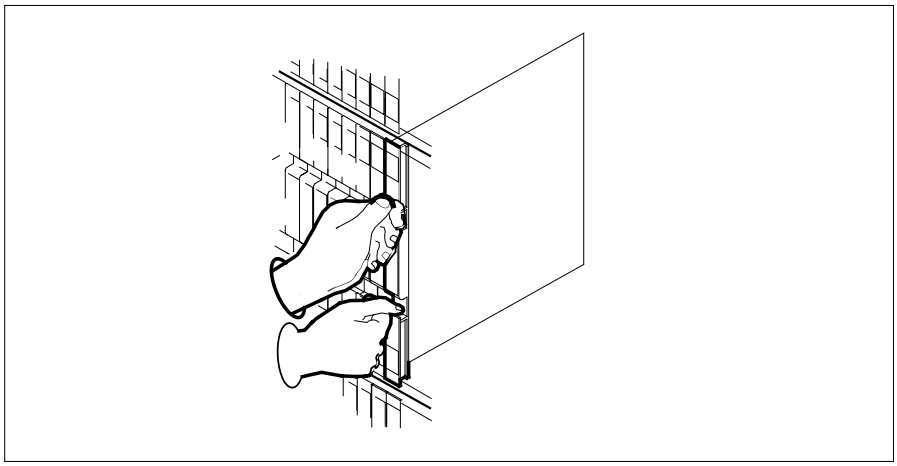
b Gently slide the card into the shelf.



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



12 Power up the LCME unit as follows:

a Ensure the power converter (NT6X53) is inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

b Set the circuit breaker switch to the ON position.

13 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 18
other	step 14

At the MAP terminal

14 Return the LCME unit to service by typing

`>RTS UNIT lcme_unit_no`

and pressing the Enter key.

where

lcme_unit_no
is the number of the LCME unit busied in step 6

If RTS	Do
passed	step 15
failed	step 19

15 Switch ringing generator activity to the new NTBX72 card by typing

`>SWRG PM`

NTBX72 in an RSC LCME (end)

and pressing the Enter key.

If SWRG	Do
passed	step 16
failed	step 19

16 Send any faulty cards for repair according to local procedure.

17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

18 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTEX17 in an RSC LCM

Application

Use this procedure to replace the following card in an RSC LCM line drawer.

PEC	Suffixes	Name
NTEX17	AA	xDSL line card
NTEX17	BA	xDSL line card
NTEX17	CA	xDSL line card

Common procedures

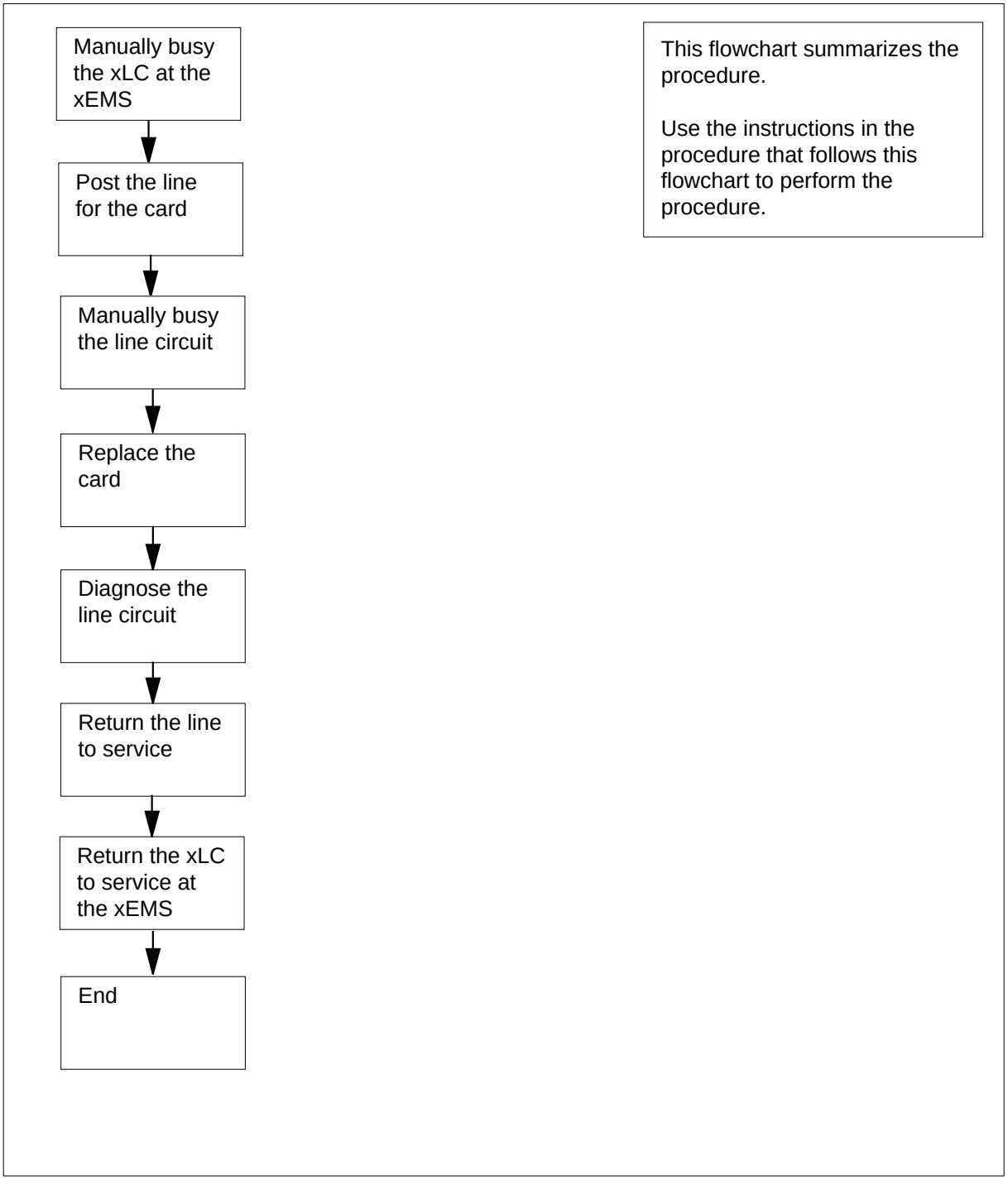
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTEX17
in an RSC LCM (continued)

Summary of replacing an NTEX17 in RSC LCM



NTEX17 in an RSC LCM (continued)

Replacing an NTEX17 in RSC LCM

At your current location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or were directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Make sure that the replacement card and the card that you remove have the same product engineering code (PEC) and PEC suffix.

At the xEMS workstation

3 Go to the submap of the LCM line drawer with the NTEX17 card that you will replace.

4 Place the cursor on the XLC you want to busy and use the mouse to select

`Maintenance : XLC -> MB`

and press the Enter key.

At the MAP terminal

5 To access the LTP level of the MAP display, type

`>MAPCI;MTC;LNS;LTP`

and press the Enter key.

Example of a MAP display:

```
 POST         DELQ             BUSYQ          PREFIX
LCC PTY RNG .....LEN.......... DN    STA F S LTA  TE  RESULT
```

Note: If you worked at the LTP level of the MAP display, a posted line can be present. A posted line does not interfere with this maintenance procedure.

6 To post the line for the card to be replaced, type

`>POST L site frame_no unit_no drawer_no slot_no`

and press the Enter key.

where

site
is the PM location (alphanumeric)

frame_no
is the frame number (0 to 511)

unit_no
is the PM unit number (0 or 1)

drawer_no
is the line drawer number (0 to 19)

NTEX17
in an RSC LCM (continued)

ckt_no
is the card slot number (0 to 31)

Example of a MAP display:

```
LCC PTY RNG .....LEN.........     DN STA F S LTA  TE  RESULT
 1FR  REM1 01 0 01 01     621 1134 IDL
```

7 Determine the state of the posted line.

If the state of the line	Do
is CPB, CPD	step 8
is CUT, HAZ, IDL, LO, PLO, SB	step 9
is MB	step 10
is NEQ	To determine why the component is offline or not equipped, consult operating company personnel. Continue as directed by operating company personnel.
is DEL, DMB, INB, LMB	step 19

8 Wait until the line state changes. Go to step 7.

9 To manually busy the line circuit, type

>BSY

and press the Enter key.

Example of a MAP display:

```
LCC  PTY  RNG .....LEN.........     DN    STA F S LTA  TE  RE
1FR           HOST   01 0 01 01     621 1134 MB
```

Note: Observe that the state that appears under the STA header changed to MB.

If BSY command	Do
passed	step 10
failed	step 19

NTEX17
in an RSC LCM (continued)

At the MAP terminal

10 To display the cabinet location of the faulty line card, type

>CKTLOC

and press the Enter key.

Example of a MAP display:

```
Site Flr RPos  Bay_id   Shf  Description    Slot     EqPEC
REM1  01  B04  LCE 01   04  LCM  01 0      01:00    EX17CA

GRD START   2DB LOSS   BAL   NETWORK   MAN OVR SET
  NO           NO       NON LOADED        NO
```

Note: In the example MAP display, the line card is an NTEX17CA and the location of the card is

Site
in the remote site

Flr
on the 1st floor

RPos
row B is the location of the line equipment bay 04

Bay_id
in line concentrating equipment, bay 01

Shf
in shelf 04

Description
in hardware device LCM, bay 01

Slot
in line drawer 01, slot 00

NTEX17
in an RSC LCM (continued)

At the shelf

11

DANGER
Static electricity damage
Wear a wrist strap that connects to a wrist-strap grounding point to handle circuit cards. The wrist-strap grounding point is on a frame supervisory panel (FSP) or a modular supervisory panel (MSP). The wrist strap protects the cards against static electricity damage.

DANGER
Risk of equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

DANGER
Risk of equipment damage
Proceed only if a step in a maintenance procedure directs you here. If you perform this procedure without permission, equipment damage can occur.

DANGER
Risk of electrocution
Proceed only if a step in a maintenance procedure directs you here. If you perform this procedure without permission, personal injury can occur.

Put on a wriststrap.

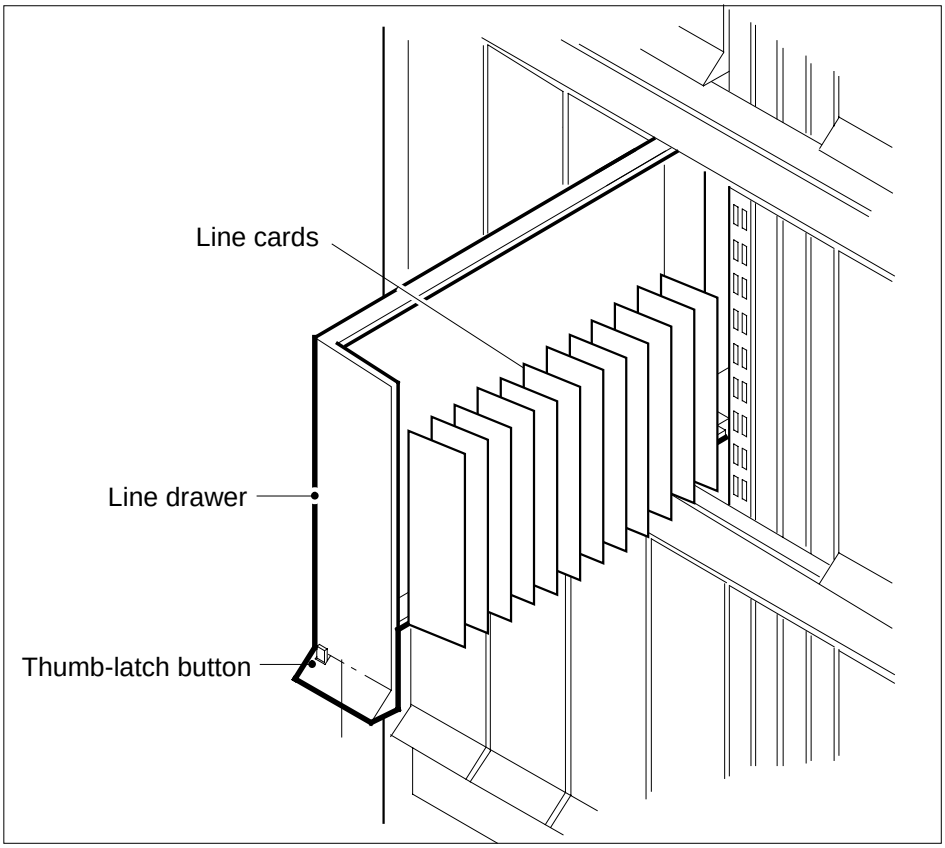
Note 1: A card shroud is required to insert or remove an NTEX17 card in line drawers. This is a 6-inch (152 mm) card, and requires the card shroud with appratus code QTH58A and common product code A0313317.

Note 2: A card removal tool is required to remove the NTEX17 card from line drawers. The appratus code for the grip tool is QTH57A, and the common product code is A0298292. You can also use the large grip tool ITA9953.

NTEX17
in an RSC LCM (continued)

12 Use the information you obtained in step 6 to locate the physical location of the line card.

13 Prepare to remove the faulty card identified in step 6 by opening the line drawer and following these substeps.



a Face the drawer shelf and grasp the handle at the bottom of the drawer with your right hand.

b Push up on the drawer latch with your thumb and pull the drawer out until fully withdrawn. It is fully withdrawn when the drawer stop, at the top, prevents further travel.

c Maintain a slight pull on the handle and lift the faceplate of the drawer approximately 2.5 cm (1.0 in.).

d While holding the drawer in this position, push the bottom of the drawer nearest the shelf with your left hand to a position about 1.0 cm (0.5 in.) to the right.

e Hold the drawer in this position with your left hand and lower the faceplate of the drawer by releasing the grip of your right hand.

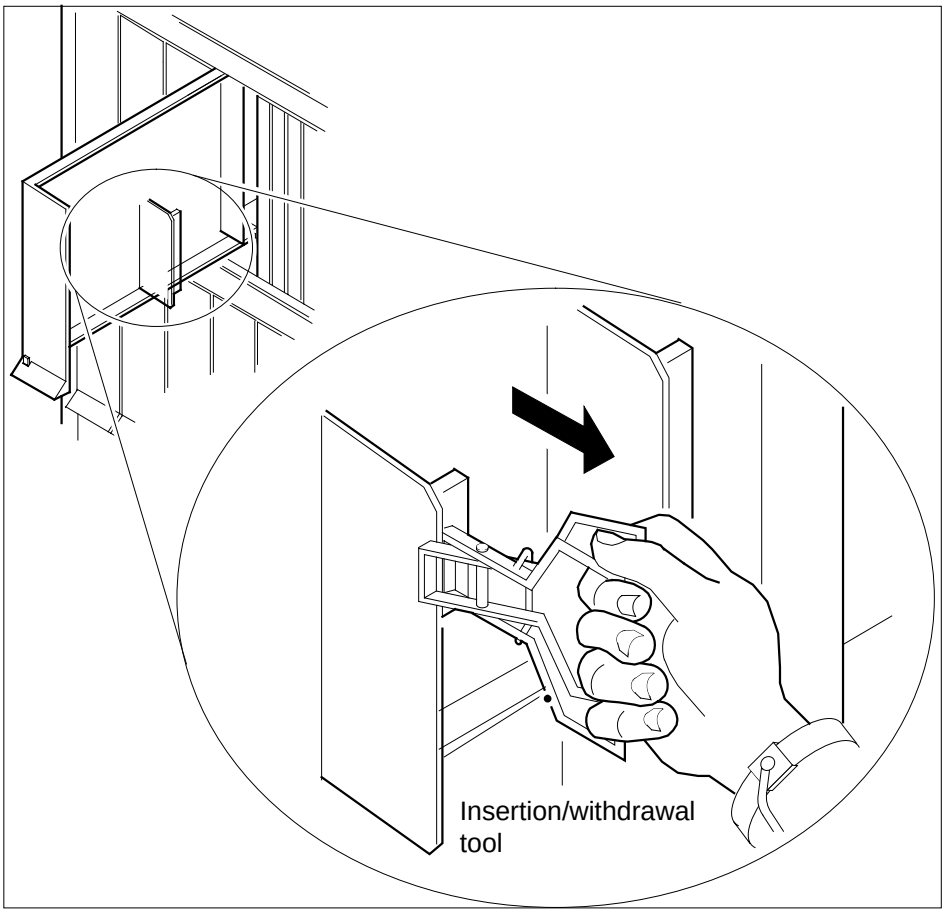
f Ensure a card shroud and line card extractor are available.

NTEX17
in an RSC LCM (continued)

14

DANGER
Risk of personal injury
Make sure you handle the line card carefully. The line feed resistor can be very hot. To avoid injury, use the insertion/withdrawal tool to remove the card as shown in the figure that follows.

Remove the line card to be replaced by using the following substeps.



a Slide a card shroud over the card to be removed and an adjacent card. If there is not an adjacent card on either side, do not use the card shroud.

b Grasp the edge of the card with a line card extractor at a point midway between the top and bottom edges. Hold the extractor in your right hand.

c Squeeze the handles of the extractor together to grasp the card tightly.

d Hold the front cover of the line drawer to steady it using your left hand.

e Pull the extractor away from the drawer, and the card will become unplugged from its socket on the drawer backplane.

f Continue pulling the card with the extractor until the card is clear of the shroud.

g Insert the card removed into the ESD container and store using local procedures.

15 Replace the faulty card using the following substeps:

a Remove the replacement card from the ESD container.

b Slide the card in the shroud guide slots toward the drawer backplane.

c Hold the front cover of the line drawer with your left hand to steady it.

d Grasp the top and bottom edges of the card with the fingers of your right hand.

e Push the card toward the backplane until it plugs fully into the backplane socket.

16 Close the line drawer.

At the MAP terminal

17 To perform a diagnostic test on the line, type

`>DIAG`

and press the Enter key.

Example of a MAP response:

```
ECOME004AH ***+LINE100 DEC17 10:04:26 0200 PASS LN_DIAG
        LEN  HOST  01 0 11 02     NO DIRN
        DIAGNOSTIC RESULT  Card Diagnostic  OK
        ACTION REQUIRED  None
        CARD TYPE  EX17BA
```

If the DIAG command	Do
passed	step 18
failed	step 19

18 To return the line to service, type

`>RTS`

and press the Enter key.

If RTS command	Do
passed	step 20

NTEX17 in an RSC LCM (end)

If RTS command	Do
failed	step 19

19 Obtain further assistance in replacing this card by contacting personnel responsible for a higher level of support.

At the xEMS workstation

20 At the submap of the LCM line drawer with the NTEX17 card that you replaced.

21 Place the cursor on the the XLC card you want to return the card to service and use the mouse to select

`Maintenance : XLC -> IDL`

and press the Enter key.

22 The procedure is complete.

NTEX54 in an RSC LCM

Application

Use this procedure to replace the following cards in an RSC LCM line drawer.

PEC	Suffixes	Name
NTEX54	AA	Data enhanced bus interface card (DBIC)
NTEX54	AB	Data enhanced bus interface card (DBIC)
NTEX54	BA	Data enhanced bus interface card (DBIC)

Common procedures

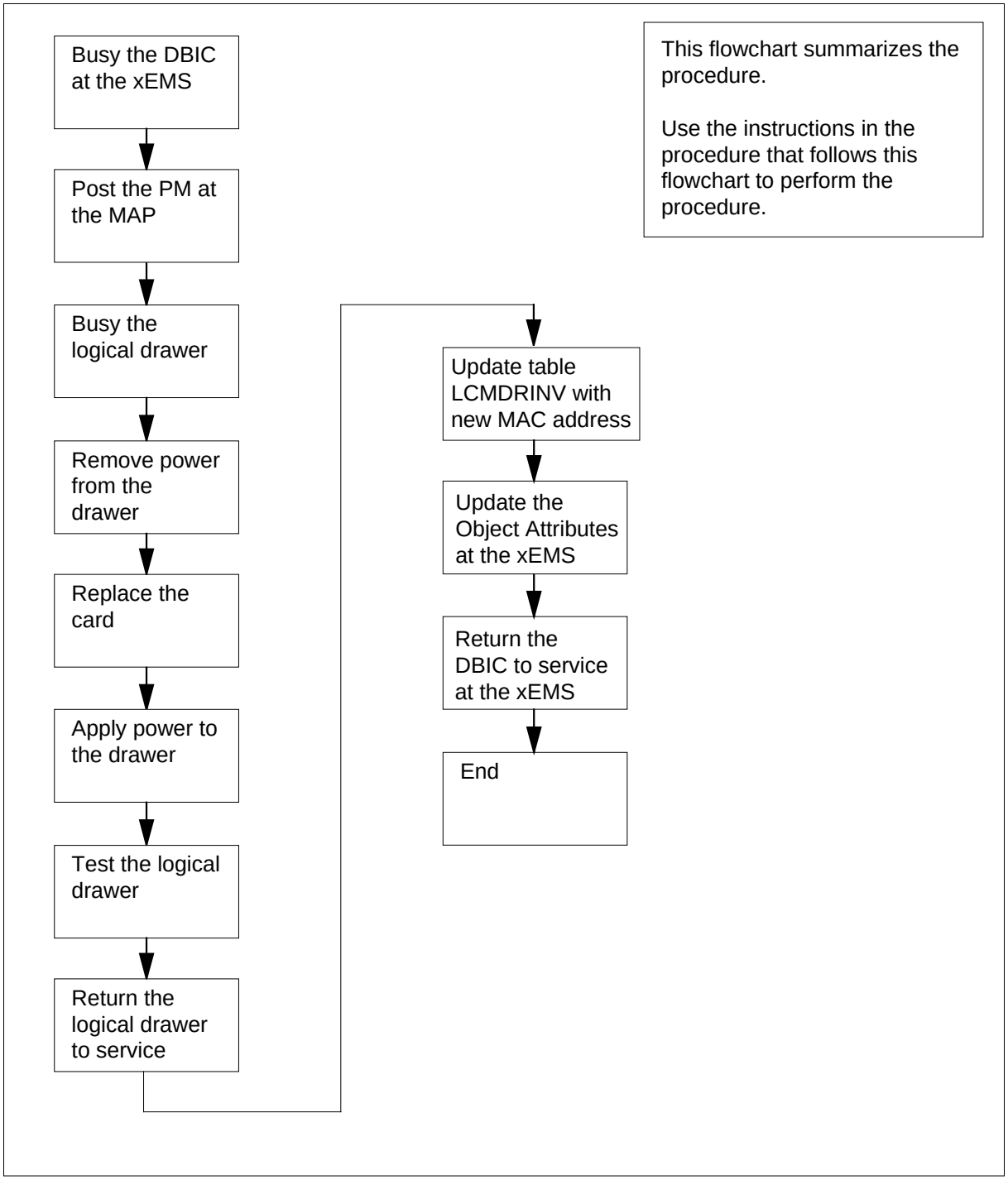
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTEX54 in an RSC LCM (continued)

Summary of replacing an NTEX54 in RSC LCM



NTEX54 in an RSC LCM (continued)

Replacing an NTEX54 in RSC LCM

At your current location

1

CAUTION
Loss of service
This procedure directs you to manually busy a line drawer. Removal of a line drawer from service can cause the system to drop calls in progress. Perform this procedure only if you need to restore out-of-service components. Unless it is urgent, perform this procedure during periods of low traffic.

Obtain a replacement card. Make sure that the replacement card and the card that you remove have the same product engineering code (PEC) and PEC suffix.

2

CAUTION
Transport network must know new MAC address
Work with the network administrator during this procedure. The transport network must know the MAC adress of the new DBIC before the DBIC can support 1MMS.

Write down the 12-digit number stamped on the new NTEX54 card. This number is the media access control (MAC) address. You will use the MAC address later in this procedure.

At the xEMS workstation

3 Go to the submap of the LCM line drawer with the NTEX54 card that you will replace.

4 Place the cursor on the DBIC you want to busy and use the mouse to select

`Maintenance -> DBIC -> ManB`

from the pop-up menu.

NTEX54 in an RSC LCM (continued)

At the MAP terminal

5 To access the peripheral module (PM) level of the MAP (maintenance and administration position) display and post the LCM, type

`>MAPCI;MTC;PM;POST LCM site frame_no lcm_no`

and press the Enter key.

where

site
is the PM location (alphanumeric)

frame_no
is the equipment frame number (00 to 511)

lcm_no
is the number of the LCM (0 or 1)

Example of a MAP display:

```
LCM  REM1 01 1   ISTb   Links OOS: Cside  0 Pside  0Unit0: ISTb
/RG: 0Unit1: ISTb  Mtce           /RG: 1  Ring gen Test                    11  11
11  11  11  RG: Pref 1 InSvDrwr:  01  23  45  67  89  01  23  45  67  89     Stby
0 InSv       ..  ..  ..  ..  MM  ..  ..  ..  ..  ..
```

6 Record the numbers of the logical drawers for the NTEX54.

Note: Logical drawers configure in pairs for the physical drawer. The NTEX54 services the physical drawer. Both logical drawers must be manually busy to perform this card replacement procedure.

7 Check the state of the affected logical drawers.

If the state for	Do
one or both logical drawers is `I`, `S`, or `.` (dot)	step 8
both logical drawers is `M`	step 11
one or both logical drawers is `0` or `-`	Determine why the drawer is offline. If necessary, contact the next level of support.

8 To manually busy the logical drawer, type

`>BSY DRWR drwr_no`

and press the Enter key.

where

drwr_no
is the logical drawer number (0 to 23)

Example of a MAP response:

```
LCM REM1 01 1  Drwr 0 will be taken out of servicePlease confirm ("YES",
"Y", "NO", or "N"):
```

9 To confirm the command, type

>YES

and press the Enter key.

Example of a MAP response:

```
LCM REM1 01 1  Drwr 0 Bsy Passed
```

If	Do
you must busy the other logical drawer of the pair	step 10
both logical drawers are now `M`	step 11

10 Busy the other logical drawer of the pair.

>BSY DRWR drwr_no

and press the Enter key.

where

drwr_no
is the logical drawer number (0 to 23)

Example of a MAP response:

```
LCM REM1 01 1  Drwr 0 Bsy Passed
```

NTEX54
in an RSC LCM (continued)

At the shelf

11

WARNING
Static electricity damage
Wear a wrist strap that connects to the wrist-strap grounding point to handle circuit cards. The wrist-strap grounding point is on a frame supervisory panel (FSP) or a modular supervisory panel (MSP). The wrist strap protects the cards against static electricity damage.

DANGER
Potential equipment damage
Note the fuses that you remove from the fuse panel. If you do not insert fuses in the correct location on the fuse panel, equipment damage occurs.

DANGER
Equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the card into its slot.

Remove fuses for the line drawer containing the faulty DBIC. Perform the following steps. Refer to the figure that follows to identify the correct fuses.

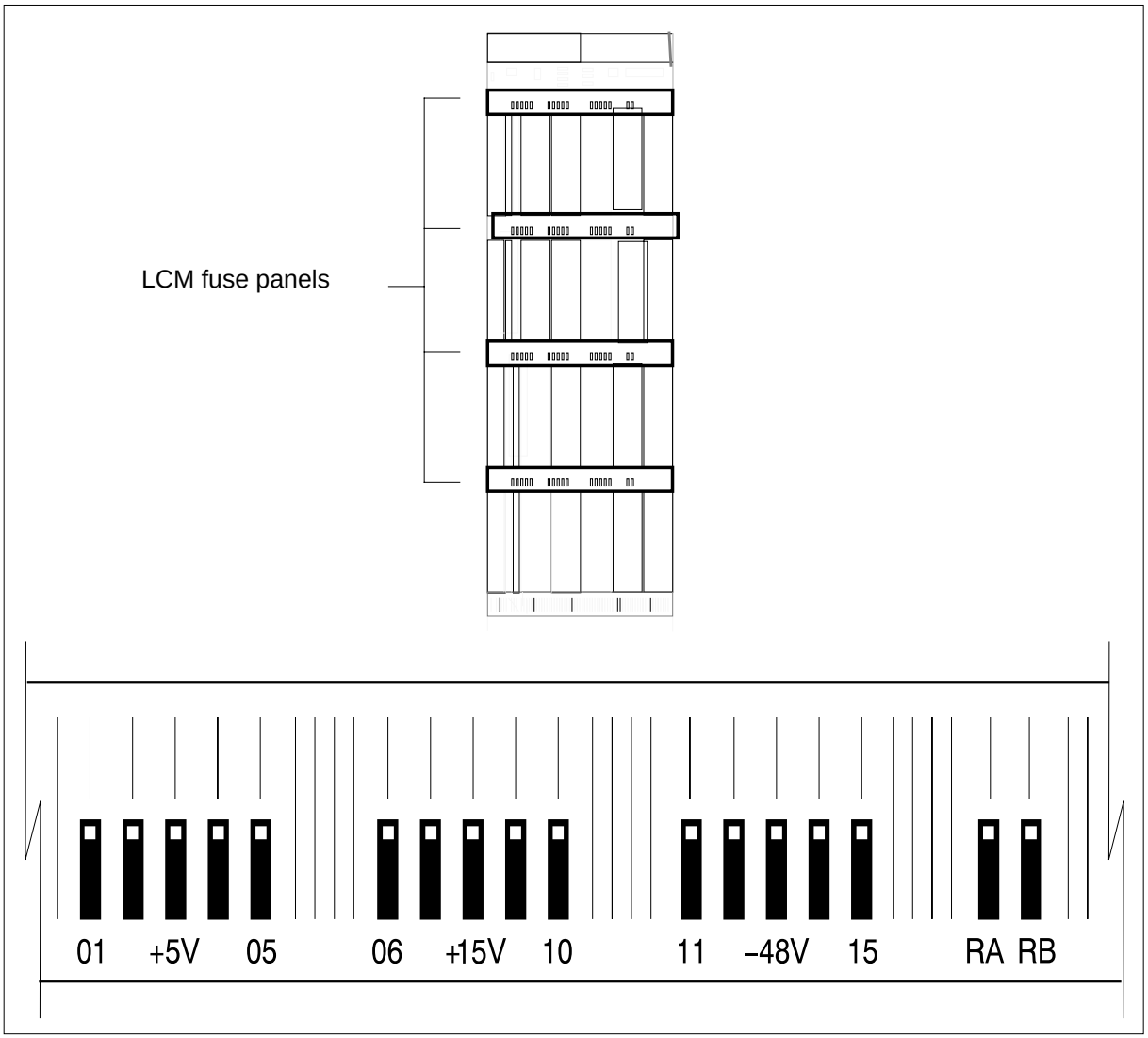
Note: Fuse markings do not always identify voltage. Make sure that you note the fuses and the location of the fuses in the fuse panel.

a Remove the -48V fuse for the line drawer that contains the faulty DBIC.

b Remove the +15V fuse for the line drawer that contains the faulty DBIC.

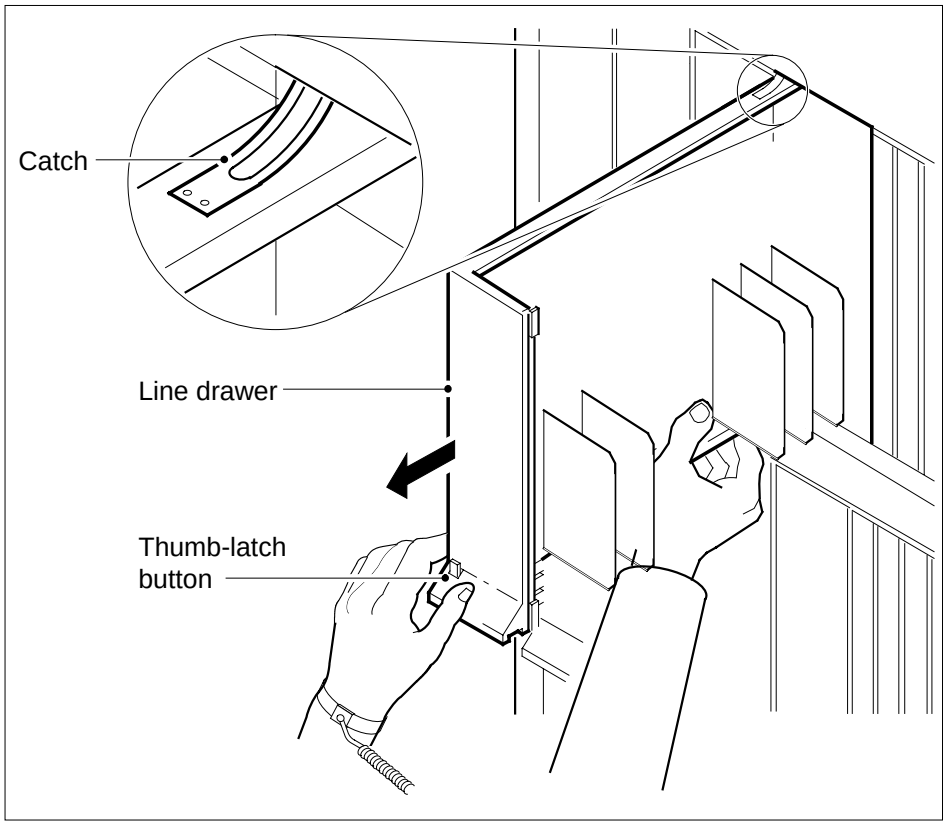
c Remove the +5V fuse for the line drawer that contains the faulty DBIC.

NTEX54
in an RSC LCM (continued)



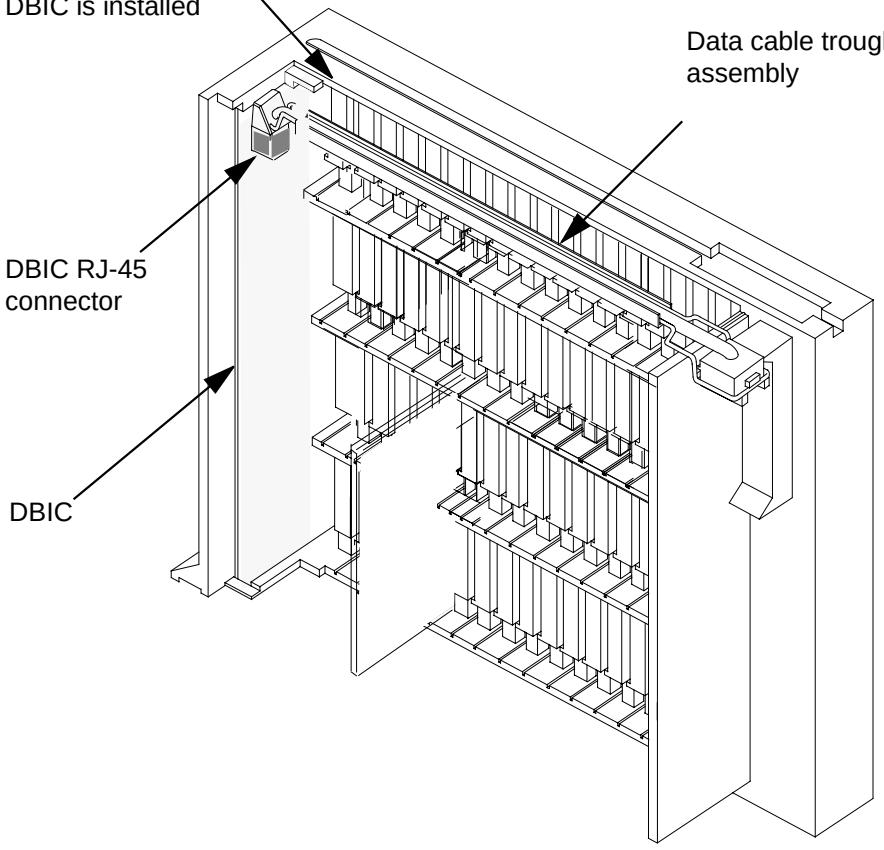
12 Identify the drawer. Press the small thumb-latch button on the lower left edge of the drawer. Pull the drawer out. To secure the drawer in a steady horizontal position, tip the drawer until the catch rests on the line drawer track.

NTEX54
in an RSC LCM (continued)



13 Disconnect the data cable from the RJ-45 connector on the DBIC card. The RJ-45 connector is located at slot position 16 of the odd LSG (connector slot). Refer to the following figure.

NTEX54
in an RSC LCM (continued)

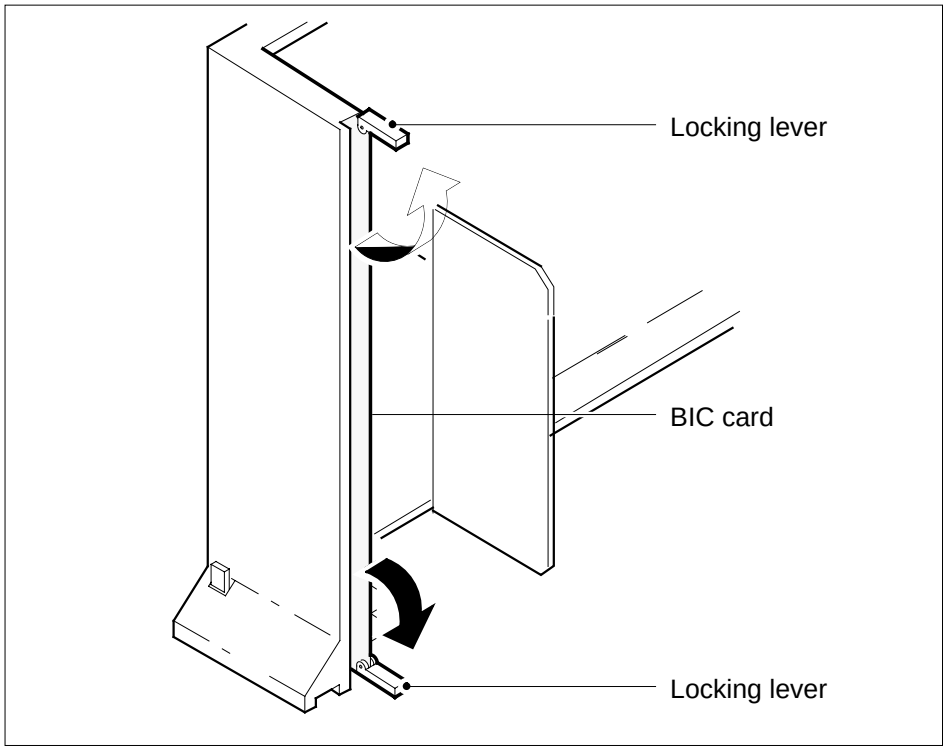


14

DANGER
Do not hold the card by the levers only
If you hold a card by the locking levers only, the levers can break. Pull the card half way out of the slot. Carefully grasp the card from below for more support. Continue to remove the card from the drawer. Make sure that you do not touch any wires or internal parts on the card.

NTEX54
in an RSC LCM (continued)

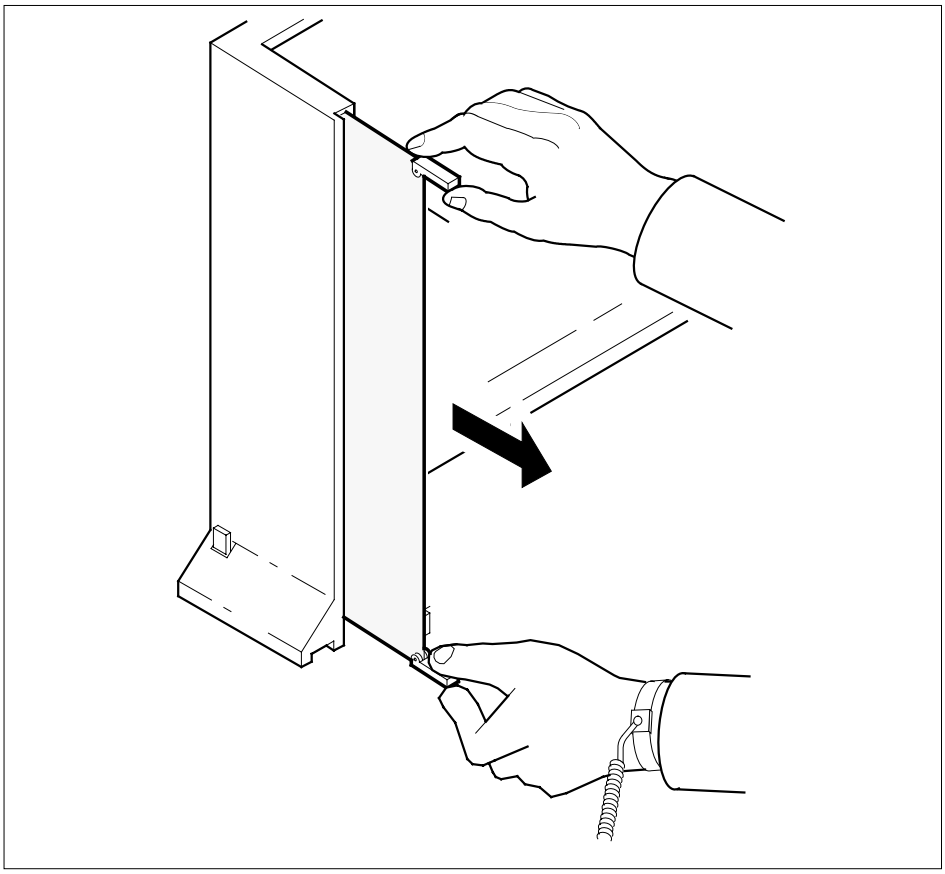
Open the locking levers on the face of the card.



15 Grasp the locking levers. Carefully pull the card toward you until the card clears the drawer.

Note: Do not use a rocking motion to remove the card.

NTEX54
in an RSC LCM (continued)



16 Place the card that you removed in an electrostatic discharge (ESD) protective container.

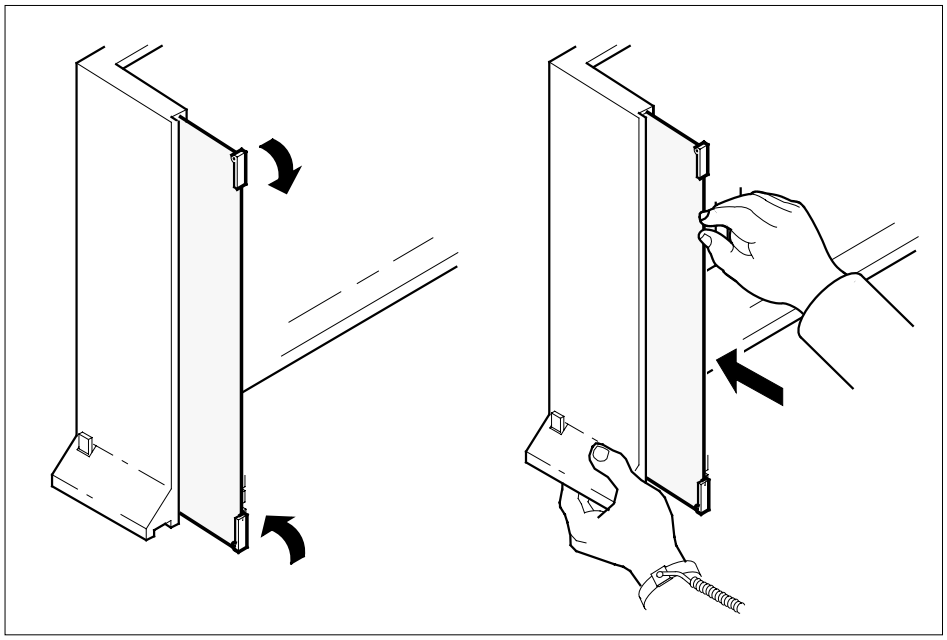
17 Make sure that the replacement card and the card that you remove have the same PEC and PEC suffix.

18 Close the locking levers on the replacement card. Align the card with the pin slots in the drawer. Carefully slide the card into the drawer.

19 Support the drawer with your left hand. Use your right hand to push on the upper and lower edges of the card. Make sure that the card sits completely in the drawer.

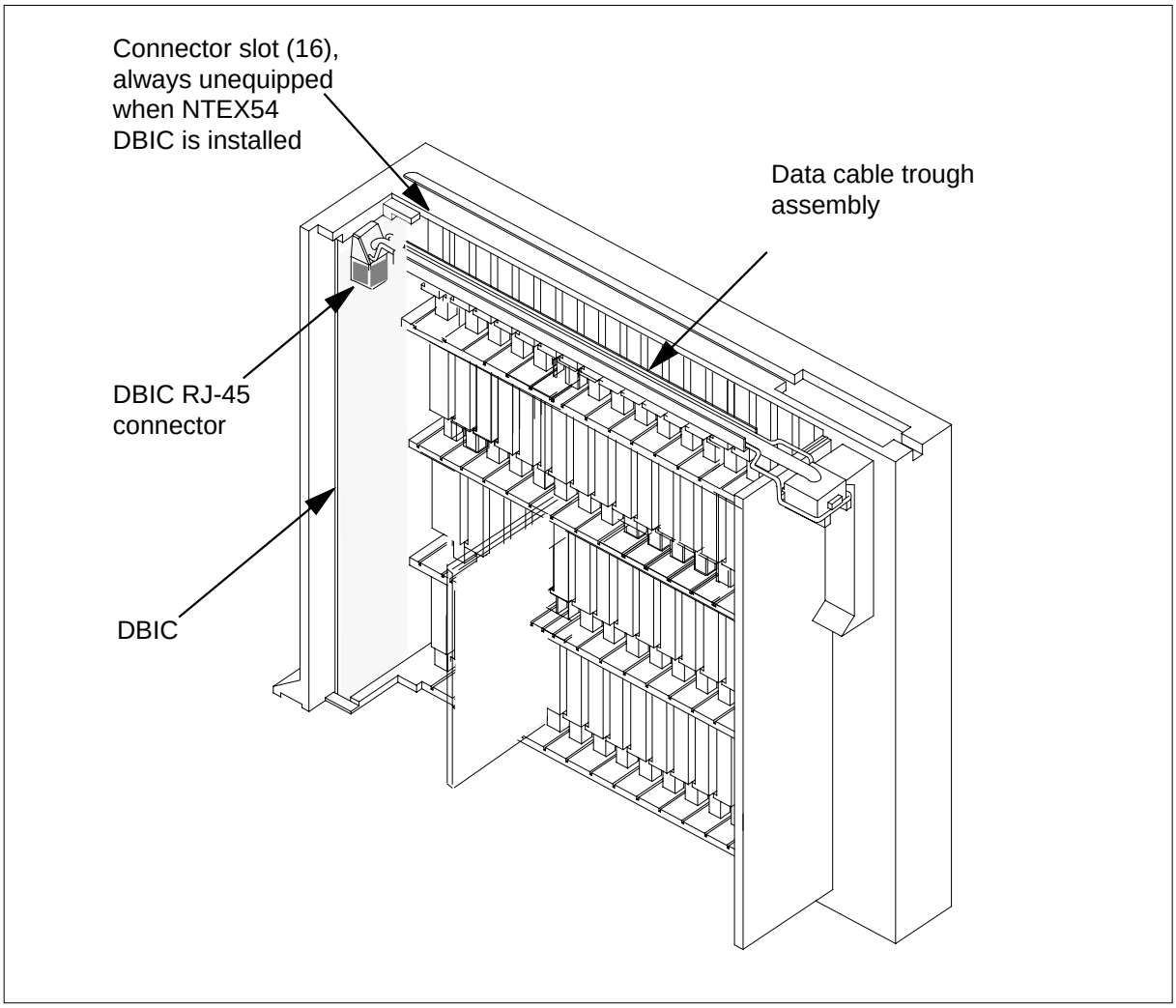
Note: Do not use a rocking motion to insert the card.

NTEX54
in an RSC LCM (continued)



20 Connect the data cable to the RJ-45 connector that you disconnected in step 13 . Refer to the following figure.

NTEX54
in an RSC LCM (continued)



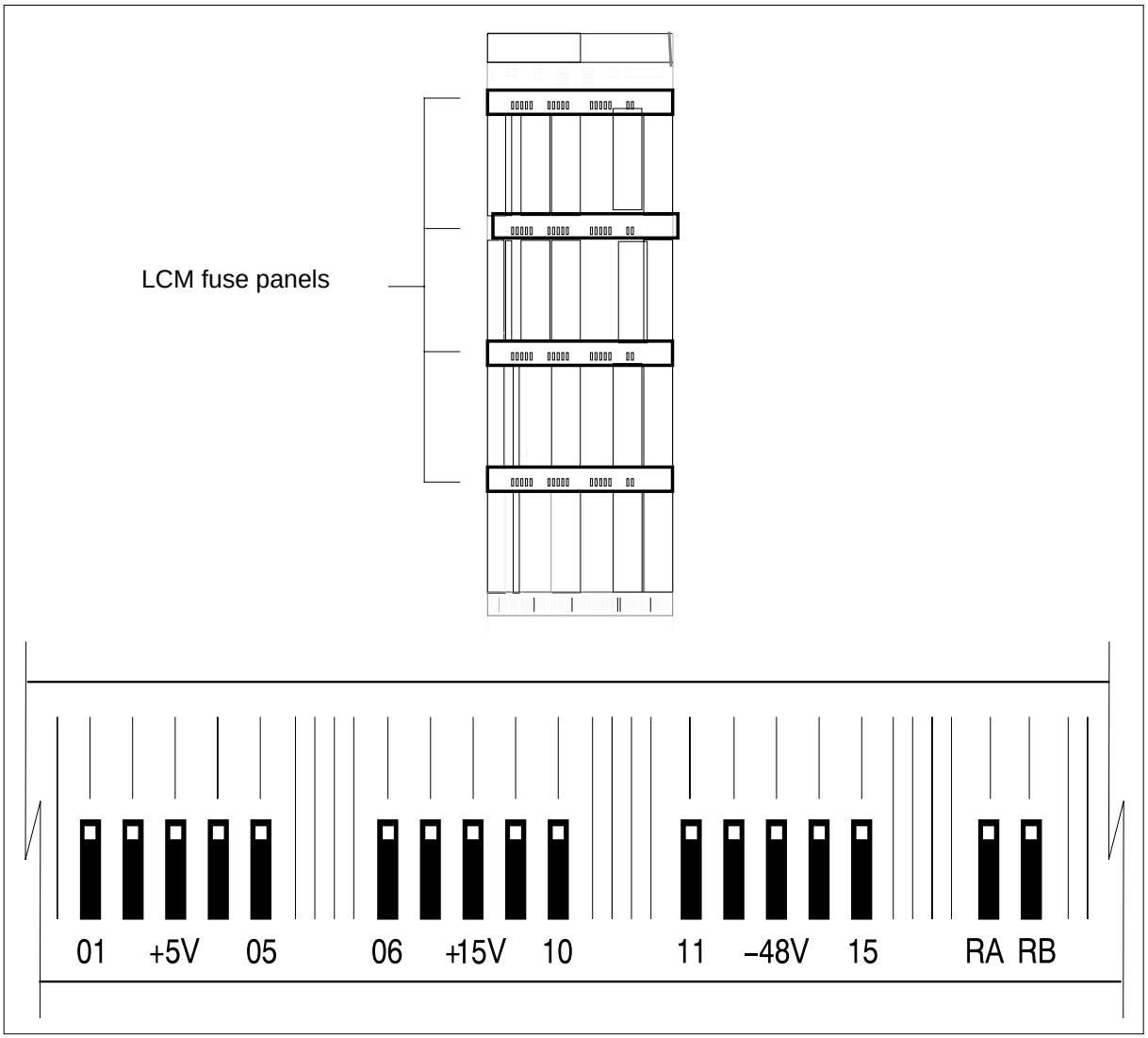
21 Close the line drawer.

22

DANGER
Potential equipment damage
Make sure you insert the fuses in the correct location on the fuse panel to prevent equipment damage.

Insert the fuses that you removed in step 11. Refer to the following figure.

NTEX54
in an RSC LCM (continued)



Note: Fuses are coded for position. The colored square on the face of the fuse identifies the top edge.

a Insert the +5V fuse.

b Insert the +15V fuse.

c Insert the -48V fuse.

NTEX54
in an RSC LCM (continued)

At the MAP terminal

23 A maintenance flag (Mtce) can appear. This flag indicates that system-initiated maintenance tasks are in progress. To stop the system-initiated maintenance tasks, type

```
>ABTK
```

and press the Enter key.

24 To return the logical drawer to service, type

```
>RTS  DRWR  drwr_no
```

and press the Enter key.

where

drwr_no
is the logical drawer number (0 to 19)

Example of a MAP response:
OSvce Tests InitiatedLCM REM1 00 0 Drwr 0 Tst PassedLCM REM1 00 0 Drwr 0 Rts Passed

If the RTS command	Do
passed, and you must return the other logical drawer to service	step 25
passed, and the other logical drawer is in service	step 26
failed	step 39

25 Repeat step 24 for the other logical drawer in the pair.

26 Update table LCMDRINV.

Note: Make sure you have the new MAC address from the replacement card as recorded in step 2.

a To open table LCMDRINV, type

```
>TABLE  LCMDRINV
```

and press the Enter key.

b To position on the tuple for the LCM, type

```
>POS  site_name  frame_no  lcm_no
```

and press the Enter key.

where

site_name
is the name of the site

frame_no
is the number of the frame

NTEX54
in an RSC LCM (continued)

lcm_no
is the number of the LCM

c To begin changing the tuple, type

>CHA

and press the Enter key.

d To continue processing, type

>Y

and press the Enter key.

e Press the Enter key to scroll through the fields until you access the field with the MAC address.

f Enter the new MAC address. Type

>drwr_id pec_id drwr_pec mac_address ip_address

and press the Enter key.

where

drwr_id
is the physical number of the drawer

pec_id
is NTEX54AA, NTEX54AB, or NTEX54BA

drwr_pec
is the PEC of the drawer

mac_address
is the MAC address of the new NTEX54

ip_address
is the IP address of the new NTEX54

g Press the Enter key to scroll through remaining fields.

h Confirm the change. Type

>Y

and press the Enter key.

i Exit the table. Type

>QUIT

and press the Enter key.

NTEX54 in an RSC LCM (end)

At the xEMS workstation

27

CAUTION
Transport network must know new MAC address
Before you return the DBIC to service, you must provide the MAC address for the DBIC to the transport network. Contact the network administrator for assistance.

Go to the submap of the LCM line drawer with the new NTEX54 card.

28 Select the card by placing the cursor on the DBIC.

29 From the pop-up menu select Describe/Modify Object. The Object Description dialog box appears.

30 From the Object Description dialog box, select HSTP Application from the fields under Object Attributes.

31 Select View/Modify Object Attributes.

32 Enter the new MAC address in the LAC MAC Address field, for example, 0060381120a1.

33 Click the Verify button to verify the information.

34 Click the OK button to close the Attributes dialog box.

35 Click OK to close the Object Description dialog box.

36 Place the cursor on the DBIC you want to return to service and use the mouse to select

`Maintenance -> DBIC -> Rts`

from the pop-up menu.

37 Send any faulty cards for repair according to local procedure.

38 Record the following items in office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 40.

39 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

40 You have successfully completed this card replacement procedure.

NTMX71 in an RSC

Application

Use this procedure to replace a NTMX71 card in a RCC.

PEC	Suffixes	Name
NTMX71	AA	XPM Plus Terminator Paddleboard

Common procedures

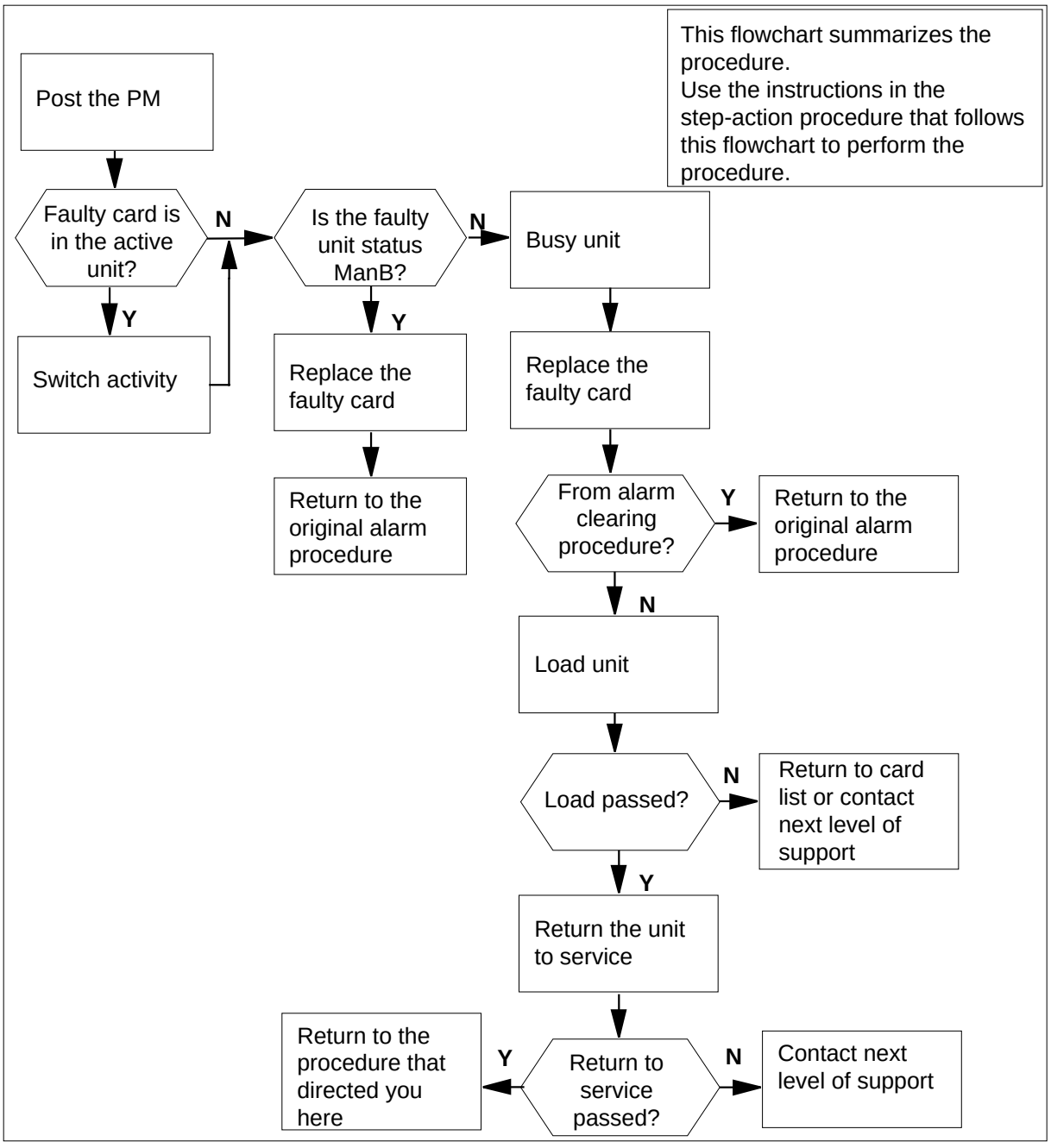
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTMX71 in an RSC (continued)

Summary of card replacement procedure for a NTMX71 card in a in RSC RCC



NTMX71 in an RSC (continued)

Replacing a NTMX71 card in a RCC

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure the replacement card has the same product engineering code (PEC), including suffix, as the card being removed.

At the MAP terminal

3 Ensure the current MAP display is at the PM level and post the RCC by typing

`>MAPCI;MTC;PM;POST RCC rcc_no`

and pressing the Enter key.

where

rcc_no
is the number of the RCC being posted

Example of a MAP response

```
RCC     SysB  ManB  Offl  CBsy  ISTb  InSv
PM        3     0     1     0     2    13
RCC       0     0     0     0     1     7

RCC 0 ISTb  Links_OOS:  CSide 0, PSide 0
Unit0:  Act   InSv
Unit1:  Inact ISTb
```

4 Observe the MAP display and determine if the faulty card is in the active or the inactive unit.

At the equipment frame

5 Hang a sign on the active unit bearing the words: *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

6 Observe the MAP display and determine the state of the inactive unit. The example in step 3 shows the status of the PM as in-service on the active unit and in-service trouble on the inactive unit.

If state is	Do
ManB	step 8

NTMX71 in an RSC (continued)

If state is	Do
SysB, CBsy, ISTb, or InSv	step 7

7 Busy the inactive PM unit by typing

>BSY UNIT unit_no

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC unit (0 or 1)

At the equipment frame

8

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

9 Unseat the NT6X48 card in slots 06 and 07.

10 Unseat the NT6X72 card in slot 19.

11 Unseat the NTMX77 card in slot 13.

NTMX71 in an RSC (continued)

12

DANGER
Personal injury
Take the following precautions when removing a backplane card:

To prevent eye and facial injuries do not jerk the card from backplane pins. Gently rock the card off the backplane pins

Using a slot screwdriver, loosen the screws from the two brackets that secure the card to the backplane at slot 18. Keep the screws in place on the backplane, moving only the two securing brackets away from the screws.

13 Gently remove the card from the backplane pins.

14 Place the card you have removed in an electrostatic discharge (ESD) protective container.

15 Line up the holes on the brackets of the replacement card with the holes on the backplane of slot 18.

16 Using a slot screwdriver, secure the card to the backplane with the screws that were loosened in step 12. Ensure the fiber washer is between the securing brackets of the replacement card and the backplane before tightening the screws.

17 Reseat the NTMX77 card in slot 13.

18 Reseat the NT6X72 card in slot 19.

19 Reseat the NT6X48 cards in slots 06 and 07.

20 Use the following information to determine the next step.

If you were directed here from	Do
alarm and trouble clearing procedures	step 26
other	step 21

At the MAP terminal

21 The peripheral loader card (NT7X05) allows local loading of the RCC data. Local data loading reduces recovery time. Determine if an NT7X05 is located in slot 12. Check if the NT7X05 card is provisioned by typing:

```
>QUERYPM FILES
```

and pressing the Enter key.

Example of a MAP display:

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .     .   1RCC    .      .       .      .      .
                         *C*
 RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM     2        0        2        0        2       25
 2 Post     RCC    1        0        0        0        1        1
 3 ListSet
 4          RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_   Unit 0:  Inact ManB
 6 TST_     Unit 1:  Act   InSv
 7 BSY_
 8 RTS_     QUERYPM files
 9 OffL     Unit 0:
10 LoadPM_     NT7X05 load File: ESR05AT
11 Disp_       NT7X05 Image File:ESR05AT
12 Next_
13 SwAct   Unit 1:
14 QueryPM     NT7X05 load File: ESR05AT
15             NT7X05 Image File:ESR05AT
16 IRLINK
17 Perform
18
```

Note: If the NT7X05 card is not provisioned the MAP response is:`Nt7X05 not datafilled,  QueryPm files invalid`

If the NT7X05 card is	Do
provisioned	step 22
not provisioned	step 24

22 Load the RCC from the local image by typing

`>LOADPM UNIT unit_no LOCAL IMAGE`

and pressing the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If the load	Do
passed	step 25
failed	step 23

23 Load the RCC from the local loadfile by typing

`>LOADPM UNIT unit_no LOCAL LOADFILE`

and pressing the Enter key.

NTMX71 in an RSC (continued)

where

rcc_unit_no
is the number of the inactive RCC unit

If the load	Do
passed	step 25
failed	step 24

24 Load the inactive RCC unit by typing

>LOADPM UNIT unit_no

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC unit

If load	Do
passed	step 25
failed	step 29

25 Return the inactive RCC unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC unit

If RTS	Do
passed	step 26
failed	step 29

At the equipment frame

26 Remove the sign from the active RCC unit.

27 Send any faulty cards for repair according to local procedure.

28 Note the following in the office records:

- date the card was replaced
- serial number of the card
- symptoms that prompted replacement of the card

Go to step 30.

NTMX71 in an RSC (end)

29 For further assistance, contact the personnel responsible for the next level of support.

30 You have completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX72 in an RSC RCC2

Application

Use this procedure to replace an NTMX72 card in an RSCE RCC2.

PEC	Suffixes	Name
NTMX72	AA, AB	Power Converter

Common procedures

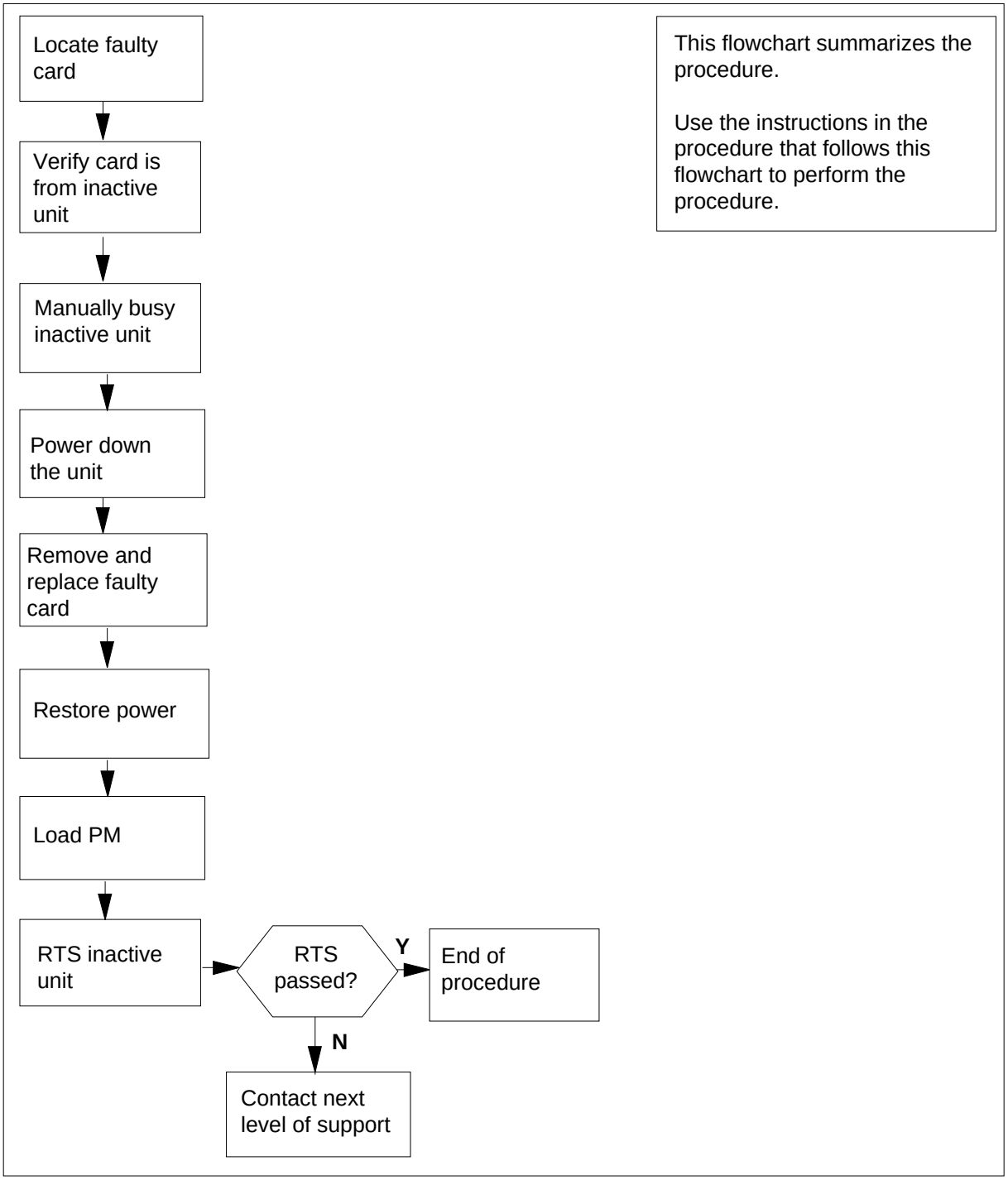
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX72 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX72 card in an RSC RCC2



NTMX72 in an RSC RCC2 (continued)

Replacing an NTMX72 card in an RSCE RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX72 replacement card. Ensure the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the RCC2 by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

NTMX72
in an RSC RCC2 (continued)

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .       .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        0        25
 2 Post_   RCC2      0        0        0        0        0         0
 3 ListSet
 4         RCC2    0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 By observing the MAP display, be sure that the card that is to be removed is on the inactive unit.

5 Busy the inactive PM unit by typing

>bsy **INACTIVE**

and pressing the Enter key.

Example of a MAP response:

```
RCC2     0 ISTb  Links_OOS: CSide  0 , PSide  1
Unit0:   Inact ManB
Unit1:   Act   ISTb
bsy unit 0
RCC2 0 Unit 0    Bsy Passed
```

If the BSY command	Do
passed	step 6
failed	step 22

6 Reset the inactive RCC2 unit by typing

>PMRESET UNIT unit_no NORUN

and pressing the Enter key.

where

NTMX72 in an RSC RCC2 (continued)

unit_no
is the RCC2 unit number (0 or 1)

Example of a MAP response:

```
RCC2 1 Unit 0    PMReset Passed
```

At the RSCE frame

7 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

8 Use the following information to determine where to proceed:

If the card you are replacing has a suffix of	Do
AA	step 9
AB	step 10

9 Power down the NTMX72AA power converter by setting the POWER switch on the NTMX72 card to the OFF position.

Go to step 11.

10 Power down the NTMX72AB power converter by setting the circuit breaker on the MSP for the inactive unit to the OFF position.

11

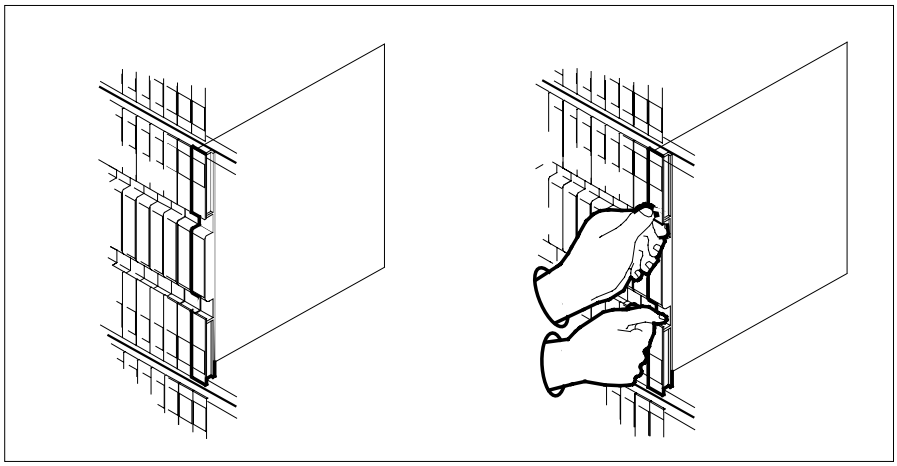
WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

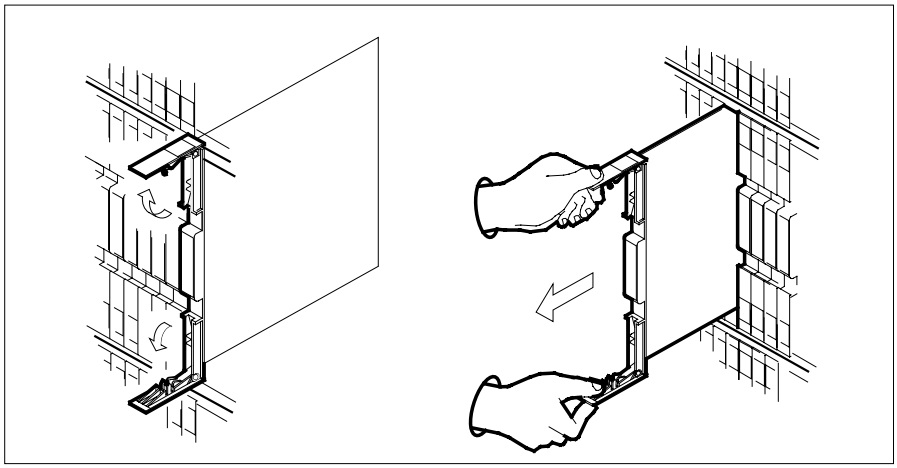
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Remove the NTMX72 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



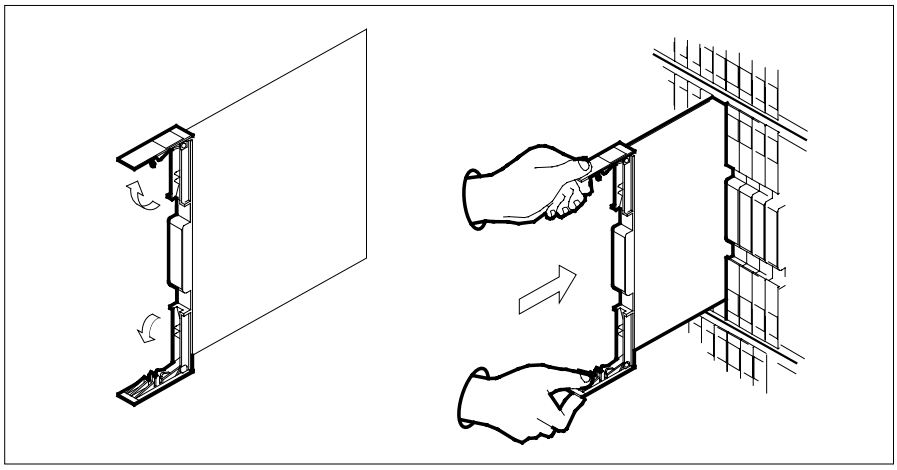
c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

12 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Gently slide the card into the shelf.

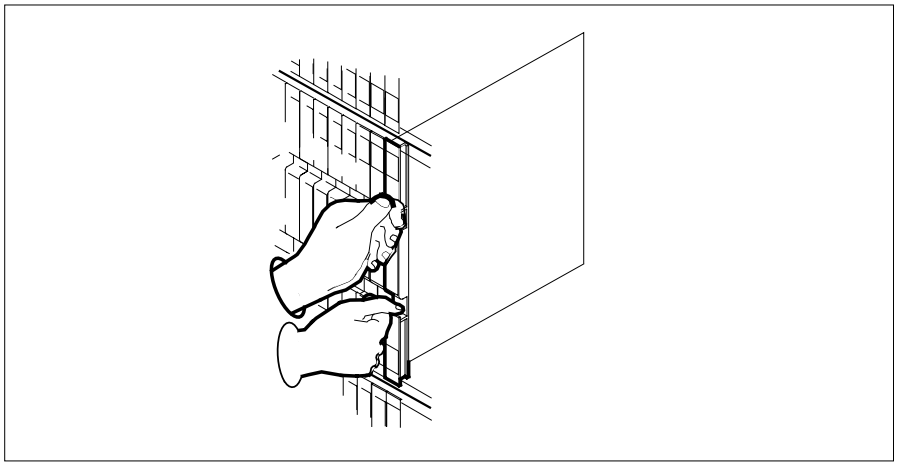
NTMX72
in an RSC RCC2 (continued)



13 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



14 Power up the inactive RCC2 unit as follows:

a Ensure the NTMX72 circuit card is fully inserted. A major audible alarm may sound. This alarm is silenced when power to the NTMX72 circuit card is restored.

Note:

b If the power converter replaced is an NTMX72AA, set the switch on the power converter to the Reset position. Set the associated circuit breaker on the MSP to the ON position.

If both the converter FAIL LED and FRAME FAIL lamp on the MSP go OFF, go to step 15.

NTMX72 in an RSC RCC2 (continued)

If both the converter FAIL LED and FRAME FAIL lamp on the MSP do not go OFF, hold the switch on the NTMX72AA power converter in the Reset position and simultaneously set the associated circuit breaker on the MSP to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will go OFF. Go to step 15.

c If the power converter replaced is an NTMX72AB, set the associated circuit breaker on the MSP to the ON position for the NTMX72AB that was powered down in step 10. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will go OFF. Go to step 15.

15 After replacing the faulty card, load the inactive RCC2 unit by typing

```
>LOADPM UNIT unit_no
```

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit

If load	Do
passed	step 16
failed	step 22

16 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 21
other	step 17

17 Return the inactive RCC2 unit to service by typing

```
>RTS UNIT unit_no
```

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit

If RTS	Do
passed	step 18
failed	step 22

18 Remove the sign from the active RCC2 unit.

19 Send any faulty cards for repair according to local procedure.

NTMX72
in an RSC RCC2 (end)

20 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 23.

21 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

22 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

23 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX73 in an RSC RCC2

Application

Use this procedure to replace an NTMX73 card in an RSCE RCC2.

PEC	Suffixes	Name
NTMX73	AA, AB	PCM Signaling Processor

Common procedures

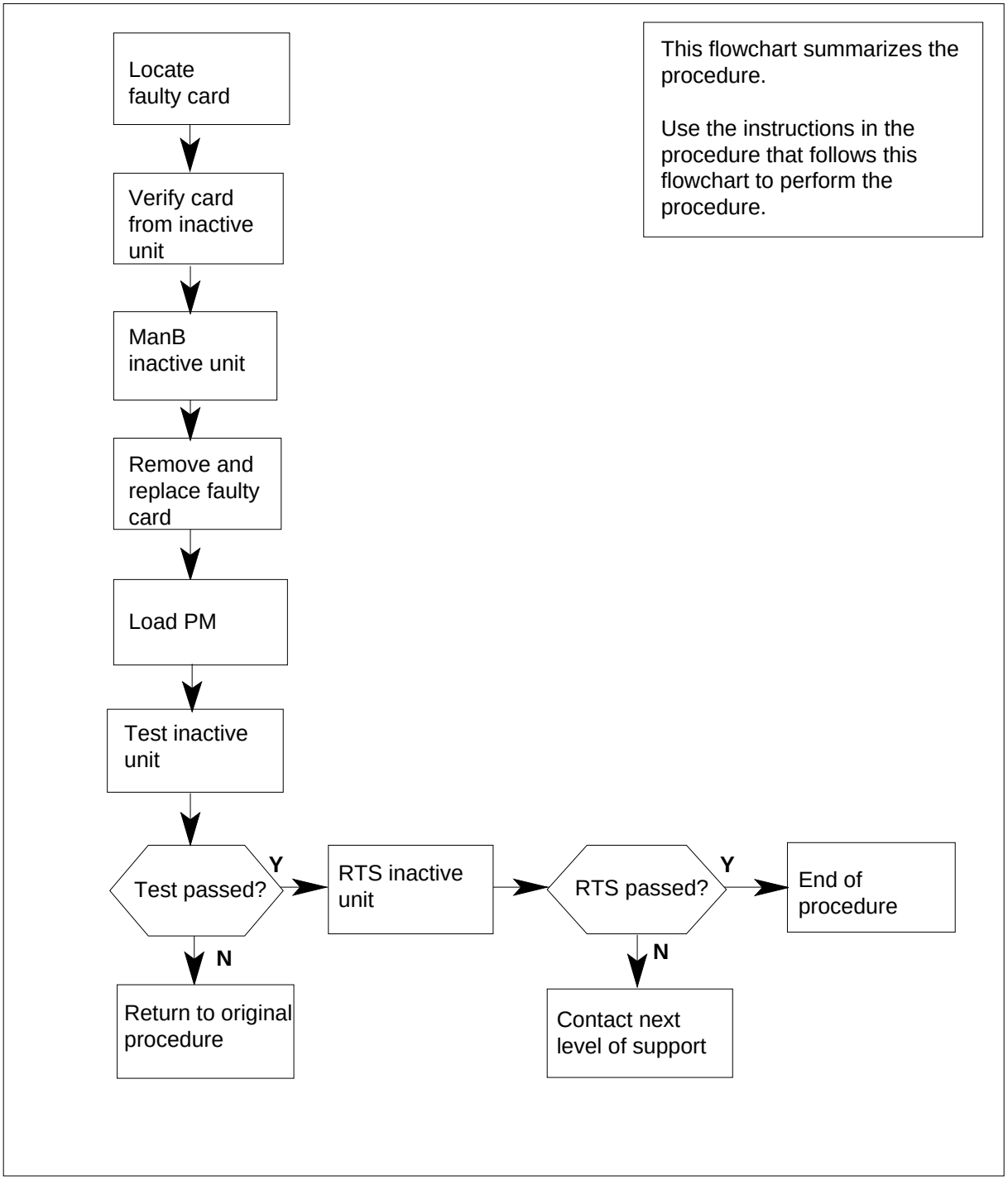
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX73 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX73 card in RSC RCC2



NTMX73 in an RSC RCC2 (continued)

Replacing an NTMX73 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX73 replacement card. Verify that the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP display

3 Set the MAP display to the PM level and post the RCC2 by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

NTMX73
in an RSC RCC2 (continued)

```
CM    MS    IOD    Net    PM    CCS    LNS    Trks    Ext    Appl
 .     .      .      .     .      .      .      .       .       .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        0        0        1        25
 2 Post_   RCC2      0        0        0        0        1         0
 3 ListSet
 4         RCC2    0 ISTb  Links_OOS:  CSide  0, PSide   0
 5 TRNSL   Unit0:   Inact SYSB
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 By observing the MAP display, be sure the card that is to be removed is on the inactive unit.

At the RSCE frame

5 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

6 Busy the inactive PM unit by typing

>bsy INACTIVE

and pressing the Enter key.

Example of a MAP response:

```
RCC2     0 ISTb  Links_OOS: CSide  0 , PSide  1
Unit0:   Inact ManB
Unit1:   Act   ISTb
Bsy INACTIVE
RCC2 0 Unit 0    Bsy Passed
```

7 Reset the inactive RCC2 unit to the ROM level by typing

>PMRESET UNIT rcc2_unit_no NORUN

and pressing the Enter key.

where

NTMX73 in an RSC RCC2 (continued)

rcc2_unit_no
is the number of the inactive RCC2 unit (0 or 1)

At the frame

8

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

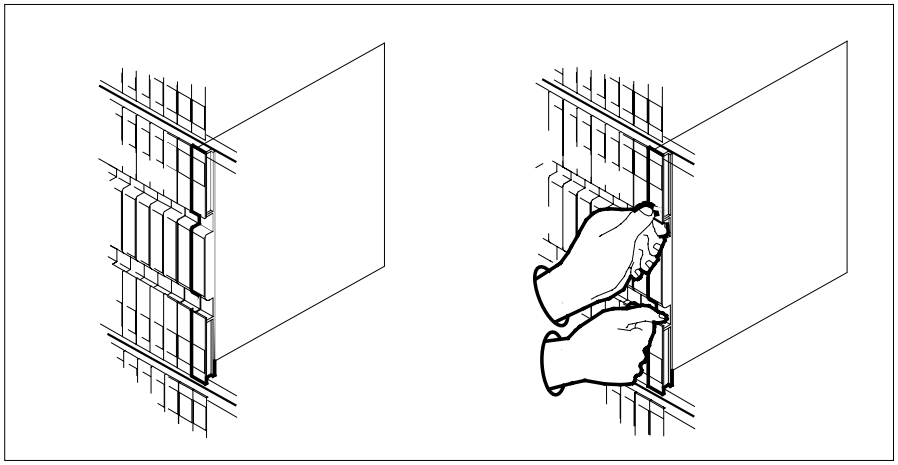
9

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

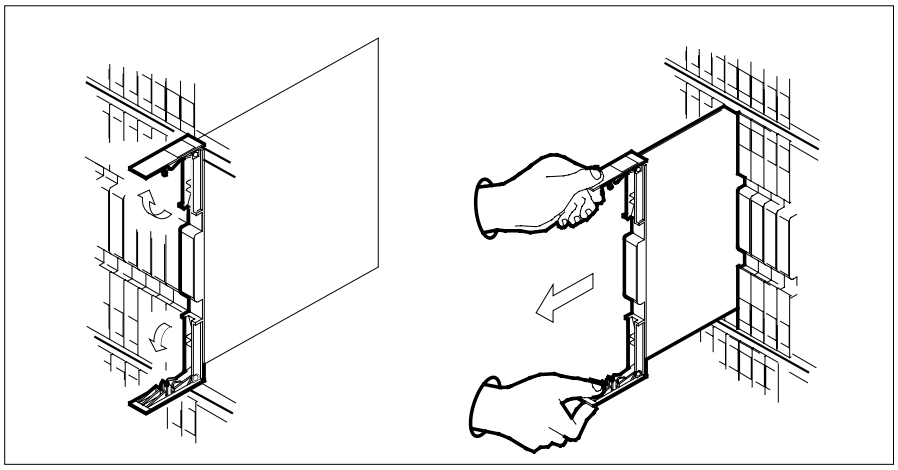
Remove the NTMX73 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



NTMX73
in an RSC RCC2 (continued)

b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.



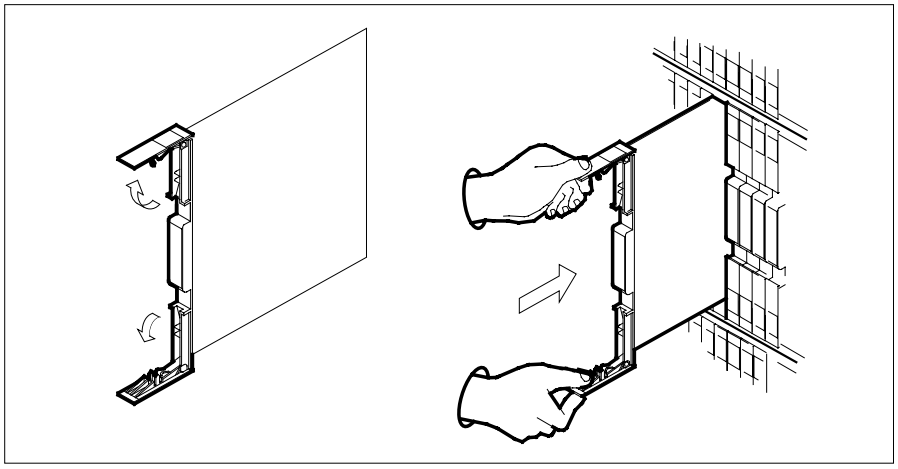
c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

Note: Set dip switch S1 toward IC U1.

10 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

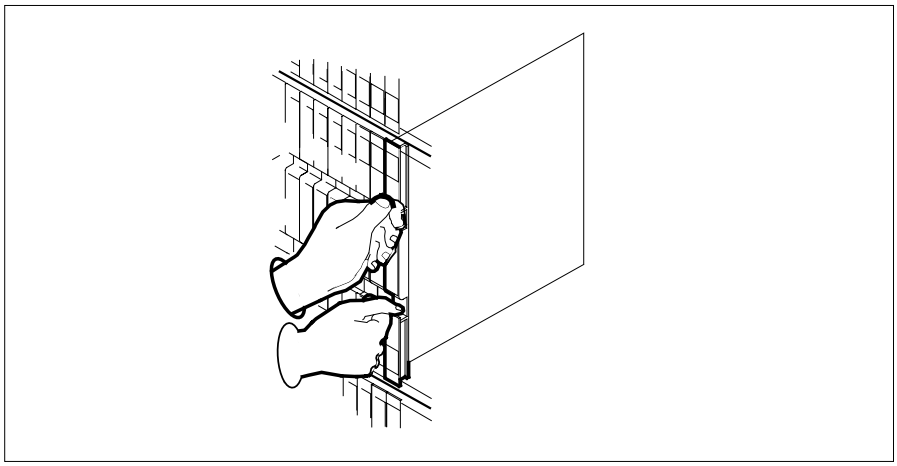
b Gently slide the card into the shelf.



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



At the MAP display

12 Load the inactive RCC2 unit by typing

>loadpm unit **unit_no CC**

and pressing the Enter key.

where

unit_no
is the number of the faulty RCC2 unit

If load	Do
passed	step 13
failed	step 16

13 Use the following information to determine where to proceed.

If you entered this procedure from	Do
alarm clearing procedures	step 15
other	step 14

14 Return the inactive RCC2 unit to service by typing

>RTS UNIT unit_no

and pressing the Enter key.

where

NTMX73 in an RSC RCC2 (end)

unit_no
is the number of the faulty RCC2 unit

If RTS	Do
passed	step 17
failed	step 16

15 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

16 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

17 Remove the sign from the active RCC2 unit.

18 Send any faulty cards for repair according to local procedure.

19 Note in office records the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX74 in an RSC RCC2

Application

Use this procedure to replace an NTMX74 card in an RSCE RCC2.

PEC	Suffixes	Name
NTMX74	AA	DS30A Interface card

Common procedures

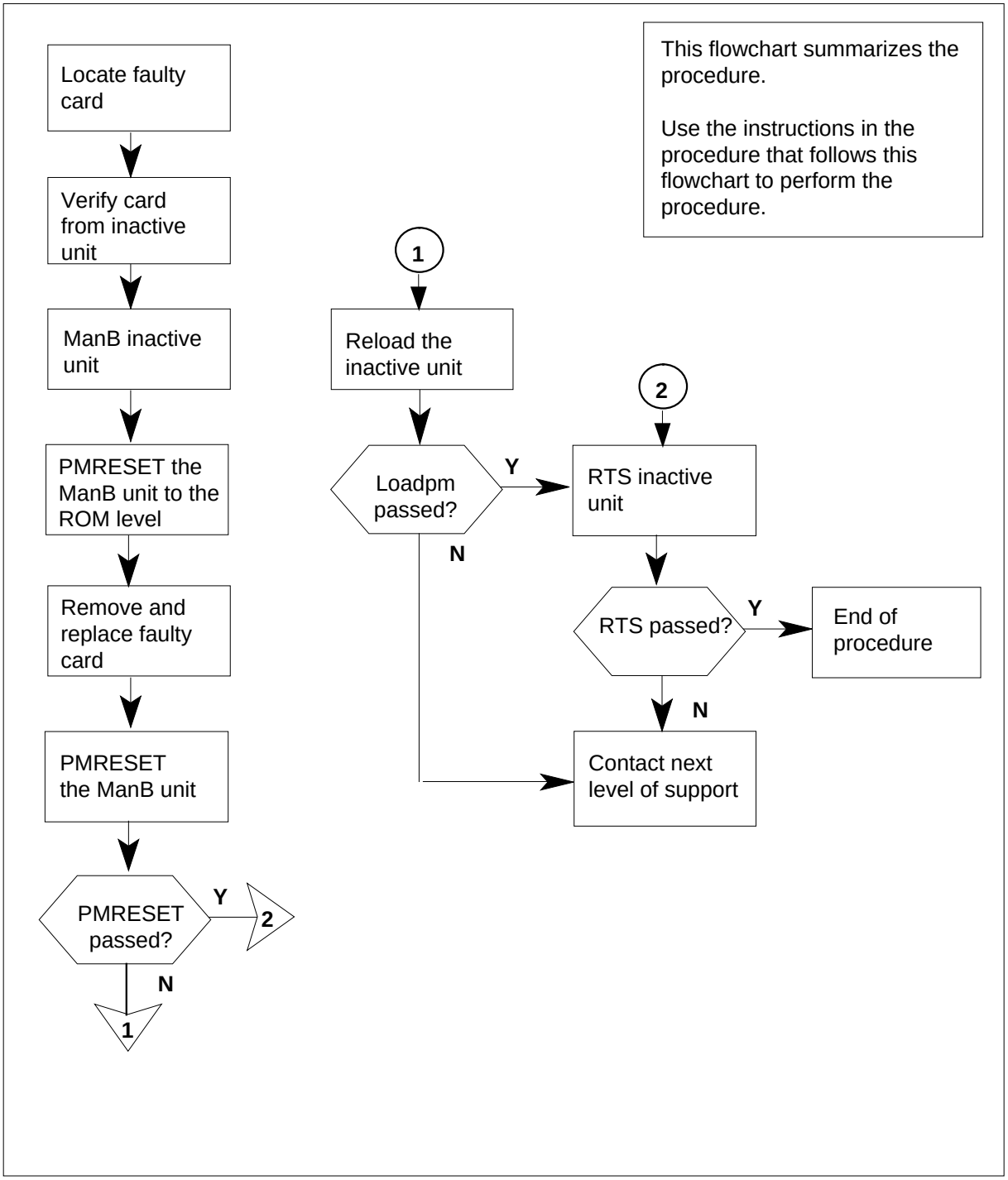
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX74
in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX74 card in RSC RCC2



Replacing an NTMX74 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX74 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the RCC2 by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

NTMX74
in an RSC RCC2 (continued)

```
 CM     MS    IOD     Net     PM    CCS    LNS    Trks     Ext    Appl
 .      .       .       .     1RCC2   .      .      .        .      .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         2        0        2         25
 2 Post_   RCC2    0        0         0        0        1          1
 3 ListSet
 4         RCC2   0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act   InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 By observing the MAP display, ensure that the card to be removed is on the inactive unit.

At the RSCE frame

5 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

6 Busy the inactive PM unit by typing

>bsy INACTIVE

and pressing the Enter key.

7 Set the ManB RCC2 unit to the ROM level to prevent trapping by typing

>PMRESET UNIT unit_no NORUN

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit busied in step 6

NTMX74 in an RSC RCC2 (continued)

At the RCE frame

8

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

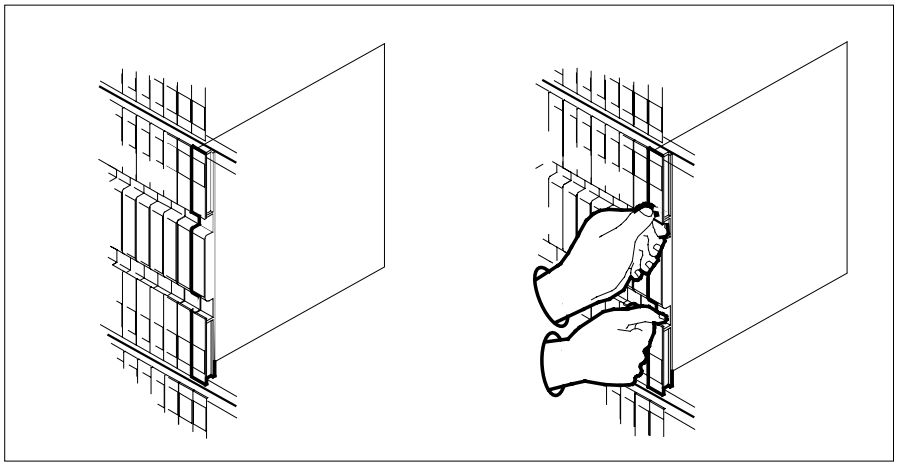
9

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

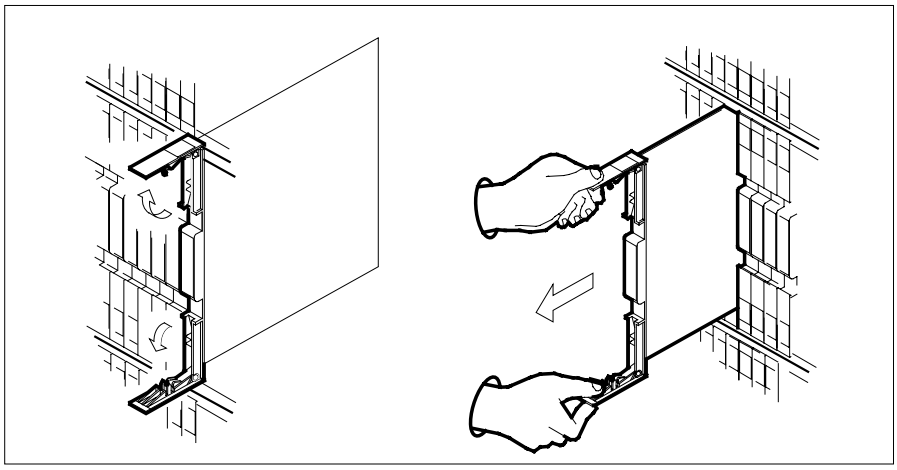
Remove the NTMX74 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

NTMX74
in an RSC RCC2 (continued)

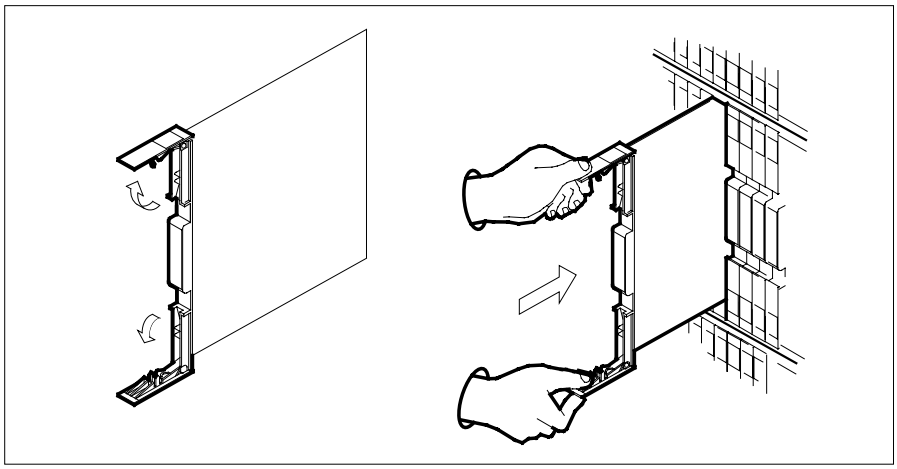


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

10 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

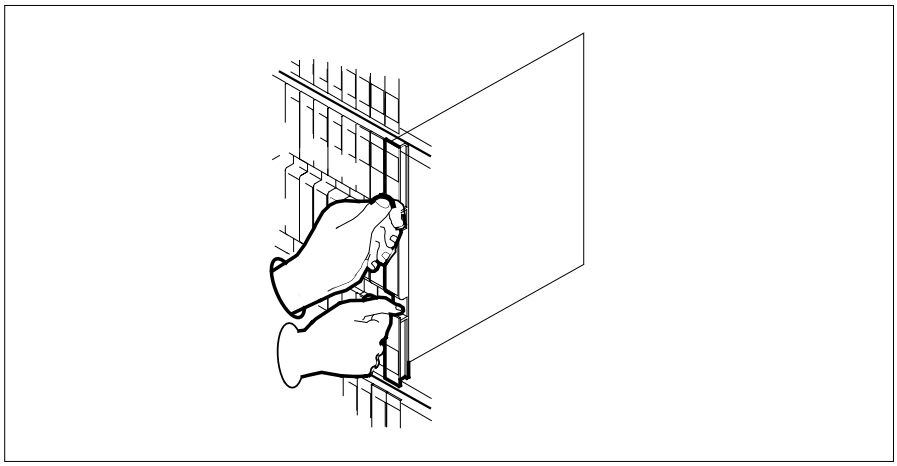
b Gently slide the card into the shelf.



11 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



12 Refer to the following table to determine the next step

If you entered this procedure from	Do
alarm clearing procedure	step 18
other	step 13

At the MAP terminal

13 Reset the inactive RCC2 unit by typing

`>PMRESET UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit (0 or 1)

If the PMRESET command	Do
passed	step 15
failed	step 14

14 Reload the inactive RCC2 unit by typing

`>LOADPM UNIT unit_no`

and pressing the Enter key.

where

NTMX74 in an RSC RCC2 (end)

unit_no
is the number of the inactive RCC2 unit (0 or 1)

If the LOADPM command	Do
passed	step 15
failed	step 19

15 Return the inactive RCC2 unit to service by typing

`>RTS UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit (0 or 1)

If the RTS command	Do
passed	step 16
failed	step 19

16 Send any faulty cards for repair according to local procedure.

17 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

18 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

19 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

20 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX75 in an RSC RCC2

Application

Use this procedure to replace an NTMX75 card in an RSCE RCC2.

PEC	Suffixes	Name
NTMX75	AA, DA	Enhanced Matrix

Common procedures

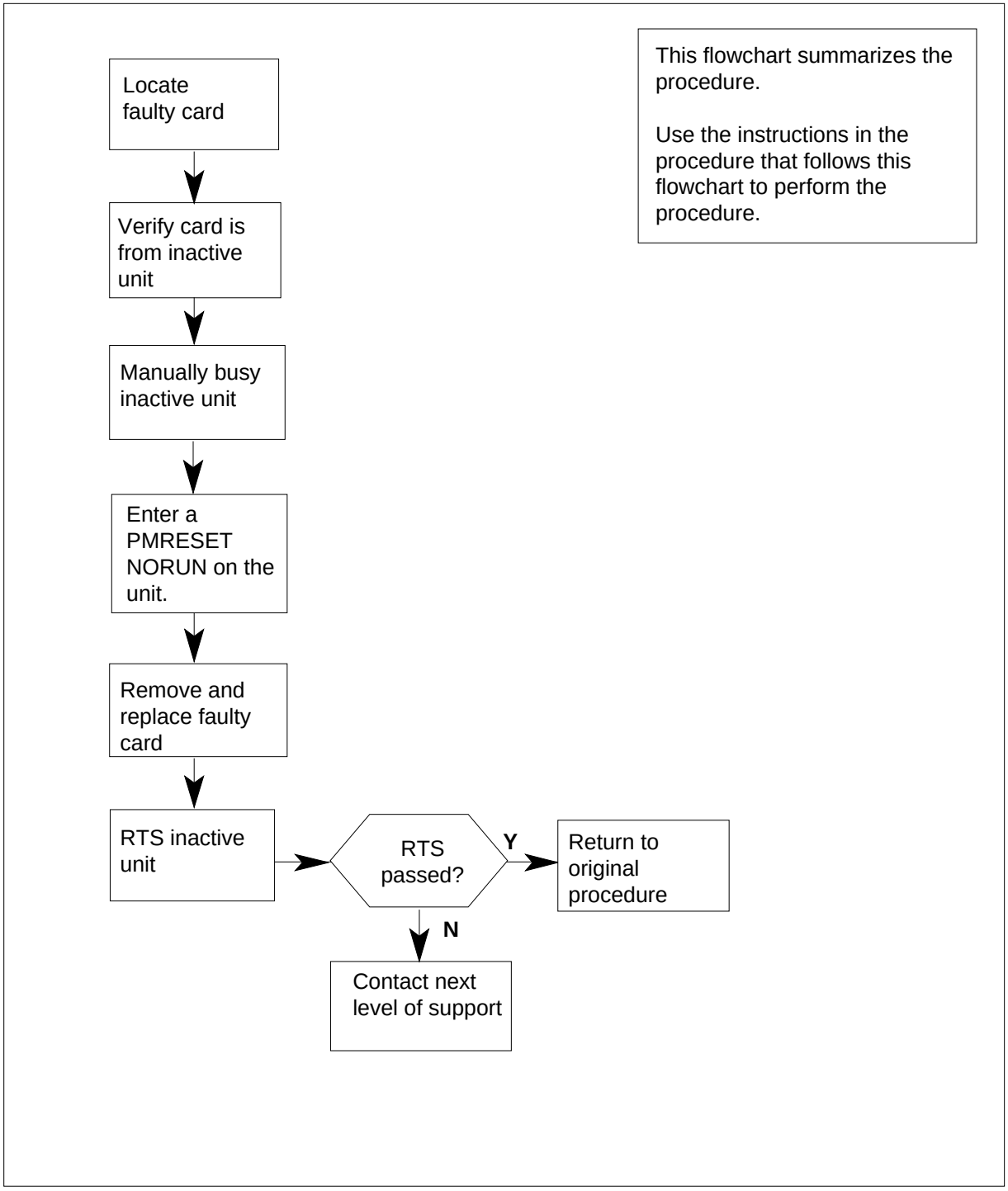
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX75 in an RSC RCC2 (continued)

Summary of card replacement procedure for NTMX75 ard in RSC



NTMX75 in an RSC RCC2 (continued)

Replacing an NTMX75 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX75 replacement card. Verify the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the RCC2 by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 to be busied

Example of a MAP display:

NTMX75
in an RSC RCC2 (continued)

```
 CM     MS     IOD     Net     PM     CCS    LNS    Trks    Ext    Appl
 .      .       .       .     1RCC2    .      .       .      .       .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         2        0        2         25
 2 Post_   RCC2    0        0         0        0        1          1
 3 ListSet
 4         RCC2   0 InSv  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 Determine from the MAP display if the card that is to be removed is on the inactive unit.

If faulty card is on	Do
active unit	step 5
inactive unit	step 7

5 Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

6 Confirm the system prompt by typing

>YES

and pressing the Enter key.

After both units are in-service, proceed to the next step.

At the RSCE frame

7 Place a sign on the active unit bearing the words *Active unit—Do not touch.* Place this sign in an electostatic discharge (ESD) bag. Do not attach the sign with magnets or tape.

NTMX75 in an RSC RCC2 (continued)

At the MAP terminal

8 Busy the inactive PM unit by typing

`>bsy unit_no`

and pressing the Enter key.

where

unit_no
is the number of the unit to be busied (0 or 1)

When both units are in-service, proceed to the next step.

9 Reset the inactive unit by typing

`>PMRESET unit_no NORUN`

and pressing the Enter key.

where

unit_no
is the number of the unit to be reset (0 or 1)

At the RSCE frame

10

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC2. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

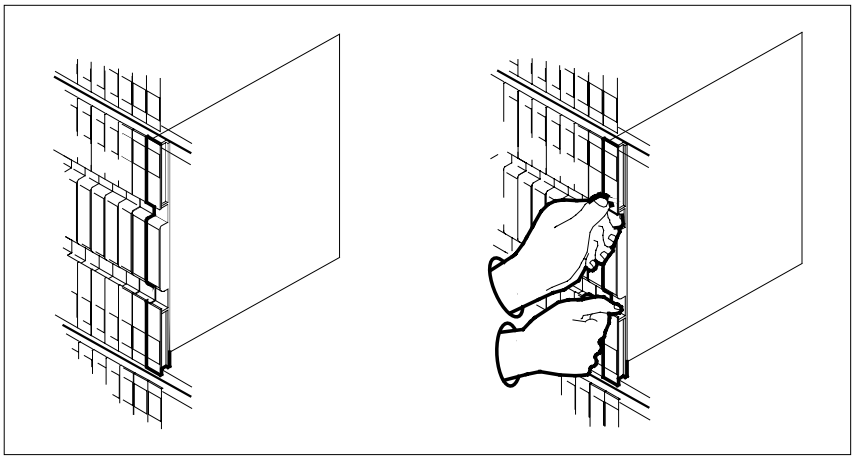
1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

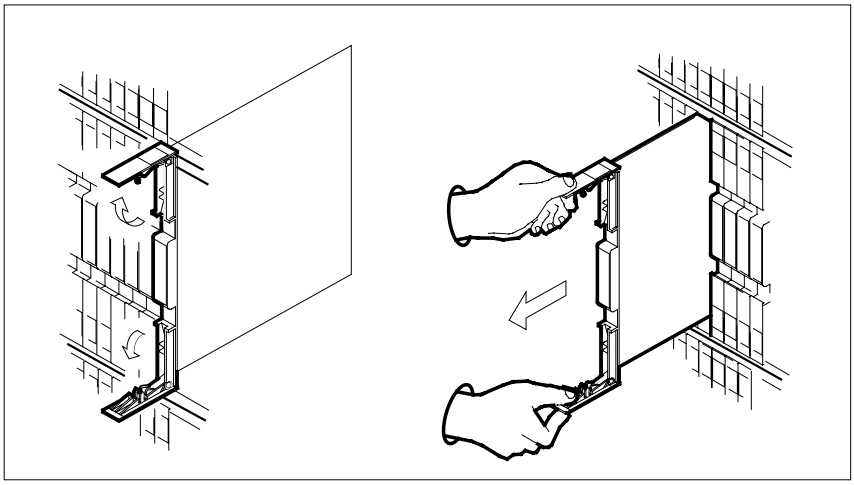
11 Remove the NTMX75 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.

NTMX75
in an RSC RCC2 (continued)



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

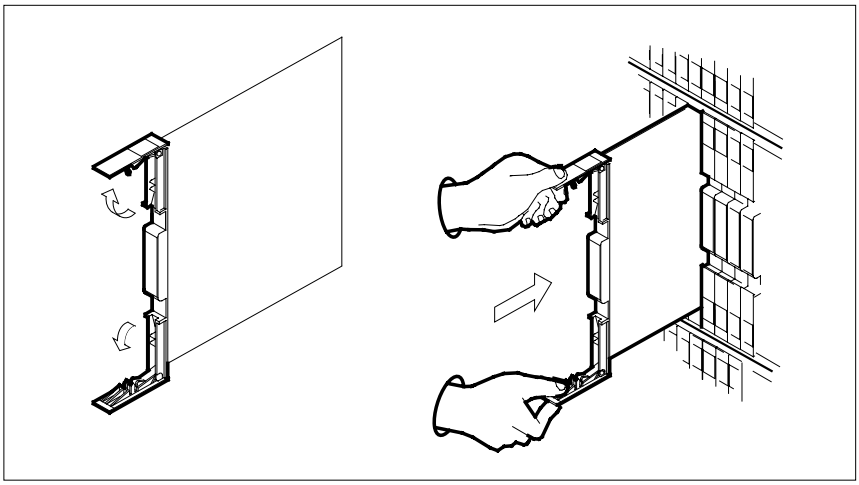


c Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

12 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

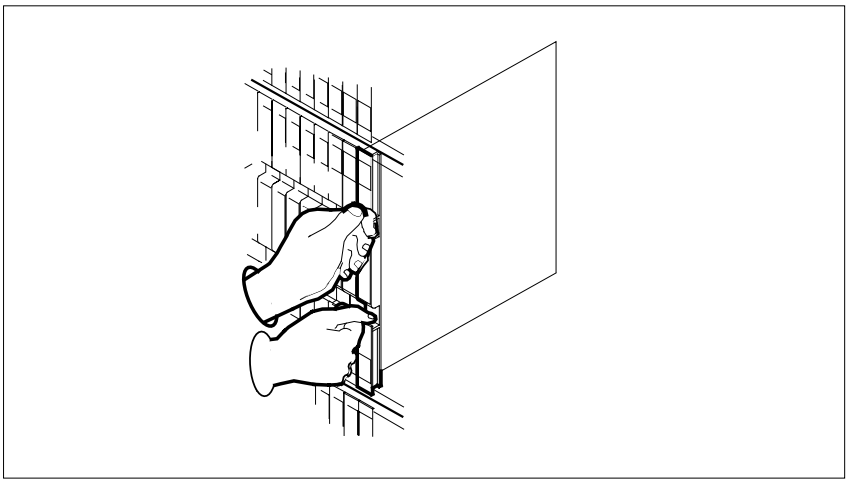
b Gently slide the card into the shelf.



13 Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



At the MAP terminal

14 Reset the inactive unit by typing

`>PMRESET unit_no`

and pressing the Enter key.

where

unit_no
is the number of the unit to be reset (0 or 1)

NTMX75 in an RSC RCC2 (end)

15 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 19
other	step 16

16 Return the inactive RCC2 unit to service by typing

`>RTS UNIT rcc2_unit_no`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the RCC2 unit being returned to service

If RTS	Do
passed	step 17
failed	step 20

17 Send any faulty cards for repair according to local procedure.

18 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 21.

19 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

20 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level of support.

21 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX76 in an RSC RCC2

Application

Use this procedure to replace the following card in an RSC RCC2.

PEC	Suffixes	Name
NTMX76	AA, AB	Message and Tone card

If you cannot identify the PEC, suffix, and shelf or frame for the card you want to replace, refer to the Index for a list of cards, shelves, and frames documented in this card replacement NTP.

Common procedures

Two common procedures are referenced in this section:

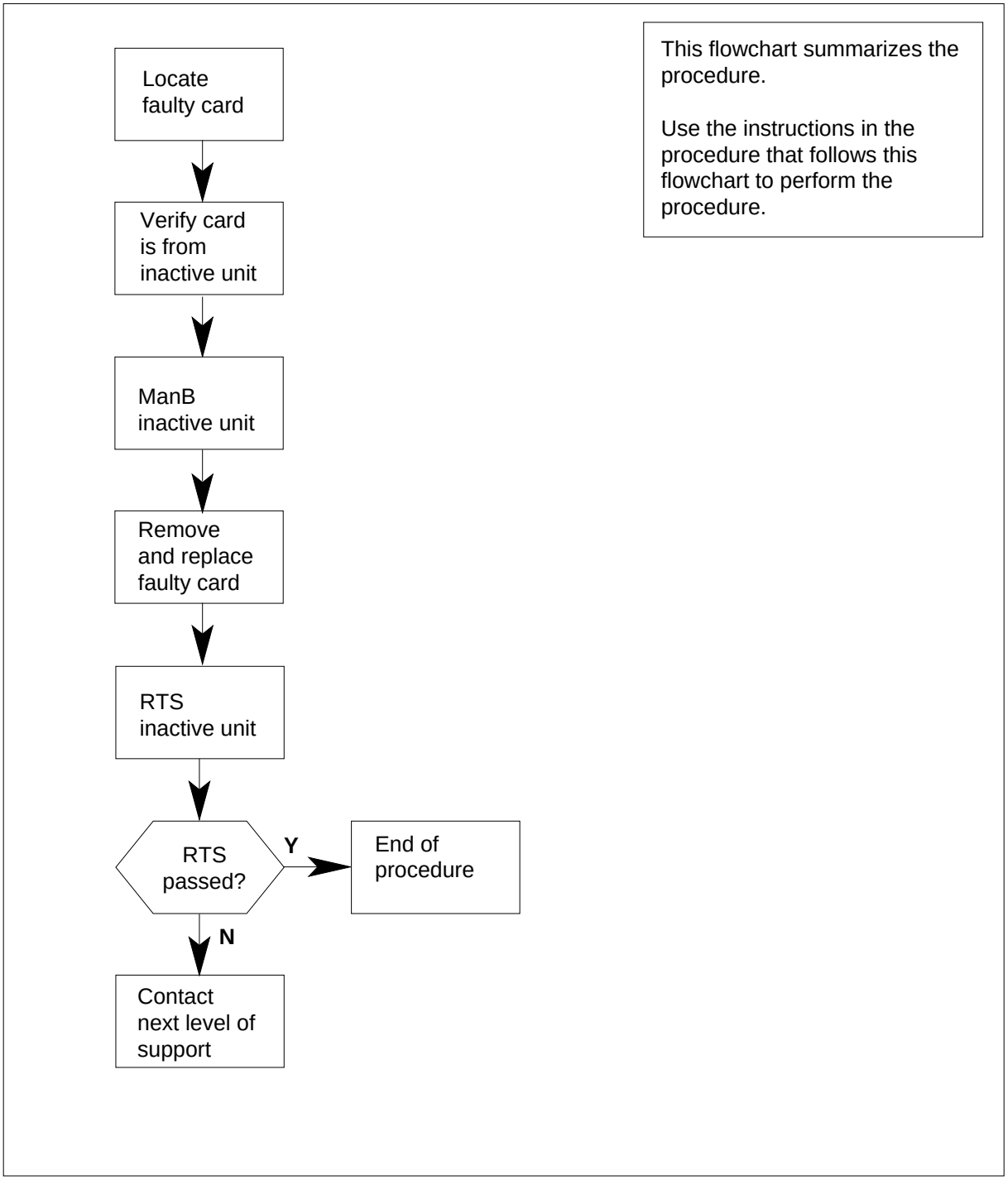
- replacing a card
- returning a card

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX76 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX76 card in RSC RCC2



NTMX76 in an RSC RCC2 (continued)

Replacing an NTMX76 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX76 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the RCC2 by typing

`>MAPCI;MTC;PM;POST RCC2 rcc2_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 to be busied (0 or 1)

Example of a MAP response:

```
RCC2   0 ISTb  Links_OOS:  CSide  1, PSide
Unit0:   Inact      ISTb
Unit1:   Act        InSv
```

4 Determine the location of the RCC2 containing the faulty NTMX76 card by typing

`>QUERYPM`

and pressing the Enter key.

Example of a MAP response:

NTMX76
in an RSC RCC2 (continued)

```
PM Type: RCC2 PM No.: 0 PM Int. No.: 9 Node_No: 24
PMs Equipped: 53 Loadname: CRI07BRI1 EEPRom Load:
MX77NB03
WARM SWACT is supported and available
RCC2 0 is included in the REX schedule.
REX on RCC2 0 has not been performed.
Node Status: {OK, FALSE}
Unit 0 Act,   Status: {OK, FALSE}
Unit 1 Inact, Status: {OK, FALSE}
Site Flr RPos Bay_id Shf   Description  Slot   EqPEC
RSC   00  C02  RSC  00 05  RCC2: 000          MX85AA
RSC   00  C02  RSC  00 47  EXT:LEFT    01:13  MX86AA
```

5 Determine the state of the RCC2 unit associated with the faulty NTMX76 card.

If the state of the RCC2 unit is	Do
active	step 6
inactive	step 8

6 Switch activity of the units by typing

>SWACT

and pressing the Enter key.

Example of a MAP response:

```
RCC2 0     A Warm SwAct will be performed after
          data sync of active terminals.
Please confirm (”YES”, ”Y”, ”NO”, or ”N”):
```

If	Do
you are prompted to confirm a warm SWACT	step 7
the system rejects the SWACT	step 21

7 Confirm the command by typing

>YES

and pressing the Enter key.

Example of a MAP response:

```
Unit0:   Inact SysB  Mtce
Unit1:   Act   ISTb

RCC2 0     SwAct Passed
```

If the MAP response is	Do
SWACT passed	step 8
anything else	step 20

8 A maintenance flag (Mtce) may appear, indicating system-initiated maintenance tasks are in progress. Wait until the flag disappears from the status lines for both RCC2 units before proceeding to the next step.

At the RSCE frame

9 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

10 Busy the inactive PM unit by typing

>bsy INACTIVE

and pressing the Enter key.

Example of a MAP response:

```
RCC2     0 ISTb  Links_OOS: CSide  0 , PSide  1
Unit0:   Inact ManB
Unit1:   Act   ISTb
Bsy INACTIVE
RCC2 0 Unit 0    Bsy Passed
```

If the BSY command	Do
passed	step 11
failed	step 20

11 Reset the inactive RCC2 unit to the ROM level by typing

>PMRESET UNIT rcc2_unit_no NORUN

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit (0 or 1)

NTMX76 in an RSC RCC2 (continued)

At the RSCE frame

12

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the CRSC cabinet. This protects the equipment against damage caused by static electricity.

Locate the circuit card to be replaced.

13 Replace the card using the common replacing a card procedure in this document. When you have completed the procedure, return to this point.

Note: If the circuit card you are replacing has switches, ensure the switches on the replacement circuit card have the same settings as the card replaced.

At the MAP terminal

14 Reset the inactive unit by typing

`>PMRESET UNIT unit_no`

and pressing the Enter key.

where

unit_no
is the number of the RCC2 unit busied in step 10

If PMRESET	Do
passed	step 15
failed	step 20

15 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 19
other	step 16

16 Return the inactive RCC2 unit to service by typing

`>RTS INACTIVE`

NTMX76 in an RSC RCC2 (end)

and pressing the Enter key.

If the RTS command	Do
passed	step 17
failed	step 20

17 Remove the sign from the active unit.

18 Go to the common returning a card procedure in this document.

Go to step 22.

19 Return to *Alarm Clearing Procedures* or other procedure that directed you to this procedure and continue as directed.

20 For further assistance, contact the personnel responsible for the next level of support.

21 For further assistance with switch of activity, contact the personnel responsible for the next level of support.

Note: If the system recommends using the SWACT command with the FORCE option, consult office personnel to determine if use of the FORCE option is advisable.

22 You have successfully completed this procedure.

NTMX77 in an RSC

Application

Use this procedure to replace the following card in an RSC RCC or RSCE RCC2.

Note: This procedure is used to replace a card in an RCC or RCC2. In this procedure the term RCC refers to both the RCC and RCC2 in an RSC frame, NT6X10.

PEC	Suffixes	Name
NTMX77	AA	Unified processor (UP)

Common procedures

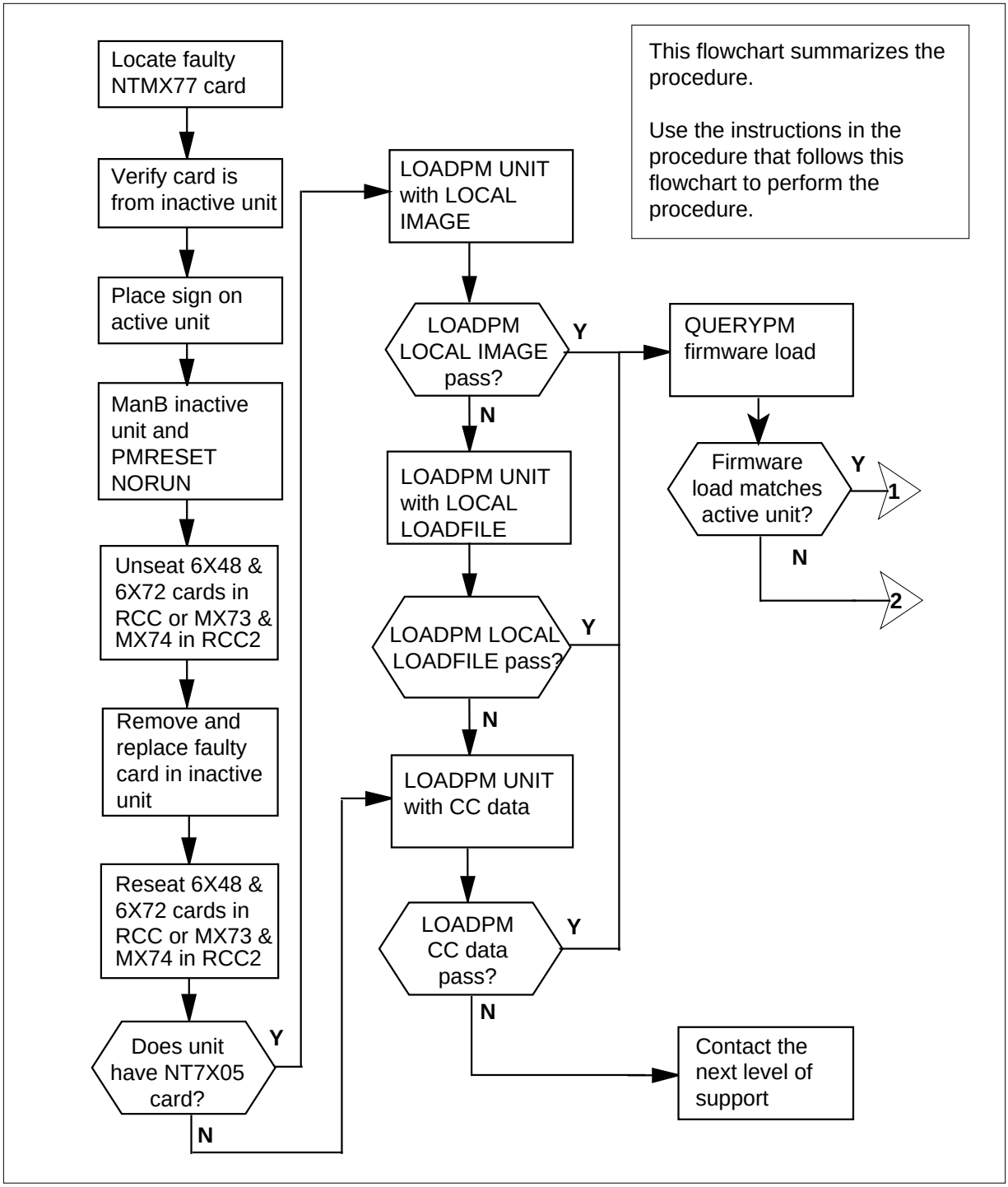
None

Action

The following flowchart is a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

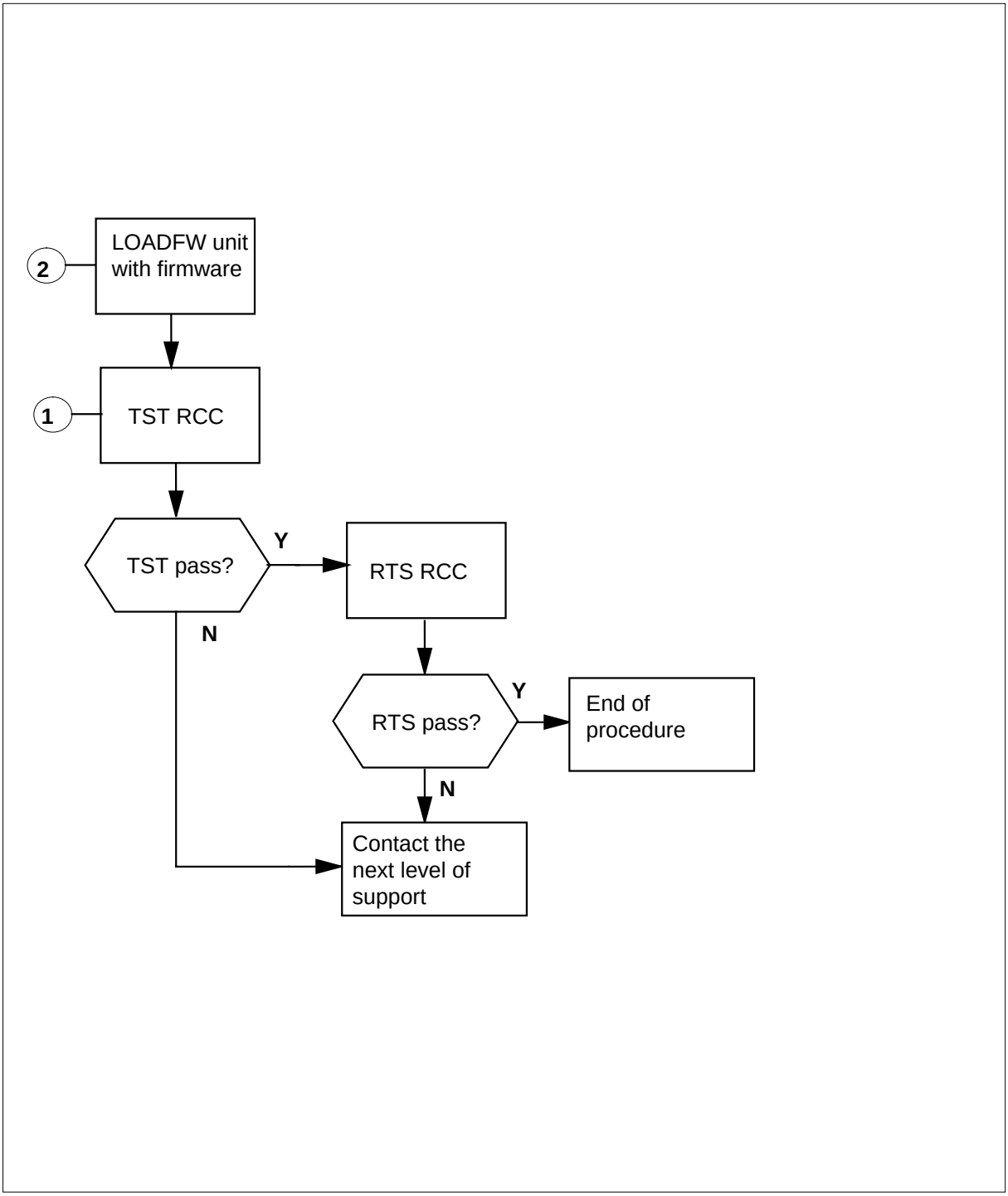
NTMX77 in an RSC (continued)

Summary of card replacement procedure for an NTMX77 card in an RCC



NTMX77 in an RSC (continued)

Summary of card replacement procedure for an NTMX77 card in an RCC (continued)



Replacing an NTMX77 card in an RSC RCC

At your Current Location

1 Proceed only if you were either directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure to verify or accept cards, or were directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC, make sure the unit where you are replacing the card is *inactive* and the mate unit is *active*.

Get a replacement card. Make sure the replacement card has the same product equipment code (PEC), including suffix, as the card to be removed.

At the MAP terminal

3 Access the PM level of the MAP terminal and post the RCC. To post the RCC, type

```
>MAPCI;MTC;PM;POST RCC rcc_unit_no
```

and press the Enter key.

where

rcc_unit_no
is the number of the RCC unit to be busied (0 or 1)

Example of a MAP display:

NTMX77
in an RSC (continued)

```
   CM    MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .     .    1RCC    .      .      .       .       .

 RCC              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM     0        0        2        0        2         25
 2 Post_    RCC    0        0        0        0        1          1
 3 ListSet
 4                RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_         Unit 0:  Inact SysB
 6 TST_           Unit 1:   Act  InSv
 7 BSY_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13 SwAct
14 QueryPM
15
16 IRLINK
17 Perform
18
```

4 Check that the NTMX77AA card with faults is in the inactive unit. Make sure the LED labeled ACTIVE is OFF or observe the MAP display.

If the NTMX77AA card with faults is in	Do
active unit	step 5
inactive unit	step 9

5 Switch the processing activity (SWACT) to the inactive unit. To SWACT the unit, type

>SWACT

and press the Enter key.

If SWACT	Do
cannot continue at this time	step 6
can continue at this time	step 7

6 Do not switch activity of the units. To reject the SWACT, type

>NO

and press the Enter key.

The system discontinues the SWACT.

Return to step 5 during a period of low traffic.

NTMX77 in an RSC (continued)

7 To confirm the system prompt, type

>YES

and press the Enter key.

The system runs a pre-SWACT audit to determine the ability of the inactive unit to accept activity reliably.

Note: A maintenance flag appears when maintenance tasks are in progress. Wait until the flag disappears before proceeding to the next maintenance action.

If the message is	Do
SWACT passed	step 9
SWACT failed	step 8
SWACT refused by SWACT controller	step 8

8 Return to the Alarm Clearing Procedures in this manual to clear the alarm condition on the inactive unit. When the alarm is cleared, return to step 1 of this procedure.

At the RCE or RSCE frame

9 Put a sign on the active unit bearing the words *Active unit—Do not touch.*

At the MAP terminal

10 Busy the inactive RCC unit. To busy the unit, type

>BSY INACTIVE

and press the Enter key.

11 Set the inactive unit to the ROM level. To set the unit to the ROM level, type

>PMRESET UNIT rcc_unit_no NORUN

and press the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit (0 or 1)

NTMX77 in an RSC (continued)

At the RCE or RSCE frame

12

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC. This protects the equipment against damage caused by static electricity.

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

13 Your next step is based on whether the NTMX77 is in an RSC or RCC2.

If the NTMX77 is in an	Do
RCC	step 14
RCC2	step 16

14 Unseat the NT6X48 card in slots 06 and 07.

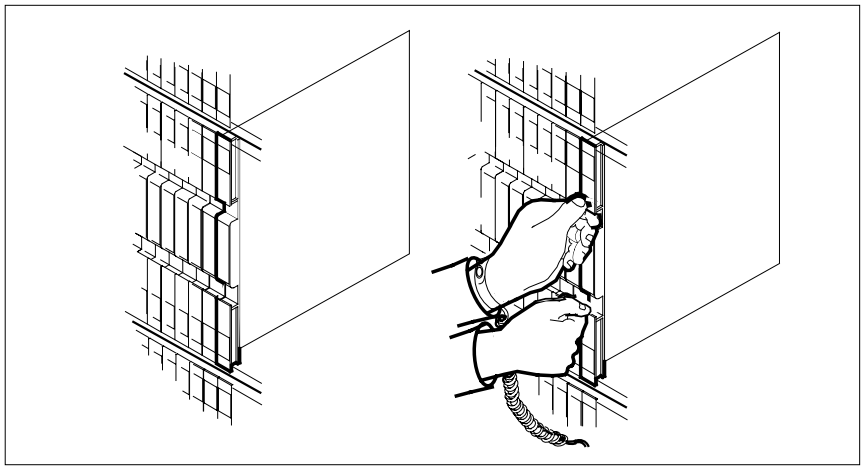
15 Unseat the NT6X72 card in slot 19.

Go to step 17.

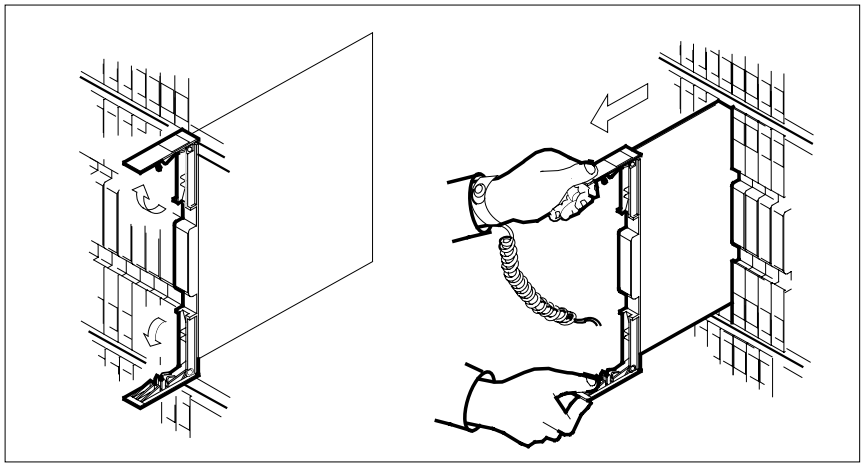
16 Unseat the NTMX73 and NTMX74 circuit cards.

17 Remove the NTMX77 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card towards you until it clears the shelf.



c Make sure the replacement card has the same PEC, including suffix, as the card you just removed. Also make sure the DIP switch settings on the replacement card match the settings of the card just removed.

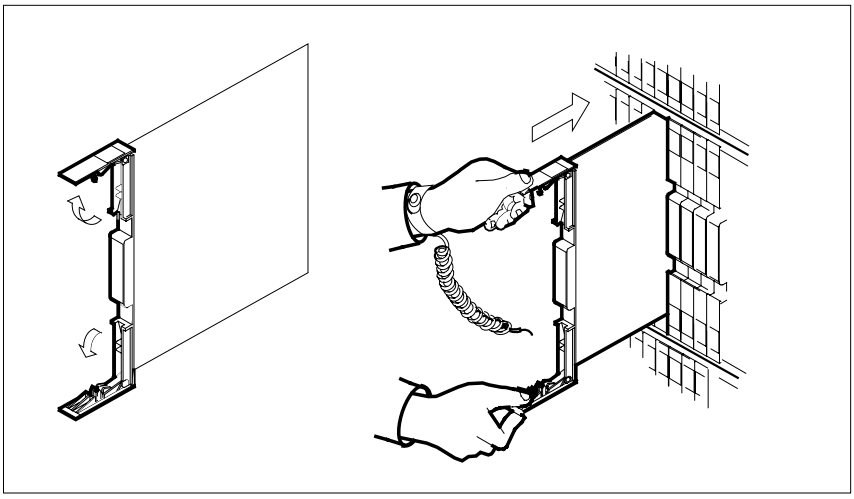
Note: If the NTMX77 has DIP switch S1, set DIP switch S1 to XPM.

18 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Carefully slide the card into the shelf.

NTMX77
in an RSC (continued)



19

DANGER
Possible loss of P-side nodes
Monitor the LEDs on the faceplate of the replacement NTMX77 circuit card.

1. The INSV and ESA LEDs may come ON and must go OFF in less than four seconds.

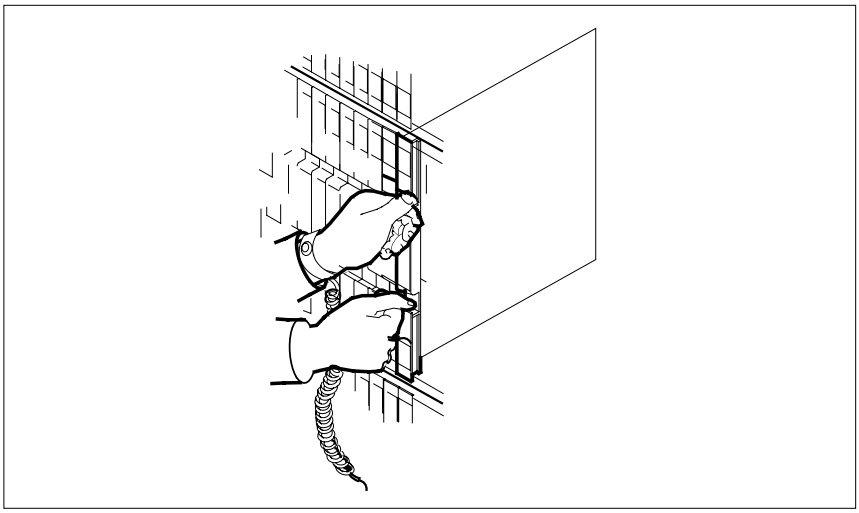
2. The ACT LED may come ON and light for less than one second. If the ACT LED remains ON for more than one second, immediately remove the NTMX77 circuit card, obtain a new NTMX77 circuit card, and return to this step. If the NTMX77 circuit card is allowed to remain with both units having an active processor, a condition of dual activity exists, which results in the loss of P-side nodes.

Seat and lock the card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.

NTMX77 in an RSC (continued)



20 Your next step is based on whether the NTMX77 is in an RCC or RCC2.

If the NTMX77 is in an	Do
RCC	step 21
RCC2	step 23

21 Reseat the NT6X72 card in slot 19.

22 Reseat the NT6X48 card in slots 06 and 07.

Go to step 24.

23 Reseat the NTMX73 and NTMX74 circuit cards.

24 Use the following information to determine the next step in this procedure.

If you entered this procedure from	Do
an alarm clearing procedure	step 34
other	step 25

At the MAP terminal

25 The peripheral/remote loader 16 card (NT7X05) allows local loading of RCC data which reduces recovery time. To check if the NT7X05 card is provisioned, type

```
>QUERYPM FILES
```

and press the Enter key.

Example of a MAP display:

NTMX77
in an RSC (continued)

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .    .    1RCC    .      .       .      .      .

RCC            SysB     ManB     OffL     CBsy     ISTb     InSv
0 Quit     PM     2        0        2        0        2       25
2 Post     RCC    1        0        0        0        1        1
3 ListSet
4          RCC      0 ISTb  Links_OOS:  CSide  0,  PSide   0
5 TRNSL_   Unit 0:  Inact ManB
6 TST_     Unit 1:  Act   InSv
7 BSY_
8 RTS_     QUERYPM files
9 OffL     Unit 0:
10 LoadPM_    NT7X05 load File: ESR05AY
11 Disp_      NT7X05 Image File:ESR05AY
12 Next_      CMR Load: CMR03A
13 SwAct   Unit 1:
14 QueryPM    NT7X05 load File: ESR05AY
15            NT7X05 Image File:ESR05AY
16 IRLINK     CMR LOad: CMR03A
17 Perform
18
```

NT7X05 image file_name

Note: If the NT7X05 card is not provisioned, the MAP response is:
`NT7X05 not datafilled,  QueryPm files invalid`

If the NT7X05 card is	Do
provisioned	step 26
not provisioned	step 27

26

DANGER
Possible service interruption
The LOCAL LOADFILE option of the LOADPM command has a parameter of [<file> string}], if this file_name parameter is used, the loadfile named in the parameter will be used which is not patched. Do not use this parameter unless the NOPATCH option of the loadfile is desired.

Load the inactive RCC unit from the local loadfile. To load the inactive RCC2 unit from the local loadfile, type

`>LOADPM UNIT unit_no LOCAL LOADFILE`

and press the Enter key.

where

rcc_unit_no
is the number of the inactive RCC unit

If the load	Do
passed	step 28
failed	step 27

27 To load the inactive RCC unit, type

>LOADPM INACTIVE

and press the Enter key.

If	Do
load passes	step 28
load fails	step 35

28 Query the XPM counters for the firmware load on the NTMX77. To query XPM counters, type

>QUERYPM CNTRS

and press the Enter key.

Example of a MAP display:

```
Unsolicitited MSG limit = 250, Unit 0 = 0, Unit 1 = 0
Unit 0:
Ram Load: ESR05AY
EPRom Version: AB02
EEPRom Load: Loadable: MX77NG03, Executable: MX77NG03
CMR LOAD: CMR03A
UP:MX77AA
Unit 1:
Ram Load: ESR05AY
EPRom Version: AB02
EEPRom Load: Loadable: MX77NG03 Executable: MX77NG03
CMR LOAD: CMR03A
UP:MX77AA
```

If firmware is	Do
valid	step 31
invalid	step 29

29 To load the NTMX77 firmware into the inactive unit, type

>LOADFW INACTIVE

NTMX77 in an RSC (end)

and press the Enter key.

Note: If the firmware load is not specified with the LOADFW command, the command applies the firmware file datafilled in the appropriate inventory table.

If load	Do
passed	step 30
failed	step 35

30 To upgrade the firmware in the inactive unit, type

`>LOADFW INACTIVE UPGRADE`

and press the Enter key.

If the LOADFW UPGRADE	Do
passes	step 31
fails	step 35

31 Return the inactive RCC unit to service. To RTS the RCC unit, type

`>RTS INACTIVE`

and press the Enter key.

If the RTS	Do
passed	step 32
failed	step 35

32 Send any faulty cards for repair according to local procedure.

33 Record the following items in office records:

- date the card was replaced
- serial number of the card
- indications that prompted replacement of the card

Go to step 36.

34 Return to the alarm clearing procedure that directed you to this procedure. At the point where a card list was produced, identify the next card on the list and go to the appropriate card replacement procedure for that card in this manual.

35 Get additional help in replacing this card by contacting operating company maintenance personnel.

36 You have correctly completed this procedure. Remove the sign from the active unit. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX79 in an RSC EXT

Application

Use this procedure to replace an NTMX79 card in an RSCE EXT.

PEC	Suffixes	Name
NTMX79	AA	DS60 Extender

Common procedures

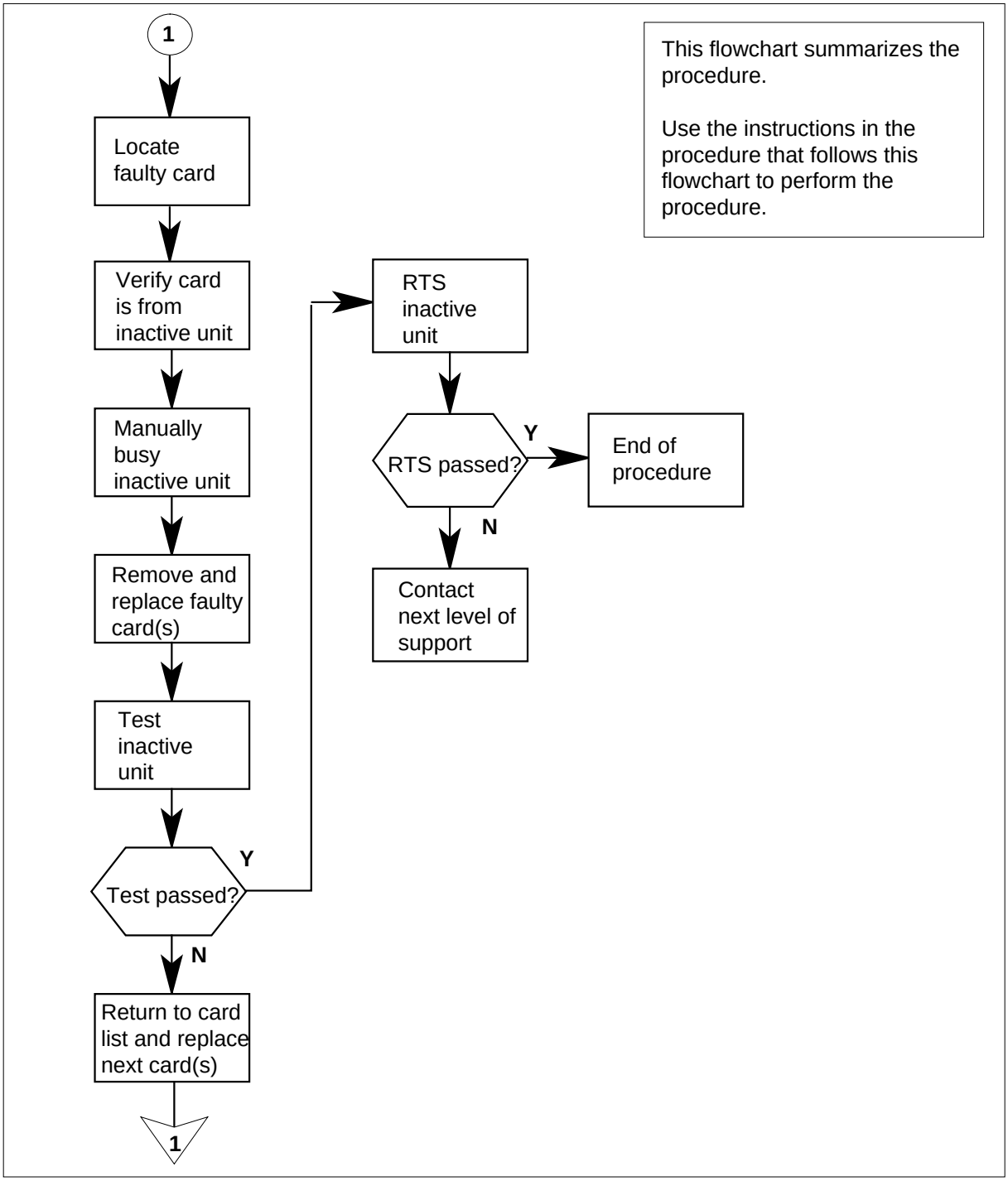
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX79
in an RSC EXT (continued)

Summary of card replacement procedure for an NTMX79 card in RSC EXT



NTMX79 in an RSC EXT (continued)

Replacing an NTMX79 card in an RSCE EXT

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX79 replacement card. Verify the replacement card has the same product engineering code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the RCC2 by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

4 Determine on which side of the extension shelf (right or left side) the faulty card is located by typing

```
QUERYPM
```

and pressing the Enter key.

Example of a MAP response:

NTMX79 in an RSC EXT (continued)

```
PM Type: RCC2 PM Nol.: 0 PM Int. No.: 2 Node_No.: 126
PMs Equipped: 61  Loadname: CRI05AW
ESA equipped: YES IntraSwitching is ON
WARM SWACT is supported and available.
REX on RCC2 0 is included in the REX schedule.
Node Status; {OK, FALSE}
Unit 0    Act, Status; {OK, FALSE}
Unit 1  Inact, Status; {OK, FALSE}
 Site  Flr  RPos  Bay_id   Shf  Description  Slot  EqPEC
 R113   01  AA00  CRSC 00   05  RCC2 : 000         MX85AA
 R113   01  AA01  CEXT 00   05  EXT : LEFT         MX86AA
```

(Extension shelf location of faulty card)

5 By observing the LED on the extension shelf, be sure that the card to be removed is on the inactive unit. The LED is lit (ON) on the active unit, and not lit (OFF) on the inactive unit.

At the RSCE frame

6 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

At the MAP terminal

7 Busy the inactive RCC2 unit by typing

`>bsy unit rcc2_unit_no`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the RCC2 unit to be busied (0 or 1)

At the RSCE frame

8

WARNING
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (MSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Put on a wrist strap.

9

DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

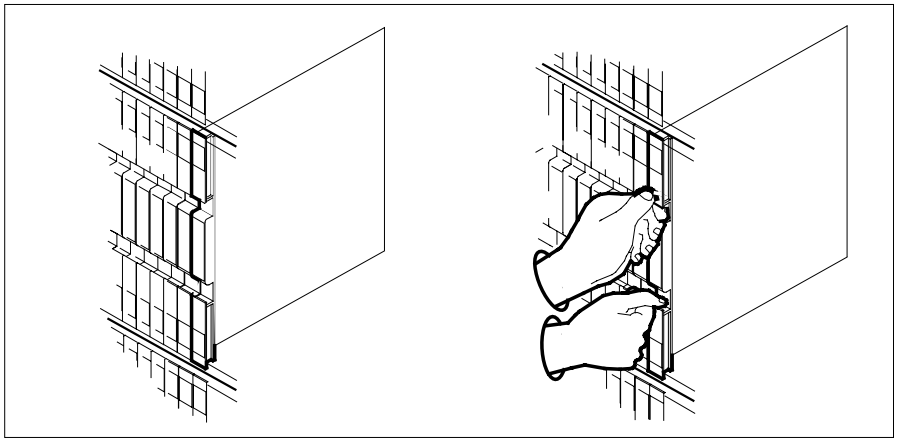
Power down the NTMX72 card in the inactive RCC2.

10

CAUTION
Loss of subscriber service
To prevent the D-channel handler (DCH) card from being set system busy (SysB), which causes a loss of subscriber service, make sure the toggle switch on the NTMX79 card is set to the ON position before removing the NTMX79 card.

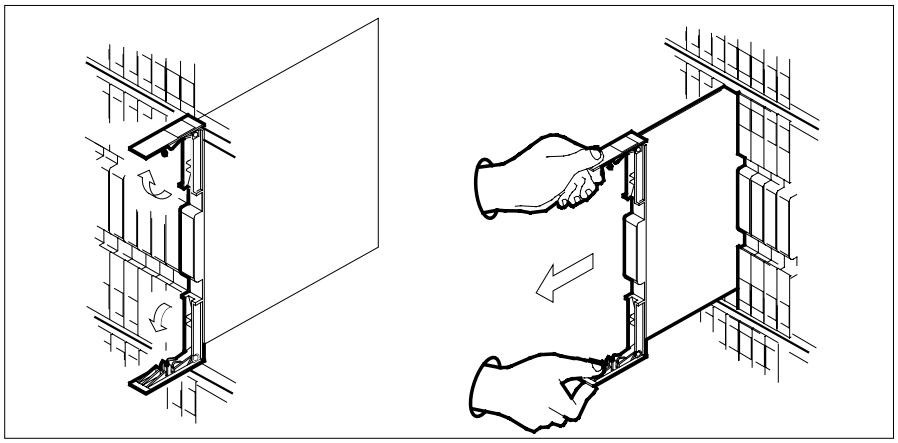
Remove the NTMX79 card as shown in the following figures.

a Locate the card to be removed on the appropriate shelf.



b Open the locking levers on the card to be replaced and gently pull the card toward you until it clears the shelf.

NTMX79
in an RSC EXT (continued)

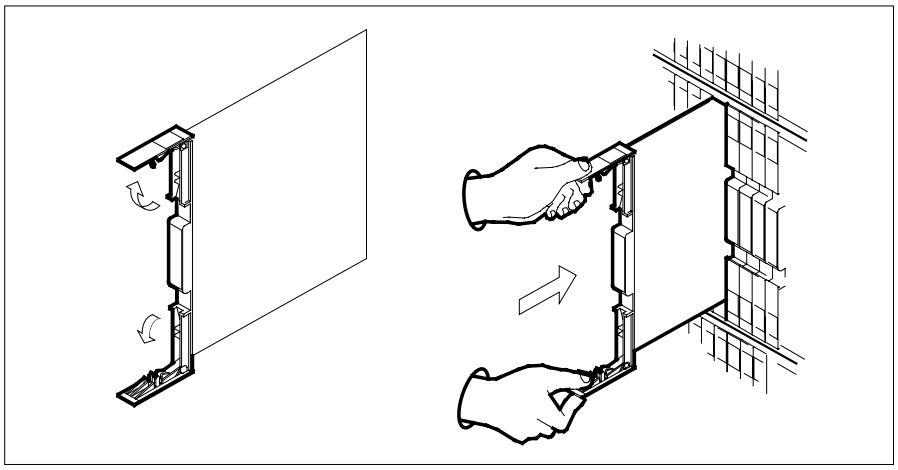


c Ensure the replacement card has the same PEC, including suffix, as the card you just removed.

11 Open the locking levers on the replacement card.

a Align the card with the slots in the shelf.

b Gently slide the card into the shelf.



12

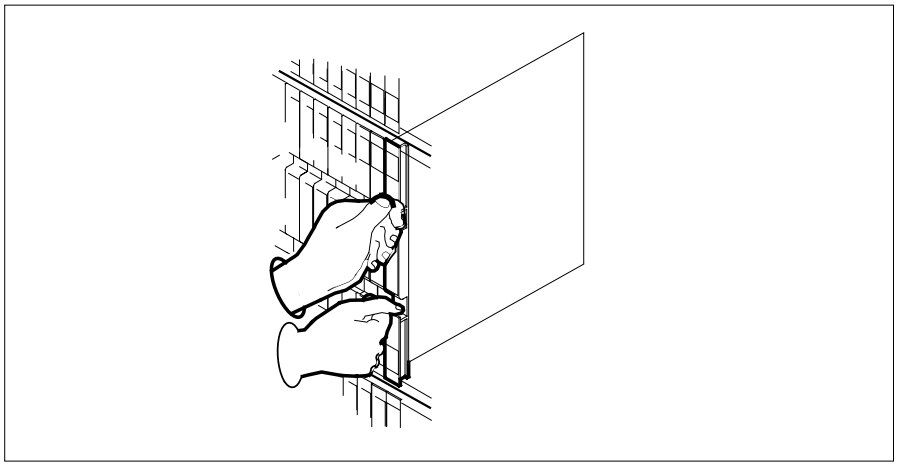
CAUTION
Loss of subscriber service
To prevent the D-channel handler (DCH) card from being set system busy (SysB), which causes a loss of subscriber service, make sure the toggle switch on the NTMX79 card is set to the OFF position before seating the NTMX79 card.

NTMX79
in an RSC EXT (continued)

Seat and lock the NTMX79 card.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate to ensure the card is fully seated in the shelf.

b Close the locking levers.



13 Power up the inactive RCC2 unit as follows:

a Ensure that the power converter (NTMX72) is fully inserted. A major audible alarm may sound. This alarm is silenced when power is restored to the converter.

Note: Some release levels of the NTMX72AA do not require the simultaneous operation of the Reset switch on the power converter and the circuit breaker on the MSP. This is reflected in the following step.

b If the power converter replaced is an NTMX72AA, set the switch on the power converter to the Reset position. Set the associated circuit breaker on the MSP to the ON position.

If both the converter FAIL LED and FRAME FAIL lamp on the MSP go OFF, go to step 14.

If both the converter FAIL LED and FRAME FAIL lamp on the MSP do not go OFF, hold the switch on the NTMX72AA power converter in the Reset position and simultaneously set the associated circuit breaker on the MSP to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will go OFF. Go to step 14.

c If the power converter replaced is an NTMX72AB, set the associated circuit breaker on the MSP to the ON position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will go OFF. Go to step 14.

14 The peripheral loader card (NT7X05) allows local loading of RCC2 data, which reduces recovery time. Check if the NT7X05 card is provisioned by typing

```
>QUERYPM FILES
```

and pressing the Enter key.

NTMX79
in an RSC EXT (continued)

Example of a MAP display:

```
   CM   MS   IOD   Net    PM    CCS    LNS    Trks    Ext    APPL
    .    .     .    .    1RCC2   .      .       .      .      .
                          *C*
 RCC2           SysB     ManB     OffL     CBsy     ISTb     InSv
 0 Quit     PM     2        0        2        0        2       25
 2 Post     RCC2   1        0        0        0        1        1
 3 ListSet
 4          RCC2     0 ISTb  Links_OOS:  CSide  0,  PSide   0
 5 TRNSL_   Unit 0:  Inact ManB
 6 TST_     Unit 1:  ACT InSv
 7 BSY_
 8 RTS_     QUERYPM files
 9 OffL     Unit 0:
10 LoadPM_     NT7X05 load File: CRI05AW
11 Disp_       NT7X05 Image File:
12 Next_       CMR Load:  CMR03A
13 SwAct   Unit 1:
14 QueryPM     NT7X05 load File: CRI05AW
15             NT7X05 Image File:
16 IRLINK      CMR Load:  CMR03A
17 Perform
18
```

Note: If the NT7X05 card is not provisioned the MAP response is:`NT7X05 not datafilled, QueryPm files invalid`

If the NT7X05 card is	Do
provisioned	step 15
not provisioned	step 16

15 Load the inactive RCC2 unit from the local load file by typing

`>LOADPM UNIT unit_no LOCAL LOADFILE`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit

If the load	Do
passed	step 17
failed	step 16

16 Load the inactive RCC2 unit (from the CM) by typing

`>LOADPM UNIT rcc2_unit_no`

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit

If load	Do
passed	step 17
failed	step 24

17 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 23
other	step 18

18 Return the inactive RCC2 unit to service by typing

```
>RTS UNIT rcc2_unit_no
```

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit

19 Use the following information to determine where to proceed.

If RTS	Do
passed	step 20
failed	step 24

20 Remove the sign from the active RCC2 unit.

21 Send any faulty cards for repair according to local procedure.

22 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 25.

23 Return to the procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

24 Obtain further assistance in replacing this card by contacting operating company maintenance personnel.

NTMX79
in an RSC EXT (end)

25 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX81 in an RSC RCC2

Application

Use this procedure to replace an NTMX81 card in an RSC RCC2.

PEC	Suffixes	Name
NTMX81	AA, BA	Dual DS-1 Interface

Common procedures

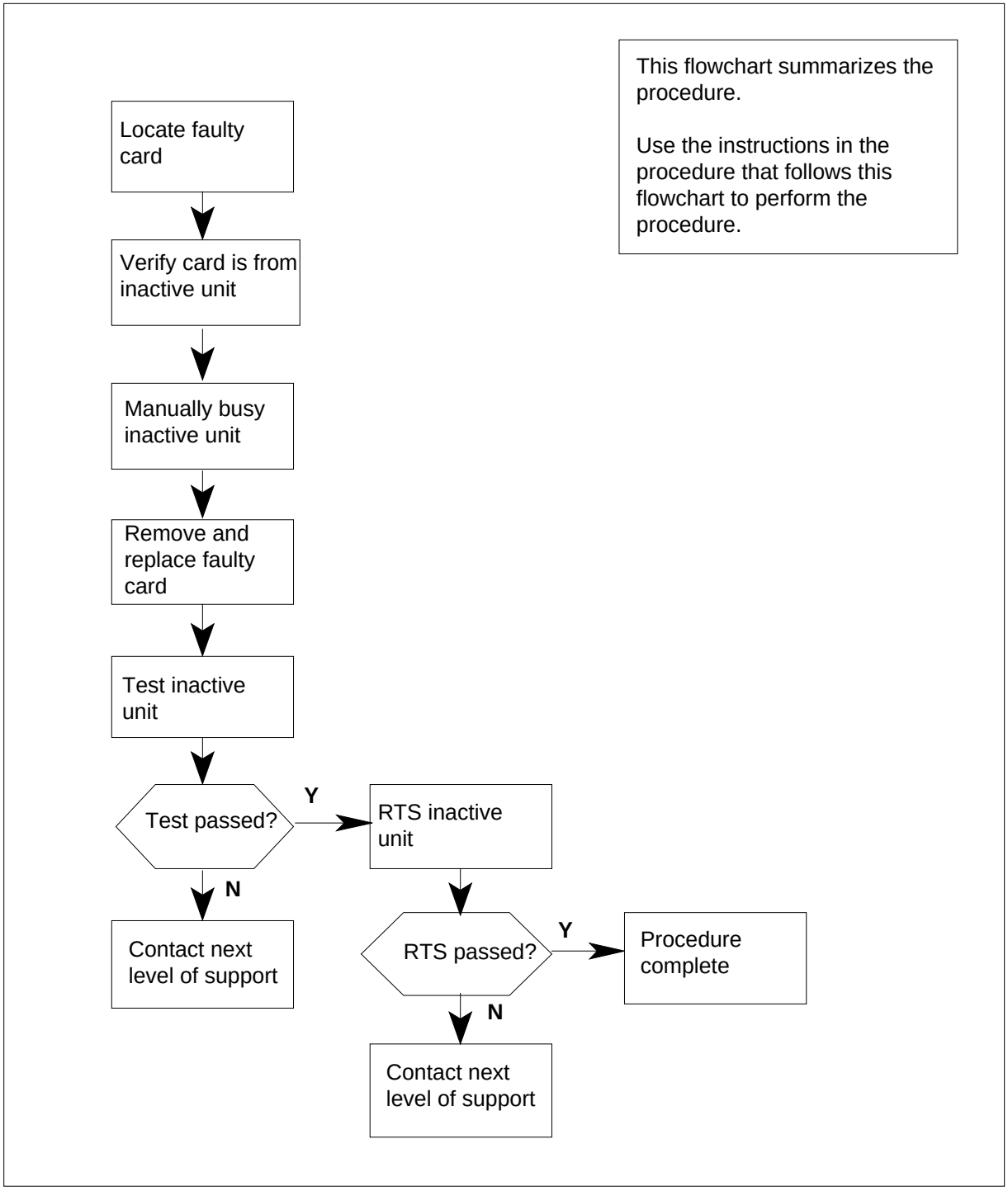
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX81 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX81 card in RSC RCC2



NTMX81 in an RSC RCC2 (continued)

Replacing an NTMX81 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX81 replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Ensure the PM level of the MAP display is currently displayed by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

NTMX81
in an RSC RCC2 (continued)

```
 CM     MS     IOD     Net     PM     CCS     LNS    Trks    Ext    Appl
  .      .       .       .    1RCC2    .       .       .       .      .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         2        0        2         25
 2 Post_   RCC2    0        0         0        0        1          1
 3 ListSet
 4         RCC2   0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 By observing the MAP display, be sure the card to be removed is in the inactive unit.

At the RSCE frame

5 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

If faulty card is	Do
C-side of RCC2	step 11
P-side faulty	step 17

At the MAP terminal

6 Determine if the RCC2 is in a single or dual configuration by typing

`>POST RCC2 rcc2_no ;IRLINK`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the faulty NTMX87 card

Note: If the posted RCC2 is in a single RCC2 configuration, the system will respond with the following message:

NO IRLINKS DATAFILLED, IRLINK LEVEL CANNOT BE ENTERED.

If the RCC2 is in a	Do
single configuration	step 9
dual configuration	step 7

7 Translate the dual RCC2s IRLINKS by typing

>TRNSL

and pressing the Enter key.

Example of a MAP response

```
 CM    MS    IOD    Net     PM    CCS     LNS    Trks    Ext    Appl
 .     .      .      .     1RCC2   .       .       .      .      .

IRLINK            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         2        0        2         25
 2         RCC2    0        0         0        0        1          1
 3
 4         RCC2   0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST_    Unit1:   Act InSv
 7 BSY_
 8 RTS_
 9
10            IR    From       To            CAP    STATE    MSGCOND
11             0   RCC2 0, 0  RCC2 1, 0      MS       OK        OPN
12             1   RCC2 0, 8  Rcc2 1, 8      MS       OK        OPN
13             2   RCC2 0, 12 RCC2 1, 12      S       OK
14 QueryIR     3   RCC2 0, 13 RCC2 1, 13      S       OK
15
16
17
18
```

8 Busy IRLINKS in the faulty NTMX87 circuit card by typing

>BSY irlink_no

and pressing the Enter key.

where

irlink_no
is the number of the irlink that must be busied

Note 1: This step must be performed for each provisioned link in the slot position.

Note 2: For link-to-slot assignments, reference step 16 for the main shelf.

9 Busy the inactive PM unit by typing

>bsy unit **unit_no**

NTMX81 in an RSC RCC2 (continued)

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit (unit 0 or 1)

When both units are in-service, proceed to next step.

10 Display the C-side links associated with the DS-1 card by typing

>TRNSL C

and pressing the Enter key.

Example of a MAP response

```
LINK 0    LTC  0        0;CAP     MS:STATUS OK        MSGCOND   OPN
LINK  1   LTC  0        1;CAP      S:STATUS SBsy
LINK  2   LTC  0        2;CAP     MS:STATUS OK        MSGCOND   OPN
LINK  3   LTC  0        3;CAP      S:STATUS OK
LINK  4   LTC  0        4;CAP      S:STATUS OK
LINK  5   LTC  0        5;CAP      S:STATUS SBsy
```

If C-side links are	Do
faulty	step 14
not faulty	step 11

11 Display the P-side links associated with the DS-1 card by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response

```
LINK 0    RCC2 0 5  27;CAP    MS:STATUS OK   MSGCOND OPN
LINK 1    RCC2 1 5  27;CAP    MS:STATUS SBsy MSGCOND CLS
LINK 2    RCC2 0 7  47;CAP    MS:STATUS OK
LINK 3    RCC2 1 7  47;CAP    MS:STATUS OK
LINK 4    RCC2 0 5  50;CAP    MS:STATUS OK   MSGCOND OPN
LINK 5    RCC2 1 5  50;CAP    MS:STATUS SBsy MSGCOND CLS
```

If P-side links are	Do
faulty	step 14
not faulty	step 28

12 Busy the links associated with the RCC2 by typing

>BSY LINK 0

and pressing the Enter key.

Example of a MAP response:

```
Please confirm (“Yes" or “No")
```

Confirm by typing

>YES

and pressing the Enter key.

Example of a MAP response:

```
 LTC 0 LINK 0 Bsy Passed
```

Note: To busy the other links associated with the RCC2, execute the procedures in this step for each link until all links are busied.

13 Post the host PM by typing

>POST host_pm host_pm_no

and pressing the Enter key.

where

host_pm
is either a line group controller (LGC), a line group controller with ISDN (LGCI), a line trunk controller (LTC), or a line trunk controller with ISDN (LTCI)

host_pm_no
is the number of either an LGC, LGCI, LTC, or LTCI

Example of a MAP display:

```
 CM     MS     IOD     Net     PM     CCS     Lns     Trks     Ext  Appl
  .      .      .       .    1RCC2     .       .       .        .    .

LTC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        1        0        4        12
 2 Post_   LTC       0        0        2        0        2         9
 3 ListSet
 4         LTC   1 ISTb  Links_OOS:  CSide  0, PSide   1
 5 Trnsl_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

NTMX81 in an RSC RCC2 (continued)

14 Manually busy the links connected to the faulty card by typing

`>BSY LINK link_no`

and pressing the Enter key.

where

link_no
is the number of the link associated with the faulty MX81 card, from step 11

Note: Each NTMX81 card has two links associated with it. Therefore, each link must be manually busied. Possible link number pairs are as follows: 0,1; 2,3; 4,5; or 6,7.

At the RCE frame

15

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the frame supervisory panel (FSP) of the RCC2. This protects the equipment against damage caused by static electricity.

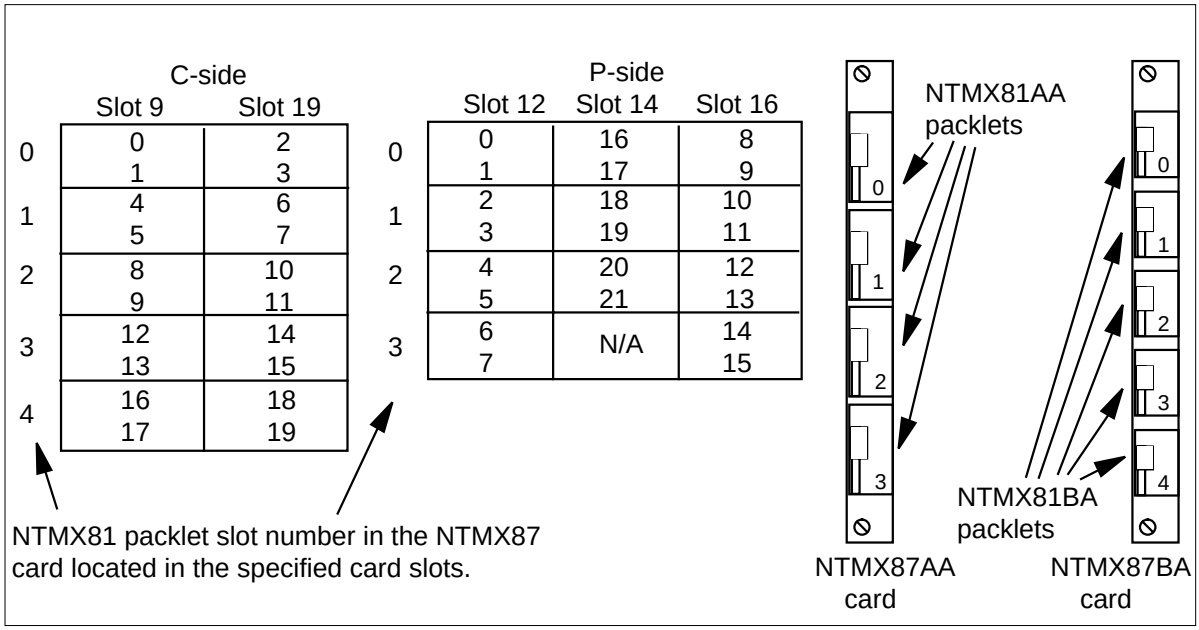
DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

16 After identifying the faulty link, use the following charts to determine which NTMX81 is to be removed by first identifying whether the link is a C-side or P-side link then by matching the link number with the slot number and the packlet number to the left of each respective table.

NTMX81
in an RSC RCC2 (continued)



Remove the NTMX81 card as described in the following steps:

a Locate the packlet to be removed on the appropriate NTMX87 card slot.

b Open the locking lever on the packlet to be replaced and gently pull the card toward you until it clears the shelf.

c Ensure that the replacement card has the same PEC, including suffix, as the card you just removed.

17 Before inserting the replacement card, set the DS-1 switch settings according to the following table.

(Sheet 1 of 2)

Distance to cross connect				
Feet	**Meters**	**S3/6**	**S2/5**	**S1/4**
0-133	0-41	On	Off	Off
133-266	41-81	Off	On	On
266-399	81-122	Off	On	Off
Note: S indicates switch number(s). On S1 dip switch (6 position): S1-S3 belong to even port, and S4-S6 belong to odd port.				

NTMX81 in an RSC RCC2 (continued)

(Sheet 2 of 2)

Distance to cross connect				
Feet	**Meters**	**S3/6**	**S2/5**	**S1/4**
399-533	122-163	Off	Off	On
533-655	163-200	Off	Off	Off
Note: S indicates switch number(s). On S1 dip switch (6 position): S1-S3 belong to even port, and S4-S6 belong to odd port.				

18 Open the locking lever on the replacement packlet.

a Align the packlet with the slots in the shelf.

b Gently slide the packlet into the card slot in the NTMX87 card.

19 Seat and lock the packlet.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate of the packlet to ensure that the packlet is fully seated in the slot.

b Close the locking lever.

20 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 27
other	step 21

At the MAP terminal

21 Test the busied network links from step 12 by typing

`>TST LINK link_no`

`and pressing the Enter key`

where

link_no
is the number of the link that was manually busied in step 14. This step must be performed for each link that is manually busied.

Note: To test the other links associated with the RCC2, execute this step for each link until all links are tested.

If TST	Do
passed	step 22

NTMX81 in an RSC RCC2 (continued)

If TST	Do
failed	step 28

22 Return to service the P-side links by typing

`>RTS LINK 0`

and pressing the Enter key.

Note: To RTS the other links associated with the RCC2, execute this step for each link until all links are returned to service.

If RTS	Do
passed	step 23
failed	step 28

23 Post the inactive RCC2 in which the NTMX81 card is located by typing

`>POST RCC2 rcc2_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the faulty card

24 Return the inactive RCC2 unit to service by typing

`>RTS UNIT` **`unit_no`**

and pressing the Enter key.

where

unit_no
is the number of the RCC2 unit posted in step 23

If RTS	Do
passes	step 25
fails	step 28

25 Send any faulty cards for repair according to local procedure.

26 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 29.

27 Return to *Alarm Clearing Procedures* or other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

28 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level support.

NTMX81
in an RSC RCC2 (end)

29 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTMX87 in an RSC RCC2

Application

Use this procedure to replace an NTMX87 card in an RSC RCC2.

PEC	Suffixes	Name
NTMX87	AA, AB	Quad Frame Carrier
	BA	Penta DS-1 Packlet Carrier

Common procedures

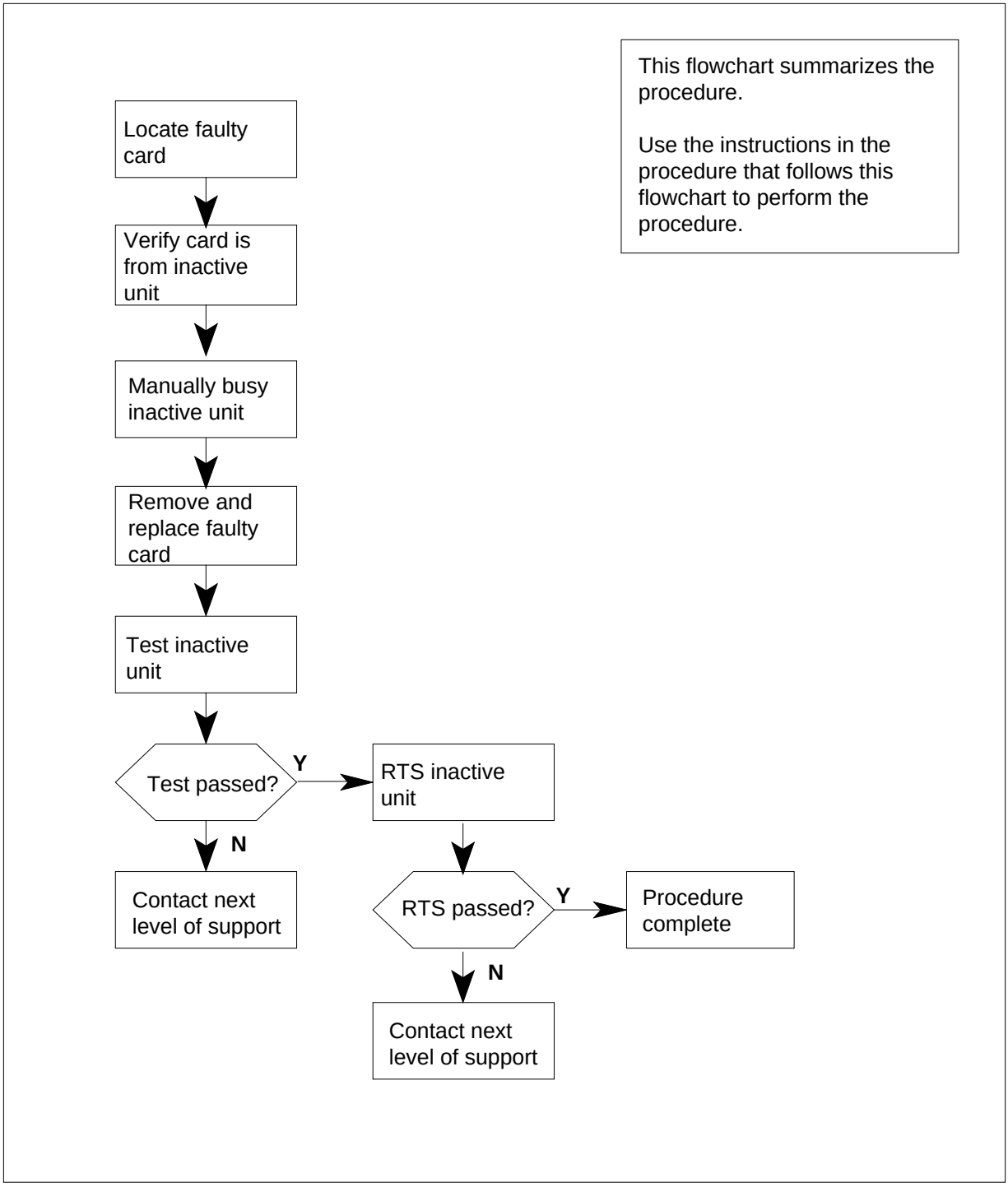
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the procedure that follows the flowchart.

NTMX87 in an RSC RCC2 (continued)

Summary of card replacement procedure for an NTMX87 card in RSC RCC2



NTMX87 in an RSC RCC2 (continued)

Replacing an NTMX87 card in RSC RCC2

At your Current Location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2

CAUTION
Several configurations of the NTMX87 carrier card are detailed in this procedure.
Be sure you are using the steps for the configuration of your RCC2, such as a single or dual RCC2 (DRCC2), main or extension shelf, or links versus carrier trunks.

CAUTION
Loss of service
When replacing a card in the RCC2, ensure that the unit in which you are replacing the card is *inactive* and that the mate unit is *active*.

Obtain an NTMX87 replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Ensure the PM level of the MAP display is currently displayed by typing

```
>MAPCI;MTC;PM;POST RCC2 rcc2_no
```

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 with the faulty card

Example of a MAP display:

NTMX87
in an RSC RCC2 (continued)

```
 CM     MS     IOD     Net     PM     CCS     LNS    Trks    Ext    Appl
  .      .       .      .    1RCC2    .       .       .       .      .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0        2        0        2         25
 2 Post_   RCC2    0        0        0        0        1          1
 3 ListSet
 4         RCC2   0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

4 Display and record the C-side link status of the posted RCC2 associated with the faulty NTMX87 carrier card by typing

>TRNSL C

and pressing the Enter key.

Example of a MAP response

```
LINK 0  LTC 0 0;CAP MS: STATUS SysB MSGCOND CLS RESTRICT
LINK 1  LTC 0 1;CAP  S: STATUS SysB
LINK 2  LTC 0 2;CAP MS: STATUS OK MSGCOND OPN UNRESTRICT
LINK 3  LTC 0 3;CAP  S: STATUS OK
LINK 4  LTC 0 4;CAP  S: STATUS SysB
LINK 5  LTC 0 5;CAP  S: STATUS SysB
```

5 Display and record the P-side link status of the posted RCC2 associated with the faulty NTMX87 carrier card by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response

```
LINK 1    Carrier of Class – Trunk      ;Status;OK
LINK 2    Carrier of Class – Trunk      ;Status;OK
LINK 3    Carrier of Class – Trunk      ;Status;OK
LINK 10   DCH 6; Status :OK
LINK 13   DCH 7; Status :OK
LINK 17   DCH 4; Status :OK
LINK 22   RMM 6           0;CAP MS;Status  OK MSGCOND OPN
LINK 24   LCME RSCS 00 0  0;CAP MS;Status OK MSGCOND OPN
LINK 25   LCME RSCS 00 0  1;CAP MS;Status OK MSGCOND OPN
LINK 26   LCME RSCS 00 0  2;CAP  S;Status OK
```

6 By observing the MAP display, be sure the card that is to be removed is in the inactive unit.

At the RSCE frame

7 Place a sign on the active unit bearing the words *Active unit—Do not touch.* This sign should not be attached by magnets or tape.

If faulty card is	Do
C-side of RCC2	step 8
P-side faulty	step 14

At the MAP terminal

8 Busy the inactive PM unit by typing

>bsy unit unit_no

and pressing the Enter key.

where

unit_no
is the number of the inactive RCC2 unit (unit 0 or 1)

9 Post the host PM by typing

>POST host_pm host_pm_no

and pressing the Enter key.

where

host_pm
is either a line group controller (LGC), a line group controller with ISDN (LGCI), a line trunk controller (LTC), or a line trunk controller with ISDN (LTCI)

host_pm_no
is the number of either an LGC, LGCI, LTC, or LTCI

Example of a MAP display:

NTMX87
in an RSC RCC2 (continued)

```
 CM     MS     IOD     Net     PM     CCS     Lns     Trks     Ext  Appl
  .      .      .       .    1RCC2     .       .       .        .    .

LTC               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        1        0        4        12
 2 Post_   LTC       0        0        2        0        2         9
 3 ListSet
 4         LTC   1 ISTb  Links_OOS:  CSide  0, PSide   1
 5 Trnsl_  Unit0:   Act InSv
 6 Tst_    Unit1:   Inact InSv
 7 Bsy_
 8 RTS_
 9 OffL
10 LoadPM_
11 Disp_
12 Next
13 SwAct
14 QueryPM
15
16
17 Perform
18
```

10 Display the host peripherals P-side links associated with the RCC2 by typing

>TRNSL P

and pressing the Enter key.

Example of a MAP response

```
LINK 0 RCC2 0  0;CAP MS:STATUS SysB MSGCOND CLS RESTRICT
LINK 1 RCC2 0  1;CAP      S:STATUS SBsy
LINK 2 RCC2 0  2;CAP MS:STATUS OK MSGCOND OPN UNRESTRICT
LINK 3 RCC2 0  3;CAP      S:STATUS OK
LINK 4 RCC2 0  4;CAP      S:STATUS SysB
LINK 5 RCC2 0  5;CAP      S:STATUS Sysb
```

11 Manually busy the links connected to the faulty NTMX87 card by typing

>BSY LINK link_no

and pressing the Enter key.

where

link_no
is the number of the link associated with the faulty NTMX87 card

Note 1: All provisioned links in the slot must be busied.

Note 2: Reference the chart in step 12 for the RCC2 C-side link-to-slot assignments.

NTMX87 in an RSC RCC2 (continued)

At the RCE frame

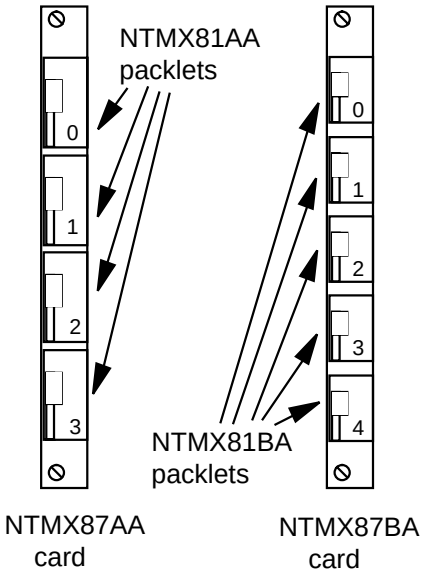
12 Use the following charts to determine which NTMX87 card is to be removed by matching the provisioned link number with the slot number and the packlet number to the left of each respective table.

Main shelf

C-side

	Slot 9	Slot 19
0	0 1	2 3
1	4 5	6 7
2	8 9	10 11
3	12 13	14 15
4	16 17	18 19

NTMX81 packlet slot number in the NTMX87 card located in the specified card slots.



13

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Remove the NTMX81 packlet as described in the following steps:

a Locate the NTMX81 packlet to be removed on the appropriate NTMX87 carrier card slot.

b Open the locking lever on the NTMX81 packlet and gently pull the packlet toward you until it clears the shelf.

c Ensure the NTMX81 packlets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 carrier card.

NTMX87 in an RSC RCC2 (continued)

d Go to step 30.

At the MAP terminal

14 Determine if the RCC2 is in a single or dual configuration by typing

>POST RCC2 rcc2_no ;IRLINK

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the faulty NTMX87 card

Note: If the posted RCC2 is in a single RCC2 configuration, the system will respnd with the following message:
NO IRLINKS DATAFILLED, IRLINK LEVEL CANNOT BE ENTERED.

If the RCC2 is in a	Do
single configuration	step 15
dual configuration	step 28

15 Determine if P-side ports are links or carrier trunks by observing the information obtained in step 5.

If P-side port is	Do
links	step 16
trunks	step 18

16 Manually busy all provisioned links connected to the faulty NTMX87 circuit card by typing

>bsy *link* link_no

and pressing the Enter key.

where

link_no
is the number of the link associated with the faulty NTMX87 circuit card

Note 1: Each NTMX81 card has two links, and each link must be manually busied. Possible link pairs are 0 and 1, 2 and 3, 4 and 5, 6 and 7. This pair relationship continues throughout all 54 P-side links.

Note 2: Reference the charts in steps 24 and 26 for P-side link-to-slot assignments. All provisioned links in the slot must be busied.

NTMX87
in an RSC RCC2 (continued)

17 Determine if the faulty NTMX87 circuit card is on the main or extension shelf. P-side ports 0 to 23, and 48 to 54 are on the main shelf. Ports 24 to 47 are on the extension shelf.

If the faulty NTMX87 is on the	Do
main shelf	step 24
extension shelf	step 26

18 Access the TRKS;TTP MAP display level, and busy the trunks assigned to the P-side carriers associated with the faulty NTMX87 by typing

`>TRKS;TTP;POST D RCC2 rcc2_no carrier_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the faulty NTMX87

carrier_no
is the number of the P-side carrier assigned

Example of a MAP response

```
LAST CIRCUIT = 27
POST CKT IDLED
SHORT CLLI IS:  1125
OK, CLLI POSTED

POST  18   DELQ       BUSY Q          DIG
TTP 6–006
CKT TYPE   PM NO.     COM LANG        STA S R DOT TE R
OG    RCC2   0 1      WADEOUT796 11    LO
```

19 Busy the trunks associated with the faulty NTMX87 circuit card by typing

`>BSY ALL`

and pressing the Enter key.

Note 1: Wait for the busy queue to clear.

Note 2: To busy other carriers associated with the faulty NTMX87 circuit card, reference the link-to-slot assignment charts in steps 24 and 26.

20 Installation busy all the trunks to prevent carrier alarms by typing

`>BSY INB ALL`

and pressing the Enter key.

21 Access the CARRIER level and post the P-side carriers associated with the faulty NTMX87 circuit card by typing

`>CARRIER;POST RCC2 rcc2_no carrier_no`

and pressing the Enter key.

NTMX87
in an RSC RCC2 (continued)

where

rcc2_no
is the number of the RCC2 associated with the faulty NTMX87

carrier_no
is the number of the P-side carrier assigned

Note: Perform this step for each carrier span in the faulty NTMX87 circuit card.

22 Busy and offline the P-side carriers associated with the faulty NTMX87 circuit card by typing

```
>BSY carrier_no ;OFFL carrier_no
```

and pressing the Enter key.

where

carrier_no
is the number of the P-side carrier assigned

Note: Perform this step for each carrier span in the faulty NTMX87 circuit card.

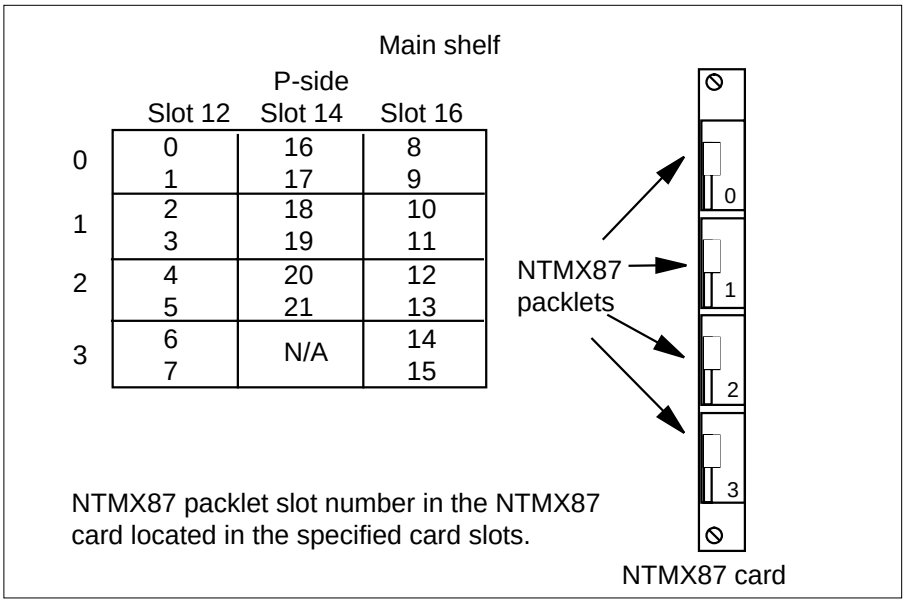
23 Determine if the faulty NTMX87 circuit card is on the main or extension shelf. P-side ports 0 to 23, and 48 to 54 are on the main shelf. Ports 24 to 47 are on the extension shelf.

If the faulty NTMX87 is on the	Do
main shelf	step 24
extension shelf	step 26

At the RSCE frame

24 Use the following figure to determine slot assignments on the P-side of the main shelf.

NTMX87 in an RSC RCC2 (continued)



25

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Remove the NTMX81 packlet as described in the following steps:

a Locate the NTMX81 packlet to be removed on the appropriate NTMX87 carrier card slot.

b Open the locking lever on the NTMX81 packlet and gently pull the packlet toward you until it clears the shelf.

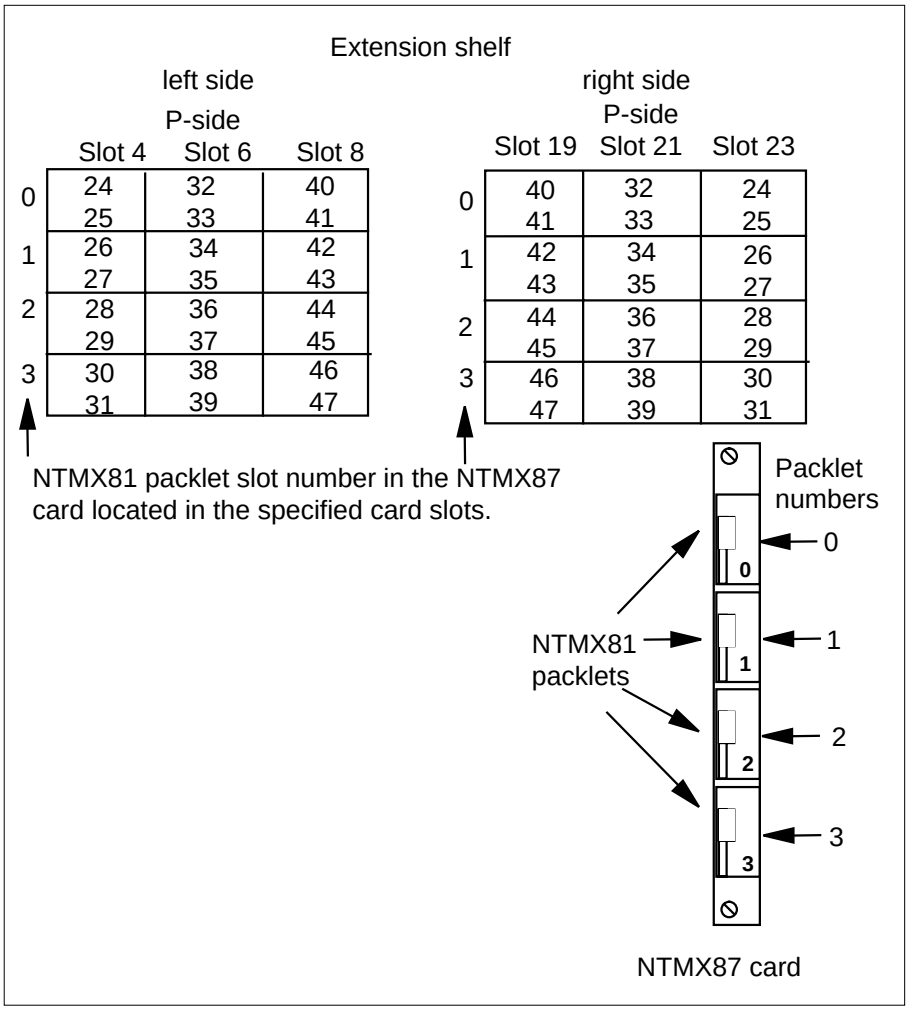
c Ensure the NTMX81 packlets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 carrier card.

d Go to step 30.

At the RSCE frame

26 Determine which side of the extension shelf the faulty NTMX87 circuit card is located by referencing field SIDE of table RCCINV.

NTMX87
in an RSC RCC2 (continued)



27

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCC2. This protects the equipment against damage caused by static electricity.

Remove the NTMX81 packlet as described in the following steps:

a Locate the NTMX81 packlet to be removed on the appropriate NTMX87 carrier card slot.

b Open the locking lever on the NTMX81 packlet and gently pull the packlet toward you until it clears the shelf.

c Ensure the NTMX81 packlets are stored in an electrostatic discharge (ESD) container for protection of the circuit card until it is reinstalled in the NTMX87 carrier card.

d Go to step 30.

28 Translate the dual RCC2s IRLINKS by typing

>TRNSL

and pressing the Enter key.

Example of a MAP response

```
CM     MS     IOD     Net     PM    CCS     LNS    Trks     Ext   Appl
 .      .       .       .    1RCC2    .       .       .       .     .

IRLINK            SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      0        0         2        0        2         25
 2         RCC2    0        0         0        0        1          1
 3
 4         RCC2   0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST_    Unit1:   Act InSv
 7 BSY_
 8 RTS_
 9
10            IR    From       To            CAP    STATE    MSGCOND
11             0   RCC2 0, 0  RCC2 1, 0      MS        OK        OPN
12             1   RCC2 0, 8  Rcc2 1, 8      MS        OK        OPN
13             2   RCC2 0, 12 RCC2 1, 12      S        OK
14 QueryIR     3   RCC2 0, 13 RCC2 1, 13      S        OK
15
16
17
18
```

29 Busy IRLINKS in the faulty NTMX87 circuit card by typing

>BSY irlink_no

and pressing the Enter key.

where

irlink_no
is the number of the irlink that must be busied

Note 1: This step must be performed for each provisioned link in the slot position.

Note 2: For link-to-slot assignments, reference step 24 for the main shelf, and step 26 for the extension shelf.

NTMX87 in an RSC RCC2 (continued)

At the RSCE frame

30

DANGER
Static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP) of the RCC2. This protects the equipment against damage caused by static electricity.

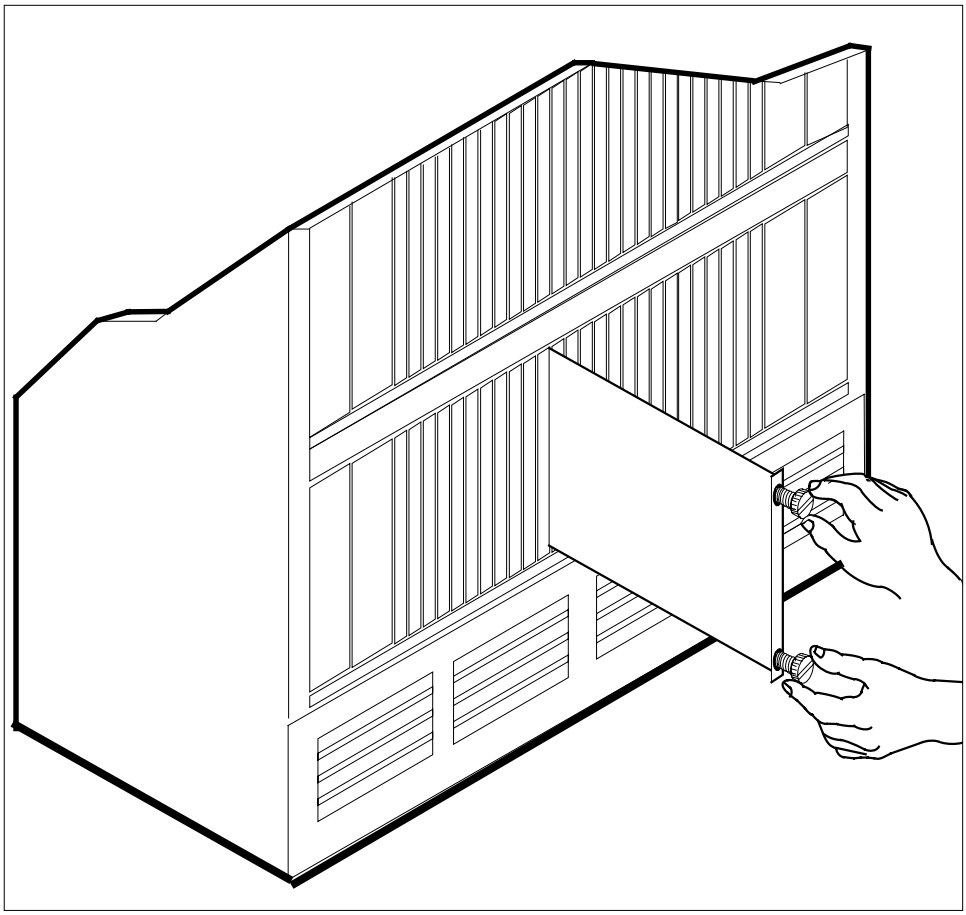
DANGER
Equipment damage
Take the following precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

31 Using the T9908 wrist grounding strap and a T1324 screwdriver, remove the NTMX87 carrier circuit card. Insert the new carrier card and secure.

NTMX87
in an RSC RCC2 (continued)



32 Replace the NTMX81 packlets previously removed. Align the packlet with the slots in the shelf and gently slide the packlet into the circuit card slot in the NTMX87 circuit card.

33 Seat and lock the packlet.

a Using your fingers or thumbs, push on the upper and lower edges of the faceplate of the packlet to ensure that the packlet is fully seated in the slot.

b Close the locking lever.

34 Use the following information to determine what step to go to next in this procedure.

If you entered this procedure from	Do
alarm clearing procedures	step 51
other	step 35

NTMX87
in an RSC RCC2 (continued)

35 Use the following information to determine what step to go to next in this procedure.

If you entered this section of the procedure from	Do
step 13 for a single RCC2 with C-side links affected	step 36
step 25 or 27 for an RCC2 with P-side trunks affected	step 44
step 25 or 27, for a single RCC2 with P-side links affected	step 40
step 29 for a DRCC2 with irlinks affected	step 42

At the MAP terminal

36 Test the busied network links from step 11 by typing

`>TST LINK link_no`

`and pressing the Enter key.`

where

link_no
is the number of the link associated with the new NTMX87 carrier card

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other links associated with the RCC2, execute this step for each link until all links are tested.

If TST	Do
passed	step 37
failed	step 52

37 Return to service the P-side links by typing

`>RTS LINK link_no`

and pressing the Enter key.

where

link_no
is the number of the link manually busied in step 11

Note 1: This step must be performed for each link that is manually busied.

NTMX87 in an RSC RCC2 (continued)

Note 2: To RTS the other links associated with the RCC2, execute the procedures in this step for each link until all links are returned to service.

If RTS	Do
passed	step 38
failed	step 52

38 Post the inactive RCC2 in which the NTMX87 card is located by typing

`>POST RCC2 rcc2_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the faulty card

39 Return the inactive RCC2 unit to service by typing

`>RTS UNIT` **`unit_no`**

and pressing the Enter key.

where

unit_no
is the number of the RCC2 unit posted in step 38

If RTS	Do
passes	step 49
fails	step 52

At the MAP terminal

40 Test the busied links from step 16 by typing

`>TST LINK link_no`

and pressing the Enter key.

where

link_no
is the number of the link associated with the new NTMX87 carrier card

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other links associated with the RCC2, execute this step for each link until all links are tested.

If TST	Do
passed	step 41
failed	step 52

NTMX87
in an RSC RCC2 (continued)

41 Return to service the P-side links by typing

`>RTS LINK link_no`

and pressing the Enter key.

where

link_no
is the number of the link manually busied in step 11

Note 1: This step must be performed for each link that is manually busied.

Note 2: To RTS the other links associated with the RCC2, execute the procedures in this step for each link until all links are returned to service.

If RTS	Do
passed	step 49
failed	step 52

At the MAP terminal

42 Test the IRLINKS by typing

`>TST irlink_no`

`and pressing the Enter key.`

where

irlink_no
is the number of the link busied in step 29

Note 1: This step must be performed for each manually busied link.

Note 2: To test the other irlinks associated with the RCC2, execute this step for each irlink until all links are tested.

If TST	Do
passed	step 43
failed	step 52

43 Return to service the IRLINKS by typing

`>RTS irlink_no`

and pressing the Enter key.

where

irlink_no
is the number of the link manually busied in step 29

Note 1: This step must be performed for each irlink that is manually busied.

NTMX87 in an RSC RCC2 (continued)

Note 2: To RTS the other links associated with the RCC2, execute this step for each link until all links are returned to service.

If RTS	Do
passed	step 49
failed	step 52

At the MAP terminal

44 Busy and return to service P-side carriers that were offlined in step 22 by typing

`>BSY carrier_no; RTS carrier_no`

and pressing the Enter key.

where

carrier_no
is the number of the P-side carrier assigned

If carrier RTS	Do
passed	step 45
failed	step 52

45 Access the TTP MAP level to post the P-side links associated with the new NTMX87 circuit card by typing

`>TTP;POST D RCC2 rcc2_no carrier_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 associated with the new NTMX87 circuit card

carrier_no
is the number of the P-side link trunks are assigned

Example of a MAP response

```
LAST CIRCUIT = 27
POST CKT IDLED
SHORT CLLI IS:  1125
OK, CLLI POSTED

POST  18   DELQ       BUSY Q          DIG
TTP 6-006
CKT TYPE   PM NO.     COM LANG        STA S R DOT TE R
OG    RCC2   0 1      WADEOUT796 11    INB
```

NTMX87 in an RSC RCC2 (end)

46 Busy the trunks associated with the new NTMX87 circuit card by typing

>BSY ALL

and pressing the Enter key.

Note 1: Wait for the busy queue to clear.

Note 2: Busy the other carriers associated with the faulty NTMX87 circuit card. Reference the link-to-slot assignment charts in steps 24 and 26 .

47 Test the trunks associated with the new NTMX87 circuit card by typing

>TST;NEXT

and pressing the Enter key.

Note: Perform this step for each carrier span associated with the new NTMX87 circuit card.

If trunks TST	Do
passed	step 48
failed	step 52

48 Return-to-service trunks assigned to links on the new NTMX87 circuit card by typing

>RTS ALL

and pressing the Enter key.

If RTS	Do
passed	step 49
failed	step 52

49 Send any faulty cards for repair according to local procedure.

50 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 53.

51 Return to *Alarm Clearing Procedures* or the other procedure that directed you to this procedure. At the point where a faulty card list was produced, identify the next faulty card on the list and go to the appropriate card replacement procedure for that card in this manual.

52 Obtain further assistance in replacing this card by contacting the personnel responsible for higher level support.

53 You have successfully completed this procedure. Remove the sign from the active unit and return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX41 in an RSC MSP

Application

Use this procedure to replace an NTRX41 card in a modular supervisory panel (MSP) located in a:

- cabinetized extension module (CEXT)
- cabinetized line concentrating equipment (CLCE)
- cabinetized line module ISDN (CLMI)
- cabinetized power distribution center (CPDC)
- cabinetized remote switching center (CRSC)
- cabinetized miscellaneous equipment (CMIS)
- cabinetized remote miscellaneous equipment (CRME)

PEC	Suffixes	Name
NTRX41	AA, BA, CA	Alarm Module

Common procedures

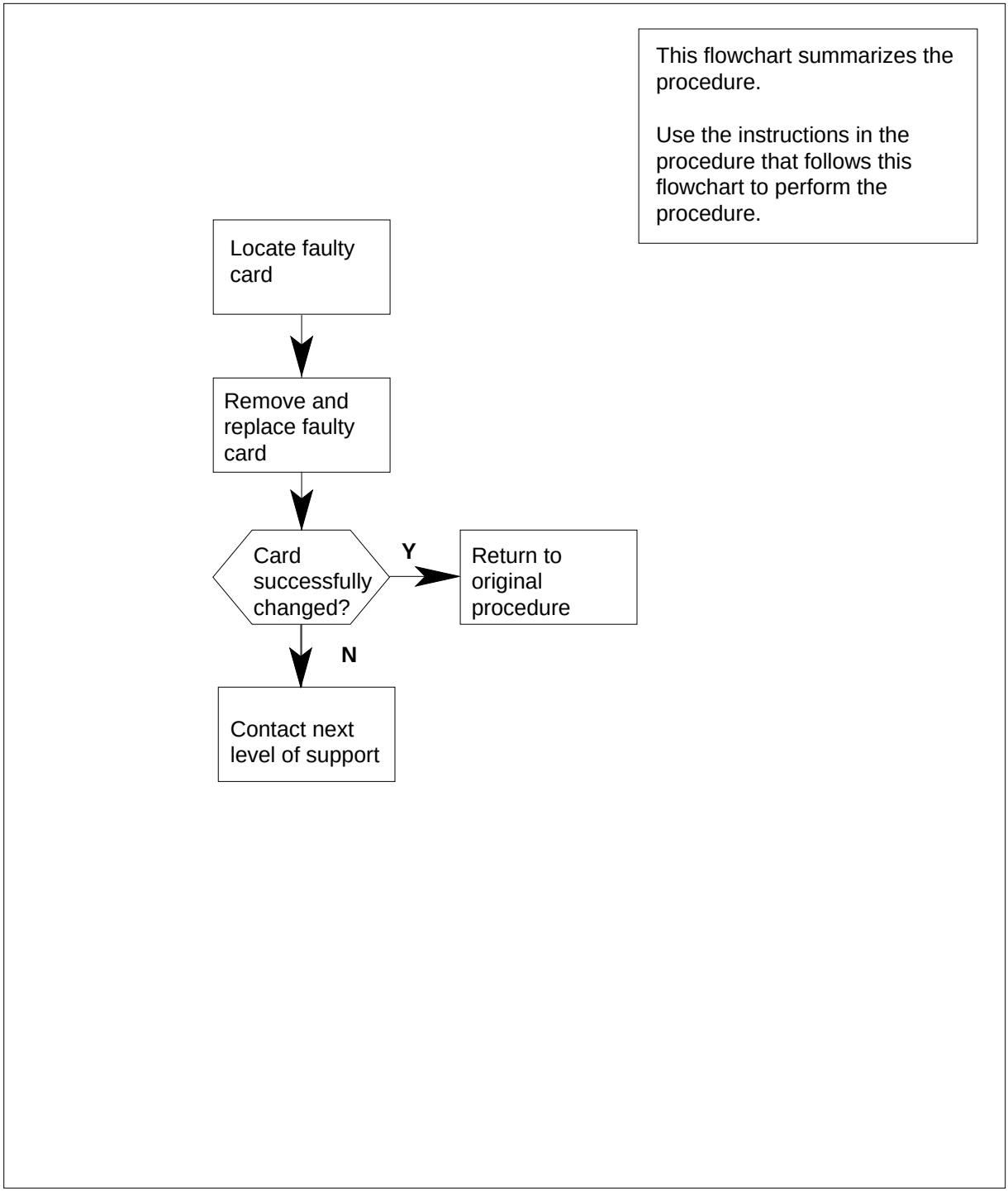
None

Action

The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTRX41 in an RSC MSP (continued)

Summary of card replacement procedure for an NTRX41 card in RSC MSP



NTRX41 in an RSC MSP (continued)

Replacing an NTRX41 card in RSCE MSP

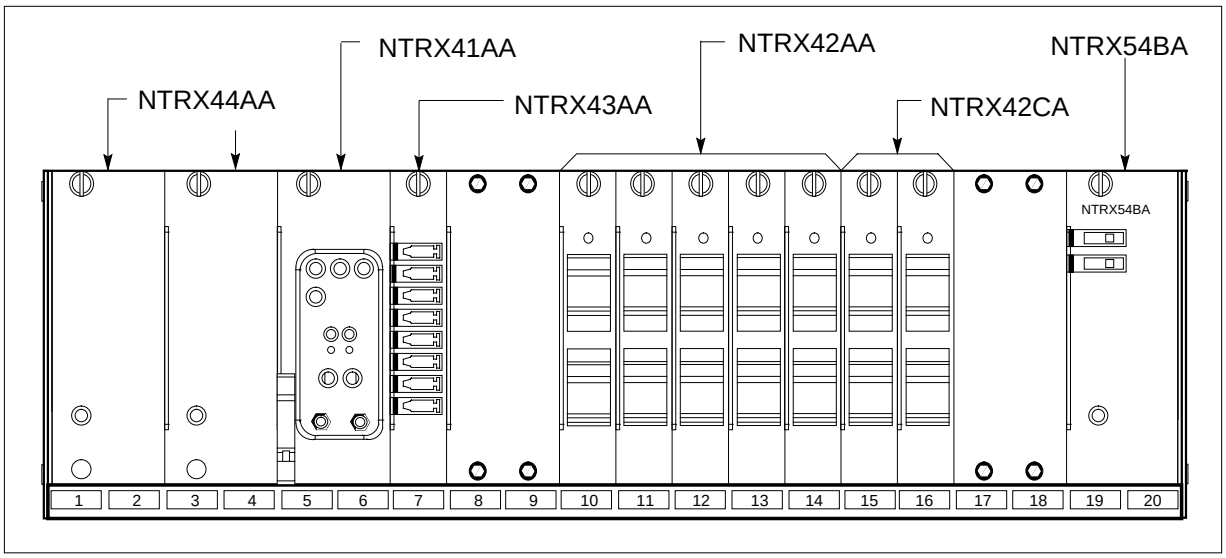
At your current location

1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an RSCE or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



4

DANGER
Risk of injury from high energy levels, static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

NTRX41 in an RSC MSP (continued)

DANGER
Risk of injury from high energy levels, equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

5 Remove the NTRX41 circuit card as shown in the following figure.

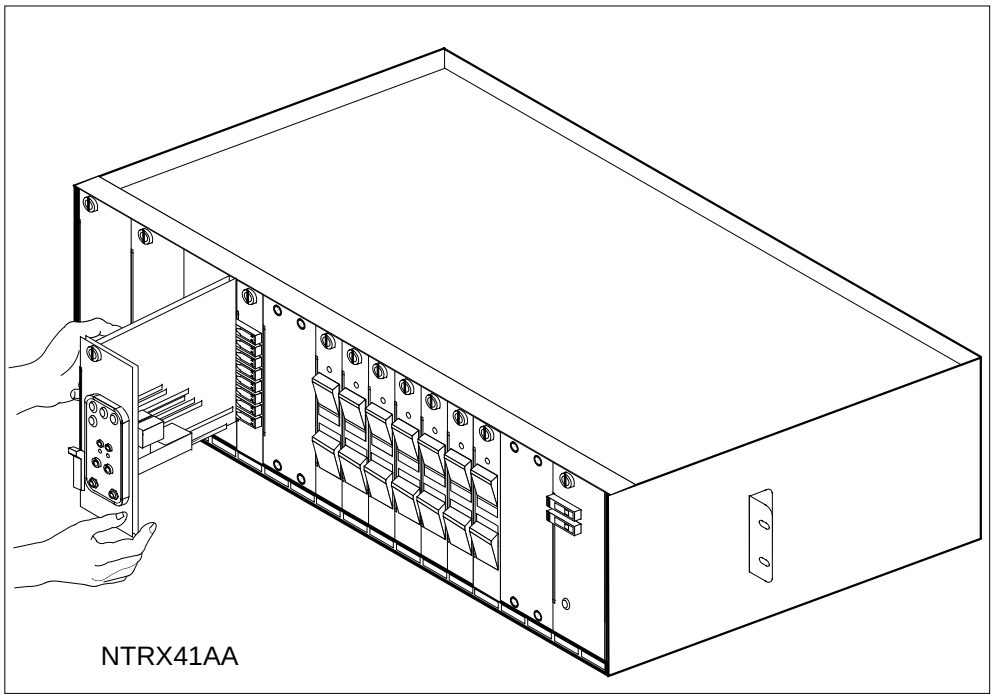
a Open the front doors of the cabinet and locate the circuit card, it will be in slots 05 and 06.

b At the front of the MSP, disengage the knurled thumbscrew at the top of the circuit card.

c Pull out the lever on the upper left side of the alarm module.

d Gently pull the circuit card toward you until it clears the shelf.

6 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.



NTRX41AA

a Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.

b Gently but firmly seat the circuit card.

c Push in lever on the upper left side of alarm module.

NTRX41 in an RSC MSP (end)

d Tighten the knurled thumbscrew at the top of the circuit card.

If alarm lights	Do
remain off	step 7
light up	step 9

7 Send any faulty cards for repair according to local procedure.

8 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 10.

9 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

10 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX42 in an RSC MSP

Application

Use this procedure to replace an NTRX42 card in a modular supervisory panel (MSP) in the following cabinets.

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX42	AA, CA	Circuit Breaker Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.) and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (0.090 in.) thick and 17 mm (0.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

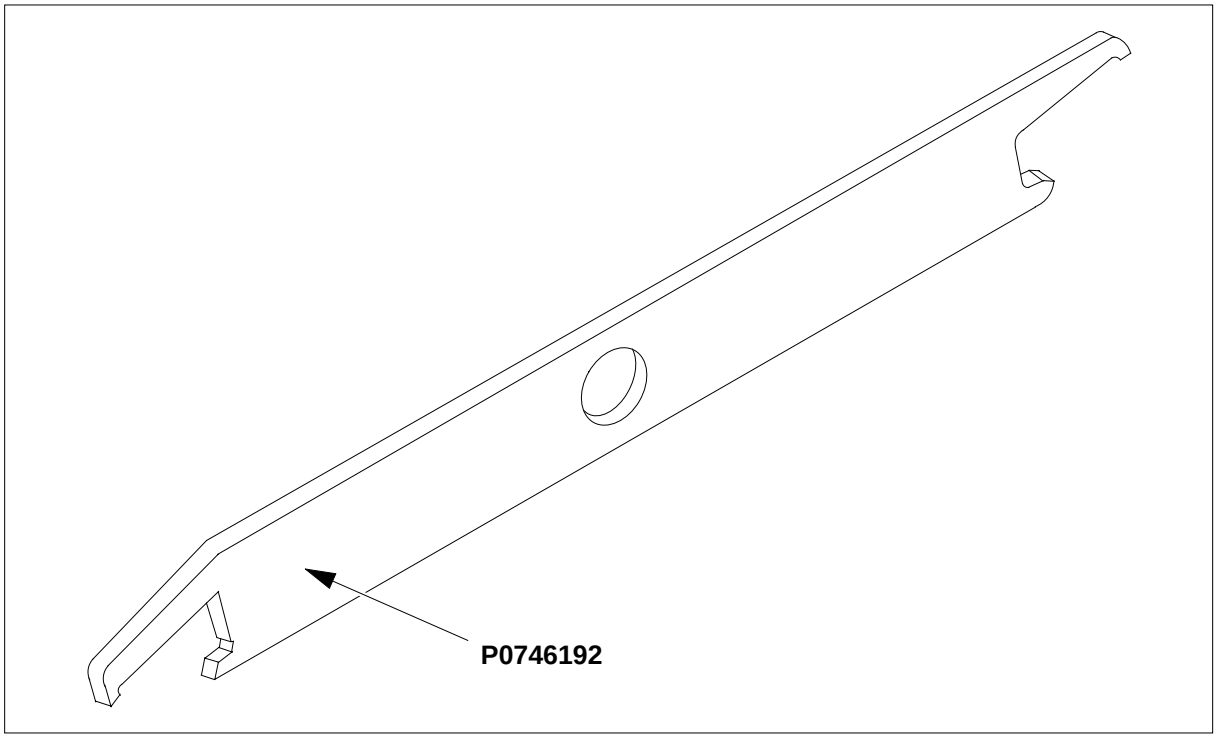
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw away from the connector. The tool is disengaged

NTRX42
in an RSC MSP (continued)

from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

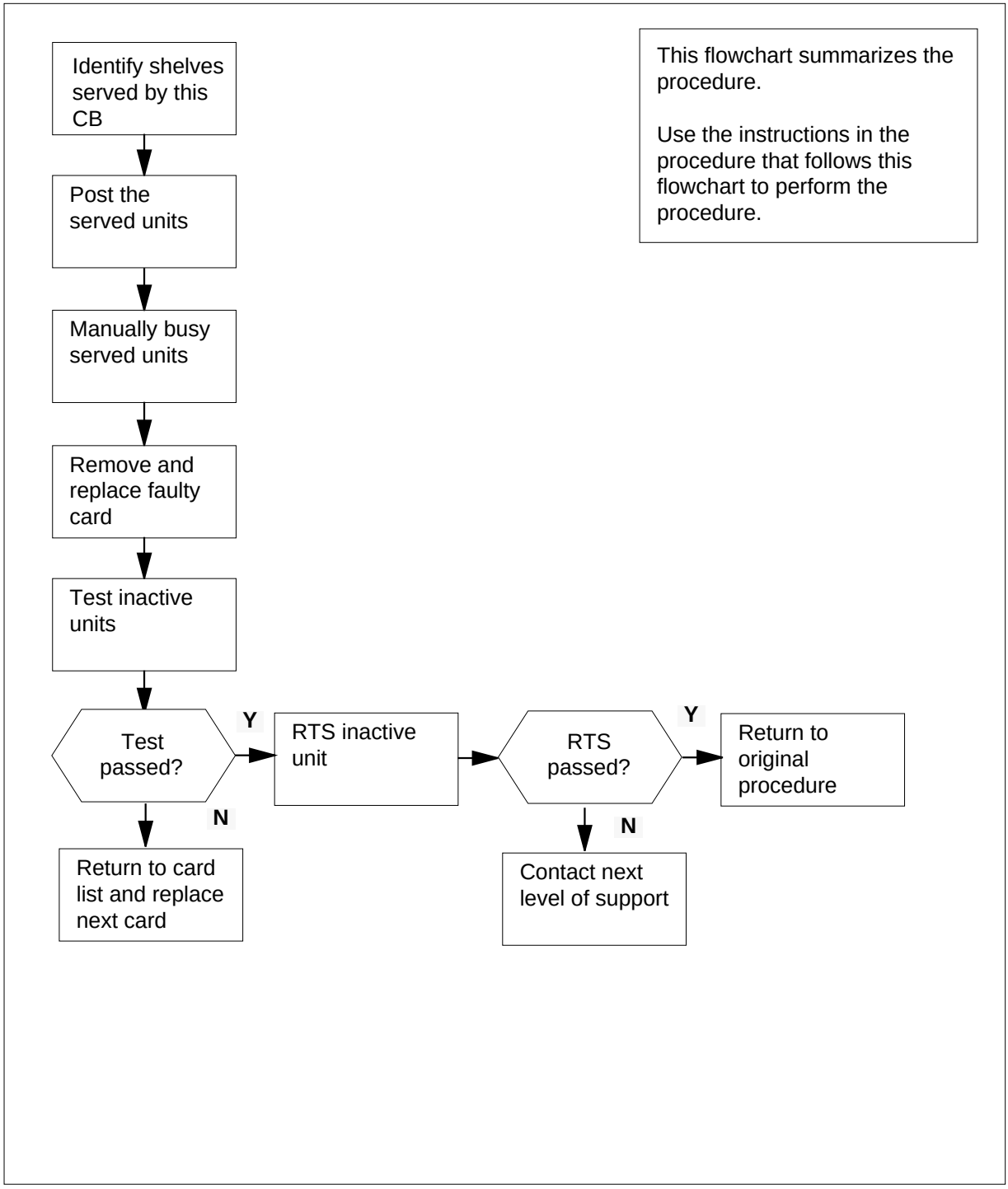
Connector removal tool



The following flowchart is a summary of this procedure. Use the instructions in the procedure that follows the flowchart to perform the procedure. The detailed procedure depends on which circuit cards are served by the breaker module circuit card (NTRX42). You will be directed to the appropriate steps depending on your configuration.

NTRX42
in an RSC MSP (continued)

Summary of card replacement procedure for an NTRX42 card in an RSC-S MSP



NTRX42
in an RSC MSP (continued)

Replacing an NTRX42 card in RSCE MSP

At your current location

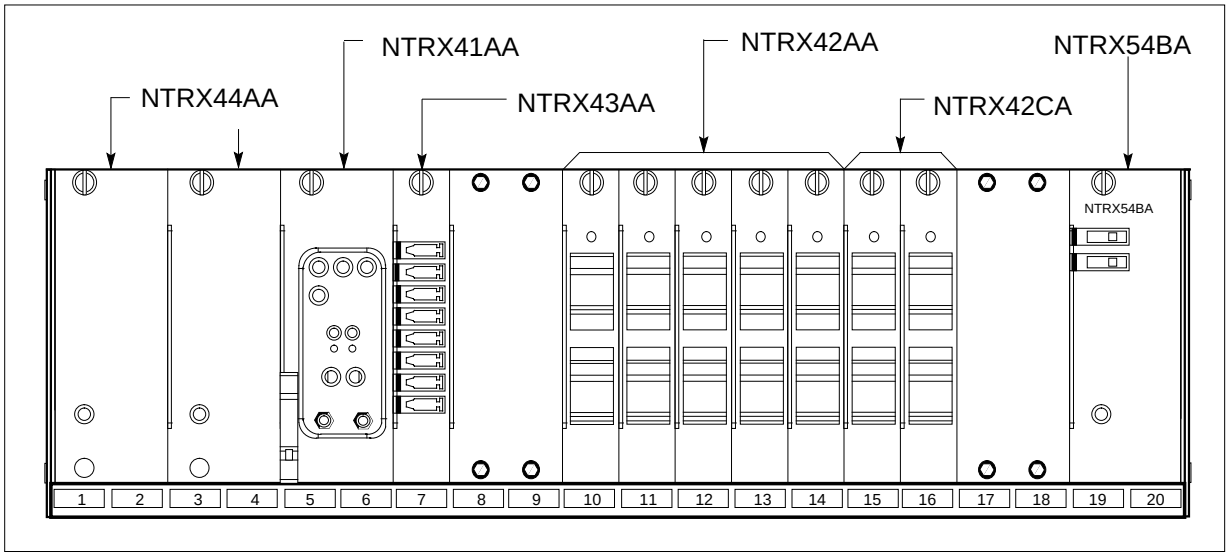
1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.

MSP



4 Use the breaker designation label to identify which cards are serviced by each circuit breaker (CB). For example, the label CB01-47-01 identifies circuit breaker 01 as controlling circuit card position 01 on shelf 47. Many RX42 modules service two separate devices (or units); both units must be powered down prior to removal of the associated RX42 circuit card.

5 Use the following table to determine which step to do next.

If the CB powers the	Do
RMM shelf containing 2X09 or 2X06 cards	step 6

NTRX42
in an RSC MSP (continued)

If the CB powers the	Do
RCC2 shelf containing MX72 card	step 9
LCME shelf containing 6X30, 6X53, or BX72 cards	step 15

6 Set the MAP display to the PM level and post the RMM by typing

>MAPCI;MTC;PM;POST RMM **rmm_no**

and pressing the Enter key.

where

rmm_no
is the number of the RMM unit from which the card is to be removed

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext      Appl
 .     .      .      .      .     .      .      .        .        .
RMM              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      4        0        10       3        3        130
 2 Post_   RMM     0        1         1       0        0          2
 3
 4         RMM  5  INSV
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

7 Busy the RMM by typing

>BSY

and pressing the Enter key.

Example of a MAP display:

NTRX42
in an RSC MSP (continued)

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext      Appl
 .     .      .      .   1ManB    .      .       .       .        .
RMM              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM      4        0        10       0        0        130
 2 Post_   RMM     0        1         0       0        0          0
 3
 4         RMM  5  ManB
 5 Trnsl
 6 Tst
 7 Bsy
 8 RTS
 9 OffL
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

At the RMM shelf

8 Power down the unit by setting the ON/OFF switch on the power converter faceplate to the OFF position. Both the converter FAIL LED and FRAME FAIL lamp on the MSP will be ON. An audible alarm may sound. If an alarm does sound, silence it by typing

`>SIL`

and pressing the Enter key.

Go to step 28.

9 Access the PM level and post the RCC2 by typing

`>MAPCI;MTC;PM;POST rcc2_no`

and pressing the Enter key.

where

rcc2_no
is the number of the RCC2 unit that will be busied

Example of a MAP display:

NTRX42
in an RSC MSP (continued)

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext      Appl
 .     .      .      .    1RCC2    .      .      .        .        .

RCC2              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        0        0        2        0        2        25
 2 Post_   RCC2      0        0        0        0        1         1
 3 ListSet
 4         RCC2    0 ISTb  Links_OOS:  CSide  1, PSide   1
 5 TRNSL   Unit0:   Inact InSv
 6 TST     Unit1:   Act InSv
 7 BSY
 8 RTS
 9 OffL
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

10 The NTRX42 you are replacing should be controlling the inactive side of the RCC2.

If NTRX42 card is on the	Do
active unit	step 11
inactive unit	step 13

11

CAUTION
Loss of service
All calls being handled by this PM could be lost, including data calls. Perform the next step during a period of low traffic only.

Switch the processing activity (SWACT) to the inactive unit by typing

>SWACT

and pressing the Enter key.

12 Confirm the system prompt by typing

>YES

and pressing the Enter key.

NTRX42 in an RSC MSP (continued)

After both units are in-service, proceed to the next step.

At the RCSE frame

13 Place a sign on the active unit bearing the words *Active unit—Do not touch*. This sign should not be attached by magnets or tape.

At the MAP terminal

14 Busy the inactive PM unit by typing

```
> bsy unit unit_no
```

where

unit_no
is the number of the inactive RCC2 unit that will be busied

Go to step 28.

15 Use the following information to determine where to proceed.

If top circuit breaker of NTRX42 powers	Do
NT6X53 or NTBX72	step 17
NT6X30	step 21

16 Use the following information to determine where to proceed.

If bottom circuit breaker of NTX42 powers	Do
NT6X53 or NTBX72	step 17
NT6X30	step 21

17 Set the MAP display to the PM level and post the LCME powered by the circuit breaker by typing

```
>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_no
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

lcme_frame_no
is the number of the frame in which the LCME is located

lcme_no
is the number of LCME the circuit breaker supplies power to

Example of a MAP display:

NTRX42
in an RSC MSP (continued)

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext     Appl
 .      .       .       .       .      .       .       .         .
lcme              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM        4        0       10        3        3       130
 2 Post_   LCME      1        0        5        0        1         9
 3
 4 Swrg_     LCME    RemL  00 0 ISTb  Links_OOS:  CSide 1
 5 Trnsl_    Unit-0:  InSv                      /RG:  0
 6 Tst_      Unit-1:  InSv                      /RG:  0
 7 Bsy_                                 11 11 11            RG:Pref:0 InSv
 8 RTS_      Drwr: 01 23 45 67 89 01 23 45                     Stby:1 InSv
 9 OffL_           .. .. .. .. .. .. .. ..
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

18 Busy the LCME unit powered by the circuit breaker by typing

>BSY UNIT **lcme_unit_no**

and pressing the Enter key.

where

lcme_unit_no
is the unit number of the LCME to which the circuit breaker supplies power

Example of a MAP display:

NTRX42
in an RSC MSP (continued)

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext     Appl
 .     .      .      .    1LCME   .      .      .        .       .
LCME             SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        1       10        3        3       130
 2 Post_   LCME      1        1        5        0        1         9
 3
 4 SwRg       LCME    RemL  OO O ISTb   Links_OOS:  CSide 1
 5 Trnsl      Unit-0:  InSv  Mtce TakeOver  /RG:  0
 6 Tst        Unit-1:  ManB Mtce            /RG:  0
 7 Bsy                              11 11 11      RG:Pref:0 InSv
 8 RTS        Drwr: 01 23 45 67 89 01 23 45         Stby:1 InSv
 9 OffL             .. .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

19 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

20 Use the following information to determine where to proceed.

If	Do
circuits associated with bottom circuit breaker of NTRX42 have not been busied or otherwise addressed	step 16
circuits associated with both circuit breakers of NTRX42 have been busied or otherwise addressed	step 28

21 Set the MAP display to the PM level and post the LCME in the same frame as the circuit breaker by typing

>MAPCI;MTC;PM;POST lcme **site lcme_frame_no lcme_no**

and pressing the Enter key.

where

NTRX42
in an RSC MSP (continued)

site
is the name of the site at which the LCME is located

lcme_frame_no
is the number of the frame in which the LCME is located

lcme_no
is the number of the LCME in the same frame as the circuit breaker

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext      Appl
  .     .      .      .      .     .      .      .        .        .
LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        0       10       3        3        130
 2 Post_   LCME     1        0        5       0        1          9
 3
 4 Swrg_     LCME    RemL  00 0 ISTb  Links_OOS:  CSide 1
 5 Trnsl_    Unit-0:  InSv                      /RG:  0
 6 Tst_      Unit-1:  InSv                      /RG:  0
 7 Bsy_                              11 11 11            RG:Pref:0 InSv
 8 RTS_      Drwr: 01 23 45 67 89 01 23 45               Stby:1 InSv
 9 OffL_           .. .. .. .. .. .. .. ..
10 LoadPM_
11 Disp_
12 Next_
13
14 QueryPM
15
16
17
18
```

22 Busy the LCME unit associated with the ringing generator by typing

>BSY UNIT **lcme_unit_no**

and pressing the Enter key.

where

lcme_unit_no
is zero when the circuit breaker powers ringing generator zero, and is one when the circuit breaker powers ringing generator one

Example of a MAP display:

```
 CM    MS    IOD    Net    PM    CCS    LNS    Trks     Ext     Appl
 .     .      .      .    1LCME    .      .      .        .       .
LCME              SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit    PM       4        1       10        3        3       130
 2 Post_   LCME      1        1        5        0        1         9
 3
 4 SwRg       LCME    RemL  OO O ISTb   Links_OOS:  CSide 1
 5 Trnsl      Unit-0:  InSv  Mtce TakeOver  /RG:  0
 6 Tst        Unit-1:  ManB Mtce            /RG:  0
 7 Bsy                            11 11 11      RG:Pref:0 InSv
 8 RTS        Drwr: 01 23 45 67 89 01 23 45         Stby:1 InSv
 9 OffL             .. .. .. .. .. .. .. ..
10 LoadPM
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

23 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

24 If there is a second LCME in the same frame as the circuit breaker, post the other LCME by typing

>MAPCI;MTC;PM;POST lcme **site lcme_frame_no lcme_unit_no**

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

lcme_frame_no
is the number of the frame in which the LCME is located

lcme_unit_no
is the number of the LCME in the same frame as the circuit breaker

25 Busy the LCME unit associated with the ringing generator by typing

>BSY UNIT **lcme_unit_no**

and pressing the Enter key.

where

lcme_unit_no
is zero when the circuit breaker powers ringing generator zero, and is one when the circuit breaker powers ringing generator one

NTRX42
in an RSC MSP (continued)

26 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

27 Use the following information to determine where to proceed.

If	Do
circuits associated with bottom circuit breaker of NTRX42 have not been busied or otherwise addressed	step 16
circuits associated with both circuit breakers of NTRX42 have been busied or otherwise addressed	step 28

At the front panel of the cabinet

28 Verify and switch off the associated power converter.

Note: This step does not apply to the CPDC and CRME.

29 Determine the faulty circuit breaker on the MSP and switch both breakers on that circuit card to the OFF position. Safety tag the front of the circuit breaker.

30 An alarm may sound. If this occurs, silence the alarm by typing

>SIL

and pressing the Enter key.

31 Power down and safety tag the ABS fuse in the power room.

32 Pull out the corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP.

Note: This step does not apply to the CMIS, CPDC, and CRME.

NTRX42
in an RSC MSP (continued)

At the rear panel of the cabinet

33

DANGER
Risk of injury from high energy levels, static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

DANGER
Risk of injury from high energy levels, equipment damage
Take these precautions when removing or inserting a card:

1 Do not apply direct pressure to the components.

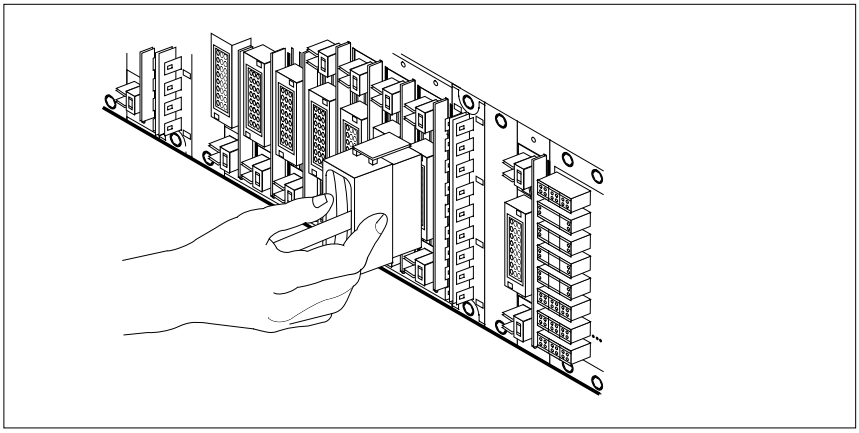
2. Do not force the cards into the slots.

3. Do not insert metallic objects into the black connectors. Voltage is present and equipment damage could result.

Put on a wrist strap.

34 Open the rear door and locate the NTRX42 circuit card. Verify the card location by checking the slot number stamped into the chassis.

a Note the wire color and the location to facilitate re-connection.



b Safety tag the front of the circuit breaker to indicate maintenance activity.

c Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect and tag the smaller black power connectors located below the larger blue power connector.

NTRX42
in an RSC MSP (continued)

Manually disconnect and tag the large blue power connector. Disconnect and tag the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.

d Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

35 Disconnect and tag any jumper connectors and cables that may be present and set them aside for use on the replacement unit.

At the front panel of the cabinet

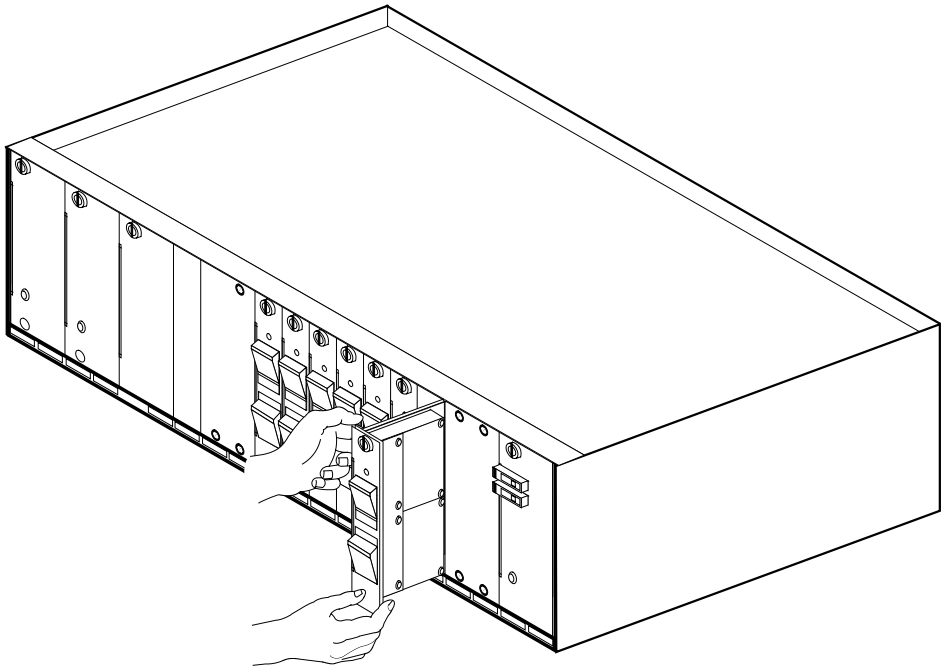
36 Remove the NTRX42 card.

a Disengage the spring-loaded captive screw at the top of the circuit card.

b Grasping the top and bottom of unit, gently pull the circuit card toward you until it clears the shelf.

c Replace the circuit card. Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card being replaced.

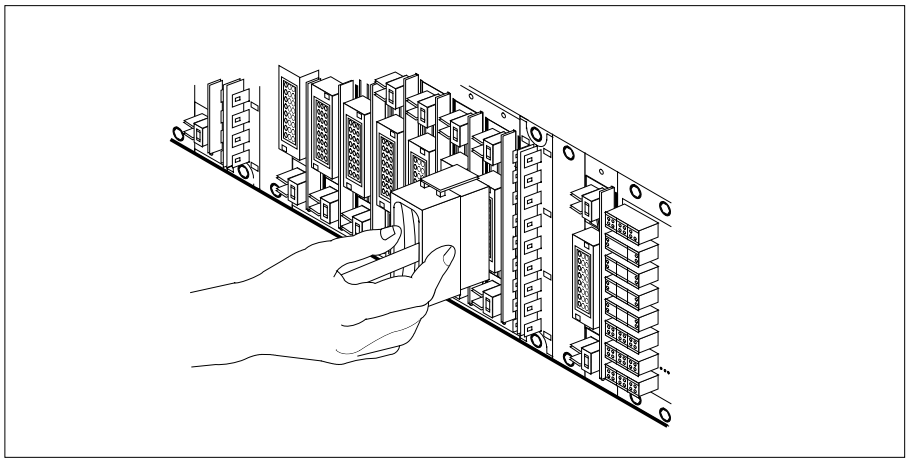
d Tighten the spring-loaded captive screw at the top of the circuit card.



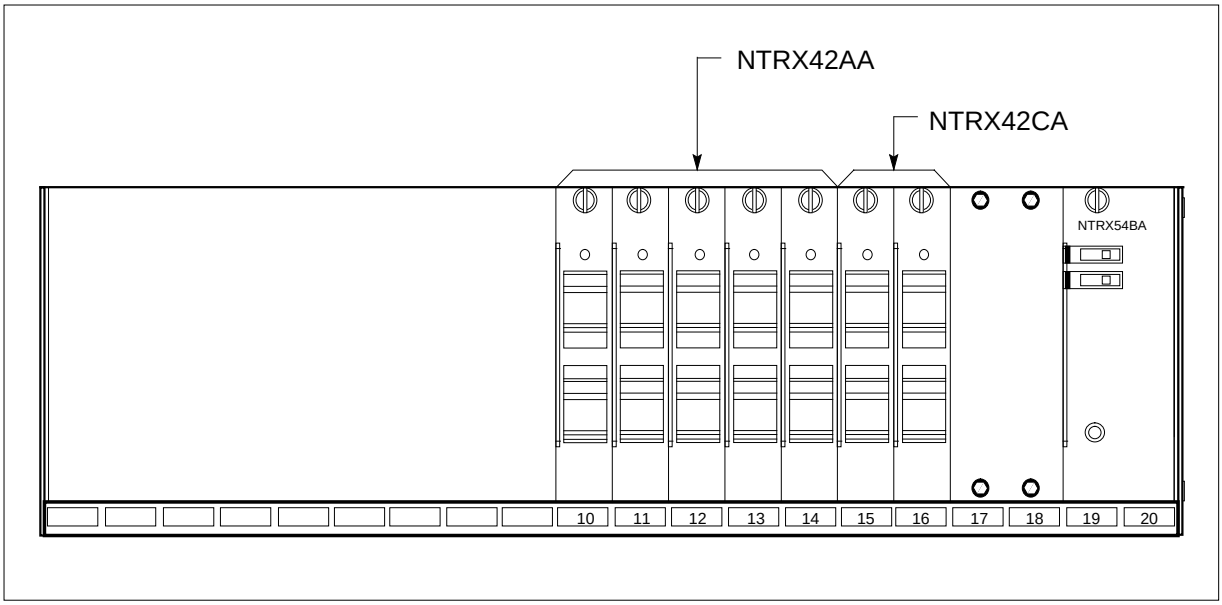
NTRX42CA

NTRX42
in an RSC MSP (continued)

37 Replace any jumper connectors and cables removed in step 35. Reinsert the power connectors at the rear of the circuit card.



38 Push in the corresponding line shelf. This step does *not* apply to the CMIS, CPDC, and CRME.



39 Apply the appropriate label from the spare parts on the replacement NTRX42 circuit card.

40 Power up the ABS fuse in the power room, and remove the safety tag from the ABS fuse.

Note: This step applies to the CPDC and CRME.

41 Switch on the associated power converter.

Note: This step does not apply to the CPDC and CRME.

NTRX42
in an RSC MSP (continued)

42 Reset the circuit breakers to ON (upward). If any card controlled by this breaker includes a reset switch, hold the RESET button downward while setting the circuit breaker to the ON position.

43 Remove the safety tag from the front of the circuit breaker.

44 Close the front cover of the MSP. Swing the cover up to the closed position and lock the two cover latches.

45 Read the following table to determine where to proceed.

If circuit breakers power the	Do
LCME shelf containing 6X30, 6X53, or BX72 cards	step 46
RCC2 shelf containing MX72 card	step 50
RMM shelf containing 2X09 or 2X06 cards	step 54

46 Return the LCME unit to service by typing

>RTS UNIT **lcme_unit_no**

and pressing the Enter key.

where

lcme_unit_no
is the number of the inactive unit

If RTS	Do
passed	step 47
failed	step 59

47 Send any faulty cards for repair according to local procedure.

48 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

49 Go to step 60.

50 Return the RCC2 unit to service by typing

>RTS UNIT **rcc2_unit_no**

and pressing the Enter key.

where

rcc2_unit_no
is the number of the inactive RCC2 unit

If RTS	Do
passed	step 51
failed	step 59

51 Send any faulty cards for repair according to local procedure.

52 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card.

53 Go to step 60.

At the MAP terminal

54 Reload the RMM by entering

>LOADPM

and pressing the Enter key.

If LOAD	Do
passed	step 55
failed	step 59

55 Test the RMM unit by typing

>TST UNIT **rmm_unit_no**

and pressing the Enter key.

where

rmm_unit_no
is the number of the RCC2 unit

If RTS	Do
passed	step 56
failed	step 59

56 Return the RMM shelf to service by typing

>RTS *UNIT* rmm_unit_no

and pressing the Enter key.

where

NTRX42 in an RSC MSP (end)

rmm_unit_no
is the number of the RCC2 unit tested in step 55

If RTS	Do
passed	step 57
failed	step 59

57 Send any faulty cards for repair according to local procedure.

58 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 60.

59 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

60 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX43 in an RSC MSP

Application

Use this procedure to replace an NTRX43 card in a modular supervisory panel (MSP) in the following cabinets.

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX43	AA	Fuse Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.), and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is, MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (.090 in.) thick and 17 mm (.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

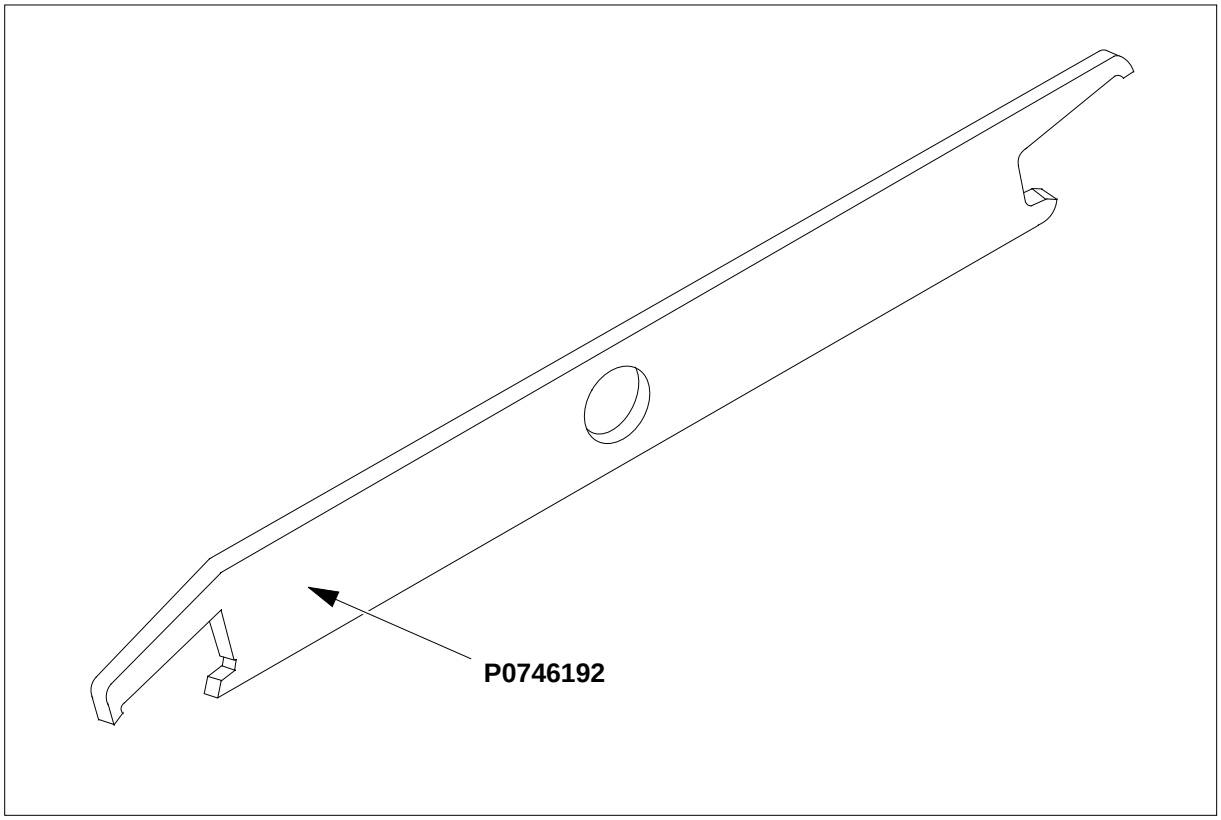
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end, is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw, away from the connector. The tool is disengaged

NTRX43
in an RSC MSP (continued)

from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

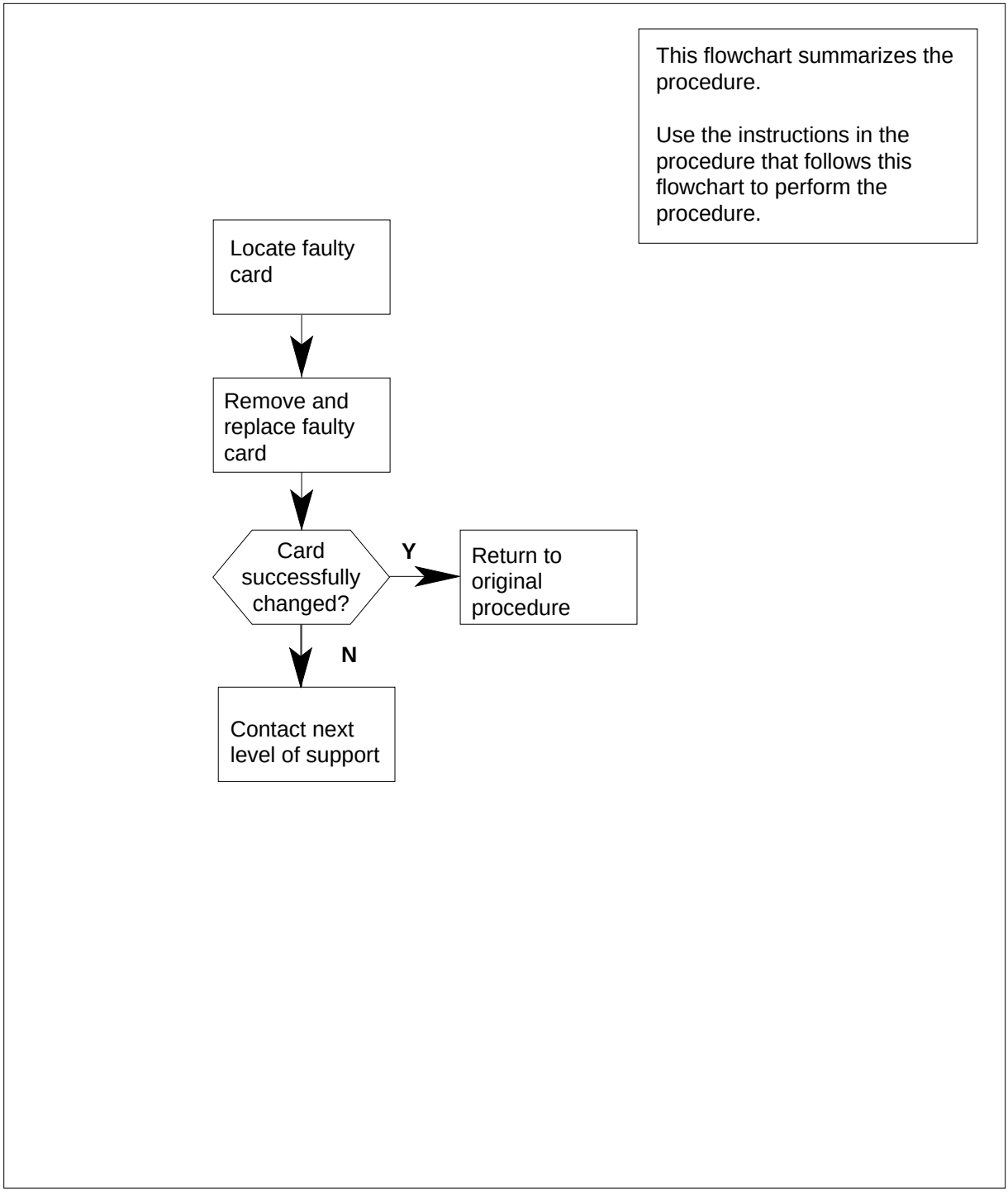
Connector removal tool



The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTRX43
in an RSC MSP (continued)

Summary of card replacement procedure for an NTRX43 card in RSC MSP



NTRX43
in an RSC MSP (continued)

Replacing an NTRX43 card in RSC MSP

At your Current Location

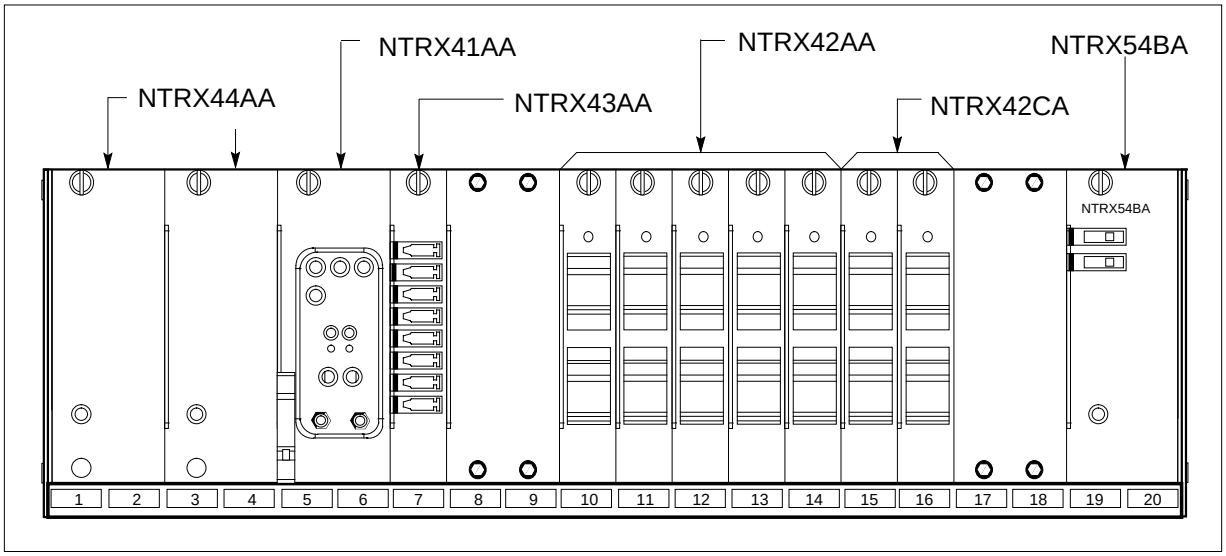
1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



4 Power down circuit breaker supplying fuse module. Safety tag the front of the circuit breaker. When servicing the fuse module, fans may shut down, alarms may sound, or there may be a loss of alarms.

NTRX43
in an RSC MSP (continued)

5

DANGER
Risk of injury from high energy levels, static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

DANGER
Risk of injury from high energy levels, equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

Put on a wrist strap.

6 Remove fuses from fuse module.

Note: Observe fuse colors, values, and positions before removing fuses from fuse module.

7 Pull out corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP. This step does *not* apply to the CMIS, CPDC, and CRME.

8

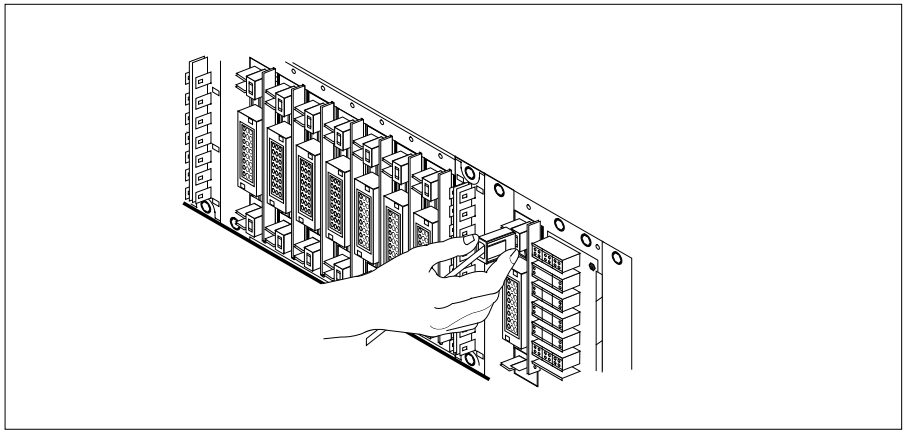
DANGER
Risk of injury from high energy levels, voltage present
Do not insert metallic objects into the black connectors. Voltage is present and equipment damage could result.

Remove the NTRX43 circuit card as shown in the following figures.

a Open the rear doors of the cabinet and locate the back of the card to be replaced.

b Note wire color and location to facilitate re-connection.

NTRX43
in an RSC MSP (continued)



9 Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.

10 Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

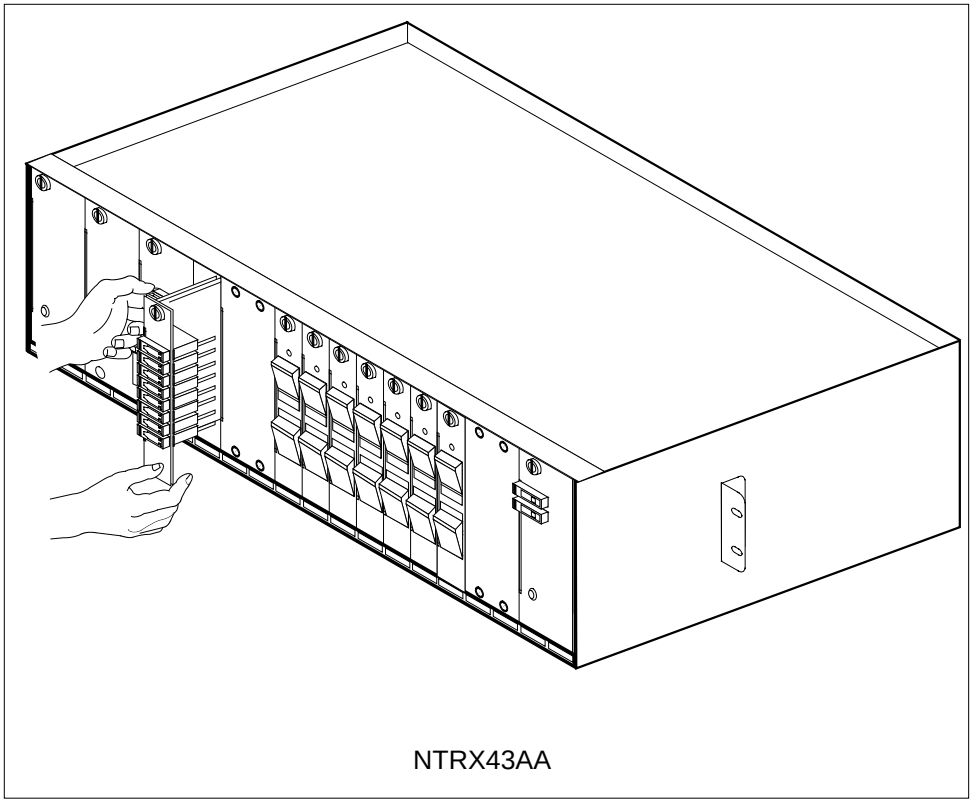
11 Remove and tag jumper connectors and cables, which may be present on the back of the circuit card and save for use on the replacement circuit card.

At the front panel of the cabinet

12 Remove the NTRX43 card.

- **a** Disengage the knurled thumbscrew at the top of the card.
- **b** Gently pull the card towards you until it clears the shelf.

NTRX43
in an RSC MSP (continued)



NTRX43AA

13 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.

a Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.

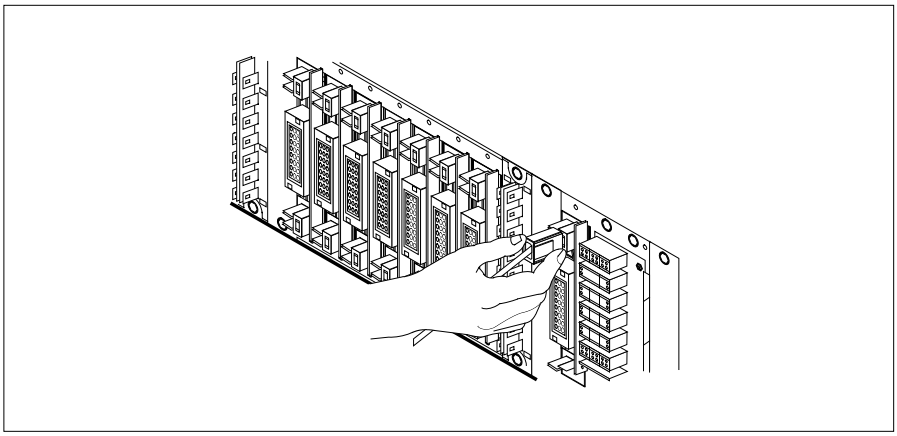
b Gently but firmly seat the circuit card.

c Tighten the knurled thumbscrew at the top of the circuit card.

At the rear panel of the cabinet

14 Locate the replaced circuit card and re-attach the power connectors.

NTRX43
in an RSC MSP (end)



15 Install the jumper connectors and cables removed in step 8 onto the replacement circuit card.

At the front of the cabinet

16 Push in corresponding line shelf. Please note this step does *not* apply to the CMIS, CPDC, and CRME.

17 Replace fuses removed in step 6.

18 Power up circuit breaker supplying fuse module and remove safety tag.

If fuses	Do
do not blow	step 19
blow (protrude)	step 21

19 Send any faulty cards for repair according to local procedure.

20 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 22.

21 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

22 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX44 in an RSC MSP

Application

Use this procedure to replace an NTRX44 card in a modular supervisory panel (MSP) in the following cabinets.

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX44	AA	Talk Battery Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.), and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is, MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (.090 in.) thick and 17 mm (.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

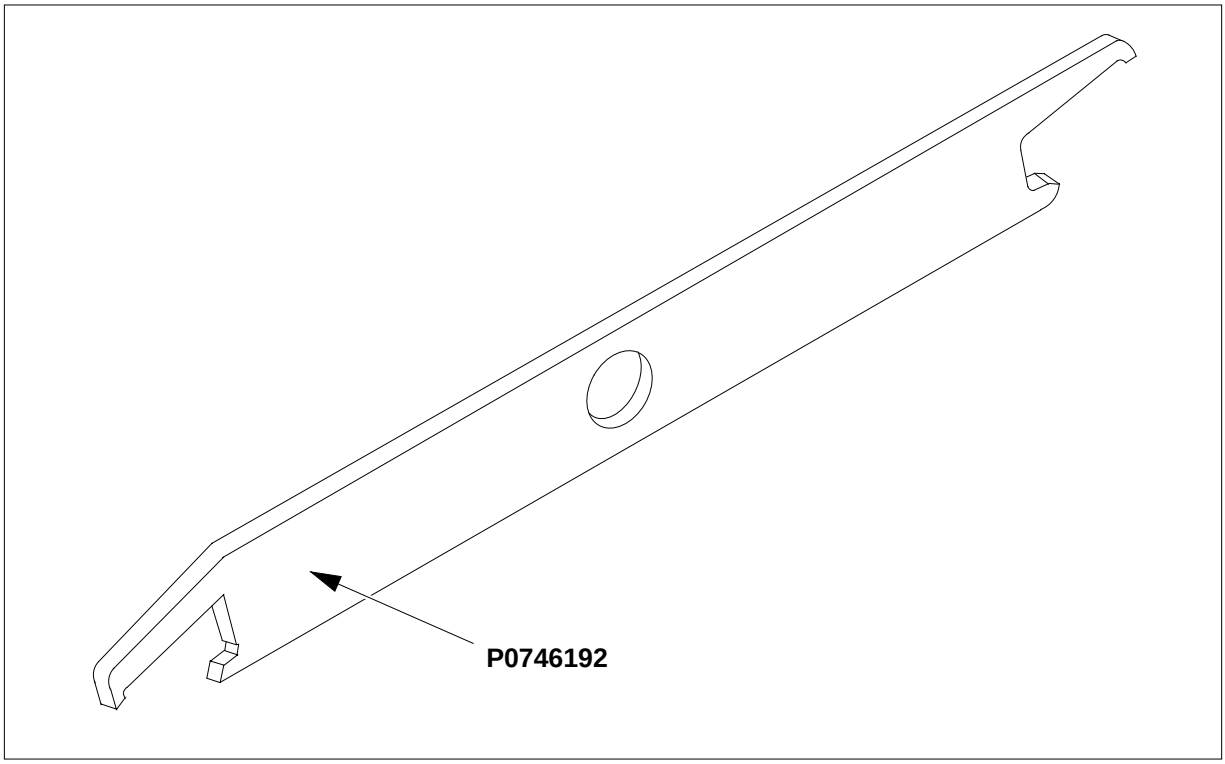
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end, is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw, away from the connector. The tool is disengaged

NTRX44
in an RSC MSP (continued)

from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

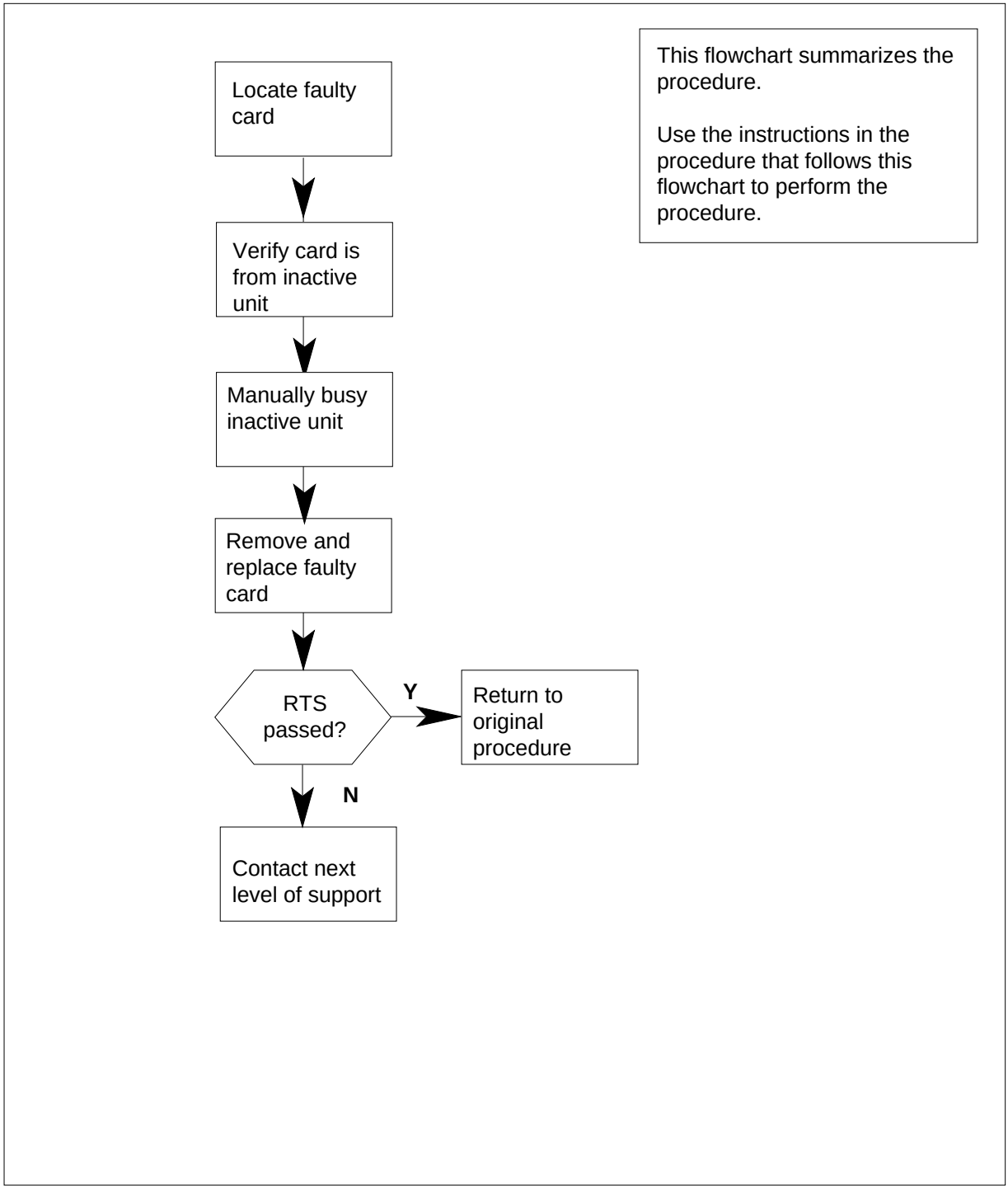
Connector removal tool



The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTRX44
in an RSC MSP (continued)

Summary of card replacement procedure for an NTRX44 card in RSC MSP



NTRX44
in an RSC MSP (continued)

Replacing an NTRX44RX44 card in RSCE MSP

At your current location

1

CAUTION
Loss of service
A loss of service *will* occur when this procedure is used as an acceptance procedure or when talk battery is already available on the affected LCM unit. Busying the LCM unit is a precaution only and does not transfer talk battery to the other LCM unit. Talk battery is *not redundant*, and therefore a loss of service occurs on the affected LCM unit. Perform this procedure only during periods of low traffic.

Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the MAP terminal

3 Set the MAP display to the PM level and post the LCME powered by the talk battery module by typing

```
>MAPCI;MTC;PM;POST LCME site lcme_frame_no lcme_no
```

and pressing the Enter key.

where

site
is the name of the site at which the LCME is located

lcme_frame_no
is the number of the frame in which the LCME is located

lcme_no
is the number of the LCME powered by the talk battery module

Example of a MAP display

```
   CM    MS    IOD   Net    PM    CCS    Lns    Trks    Ext   APPL
   .     .      .      .   1LCME      .      .       .      .      .

LCME               SysB     ManB     OffL     CBsy     ISTb      InSv
 0 Quit     PM        1        0        2        0        2        12
 2 Post_    LCME      0        0        2        0        2         9
 3 ListSet
 4 SwRG     LCME   RSC-S  14 1 ISTb  Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InSv                /RG: 1
 6 Tst_     Unit1:   InSv                /RG: 1
 7 Bsy_                                 11  11  11      RG:Pref 1 ISTB
 8 RTS_     Drwr:  01  23  45  67  89  01  23  4       Stby 0 InSv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_
11 Disp_
12 Next
13
14 QueryPM
15
16
17
18
```

4 Busy the affected in-service PM unit by typing

`>BSY UNIT lcme_unit_no`

and pressing the Enter key.

where

lcme_unit_no
is the number of the LCME unit.

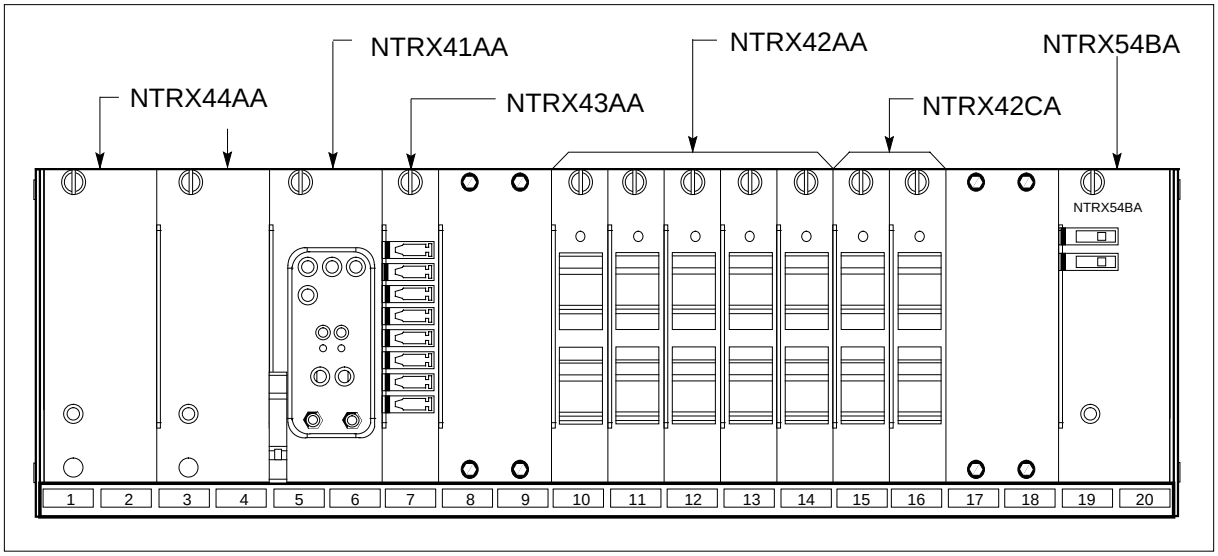
Note: The talk battery module in slots 1 and 2 controls unit number 0; the module in slots 3 and 4 controls unit number 1.

At the front panel of the cabinet

5 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module.

NTRX44
in an RSC MSP (continued)



6

DANGER
Risk of injury from high energy levels, static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

DANGER
Risk of injury from high energy levels, equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.
2. Do not force the cards into the slots.

Put on a wrist strap.

7 Turn off the circuit breaker at slot 15 (circuit breaker 12) if replacing the talk battery module in slots 1 and 2. Turn off the circuit breaker at slot 16 (circuit breaker 14) if replacing the talk battery module in slots 3 and 4. These circuit breaker locations correspond to the CRSC and CEXT modules.

Note: The circuit breaker designation may vary depending on the type of cabinet where you are replacing the talk battery module. Verify the circuit breaker designation at shelf position 61 before replacing the talk battery.

NTRX44
in an RSC MSP (continued)

8 Pull out corresponding line shelf approximately 152 mm (6 in.). The line shelf is located below the MSP. This approach permits easier hand access to the connectors on the rear of the MSP. This step does not apply to the CMIS, CPDC, and CRME.

At the rear panel of the cabinet

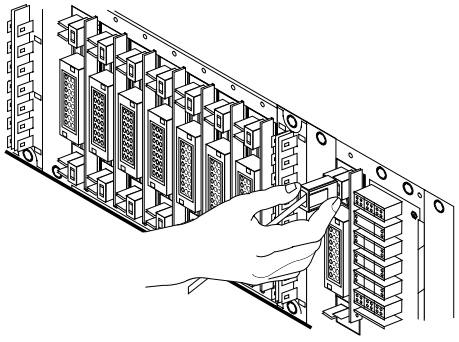
9

DANGER
Risk of injury from high energy levels, voltage present
Do not insert metallic objects into the black connectors. Voltage is present and equipment damage can result.

Remove the NTRX44 circuit card as shown in the following figures.

a Open the rear doors of the cabinet and locate the back of the circuit card to be replaced. The circuit card is located in slots 1 and 2 for talk battery “A" or in slots 3 and 4 for talk battery “B".

b Note wire color and location to facilitate re-connection.



c Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black power connectors located above the large blue power connector. Ensure you disconnect the black connectors before removing the circuit card.

d Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

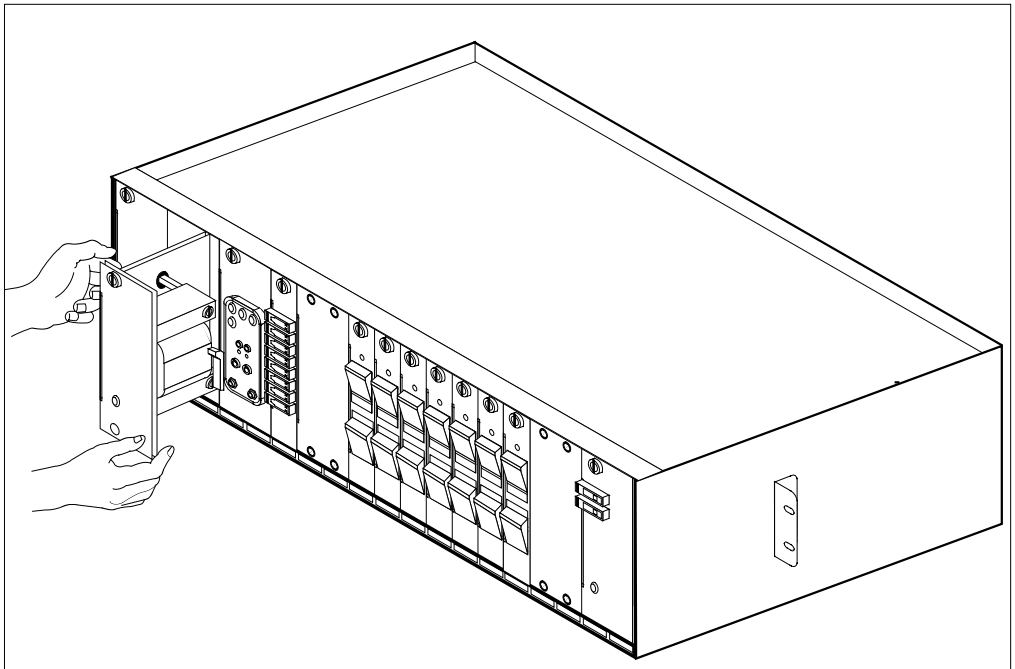
NTRX44
in an RSC MSP (continued)

At the front panel of the cabinet

10 Remove the NTRX44 card.

a Disengage the knurled thumbscrew at the top of the card.

b Gently pull the card towards you until it clears the shelf.



NTRX44AA

11 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.

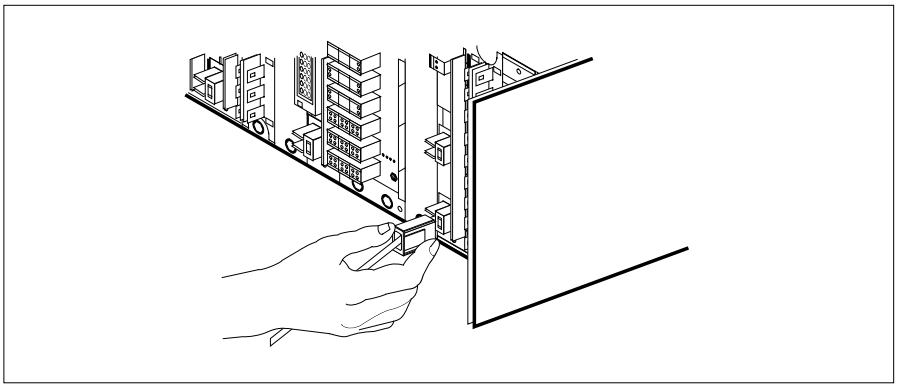
a Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.

b Gently but firmly seat the circuit card.

c Tighten the knurled thumbscrew at the top of the circuit card.

At the rear panel of the cabinet

12 Locate the replaced circuit card and re-attach the power connectors.



13 Install the jumper connectors and cables removed in step 9 onto the replacement circuit card.

At the front of the cabinet

14 If talk battery A, in slots 1 and 2, was replaced, turn on the circuit breaker at slot 15 (circuit breaker 12). If Talk Battery B, in slots 3 and 4, was replaced, turn on the circuit breaker at slot 16 (circuit breaker 14).

Note: The circuit breaker designation may vary depending on the type of cabinet where you are replacing the talk battery module. Verify the circuit breaker designation at shelf position 61 before replacing the talk battery.

15 Push in corresponding line shelf. Note that this step does *not* apply to the CMIS, CPDC, and CRME.

At the MAP terminal

16 Return the LCME to service by typing

`>RTS UNIT lcme_unit_no`

and pressing the Enter key.

where

lcme_unit_no
is the number of the LCME unit.

If RTS	Do
passed	step 17
did not pass	step 19

17 Send any faulty cards for repair according to local procedure.

18 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 20.

19 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

NTRX44
in an RSC MSP (end)

20 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

NTRX54 in an RSC MSP

Application

Use this procedure to replace an NTRX54 card in a modular supervisory panel (MSP) in the following cabinets.

- Cabinetized Extension Module (CEXT)
- Cabinetized Line Concentrating Equipment (CLCE)
- Cabinetized Power Distribution Center (CPDC)
- Cabinetized Remote Switching Center (CRSC)
- Cabinetized Miscellaneous Equipment (CMIS)
- Cabinetized Remote Miscellaneous Equipment (CRME)

PEC	Suffixes	Name
NTRX54	BA	Fan Power Control Module

Common procedures

None

Action

A connector removal tool is available to facilitate removal of the AMP Faston receptacles from the power input and output connectors of the MSP modules. This tool comes in two lengths: P0746192 152 mm (6 in.), and P0747552 254 mm (10 in.). The shorter tool is used when access to the rear of the MSP is very limited. An example of limited access is, MSP modules located directly behind the cabinet bulkhead.

This tool is approximately 2 mm (.090 in.) thick and 17 mm (.65 in.) wide, with a jaw-like cut-out at each end. The cut-out profile conforms to the shape of the Faston receptacle. The shorter tip of each profile is used to position the receptacle in the tool.

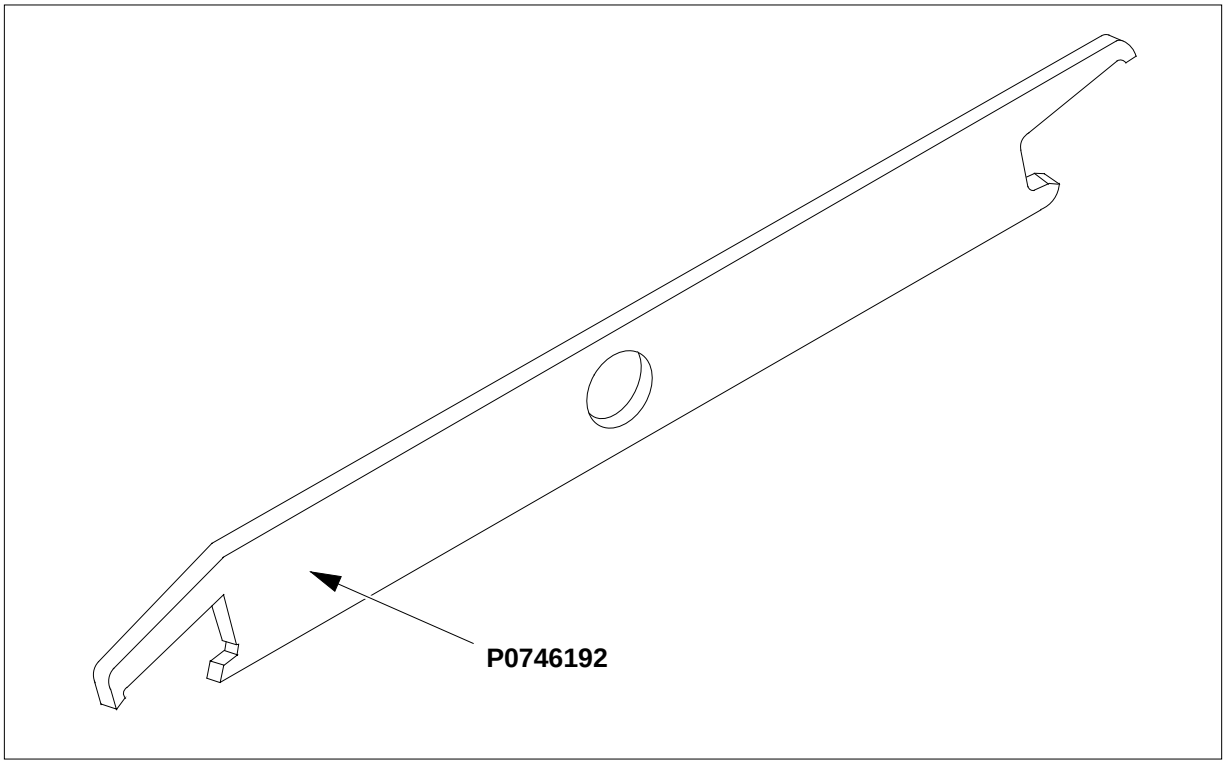
The first meeting point of the tool serves as the pivot point. By rotating the tool around this pivot point, the longer tip of the profile which has a hook on its end, is engaged with the action-arm of the power connector. As the action-arm of the connector is depressed, the receptacle is disengaged from the connector tab. The receptacle is removed by pulling the tool with the receptacle trapped in its jaw, away from the connector. The tool is disengaged

NTRX54
in an RSC MSP (continued)

from the receptacle by rotating the tool's hook off the action-arm of the receptacle.

Although the shape of the cut-out is the same on each end of the tool, the orientation of the profile is off by 15 degrees. This difference allows for the use of the tool at different angles, which may be required due to limited access to the connectors.

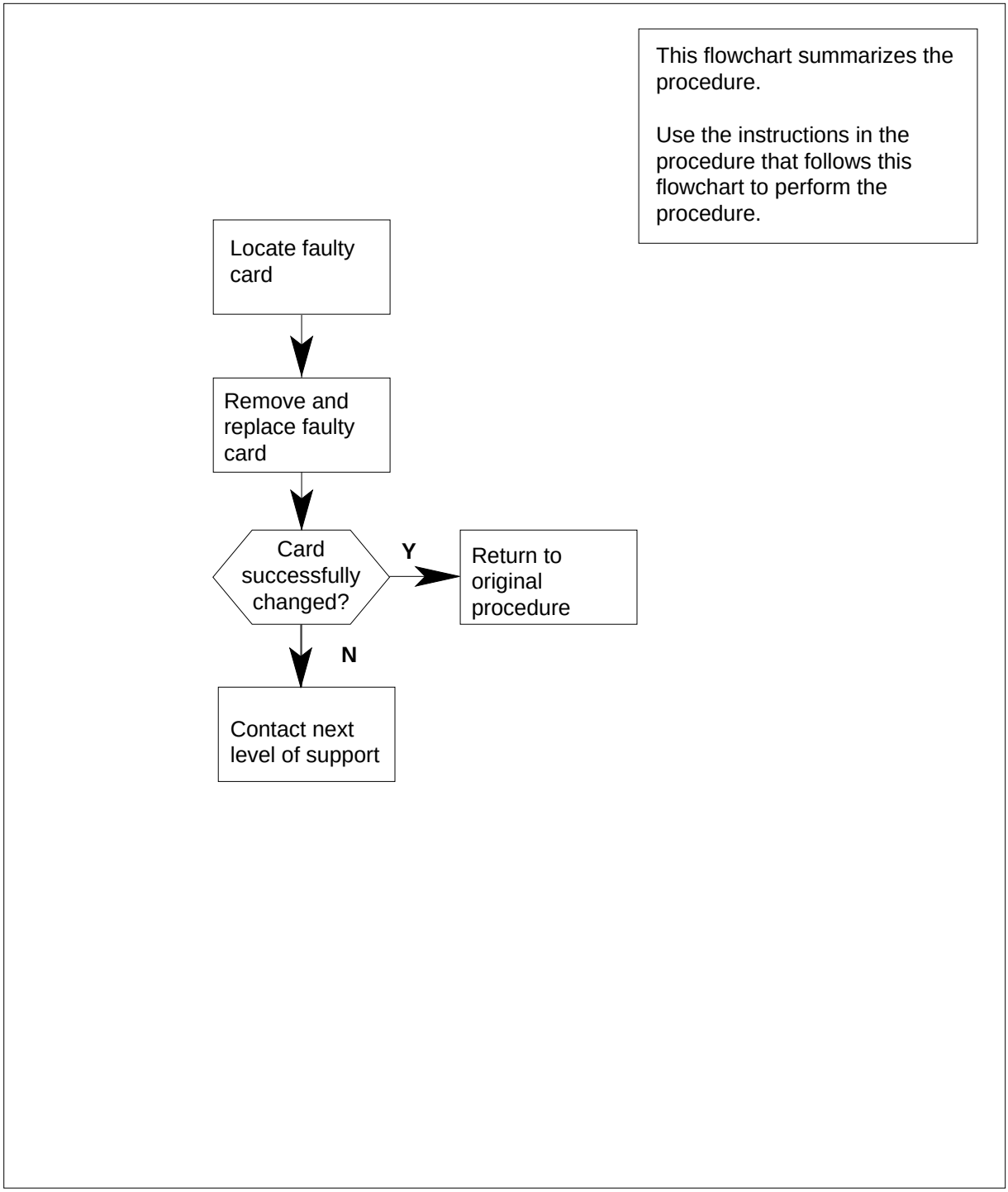
Connector removal tool



The following flowchart is only a summary of the procedure. To replace the card, use the instructions in the step-action procedure that follows the flowchart.

NTRX54
in an RSC MSP (continued)

Summary of card replacement procedure for an NTRX54 card in RSC MSP



NTRX54
in an RSC MSP (continued)

Replacing an NTRX54 card in RSCE MSP

At your current location

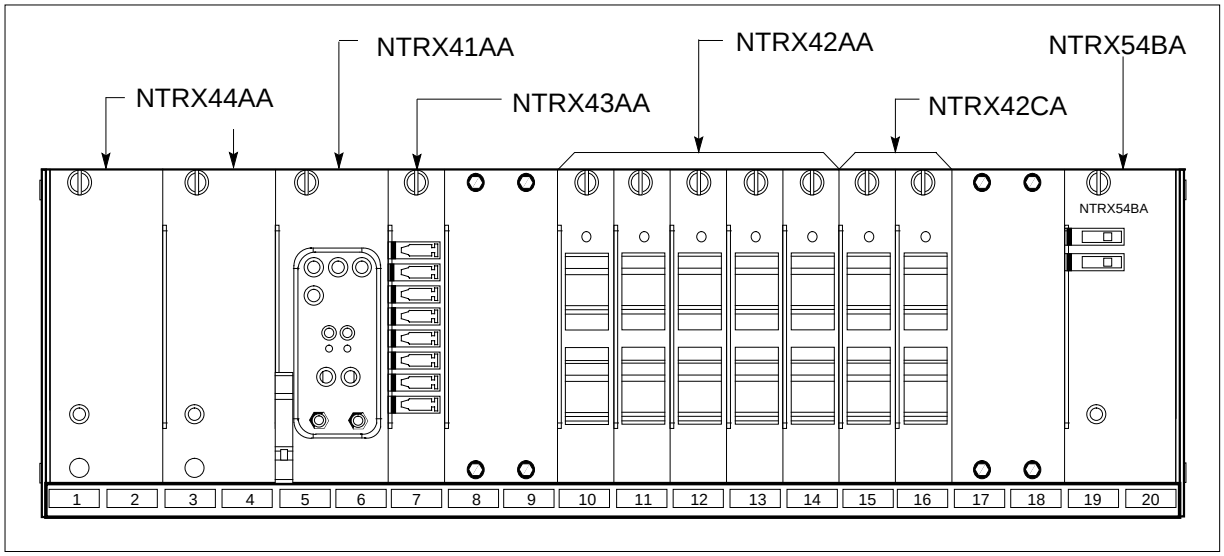
1 Proceed only if you have been directed to this card replacement procedure from a step in a maintenance procedure, are using the procedure for verifying or accepting cards, or have been directed to this procedure by your maintenance support group.

2 Obtain a replacement card. Ensure that the replacement card has the same product equipment code (PEC), including suffix, as the card that is to be removed.

At the front panel of the cabinet

3 Open the front cover of the MSP. Release the two cover latches and swing the cover down to the open position.

Note: The illustrations in this card replacement procedure are for the MSP shelf in an CRSC or CEXT module. The circuit breaker designation may vary depending on the type of cabinet you are working in.



4

DANGER
Risk of injury from high energy levels, static electricity damage
Before removing any cards, put on a wrist strap and connect it to the wrist strap grounding point on the left side of the modular supervisory panel (MSP). This protects the equipment against damage caused by static electricity.

NTRX54
in an RSC MSP (continued)

DANGER
Risk of injury from high energy levels, equipment damage
Take these precautions when removing or inserting a card:

1. Do not apply direct pressure to the components.

2. Do not force the cards into the slots.

DANGER
Heat damage
Avoid leaving this card out of service for more than 30 minutes. Extensive damage to the entire cabinet may occur if cooling is lost for more than 30 minutes.

Put on a wrist strap.

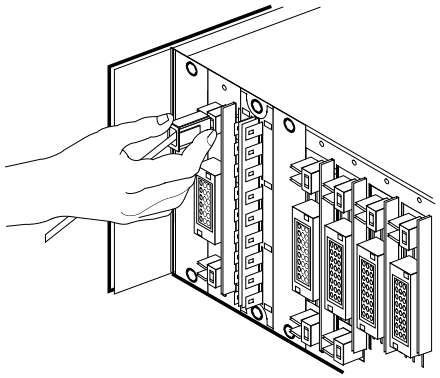
5 Remove the two fuses in the fan power control module.

At the rear panel of the cabinet

6 Remove the NTRX54 circuit card as shown in the following figures.

a Open the rear doors of the cabinet and locate the circuit card, it will be in slots 19 and 20.

b Note the wire color and location to facilitate re-connection.



c Using the connector removal tool, manually disconnect the power connectors to the circuit card. Working from the bottom of the MSP shelf to the top of the MSP shelf, manually disconnect the smaller black power connectors located below the larger blue power connector. Manually disconnect the large blue power connector. Disconnect the smaller black

NTRX54
in an RSC MSP (continued)

power connectors located above the large blue power connector. Ensure you disconnect the black connectors *before* removing the circuit card.

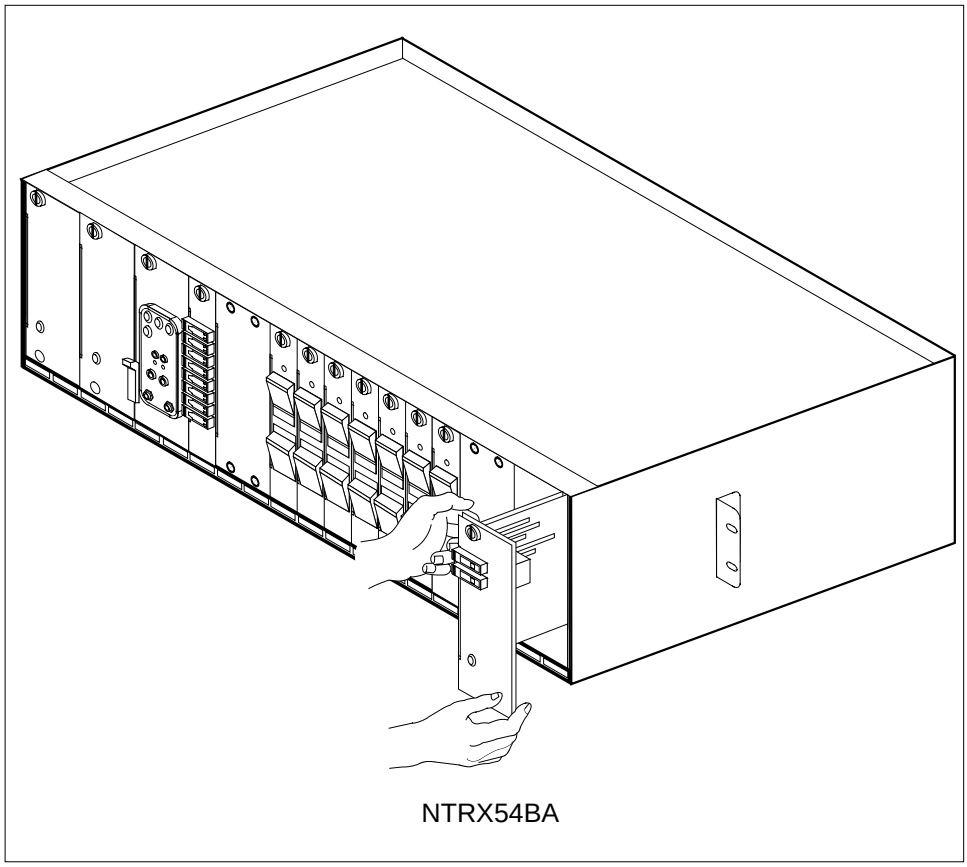
d Although the connectors have voltage present on them, they are insulated. Secure the connectors to the power-connector bundle with a line-tie until it is time to reconnect them.

At the front panel of the cabinet

7 Remove the NTRX54 card.

a Disengage the knurled thumbscrew at the top of the card.

b Gently pull the card towards you until it clears the shelf.



NTRX54BA

8 Ensure the replacement circuit card has the same PEC, including suffix, as the circuit card just removed.

a Align the circuit card with the slots in the shelf and gently slide the circuit card into the shelf.

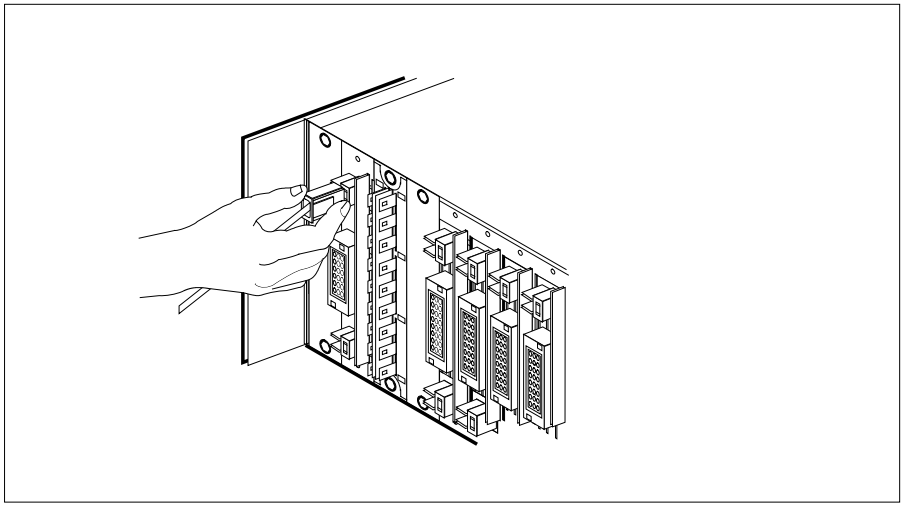
b Gently but firmly seat the circuit card.

c Tighten the knurled thumbscrew at the top of the circuit card.

NTRX54 in an RSC MSP (end)

At the rear panel of the cabinet

9 Locate the replaced circuit card and re-attach the power connectors, as noted in step 6.



10 Replace the two fuses removed in step 5.

If fuses	Do
do not blow	step 11
blow (protrude)	step 13

11 Send any faulty cards for repair according to local procedure.

12 Record the date the card was replaced, the serial number of the card, and the symptoms that prompted replacement of the card. Go to step 14.

13 Obtain further assistance in replacing this card by contacting the personnel responsible for the next higher level of support.

14 You have successfully completed this procedure. Return to the maintenance procedure that directed you to this card replacement procedure and continue as directed.

8 Locating and clearing RSC problems

This section on how to locate and clear trouble is for use by maintenance engineering and field maintenance personnel use this section. The personnel must have basic knowledge of the Digital Muliplex System-100 (DMS-100) Family of switches and of the Remote Switching Center (RSC). Operating company personnel who need specific, step-by-step procedures to perform maintenance tasks do not use this task.

Trouble isolation and correction

Description of problem solving procedures

A remote switching center (RSC) has a remote cluster controller (RCC), line concentrating devices, trunks and links that connect RSC components. The RCC normally determines the state of the other RSC components. This chapter describes the problem solving procedure for each component.

The problem solving procedures for the RSC are as follows:

- how to locate and clear faults
- fault isolation tests
- diagnostic tests
- product specified test tools

Locating and clearing faults

The following methods clear and locate faults:

- operational measurements (OM)
- log reports
- alarms
- customer complaints

Operational measurements

The OMs monitor and count events in the system. These OMs detect current and potential system troubles. The OM thresholding feature monitors and reports RSC activity. You must perform these reports daily or weekly. These reports are the primary method of trouble detection.

Log reports

Use log reports for analysis and to provide detailed information on call errors, diagnostic results and system status. Logs indicate trouble conditions. Logs indicate trouble conditions when one of the following conditions occur:

- sudden increase in volume of logs
- the message, `not printed`, appears
- large number of equal logs

RCC alarms (PM level)

Audible and visual alarms indicate the corrective action you must take. The alarm level indicates alarm severity and the urgency for corrective action. The

Trouble isolation and correction (continued)

alarm level is critical, major or minor. These alarms appear in the following table.

RCC PM level alarms

Alarm	MAP indicator	Normal impact on service
Critical	(*C*)	service outage or potential service outage
Major	(M)	service degrading or threatening condition
Minor	(blank)	does not affect service

Correct performance of routine system maintenance and the use of OMs and logs minimizes the occurrence of alarms. The following table describes alarms that the MAP subsystems produce for the RSC.

PM alarms for the RCC at the MAP (Sheet 1 of 2)

MTC levels	PM level	Possible causes
PM RCC	ISTb 1	(In-service trouble) One or both units has minor problems. These problems do not normally involve the peripheral processor (PP). A static data mismatch is present between an RCC unit and the central controller (CC) A non-messaging central-side (C-side) link is out of service A peripheral-side (P-side) link is out of service

Trouble isolation and correction (continued)

PM alarms for the RCC at the MAP (Sheet 2 of 2)

MTC levels	PM level	Possible causes
PM RCC M	ISTb 1	One of the units is system busy (SysB), normally because of a PP card failure. If the unit is the active unit, the peripheral module (PM) software SWACTs the units. The system generates PM128 logs.
PM RCC *C*	SysB 1	Both units are SysB If the cause is communication with the host, the RCC enters emergency stand-alone (ESA). This action results in the following sequence of logs: • PM109 (the carrier is busy) • PM128 (the RCC is ISTb) • PM107 (the RCC is C-side Bsy [CBsy]) • PM107 (the line concentrating modules [LCM] go CBsy) • PM102 (the RCC is SysB) • PM181 (the RCC tries to start the message links again) The units can be SysB if both PPs have faults

Clearing alarms

Follow these guidelines when you respond to alarms:

- A minimum of two alarms of the same severity can appear on the MAP screen. If this condition occurs, clear the alarms from the left of the screen to the right side of the screen.
- While you fix an alarm an alarm of greater severity can occurs. If this condition occurs, respond to the new alarm. Do not continue attempts to clear the alarm that is less severe.

For alarm clearing procedures, refer to the section *Alarm Clearing Procedures*.

Trouble isolation and correction (continued)

Static data mismatch

To correct RCC data mismatch problems, like a static data mismatch with the CC, perform one of the following procedures:

- Busy and return to service (RTS) the inactive RCC unit.
- Busy and RTS the inactive RCC unit. Perform a Warm SWACT.

A static data update tracking mechanism specifies the data changed in the CC as datasyncing or nondatasyncing. This mechanism allows the CC to determine the action that the system requires to correct the data in the XPM. This feature only applies to XPMs that are not ISDN. The tracking mechanism:

- stores the severity level of the data mismatch condition against each XPM
- monitors ODM changes that affect static data to set an ISTb condition with a static data mismatch reason
- monitors maintenance actions performed on an XPM to set the ISTb condition of static data mismatch
- generates a message that informs operating company personnel how to update the static data

To perform the above functions, the tracking system contains the following:

- interfaces to the tracking system. Examples of interfaces are dynamic static data update failures, XPM table identifiers, maintenance actions and message display.
- database that contain flags. These flags indicate nondatasyncing and datasyncing data
- the XPM information to maintain the status of the static data

When operating company personnel initiate an ODM that affects static data to update, the system notifies the tracking system. The tracking system uses the database to determine the severity of the static data mismatch. The system stores this information in the node information of the XPM for future reference.

The severity level stored in the node information for the XPM determines the MAP message. Each application requests the user interface message from the tracking system.

The MAP message specifies the action required to correct the most severe static data mismatch in the XPM. A warning message appears if the current change affects static data or the current change does not affect static data.

Trouble isolation and correction (continued)

To clear the ISTb condition, the system informs the tracking system when the system RTS an XPM unit. During the RTS, the tracking system uses the following criteria to determine if the system can clear the ISTb condition:

- mate unit has current data
- mate unit has a mismatch in data that is not synchronized

In all other conditions, ISTb remains set. Operating company personnel must manually correct the static data mismatch. The system clears the static data mismatch on RELOAD restarts. The system maintains the mismatch over WARM and COLD restarts.

A message appears when static data mismatch is present. This message informs operating company personnel how to update the data. The following message format is output when a static data mismatch is present:

```
WARNING:  Static data needs to be updated for: <pmtype> <pm
number> <unit> <act/inact> <action>
```

where:

pmtype
is the peripheral type that needs the static data updated

pm number
is the peripheral identification number

unit
is an optional specification of the unit if the condition affects a single unit of the XPM

act/inact
is an optional specification the system uses to specify if the affected unit is the ACTive or INACTive unit

action
is a description of the action required to update the static data in the peripheral.

The above warning appears under the following conditions:

- when the user issues the TABLE command at the MAP terminal and the addition, change or removal of entry information causes a static data mismatch. Refer to *Translations Guide* for additional information on static data messages that appear under these conditions.
- when the system post an XPM and executes a QUERYPM FLT command. A `Static data mismatch with CC` ISTb fault condition appears

as a result of this condition. The above message format is output that states the action required to update the data.

Lines

Operating company personnel can isolate a fault to a line concentrating device (LCD). When this action occurs, maintenance procedures are like the procedures at the host office. Operating company personnel must make sure that a fault at another location did not cause the fault in an LCM.

DS30A links

The DS30A links are on the P-side of the RCC and the C-side of the LCM and RMM. These links can be defective. Defective links affect the associated components.

DS-1 links

The DS-1 links are as follows:

- *C-side of the RCC*

  These links send voice and message to the host. The system can use some channels as trunks. The system uses the channel on link 0 and link 2 for messaging.

- *P-side of the RCC*

  These links function as trunks that connect to RLCMs or other offices. These trunks are static or dynamic.

DRCC

Dual RCC (DRCC) troubles can result from interlink conditions. The condition of the messaging links to the host office can cause the RCC to enter

Trouble isolation and correction (continued)

Dual ESA. The following table lists interlink trouble indicators and the indicators that appear when operating company personnel clear the problem.

Indicators for interlink maintenance (Sheet 1 of 3)

Trouble indicator	Possible cause	Indicators when cleared
PM110 0—MTCE LIMIT SET The QUERYIR shows ML under the BER heading.	Bipolar Violations at the Maintenance Limit Bipolar violations at the ML indicate decrease of the DS-1 link. This link is normally set at 1 in 100 bits in table CARRMTC.	The PM110—Carrier BPV Limit Cleared. The QUERYIR shows the ML alarm is gone.
PM110—MTCE LIMIT SET PM222—Interlink is system-busied The PM128—RCC goes ISTb. The system drops calls on that link. The QUERYIR shows OS under the BER heading and the state as SysB.	Bipolar Violations at the Out-of-Service Limit Bipolar violations at the OOS limit are set at 1 in 100 bits in table CARRMTC.	The PM110—Carrier BPV Limit Cleared. The PM106—RCC returns to service from ISTb The PM223—Interlink returns to service The QUERYIR shows the ML alarm is gone, and the link is now good.
The PM109—Carrier Local Alarm Set The PM222—Interlink is system-busied. The PM128—RCC goes ISTb. The system drops calls on that link. The QUERYIR shows local carrier group alarm (LCGA) under ALRM heading and the state as SysB. For the interconnected RCC, QUERYIR shows remote carrier group alarm (RCGA) under ALRM.	Local Alarm is Set	PM106—RCC returns to service from ISTb. PM223—Interlink returns to service. QUERYIR shows the ML alarm is gone, and the link is now good.

Trouble isolation and correction (continued)

Indicators for interlink maintenance (Sheet 2 of 3)

Trouble indicator	Possible cause	Indicators when cleared
The PM109—Carrier Card Removed The PM128—RCC goes ISTb The PM222—Interlink is system-busied. The system drops calls on that link. The QUERYIR shows (-) under the C heading and the state as SysB. For the interconnected RCC, QUERYIR shows LCGA under ALRM.	DS-1 Card is Missing	The PM106—RCC returns to service from ISTb. The PM223—Interlink returns to service. The QUERYIR shows the ML alarm is gone, and the link is now good.
The PM110—Carrier Slip Maintenance Limit Set The QUERYIR shows ML under the slip heading. For the interconnected RCC, QUERYIR shows RCGA under ALRM.	Slips at the Maintenance Limit	The QUERYIR shows the ML alarm is gone.
The PM110—Carrier OSS Limit Set The QUERYIR shows OS under the SLIP heading. For the interconnected RCC, QUERYIR shows RCGA under ALRM.	Slips at the Out-of-Service Limit	The QUERYIR shows the OS alarm is gone.

Trouble isolation and correction (continued)

Indicators for interlink maintenance (Sheet 3 of 3)

Trouble indicator	Possible cause	Indicators when cleared
The PM110—Carrier LOF Maintenance Limit Set The QUERYIR shows ML under the FRME heading. For the interconnected RCC, QUERYIR shows RCGA under ALRM.	Frame Loss at the Maintenance Limit	The QUERYIR shows the ML alarm is gone.
The PM110—Carrier LOF Maintenance Limit Set The QUERYIR shows OS under the FRME heading. For the interconnected RCC, QUERYIR shows RCGA under ALRM.	Frame Loss at the Out-of-Service Limit	The QUERYIR shows the OS alarm is gone.

Forced ESA

When forced into ESA, the RCC sends a PM189 log `FORCE DOWN` message to the host. The RCC simulates link faults on messaging links 0 and 2. If The user can post these links at the carrier MAP level, POST LTC 2, for example. If this event occurs, these links show the RCGA alarm.

The RCGA alarm is real if a PM189 log accompanies the alarm. If links 0 and 2 break while the RCC is in forced ESA, links at the carrier level show LCGA alarm.

> ***Note:*** Real faults at the RCC can be one-way. The alarm will continue to be RCGA, the PM189 log of the operating company personnel will not be true. Real faults on the messaging links are normally two-way and produce LCGA alarms.

Customer complaints

Customer complaints are trouble indicators where a subscriber has a service problem, and the MAP terminal does not produce an alarm.

Trouble isolation and correction (continued)

Voice service

Problems that can occur are like the problems that can occur at the host office.

Fault isolation tests

RCC

When troubleshooting the RCC, operating company personnel normally access the RCC MAP level and enters QUERYPM FLT. The following tables list the messages and possible causes for an RCC alarm. The log report is identical to the QUERYPM FLT response most of the time.

Fault messages associated with SysB alarms in the RCC (Sheet 1 of 2)

Message at RCC level	Possible cause
All C-side Links are Down	The C-side PM does not have communication with the RCC.
Audit Detected Inconsistent PM Activity	For example, the CC sees unit 0 as inactive, although unit 1 is active. This condition means that the CC does not recognize that a SWACT occurred. The CC busies and RTSs both units. The CC has the units operating with active/inactive unit configuration. The CC originally had this configuration.
Audit Detected Inconsistent PM State	The internal state of the active unit is not READY. The state is BUSY, RESTART or SYNCING. This condition is normally a software error. The CC busies and RTSs both the RCC and the C-side links. The CC tries to return the links to service.
Autonomous Activity Drop	A system-generated SWACT occurred, normally because of a trap or facility audit.
Diagnostics Failed	Unit failed TST or RTS.
Inact Unit Lost Data Synch	Unit-to-unit communication failed. A Warm SWACT cannot occur.
PM Audit Detect Fault	One of the background hardware audits detects a fault.
PM SWACT	A Warm SWACT occurred.
Require Data Load	An error occurred on a DS-1 link to the unit. The unit waits for a reset. The maintenance system performs the reset.

Trouble isolation and correction (continued)

Fault messages associated with SysB alarms in the RCC (Sheet 2 of 2)

Message at RCC level	Possible cause
Reset While In-Service	An error occurred on a DS-1 link to the unit. The unit waits for a reset. The maintenance system performs the reset.
REX Incomplete (Terminated)	The routine exercise (REX) test did not complete the series of tests because of an abnormal condition. The following are abnormal conditions that can cause the problem: • `At least one unit is ISTb` • `Inactive unit is BSY` • `Warm SWACT is off`
REX Failed	A failure occurred when a test runs. The following messages inform the user of the actions the system takes to compensate for the failure: • `Achieving superframe/data synch` • `Inactive OOS Tests` • `Inactive RTS` • `Warm SWACT` • `Inactive OOS Tests after SWACT`
Self Test Failed	A background hardware audit detects a fault.
Trap Message Received From PM	The unit sent an `initiation complete` message to the CC after an auto-restart.
Unsolicited Message Limit Exceeded	The unit sent more than 100 unsolicited messages to the CC in one minute.

Fault messages associated with ISTb alarms in the RCC (Sheet 1 of 3)

Alarm	Message at RCC level	Possible cause
minor	One/Both Unit(s) ISTb	One or both units are ISTb.
	PM Overloaded	The traffic load exceeds the ability of the PM to process calls.

Trouble isolation and correction (continued)

Fault messages associated with ISTb alarms in the RCC (Sheet 2 of 3)

Alarm	Message at RCC level	Possible cause
	CSLinks Out of Service	The C-side message links failed the periodic in-service C-side links test The links test is one per minute.
	PSLinks Out of Service	A P-side link, like to the LCM or RMM, is SysB.
	Interlinks out of service	One of the interlinks of the DRCC configuration is SysB.
	Bad 6X45 IMC link	An intermodule communication (IMC) link is bad.
	Bad 6X69 IMC link	An intermodule communication link is bad.
	PM node table mismatch	The node table data that the RCC and the CC contain do not match.
	Dynamic data sync	The RCC does not achieve dynamic data syncronization.
	ESADATA	The RCC does not have an ESA load or the current load is corrupt or does not match the CC.
	Static data mismatch with CC	The static data of the RCC does not match the static data of the CC.
	Data mismatch with inventory table	The load in RCCINV does not match the loadname from the CC.
major	Node Redundancy Lost	A unit is out of service. The RCC cannot perform a SWACT if necessary.

Trouble isolation and correction (continued)

Fault messages associated with ISTb alarms in the RCC (Sheet 3 of 3)

Alarm	Message at RCC level	Possible cause
	Major CSLink Failure	A C-side link failure caused a major alarm.
critical	Critical CSLink Failure	A C-side link failure caused a critical alarm.

Lines

When an LCM alarm appears on the MAP screen, operating company personnel access the LCM level. Operating company personnel posts the LCMs that match that state. Operating company personnel post the LCM according to SITE. This action makes sure that the LCM with the alarm is part of the RSC configuration.

If the LCM is part of the RSC configuration, operating company personnel post the C-side RCC. Operating company personnel enter the QUERYPM FLT command. If any response indicates a problem, operating company personnel perform an in service test. If the test fails, the operating company must perform normal RCC maintenance. When maintenance is complete, the LCM maintenance is the same as that of the host office.

Diagnostic tests

Remote cluster controller

The system performs the diagnostic tests for the RCC when the user performs the TST command.

Lines

When operating company personnel perform a test on a subscriber line, like DIAG, operating company personnel must perform the command several times. This action makes sure the DS-1 links do not affect the results.

Dual RCC

The system performs the diagnostic tests for the interlinks of the Dual RCC when the user performs the TST command. The user performs the TST command at the IRLINK level.

XPM diagnostic history

The Extended Peripheral Modules Diagnostics History, feature number AF5006, provides a resident database. This database records selected diagnostic results of XPMs. This feature captures diagnostic results that indicate the sanity of the XPM. Use the data in this database to affect DMS maintenance activities. This database provides operating company personnel

with MAP command access to data on the accumulated results of diagnostics. The system retains data in the history database over warm, cold and reload restarts. This feature is part of *Functional Group BAS00003 New Peripheral Maintenance* and is not an optional feature.

This feature is one of a group of three features. The other features are Feature AF5007, *XPM PreSWACT/Post SWACT Audit* and Feature AF5008, *XPM REX Control and Trouble Notification Improvements*. Feature AF5007 uses a subset of diagnostic results and REX tests and SWACT results to determine if a SWACT must be performed. This text refers to the functionality that feature AF5007 introduces as the *SWACT controller*. Feature AF5008 changes the XPM REX test to use the *SWACT controller* and provide log improvements.

An XPM can execute diagnostics to test the functionality of its hardware. Diagnostics can run as a result of CC or XPM requests. The XPM diagnostics normally are part of XPM audits. The *SWACT controller* and operating company personnel use diagnostic results that feature AF5996 provides for system analysis.

SWACT controller

This feature provides short-term diagnostic performance data to the *SWACT controller*. This feature provides a set of query procedures for applications which desire such information. The *SWACT controller* determines if a SWACT is necessary. Short-term data for a specified unit means diagnostic and audit failure counts measured since a unit became active.

Operating company personnel analysis

Feature AF5006 provides data on the failure history of diagnostics. This data is in the form of the number of failures that occur and which cards are at fault. The feature provides MAP commands to display data for a specified XPM or for all XPMs this feature supports. The two sets of data that are available with MAP commands are short-term failure counts and long-term failure counts.

Short-term failure counts

The system stores short term failure counts from the last time a unit became active. Operating company personnel can use this data to guide maintenance activities and to support organizations for outage analysis. If an outage occurs, include the XPM Diagnostic History data for that peripheral with other necessary data.

Long-term failure counts

The system stores long-term failure counts from the last time long-term failure counts are reset. Manual action or BCS application reset failure counts. Long-term failure counts last for the life of the BCS. This data goes back to

Trouble isolation and correction (continued)

the design groups to provide data for additional diagnostic system improvements.

The system implements the functionality this feature describes on SuperNode and BNR Reduced Instruction Set Computing (BRISC) platforms. The system supports the diagnostics and associated cards necessary for the *SWACT controller* on NT40 platforms. The NT40 data store requirements cause this restriction. The diagnostic results and suspect cards captured are less for the NT40 platform than the SuperNode or BRISC platforms.

Description of diagnostics

Different PM contain different hardware. Different diagnostics run on each type of PM. There are approximately 75 diagnostics for XPMs. A subset of the 75 diagnostics runs on any PM. This feature captures failures for the following types of diagnostics:

- in-service
- out-of-service
- single diagnostic
- facility audit
- other audits

Each diagnostic identifies zero or more cards as the XPM determines. The CC can generate card lists for display at the MAP terminal or in logs. The system includes any card a XPM diagnostic or audit identifies and reports to CC in a list of card failures.

Note: Feature AF5006 records the cards that an XPM identifies. Feature AF5006 does not record cards the CC generates.

Diagnostics can be grouped together and run as a set of diagnostics or as a single test. Commonly defined sets are:

- in-service tests
- out-of-service tests
- facility audit tests
- mate diagnostics
- ROM diagnostics

In-service and out-of-service tests

In-service and out-of-service tests are solicited tests. These tests run because of CC requests. The CC can request to test an XPM unit. The CC tests the

Trouble isolation and correction (continued)

XPM unit with the manual TST command, manual or system RTS, SWACT, BSY or REX commands. When this event occurs, the XPM runs a set of diagnostics. The diagnostics included in the set can vary. The following conditions can cause the diagnostics to vary.

- the PM type of the XPM
- the state of the XPM unit
- the activity of the XPM unit

When the unit is in service, the XPM runs a set of in-service diagnostics. When the unit is out of service, the XPM runs a set of out-of-service diagnostics.

The system returns the results of separate diagnostics and a final result for the complete set to CC. When cards are defective, the system generates a card list. The system transfers the list to CC at the end of the set of tests.

In-service diagnostics improvements

The in-service tests *ABDIAG* and *RFMTDIAG* are added or improved.

The test ABDIAG tests the NT6X44 time switch card to verify that the system can insert A-, B-, C-, D- and SV bits. This test uses the NT6X69 message interface card to provide a constant data pattern to the outgoing speech bus. A P-side loop routes the data to the incoming speech bus where the NT6X69 card checksums the data. The NT6X44 inserts the desired bit into the data stream where the NT6X69 checksums the bits.

The test RFMTDIAG tests the NT6X72 remote formatter card. This test verifies that all accessible locations of the looparound delay RAM the speech bus delay RAM. This test uses the NT6X69 message interface card to provide data to the incoming speech bus through an acquired C-side loop.

For the looparound delay RAM test, the system routes data through the looparound delay RAMs in the NT6X41 speech bus formatter. The system sends the data to the outgoing speech bus. The system routes the data through the speech bus delay RAM to the DS-1 port for a speech bus delay RAM test. This event occurs if a DS-1 port is available. The system routes looped data from the DS-1 port to the outgoing speech bus. The NT6X69 messaging card checksums multiple frames of data. This action occurs to make sure the system verifies all locations the system can test for both tests.

The looparound delay RAM test replaces the CHNL_LOOP_TEST and provides improved memory cell testing for the delay RAM. The speech bus delay RAM test is a new in service test.

Trouble isolation and correction (continued)

Facility audit

The facility audit is a set of diagnostics the XPM runs to test the XPM. If problems occur, the system sends a message to CC that indicates the problem and a list of defective cards.

Mate diagnostics

If the system loses communications with one unit, the mate unit can diagnose that unit. The mate unit sends the results sent to CC.

ROM diagnostics

If the XPM is at ROM level, the system can start a set of ROM diagnostics.

This feature does not capture failures or cards that the mate and ROM diagnostics identify. For each diagnostic, the system generates a card list or log at the MAP terminal. The diagnostic history does not record a card list or diagnostic failure.

The following table describes diagnostics this feature supports. The system classifies the diagnostics as *solicited, audit*, or *both*. The system identities the diagnostics the *SWACT controller* requires.

Diagnostics supported (Sheet 1 of 2)

Diagnostic name	Description	Type	Required by SWACT controller
ABDIAG	A-, B-, C-, D-, and SV-bits	solicited	no
AMUDIAG	NT6X50 external loop	solicited	no
CSD1 DG	C-side DS-1	solicited	no
CMRDIAG	CLASS modem resource (CMR) card	both	no
CONT DG	Continuity diag	solicited	no
CSMDIAG	Channel supervision message (CSM) diag	solicited	no
CS SPCH	Network links	solicited	no
DS1DIAG	P-side DS-1	solicited	no
DS30A	NT6X48/NTMX74 audit	audit	no

Trouble isolation and correction (continued)

Diagnostics supported (Sheet 2 of 2)

Diagnostic name	Description	Type	Required by SWACT controller
FAC AUD	Facility audit	audit	no
FORMATR	Local formatter	solicited	no
MSGDIAG	NT6X69 messaging card	solicited	yes
MSG IMC	IMC link	both	yes
MX76 MSG	NTMX76 messaging card	solicited	yes
PADRING	NT6X80 pad/ring	solicited	no
PARITY	Parity audit	audit	yes
PS LOOP	P-side loops	solicited	no
PS SPCH	P-side speech links	solicited	no
RCC FMT	Remote formatter	solicited	no
RFMTDIAG	Remote formatter diag	solicited	no
SCM AB	NT6X81 A/B bits	solicited	no
SCM MSG	SCM A/B DDL Msg	solicited	no
SPCH DG	Speech path	solicited	no
STRDIAG	Special tone receiver	solicited	no
SYNC DG	Sync diag	both	yes
TONES DG	Tone diag	both	no
TS DIAG	Time switch diag	solicited	no
UTRDIAG	Universal tone receiver (UTR)	solicited	no

Trouble isolation and correction (continued)

The following table lists cards that this feature supports.

Supported cards (Sheet 1 of 2)

Card name	Description
NT6X40	Net interface link
NT6X41	Speech bus formatter and clock
NT6X42	CSM
NT6X44	Time switch and A/B-Bit logic
NT6X45	Master/signaling/file processor
NT6X46	SP memory
NT6X47	MP memory
NT6X48	DS30A interface
NT6X50	DS-1 interface
NT6X55	DS-0 interface
NT6X62	STR card
NT6X69	Messaging card
NT6X70	Continuity card
NT6X72	RCC host link formatter
NT6X78	CLASS Modem Resource (CMR) card
NT6X79	Tone generator
NT6X80	SCM Pad/Pad ring
NT6X81	SCM A/B-bit
NT6X85	SCM DS-1
NT6X86	SCM MSG
NT6X92	Universal tone receiver (UTR)
NT8X18	SMSR C-side DS30A interface

Trouble isolation and correction (continued)

Supported cards (Sheet 2 of 2)

Card name	Description
NTMX76	CSM + MSG card
NTMX77	68020 processor (UP)

Storage of diagnostics

This feature stores diagnostic results in the form of counters. Each unit of each peripheral this feature supports has a set of counters. The system keeps counters for diagnostic failures and for defective cards. The system keeps three types of counters:

- *diag* - the number of times a diagnostic fails
- *card* - the number of times the system reports a card as defective
- *diag and card combination* - the number of times a diagnostic and card collection occurs

The system keeps two subcounters for each of the three counters. These counters are a short-term failure counter and a long-term failure counter. Feature AF5007 uses the short-term failure counter to determine if a SWACT is necessary. The system resets short-term failure counters often in the BCS cycle. Long-term failure counters record the diagnostic history of a peripheral or office over a long period of time. The QUERYPM DIAGHIST RESET command or by a BCS application can reset long-term failure counters.

A single test failure can report one or more diagnostic failures and zero or more cards that are defective. A diagnostic that runs in one unit can report cards in that unit and the mate unit. When a diagnostic fails, the separate diagnostic routine sends the failure information to the history database. The following

Trouble isolation and correction (continued)

table summarizes how each type of counter increases and the differences for NT40 platforms.

Counter Increments

Counter	SuperNode, BRISC	NT40
Diag	Increments short and long-term failure counts for all diagnostics on the unit where the diagnostic runs.	Increments short and long-term failure counts for diagnostics the *SWACT controller* requires.
Card	Increments short and long-term failure counts for all cards in the unit or units where the card is located.	Increments short and long-term failure counts for cards that associate with diagnostics the *SWACT controller* requires.
Diag and card	Increments short and long-term failure counts for all collections of diagnostics and cards. This counter is for cards in the same unit the diagnostic runs.	The NT40 does not store Diagnostic and card collections because of data store limits.

Resets and timestamps

The history database stores five timestamps for every peripheral:

- *for the node*
  - — the time when long-term failure counters are last reset
- *for unit 0*
  - — the time when short-term failure counters for unit 0 are last reset
  - — the time when the last diagnostic failure occurred on unit 0
- *for unit 1*
  - — the time when short-term failure counters for unit 1 are last reset
  - — the time when the last diagnostic failure occurred on unit 1

Short-term counters are set to zero internally on a unit basis when a unit becomes active. This gain of activity can occur because of an RTS or SWACT command. An XPM posted at the MAP terminal resets the long-term counters on a node basis. When the XPM sets the long-term counters again, the system generates a log. This log has a summary of the data collected for that node before the reset.

Trouble isolation and correction (continued)

A BCS application resets all diagnostic history data, including short and long-term failure counts. In this example, the system does not generate a log with long-term failure counts.

Ring pretrip on LCM lines

A ring pretrip is an early ring trip and a false indication of an answered ringing telephone

In NA009, the PRETRIP nonmenu command adds to the LCM level. The PRETRIP command provides operating company personnel the:

- option to enable or disable pretrip log reports on the posted LCM or all LCMs in the posted set
- option to enable or disable extension of the ring trip filter timing on all 4FR lines on the posted LCM or all LCMs in the posted set
- ability to query the status of the two previous pretrip options

Note: When a new LCM tuple is entered in table LCMINV, the value for LOGS and 4FR are set to DISABLE by default.

In response to the command string HELP PRETRIP, the command syntax is displayed at the MAP terminal as follows.

```
>help pretrip
PRETRIP : AVAILABLE RINGING PRETRIP OPTIONS
    LOGS: Enable/Disable Pretrip LOG Reporting for
          the posted PM or posted set of PMs.
    4FR:  Used to reduce Ring Pretrip occurrences on
          long loop length 4FR lines.  Enabling this
          command results in extension of the Ring
          Trip filter timing for ALL lines serviced
          by the posted PM or posted set of PMs.
 Query:   Displays the status of Pretrip options
Parms: <OPTION>     {LOGS     <ACTION>  {ENABLE   [<OPTION> {ALL}],
                                          DISABLE   [<OPTION> {ALL}]} [<NOWAIT>{NOWAIT}],
                    4FR       <ACTION> {ENABLE    [<OPTION> {ALL}],
                                          DISABLE   [<OPTION> {ALL}]} [<NOWAIT> {NOWAIT}]
                    QUERY}
```

Pretrip log reports

Pretrip log reports are enabled or disabled for a posted LCM or all LCMs in the posted set. If the LCM is in service, the effect is immediate. Otherwise,

Trouble isolation and correction (continued)

the LCM is updated during the next RTS. You must enter one of the following actions with the command string PRETRIP LOGS.

- ENABLE - This enables recording of LINE113 log reports for the posted LCM when the system detects a pretrip.
- DISABLE - This prevents any LINE113 log reports from being generated when the system detects a pretrip on a posted LCM.

You can enter the following optional parameters with either of the previous actions.

- ALL - This results in the selected action being applied to all LCMs in the posted set.
- NOWAIT - This option prevents waiting for confirmation that the command has been completed.

For example, to record LINE113 logs for all pretrips detected on all LCMs in the posted set, activate the logs feature by typing

```
>PRETRIP LOGS ENABLE ALL
```

and pressing the Enter key.

When a pretrip occurs and the pretrip logs are enabled, a LINE113 log is output. An example of a LINE113 log follows.

```
LINE113  JAN27 09:14:14 6220 TBL
   KRCM 03 0 19 04    DN 6195441578
   TROUBLE CODE = RINGING_FAILED
   RINGING TROUBLE = PRETRIP
   CALLID = 98776
```

When a pretrip occurs on a line that connects to an LCM, a LINE138 log is output. A LINE138 log identifies the call that was routed to a treatment. An example of a LINE138 log follows.

```
LINE138 JAN27 09:14:14 6321 INFO TRMT
   KRCM 03 0 00 08    DN 6195441579
   TREATMENT SET = SYFL   CALLED NO = 5441578
   CALLID= 01D8 0003
```

After two pretrips occur, the line is scheduled for a diagnostic. If the diagnostic fails, a LINE101 log is generated. An example of a LINE101 log follows.

Trouble isolation and correction (continued)

```
LINE101 JAN27 09:16:05 3782 FAIL LN_DIAG
   KRCM 03 0 01 06    DN 6195441586
   DIAGNOSTIC RESULT  Ringing Failed Pre Trip
   ACTION REQUIRED  Chk Ringing
   CARD TYPE  6X17AC
```

Pretrip on 4FR lines

The command string PRETRIP 4FR ENABLE is used to reduce ring pretrip occurrences on long loop length 4FR lines served from the posted LCM or all LCMs in the posted set. The effect of this command is not immediate and will not be realized until the next RTS of the LCM. You must enter one of the following actions with the command string PRETRIP 4FR.

- ENABLE - This extends 4FR line ring filter timing.
- DISABLE - This returns to non-extended 4FR line ring filter timing.

The following optional parameters can be entered with either of the previous actions.

- ALL - This results in the selected action being applied to all LCMs in the posted set.
- NOWAIT - This option prevents waiting for confirmation that a command has been completed.

For example, entend 4FR line ring filter timing for all LCMs in the posted set by typing

```
>PRETRIP 4FR ENABLE ALL
```

and pressing the Enter key.

Display status of pretrip options logs and 4FR

Display the status of options LOGS and 4FR by typing

```
>PRETRIP QUERY
```

and pressing the Enter key.

An example of a system response to the PRETRIP QUERY command string follows.

Trouble isolation and correction (end)

```
 CM    MS     IOD     Net     PM     CCS     Lns     Trks     Ext  APPL
  .     .      .       .     1LCM     .       .        .       .     .
                             *C*

LCM                SysB     ManB     OffL     CBsy     ISTb       InSv
 0 Quit        PM    0         0        2        0        2          42
 2 Post_       LCM   0         0        0        0        2           9
 3 ListSet
 4 SwRG     LCM  HOST 00 0  InSv     Links_OOS:  CSide  0   PSide   0
 5 Trnsl_   Unit0:   InsV                /RG: 1
 6 Tst_     Unit1:   InsV                /RG: 1
 7 Bsy_                                 11  11  11  11  11  RG:Pref 1 InsV
 8 RTS_     Drwr:  01  23  45  67  89  01  23  45  67  89     Stby 0 Insv
 9 OffL            ..  ..  ..  ..  ..  ..  ..  ..  ..  ..
10 LoadPM_  pretrip query
11 Disp_    LCM HOST 00 0 – PRETRIP LOGS are DISABLED
12 Next                     PRETRIP 4FR is DISABLED
13
14 QueryPM
15
16
17
18
```

Product specific test tools

The test tools provided for XPMs apply for the components of an RSC.

9 Troubleshooting chart

This chapter contains the following tables for troubleshooting conditions that cause the system to generate an alarm. These conditions occur in the RSC. This chapter contains separate tables for each of the following Remote Switching Center (RSC) components:

- remote cluster controller (RCC)
- dual RCC (DRCC)
- line concentrating module (LCM)
- remote maintenance module (RMM)

The following table provides RSC alarm clearing procedures for an LCM.

Table 9-1 RSC alarm clearing for an LCM (Sheet 1 of 2)

Alarm condition	Possible cause	Action
Critical	The LCM units indicate either system busy (SysB) or C-side busy (CBsy).	Proceed as follows:Refer to the *Alarm Clearing Procedures* and follow the procedure to clear an LCM critical alarm. 1. Check for any PM or LINE logs that indicate other problems in the LCM. 2. Check any operational measurements (OM) that indicate problems in the LCM.
	Both LCM ringing generators (LCMRG) in a line concentrating equipment (LCE) frame are in-service trouble (ISTb).	Proceed as follows: 1. Refer to the *Alarm Clearing Procedures* and follow the procedure to clear an LCM(RG) critical alarm. 2. Check for any PM or LINE logs that indicate other problems in the LCM. 3. Check any OMs that indicate problems in the LCM.

Table 9-1 RSC alarm clearing for an LCM (Sheet 2 of 2)

Alarm condition	Possible cause	Action
Major	The LCM units indicated are either ISTb or SysB.	Proceed as follows: 1. Refer to the *Alarm Clearing Procedures* and follow the procedure to clear an LCM major alarm. 2. Check for any PM or LINE logs that indicate other problems in the LCM. 3. Check any OMs that indicate problems in the LCM .
	One of the two ringing generators (LCMRG) in an LCE is ISTb.	Proceed as follows: 1. Refer to the *Alarm Clearing Procedures* and follow the procedure to clear an LCM(RG) major alarm. 2. Check for any PM or LINE logs that indicate other problems in the LCM. 3. Check any OMs that indicate problems in the LCM.
Minor	The indicated LCM is ISTb.	Proceed as follows: 1. Refer to the *Alarm Clearing Procedures* and follow the procedure to clear an LCM minor alarm. 2. Check for any PM or LINE logs that indicate other problems in the LCM. 3. Check any OMs that indicate problems in the LCM.

10 Advanced troubleshooting procedures

Advanced trouble locating procedures

Maintenance personnel use advanced trouble locating procedures when normal troubleshooting procedures do not clear a fault. A PMRESET can be performed more than one time on the remote cluster controller (RCC). If an error message occurs after each PMRESET attempt, the advanced troubleshooting procedures is used. When this condition occurs, use the PMDEBUG tool. Refer to the *PMDEBUG Users Guide* for additional information.

Under normal troubleshooting procedures, a faulty component is busied and tested. A list of cards appears at the MAP (maintenance and administration position) as a result of this test. The card at the start of the list often causes the component problem. When you replace the problem card, test the faulty component again. If the component passes this test, return the component to service (RTS). The troubleshooting procedure is complete.

If normal troubleshooting procedures do not restore a component to service, use advanced troubleshooting procedures. Operating company personnel use MAP responses from failed troubleshooting attempts to formulate a maintenance method. Use advanced step action procedures to repair a component fault.

Using the XPM footprint tool

The footprint tool collects data when key events occur in the Remote Switching Center (RSC). This data can determine the cause of failures. The data is stored in buffers that survive all RSC restarts and resets. The restarts and resets include RSC program reloads. You can retrieve the data after an RSC outage. Memory buffers are a circular queue of events that contain information about different RSC operations and results. These buffers appear either in a raw hex format or in a readable format.

The XPM footprint tool has two event storage buffers: the active buffer and the holding buffer. These buffers make sure data saved from the previous

outage does not overwrite. When an outage occurs, the active and holding buffers are swapped. The buffer that was active before the outage is locked. The buffer does not overwrite if the RSC goes through more than one initialization when the buffer is locked.

Note: Not all of the buffers are locked.

Buffers are not locked for the following planned RSC outages:

- manual warm activity switches (SWACT)
- routine exercise (REX) tests
- busy (Bsy) operations
- if the holding buffer is locked

The footprint tool records critical events in the RSC with appropriate data during the normal operation of the RSC. When the active buffer is full, the buffer wraps around to the start of the data area. The buffer overwrites data and events already captured. This wrap records the latest events in the footprint area but the wrap can cause data loss. To avoid lost data, the footprint tool groups events in classes. The event types stored by the footprint tool occur in the following RSC classes:

- maintenance
- sync
- activity
- diagnostics
- audits
- messaging
- patcher
- call processing
- PMDEBUG
- static data

You can select or omit these classes of events to refine the data collected to prevent data overflow in the buffer. If the suspected cause of the outage is one diagnostic, this class is enabled and other classes omitted. This action focuses data collection on the diagnostic.

When the RCC unit is close to restart, the tool records an additional set of events. This data contains the type and cause of failure. The tool saves

specified system variables. The RCC decides before restart if the active buffer must lock. This decision is based on the following conditions:

- If the drop request originates from the central control (CC), the buffers are not locked. The system can request a buffer lock.
- If the drop request originates from an internal RCC decision, the buffers are locked.

A footprint information area indicates when the data wraps around to the start of the data area. The footprint information area also indicates the size of the footprint area and the address of the last used buffer. This data is used when the RCC cannot return to task level. The read-only memory (ROM) firmware must dump the data.

An audit unlocks a buffer after 24 hours to prevent the loss of data from additional RSC outages. The system generates a PM189 log when the active buffer is locked or freed.

The following examples describe the type of information that the footprint tool collects:

- The tool stores every command entered from PMDEBUG. Stored commands are used to determine if a user entered a dangerous command that caused an RSC outage.
- The tool records the start and completion of a patch applied or removed. This record is used to determine if the application or removal of a patch was not correct and caused an RSC outage.

Accessing the data collected

The footprint tool uses the PMDEBUG to select and access the classes of data. At the highest level, the BIGFOOT command allows access to commands to select and display data.

The Bigfoot utility stores information on passed and failed diagnostics. When feature AF5008, *XPM* Control and Trouble Notification Improvements is active, the Bigfoot utility maintains error log information on failed diagnostics. This information enhances debugging efforts. The diagnostics code maintains a results graph for each set of diagnostics that runs. The results graph contains data on each diagnostic test in a diagnostics run. The results graph identifies a diagnostic as passed, failed, not run, or test undefined. An example of the diagnostics graph appears later in this section.

The three main sublevels for these functions are as follows:

- *selection menu* - selects, deletes and queries classes of events to capture.
- *HEX DUMP* - command - displays collected data in raw hex format. This command does not interpret the data. This command allows the quick display of data or loads that do not have a routine to decode.
- *dump routine* - displays formatted data. If a routine to format is not present, the dump routine displays data in raw hex format.

The DISPLAY MEMORY command is used to display data if the RSC component is at the ROM level.

The commands provided to the RSC footprint tool appear in the following table. The footprint tool receives these tools as part of the PMDEBUG user interface.

Table 10-1 RSC footprint commands (Sheet 1 of 2)

Command	Function
DISPLAY DATA	Displays formatted data. This command formats saved data if a display routine is bound in.
DUMP DATA	Displays unformatted data. Data in this command appears in hexadecimal format (16 bytes)
QUERY STATUS	Retrieves the state of the active and holding data areas. The type of information provided appears in the RSC component footprint ID area.
CLASS	Enables, disables, or queries event classes. The state appears for the queried or ALL classes. The command can enable or disable the state.
SURVIVE	Enables, disables, or queries the ability of class settings to survive a restart.
CLEAR	Clears data areas to the first states of the data areas. Resets the RSC component footprint ID area to the first state.

Table 10-1 RSC footprint commands (Sheet 2 of 2)

Command	Function
LOCK	Locks the active or holding data area. Field personnel and technicians can use this command to retain data collected when the tool did not lock the buffers.
UNLOCK	Unlocks the active or holding data area. You can perform this action when the system displays data collected. Perform this action when the data is not required.
HELP	Provides the syntax for the previous commands.

The standardized header for the output routines is as follows:

```
<nnn>      CLASS     EVENT     CC TIME OF EVENT   MAINTENANCE
(#xx)    #yy       01:13:19:12.52
```

where:

nnn =
the buffer number

xx =
the hex value for the given class

yy =
the event number of the given class

Diagnostics results graph output

An example of the diagnostics results graph display output follows:

```
<001>       CLASS       EVENT   CC TIME OF EVENT
    DIAG GRAPH (#0F)  #00   00:00:06:34:58
Diag_id =did_cmr_diag(#7) – CMR Card Diagnostics.
res_num=FF(P=Pass,F=Fail,N=Not Run|Test Undefined,O=Other)
Diag Results Graph: PFNNNNNNNNNNNNNNNNN
```

Powering up the RSC

Use this procedure when the components of the remote switching center are out of service and power is cut. The following steps are the reverse of a power-down procedure. In this procedure, start with the C-side and work toward the P-side of the RCC.

Follow these steps to power up the RCC:

1 Return to service the RCC.

- **a** Set the power switch of one of the RCC units to ON.
- **b** Set the reset button of this RCC unit and, at the same time, flip the associated circuit breaker up. Release the circuit breaker. The circuit breaker must remain up. If the circuit breaker trips down, a problem with the power circuits is present.
- **c** Post the C-side peripheral of the RCC and RTS linked by the message to the RCC. These links are busied when the RSC powered down.
- **d** Repeat steps *a* through *c* for the other RCC unit.
- **e** Post the appropriate RCC. The RCC must be Offl.
- **f** Busy the RCC.
- **g** Load the RCC. List the appropriate device, like D000XPM, use the CC option and type

  >LOADPM PM CC
- **h** Return to service the RCC. Do not use parameters. This method makes sure the RTS sequence includes diagnostics. To RTS the RCC, type

  >RTS PM

2 Return to service the line concentrating modules (LCM) of the RCC.

- **a** Set the power switch of one of the LCM units to ON.
- **b** Set the reset button of this LCM unit and flip the associated circuit breaker up at the same time. Release the circuit breaker. The circuit breaker must stay up. If the circuit breaker trips down, there is a problem with the power circuits.
- **c** Repeat steps *a* and *b* for the other LCM unit.
- **d** Post the first LCM.
- **e** Load one of the LCM units. List the appropriate device, like D000XPM. To use the CC option, type

  >LOADPM UNIT n CC
- **f** Return to service the unit. Do not use parameters. This method makes sure the RTS sequence includes diagnostics. To RTS the unit, type

  >RTS UNIT n
- **g** Repeat steps *e* and *f* for the other LCM unit.
- **h** Continue this procedure until you return all the LCMs to service.

3 Return to service the remote maintenance module (RMM).

1. Set the power switch of the RMM to ON.
2. Set the reset button of this RMM unit and flip the associated circuit breaker up at the same time. Release the circuit breaker. The circuit breaker must stay up. If the circuit breaker trips down, there is a problem with the power circuits.
3. Load the RMM unit. To list the appropriate device, like D000XPM, type

   >LOADPM
4. To return to service the RMM, type

   >RTS
5. Repeat steps *a* through *d* if the remote switching center contains two RMMs.

4 Post the RCC and RTS all of the P-side DS-1 links. The normal procedure is to busy these links when the RSC powered down.

Powering down the RSC

The RSC is a separate switching system. It is not recommended to power down the RSC because communication with other offices is lost. A maximum of 5760 lines can lose service. When a host peripheral is powered down, the loss of service is normally not as great. If the operating company must power down the RSC, perform the steps in the following section.

Follow these steps to power down the RCC:

1 Notify all appropriate personnel that the RSC will power down. Notify personnel both at the host office and at offices that connect to the RCC over P-side trunks.

2 Busy all of the P-side peripheral modules (PM) off the RCC. These PMs include RMMs and line concentrating devices.

3 Offline all of the P-side PMs off the RCC. These PMs include RMMs and line concentrating devices.

4 Busy all of the P-side links off the RCC. The P-side links include both the DS-1 links to other offices.

5 To power down the P-side PMs, set the switch to the associated power converter units to OFF.

6 Busy the inactive unit of the RCC.

7 Post the associated line trunk controller (LTC). Busy the message link that connects to the busied inactive RCC unit.

8 To power down the inactive unit of the RCC, set the power converter of the unit to the OFF position.

9 Busy the active unit of the RCC. Override any warning.

10 Post the associated LTC. Busy the message link that connects to the busied RCC unit.

11 To power down the unit of the RCC that was active, set the power converter of the unit to the OFF position.

Common procedures

Refer to the *PMDEBUG Users Guide* for more information.

11 RSC routine maintenance procedures

This chapter contains the routine maintenance procedures for the remote switching center (RSC). These procedures describe preventive maintenance tasks. These procedures are for maintenance engineering and field maintenance personnel. Maintenance engineering and field maintenance personnel perform these maintenance tasks at scheduled intervals.

Checking torque on grounding bolts

Application

Use this procedure to check the correct torque of grounding bolts.

Interval

Perform this procedure every month.

Common procedures

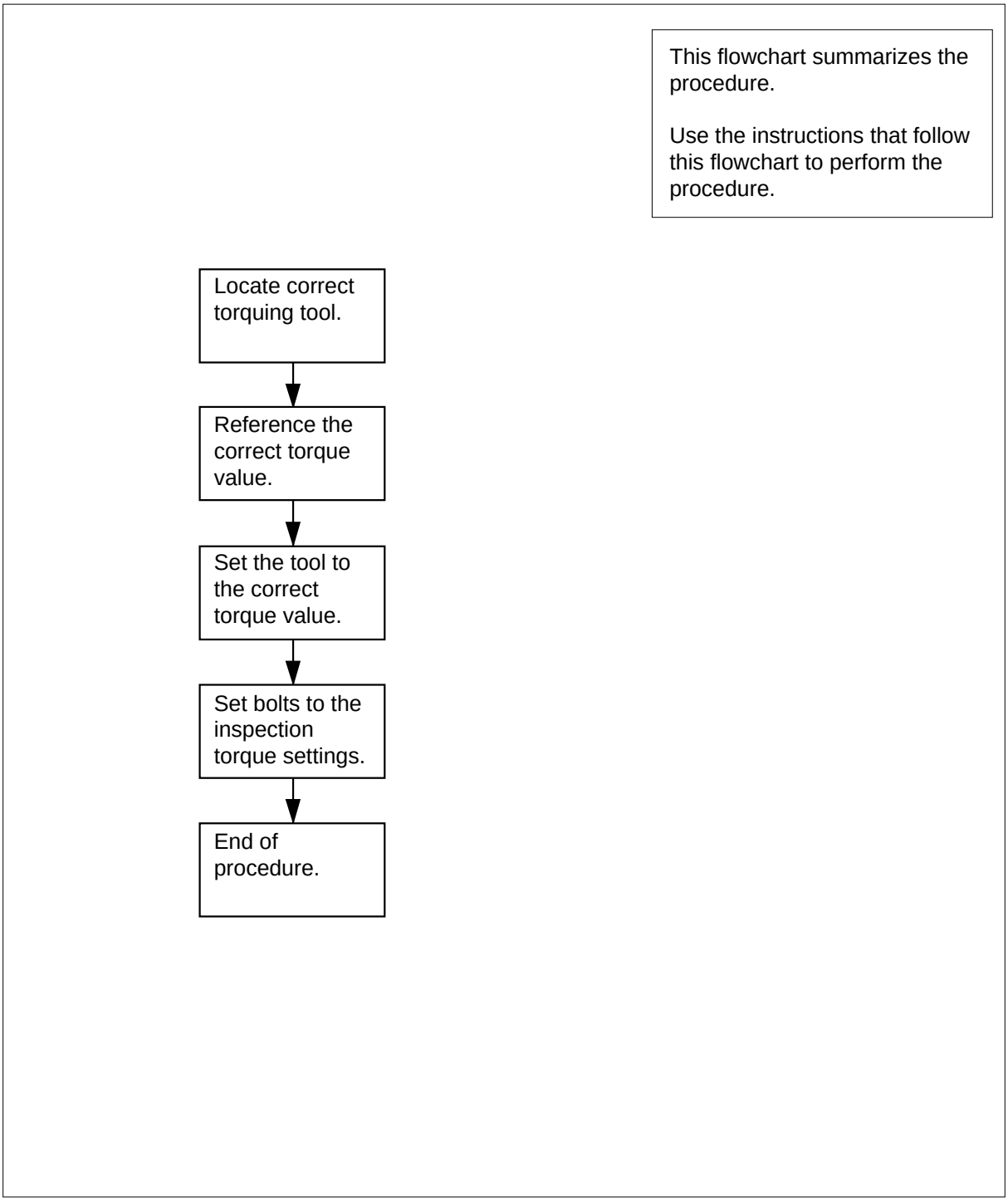
Does not apply

Action

This procedure contains a summary flowchart as an overview of the procedure. Follow the steps to perform this procedure.

Checking torque on grounding bolts (continued)

Summary of checking torque on grounding bolts



Checking torque on grounding bolts (end)

Checking torque on grounding bolts

At your Current Location

1 Locate the T9958 click-type preset torque wrench.

2 Align the small fractions on the edge of the handle with the center of the main torque scale.

3 To set the correct inspection torque value, turn clockwise to increase value or turn counter-clockwise to decrease value.

If grounding bolts are type	Do
1/4-20 backplane, -48 V ground first nut	step 4
1/4-20 backplane, -48 V ground second nut	step 5

4 Set inspection torque to 5 ft/lb. Proceed to step 6.

5 Set inspection torque to 25 in/lb.

6 Position the wrench on the grounding bolts and tighten to the inspection torque specification.

7 Return the T9958 torque wrench to the appropriate location.

8 The procedure is complete.

Inspecting and changing bulbs

Application

Use this procedure to inspect and replace defective fan fail, aisle end, and frame supervisory panel (FSP) bulbs.

Interval

Perform this procedure one time each month.

Common procedures

There are no common procedures.

Action

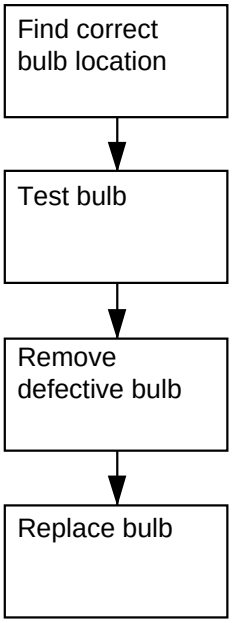
This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Inspecting and changing bulbs (continued)

Summary of Inspecting and changing bulbs

This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.



Inspecting and changing bulbs (end)

Inspecting and changing bulbs

At your current location

1 Use the following procedures to inspect the fan fail, aisle end, and FSP panel bulbs.

If bulbs are	Do
fan fail bulbs	step 2
aisle end bulbs	step 3
FSP panel bulbs	step 4

2 Flip the ALM override switch on the FSP to ON.

If fan fail bulb	Do
does not light	step 5
lights	step 9

3 Press a fuse on the fuse pad on the FSP.

If aisle end bulb	Do
does not light	step 5
lights	step 9

4 Press a fuse on the fuse pad on the FSP.

If FSP panel bulb	Do
does not light	step 6
lights	step 9

5 Remove bulb cover. Grasp the bulb tightly with two fingers, squeeze, and pull out. Go to step 7.

6 Remove the bulb frame casing. Grasp the aisle end or FSP panel bulb tight with two fingers, squeeze, and pull out. Go to step 7.

7 Replace with new bulb.

8 Attach bulb cover again.

9 The procedure is complete.

Inspecting cooling unit filters

Application

Use the following procedure to inspect cooling unit filters in cabinet cooling units.

Interval

Perform this procedure every two weeks.

Common procedures

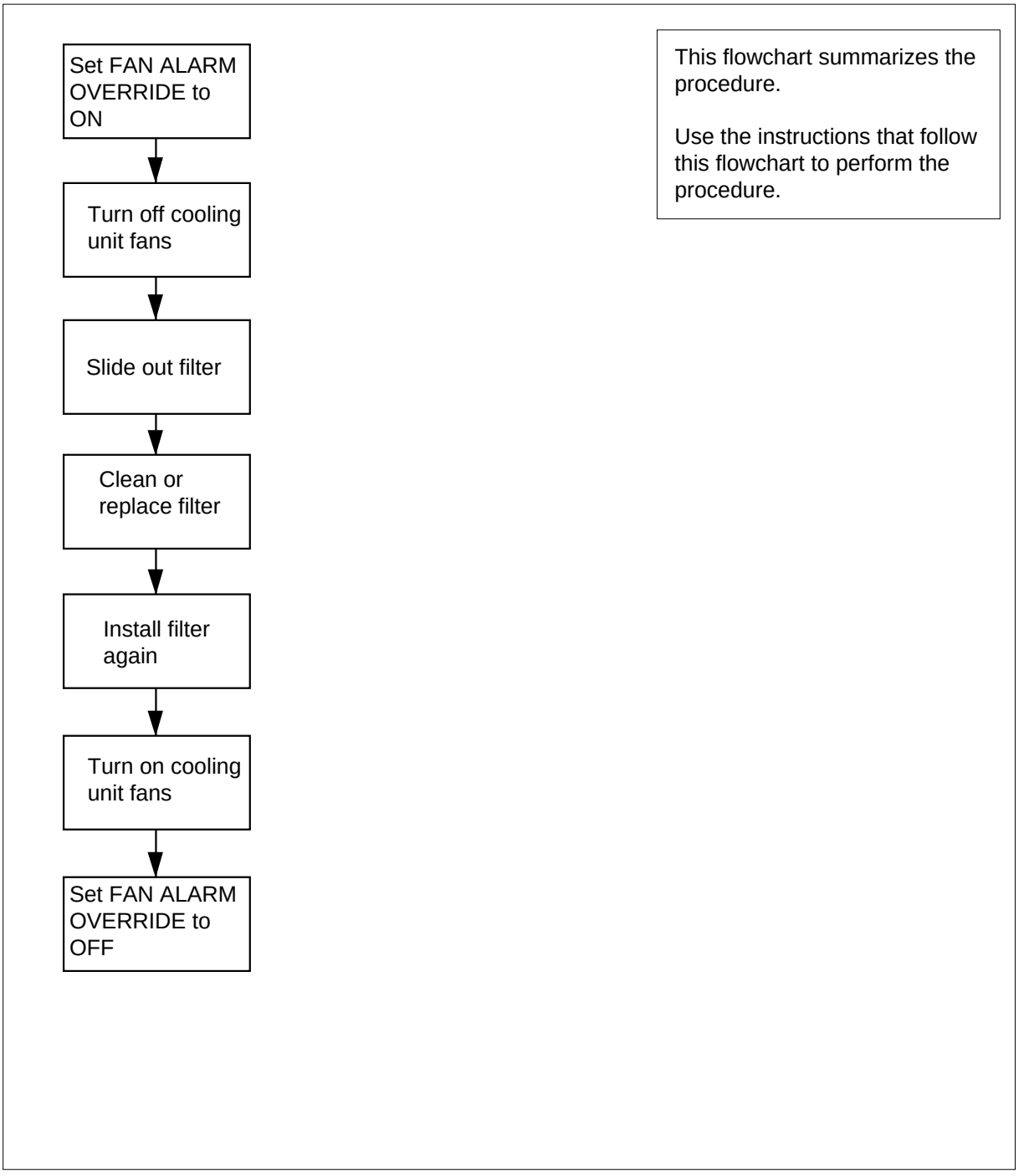
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review this procedure. Follow the steps to perform this procedure.

Inspecting cooling unit filters (continued)

Summary of Inspecting cooling unit filters



Inspecting cooling unit filters (continued)

Inspecting cooling unit filters

At your Current Location

1

DANGER
Rotating fan blades
Do not reach more than 6 in. beyond the upper lip of the air-intake grill. You risk injury because your fingers can contact the rotating blades of the cooling unit fans.

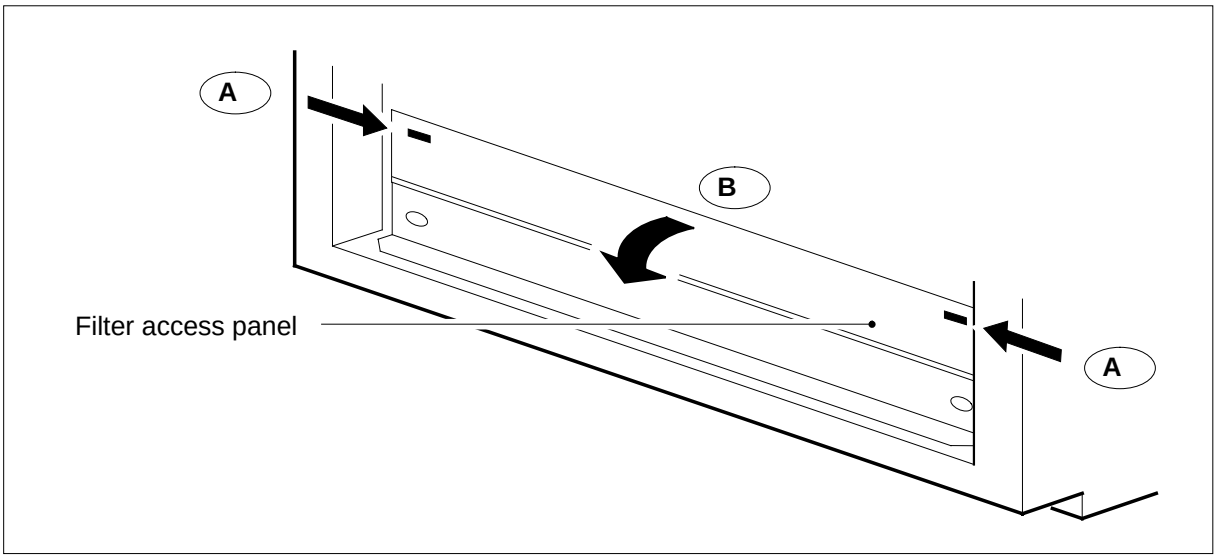
On the frame supervisory panel (FSP), set the FAN ALARM OVERRIDE switch to ON.

2

DANGER
Prevent overheating
Do not leave the cooling unit fans off for longer than 30 min.

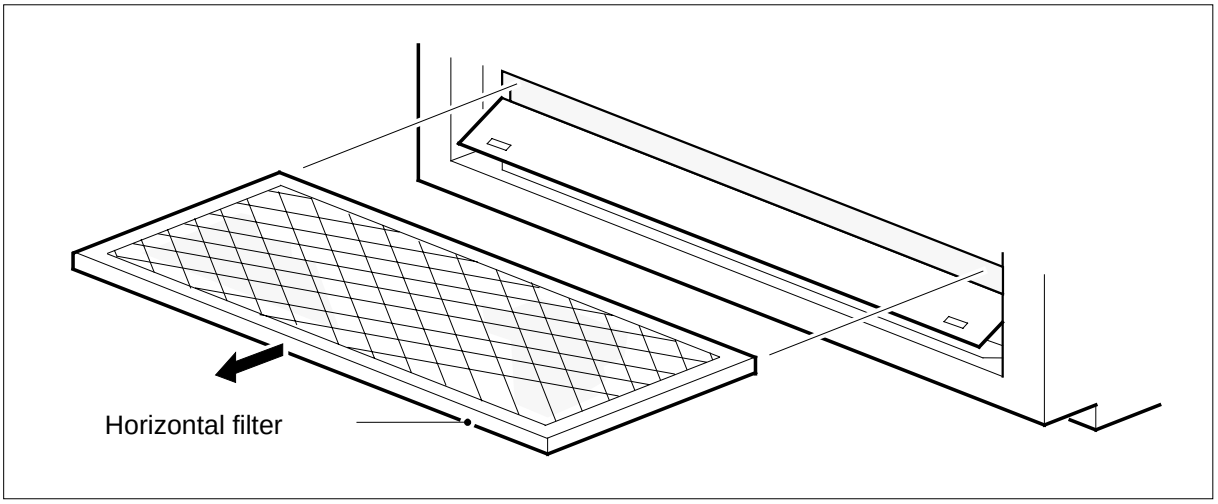
To make sure the cooling unit fans are off, remove fuses F03 and F04 on the faceplate of the FSP.

3 To open the filter access panel, slide the catches toward each other (A) and swing the panel downward (B). The filter access panel is at the bottom of the cabinet.



Inspecting cooling unit filters (continued)

4 Slide the filter out of the cabinet.



If filter surfaces	Do
appear dirty	step 7
appear clean	step 5

5 Shine a trouble light through the filter.

If light	Do
is visible through the filter	step 6
is not visible through the filter	step 7

6 Install the filter in the cabinet again. Go to step 16.

7 Read the following table to determine the next step.

If filter part number	Do
is A0344437	step 8
is P0558302	step 11
is P0623539	step 13

8 Clean the cooling unit.

9 Slide the replacement filter back into the cabinet.

10 Close the filter access panel. Go to step 16.

11 Vacuum the filter in an area outside the room that contains the switching system.

12 Install the filter in the cabinet. Go to step 16.

Inspecting cooling unit filters (end)

13 Wash the filter in soap and water.

14 Before you install the filter again, rinse and dry the filter completely.

15 Install the filter in the cabinet.

16 Replace the fuses you removed in step 2.

17 On the front of the FSP, set the FAN ALARM OVERRIDE switch to OFF.

18 The procedure is complete.

Inspecting spare fuse holders

Application

Use this procedure to inspect spare fuse holders. Fill the fuses again as needed.

Interval

Perform this procedure at two week intervals.

Common procedures

There are no common procedures.

Action

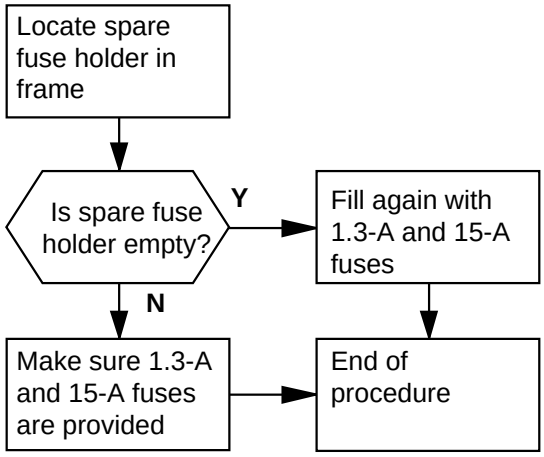
This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Inspecting spare fuse holders (continued)

Summary of Inspecting spare fuse holders

This flowchart summarizes the procedure.

Use the instructions that follow this flowchart to perform the procedure.



Inspecting spare fuse holders (end)

Inspecting spare fuse holders

At your current location

1 Locate the spare fuse holder in the frame supervisory panel (FSP).

If spare fuse holder	Do
is empty	step 2
is not empty	step 3

2 Fill the spare fuse holder again with the following fuses and circuit breakers:

- 15-A circuit breakers for the -48 V shelf feeds
- 1.3-A fuses for the alarm battery supply (ABS) feeds

Go to step 4.

3 Make sure that enough of the following fuses and circuit breakers are provided:

- 15-A circuit breakers for the -48 V shelf feeds
- 1.3-A fuses for the alarm battery supply (ABS) feeds

4 The procedure is complete.

Returning a card for repair or replacement

Application

Use this procedure to return a circuit card (like a power converter) to Northern Telecom for repair or replacement. Your location, Canada or the United States, determines the documents you must complete. Your location determines to which address you must return the card.

Interval

Perform this procedure as needed.

Common procedures

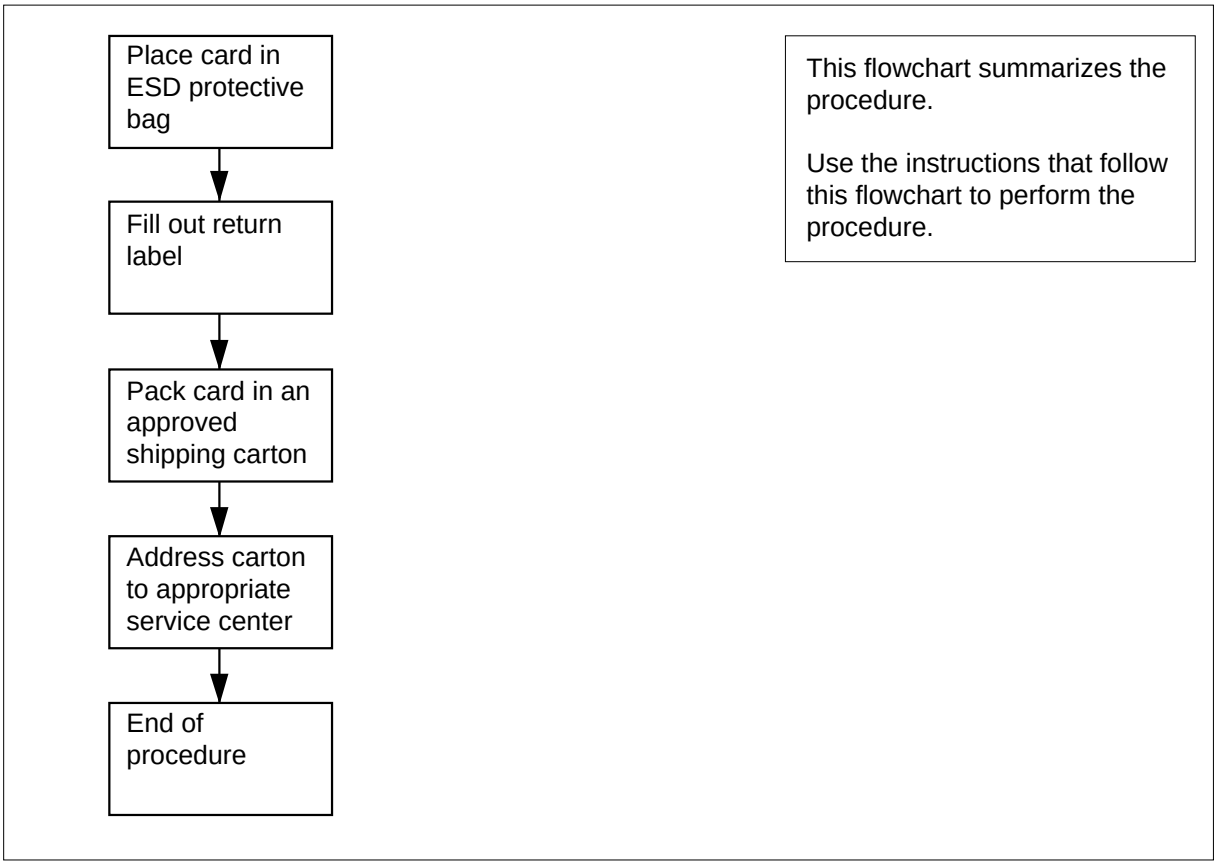
There are no common procedures.

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Returning a card for repair or replacement (continued)

Summary of returning a card for repair or replacement



Returning a card for repair or replacement

At your current location

1 Place the card in an electrostatic-discharge protective bag.

If your location	Do
is in Canada	step 6
is in the United States	step 2

2 Fill in the return label for each card you return. If return labels are not available, use any available blank label. For help to fill out the labels, call the Nortel Customer Service Center at 1-800-347-4850.

3 Pack the card or assembly in a Nortel card shipping carton and seal the carton.

Returning a card for repair or replacement (continued)

If a Nortel shipping carton is not available, use any available carton. Make sure that you perform the following actions:

- enclose each card or assembly in packing paper
- surround each card or assembly in bubble pack or foam
- secured each card or assembly in the carton so that no card or assembly can shift

4 Address the carton and send the carton to Nortel at the following address:

Nortel Customer Service Center

4600 Emperor Blvd.

Morrisville, North Carolina 27560

5 Go to step 11.

6 Fill in one return label (form 24-115) for each card or assembly you return.

Make sure that you include the following information:

- return authorization number from customer service
- Nortel product engineering code (PEC)
- serial number
- release number
- batch change supplement (BCS) release software used at the time of replacement
- peripheral module load name
- description of the failure and action taken to repair
- fault code that describes the fault best (see the bottom of the label)
- name of your company
- office identifier code
- your name
- site name

For help to fill out the label, call 905-454-2808. In the event of an emergency, call 905-457-9555.

7 Attach one copy of the card label to a card latch.

8 Keep the other copies of the label for your records.

9 Pack the card or assembly in a Nortel shipping carton and seal the carton.

If a Nortel shipping carton is not available, use any available carton. Make sure that you perform the following actions:

- enclose each card or assembly in packing paper
- surround each card or assembly in bubble pack or foam
- secure each card or assembly in the carton so that no card or assembly can shift

10 Address the carton and send the carton to Nortel at the following address:

Nortel Customer Operations

Returning a card for repair or replacement (end)

```
c/o Wesbell Transport
1630 Trinity Road
Unit #3, Door#4
Mississauga, Ontario
L5T 1L6
```

11 This procedure is complete.

Testing the dead system alarm

Application

Use this procedure to verify that the dead system alarm is operating correctly.

Interval

Perform this procedure monthly.

Common procedures

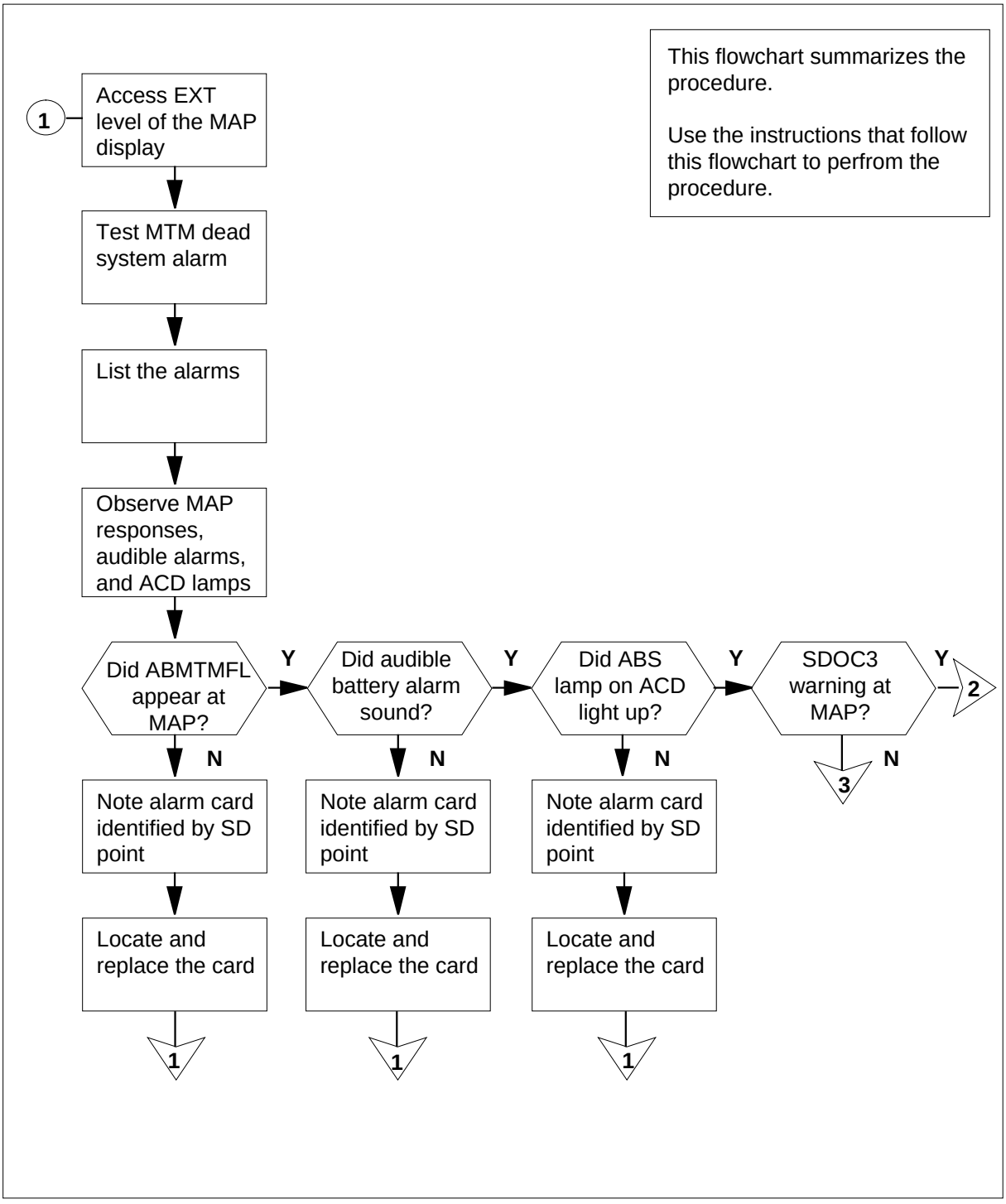
There are no common procedures

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

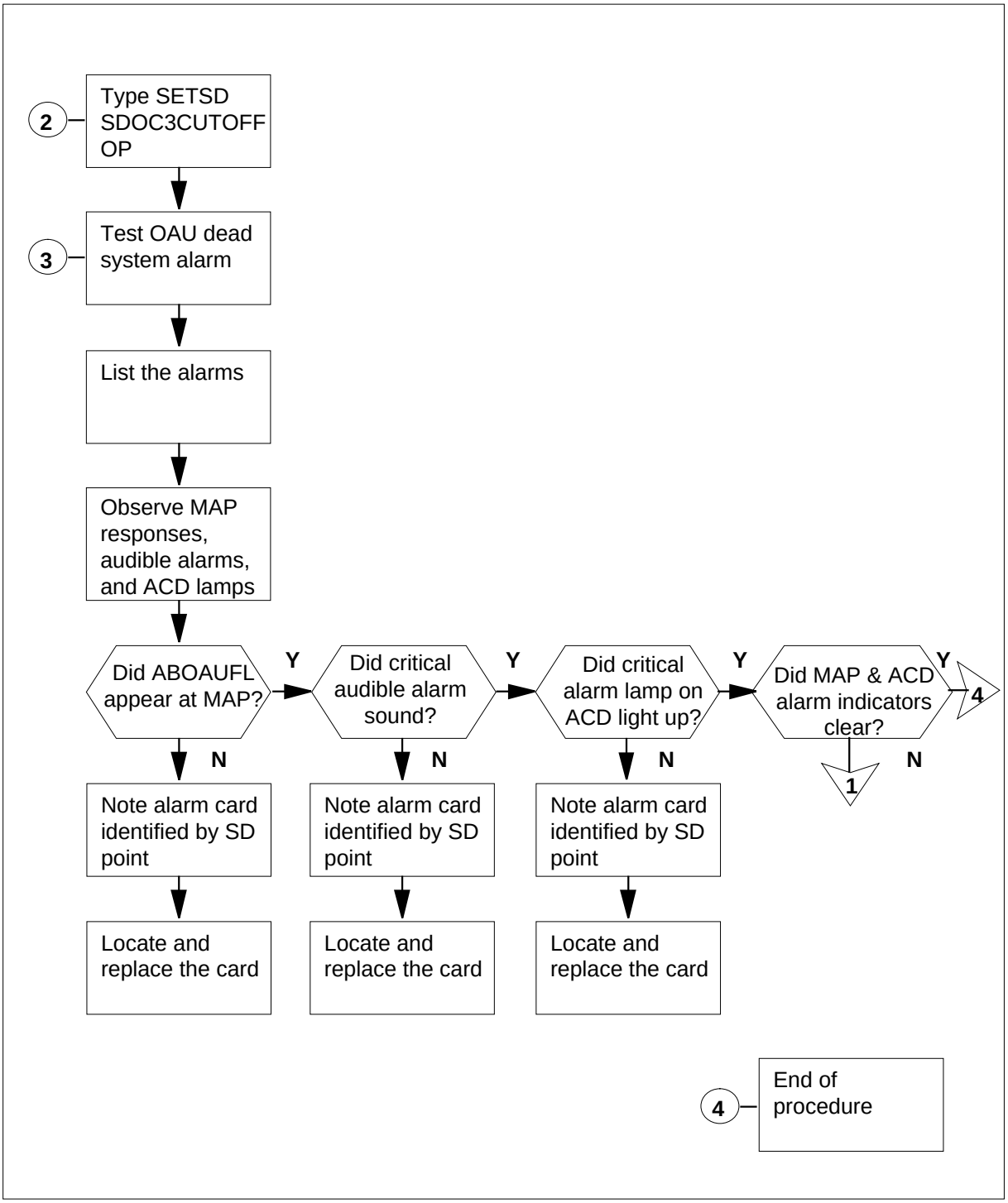
Testing the dead system alarm (continued)

Summary of Testing the dead system alarm



Testing the dead system alarm (continued)

Summary of Testing the dead system alarm (continued)



Testing the dead system alarm (continued)

Testing the dead system alarm

At the ACD

1 In offices equipped with NT0X63 alarm control and display panels (ACD), ensure that the AUDIBLE ALARM DISABLE switch is set downward.

At the MAP terminal

2 To access the EXT level of the MAP screen, type

```
>MAPCI;MTC;EXT
```

and press the Enter key.

3 To test the dead system alarm, type

```
>TSTDSALM MTMFAIL 12
```

and press the Enter key.

4 Wait 15 seconds. To get a list of alarms, type

```
>LIST MAJ;LIST MIN
```

and press the Enter key.

5 Observe the responses on the MAP screen, listen for audible alarms, and examine the lamps on alarm and control display panel.

If	Do
ABMTMFL was *not* displayed at MAP screen	step 6
audible battery alarm did *not* sound	step 6
ABS lamp on ACD panel did *not* activate	step 6
Ithe system displays: WARNING --SDOC3 SENT ON DEAD SYSTEM at MAP screen	step 18
you observe none of the above indications	step 19

Testing the dead system alarm (continued)

6 Note the alarm card identified by one of the following SD points:

- MTMFAIL
- OAUFAIL
- CRALMAUD
- CRALMVIS

Proceed to step 7 to locate the card.

7 To access system table ALMSD, type

```
>TABLE ALMSD
```

and press the Enter key.

8 To position on the field bearing the name of the SD group, type

```
>POS sd_group
```

and press the Enter key.

where

sd_group
is the SD group name identified in step 5

9 To list the table, type

```
>LIST
```

and press the Enter key.

10 Note the entry under SDGROUP.

11 To exit from the table type

```
>QUIT
```

and press the Enter key.

12 To access system table ALMSDGRP, type

```
>TABLE ALMSDGRP
```

and press the Enter key.

Testing the dead system alarm (continued)

13 tp position on the field noted in step 10, type

>POS sd_group

and press the Enter key.

where

sd_group
is the SD group noted in step 10

14 To list the entries, type

>LIST

and press the Enter key.

15 Note the entries under TMTYPE, TMNO and CARDCODE. This information identifies the location of the card.

16 To exit the table, type

>QUIT

and press the Enter key.

17 Replace the card. Return to step 1 of this procedure.

18 To respond to the warning, type

>SETSD SDOC3CUTOFF OP

and press the Enter key.

19 To test the dead system alarm, type

>TSTDSALM OAUFAIL 12

and press the Enter key.

20 Wait 15 seconds. To get a list of alarms, type

>LIST MAJ;LIST MIN

and press the Enter key.

21 Observe the responses on the MAP screen, listen for audible alarms, and examine the lamps on alarm and control display panel.

If	Do
ABOAUFL was not displayed at MAP terminal	step 6
critical audible alarm did not sound	step 6
critical alarm lamp on ACD panel did not activate	step 6
you observe none of the above indications	step 22

Testing the dead system alarm (end)

22 Wait 60 seconds. Note any changes on the MAP display and the ACD panel. The following changes should occur:

- On the MAP display, the alarm under the Ext header disappears.
- On the ACD panel, the critical alarm lamp turns OFF.
- On the MAP screen, the ACD lamp turns OFF.

If above changes	Do
occur	step 24
do not occur	step 23

23 It is possible that you missed a problem. Return to step 1 and repeat this procedure.

24 The dead system alarm is correct. This procedure is complete.

Testing power converter voltages

Application

Use this procedure to test power converter voltages for power converters in the remote switching center (RSC) cabinets.

Interval

Perform this procedure in six month intervals.

Common procedures

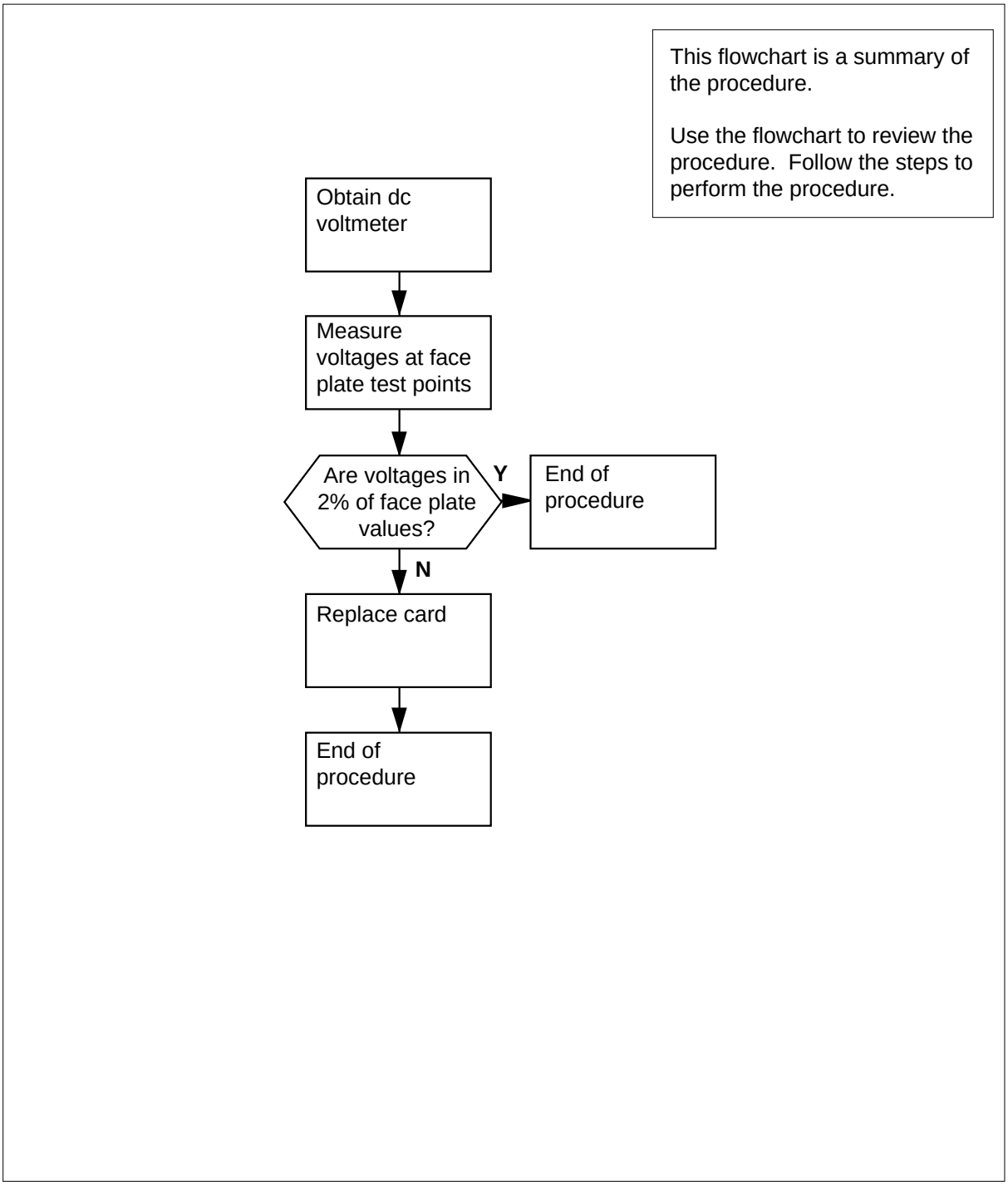
Does not apply

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Use the steps to perform the procedure.

Testing power converter voltages (continued)

Summary of Testing power converter voltages



Testing power converter voltages (end)

Testing power converter voltages

At your Current Location

1 Obtain a dc voltmeter.

2 Measure the voltage at the test points on the faceplates of the power converters in the equipment frame.

3 The voltages must be in 2 % of the nominal values that appear on the faceplate. Compare the voltages measured in step 2 with the acceptable voltage ranges that appear in the following table:

Test point voltage	Acceptable range
+12 V	+11.76 V to + 12.24 V
-12 V	-12.24 V to -11.76 V
+ 5 V	+4.9 V to +5.1 V
-5 V	-5.1 V through -4.9 V

If test point voltages	Do
are in acceptable range	step 5
are not in acceptable range	step 4

4 Replace the NT2X70 power converter. Refer to *Card Replacement Procedures*. When you return to this procedure, go to step 5.

5 The procedure is complete.

Testing wrist strap grounding cords

Application

Use this procedure to verify the resistance of wrist strap grounding cords. The resistance must be suitably low, to allow static electricity to discharge from the person that wears the strap. The resistance must be suitably high, to prevent electrocution if the equipment develops a short-circuit while a user wears the wrist strap.

Interval

Perform this procedure one time a month.

Common procedures

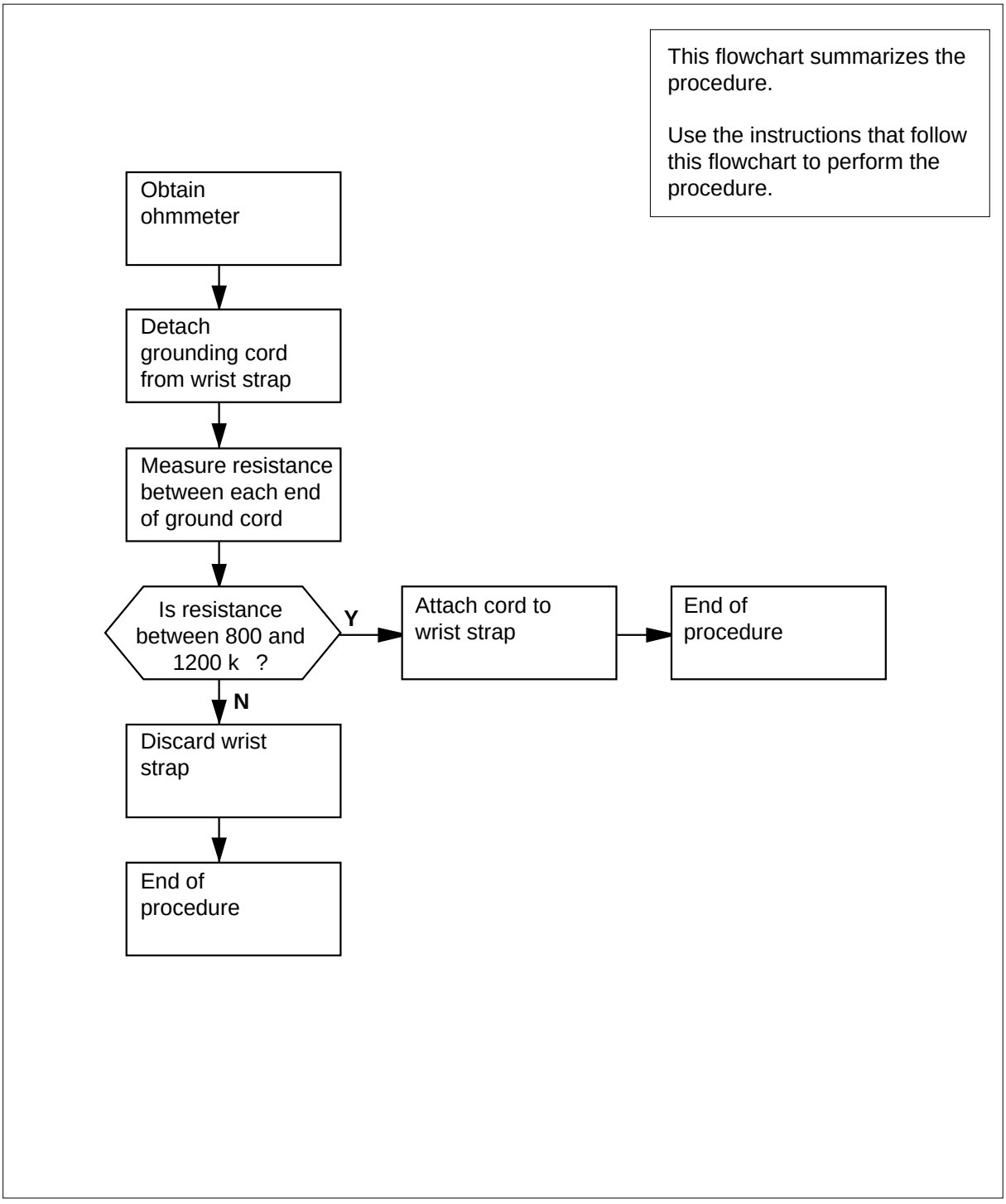
There are no common procedures

Action

This procedure contains a summary flowchart and a list of steps. Use the flowchart to review the procedure. Follow the steps to perform the procedure.

Testing wrist strap grounding cords (continued)

Summary of Testing wrist strap grounding cords



Testing wrist strap grounding cords (end)

Testing wrist strap grounding cords

At your Current Location

1 Obtain an ohmmeter.

2 Detach the grounding cord from the wrist strap.

3 Measure the resistance between opposite ends of the grounding cord with the ohmmeter.

If resistance is	Do
between 800 kΩ and 1200 κΩ	step 4
not between 800 kΩ and 1200 κΩ	step 5

4 You can use the grounding cord and wrist strap assembly. Assemble the wrist strap to the grounding cord.

Go to step 6.

5

DANGER
Risk of electrocution
The grounding cord is safe to if its resistance measures higher than 800 kohms only. A lower resistance exposes the person that wears the strap to the risk of electrocution. Electrocution is a risk if the equipment short-circuits while the user wears the wrist strap.

WARNING
Damage to electronic equipment
A grounding cord that has a resistance higher than 1200 kohms is can not conduct static charges to ground correctly. It will not protect sensitive electronic equipment against build-ups of damaging static charges.

Discard the assembly. *Do not attempt to use it.*

6 The procedure is complete.

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DMS-100 Family

Remote Switching Center

Remote Switching Center Maintenance Manual

Volume 1 of 2

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Electronic mail: cits@nortelnetworks.com

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