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DMS-10 and DMS-100 Families

Billing Media Converter II

BISYNC Operation, Administration, and Maintenance Guide

BMCB001 and up   Standard   01.02   September 2000

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DMS-10 and DMS-100 Families

Billing Media Converter II

BISYNC Operation, Administration, and Maintenance Guide

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About this document

When to use this document

This document contains the operation, administration and maintenance for the Billing Media Converter II (BMC II). This document contains information specific to BMC II Bisynchronous (BISYNC) systems equipped with 3 1/2" disk drives (1 gigabyte of capacity). This document is not intended for use with BMC II BISYNC systems equipped with 5 1/4" disk drives (30-, 72-, 140-megabytes of capacity). Users of BMC II BISYNC systems equipped with 5 1/4" disk drives should refer to the original Cook Electric Division manuals (document numbers 215xxx), as listed in the *Related documents* subsection of this section.

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 feature release. For example, the first release of the document is 01.01. In the *next* feature 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* feature release cycle. For example, the second release of the document in the same feature release cycle is 01.02.

This document is written for all DMS-10 and DMS-100 families offices. More than one version of this document may exist. DMS-100 Switching System users can determine whether they have the latest version of this document and how documentation for the product is organized by referring to the release information in *North American DMS-100 Northern Telecom Publications Cancellation Index*, 297-1001-001.

References in this document

The following documents are referred to in this document:

- BMC II BISYNC Reference Manual - DMS-10 Systems, 215115.
- BMC II BISYNC Reference Manual - DMS-100 Systems, 215117.
- *Billing Media Converter Functional Tests*, IM-26-0453.
- *BMC (Billing Media Converter 3.5") Install - Test - DMS-10*, IM 26-1170.
- *BMC (Billing Media Converter 3.5") Upgrades - DMS-10*, IM 26-1170.
- *LATA Switching System Generic Requirements (LSSGR)*, TR-TSY-000064, PUB 48501.

What precautionary messages mean

The types of precautionary messages used in Northern Telecom (Nortel) documents include warning and caution messages. Warning and caution messages indicate possible risks.

Example of the precautionary messages follow.

WARNINGPossibility 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 remover 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.

Section 060-INDP-110
System Index

The purpose of this section is to provide a brief description of the sections that are contained within this document. The sections in this document are specific to the use of the Billing Media Converter II (BMC II - hereafter referred to as BMC), used in the Independent LATA Switching System Generic Requirements (INDP LSSGR) application, that perform polling using the Bisynchronous (BISYNC) protocol and perform software downloads using the ASCII protocol.

Section List

This document is divided into sections by user function. Some sections are oriented towards equipment repair by a craftsperson, while others suit the needs of day-to-day system users. These sections provide the information necessary for a particular user to understand the BMC system functions as they pertain to a job function. The numbers associated with each section are taken from the long-standing format of the BMC documentation prepared by the Cook Electric Division of Nortel.

Some of the sections found in the original Cook Electric Division manuals are not replicated in this document. The information in these sections can be found in the Installation Manuals (IMs) listed in the *Related documents* subsection of the *About this document* section. The following sections are not included in this document:

- 060-INDP-210 - Installation Guide
- 060-INDP-211 - Performance Test Requirements
- 060-INDP-810 - System Audit Test Requirements.

060-INDP-110 - System Index

This section provides document identification information and a section listing.

060-INDP-111 - System Description

This section provides an overview of the hardware and software elements of the BMC system.

060-INDP-310 - System Administration

This section provides procedures and information to coordinate and manage the BMC.

060-INDP-410 - Command and Message Guide

This section provides information for the user to enter BMC commands and interpret system messages.

060-INDP-510 - System Operation Guide

This section provides information to describe the operational processes of the BMC system when fully functional.

060-INDP-610 - Maintenance Procedures Guide

This section provides information and procedures for corrective and preventive maintenance.

060-INDP-710 - DMS-10 Switching System Specific Data

This section provides descriptive information for the characteristics and requirements for BMC systems associated with a DMS-10 Switching System.

060-INDP-711 - DMS-100 Switching System Specific Data

This section provides descriptive information for the characteristics and requirements for BMC systems associated with a DMS-100 Switching System.

Section 060-INDP-111
System Description

This section provides a description of the BMC Network Teleprocessing System. The BMC is a plug-compatible, remotely-accessible replacement for billing record tape drive units. The BMC provides local storage of billing records. The BMC is designed to interface directly with the DMS-10 and DMS-100 Switching Systems. Billing record information captured by the Switching System is transmitted to the BMC. These records are maintained by the BMC until a request for polling is received from an authorized Host Office Controller (HOC). The BMC does not alter call records, but acts as a storage media until the HOC can remotely access and request call records. Polling functions are conducted through the use of the BISYNC 3270 or 3780 protocol. New software downloads are offered from a Nortel-based host using the ASCII protocol (Pollstar not required).

The BMC emulates the tape drives originally used in the Switching System. All control signals, wait states, and interface requirements for standard tape drives are duplicated in the BMC by the Tape Emulation Circuit (TEC - DMS-10 only) or Data Stream Interface (DSI - DMS-100 only) Printed Circuit Assembly (PCAs). The TEC/DSI PCA interfaces with the Switching System through existing tape ports and provides the appropriate response to all control signals, commands, and data transmitted from the Switching System. This results in a transparent replacement for tape drive units.

The BMC enhances the processing of call record data of the LSSGR by providing remote access capability. An authorized HOC can access the BMC through dial-up or dedicated, voice-grade lines. Call records are polled using the BISYNC (1200-9600 baud) communication protocol. Polling rates are user-selected up to 9600 baud.

The BMC provides several levels of security. The modems at the BMC and at the HOC must be compatible. The system passwords must be correct. The System Administrator can define three levels of security for each command to the BMC from the maintenance ports. Security varies with the requirements of the Operating Company.

System description - Hardware

The BMC consists of two processor units physically connected together. Figure 2-1 provides a view of the general appearance of the BMC. The two processor units are electronically linked through crossover capability, which enables either unit to communicate with either of the disk drives. This feature safeguards against the loss of billing data in the event of a circuit fault. The two units are functionally identical, each with a power supply and disk drive. During normal operation, only one of the units is doing the work, with the other unit in a warm standby mode. All data is written to both disk drives. Only one of the disk drives is accessed for read operations. In the event of a system malfunction, operation is automatically switched to the warm standby unit.

Each BMC cabinet is approximately 24 inches (618 mm) high by 19 inches (483 mm) wide by 14 inches (362 mm) deep. Each unit, power supply, and disk drive is housed in a separate chassis. Each BMC cabinet is constructed of aluminum to both decrease unit weight and to protect against Electromagnetic Interference (EMI) effects.

The external dimensions of a BMC cabinet are provided in Figure 2-2.

External connections to the Switching System are made through bulkhead connectors provided on the sides of the cabinet as shown in Figures 2-3 and 2-4. The bulkhead connectors are located as follows, when viewing the BMC unit from the rear:

- Right Side: Data and Peripheral Interface connectors.
- Left Side: Power, Ground, and Alarm Interface connectors.

Each chassis back panel is secured to the unit with eight captive screws. One ventilation screen is mounted on each of these panels for the purpose of providing an air intake for the three ventilation fans mounted inside the chassis. The back panels may be removed for inspection, installation, or troubleshooting, but should be in place during testing and normal operation.

Both chassis in the BMC cabinet contain a front cover made of aluminum and secured to the front edges of the chassis with four screws. The cover mounted to the top chassis contains an EMI window, which allows an operator to view the various switch and status panel controls located on the front of the cabinet.

Note: The front cover and the back panel of the cabinet should be kept closed during all normal operation.

Figure 3-1
Billing Media Converter II
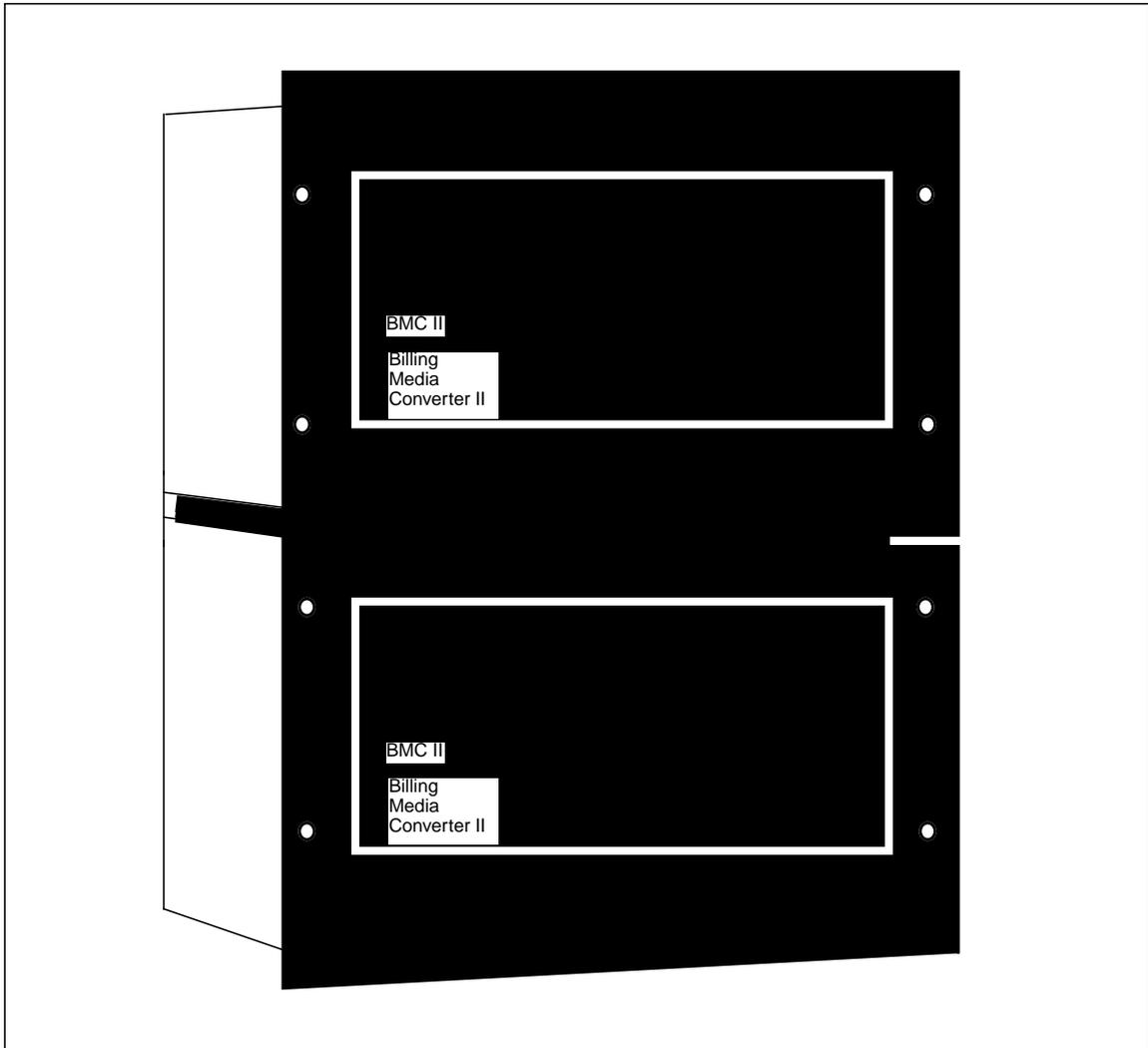
Figure 3-1
BMC cabinet dimensions

17.52 in.
(445 mm)

Shipping
Bracket

14.25 in.
(362 mm)

TOP VIEW

24.34 in.
(618 mm)

FRONT VIEW

19.00 in.
(482.6 mm)
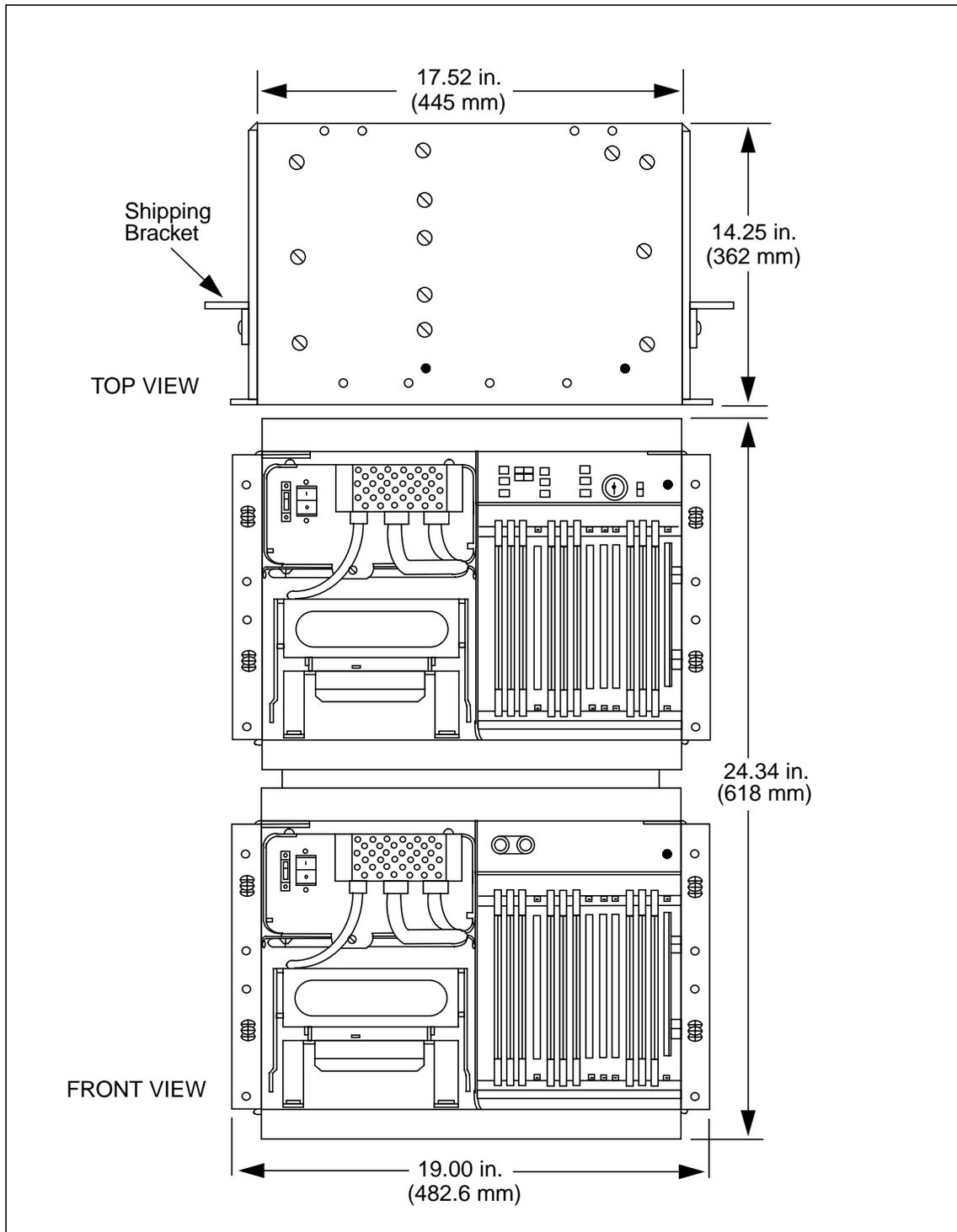
Figure 3-1
Data and Peripheral Interface connectors
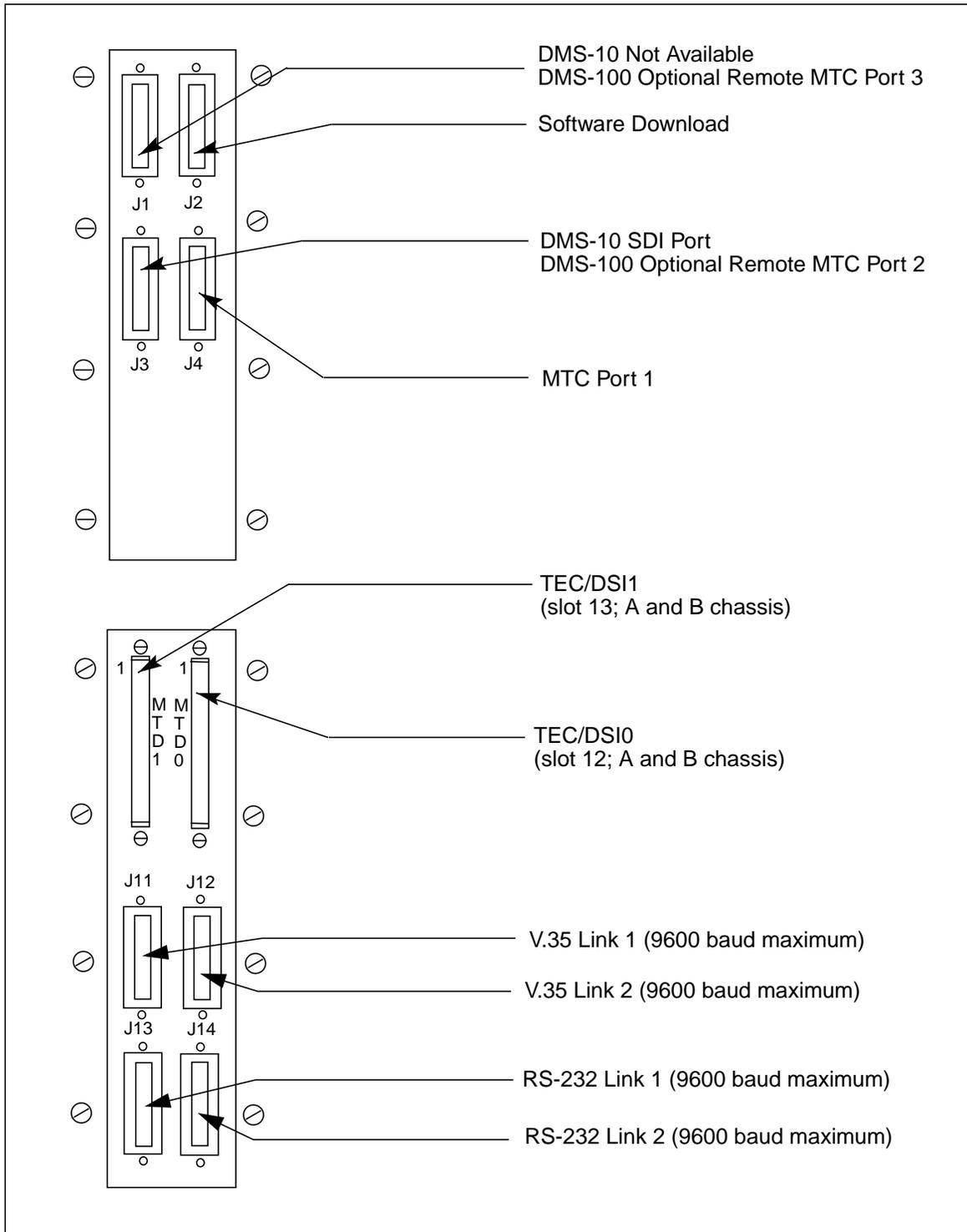
Figure 3-1
Power, Ground and Alarm Interface connectors

DC Input Power

Alarms

J15

J16

Frame Ground Stud

FR

DMS-10 Only +12V
fuse for J17 (fused
at 5A. 12 volt power
from the BMC to
3T11 Interface Box.
+12 volt power is
not wired for other
applications.

J17

J18

F1

DMS-100 Logic (Signal) Ground
(DMS-10; +12V AUX, fused at P1)

No longer used.
Was the 19 VAC input
(60 HZ Clock; optional)
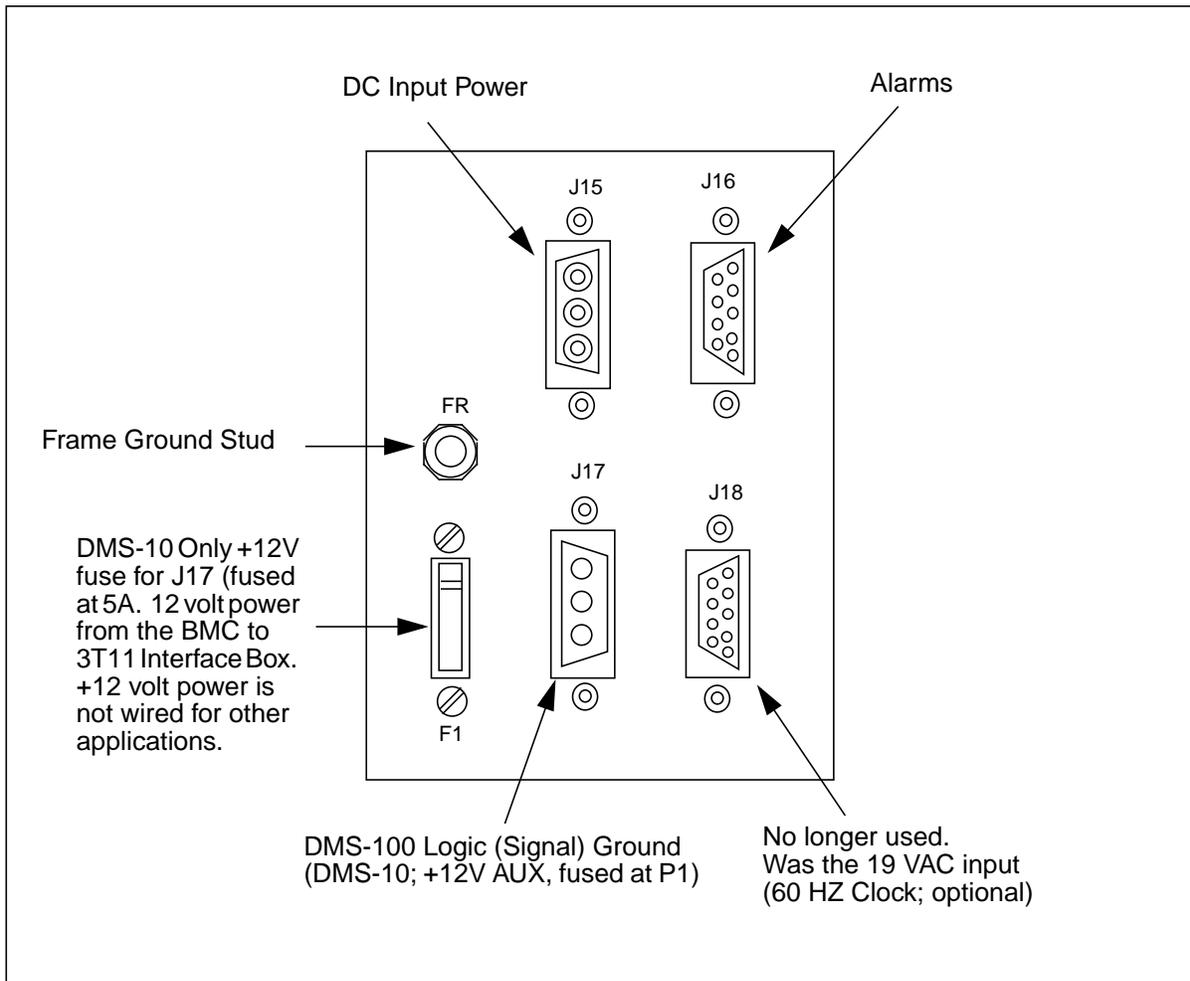
The BMC employs two complete processing units, one identified as the A chassis, the other as the B chassis. The A chassis is physically located above the B chassis, the two units being connected together as shown in Figure 2-5. The A chassis assembly contains the A processor and provides the Switch and Status panel for the system. The B chassis assembly contains the B processor and the Filler Panel with Fan Assembly.

Figure 3-1
BMC cabinet subassemblies

Switch and
Status Panel

Processor A
Circuit Boards

A1------------------------A14

Processor A chassis

A20 Power
Supply

A21 Disk
Drive A

B20 Power
Supply

B21 Disk
Drive B

Processor B chassis

Filler Panel

B1------------------------B14

Processor B
Circuit Boards

Front View (cover off)
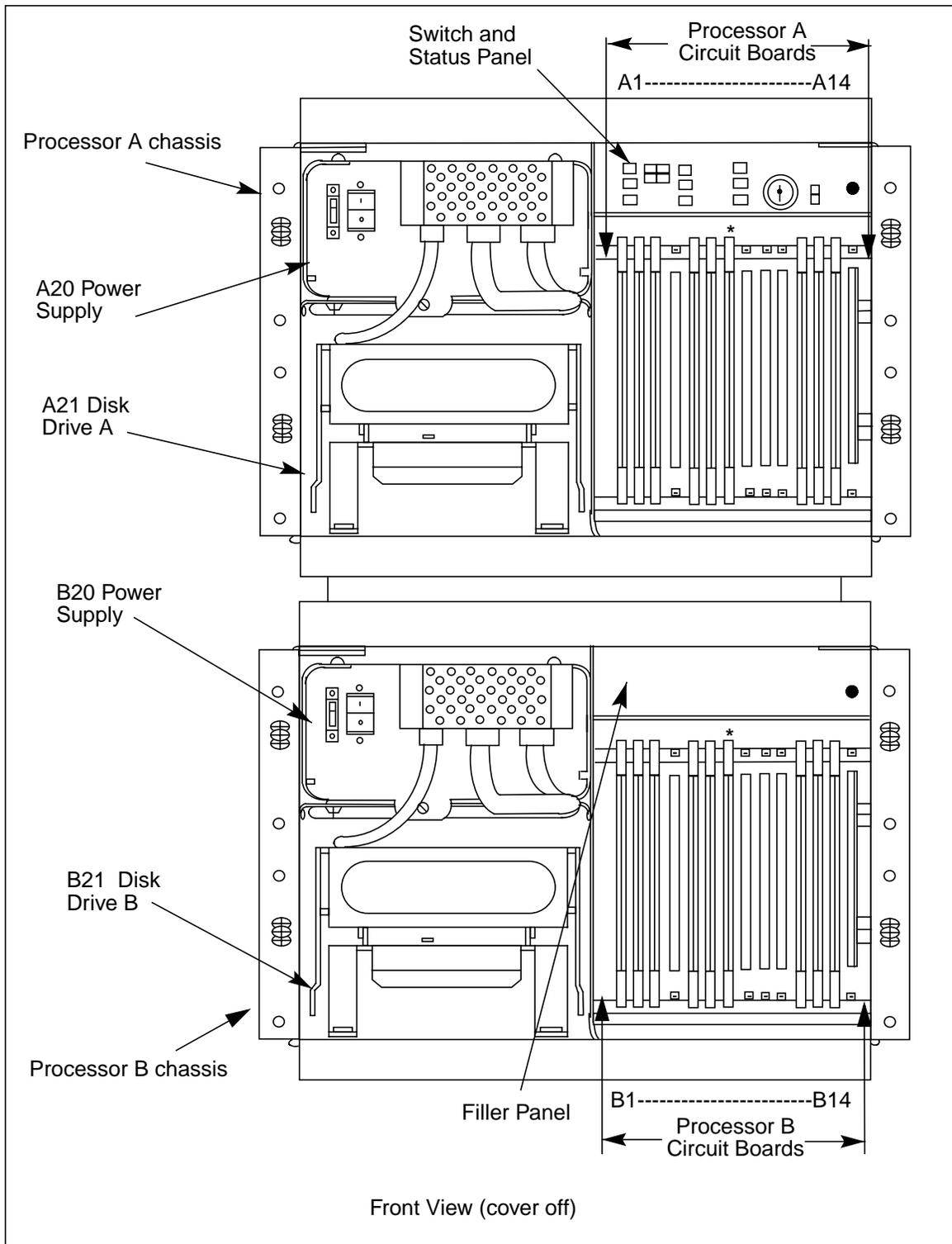
J-Connector identification

These connectors, located on certain subassemblies, are identified by the letter J, followed by up to three digits. For example, both the A and B chassis have J-connectors on the pin side of the backplane; numbers increasing from right to left. AJ2 is located on the backplane of the A chassis.

J-numbered connectors are also located on certain PCAs and are described by first identifying the chassis number, the number of the PCA, and finally the number of the connector. For example, B13 J1 is located in the B chassis on the assembly occupying the 13th slot from the left, viewing the chassis from the front. J numbers on PCAs are clearly marked.

J-numbered connectors are located on certain assemblies, such as the disk drives. Locations of these J-connectors are illustrated in the figures of the specific subassembly.

Pin number identification

Pin numbers of a given connector are identified by up to three digits following the designation of the connector. For example, A13 J1 P34 designates the 34th pin of the connector located thirteen slots from the left in the card rack of the A chassis, viewed from the front.

In many cases, locating a pin requires first locating the position of Pin 1. Manufacturers use a variety of means to locate Pin 1; a dot (.), a printed number 1, or a triangle are most common. Ribbon cables with multi-colored conductors use a brown wire on the cable and a triangle on the connector to indicate Pin 1. Many connectors have even-numbered pins on one side, odd-numbered pins on the other. Some connectors, such as the DB-25 types used in the BMC, number pins consecutively left to right, top to bottom, returning to the left of the next row when the end of the upper row has been reached.

Component description

The following paragraphs describe the components that comprise the BMC.

BMC central processor unit

Both Central Processor Units (CPUs) can control the BMC and are electronically linked to allow either processor to assume control should the other fail. A Small Computer System Interface (SCSI) disk crossover capability is also provided so that either CPU can communicate with either disk drive. This crossover capability safeguards against the loss of data if there is a malfunction in either processor. If the system were to malfunction, the standby processor automatically takes control.

PCA racks

Typical subassembly and circuit assembly locations are shown in Figure 2-6. The illustration shows that two PCA racks (A and B) are used. PCAs are designated A1 through A14 in the A (upper) chassis; B1 through B14 in the B (lower) chassis. The A and B prefix designations are not marked on the equipment. Figure 2-6 provides the PCA identifiers and locations.

A backplane circuit assembly comprises the rear of the card rack. The backplane circuit assembly provides the sockets for the installation and interconnection of the PCAs. Sockets are numbered, from left to right, 1 to 14 in each chassis. The backplane circuit assembly provides the interconnections between the plug-in PCAs and the other circuit assemblies and subassemblies in each BMC chassis.

All BMC equipment employs a standard complement of circuit assemblies to provide basic system operation. The following PCAs are rack-mounted in BMC systems:

- two - CPU Logic PCAs
- two - EPROM PCAs
- two - DRAM Expansion PCAs
- one - Error Control II PCA (A chassis)
- one - Error Control II Jumper PCA (B chassis)
- two - Quad Serial Input/Output (SIO) PCAs
- two - 56K Interface PCAs
- two - SCSI Interface PCAs
- four - TEC/DSI PCAs
- two - Bus Terminator PCAs.

Other circuit assembly locations

Circuit assemblies are used in locations other than the card racks as described in the following paragraphs.

There are PCAs located at the rear of the cabinet, on a hinged panel, as shown in Figure 2-7. The PCAs used at these locations are the Power and Alarm Communication (P/A Comm) PCA, SCSI Crossover PCAs (in the A chassis), and 56K Crossover (in the B chassis).

Located on the Power Filter Panel (bottom rear of both the A and B chassis) is a Fan Filter PCA. The Power Filter Panel also holds a Fan Assembly. There is another Fan Assembly located in the B chassis behind the Filler Panel.

Figure 3-1
Printed Circuit Assembly identifiers and locations

Processor B
B1 CPU LOGIC PCA
B2 EPROM PCA
B3 MEMORY EXPANSION PCA
B4
B5 ERROR CONTROL II JUMPER PCA
B6 QUAD SIO PCA
B7 56K INTERFACE PCA
B8
B9
B10
B11 SCSI INTERFACE PCA
B12 TEC/DSI PCA
B13 TEC/DSI PCA
B14 BUS TERMINATOR PCA

Processor A
A1 CPU LOGIC PCA
A2 EPROM PCA
A3 MEMORY EXPANSION PCA
A4
A5 ERROR CONTROL II PCA
A6 QUAD SIO PCA
A7 56K INTERFACE PCA
A8
A9
A10
A11 SCSI INTERFACE PCA
A12 DSI/TEC PCA
A13 DSI/TEC PCA
A14 BUS TERMINATOR PCA

NOTE:

Reference designation A and B are shown for clarity. They are not printed on the equipment.

Figure 3-1
Auxiliary circuit assembly locations

Left rear of chassis
(with cabinet back removed)

Hinged card panel
(closed)

Power and Alarm
Communications PCA
(A16) or 56K Crossover
PCA (B16)

a. View with hinged card panel closed

SCSI Crossover PCA
(A15 and B15)
(opposite side of hinged panel)

Left rear of chassis
(with cabinet back removed)

SCSI Crossover PCA
(A15 and B15)

Hinged card panel
(open)

b. View with hinged card panel open

Power and Alarm Communications
PCA (A16) or

List of equipment assemblies and subassemblies

Table 2-1 lists the assemblies and subassemblies used in the BMC system. The list provides reference designations, abbreviated names, full names, part numbers, and usage notes, where applicable.

Table 2-1
List of assemblies and subassemblies

Reference designat or	ABBR name	Full name - part number - usage notes
N/A	BMC II	Billing Media Converter II (system) **(1) NT8M01GC -** BMC BISYNC with 1-GB disk drives for DMS-10 **(2) NT8M04GC -** BMC BISYNC with 1-GB disk drives for DMS-100
A		A Processor (Upper) Chassis - N/A
A1	CPU	Central Processor Unit Logic w/DMA PCA - **NT6M62BA**
A2	EPROM	Erasable, Programmable, Read-Only Memory PCA **(1) NT6M63FI** - for DMS-10 Switching Systems **(2) NT6M63FL** - for DMS-100 Switching Systems
A3	DRAM	Memory Expansion PCA - **NT6M64AA**
A5	ERC	Error Control II PCA - **NT6M65AG**
A6	QUAD SIO	Quad Serial Input/Output PCA - **NT6M60BA**
A7	56K INTF	56K Interface PCA - **NT6M94AA**
A11	SCSI INTF	SCSI Interface PCA - **NT6M66CA**
A12 & A13	TEC/DSI	Tape Emulation Circuit/Data Stream Interface PCA **(1) NT6M89BD** - TEC for DMS-10 Switching System **(2) NT6M70BD** - DSI for DMS-100 Switching System
		Sheet 1 of 4

Table 2-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
A14	BUS TERM	Bus Terminator PCA - **NT6M68AA**
A15	SCSI XOVR	SCSI Crossover PCA (located on inner portion of hinged panel at rear of upper chassis) - **NT6M93BA**
A16	P/A COMM	Power and Alarm Communications PCA (located on the outer portion of hinged panel at rear of upper chassis) - **NT6M84BA**
A17	4-CHAN	Four Channel Communication PCA (located on the upper connector panel on left side of the chassis [viewed from the rear] - **NT6M85AA**
A18	FAN	a. Fan Mounting Bracket Assembly - **NT6M55DD** b. Fan, 48 V dc - A0287304 c. Fan Filter PCA - **NT6M56AD** at location A18A1 d. Fan Foam Filter - A0379820
A19		Switch and Status Panel **- NT6M59AA**
A20		Power Supply Assembly - **NT6M71AB**
A21	DISK	Disk Drive Assembly - **NT6M72GA** 3 1/2" disk drive with a 1-Gbyte capacity
B		B Processor (Lower) Chassis - N/A
B1	CPU	Central Processor Unit Logic w/DMA PCA - **NT6M62BA**
B2	EPROM	Erasable, Programmable, Read-Only Memory PCA **(1) NT6M63FI** - for DMS-10 Switching Systems **(2) NT6M63FL** - for DMS-100 Switching Systems
B3	DRAM	Memory Expansion PCA - **NT6M64AA**
	Sheet 2 of 4	

Table 2-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
B5	ERCJ	Error Control II Jumper PCA - **NTM609AB**
B6	QUAD SIO	Quad Serial Input/Output PCA - **NT6M60BA**
B7	56K INTF	56K Interface PCA - **NT6M94AA**
B11	SCSI INTF	SCSI Interface PCA - **NT6M66CA**
B12 & B13	TEC/DSI	Tape Emulation Circuit/Data Stream Interface PCA **(1) NT6M89BD** - TEC for DMS-10 Switching System **(2) NT6M70BD** - DSI for DMS-100 Switching System
B14	BUS TERM	Bus Terminator PCA - **NT6M68AA**
B15	SCSI XOVR	SCSI Crossover PCA (located on inner portion of hinged panel at rear of upper chassis) - **NT6M93BA**
B16	56K XOVR	56K Crossover PCA (located on outer portion of lower hinged panel at rear of chassis) - **NT6M48AA**
B18	FAN	a. Fan Mounting Bracket Assembly - **NT6M55DD** b. Fan, 48 V dc - A0287304 c. Fan Filter PCA - **NT6M56AD** at location B18A1 d. Fan Foam Filter - A0379820
B19		a. Filler Panel Interface Panel - **NT8M59BB** b. Fan Assembly (inner chassis; behind the panel) - **NT6M56AA** at location B19A
B20		Power Supply Assembly - **NT6M71AB**
Sheet 3 of 4		

Table 2-1
List of assemblies and subassemblies

Reference designat or	ABBR name	Full name - part number - usage notes
B21	DISK	Disk Drive Assembly **- NT6M72GA** a. 3 1/2" disk drive with a 1-Gbyte capacity b. use option jumper to identify the B disk at position B21
B26		56K Connector - **NT6M54AL** a. 56K Connector Panel; includes 56K connector PCA, **NT6M49AA** b. located on the lower connector panel on the left side of the chassis, as viewed from the rear
A2		Interface Box **(1) 214299** - for DMS-10 Switching System **(2) NT6M98AA** - for DMS-100 Switching System
A3		Interface Box - **214299** - for DMS-10 Switching System
		Sheet 4 of 4

List of Hardware Spare Kits

Table 2-2 **List of Hardware Spare Kits**	
PEC	**Description**
NT6M91WE	Minimum BMC spares package for DMS-10 system with 3.5" disk drives (disk drive not included). The following items are standard in this spares kit: NT6M96AA - fuse kit NT6M84BA - Power and Alarm Communications PCA NT6M65AG - Memory Expansion PCA NT6M89BD - TEC PCA NT6M66CA - SCSI Interface PCA NT6M48AA - 56K Crossover PCA NT6M94AA - 56K Interface PCA
NT6M91XE	Maximum BMC spares package for DMS-10 system with 3.5" disk drives (disk drive not included). The following items are standard in this spares kit: NT6M96AA - fuse kit NT6M84BA - Power and Alarm Communications PCA NT6M65AG - Memory Expansion PCA NT6M89BD - TEC PCA NT6M66CA - SCSI Interface PCA NT6M48AA - 56K Crossover PCA NT6M94AA - 56K Interface PCA 212934-101 - ALM LED 212934-103 - PRI LED 212934-105 - ONL LED 212934-107 - MAJ LED 212934-109 - MIN LED 212934-115 - CRIT LED A0287304 - Fan 48 VDC NT6M60BA - Quad SIO PCA NT6M62BA - CPU Logic with DMA PCA NTM609AB - Error Control II Jumper PCA NT6M68AA - Bus Terminator PCA NT6M71AB - Power Supply Assembly NT6M63FI - EPROM PCA NT6M93BA - SCSI Crossover PCA
Sheet 1 of 2	

Table 2-2
List of Hardware Spare Kits

PEC	Description
NT6M94WE	Minimum BMC spares package for DMS-100 system with 3.5" disk drives (disk drive not included). The following items are standard in this spares kit: NT6M96AA - fuse kit NT6M84BA - Power and Alarm Communications PCA NT6M65AG - Memory Expansion PCA NT6M70BD - DSI PCA NT6M66CA - SCSI Interface PCA NT6M48AA - 56K Crossover PCA NT6M94AA - 56K Interface PCA
NT6M94XE	Maximum BMC spares package for DMS-100 system with 3.5" disk drives (disk drive not included). The following items are standard in this spares kit: NT6M96AA - fuse kit NT6M84BA - Power and Alarm Communications PCA NT6M65AG - Memory Expansion PCA NT6M70BD - DSI PCA NT6M66CA - SCSI Interface PCA NT6M48AA - 56K Crossover PCA NT6M94AA - 56K Interface PCA 212934-101 - ALM LED 212934-103 - PRI LED 212934-105 - ONL LED 212934-107 - MAJ LED 212934-109 - MIN LED 212934-115 - CRIT LED A0287304 - Fan 48 VDC NT6M60BA - Quad SIO PCA NT6M62BA - CPU Logic with DMA PCA NTM609AB - Error Control II Jumper PCA NT6M68AA - Bus Terminator PCA NT6M71AB - Power Supply Assembly NT6M63FL - EPROM PCA NT6M93BA - SCSI Crossover PCA

Sheet 2 of 2

PCA Functions

The following subsections describe the PCAs that comprise the BMC.

Central Processor Unit Logic PCA

The CPU PCA is located in slot 1 of the A and B chassis. The CPU, which has DMA, organizes data flow throughout the BMC. Its operations can be classified according to the functions of its four major Integrated Circuits (ICs):

- Z80 IC

- DMA IC

- Counter Timer Circuit (CTC) IC

- Parallel Input/Output (PIO) IC.

The 8-bit microprocessor Z80 IC is responsible for operational, statistical, and maintenance functions. Some of its activities include communication, statistics, and log messages. The Z80 microprocessor is driven by the crystal clock (on the same PCA) through the various program steps.

The DMA IC is a Z80-compatible device, responsible for data transfer to and from RAM and the TEC/DSI PCAs.

The CTC IC handles interrupts from various devices within the BMC that request access to the bus for data transfer. The CTC recognizes the priority of the devices interrupting the normal idle state of the Z80 microprocessor and directs the Z80 to grant access to the bus according to the importance of the device making the request.

The PIO Circuit IC is used for all interprocessor communications.

Central processor unit LED display

The CPU PCA contains a seven-segment display LED that provides a visual display of error control status. Five hardware status lines are decoded to display CPU fault conditions. The display also contains a decimal point feature that provides a visual display of the CPU clock. Refer to Table 2-3 for more information.

Output to the display must occur within 0.5 seconds for the display to remain valid. This time frame is compatible with the 0.5 second status request time interval of the Error Control II PCA. The data byte and hardware status lines are decoded by an EPROM. Output conditions may appear as shown in Table 2-4.

Table 2-3
ECAC alarm reporting priority sequence - LED display codes

LED	Level	Category	Response	Notes
E.		Major	Invalid CPU Response	
d.	3	Critical	Critical Level 3	Processor switch occurs.
C.	2	Critical	Critical Level 2	Processor switch occurs.
b.	1	Critical	Critical Level 1	Processor switch occurs.
A.	0	Critical	Critical Level 0	Level 0 alarms are alarms only, with no accompanying processor switch.
9.	3	Major	Major Level 3	Processor switch occurs.
8.	2	Major	Major Level 2	Processor switch occurs.
7.	1	Major	Major Level 1	Processor switch occurs.
6.	0	Major	Major Level 0	Level 0 alarms are alarms only, with no accompanying processor switch.
5.	3	Minor	Minor Level 3	Processor switch occurs.
4.	2	Minor	Minor Level 2	Processor switch occurs.
3.	1	Minor	Minor Level 1	Processor switch occurs.
2.	0	Minor	Minor Level 0	Level 0 alarms are alarms only, with no accompanying processor switch.

Table 2-3
ECAC alarm reporting priority sequence - LED display codes

LED	Level	Category	Response	Notes
1.		None		Planned processor switch.
≡.		None		All systems operational.

Table 2-4
CPU display control functions

Mode	SW2-3	SW2-4	Description
Monitor Error Control Port	on	off	Standard setting: data written to the error control port I/01 (88-8B; hex) is decoded, along with processor signals WAIT, HALT, RESET, BUSAK, and CLK
Independent Port (invalid)	off	on	Data must be written to I/06 (9C-9F; Hex). This is included for future use. Display codes must be modified by changing the decoder firmware.
Both Ports (invalid)	on	on	This is an invalid condition since data written to either port may be displayed.
Neither Port (invalid)	off	off	No data is written to the display circuit, causing an error condition display = E.

Note: Switch SW2 is a four position right angle dip switch located at the edge of the CPU PCA.

Erasable Programmable Read-Only Memory PCA

This PCA, in slot 2 of the A and B chassis, stores the main program for BMC operation. It contains 16 Kilobytes (Kbytes) of EPROM and 48 Kbytes of RAM. At power up, the EPROM Boot and Monitor programs automatically download the main program from disk to RAM on the PCA.

A power regulator IC on this PCA reduces the nominal +8.5 V dc provided by the power supply to a regulated +5 V dc for PCA operation.

Dynamic Random Access Memory Expansion PCA

The DRAM Expansion PCA in slot 3 of the A and B chassis provides DRAM for temporarily storing various data in the BMC. DRAM is refreshed period-

ically by the CPU to maintain its programmed state. Each DRAM Expansion PCA contains up to 128 Kbytes of DRAM. On the system level, DRAM provides storage of temporary data, such as system calculations, and updating of statistics.

Error Control II and Error Control II Jumper PCAs

The Error Control II PCA is located in slot 5 of the A chassis, and the Error Control II Jumper PCA is in slot 5 of the B chassis. The Error Control II PCA constantly checks the system to verify satisfactory operation and to immediately sense and react to a fault. The Error Control II Jumper PCA contains a loop to feed data from the B processor bus to the Error Control II PCA in the A chassis, as well as a switch to bypass the Error Control II PCA in the event the Error Control II CPA must be replaced.

On the system level, the Error Control II PCA regulates the status lamps, alarms, and the Processor A Select (ASEL) line directing which processor (A or B) currently controls the BMC.

Error Control II Jumper PCA LED

The LED on the Error Control II Jumper PCA (slot 5; B chassis) lights to indicate the toggle switch on the PCA has been activated, up position. This toggle switch is activated during replacement of the Error Control II PCA (slot 5; A chassis).

⚠	**CAUTION** Do not activate the toggle switch unless performing maintenance activity (replacing Error Control II PCA and the replacement PCA is immediately available).

Quad Serial Input/Output PCA

Located in slot 6 of each chassis, the Quad SIO PCA provides three ports for maintenance terminal communications and one port for software download functions. Each port maintains an independent, selectable baud rate for the transmit and receive functions. The transmit clock may be generated externally or internally. The receive clock can be set for internal or external. Refer to the *Command and Message Guide* section for more information.

The polling facility previously located at S2 on the Quad SIO PCA is disabled. The polling channel(s) are on the 56K Interface PCA located in slots A7 and B7.

The Quad SIO PCA is a peripheral I/O device to the BMC on-line processor. It provides an interface to system data, addresses, and control signals. The eight-bit data bus is powered by a tri-state octal bus transceiver circuit under the active processor's control. The eight address lines are also driven by the

active processor, four of them buffered by a tri-state octal buffer. Another tri-state octal buffer circuit buffers the ten control lines used by the processor.

The Quad SIO PCA reports internal faults to the active processor by generating signal interrupts. To minimize the signal's propagation delay through the PCA, a bypass circuit is used in the Programmable Array Logic (PAL). The interrupt output (-INT) is buffered by a quad z-input positive NAND buffer chip to connect to the system interrupt line.

The Quad SIO PCA includes two dual baud rate circuits, plus circuitry to select the clocking source. Each channel of the SIO chips requires two separate clocks: one for transmit and one for receive. Either clock may be generated internally on the PCA or externally. For externally generated clocks, the SIO chips are fed by the two identical baud rate circuits, each supporting a single SIO chip. Each circuit generates two baud rate clocks. As a result, if internally generated clocks are selected, the transmit and receive clocks for that channel must operate at the same rate, since only one baud rate clock may be produced for each channel.

The settings on each SIO channel baud rate selector switch correspond to different baud rates. These rates differ for synchronous and asynchronous ports. Since the SIO channels have both synchronous and asynchronous ports, the baud rates corresponding to the switch settings are not the same for all SIO baud switches.

> *Note 1:*   Enter the baud rate set command BAUD to establish software control of the Quad SIO channel. Refer to the *Commands and Messages Guide* section for further information.

> *Note 2:*   This PCA supports polling on digital data lines and on an analog network.

56K Interface PCA

The 56K Interface PCA in slot 7 provides a dual serial communication interface function for the BMC. This PCA uses a Serial Communication Controller (SCC) chip which lets the BMC transmit and receive serial data at various standard software selectable programmed rates from 1200-9600 bps on channels A and B.

56K Interface PCA communication with the Main Processor (MP), in slot 1, is based on a polling strategy as opposed to an interrupt scheme. Two FIFO (First In-First Out) buffers provide a bidirectional path between the 56K Interface PCA and MP.

The SCC port consists of an SCC chip (at U36) along with a bus interface section and CPU interface section. The SCC has a 9.8304 MHz clock from which it derives timing for SCC bus activity and SIO baud rates. A separate

clock is used because the clock available on the PCA (12 MHz) exceeds chip capability. The 6MHz (12 MHz divided by two) provided by the CPU is too slow for adequate SCC response.

The 56K Interface PCA requires +5 V dc +/- 0.25 volts. This is accomplished by the 5 volt regulator on the PCA which uses the +8.5 V dc supply from the backplane.

The 56K Interface PCA capabilities and functions include:

- Interface between BMC system backplane and 56K Crossover PCA.

- 512 bytes of bidirectional FIFO RAM for data passing to/from MP.

- Noninterrupt driven (polled) data and command port implementation allowing installation in any BMC COM (A7 and B7 used) slot without any additional backplane wiring and capable of virtually simultaneous access from either port without using WAIT states.

- Host (main CPU side) interface to support fully asynchronous access based on 4 mHz timing of standard Z80 bus cycle without wait states.

- Uses 64180 Z80 compatible CPU running at 6Mhz processor clock.

- Industry standard two channel SCC chip running at 9.8304 Mhz.

- 32K bytes of data RAM with plug-in sockets for up to an additional 512K bytes.

- 32K bytes to 64K bytes of boot PROM.

- Support for V.35 (1200-9600 bps) or RS-232 (1200-9600 bps) selection on the SCC ports.

- Single error detection parity guard on entire static memory.

- 50-pin access port for logic analyzer, emulator and/or test support (factory use only).

- RS-232 compatible port for local diagnostics.

 The SCC has two channels of high-speed-communication-designated COM channel A and COM channel B. Under software control, it provides all necessary control, status, and data functions for both the V.35 and RS-232 interfaces supported by the 56K Crossover PCA. Interface to the 56K Crossover PCA is through the backplane via two 20 pin ribbon cables: one 40-pin cable with two 20-pin connectors.

SCSI Interface PCA

The SCSI Interface PCA, in slot 11 of the A and B chassis, is a smart PCA with its own 64180 microprocessor, EPROM, local RAM, and Dual-Ported

RAM (DPR). It is considered a peripheral of the microprocessor on the main CPU (A1).

The SCSI Interface PCA is the link to the disk drive. It transfers data from and to the bus used for recording on or reading from the disk. The stored program on the SCSI Interface PCA provides read and write commands to the disk drive.

This PCA performs a SCSI Host Adapter function and resembles an Initiator of Priority 7 to the SCSI bus. Target operation is not provided due to the complexity of an external Y-type crossover network which supports redundant storage elements. 32 Kbytes of DPR are used as interface and control for commands and data to and from the MP at slot 1. The SCSI Interface PCA provides the following capabilities:

- Interface between BMC system backplane and SCSI hard disk drives.
- 32 KBytes of parity protected DPR for command and data passing to and from the Main CPU at slot 1.
- Fully transparent DPR implementation allowing virtually simultaneous access from either port without using wait states.
- Host port of DPR (Main CPU side; slot 1) designed to support fully asynchronous access based on 4 mHz timing of standard Z80 bus cycle without WAIT states.
- 6 MHz processor clock with DPR synchronized and running alternate half clock cycles. (Host cycles occur during the first half of every T state when the clock is high, while SCSI side accesses occur during the second half of each T state when the clock is low).
- NCR53C90 SCSI Bus Controller running at 10 mHz. Cycle-Steal DMA yields approximately 0.4 Mbytes per second across the SCSI bus.
- 32 KBytes of data RAM with plug-in slots for up to an additional 256 Kbytes.
- Up to 64 KBytes of program PROM.
- Support for disconnect/reconnect operation on the SCSI bus.
- Single error detection parity guard on DPR memory.
- 50 pin access port for logic analyzer, emulator and test support (factory use only).

System interface is via the 100-pin edge connector. The EPROM at U16 is a 27C1001 type.

Tape Emulation Circuit/Data Stream Interface PCA

The BMC application eliminates the Magnetic Tape Drives (MTDs) used with the Switching Systems to collect Automatic Message Accounting (AMA) data. The four TEC/DSI PCAs (slots 12 and 13 in the A and B chassis) in the BMC replace the MTDs.

The TEC/DSI packs are smart PCAs, each with its own Z80 microprocessors, EPROM-resident software programs, and RAM. Since MTD emulation requires the BMC to maintain redundant communication with the Switching System, the TEC/DSI PCAs are active devices. The TEC/DSI software program receives and processes commands the Switching System normally sends to the MTD. This software also responds with the status and strobe signals the MTDs normally return to the Switching System. Furthermore, these packs handle the call record data from the Switching System.

The data path from the Switching System to BMC is through TEC/DSI cable adapter assemblies, contained in interface boxes installed near the BMC. The TEC/DSI cable adapter assemblies duplicate the connections for the cables that normally interface the Switching System to the MTDs. The Switching System MTD ports plug into an interface box that provides connectors for the control and status, read, and write leads from the Switching System. System signals are passed through the interface boxes to J connectors on the BMC. From the - connectors, the signals are routed internally to the TEC/DSI PCAs.

The TEC/DSI PCAs serve the primary function of receiving call record AMA data blocks from the Switching System, to process those records (where required), and to make this data available for transfer to the correct buffer in the main CPU.

Output signals from the Switching System MTD ports come through the interface box ribbon cables and adapters and arrive at the TEC/DSI PCA input ports.

Bus Terminator PCA

The Bus Terminator PCA, in slot 14 of the A and B chassis, contains a power regulator. This regulator provides circuitry to terminate the end of the bus which prevents ringing (oscillation) of signals on the bus.

SCSI Crossover PCA

The SCSI Crossover PCAs are located at positions A15 and B15 on the inner portion of the hinged card panel at the rear of the A and B chassis. They are connected between both SCSI Interface PCAs in the BMC (A side and B side) and both SCSI Disk Drive assemblies (Disk 1, disk A at A21; Disk 2, disk B at B21).

The system interface ports of the SCSI Crossover PCAs (40-pin connectors J1 & J2) consist of 8 data lines with parity and 12 control lines. One port is

provided for each of the two SCSI Interface PCAs. The SCSI port provides the system interface to the SCSI disk drives.

Power from both A and B chassis is provided at this connector in a diode OR'ed arrangement for redundancy purposes. The SCSI Crossover PCAs provide the following functions:

- Interface between BMC system backplane (SCSI Interface PCA) and SCSI Disk Drives.

- Support for crossover and disk selections for the SCSI Interface PCA.

- Support for disconnect/reconnect feature.

- Full hardware implementation; no software required.

- Two 40-Pin access ports; one for each SCSI Interface PCA.

- 50-pin access port for the disk drive.

- 4-pin power connector identical to current crossover card.

- Either disk drive tri-statable off the SCSI bus in case of a fault.

Power and Alarm Communications PCA

The P/A Comm PCA, located at the rear of the A chassis in position 16, performs a multipurpose function. It provides communications between the Quad SIO PCA and various peripherals. Its circuitry responds to switching signals from the Error Control II PCA or keyboard-entered commands. Furthermore, it provides power detection and alarm generation.

The P/A Comm PCA contains circuitry used to detect the loss of output voltages from the BMC power supplies. Six optoisolators are connected in a series string, insuring that any voltage loss interrupts the string and deenergizes the power alarm relay (K7). This causes a form C relay to change state, signaling an alarm condition. This circuitry also provides operating power for the PCA. The +12 V dc, -12 V dc, +8 V dc, and +5 V dc supplies are all monitored and connected to guarantee power to the PCA as long as at the BMC power supply is operational. The +8 V dc passes through a regulator to provide +5 V dc power for the logic circuits.

The P/A Comm PCA also contains circuitry to generate external alarms using signals from the Error Control II PCA. Three relays on this PCA signal alarm conditions to devices outside the BMC. The circuits that drive these relays are also on the PCA. The three relays follow:

- K1 - Minor Alarm

- K2 - Major Alarm

- K3 - Critical Alarm.

The P/A Comm PCA contains four serial channels configured as a 2-input, 1-output switch. The input is connected to the Quad SIO PCAs in the BMC chassis. The input interface consists of eight signal lines (plus ground) for each channel. These lines are connected to a tri-statable octal buffer IC. The -ASEL signal from the Error Control II PCA determines the input-to-output connection.

The P/A Comm PCA can use either internal or external transmit clocks for all eight channels. For channel four, the internal clock must be selected if the Quad SIO switch control option is used. Externally transmitted clock signals from the eight outputs are connected to clock lines on the Quad SIO PCA.

56K Crossover PCA

The 56K Crossover PCA provides a dual high-speed serial communication crossover function for the BMC. This PCA provides both a V.35 (1200-9600 baud) and RS-232 (1200-9600 baud) interface circuit that allows the BMC to transmit and receive serial data at various standard software programmed rates from 1200 to 9600 bits per second. The BMC can use the V.35 interface for communications. However, the software limits the maximum baud rate for the BMC to 9600 baud.

The 56K Crossover PCA provides the following capabilities:

- Interface between the BMC system backplane (56K Interface PCA at A7 and B7) and 56K Connector PCA.
- Support for crossover and interface selections for the SCC ports.
- Support for V.35 and RS-232 interface for the SCC ports.
- Full hardware implementation; no software required.
- Two 40-pin access ports; one for each of the 56K Interface PCAs.
- A 60-pin access for the 56K Connector PCA.
- 12-pin power connector like the one on the P/A Comm PCA.

Four-Channel Communication PCA

The Four-Channel Communication PCA provides the physical interface between the BMC's serial communication channels and external devices.

The PCA is located on the connector mounting panel on the right side of the upper chassis, as viewed from the front. This PCA supports four serial channels. It provides pin-out connection between a single 50-pin ribbon cable and four DB-25 connectors. The PCA is totally passive, containing connectors only and no active circuitry. All EIA interface leads are supported, whether for synchronous or asynchronous operation.

The Four-Channel Communication PCA provides the following functions:

- up to four channels of EIA RS-232 compatible serial interface (DTE interface).
- two channels, jumper-selectable, between Automatic Dial-up Unit (ADU) interface (unused) to modem/telephone line and serial channels.
- physical interface serial channels and the P/A Comm PCA.

Interface between this PCA and the P/A Comm PCA is via a 50-pin ribbon cable. Signals carried by the cable are:

- nine EIA RS-232 leads for each of the four channels.

- multiple logic ground lines.

Fan Filter PCA

The Fan Filter PCA suppresses fan noise generated within the BMC from being fed back into the -48 VDC source.

56K Connector PCA

The 56K Connector PCA provides the physical interface between the serial communication channels of the BMC unit and external devices. The 56K Connector PCA is located on the lower connector panel on the right side of the chassis, as viewed from the front (B26).

This PCA supports four serial channels. The PCA provides pin-out connection between a single 50-pin ribbon cable and four DB-25 connectors. The PCA is totally passive, containing connectors only and no active circuitry. All EIA interface leads are supported, whether for synchronous or asynchronous operation.

Power Supplies

The BMC contains one power supply for each processor unit, located at A20 and B20. Each power supply is fully connectorized and mounted in the cabinet at the upper left. Primary power required for the BMC is -48 VDC from the CO battery. Three cables route power to the BMC. The fuse, circuit breaker, and cable connectors are located on the front of each Power Supply. Refer to Figure 2-8 for more information. Each power supply provides the following voltages required for circuit operation:

- +12 VDC- used for power to the disk drive and P/A Comm PCA and DMS-10 Interface Box assemblies.

- -12 VDC - used for power to the P/A Comm PCA.

- +5 VDC- used for power to the disk drive assembly.

- +8.5 VDC - used for unregulated power to all PCAs.

Power Supply Fuse and Circuit Breaker

The fuse and circuit breaker for the protection of the input and output dc circuits are located on the front of the Power Supply assemblies, as shown in Figure 2-8.

The power supply has the -48 V dc circuit fused. A GMT-type fuse is used. These fuses have an indicator that becomes visible at the end of the fuse if the fuse is blown. A clear fuse cover is furnished for covering the fuse as a safety precaution. After replacing a fuse, remember to re-install the cover.

Figure 3-1
BMC Power Supply Assembly
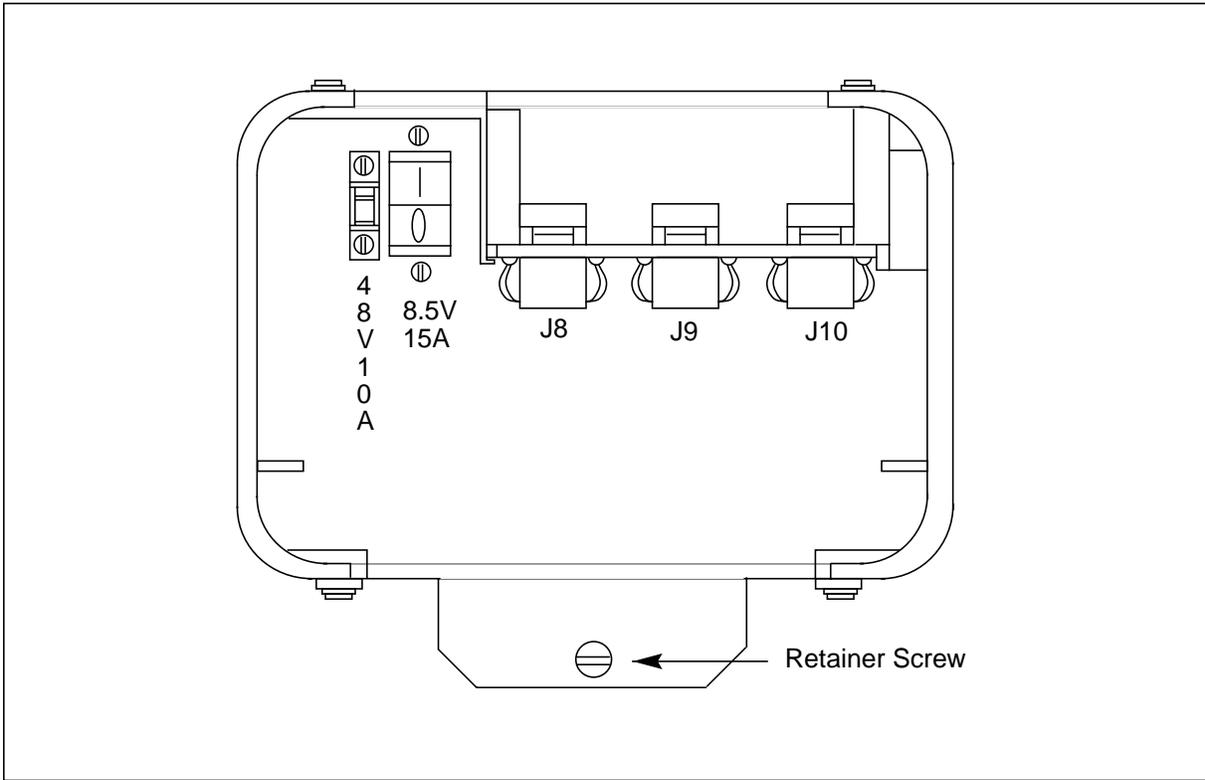
The power supply has a circuit breaker to protect the +8.5 V dc line. Refer to Figure 2-8 for the location of the fuse and Table 2-5 for fuse replacement part number information.

Table 2-5
Fuse replacement information

Fuse function	Fuse function	Amperes (color)	Fuse type and replacement part number
Power Supply	-48 VDC from CO	5 (green)	5 amp fuse: Buss GMT-5 or equivalent Nortel part number: A0108995
Input Connector Panel	+12 VDC (AUX)	5 (green)	5 amp fuse: Buss GMT-5 or equivalent Nortel part number: A0108996
Fan Filter PCA Assembly	-48 VDC from CO	0.5	0.5 amp fuse: Buss 8AG or equivalent Nortel part number: A0344158

System Temperature Sensor(s)

The System Temperature Sensors are located inside the Power Supplies. These sensors provide an "early warning" alarm to indicate that the BMC is operating above its recommended operating temperature limits. The temperature at the sensor on the BMC power supply exceeds 120°-130° F due to:

- BMC fan failure

- BMC fan filter not clear; dirt blocking airflow

- Ambient temperature surrounding BMC exceeds 100° F.

Note: Ambient temperature measured at the fan filter inputs on the rear of the BMC chassis inside the equipment bay.

> **CAUTION**
> Continuous operation of the BMC under extreme heat conditions will degrade system operation.

Once the temperature alarm has been set, the ambient temperature must be reduced to 80° F to reset the thermostat. Removal of the BMC front covers and rear cabinet doors can serve to speed the thermostat reset by allowing for better circulation of cooling air within the BMC.

Maintenance Considerations

Powering down the BMC for maintenance is divided into two categories:

- -48 VDC power down

- +8.5 VDC power down.

-48 VDC Power Down

Power down the -48 VDC C.O. input power for maintenance on the following:

- Power supply

- Disk Drive

- Cooling fan (except for brief periods of time, i.e., when the required spare parts are near at hand).

Since the processor and disk in the chassis are powered down, make sure the processor mode and the disk mode are ONLY (toward the other chassis and disk) **before** the power is removed.

When performing any type of maintenance on the fan (fan not running), open the front cover of the BMC to improve convection cooling. Perform the necessary functions. Power down the -48 VDC when the fan is inoperable for extended periods of time to prevent damage from overheating.

For maintenance, power down the -48 VDC at the external circuit breakers (or other disconnects) for power distribution control. Note the location of the disconnects before removing any equipment in case of an emergency. Only remove the -48 VDC fuse from the power supply to power down the BMC in an emergency.

Removal of the -48 VDC fuse from the Power Supply **must not** be used to power down the BMC system, except in case of emergency.

When performing maintenance on a disk drive (replacing), leave the disk drives untouched for at least 30 seconds after power down since vibration during power down may damage the disk drive.

+8.5 VDC Power Down
Since the processor and disk in the chassis are powered down, make sure the processor mode and the disk mode are ONLY (toward the other chassis and disk) **before** the power is removed.

Removal or maintenance of PCAs in the circuit board racks requires removing the +8.5 VDC output from the BMC Power Supply. The circuit breaker is a push ON (I), push OFF (O) rocker switch. Press the rocker switch to the OFF (O) position to manually open the +8.5 VDC line. To reset an automatically tripped circuit breaker, first push the OFF (O) side of the circuit breaker, then push the ON (I) side. Refer to Figure 2-8. The disk drive in this chassis is not affected by removal of the +8.5 VDC source.

Fuses

BMC system fuses are located on the front panel of the Power Supply and on the input connector panel on the left side of the system (as viewed from the front). In addition, each Fan Filter PCA has a fuse.

GMT-type fuses are employed. These fuses have an indicator that becomes visible at the end of the fuse, if the fuse is blown. To replace, pull the blown fuse straight out from the fuse holder, and insert the new fuse. Make certain that the new fuse is of the same type and rating (the fan filter does not use a GMT fuse).

Clear fuse covers are furnished for covering the GMT fuses as a safety precaution. After performing fuse maintenance, remember to reinstall the covers.

Refer to Table 2-5 for fuse replacement part number information.

Power and Ground Requirements

The following subsections describe the power and ground requirements for the BMC.

DC power requirements

The BMC system receives dc power from the Central Office (CO) dc power system. Refer to Figure 2-9 for more information. Minimum operating voltage is -44 VDC; maximum is -56 VDC. The BMC suffers no damage if a temporary low voltage condition occurs. However, voltages in excess of -56 VDC can cause damage to BMC hardware.

The BMC places a 6 ampere current load on the dc power source when fully operational. The noise levels that are embedded on the CO dc power system by the BMC are:

• 35 dBmv - 0-5 MHz

• 30 dBmv - 5-50 MHz.

Figure 3-1
BMC System Grounding Interface to CO Grounding System
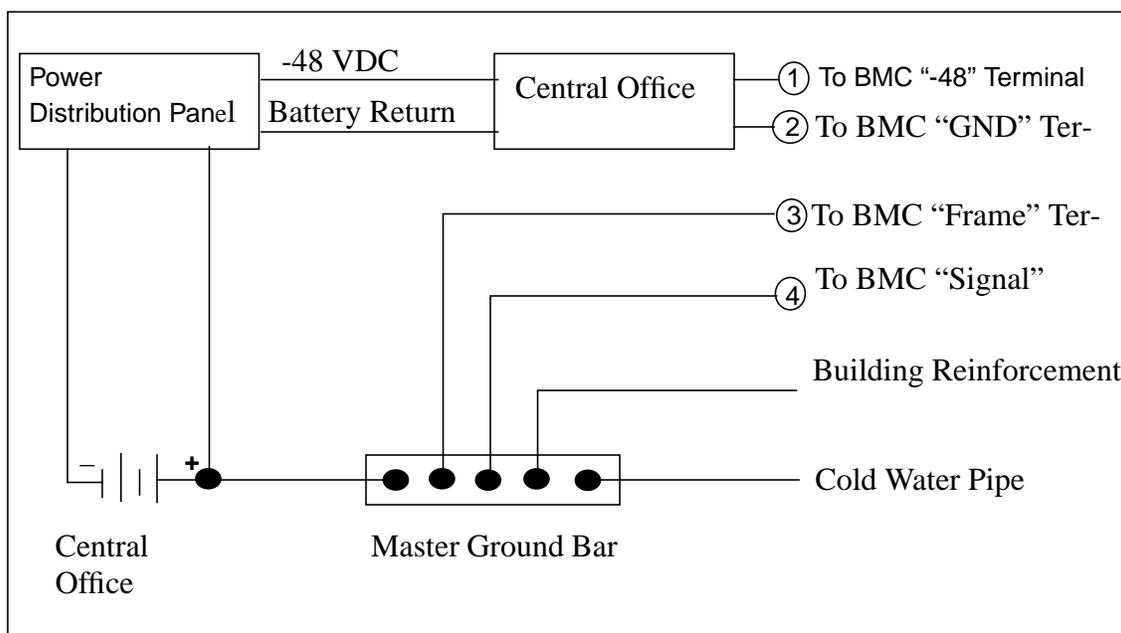
Power alarm condition reporting

If a blown fuse is sensed on the -48 VDC input line of the BMC Power Supply, the system places -48 VDC on a normally open terminal of the chassis (A or B) that contains the blown fuse. If a low voltage condition from the Power Supply is sensed, telephony ground (battery return) is placed on a normally open contact of the alarm connector for that chassis.

Grounding interface

Internal grounding of the BMC is a star-type arrangement, with battery and chassis grounds isolated from each other. Connections for each of the grounds are indicated on the power and alarm connector panels.

The arrangement of frame grounding conductors for the isolated ground plane and integrated ground plane frames and the interfaces with the CO grounding system are shown in Figure 2-9.

External connector wiring

The following subsections describe the BMC external connector wiring.

Connector J15 (Input Power)

Connector J15 is a 3-pin connector with male pins. The mating connector can accept 8, 12, and 16 AWG wire depending on the socket terminal selected. J15 serves to "bring-in" the -48 V dc battery supply and provide the connection for the BMC battery return.

Table 2-6
Wiring for Connector J15

Pin Num.	Signal On Line	Description of Pin Conditions
1	-48 VDC	CO (-48 VDC) battery input to BMC.
2	Frame Ground	Optional Frame Ground for BMC. Normally not connected; use Frame Ground stud (refer to Figure 2-4).
3	+48V return	Return line for 48 VDC.

Connector J16 (External Alarms)

Connector J16 is a 15-pin connector with male pins. The CRITICAL, MAJOR, MINOR, FAN (TEMPERATURE), FUSE and LOW POWER external alarm connections are provided at this connector.

Table 2-7
Wiring for Connector J16 (A chassis only)

Alarm Type	Pin Num.	Signal name	Description
Critical	1	CRIT COM	Center (common) pin of contact set controlled by Critical Alarm relay
	2	CRIT	NO CRITICAL ALARM: closed, connected to pin 1 ANY CRITICAL ALARM: open
Critical	3	CRIT	NO CRITICAL ALARM: open ANY CRITICAL ALARM: connected to pin 1
Major	4	MAJ COM	Center (common) pin of contact set controlled by the major alarm relay
	5	MAJ	NO MAJOR ALARM: closed, connected to pin 1 ANY MAJOR ALARM: open
	6	MAJ	NO MAJOR ALARM: open ANY MAJOR ALARM: connected to pin 1
Temp	7	TEMP ALM	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 8
	8	TEMP	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 7
Power	9	PWR COM	Center (common) pin of contact set controlled by power (low voltage) alarm relay

Note: Pin 9, along with pins 13 and 14 are for both A and B chassis; shown here to maintain numerical labelling sequence.

Sheet 1 of 2

Table 2-7
Wiring for Connector J16 (A chassis only)

Alarm Type	Pin Num.	Signal name	Description
Minor	10	MIN COM	Center (common) pin of contact set controlled by the minor alarm relay
	11	MIN	NO MINOR ALARM: closed, connected to pin 10 ANY MINOR ALARM: open
	12	MIN	NO MINOR ALARM: open ANY MINOR ALARM: connected to pin 10
Power	13	PWR ALM	NO LOW VOLTAGE CONDITION: open LOW VOLTAGE IN EITHER CHASSIS: connected to pin 9
Note: Pins 13 and 14, along with pin 9 are for both A and B chassis; shown here to maintain numerical labelling sequence.			
Power	14	PWR ALM	NO LOW VOLTAGE CONDITION: connected to pin 9 LOW VOLTAGE IN EITHER CHASSIS: open
Power	15	FUSE ALM	-48 VDC FUSE INTACT: open -48 VDC FUSE "BLOWN": -48 VDC on pin 15
		SHIELD	To connector shell for full EMC compliance
Sheet 2 of 2			

Table 2-8
Wiring for Connector J16 (B chassis only)

Pin Num.	Signal On Line	Description of Pin Conditions
1	+12V AUX (A) Alarm	A Chassis +12V Fuse intact: open A Chassis +12V Fuse blown: connected to pin 2
2	+12V AUX (A) Alarm	A Chassis +12V Fuse intact: open A Chassis +12V Fuse blown: connected to pin 1
Sheet 1 of 2		

Table 2-8
Wiring for Connector J16 (B chassis only)

Pin Num.	Signal On Line	Description of Pin Conditions
Note: +12V AUX (A) Alarm is used for DMS-10 Switching Systems only.		
3	Not used	
4	+12V AUX (B) Alarm	B Chassis +12V Fuse intact: open B Chassis +12V Fuse blown: connected to pin 5
5	+12V AUX (B) Alarm	B Chassis +12V Fuse intact: open B Chassis +12V Fuse blown: connected to pin 4
Note: +12V AUX (B) Alarm is used for DMS-10 Switching Systems only.		
6	Not used	
7	TEMP ALM	WITHIN UPPER LIMITS: open ABOVE UPPER HEAT LIMIT: connected to pin 8
8	TEMP ALM	WITHIN UPPER LIMITS: open ABOVE UPPER HEAT LIMIT: connected to pin 7
9	Not used	
10	Not used	
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	FUSE ALM	-48 VDC FUSE INTACT: open -48 VDC FUSE BLOWN: -48 VDC on pin 15
Sheet 2 of 2		

Connector J17 (+12V AUX)

Connector J17 is a 3-pin connector with female pins. For DMS-100 Switching Systems, this is the location of the signal (Logic) ground used if the DMS-100 has the latest Isolated Signal Ground (ISG) wiring.

Table 2-9
Wiring for Connector J17

Pin Num.	Signal On Line	Description of Pin Conditions
1	+12 VDC	+12 VDC (DMS-10 Switching System)
2	Not used	
3	Logic Ground	DMS-100 Switching System - Logic return DMS-10 - +12 VDC battery return

Disk Drives

The BMC employs two hard (fixed) 3.5 inch disk drives, located in the lower left corner of each processor chassis. The two disk drives are mounted on brackets, as illustrated in Figure 2-10. In the 1-gigabyte disk drive, the controller is an integral part of the disk drive assembly.

The BMC System is configured as a "disk based" system. The main programs for system operation are resident on the disks. The programs are automatically retrieved from disk and loaded to the static memory on the EPROM PCA upon power-up. Programs are retained on disk as archives in case the processor(s) require a reboot. The BMC System can be downloaded with new programs from a remote site.

Figure 3-1
Disk drive mounting details
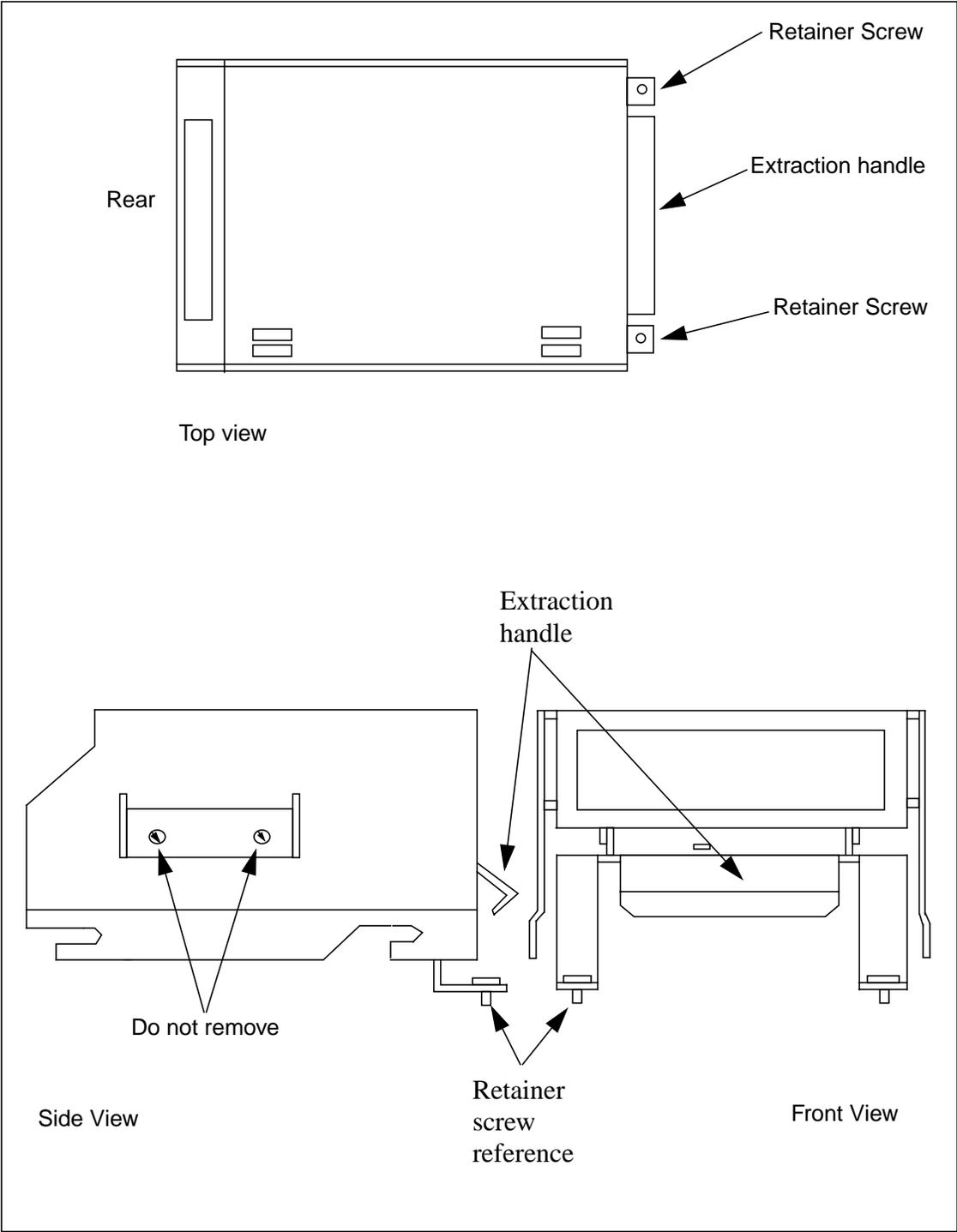
The disk drives also provide a permanent storage medium for entering site dependent data, system routines, message journals, and software files.

Disk Drive Start-up

When the BMC System is powered-up, either during initial installation procedures or after maintenance activities, closely observe the output messages. These messages provide information as to the initial condition of the BMC System and direct the next course of action to follow. Three important system messages can occur within the first sixty (60) seconds.

The first of these system messages that may appear is S/W LOADED. This message indicates that the MP software is successfully loaded from disk to the processor RAM.

The second of these system messages that can appear is CP LOADED. This messages indicates that the CP software is successfully loaded from disk to the 56K Interface PCA.

The third of these system messages to appear is:

DISK MODE: xx

where: xx - AO: A ONLY
                    AP: A PRIME
                    BO: B ONLY
                    BP: B PRIME
                    NONE: No Disk Mode.

This message defines the BMCs ability to access the disks.

S/W LOADED message cannot print out if DISK MODE: NONE is printed out. Disk mode values are defined in Table 2-10.

For disk file manipulation procedures and commands, disk setup, and maintenance information, refer to the *Command and Message Guide* and the *Maintenance Procedures Guide* sections.

Table 2-10 Disk Drive Operating Modes	
Mode	**Description**
AO	A Only - BMC processors read data from and write data to the disk in the A chassis ONLY.
BO	B Only - BMC processors read data from and write data to the disk in the B chassis ONLY.
AP	A Prime - BMC MP writes duplicate information to both disks (A and B). Disk in A chassis is said to be the PRIME disk and the active processor reads data from that disk and accesses the disk in the B chassis at the same time (writes to PRIME disk first).
BP	B Prime - BMC MP writes duplicate information to both disks (A and B). Disk in B chassis is said to be the PRIME disk and the active processor reads data from that disk and accesses the disk in the A chassis at the same time (writes to PRIME disk first).
NONE	BMC is unable to access either disk for read or write functions. This indicates: - a failure to set up disk mode at the factory (initial installation) - hardware failure (i.e., improper installation cabling, rough handling of disk drive assembly, or a PCA failure). - operator error (setting disk mode to NONE).

Disk Drive Commands

The BMC disk drives operating configuration can be manually controlled to obtain optimum performance. The optimum operating condition is the PRIME, or redundant (A or B) mode, as defined in Table 2-10. Certain disk errors, hardware faults or software conditions, can cause the disk system to go to the ONLY, or non-redundant, mode. If the situation arises where the disk system is in the ONLY mode, refer to the terminal output for the disk message that provides information on the situation. Refer to the *Command and Message Guide* section reference to that message for the proper corrective action.

Switch and Status Panel Operation

The following subsections describe the operation of the Switch and Status Panel.

Processor mode changes at the Switch and Status Panel

The following procedure is to be used whenever it becomes necessary to alter the operational configuration of the BMC processors using the Switch and Status Panel.

It must be remembered that the Switch and Status Panel affects only the operating status of the A and B processors. To change operating modes of the disk drives, refer to the procedure the disk drive error message appeared on and use the terminal command provided in the *Craftsperson Activity* section of the message procedure.

Table 2-11 provides the necessary actions for changing processor modes in the BMC at the Switch and Status Panel. The changes listed in the table occur when the A/B mode and Only/Prime mode switches are set and the Mode Key Switch is turned to the right and released. Refer to Figure 2-11 for the layout of the Switch and Status Panel.

CAUTION
Use of this procedure during a high traffic period may result in the loss of some data during the processor switch.

Note: Automatic mode changes such as AP to BP or BP to AP occur only if the alarm level in the standby processor (the one being switched to) is of a lower severity level than the active processor (the one being switched from).

Table 2-11
BMC switch and status panel operation

Initial processor mode	A/B mode select switch	Only/Prime mode select switch	Final processor mode
A PRIME	A	O	A ONLY
A PRIME	B	P	B PRIME
Sheet 1 of 2			

Table 2-11
BMC switch and status panel operation

Initial processor mode	A/B mode select switch	Only/Prime mode select switch	Final processor mode
A PRIME	B	O	B ONLY
A ONLY	A	P	A PRIME
A ONLY	B	P	B PRIME
A ONLY	B	O	B ONLY (see note)
B PRIME	B	O	B ONLY
B PRIME	A	P	A PRIME
B PRIME	A	O	A ONLY
B ONLY	B	P	B PRIME
B ONLY	A	O	A ONLY (see note)
B ONLY	A	P	A PRIME

Note: These changes are to be used as emergency measures ONLY. The status of the processor being changed to may be questionable.

Sheet 2 of 2

Processor mode changes at the terminal keyboard

Provision is made to change the operating status of the processors at the terminal. To initiate a processor switch, enter the following command:

>**SWACT (cr)**

CAUTION
Use of this command during a high traffic period may result in the loss of some data during the processor switch.

This command is used to initiate a processor activity switch from the currently active processor the currently standby processor.

Figure 3-1
BMC Switch and status panel
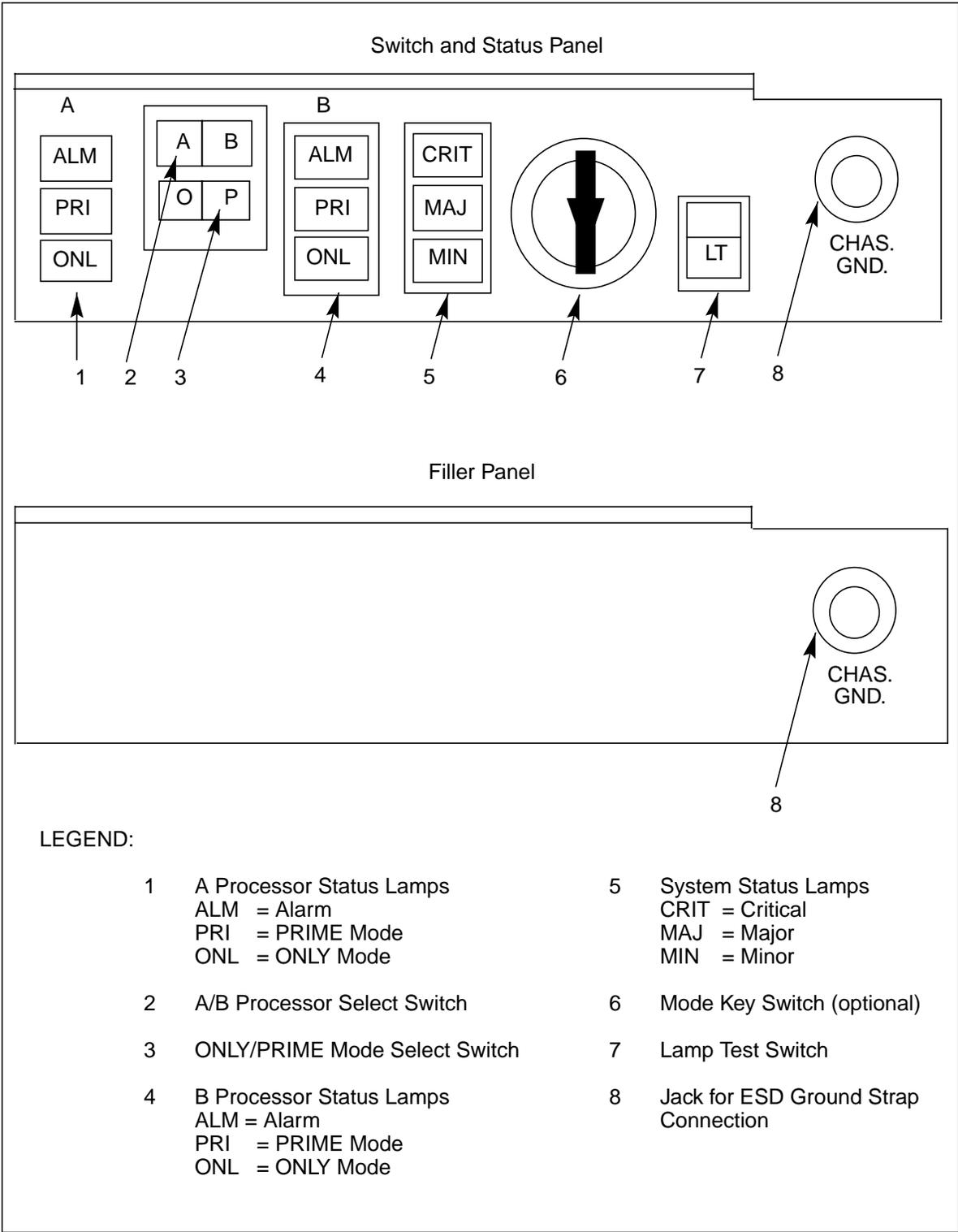
Switch and Status Panel

A   B

A B   ALM   CRIT

ALM   MAJ

O P   PRI   MIN   LT   CHAS.
PRI   GND.

ONL   ONL

1   2   3   4   5   6   7   8

Filler Panel

CHAS.
GND.

8

LEGEND:

1   A Processor Status Lamps   5   System Status Lamps
     ALM = Alarm   CRIT = Critical
     PRI   = PRIME Mode   MAJ   = Major
     ONL = ONLY Mode   MIN   = Minor

2   A/B Processor Select Switch   6   Mode Key Switch (optional)

3   ONLY/PRIME Mode Select Switch   7   Lamp Test Switch

4   B Processor Status Lamps   8   Jack for ESD Ground Strap
     ALM = Alarm   Connection
     PRI   = PRIME Mode
     ONL = ONLY Mode

To clear the active event/device alarms for the currently standby processor, followed by a processor activity switch, enter the following command:

>**SWACT FORCE (cr)**

CAUTION
This action may cause a loss of data.
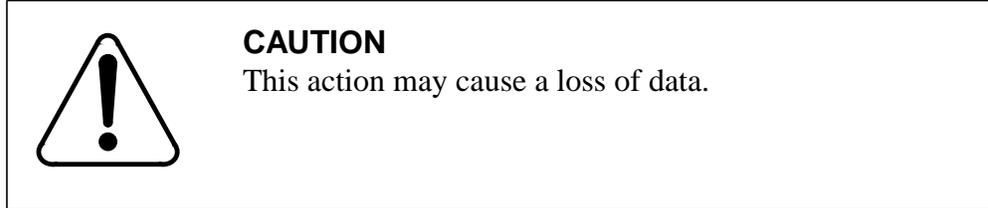
The execution of either command produces the following sequence of expected messages:

ALL ALARMS CLEARED (only for SWACT FORCE command)
MP SWITCH
DISK MODE: xx   (xx - current disk system operating mode)
SITDAT FILE DISK JOB COMPLETE
TDYSTS FILE DISK JOB COMPLETE

The following messages may be printed:

GOOD LOGIDX FILE
GOOD AMAIDX FILE

Switch and status panel indicators

The system provides lamps on the Switch and Status Panel for quickly ascertaining overall system operational conditions.   Table 2-12 provides the color scheme and mnemonic identifier of the status and alarm lamps.

Table 2-12
Alarm lamp color scheme and identifiers

Mnemonic	Color	Function
ALM	Red	Alarm (Active)
PRI	Green	PRIME Unit (status)
ONL	Yellow	ONLY Unit (status)
CRIT	Red	Critical Alarm
MAJ	Red	Major Alarm
MIN	Yellow	Minor Alarm

The following paragraphs provide a brief description of the status and alarm lamps listed in Table 2-12.

ALM (Alarm)
Red indicator lamp (ALM) indicates that an alarm is in active status. When this lamp is active with other indicator lamps (CRIT, MAJ, or MIN), it is used to determine particular operational status (level of alarm).

PRI (Primary)
Green status lamps (PRI) indicate which unit is in control of the system. In the PRIMARY state, the active unit is in operational control of the system and the other unit is in a standby, or ready state.

ONL (Only)
Yellow status lamp (ONL) indicates which processor has sole, non-transferable operational control of the system. The other unit is not available for system functions in the event of a malfunction in the ONLY unit. Non-availability of a unit could be due to a fault in a unit or normal maintenance activity on a unit. In this operating condition, both the PRI and ONL status lamps are lit for the active processor.

CRIT (Critical)
Red indicator lamp (CRIT) when lit, indicates that the system may no longer be capable of performing its design function of data collection, storage, retrieval, and forwarding. The situation requires immediate corrective action so that the performance of the system may return to its design function. Critical alarms are normally configured to reflect conditions where the probability of data loss is very high.

MAJ (Major)
Red indicator lamp (MAJ) alarm lamp, when lit, indicates that the system is in danger of loss of operational capability. A condition exists, which, if not corrected, may result in loss of functional capability. Major alarms are normally configured such that if corrective action is not taken immediately, there is a high probability of subsequent faults resulting in loss of data.

MIN (Minor)
Yellow indicator lamps (MIN) alarm lamp, when lit, indicates that one processor unit (A or B) has developed a fault condition; there has been no degradation of system performance as relates to overall design capability. This situation does not require immediate attention, though delay could lead to worsening of the situation.

Central Processor Unit LED Display
The CPU with DMA PCA contains a seven-segment display that serves the purpose of providing a visual display of Error Control Status. Five hardware status lines are decoded to display CPU fault conditions. The display contains

a decimal point feature that provides a visual display of the CPU clock. For the display to remain valid, the output to the display must occur every 0.5 second or less.

Error Control II PCA Jumper LED

The LED on the Error Control II Jumper PCA (slot B5) lights to indicate the toggle switch on the PCA has been activated (up position). This toggle switch is activated during replacement of the Error Control II PCA (slot A5).

> **CAUTION**
> Do not activate the toggle switch unless maintenance activity is in progress (replacement of Error Control II PCA) and the replacement PCA is immediately available.

Alarm and Error Handling

Alarms and errors can be internal to the BMC, or may result for external operating conditions. The Error Control II PCA monitors the operation of the BMC and generates signals according to any error condition which may be encountered. The internal errors generally relate to hardware or communications malfunctions. Dedicated software routes error codes to command an activity switch at the processors, if required. The same software sets the conditions for which processor controls the Switch and Status Panel.

TEC/DSI Alarm

The TEC/DSI Alarm is activated when the TEC/DSI fails its own self-diagnostic check. The TEC/DSI sends an alarm bit, End-of-Tape (EOT), to the Switching System. The Switching System interprets the alarm bit as an indication that the active disk drive, is full. The Switching System switches the standby disk drive (other TEC/DSI) to the active position and continues sending AMA to the BMC.

AMA NO BLOCK Alarm

The AMA NO BLOCK ALARM notifies the BMC user that no data blocks have been received from the Switching System within an hourly interval starting at the beginning of each clock hour. This condition may indicate a failure of the link between systems, requiring correction before call record data can be handled properly. If no blocks are received within an hour, an alarm is generated, notifying the user of a possible equipment failure. With this system, potential problems can be reported to the user within an hour of the occurrence. In addition, this system can check any time range, including one which crosses the midnight boundary. Maintenance personnel should conduct periodic checks on data traffic volume occurring at different hourly intervals to determine whether it is normal for data traffic to subside at any

time. This information should, in turn, be used to determine when block checks should occur.

To examine the hour boundaries currently assigned, enter the following at the maintenance terminal:

>**AMAHRS (cr)**

The system response is:

BLOCK CHECK START xx END yy HOURS, INTERVAL OF zz MINUTES

where: xx - block check start time (hour of the day)
      yy - block check end time (hour of the day)
      zz - block check interval (in minutes).

The log message is:

NO BLOCK LAST ii MINUTES

To assign or change hour boundaries, enter the following at the maintenance terminal:

>**AMAHRS Start Stop Interval (cr)**

where: Start   - starting hour (00-23)
      Stop   - stopping hour (Start-23) - greater than starting hour but less than 24
      Interval- number of minutes between reception of blocks before an alarm is generated (1-60).

If full time hourly block checks are required, enter 00 for Start, 23 for Stop, and 1-60 for Interval. If hourly block checks are not required, enter 00 for Start, 00 for Stop, and 00 for Interval.

Temperature alarm
The temperature alarm is activated when the temperature at the sensor on the BMC Power Supply exceeds 120°-130° F due to:

- BMC fan failure

- BMC fan filter not clear; dirt blocking airflow

- Ambient temperature surrounding BMC exceeds 100^oF.

The BMC sends a warning signal through a cabled connection to the Switching System. The Switching System displays the signal either in the form of an external alarm or other indicator as determined by local practices.

BMC systems for DMS-100 Switching Systems can be equipped with Enhanced Alarm Cables, which enable a temperature alarm system error message to be issued at the maintenance terminal.

Low Voltage Alarm

The low voltage alarm is activated when the voltage output of the BMC power supply drops below a given threshold. The threshold is set above the point when the voltage becomes insufficient to support normal operation. A voltage sensor located on the P/A Comm PCA detects the condition, sending a warning signal through a cabled connection to the Switching System. Just as with the temperature alarm, the Switching System displays the signal either as an external alarm or as determined by local practices. BMC systems for DMS-100 Switching Systems can be equipped with Enhanced Alarm Cables, which enable a low voltage alarm system error message to be issued at the maintenance terminal.

48V Fuse Alarm

The 48V Fuse Alarm is activated when the -48V fuse on either BMC power supply blows. A -48 VDC signal is placed on a connector point at the BMC input connection point, where it is then cabled to the Switching System and displayed either in the form of a warning light or other locally approved reporting method.

12V DC Fuse Alarm

Indicates that either one of the 12 VDC fuses on the BMC Input Connector Panels is open. This alarm applies to DMS-10 applications only. This alarm is not displayed but is transmitted to the Switching System. When encountered, this alarm indicates that no communication between the DMS-10 magnetic tape ports and the BMC is possible. Refer to the *Maintenance Procedures Guide* section for more information.

Other Indicators

The system contains no audible alarm devices. Relay contacts are provided for routing of alarm signals to the Office Alarm system. Refer to *Power and Ground Requirements* subsection.

BMC Test Function and Diagnostics

The TEST command is used to verify the proper operation of various functions that reside in the System. The following paragraphs provide a general description of the TEST command and a brief description of the various functions incorporated in the TEST command. The TEST command is invoked by manual input at the terminal. The command takes the form:

TEST (cr)   - active processor
DOS S TEST (cr) - standby processor.

When the TEST command is activated, either automatically as part of a start-up routine, or as a manual input, all ten (10) tests are performed. These tests are listed in Table 2-13. At the conclusion of each test, an indication is provided to the terminal. The indication consists of two possible outputs. The first is:

xxx TEST PASSED

where: xxx - identity of test

This message indicates the successful completion of the test. The second is an error message to provide pertinent information concerning the unsuccessful completion of a test.

The following paragraphs provide a description of the TEST command execution routines, and identify whether the routine is available on demand at the terminal or is available as a scheduled routine task. Refer to tables 2-13-2-15.

Table 2-13
Active Processor TEST Command Functions and Availability

Test Pass Indication	Test Error Indication	PCA Effected	PCA Slot
DPR TEST PASSED	DPR TEST FAILED: ADD: xxxx(H), RD: yy(H), WRT: zz(H)	SCSI	A11
DSK TEST PASSED	DSK TEST FAILED	SCSI	A11
CLK TEST PASSED	CLK TEST FAILED	CPU	A1
CTC TEST PASSED	EC-IC-ALM	CPU	A1
(Sheet 1 of 2)			

Table 2-13
Active Processor TEST Command Functions and Availability

Test Pass Indication	Test Error Indication	PCA Effected	PCA Slot
SIO TEST PASSED	A2 SIO TEST FAILED A4 SIO TEST FAILED A6 SIO TEST FAILED	Quad SIO	A6
PIO TEST PASSED	PIO TEST FAILED	Standby CPU	A1
ERR TEST PASSED	EC-CF-ALM	Error Control II	A5
B0 TEC TEST PASSED	B1 TEC COMM FAIL	TEC/DSI1	A13
B2 TEC TEST PASSED	B2 TEC COMM FAIL	TEC/DSI2	A12
RAM TEST PASSED	RAM PAGE x FAILURE/ADR: nnnn; RD: xx; WR: yy	DRAM	A3
ROM TEST PASSED	PROM CHKSUM ALM VAL=nn	EPROM	A2
PRG TEST PASSED	PROG CHECKSUM ALM VAL=nn	EPROM	A2

Note 3: The DMA test is not run on the active processor.

Note 4: The disk test is not run on the standby processor.

(Sheet 2 of 2)

Table 2-14
Standby Processor TEST Command Functions and Availability

Test Pass Indication	Test Error Indication	PCA Effected	PCA Slot
DPR TEST PASSED	DPR TEST FAILED: ADD: xxxx(H), RD: yy(H), WRT: zz(H)	SCSI	A11
DSK TEST PASSED	DSK TEST FAILED	SCSI	A11

(Sheet 1 of 2)

Table 2-14
Standby Processor TEST Command Functions and Availability

Test Pass Indication	Test Error Indication	PCA Effected	PCA Slot
CLK TEST PASSED	CLK TEST FAILED	CPU	A1
CTC TEST PASSED	EC-IC-ALM	CPU	A1
SIO TEST PASSED	A2 SIO TEST FAILED A4 SIO TEST FAILED A6 SIO TEST FAILED	Quad SIO	A6
PIO TEST PASSED	PIO TEST FAILED	Standby CPU	A1
ERR TEST PASSED	EC-CF-ALM	Error Control II	A5
B0 TEC TEST PASSED	B1 TEC COMM FAIL	TEC/DSI1	A13
B2 TEC TEST PASSED	B2 TEC COMM FAIL	TEC/DSI2	A12
RAM TEST PASSED	RAM PAGE x FAILURE/ADR: nnnn; RD: xx; WR: yy	DRAM	A3
ROM TEST PASSED	PROM CHKSUM ALM VAL=nn	EPROM	A2
PRG TEST PASSED	PROG CHECKSUM ALM VAL=nn	EPROM	A2

Note 5: The DMA test is not run on the active processor.

Note 6: The disk test is not run on the standby processor.

(Sheet 2 of 2)

Table 2-15
Test Descriptions

Test Name	Mnemonic	PCA Tested	PCA Slot	Occurrence
DPR Communications (standby processor)	DPR	SCSI	A11	Every hour, 50 minutes after the hour
Disk File System End-to-End Integrity (active processor)	DSK	SCSI	A11	3:10 am
TEC/DSI Communications	B0 TEC/DSI	TEC/DSI1	A13	Every 20 minutes*
TEC/DSI Communications	B2 TEC/DSI	TEC/DSI2	A12	Every 20 minutes**
RAM Read/Write Integrity	RAM	DRAM	A3	Continuous
ROM Program Checksum	ROM	EPROM	A2	Continuous
ECAC Communications	ERR	Error Control II	A5	Continuous
SIO Port Check	SIO	Quad SIO	A6	Every 0.5 second
CTC Vectors Correct	CTC	CPU	A1	Continuous
Clock Operations	CLK	CPU	A1	Continuous
DMA Integrity	DMA	CPU	A1	Continuous
PIO Communications	PIO	Standby CPU	A1	Continuous

* TEC/DSI1 (B0) is tested on the 5, 25, and 45 minute bounders, if idle.
** TEC/DSI2 (B2) is tested on the 15, 35, and 55 minute bounders, if idle.

Note 7: The DMA test is not run on the active processor.

Note 8: The disk test is not run on the standby processor.

DPR Communication Test

The DPR is shared by the main CPU and the SCSI Interface PCA. This 32K RAM is divided into sixteen descriptors and 16 buffers. The buffers are further divided into three types:

- Seven buffers of 4 Kbytes each
- Seven buffers of 512 bytes each
- Two buffers of 30 and 80 bytes each.

The 30-byte and 80-byte buffers are unidirectional. That is, data is passed through these buffers toward one destination only. The 30-byte buffer is used to transfer data from the main CPU to the disk; the 80-byte buffer is used to transfer data from the disk to the main CPU. These two buffers are associated with two unidirectional channels that correspond directly to the buffers in direction and size. The remaining buffers and corresponding channels can be used by either the main CPU or the disk. The DPR Communication test is designed to test the ability of the unit to perform the following functions:

- Use the 30-byte buffer and its corresponding channel descriptor to send a message to the disk.
- Make certain that the disk CPU receives that message and responds back using the 80-byte buffer and the corresponding channel descriptor.
- Make the CPU access the seven 4K buffers in less than two minutes. Provide a successful completion message if this is accomplished.
- Repeat the step above, using the 512 byte buffers.

If the DPR Communication test fails to send the message from the main CPU to the disk in less than one second, the following error message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

DPR TEST FAILED:
ADD: xxxx(HEX), RD: yy(HEX), WRT: zz(HEX)

where: xxxx - DPR address where the fault occurred (in HEX)
      yy   - incorrect value read from memory (in HEX)
      zz   - value (expected) which was written to memory (in HEX).

Disk Write/Read Test

The File System uses buffer management and file utilities to write and read data from and to the disk. The sequence of events that must be followed for reading and writing to disk are provided in Table 2-16.

The Disk Write/Read test confirms that data can be written to and read from disk. There are two functional tests involved. The first test is the 4K buffers test, then the 512 byte buffers test.

Table 2-16
Disk Write/Read Functions Overview

For Writing to Disk		For Reading from Disk	
Step	**Description**	**Step**	**Description**
1	Create the file	1	Open file for read
2	Open the file for write	2	Read desired data into DPR buffer
3	Allocate DPR buffer	3	Transfer data from DPR buffer
4	Transfer data to DPR buffer	4	Consume DPR buffer
5	Write data to disk	5	Close file
6	Close file	6	Delete file

TEC/DSI Communication

The TEC/DSI Communication test is designed to verify that communication is possible with the main CPU. The test is executed when the TEC/DSI is not in use and when it is not in send or receive mode. The test consists of asking the card for its status (RDY or NOT RDY). The response must be returned within one second of the request or an error is generated. The following error message is output to the terminal:

(log message) Bx TEC COMM FAIL

where: x - TEC/DSI Port ID (0 or 2)
        0 - message is from the TEC/DSI PCA in slot A13
        2 - message is from the TEC/DSI PCA in slot A12.

The same procedure is followed for the second TEC/DSI PCA.

There are two tests, manual and running. The manual test asks for the status of the first TEC/DSI PCA. If there is no response with status "OK" within one second, an error message is output.

If the status is "OK", the following message is output to the terminal (the same procedure is followed for the second TEC/DSI PCA):

Bx TEC TEST PASSED

where: x - TEC/DSI Port ID (0 or 2)
           0 - message is from the TEC/DSI PCA in slot A13
           2 - message is from the TEC/DSI PCA in slot A12.

The running test performs the same tests as the manual test, but asks for the status of the first TEC/DSI PCA on the 5, 25, and 45 minute boundaries, and the status of the second TEC/DSI PCA on the 15, 35, and 55 minute boundaries. The Bx TEC TEST PASSED message is not output if the status is returned "OK". The appropriate error message (as shown above) is output if the status is not "OK".

RAM Write-Read-Verify Test

This test cycles through all of the RAM. Each byte of RAM is read by the test program in a search for incorrect parity.

If a parity error is encountered, the following message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

D-RAM ERROR xx AT yyyy

where: xx - interrupt register value (page number, high-order bit is parity bit)
     yyyy - the next program address to be executed.

Program Checksum Test

The Program Checksum Test is designed to cycle from the beginning of the program to the end of the program, adding together the value of each byte as it progresses. At the end, the sum should equal "ZERO".

If the sum is not equal to "ZERO", the following error message is output to the terminal and a CRITICAL alarm is generated; refer to the procedure for this message and perform the craftsperson activities listed:

PROM CHECKSUM ALM VAL = nn

where: nn - difference from "0" (zero) of the calculated checksum.

There are two tests, manual and running. The manual test is initiated at the terminal and executes the test as described above. The running test is constantly executing to make certain at all times that program data is not corrupted.

Error Control and Alarm Circuit (ECAC) Communication Test

The ECAC Communication test checks the ability of the Error Control II PCA to provide interactive monitoring of the Active and Standby Processors.

The ECAC initiates a Processor switch when the current error count in the active Processor exceeds sixteen (16), generates the appropriate alarm, and outputs the following error message to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

MP SWITCH

The ECAC Communication test checks the communication between the ECAC and active Processor. This is accomplished as a running test, divided into two parts.

Communication is checked every second. This is done to confirm that the ECAC can communicate with the active Processor. This is done indirectly. The ECAC must initiate a request for Processor status every one-half (0.5) second.

If a full second expires without a request being initiated, the Processor dialogue has been compromised and the following error message is output to the terminal; refer to the procedure for this message and perform the Craftsperson activities listed:

EC-IC-ALM

The active processor must respond to a status request from the ECAC within 200 milliseconds, with a valid response. If there is no response from the active processor, or if there is an invalid response, the ECAC lights the MAJOR alarm lamp.

CTC Vector Test

The CTC channels are used as countdown timers and these timers generate Processor interrupts. When an interrupt occurs, the CTC counter for the channel is set to a "1" (one). After the interrupt is processed, the counter is set to "0" (zero). The channels are arranged in a priority scheme to assure that prompt handling is provided to the associated interrupt.

The CTC Vector test is a running test. Because the interrupts are processed immediately, the counter for the interrupt must be set back to "0" (zero), before the program can resume. The CTC Vector test is for CTC channels 1 and 2; channel 0 (zero) is reserved for the clock and channel 3 is not used. If the counter is not set to "0" (zero), there is an indication that the interrupt did not receive the proper handling, or did not execute at all, and the following message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

EC-IC-ALM

Clock Operations Test

The clock operations test is a running test designed to ensure that none of the 16 millisecond interrupts generated by the CPU Clock Circuit are missing. There are two tests, manual and running. For the test, the check routing sets a counter. This counter is reset for every clock interrupt generated by the CPU Clock Circuit. If the counter is not reset at the proper interval, or not reset at all, it is an indication that an interrupt has been missed. If the manual test is unsuccessful the following message is output to the terminal:

CLK TEST FAIL

SIO Port Check

The SIO port check verifies the integrity of the port vectors. An I/O interrupt is defined as a "Mode 2" interrupt. This means that when an interrupt occurs, the "I" register, along with the eight (8) bits from the device form the sixteen (16) bit service routine.

The test begins by requesting the device's vector. The vector value returned is checked against the expected value. If there is a mismatch, an error exists.

There are two tests, manual and running. The manual test is initiated at the terminal and tests each channel on the SIO as described in above. If there is an incorrect response, the following error message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

xx SIO TEST FAILED

where: xx - A2 - Communications port; Modem/HOC (download) link.
- A4 - Maintenance port; BMC is unable to obtain a Switching System prompt from the Maintenance Interface printer port (Terminal 2 for DMS-100;SDI port for DMS-10).
- A6 - Maintenance port; teleprinter.

The running test is the same as the manual test, with the same error message output. The running test is called automatically by the program every one-half (0.5) second.

DMA Communication Test

The DMA provides the control and processing of data transfers between the main CPU and the TEC/DSI. During a transfer operation, the DMA controls reading from and writing to addressable ports. The data flow is handled on a byte-by-byte basis. These addressable ports may be either main memory or TEC/DSI.

There is only the manual test for DMA Communication. The test consists of transmitting a message from the main CPU to the TEC/DSI. The message from the CPU is a "trigger" for the TEC/DSI to send a test block to the CPU. The CPU checks the returned test block to ensure that it is equal to the data that was originally requested by the CPU. The TEC/DSI response must occur within one second or an error indicating communications failure is generated.

The following error message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

Bx TEC COMM FAIL

where: x - TEC/DSI Port ID (0 or 2)
0 - message is from TEC/DSI PCA in slot A13
2 - message is from TEC/DSI PCA in slot A12.

If the data is returned within the specified one second, but is not as requested by the CPU, the following error message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

DMA TEST FAILED

The DMA test is run if the TEC/DSI Communication tests have first established that communications with one of the TEC/DSIs is possible.

PIO Communication Test

The PIO is the medium of communication between the active and standby processors, using the transmit and receive routines resident in the program software. The PIO Communication test is initiated when the transmitter starts sending a message (receiving an echo for each byte transmitted), to the

receiver. Upon completion of transmission, the transmitter generates an interrupt to the receiver to give control to the receiver, and to start receiver completion. The receiver accepts all of the incoming bytes, echoes them, and waits for the transmitter interrupt, to begin its completion. If a timeout occurs during or after reception of all bytes, a reception error is generated.

There are two tests, manual and running. The manual test is initiated by terminal input. During the manual test, the active processor sends a message to the standby, waits for the message to return from the standby, and verifies that the returned message is the same as the message originally sent.

If there is a discrepancy, the following error message is output to the terminal; refer to the procedure for this message and perform the craftsperson activities listed:

00 PIO TEST FAILED

The running test is performed for every occasion of messages being sent across the PIO from active Processor to the standby Processor. The running test consists of two operations. The first is an echo check. If the character (byte) sent across the PIO is not the same as the one echoed back, the following error message is output on the terminal:

00 PIO TEST FAILED

The second operation performed during the running test is the timeout test. When a message is started, the time between the transmission of each byte must not exceed a predetermined threshold.

If this threshold is exceeded, the following error message is output to the terminal:

COMM DOWN TO STANDBY PROC

Communication Processor (CP) Testing Overview

The CP test function is used to verify the proper operation of various functions that reside on the 56K Interface PCA. The test command takes the form:

>CP TEST ACT (cr)   - active processor
>CP TEST STDBY (cr) - standby processor.

The following paragraphs provide a general description of the CP test command and a brief description of the various test functions incorporated in the test function.

The CP test function can be invoked manually by either of two means. The first is automatic activation by the BMC during a cold or warm restart (CP reset) procedure to automatically ascertain proper system operation. The CP test function can also be invoked by manual input at a local terminal.

There are two modes of execution: MANUAL and BACKGROUND. The manual mode is entered when the test command is executed from the terminal. In the manual mode, the result of each test is reported, whether the test passes or fails. In the background mode, test execution is continuous; output is generated only when a test fails to execute properly. The continuous operation in background operation is suspended for higher priority functions, such as, a polling session.

When the CP test function is activated, either automatically as part of the start-up routine, during the normal sequence of operations, or as a manual input, all tests are performed. At the conclusion of each test in manual mode, an indication is provided to the terminal. The indication consists of two possible outputs. The first possibility is an indication of the successful completion of the test. The second possibility is an error message to provide pertinent information concerning the unsuccessful completion of a test.

The following paragraphs provide a description of the test function execution routines. Keep in mind that the tests described here are to verify the functional operation of the SCSI Interface PCA in slots A11 and B11, and the 56K Interface PCA in slots A7 and B7.

CP EPROM Checksum Test
This test verifies that the 2s complement of all EPROM bytes is equal to zero. If this test is successful, in background mode, there is no output. If this test is successful, in manual mode, the following message is generated:

CP ROM Checksum Test Passed

If this test is unsuccessful, in background or manual mode, the following message is output:

CP ROM Checksum Test Failed

CP Program Checksum Test
This test verifies that the 2s complement of all program bytes is equal to zero. If this test is successful, in background mode, there is no output. If this test is successful, in manual mode, the following message is generated:

CP PRG Checksum Test Passed

If this test is unsuccessful, in background or manual mode, the following message is output:

CP PRG Checksum Test Failed

CP DMA Test

Tests the DMA registers to detect DMA failures and DMA false interrupts. The test checks the DMA registers to determine whether, or not, a DMA operation was successful. If the test is successful, in background mode, there is no output. If the test is successful, in manual mode, the following message is generated:

CP DMA Test Passed

If the test fails, or an unknown interrupt occurs, in background or manual mode, the following message is output:

CP DMA Test Failed

CP RAM Parity Test

The data RAM on the CP is odd-parity protected. If even parity is detected by the on-board parity circuitry, a maskable interrupt is generated. This is one of the highest error conditions and maintenance activity is required. If this test is successful, in background mode, there is no output. If this test is successful, in manual mode, the following message is generated:

CP RAM Test Passed

If this test is unsuccessful, in background or manual mode, the following message is output:

CP RAM Test Failed

CP SCC Loopback Test

During the SCC local loopback test, data is written to the transmit buffer and routed back to the receiver. A match function is performed on the sent and received data; if the data matches, test pass, if there is a data mismatch, test fail. Each channel is tested separately. If this test is successful, in background mode, there is no output. If this test is successful, in manual mode, the following message is generated:

CP SCC Loopback Test Passed on Channel A
CP SCC Loopback Test Passed on Channel B

If this test is unsuccessful, in background or manual mode, the following message is output:

CP SCC Loopback Test Failed on Channel A
CP SCC Loopback Test Failed on Channel B

> *Note:*   This test cannot execute if a polling session is in progress.

Error Indicators

This section describes the error indication structure for the BMC.

Three Level Alarm Structure

The ECAC provides three alarm categories. The categories are defined, in order of severity as: CRITICAL (CRIT), MAJOR (MAJ), MINOR (MIN), with NO ALARM defined as the error free (redundant system) operational level. PROCESSOR SWITCH (PSWITCH) and INHIBIT are part of the ERRMAP scheme, but are not alarms in the usual sense.

The ECAC provides fourteen alarm levels. The fourteenth alarm level is reserved for the System, to initiate the planned processor switch.

Each alarm category, CRITICAL, MAJOR, and MINOR is divided into four levels. These four levels are defined as: 0, 1, 2, and 3, with level 3 as the most severe.

PSWITCH is used by the BMC system to initiate a planned processor switch as part of the normal system operational routine. To INHIBIT an ERRMAP event is to "turn off" the alarm that event represents. The appropriate error message prints out, the condition still exists, but for every subsequent occurrence of the alarm, no further audible/visual indications or reconfiguration activity takes place.

For alarm categories CRITICAL, MAJOR, and MINOR, levels 1, 2, and 3 result in a Processor switch. Level 0 alarms for CRITICAL, MAJOR, and MINOR, do not result in a Processor switch. Level 0 may be reserved for conditions in which a processor switch serves no purpose (i.e., the condition of "BOTH DISKS FULL").

If an alarm occurs that is LEVEL 0, no Processor switch takes place. LEVELS 1-3 assign priorities to the remaining alarms. If an alarm occurs in the Standby Processor (MINOR Level 2), and a second alarm occurs in the Active Processor that is a higher priority than the alarm in the Standby Processor (MINOR Level 3), a processor switch takes place. The BMC always makes active the processor with the lowest priority of active alarm.

Alarm Upgrading

Under certain circumstances, if the situation arises in which two alarms are present in the Processor System, the alarm is automatically "upgraded" to the next higher level alarm. The alarm upgrading (reporting) scheme is as follows:

• A MINOR alarm occurs in each Processor, the alarm is reported as MAJOR.

- A MAJOR alarm occurs in each Processor, the alarm is reported as CRITICAL.

- A MAJOR alarm occurs in one Processor, and a MINOR alarm occurs in the other Processor, the alarm is reported as MAJOR.

- A CRITICAL alarm occurs in one Processor and a MAJOR alarm occurs in the other Processor, the alarm is reported as CRITICAL.

- A CRITICAL alarm occurs in one Processor and a MINOR alarm occurs in the other Processor, the alarm is reported as CRITICAL.

- Two MINOR alarms in one Processor are reported as a MINOR alarm.

- Two MAJOR alarms in one Processor are reported as a MAJOR alarm.

- Two CRITICAL alarms in one Processor are reported as a CRITICAL alarm.

Error Map (ERRMAP) Command

For maintenance and/or service purposes, the user may override the existing (System Default or Customer-Selected) alarm by assigning INHIBIT status to a particular device or event. This is accomplished through the use of the ERRMAP Command. This prevents subsequent alarm reporting (and possible repetitive processor switches) while maintenance activity/ troubleshooting proceeds.

Inhibiting an alarm does not remove the cause of the alarm. The reason for the alarm may still exist, but the alarm will not appear as an error condition on the Status Panel or on the maintenance terminal (an alarm does not have to be active to be inhibited).

A distinction is made between inhibiting an alarm and resetting an alarm. Inhibiting an alarm prevents the alarm from having an effect on the System. Resetting the alarm clears its active status until the appropriate error condition reappears, at which time the alarm again becomes active.

The Error Map command displays a list of all alarms, their respective current level assignments, and whether or not a particular alarm is currently active. The Error Map command also permits the changing of alarm and level assignments. Maintain a record of any changes. The following example illustrates the ERRMAP command. Enter the following at the maintenance terminal to display a list of alarms and level assignments:

>**ERRMAP (cr)**

The system response is:

```
          CURRENT ALARM ASSIGNMENTS ARE:
          DEV/EVT # NAME        ALARM   LEVEL
          * 01   NO BLK LAST PER  MINOR     1
            02   TEC STNBY FAIL   MINOR     0
            03   TEC PRIME FAIL   MAJOR     1
          * 04   D-RAM ERROR      MAJOR     1
             .
             .
            33   DISK ER MESSAGE  MINOR     0

          * INDICATES CURRENTLY ACTIVE ALARM(S)
          TO CHANGE  ERRMAP  TABLE, ENTER:
           ERRMAP  DEV/EVT#  ALARMTYPE  LEVEL
             EXAMPLE:   ERRMAP  2  MINOR  1
```

> *Note:*   To clear an active alarm after the condition is no longer pre-sent,
> enter RSERR 00 to reset all alarms, or DEVICE/EVENT#. (1 or 2 digits)
> to clear a specific alarm. For more information, refer to the information
> regarding the RSERR command in the *Command and Message Guide*
> section.

CAUTION

Use of this command may cause loss of data. Consult
with technical assistance personnel before changing
alarm level assignments.

Enter the following at the maintenance terminal to assign or change an alarm
event, alarm type, or alarm level:

>ERRMAP event alarmtype level (cr)

where: event   - Device/Event Number (0-99)
       alarmtype - INHIBIT, MINOR, MAJOR, or CRITICAL.
       level   - Severity Level (0-3)
                 0 - No Switch (Processor)
                 1 - Least Serious
                 2
                 3 - Most Serious.

If a Level 0 alarm occurs, no Processor switch takes place. Levels 1-3
establish the priorities of the remaining alarms. If an alarm occurs that is a
higher level alarm than the highest Level active alarm on the standby side, a
Processor switch takes place.

Enter the following at the maintenance terminal to INHIBIT a selected alarm:

>ERRMAP event# INHIBIT level (cr)

where: event# - Device/Event Number (0-99)
        level - Severity Level (0-3), 3 - most serious.

If desired, make the inhibited alarms permanent by entering the following at the maintenance terminal (after the completion of the ERRMAP command entry activity):

>**SITDAT WRITE (cr)**

Alarms (ERRMAP entries) on the Standby Processor are viewed and inhibited by prefixing the ERRMAP commands with the following command:

>**DOS S (cr)**

The ERRMAP printout for the Standby Processor displays all items for the ERRMAP list.

The currently active alarms on both processors, including any active alarms that are inhibited, can be viewed by entering the following at the maintenance terminal.

>**ERRMAP ALARMS (cr)**

The system responds with an ERRMAP printout of active alarms for the Active and Standby Processors.

Log Call Record File

The Log Call Record File, which is listed as LOGCRD in the directory listing, contains the various information and log messages that are generated by the BMC System. Versions of this file are stored on the Disk for several days; the oldest LOGCRD files are automatically deleted by the System to make room for the newest LOGCRD files.

New AMA and LOG files are not created at processor switches. The "old" file is reopened after the processor switch is completed and any new data is appended to the old data in the file. Log files are closed when they reach their physical maximum or whenever they are closed manually be the IDXMAINT command.

Every time a LOGCRD is closed, the newly opened one is said to be another version of the LOGCRD. The LOGCRD versions are numbered sequentially from 01-255. The 255th+1 version starts the count over again at 01. However, only 200 versions of the LOGCRD can be stored on disk at any one time.

System Description - Software

The BMC is an intelligent peripheral of the associated Switching System, capable of making decisions without guidance from the Switching System's Common Control Processor/Memory Complex. The BMC activities are controlled by software resident in the BMC. The internal architecture of the BMC is closely related to the task structure of the software modules. The software is divided into two fundamental areas:

- Monitor routines
- Application routines.

Monitor routines are stored in firmware to provide allocation of physical resources and a center for process structuring. Download instructions and communication support programs are also located in the monitor routines.

Application routines are higher level software modules that are identified closely with system objectives such as specific report generation or AMA record processing.

The BMC architecture makes use of a distributed processing scheme (that is, a group of microprocessors working together) to increase system throughput by accomplishing tasks in parallel. The SCSI Interface and TEC/DSI PCAs have dedicated microprocessors which execute routines specifically tailored to their activities. The main BMC processor is freed of these tasks and can handle other system tasks rapidly with a minimum number of interruptions.

Monitor routines

System instructions that must be present for the BMC to operate are referred to as the monitor routines. One of the modules that make up the monitor is referred to as the boot program. A boot program contains the necessary features required for initial start up of the basic BMC; for example, disk operation and memory allocation. The boot program is stored in EPROM, and is available upon power up. Monitor routines are classified into groups based on their effect on the BMC.

The basic boot programs search the disk for the larger programs, such as the application routines, and cause them to download to the BMC RAM. If good program/data cannot be found on disk, a software download from an authorized source is necessary.

System start-up and scheduler

Once the additional programs are loaded, there are a number of other features used by the system. The BMC operating system includes several code modules that both supervise and offer services to various application processes. This structure is distinguished by its separation of function,

combined with a strong intercoupling of function modules. The BMC start-up and scheduler consists of six modules:

- Process Scheduler

- Clock Services

- System Calls

- Memory Manager

- General Purpose Functions

- Human-machine interface functions.

Once the additional programs are loaded, there are a number of other features used by the system. Scheduler routines control the activities of the microprocessor and the clock circuits. Memory management modules assign RAM areas to incoming data, temporary storage, vector tables, device status, and other data structures, as required. File system routines direct the flow of data to and from the disk. Error control functions, log and alarm messages, command responses, and emergency access modules are part of the system monitor.

System utility routines allow access to the memory, permitting examination of the SCSI interface and processor files. The Switching System displays the contents of these areas on the terminal for viewing by the craftsperson. The utility routines also allow user programming to facilitate selection of features. For example, menu choices, AMA or status report requests, or maintenance and test procedures. Communications with the Switching System go through the application software to reach the lower monitor routines.

Application routines

System instructions that are related to data handling or BMC features are referred to as application routines. Software modules falling under the application classification are generally higher level programs since more complicated decisions and data manipulations are encountered here than are required at the monitor level. Applications routines work directly with AMA data, reports, files, and formatting. Because applications are basically stand alone programs, they function independently with little or no intercommunication.

The AMA application programs direct the processing of the call record data received from the Switching System. AMA applications modules control the flow of data from the interface to the disk, and from the disk to the HOC when the stored records are polled. Other modules group the data into blocks and perform the necessary protocol conversions to ensure that information is uniform for transmittal to the Regional Accounting Office (RAO). If the call records sent to the BMC are not completely structured, applications modules

are provided to convert the raw data to the required format before processing any further.

Other application routines manage events that must be scheduled on a regular basis. Call record report generation and BMC processor switchovers are two examples of the events directed by these application modules.

Command and response application routines permit user intervention with system variables. Disk parameters, site data, and BMC user file maintenance are all made possible through these command and response routines. The command modules are used to recognize keyboard inputs from the terminal which are passed through the Switching System to the BMC. Response modules return prompt or comment statements back through the system to the terminal to provide replies to system queries. The commands are response application routines to allow a user friendly human-machine interface operation by providing the translation between the BMC code and the English language.

One section of the application is dedicated to defining error messages associated with the BMC. A fault in the BMC is analyzed by the alarm application routines and classified according to its severity. Fault messages are then generated from this information and sent to the terminal to alert maintenance personnel of the difficulty.

Interface routines

The TEC/DSI PCAs employ a microprocessor to control the data handling activities. This microprocessor requires its own programs to direct its local operations and to interpret instructions from the BMC microprocessor. The TEC/DSI application routines are subdivided into communication, tape drive emulation, and data transfer module groups. The data is moved using DMA to read and write to RAM. The communications modules allow the BMC to respond to system commands without having to reprogram the Switching System. The communications package controls the link between the Switching System and the TEC/DSI.

The TEC/DSI provides an active interface by emulating the tape drive functions and providing two-way communication between the BMC and Switching System.

Disk routines

The SCSI Interface PCA has its own microprocessor and software routines. Read, write, and retry (error recovery) instructions are resident in the disk interface circuitry. Disk initialization, buffer management, directory management, and file management modules are part of the disk programs. There is also a communications package and an input/output handler program included in the disk routines.

Downloading software to the BMC

When a situation arises where the BMC requires a download of software, it is normally accomplished by transfer from an authorized source, usually Nortel. There are two possible BMC conditions that require the downloading of new software. They are as follows:

- The development of upgraded software to replace the existing BMC program. This could range from a debugged version of the same program to an entirely different program with updated features.

- An attempt to recover from a disk failure, in which the BMC is unable to retrieve program software from either disk drive.

System Operation

The BMC acquires, stores, formats, and forwards data from the Switching System. The BMC accepts billing data from the Switching System, temporarily stores the collected data on hard disk, and when requested, retrieves, reformats, and sends the stored data to the HOC. Data collected by the BMC includes call records for billing purposes, statistical data, and maintenance reports. The various types of data are stored in different files on disk drives for ease of retrieval. The retrieval of the stored data is under control of the HOC located at the central collection point.

Collecting and storing data

Tape drive and storage type output signals from the Switching System are routed from the active Switching System tape drive port, through the Interface Box, to the BMC TEC/DSI PCAs. The TEC/DSI PCAs have their own microprocessor and software program to emulate tape drive functions, which requires two-way communication between the BMC and the Switching System. The TEC/DSI software receives commands that are normally sent to the tape drives, and responds with the status and strobe signals normally sent back to the Switching System. The TEC/DSI receives call record data blocks, processes them and forwards them to the active processing unit.

When data blocks are received from the Switching System, a signal is sent to the active processing unit to take the data block. Under processor (DMA) control, the data block is transferred through the data bus and assigned to a buffer. The buffer used depends upon whether the block contains test or call record data. Test data blocks may be read back to the Switching System, but not to disk. The BMC software program stores test blocks on the TEC/DSI PCA. There is a six block buffer in the main CPU to hold call records where validation occurs.

During the validation checks, all criteria relative to validation, thresholds, and alarms are used in examining the data block. If a call record, a group of call records, or the entire block does not meet the validation requirements, an exception report is printed out as a log message. In extreme cases, a processor alarm is generated.

Validated call records are loaded into a disk buffer on the SCSI Interface PCA, used for AMA call records. When a buffer is full, its contents are written to disk, while another buffer is made available to receive call records.

Ribbon cables are used to send data and write commands from the SCSI Interface PCA to the SCSI Crossover PCA and both disk drives. Identical data is written to the primary disk, then to the secondary disk, providing redundancy to enhance the integrity of the billing data.

Data storage

The disks provide an intelligent data storage system by recording different types of information in separate files. Files for record storage are divided as follows:

- PRIMARY- primary AMACRD files. Contains unpolled AMACRD files.

- SECONDARY - secondary AMACRD files. Contains polled AMACRD files.

- LOG - contains BMC-generated maintenance messages.

- SITE DATA - contains site data entered at start-up.

- REPORT STATISTICS - contains statistical data on BMC operation.

- PROGRAM FILES - contains the BMC program files.

These files are standard on the BMC, whether or not they are used.

Disk file system

The disk drives provide an off-line medium for data storage that is not affected by power outage. Data remains on disk, as secondary AMA data, even after polling by the HOC. Due to the large storage capacity of disks, several days of records are accommodated on the disk, available as backup records to retrieve at a later time, if necessary. When certain threshold values are reached, or if additional storage space is required, files are removed from disk. Sufficient disk capacity allows several days storage while polling problems are resolved, so that no data is lost.

The BMC uses a redundant disk configuration which is capable of operating in either a prime or only mode. In the **prime** mode, data is written to both disks; first to the prime disk, then the standby disk. In the **only** mode, data is written to the prime disk. The prime mode is the normal operating mode for the disk system. The only mode is used when either disk drive is unavailable due to a fault, or some maintenance condition.

The BMC disk system consists of multiple files. The maximum number of files is 511. These files can be displayed by use of the LSTDIR ALL

command. For more information concerning the LSTDIR command, consult the *Commands and Messages Guide* section.

The total number of files divides into two categories: dynamic and static. **Dynamic** files are usually large, while most static files are small. Most dynamic files are data files consisting of AMA and log (LOG) records. Each of these files has an index file associated with it. **Static** files are stand-alone files, primarily various index files that are used for the management of data, statistics, site data, program, boot, and other files.

Due to DPR buffer limitations, a maximum of 14 files can be open (reading from or writing to) at one time. This is further divided into seven dynamic and seven static files. Since only seven dynamic files can be open at one time, this the total number of data files that can be polled from or written to at one time. The data files may have a maximum of 255 versions, after which it rolls back to restart the count at version 1, with the previous version 1 deleted.

> *Note:* File versions containing primary data are not deleted.

The index file is used to keep track of the data file versions. It may contain up to 200 versions. Each version of the index file consists of 9 bytes which is described by the following table:

Table 2-17
Byte structure of index files

Byte	Description
1	Version number
2-3	Total number of blocks
4-5	Number of blocks to be polled
6, 7, 8	Starting sequence number
9	Days to delete

The total number of bytes in an index file is 1800 (9 bytes times 200 versions). The other static files (statistics, site data, program) are accumulated in 512 byte increments and put on disk.

Data Management

The BMC disk system supports two types of data structures: (1) files, and (2) blocks. Files are named groups of blocks. The disk system consists of multiple files which are named using a binary integer value range of 1-255.

Generally, call record data blocks from the Switching System are formatted as LSSGR data blocks. Other files on disk contain the site data and statistics. An Error Block is generated and used during file transfer to the HOC to indicate that a data block could not be successfully read from the storage device. The BMC creates several block types which are discussed individually.

Block Types

Data files contain two types of blocks; File Header/trailer blocks and Files data blocks. Both block types have a checksum to assure transmission integrity. The checksum is the last four octets of the block. Major block types are:

- Header Trailer Blocks - Header/Trailer Blocks uniquely identify a file. Fields within a block include:
  - Block Type - Header or Trailer
  - File Type - Hexadecimal identifier
  - File Name - a binary number (1-175)
  - Date - YR/MM/DD
  - Time - HR:MN.SC
  - Office ID - location from which data originated
  - System information - System type, version, release
  - Office Type - site specific
  - File resettable block count
  - Fill characters
  - Checksum.

- Statistics - Date, Time, Resettable block counts, and error block counts.

- Site Data - Site data parameters may be customized to suit a particular set of data traffic, data collection, and security needs. Refer to the *System Administration Guide* section. It is recommended that a review be conducted by the traffic department of the operating company concerning establishing the recommended values for site data entries. This data should be provided to those performing site data entry.

- Error blocks - Error blocks are generated during transmission when successful transmission is suspect. The BMC inserts an error block to identify a missing or suspect block. Fields in the block include: Block ID, Office ID, Filler (Hex As) and a checksum.

Each BMC disk file has a number associated with it which represents the number of days left before the file is deleted. This number is used for the

message journal files and secondary (polled) call record data files. The number is entered into the file upon creation of the file on the disk. After the file has been polled, the number is decremented by one at 1 a.m. of each day. The file is deleted when:

- the (down) count reaches zero.

- when it is the oldest file on disk with AMA storage exceeding 70%, or with AMA file versions exceeding 200.

The recovery strategy is implemented in three stages, each of which is directly related to disk capacity. The first stage occurs when the amount of disk space allocated for AMA data is exceeded (70 percent of the total disk capacity).

> *Note:*   Total disk capacity for a BMC is 95 percent of total disk space available. When total disk capacity (100 percent disk usage) is referred to throughout this section in relation to AMA files, it refers to 95 percent of actual BMC disk capacity. The remaining 5 percent is reserved for emergency conditions when the redundancy of the disks has been disengaged. Data is written in this reserved 5 percent when polling of non-redundant disks is underway.

The following ERRMAP and log messages are active at the specified disk percent used levels. Refer to the *Maintenance Procedures Guide* section for the procedures to alleviate the conditions indicated in Table 2-18.

Table 2-18
Disk capacity indications requiring maintenance activity

Disk Usage	ERRMAP Entry	Corresponding Log Message
70%	DSK 70% PRIMARY	NO SECONDARY FILE TO DELETE
90%	DSK 90% PRIMARY	LOG FILES DELETED
99%	OFFLN DSK FULL	OFFLINE DISK FULL
Both Disks Full	DSK STORE LIMIT	BOTH DISKS FULL

Note: To determine what percentage of the disk has been used, refer to the DISK USAGE command in the *Command and Message Guide* section.

When a DISK FULL condition exists, the BMC does not write-over stored primary data. Instead, it switches to an ONLY (SPLIT) Disk mode and continues writing data to the other disk. When this disk becomes full, an EOT

signal is sent to the Switching System. The Switching System attempts to access the second interface. The second interface also returns an EOT to the Switching System and a critical alarm is generated.

When the allocated disk space for AMA files is reached, the following actions occur:

1. A user-selected alarm (default = minor) is activated.

2. A log message is generated.

3. A secondary file is deleted until the amount of disk space used drops below the amount allocated for AMA data.

4. The amount of time at that alarm level is recorded.

If the rate of incoming AMA file creation is greater than the rate of secondary file deletion, or if all of the secondary files has been deleted, the second phase of the recovery strategy occurs when disk usage exceeds 90 percent.

This second condition causes the following to occur:

1. All message journal files are deleted.
2. The alarm level is raised to major.
3. A log message is generated.
4. The amount of time at that alarm level is recorded.

If a polling session does not take place, and disk usage has reached 100 percent, the third recovery phase occurs. During this third condition, the following actions take place:

1. A log message is generated.

2. Disk mode changes to ONLY.

3. The first disk is write-disabled.

4. The second disk is cleared of all files.

5. Subsequent AMA data is written to the second disk.

6. Log messages are generated each minute that the BMC is in a non-redundant mode; alarm level remains major.

7. The amount of time at that alarm level is recorded.

In the extreme case, where the second disk reaches 100 percent usage, the following activities occur:

1. Alarm level is raised to critical.
2. BMC returns EOT status to the Switching System.
3. Switching System transfers to the second interface.
4. BMC returns EOT status to the second Switching System interface.

In order to poll AMA data in sequence, the BMC disk mode must be manually changed back to the original full disk. The polling session then takes the oldest primary AMA data from the first full disk. At this time, any incoming AMA data from the Switching System is written to a special reserved area of the disk from which AMA data is being polled. The polling session ends when all primary AMA data has been read from the first full disk. In order to poll the second disk, a manual disk mode change to the second disk must be performed, and another polling session initiated. Any AMA data is written on a special reserved area of the second disk. If AMA data is being written at a consistent rate, several disk mode changes and polling sessions may be required to poll all of the primary data.

Once all of the primary AMA data has been polled from the second disk, the following manual actions have to be performed in order to return the BMC to its normal operation:

1. Change disk mode to first disk.
2. Change BMC disk operation to prime mode.
3. Clear all alarms.

Bad Track Mapping

The BAD TRACK MAPPING or DEFMAP procedure is not active for BMC systems equipped with 1-gigabyte disk drives. The DEFMAP is "loaded" onto disk at the time of manufacture. Any subsequent defects are automatically blocked out by the disk firmware.

Disk Initialization

The disk initialization command (DISK INIT n, where n is the disk reference), is not active for BMC systems equipped with 1-gigabyte disk drives.

Files

Files are a named sequence of blocks. The data billing files are named with a binary number in the range 1 to 255, inclusive. The number of blocks per files is related to the communication line speed. Consequently, the number of blocks is proportional to the transmission speed (baud rate). Assuming a 60 percent efficiency, for communication overhead and a block size of 1531

octets, the relative file sizes are: (a) 325 blocks at 9600 bits-per-second (baud) and, (b) 40 blocks at 1200 baud.

The headers and trailers are generated and maintained by the BMC. Other files handled by the BMC include: statistical, error, communication, and security files. Files are divided into two functional groups, Static and Dynamic. Due to buffer capacity, only 14 files can be open at one time.

- Static Files - generally small (about 512 bytes) and contain statistical and site specific data. These files are handled separately from dynamic files and relate primarily to internal operation and processing of transmission and polling requests.

- Dynamic Files - larger than static files and include the call records being stored. Due to buffer dynamics, seven dynamic files may be open (read from or written to) at one time. The maximum number of data files is 255. A file counter keeps track of the files. When the limit is reached, the system will attempt to access file number one (loop to first reference number). If this file does not exist (has already been polled) the system creates the file.

Communications

The BMC communicates with the Switching System (receipt of data) and the HOC (polling of data). Communications are handled in accordance with three of the seven layers of the ISO model. This model groups communications functions into layers. The functions for each layer in the local devices relate to similar functions in the same layer on the remote device. Each layer has tasks that provide the required information for adjacent layers in the protocol.

Establishing the Communication Link

The communication link between the BMC and the Switching System is hardwired and the internal control and acknowledgment signals are self-contained. The BMC-HOC link is over voice-grade telephone lines. The BMC-HOC link has several levels of access protection. To establish a communication link, the BMC and HOC must recognize confirmation tones (carriers), and exchange passwords before a link is established.

BMC-to-HOC Communication

The BMC BISYNC Protocol System uses Extended Binary Coded Decimal Interchange Code (EBCDIC) point-to-point Binary Synchronous Communications without IAM/WRU station identification (it will accept IAM/WRU characters but will not generate them). The BMC also accepts and ignores headers in Text messages but does not generate them.

There are basically two types of messages in the BISYNC protocol: Text and Control. Control messages are used to administer the link. These messages are also referred to as "overhead." Text messages contain the information that the application programs exchange. The BMC makes no distinction between a Text message ending in ETB or ETX. It also ends all of its Text messages with ETX.

When a BISYNC station originates a call, it is referred to as the Primary Station. The answering station is referred to as the Secondary Station.

BISYNC Station Modes

There are four station modes available to the BISYNC station:

- Disconnect
- Contention
- Talker
- Listener.

A BISYNC station in Disconnect mode has not established a physical link to a remote station. In Contention mode, a BISYNC station has established a link with a remote station, but neither station has control over the link. Also, in Contention mode the Primary Station uses a one second timeout while the Secondary Station uses a three second timeout (both stations use a three second timeout in the other modes). A BISYNC station in Talker mode is able to send Text messages to the remote station. A station in Listener mode is able to receive Text messages from the remote station.

When a station is in Disconnect or Contention mode, the remote station must be in the same mode. When a station is in Talker mode, the remote station must be in Listener mode, and visa-versa. Any other combination of modes in considered invalid.

From the Listener and Talker modes, the BMC retries a bad transmission six times before sending an EOT message to force both stations into Contention mode. If a BMC in Contention mode is not able to make a successful message exchange after seven tries, it sends a Disconnect message to the remote station and hangs up.

BISYNC Message Definitions

The BISYNC protocol uses nine message types to communicate with the HOC. They are as follows:

- Enquire (ENQ) - used to either request control of the link or request acknowledgment of last Text message sent.
- Text - used to send application information.

- EOT - used to indicate the end of application information.

- Acknowledge (ACKn - n = 0 or 1) - used to accept the last message received. The ACK0 and ACK1 messages are generally alternated.

- Wait Acknowledge (WACK) - used by a station in Listener mode to accept the last Text message with the added implication that additional Text messages will not be accepted until a short time later.

- Negative Acknowledge (NAK) - used to reject the last message.

- Temporary Transmission Delay (TTD) - used by a station in Talker mode to indicate a delay in the transmission. The station in Listener mode should respond with a NAK message.

  Note: A canceled Text message (message starts with STX, but ends with ENQ instead of ETB BCC or ETX BCC) is treated like a TTD message. The BMC can accept but will not generate this message.

- Reverse Interrupt (RVI) - used by a station in Listener mode to reverse the flow of text transmission. The BMC can accept but will not generate this message.

- Disconnect (DISC) - used to indicate that the station is disconnecting the link.

Message Transmission

The following paragraphs describe the usage of the various message types for each of the BISYNC modes. Messages come in pairs, a request and its response. The EOT message can be sent at any time to force both stations into Contention mode, if the stations are in incompatible modes. In addition, either station can send the DISC message at any time to indicate that the link is to be disconnected. This message forces both stations into Disconnect mode. A response to this message is not required, but the BMC sends a DISC message in response.

Disconnect Mode

Message transmissions are not possible from the Disconnect mode. This mode is exited when one station dials up the other. The answering station uses the Data Carrier Detect (DCD) modem line to determine that a call is coming in and that the physical link is up. When this happens, the mode changes to Contention.

Contention Mode

A station in Contention mode can make the following request:

- ENQ message - sending station requests to enter Talker mode.

A station in Contention mode can send the following responses:

- ACK0 message - sent in response to an ENQ message after entering Listener mode.

- NAK message - sent in response to an ENQ message if the station is unable to enter Listener mode.

Both stations, while in Contention mode, can attempt to enter Talker mode by sending an ENQ message. If a station has no messages to send, it waits for the other station to send messages. If neither station has any messages to send, the Primary Station (after one second) will timeout and send its ENQ message. However, after entering the Talker mode, the Primary Station immediately sends an EOT message to indicate that there are no messages to send. If the Primary Station does not do this, the Secondary Station (after three seconds) will perform the same actions. These empty transmissions are used to verify that the physical line is still operating.

Talker Mode
A station in Talker mode can make the following requests:

- Text message - information transmission.

- ENQ message - request acknowledgment of last Text message. Usually used when a response from a Text message was not received or when the response to a Text message is a WACK message.

- TTD message - sent to indicate a delay in transmission. The station in Listener mode must respond with a NAK message. The BMC can accept this message, but does not generate it.

- EOT message - sent to indicate a change to Contention mode. This message is used to allow a station in Listener mode to enter Talker mode.

A station in Talker mode can send the following response:

- ACK0 message - sent only in response to a conversational Text message from a station in Listener mode that has changed to Talker mode. This message indicates that the station that was in Talker mode has entered Listener mode.

Listener Mode
A station in Listener mode can send the following responses:

- ACKn message - indicates successful reception of the last Text message. The value of n should be equal to one minus the last value of n sent in an ACKn message.

- WACK message - indicates successful reception of the last Text message. However, the station in Talker mode must respond to the WACK message with an ENQ message.

- NAK message - indicates an unsuccessful reception of the last Text message. A re-transmission of that message is required.

- RVI message - indicates successful reception of the last Text message plus a request to enter the Talker mode. The station in Talker mode should finish sending Text messages and then send an EOT message. The BMC can accept a message of this type, but cannot generate it.

- Text message (limited conversational reply) - indicates successful reception of the last Text message plus forced switch of Listener/Talker modes. This message should only be used by a station in Listener mode when the Talker is known to be finished sending its Text messages. This message is used to bypass the overhead used by the EOT, ENQ, ACK0 and Text messages normally used to switch modes. The BMC can accept a message of this type, but cannot generate it.

Structure Identifier

The Structure Identifier defines a set of data fields that comprise a record and the order of the fields within the record. A unique structure is defined for each recognized call condition. Characters one through five contain the structure identifier code. All data fields called for by a structure should be present within a record. The RAO expects that the data reported is correct except where fill characters are used padding. The most significant character of the structure identifier code is a universal option indicator. The values 0 through 3 are currently used:

- 0 - contains neither the TNN or CDAR numbers

- 1 - contains the TNN number

- 2 - contains the CDAR number

- 3 - contains both the TNN and CDAR numbers.

For more details concerning the output structures and data fields used in LSSGR call record format, refer to *LATA Switching System Generic Requirements* document.

Security

The BMC limits access to stored records on both hardware and software level. Since the connection between the Switching System and the BMC is hardwired, remote access is prevented. Security becomes an issue when a request for polling are being processed by the BMC. Initially, any dial-up or dedicated line connection must provide the proper tone frequency in response to the carrier from the BMC modem to have a connection established. Device identification protection is also included in the access procedure. The BMC expects a 64 byte connect request message. The format of this message is very specific. A 6 character password is also required. If either the connect request message or the password is incorrect, the BMC rejects the connection request.

Internally, the BMC provides human-machine password protection that is defined by the system administrator. The BMC password is a six-character alphanumeric password.

In addition to the access level password, the BMC has three levels of password protection which allow the System Administrator to limit access within the BMC. The most restrictive level (Level one) limits most access. Level 3 affords the most access. Priority can be assigned to individual BMC commands. For User Sensitive information, the BMC uses single application to single application communication links which are password protected and limit utilization of a specific application to user specified applications. Security is discussed in greater detail in the *Command and Message Guide* section.

Download of Software

Since many of the operating programs are disk-based, the programs may be downloaded from an authorized source under operator supervision. The download of new software uses ASCII asynchronous communications protocol. Nortel maintains a record of software for each operating site. A port on the BMC is dedicated to the download function. Software may be downloaded to the BMC because:

- A new program revision has been developed and the user wishes to take advantage of the new software.

- An attempt to recover from a hard disk failure is unsuccessful and software must be reinstalled on the system.

- The download function is to be tested.

For further information for downloading and the detailed procedures to accomplish a download, refer to the *Maintenance Procedures Guide* section.

Test File

The Test File is transmitted from the HOC to the BMC when initiated by manual terminal request at the HOC. The Test File consists of a 10-byte file header and one 256-byte block sent from the HOC to the BMC. The Test File is provided to aid in testing data transmission facilities, BMC hardware, and the store and forward capabilities of the BMC.

Note: The test file is a 256 byte file. The HOC may have to reset to Category A to properly receive this file. Consult with technical assistance personnel for requirements.

The HOC sends the Test File to the BMC as a result of terminal input request. The BMC stores the Test File on Disk and returns the identical file, with a change of name, to the HOC when a Specific File Poll message for the Test

File is received. The loop can be repeated a maximum of one thousand times per request, depending on the capabilities of the equipment at the HOC.

A cancel command at the HOC terminal can be used to terminate Test File loop activity. The Test File sent from the HOC has a file name of 64 (1 byte); the Test File returned from the BMC to the HOC has a File Name of 7 (1 byte). The 256-byte data pattern for the Test File is provided in Table 2-19.

Table 2-19
Fixed Data Test Pattern

Item	Description							
Byte Number	0	1	2	3	4	5	6	7
Hexadecimal Data	0 0	1 1	2 2	3 3	4 4	5 5	6 6	7 7
Byte Number	8	9	10	11	12	13	14	15
Hexadecimal Data	8 8	9 9	A A	B B	C C	D D	E E	F F
Byte Number	16	17	18	19	20	21	22	23
Hexadecimal Data	0 0	F 7	1 1	E 6	2 2	D 5	3 3	C 4
Byte Number	24	25	26	27	28	29	30	31
Hexadecimal Data	4 4	B 3	5 5	A 2	6 6	9 1	7 7	8 0

Note: The same pattern is repeated seven additional times to form the 256-byte test pattern.

Statistical Reports

The Statistics Report(s) provide information concerning the current day's and one previous day's AMA, COM, and DISK activity. The format of the statistical reports are shown below. Enter the following at the maintenance terminal to obtain this report:

>REPORT Reptype Repperiod (cr)

where: Reptype - AMA (AMA report), COM (polling summary), or DISK (disk report)
          Repperiod - TDAY (Today's report) or YDAY (Yesterday's report).

Example of AMA Statistical Report:

```
TODAY'S REPORT
AMA STATISTICS
AMA BLKS RECEIVED........XXXXX        (from TEC/DSI Interface)
AMA BLKS PROCESSED.......XXXXX      (sent to disk)
INVALID BLK COUNT.........  0      (not available)
INVALID REC COUNT.........  0      (not available)
AMA BLOCKS LOST..........XXXXX       (blocks overwritten)
AMA RECORDS LOST........XXXXXX      (failed writing to disk)
FORMAT CR TO DISK.......XXXXXX      (formatted call records)
```

Example of COM Polling Summary Report:

```
TODAY'S REPORT
POLLING SUMMARY     (BLOCKS)
AMA...................XXXXXXXX       (blocks of primary AMA)
REPOLL................XXXXXXXX      (blocks of secondary AMA)
```

Example of DISK Statistical Report:

```
YESTERDAY'S REPORT
DISK STATISTICS
DISK. . . . . . . . . .      A          B
VENDOR ID . . . . . . . .   xxxxxxxx    xxxxxxxx
PRODUCT ID. . . . . . . .   xxxxxxxx    xxxxxxxx
PRODUCT ID. . . . . . . .   xxxxxxxx    xxxxxxxx
REVISION LEVEL. . . . . .     xxxx       xxxx
DISK CAPACITY (LB). . . .   xxxxxxx    xxxxxxx
USER CAPACITY (LB). . . .   xxxxxxx    xxxxxxx
MANUFACTURE DEFECTS . . .     xxxx       xxxx
GROWN DEFECTS . . . . . .     xxxx       xxxx
SCSI BUS ERRORS . . . . .     xxxx       xxxx
DISK ERRORS . . . . . . .    xxxx       xxxx
PEAK LOAD . . . . . . . .       x          x
```

Note 9: If this report is requested while the disk system is in AO or BO, the report column for off-line disk contains the characters N/A for VENDOR ID, PRODUCT ID, REVISION LEVEL, DISK CAPACITY, USER CAPACITY, MANUFACTURE DEFECTS, and GROWN DEFECTS. SCSI BUS ERRORS, DISK ERRORS, and PEAK LOAD are still reported. PEAK LOAD reports as 0.

Note 10: If the disk mode is NONE, N/A appears in both columns for VENDOR ID, PRODUCT ID, REVISION LEVEL, DISK CAPACITY, USER CAPACITY, MANUFACTURE DEFECTS, and GROWN DEFECTS. SCSI BUS ERRORS, DISK ERRORS, and PEAK LOAD are still reported. PEAK LOAD reports as 0.

The following table describes the fields for the DISK report.

Table 2-20
Disk report field descriptions

Field	Description
VENDOR ID	Identifies the manufacturer of the disk drive
PRODUCT ID	Identifies the disk drive. Up to 16 digits (two fields)
REVISION LEVEL	Indicates the revision level of disk controller firmware
DISK CAPACITY	Size of the disk drive in logical blocks
USER CAPACITY	Available disk space in logical blocks
MANUFACTURE DEFECTS	Number of disk defects mapped out by the manufacturer
GROWN DEFECTS	Number of defects found and mapped out during system operation
SCSI BUS ERRORS	Number of recoverable failed attempts to communicate with the indicated disk drive via the SCSI bus.
DISK ERRORS	Number of errors reported by the disk drive
PEAK LOAD	Highest number of disk jobs processed during a specified time period (i.e., per 24 hour interval)

Optional Functions

This section describes the functions that are optional for the DMS-10 and DMS-100 Switching Systems.

Multiple Terminals

Multiple terminals can be attached to the BMC. Terminals can be attached directly or may be routed through the Switching System to a port which is attached to the BMC. The difference between these two methods is described in the following subsections.

Multiple Terminals (DMS-100)

Up to three Maintenance Terminals may be attached to the BMC. The DMS-100 allows multiple terminals to attached directly to, and interact concurrently with the BMC. Each terminal is assigned a logical device number and all command and return messages are routed accordingly. Log and Error messages are routed to all terminals on the BMC. Command interaction is routed only to the originating terminal. If commands are entered concurrently on different terminals which cause memory overwrite, command conflict or collision, erroneous output can result.

Multiple Terminals (DMS-10)

Up to two Maintenance Terminals and one Serial Data Interface (SDI) port can be attached to the BMC. Commands must be routed from the remote terminal through the port to the BMC. Unlike the DMS-100 option, commands cannot be entered at separate terminals concurrently, and the commands must be routed using DMS-10 routing syntax.

Section 060-INDP-310
System Administration Guide

General Information

The purpose of this section is to present general information concerning assignment of site-dependent data, system parameters, files management and security related issues for the BMC. This section provides examples for use in the definition of system requirements.

System administration consists of review and definition of the operating characteristics of the BMC. BMC issues and operating parameters depend on the following:

- Site (Telephone Company location).

- Switching System type with which the BMC is used.

- Initial setup and testing of system files.

- Security.

Site data refers to the review and definition of the operating requirements of the Telephone Company site. Switching System specific information defines how call records are received and polled. Setup and testing of system files assures the site data for the site is available. Security relates to the ability to control access to the commands and functions of the BMC.

DMS-10 Switching System specific data is discussed in the *DMS-10 Switch Specific Data* section. DMS-100 Switching System specific data is discussed in the *DMS-100 Switch Specific Data* section. Installation is covered in the Installation Methods (IMs) listed in the *About this Document* section:

Levels of Operation

The use, support, and control of the BMC can be broken down into four major tasks:

- System administration

- Maintenance

- Receipt and storage of call record data
- Polling of call record data by the HOC.

Each of these functions has specific requirements that differ from other tasks. The differences in operating requirements of each of these tasks defines a level of operation. The BMC provides for two levels of machine operation and four levels of user operation.

Each level of operation can be tailored to specific requirements of the Telephone Company site. Levels of operation are implemented through careful use of the password and priority functions of the BMC.

System Administration

The system administration refers to the organization and management of the BMC resources. System administration includes establishing the requirements of the Telephone Company site and assuring the security of the operating requirements. The system administrator generally has access to all commands and functions of the system but intervenes only if site requirements or security issues change. In some cases, the division of labor may exclude some maintenance and control functions from some individuals. In any case, the system administrator requires the ability to examine and alter system operating parameters, passwords and priorities. Actual implemented requirements are site specific.

Maintenance

The maintenance function requires the ability to access and possibly alter many of the hardware and operating parameters of the BMC. The maintenance function is probably the most wide ranging function. With the exception of security considerations, the maintenance personnel should be able to access all the functions of the BMC.

Call Record Storage

Receipt of call record data by the BMC is under control of the operating software. Call record blocks sent from the Switching System are read into RAM, a header is attached to each block, and the blocks are written to disk without the content being altered. Since the BMC is hardwired and acting as a Magnetic Tape Unit (MTU), no user or security attributes need be assigned.

Call Record Polling

Call record polling requires remote activity through either dedicated line or dial-up lines. Since this activity could provide access to unauthorized operators, the polling link is password protected. Polling requires specific information concerning the Telephone Company site to properly process the polled call records. This includes the Switching System type, the software version the Switching System used, the expected polling baud rate, and the HOC password.

Machine-Machine Interface

The BMC provides interface for the Switching System and the HOC. The Switching System transmits call record data to the BMC. The HOC polls call records from the BMC through one of two serial ports. Modems attached to the serial ports provide a physical link to other computing systems.

Switching System - BMC Interface

The BMC - Switching System interface is a hardwired connection that does not require security protection. The BMC is acting as an MTU and is restricted to the receive and store data functions. This activity is handled by the software and cannot be altered without physical contact with the system.

BMC-HOC Interface

The BMC-HOC interface is more open and consequently has password protection. The BMC modem provides access to any other compatible modem. To prevent unauthorized access, one password for the HOC is provided. If multiple HOCs are used, each HOC must have a password.

Human-Machine Interface

The Human-Machine interface is through a terminal that is attached to the BMC or through a terminal and a Switching System that is attached to the BMC (DMS-10 applications only). Individual sites may vary but, generally, only one terminal is used with each system.

Prompts

Some commands have several options or subtasks. These commands return a prompt with the command name. This task prompt allows direct entry and repetition of any of the command's subtasks. If another subtask is to be performed, only the subtask name is required. The entire command name does not have to be repeated. To leave the command task, use the CTRL/Z, escape sequence.

For example, to read data from a specific TEC/DSI port, and write to the port, enter the following at the maintenance terminal:

>TECMAINT EXAMINE 1 xxxx (cr)

where: s   - TEC/DSI to examine (1 or 2)
           xxxx - address to examine in HEX (0000-FFFF).

The system displays the port contents and returns a command prompt:

TECMAINT>IOREAD 1 xx (cr) (read port xx)

System displays the port contents. To leave the TECMAINT command task, press CRTL/Z (press and hold the CONTROL key and press the Z key).

TECMAINT>CTRL/Z

Command Abort Sequence

Any terminal keyboard entry can be aborted before the carriage return with a CONTROL Z (CTRL/Z). A CRTL/Z is entered by pressing and holding the Control key and pressing the Z key. No carriage return is required. The BMC (terminal) skips to the next line and is ready for command input. This action is equivalent to erasing (deleting) all of the typed characters.

Switching System Specific Commands

This document contains command information which relates to two different Switching System types, the DMS-10 and DMS-100. Any command or message that pertains to only one Switching System type is marked as follows:

- *****DMS-100***** for DMS-100 Switching Systems.
- *****DMS-10***** for DMS-10 Switching Systems.

Site-Dependent Data

After the BMC is installed and tested, and before test traffic is sent from the Switching System, site dependent data must be entered into the BMC system to match the operating parameters of the BMC to the specific site. The commands to enter this data are discussed individually.

Types of Site-Dependent Data

The operating parameters of a specific site are determined by the Telephone Company operating the BMC. It is recommended that this section be reviewed by the traffic department, or other technical groups of the operating company, and that these groups establish the values for the site data. A worksheet is included at the rear of this section to assist in this evaluation. The worksheet should be removed and filled in with the site requirements. The worksheet should be maintained as a reference. This information should be provided to the individuals performing the actual site data entry. Security issues should be handled by the system administrator **only**.

Saving Site Data

The SITDAT WRITE command writes the site data currently in memory to hard disk. Site data is read from disk every hour, on the hour. Changes to site data must be saved before the start of the next hour to prevent site data changes from being overwritten in memory. Some commands invoke a SITDAT WRITE directly.

Whenever the value of site data is modified, the LINIT command should also be issued to ensure that the CP is using the most recent command settings.

> ⚠ **CAUTION**
> To avoid conflict of data on the BMC disk drives, **do not** use the SITDAT WRITE command when the user interface is directed to the standby processor.

The input form of this command is:

>**SITDAT WRITE (cr)**

The BMC responds:

(log message) SITDAT FILE DISK JOB COMPLETE

Initial System Start-up

Initial system start-up requires completion of the procedure described in the IMs associated with the BMC. Initial start-up includes setting system parameters to match the hardware configuration of the BMC and the Switching System and the input of the site specific data.

> *Note 3:*   Before powering up either Processor, ensure that the Switch and Status Panel Processor Select switch is set to the side being powered up to allow proper error control alignment on power-up.

> *Note 4:*   *****DMS-10 ONLY***** If a remote terminal is used, be sure to assign the remote terminal number on the BMC to prevent loss of some messages. Refer to the *DMS-10 Switch Specific Data* section.

The following commands are used to establish the site data on initial start-up:

- AMAHRS - defines the time interval to confirm that call record blocks are received from the Switching System and the amount of time no call record blocks can be received before an error is generated.

- BAUD - defines the baud rate for the two polling channels.

- BUFSZ - defines the time to check that call records are received from the Switching System.

- BVALID - identifies the Switching System type to which BMC is connected.

- CP CLOCK - defines source of the transient clock used in polling for a specific link.

- CP CONTROL - defines the polling modem line control setting.

- CP INTERFACE - defines the type of interface used in polling for a specific link.

- ERRMAP - defines the type, level and handling of alarms.

- LPAD - defines the leading pad character for the polling communications link.

- MPRI - used to set the access priority of commands.

- PSWD - used to set user passwords and priorities.

- SETTERM - defines the amount of time no activity can take place at a terminal before the system logs the terminal off.

- VALPARM - defines the number of cumulative invalid call record blocks that can be received before an error is generated.

Site Data Entry

Site data entry allows the software configuration of the BMC operating parameters to match the requirements of the specific site. The site data parameters control the overall operation of the BMC and access security. Configuration of BMC operating parameters consists of several functions. Each of these functions are discussed individually.

Call Record Confirmation

The command used to set the time interval to verify that AMA records have been received from the Switching System is the AMAHRS command. The command requires the start and end times to perform the check and the amount of time that no blocks can be received before an alarm is generated. If a data block has not been received within the specified interval between the hour boundaries, an alarm is generated. Times are based on a 24 hour clock (00-23).

To examine hour boundaries currently assigned, enter the following at the maintenance terminal:

>AMAHRS (cr)

To assign or change hour boundaries and interval, enter the following at the maintenance terminal:

>AMAHRS Start Stop Interval (cr)

where: Start   - starting hour (less than 24). Range: 00-23.
       Stop   - stopping hour (greater than starting hour but less than 24 - Start - 23).
     Interval - number of minutes between reception of blocks before an alarm is generated. Range: 1-60.

Note 5:   For full-time block checks, enter 00 for Start, and 23 for Stop, and 01 for Interval.

Note 6:   If no block checks are required, enter 00 for start and 00 for Stop, and 00 for Interval.

The system response is as follows:

BLOCK CHECK START xx END yy HOURS, INTERVAL OF zz MINUTES

where: xx - block check start time (hour of the day)
　　　　yy - block check end time (hour of the day)
　　　　zz - minutes of interval.

Note 7:   If an incorrect value is entered, the BMC responds:

　　　　INVALID RANGE (or) ?

Note 8:   Use the SITDAT WRITE command to save any changes and the LINIT command to restart the CP with the new value.

Polling Baud Rate
The internal BMC timer and retry counters for the polling link are set with the BAUD command. The BAUD command sets the values of the T1 (timer) and N2 (retry) parameters on a specified link. This baud rate must match the values expected by the HOC.

To examine BAUD rate currently assigned, enter the following at the maintenance terminal:

>**BAUD (cr)**

The system responds with baud rate data for the two polling links, as shown below:

FOR LINK #1, BAUD RATE = xxxx, T1 = yy, and N2 = zz
FOR LINK #2, BAUD RATE = xxxx, T1 = yy, and N2 = zz

where: xxxx - baud rate for the link
　　　　yy   - value of T1 timer, in seconds
　　　　zz   - value of retry counter, N2.

To assign or change BAUD rate data, enter the following at the maintenance terminal:

>**BAUD link rate (cr)**

where: link - one digit link number, either 1 or 2
 rate - baud rate (select one of the following values: 1200, 2400, 4800, or 9600).

Note 9:   The BMC BISYNC system can use the either the RS-232 or V.35 interface for an maximum baud rate of 9600.

The system responds with the baud rate data for specified link, as shown below:

FOR LINK aa, BAUD RATE = xxxx, T1 = yy, and N2 = zz

where: aa - link number
 xxxx - baud rate for the link
  yy - value of T1 timer, in seconds
  zz - value of retry counter, N2

⚠️ **CAUTION**
The BMC baud rate must match the HOC baud rate.

Note 10:   Follow this command with the SITDAT WRITE and LINIT commands to make the change permanent and transfer the data to the CP.

Note 11:   If an invalid baud rate is specified, the BMC responds:

BAD BAUD RATE
VALID RATES - 1200, 2400, 4800, 9600

Call Record Buffer Size
The BUFSZ command is used to set the size of the BMC internal buffer to be used for the polling frame size. The polling frame size may be as low as 64 bytes or as much as 512 bytes. The polling frame size is set in increments of 32 bytes. If the input frame size is not a 32 byte increment, the BMC rounds the size to the nearest 32 byte increment. To specify the polling frame size in bytes, at the BMC terminal, enter the following at the maintenance terminal:

>BUFSZxxx (cr)

where: xxx - frame size in 32 byte increments.

Note: If the frame size entered is out of range, the BMC responds with a question mark. If the specified frame size is not a 32 byte increment, the

BMC truncates the frame size to the nearest 32 byte increment. The BMC prints the truncated frame size.

Billing Validation Identification Command
The Billing Validation Identification (BVALID) command is used to examine or change the site information for the Switching System to which the BMC is connected. To change the site information, enter the following at the maintenance terminal:

>**BVALID aabb (cr)**

where: aa - site identification
       bb - Switching System type.

Note: These values are provided by the operating company.

Site Identification is a two-digit field that uniquely links call records to a particular site. Switching System type is a two-digit field that identifies the type of Switching System at the site. This information is used by the HOC to assure the correct site is being polled and to process the call records.

To display the Site Identification Number (SITE ID) and Switching System type currently assigned, enter the following at the maintenance terminal:

>**BVALIDE (cr)**

Polling Link Clock Source
The CP CLOCK command is used to examine or change the clock source used in polling for a specific link. If set to EXTERNAL, the BMC uses external device for its clock source. If set to INTERNAL, the BMC uses the baud rate specified when the baud command was entered to generate its own transmit clock.

To examine the CP clock source currently assigned to the polling channels, enter the following at the maintenance terminal:

>**CP CLOCK (cr)**

The system responds with the clock source data for the two polling links, as shown below:

LINK# 0x: CLK SRC= yyyyyyyy

where: x - link number, either 1 or 2
                    RS-232 - J13 (link 1) or J14 (link 2)
       yyyyyyyy - clock source, INTERNAL or EXTERNAL
                        INTERNAL - BMC uses rate specified when the BAUD

command was entered to generate its own transmit clock. EXTERNAL - BMC uses an external device for its clock source.

To change the CP clock source, enter the following at the maintenance terminal:

>CP CLOCK link source (cr)

where: link - one digit link number; 1 or 2
source - INTERNAL or EXTERNAL clock source.

The system responds with the clock source data for the specified link, as shown below:

LINK# 0x: CLK SRC= yyyyyyyy

> *Note:*   Follow this command with the SITDAT WRITE and LINIT commands to make the change permanent and transfer the data to the CP.

Polling Modem Line Control
The CP CONTROL command is used to examine or change the polling modem line control setting. The polling modem line control can be set to Half Duplex (HD - the default value) or Full Duplex (FD). CP CONTROL should be set to HD when the polling modem requires Bell 208 compatibility. If the polling modem requires V.32 (or V.34/V.FC) compatibility, CP CONTROL should be set to FD.

> **CAUTION**
> The value of this command should not be modified except during initial installation or polling modem replacement.

To examine the polling modem line control setting, enter the following at the maintenance terminal:

>CP CONTROL (cr)

The system responds with the following message:

LINE CONTROL SET TO xxxx DUPLEX

where: xxxx - modem line control type (HALF or FULL).

To change the polling modem line control setting, enter the following at the maintenance terminal:

>CP CONTROL type (cr)

where: type - modem line control type (HD or FD).

The system responds with the following message:

LINE CONTROL SET TO xxxx DUPLEX

> *Note:*   Follow this command with the SITDAT WRITE and LINIT commands to make the change permanent and transfer the data to the CP.

If an invalid modem line control type is entered, the following message is displayed:

BAD LINE CONTROL SELECTION, VALID SELECTIONS - FD OR HD

Polling Link Interface
The CP INTERFACE command is used to examine or change the type of interface used in polling for a specific link. The BISYNC polling with ASCII protocol version of the BMC can use the RS-232 interface. The V.35 interface is also supported.

To examine the CP INTERFACE currently assigned, enter the following at the maintenance terminal:

>CP INTERFACE (cr)

The system responds with the interface data for the polling links.

LINK xx, INTERFACE = yyyy

where: xx   - link (one digit link number; 1 or 2)
       yyyy - interface (RS232 or V35)

To change the CP INTERFACE in use, enter the following at the maintenance terminal:

>CP INTERFACE xx yyyy (cr)

The system responds with the CP INTERFACE data for the selected, changed, link, as shown below:

LINK xx, INTERFACE = yyyy

> *Note:* Follow this command with the SITDAT WRITE and LINIT
> command to make the change permanent and transfer the data to the CP.

Alarm Handling Activity
The ERRMAP command is used to list or assign all the alarm type, status and
level assignments. A complete list of all ERRMAP entries is provided in the
example ERRMAP response below.

CURRENT ALARM ASSIGNMENTS ARE:

DEV/EVT.NAMEALARMLEVEL
  01NO BLK LAST PERMINOR 0
  02TEC STDBY FAILMINOR 0
  03TEC PRIME FAILMAJOR 1
  04D_RAM ERRORMAJOR 1
  05SIO-1 FAILUREMAJOR 1
  06ERROR CTL CONFLMAJOR 1
  07ERROR CTL INCONMAJOR 0
  08DMA COMM FAILMAJOR 2
  09PROC STAT ALARMMAJOR 2
  10PROG CKSUM ALMMAJOR 3
  11TEC DATA OVERFLOCRITICAL 0
  12NO CLK TIME SETMINOR 0
  13PLANNED SWITCHPSWITCH 0
  14ONLY NON-REDUNDMINOR 0
  15STNBY COMM DOWNMAJOR 0
  16PROM CKSUM FAILMAJOR 3
  17DSK 70% PRIMARYMINOR 0
  18DSK 90% PRIMARYMAJOR 0
  19OFFLIN DSK FULLMAJOR 0
  20DSK STORE LIMITCRITICAL 0
  21DISK WRITE FAILMAJOR 2
  22DSK INDEX ERRORMINOR 0
  23NO INDEX FILEMAJOR 0
  24DIRECTORY FULLCRITICAL 0
  25SITE FILE ERRORMINOR 0
  26STAT FILE ERRORMINOR 0
  27EXCESS INV BLKSMINOR 0
  28CP NOT AVAIL.MAJOR 1
  29CP FAULTMAJOR 1
  30DSK ERROR ALARMCRITICAL 0
  31DISK MODE ALARMMAJOR 0
  32DSK CARD HW ERRMAJOR 2
  33DISK ER MESSAGEMINOR 0

  * INDICATES CURRENTLY ACTIVE ALARM(S)
  TO CHANGE ERRMAP TABLE, ENTER:
  ERRMAP DEV/EVT# ALARMTYPE LEVEL

During operation, errors may be encountered. Since some errors are more
serious than others, the BMC provides a means of controlling the operation
when errors are encountered. In more serious cases, the BMC can switch
active processors, change operating mode (PRIME to ONLY) and change

disk mode (PRIME to ONLY). Less serious errors do not require such actions. Table 3-1 is a cross reference between the BMC output log messages and the ERRMAP entry messages.

Table 3-1
ERRMAP entries to Log message cross-reference

EVT#	Message, alarm, level	Associated log message(s)
01	NO BLK LAST PER, Minor, 0	NO BLOCK LAST ii MINUTES
02	TEC STNBY FAIL, Minor, 0	B0 (or)B2 TEC COLD START B0 (or)B2 TEC COMM FAIL B0 (or)B2 TEC DMA FAIL B0 (or) B2 TEC NOT READY B0 (or) B2 TEC TIME OUT B0 (or) B2 TEC WARM START TEC DMA FAIL
03	TEC PRIME FAIL, Major, 1	B0 (or) B2 TEC COLD START B0 (or) B2 TEC COMM FAIL B0 (or) B2 TEC DMA FAIL B0 (or) B2 TEC NOT READY B0 (or) B2 TEC TIME OUT B0 (or) B2 TEC WARM START TEC DMA FAIL
04	D_RAM ERROR, Major, 1	D_RAM ERROR xx AT yyyy
05	SIO-1 FAILURE, Major, 1	A2 SIO TEST FAILED A4 SIO TEST FAILED A6 SIO TEST FAILED
06	ERROR CTL CONFL, Major, 0	EC-CF-ALM
07	ERROR CTL INCON, Major, 0	EC-IC-ALM
08	DMA COMM FAIL, Major, 2	DMA TIME OUT ALARM
09	PROC STAT ALARM, Major, 2	CTC MP-ST-ALM
10	PROG CKSUM ALM, Major, 3	PROG CHKSUM ALM VAL=nn
Sheet 1 of 4		

Table 3-1
ERRMAP entries to Log message cross-reference

EVT#	Message, alarm, level	Associated log message(s)
11	TEC DATA OVRFLO, Critical, 0	DATA BUFFER EXCEEDED TEC BUFFER OVERFLOW xx BLOCKS
12	NO CLK TIME SET, Minor, 0	KEY "SETCLK", THEN ENTER DATE, TIME, AND DAY
13	PLANNED SWITCH, PSwitch, 0	MP SWITCH
14	ONLY NON-REDUND, Minor, 0	ONLY MODE NON-REDUNDANT x
15	STNBY COMM DOWN, Major, 0	STANBY PROC NOT AVAILABLE 00 PIO TEST FAILED
16	PROM CKSUM FAIL, Major, 3	PROM CHKSUM ALM VAL=nn
17	DSK 70% PRIMARY, Minor, 0	NO SECONDARY FILES TO DELETE
18	DSK 90% PRIMARY, Major, 0	LOG FILES DELETED
19	OFFLIN DSK FULL, Major, 0	OFF-LINE DISK HAS UNPOLLED DATA OFFLINE DISK FULL (Refer to procedure for BOTH DISKS FULL)
20	DSK STORE LIMIT, Critical, 0	BOTH DISKS FULL VERSION POOL EXHAUSTED
21	DISK WRITE FAIL, Major, 2	AMAIDX FILE FAILURE LOGIDX FILE FAILURE AMACRD FILE WRITE ERROR xx
22	DSK INDEX ERROR, Minor, 0	BAD AMAIDX FILE BAD LOGIDX FILE LOGIDX FILE FULL AMAIDX FILE FULL
23	NO INDEX FILE, Major, 0	AMAIDX FILE yyyyyy ERROR: 03 LOGIDX FILE yyyyyy ERORR: 03
24	DIRECTORY FULL, Critical, 0	DISK DIRECTORY FULL

Sheet 2 of 4

Table 3-1
ERRMAP entries to Log message cross-reference

EVT#	Message, alarm, level	Associated log message(s)
25	SITE FILE ERROR, Minor, 0	SITDAT FILE yyyyyy ERROR: ee
26	STAT FILE ERROR, Minor, 0	TDYSTS FILE yyyyyy ERROR: ee
27	EXCESS INV BLKS, Minor, 0	BLOCK LENGTH ERROR DETECTED BLOCK PARITY ERROR DETECTED EXCESSIVE INVALID BLOCKS INVALID BLOCK DETECTED
28	CP NOT AVAIL., Major, 1	BOOTCP FILE yyyyyy ERROR: ee CP ACTIVATE FAIL CP AUDIT FAIL CP BOOT LIST EMPTY CP DATA ERR CP DMA Test Failed CP I/O FAILURE CP LOAD FAIL CP PRG Checksum Test Failed CP RAM Test Failed CP RESTART FAIL CP ROM CKSM ERR CP ROM Checksum Test Failed CP SCC Loopback Test Failed on Channel x CP TASK ERR CP TIMEOUT xxxxxx FILE yyyyyy ERROR: ee

Sheet 3 of 4

Table 3-1
ERRMAP entries to Log message cross-reference

EVT#	Message, alarm, level	Associated log message(s)
29	CP FAULT, Major, 1	BOOTCP FILE yyyyyy ERROR: ee CP ACTIVATE FAIL CP AUDIT FAIL CP BOOT LIST EMPTY CP DATA ERR CP DMA Test Failed CP I/O FAILURE CP LOAD FAIL CP PRG Checksum Test Failed CP RAM Test Failed CP RESTART FAIL CP ROM CKSM ERR CP ROM Checksum Test Failed CP SCC Loopback Test Failed on Channel x CP TASK ERR CP TIMEOUT xxxxxx FILE yyyyyy ERROR: ee
30	DSK ERROR ALARM, Critical, 0	DISK ALARM x DISK TEST FAILED
31	DISK MODE ALARM, Major, 0	DISK MODE ALARM
32	DSK CARD HW ERR, Major, 2	DISK QUEUE ERROR DISK DPR FAULT DPR TEST FAILED: ADD xxxx(Hex), RD: yy(Hex), WRT: yy(Hex)
33	DISK ER MESSAGE, Minor, 0	DISK VS NOT FOUND DISK: BUS CONTROLLER FAILED SELF TEST DISK: BUS CONTROLLER INTERRUPT WHILE IDLE DISK: COMMAND ERROR DISK: DISK COMMAND xx ATTEMPTED WHILE DISK BUSY PURCHASED CAPACITY NOT AVAILABLE
		Sheet 4 of 4

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
01, NO BLK LAST PER Minor, 0	Cause:BMC has not received any data blocks from the Switching System within a desired period of time
	Test:every 60 minutes (as defined by AMAHRS entry)
	Reset:no automatic reset, cleared by input of RSERR command
	Notes:no check is performed if the current time is not within the AMAHRS hour checking range
02, TEC STNBY FAIL Minor, 0 (continued next page)	Cause:standby TEC/DSI PCA is not connected, TEC time out, or there has been a hardware failure
02, TEC STNBY FAIL Minor, 0	Testa.tested three times an hour at 15, 35, and 55 minutes past the hour, B2 TEC/DSI port (PCA in slot 12)
	b.tested three times an hour at 5, 25, and 45 minutes past the hour, B0 TEC/DSI port (PCA in slot 13)
	c.manually tested by input of TEST command
	Reset:no automatic reset, alarm cleared by input of RSERR command
03, TEC PRIME FAIL Major, 1	Cause:active TEC/DSI PCA not connected, TEC time out, or there has been a hardware failure
	Testa.tested three times an hour at 15, 35, and 55 minutes past the hour, B2 TEC/DSI port (PCA in slot 12)
	b.tested three times an hour at 5, 25, and 45 minutes past the hour, B0 TEC/DSI port (PCA in slot 13)
	c.manually tested by input of TEST command
	Reset:no automatic reset, cleared by input of RSERR command
Sheet 1 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
04, D-RAM ERROR Major, 1	Cause:parity error of DRAM
	Test:by Memory Expansion PCA when parity error occurs (detected) whenever reading a byte from RAM
	Reset:no automatic reset, cleared by input of RSERR command
	Notes:alarm set and message printed only once per occurrence
05, SIO-1 FAILURE Major, 1 (continued on next page)	Cause:SIO-1 of terminal line 1 or fail, of first polling link or download link fail
	Test:a.input of TEST command b. when doing a processor switch
	Reset:no automatic reset, cleared by input of RSERR command
05, SIO-1 FAILURE Major, 1	Notes:a.alarm set and message printed only once per occurrence unless alarm is reset by the RSERR command and the error condition still exists
	b.test done by firmware is to check the availability of the SIO chip
06, ERROR CTL CONFL Major, 0	Cause:error control conflict caused by hardware faults in the Error Control II PCA
	Test:continuously checked
	Reset:cleared immediately, automatically if the fault goes away
	Notes:alarm is set by hardware logic
07, ERROR CTL INCON Major, 0	Cause:CPU PCA is not responding to the Error Control II PCA
	Test:every half-second. Must fail 16 times consecutively before an error is generated and the alarm is set
	Reset:if the CPU starts responding to the Error Control II PCA, the Error Control II PCA clears this alarm
Sheet 2 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
08, DMA COMM FAIL Major, 2	Cause:DMA timeout
	Test:checked every 16 msecs
	Reset:no automatic reset, cleared by input of RSERR command
	Notes:when the TEC/DSI PCA transfers call record blocks through the DMA channel, BMC sets up a time out value. At the end of the timer count down, DMA time out occurs if the DMA has not generated the interrupt to indicate completion of the DMA transfer
09, PROC STAT ALARM Major, 2	Cause:a.Counter Timer Chip (CTC) counter error b.bad error control I/O status byte (ERIOST), status bit 1 is set
	Test:when doing processor switch
	Reset:no automatic reset, cleared by input of RSERR command
	Notes:if alarm is set by bit 1 of ERIOST, no message is printed
10, PROG CKSUM ALM Major, 3	Cause:static RAM software checksum error
	Test:a.checksum test is continuously performed by a scheduled call; one cycle takes about six minutes b.one-time test after booting the program from disk to RAM
	Reset:no automatic reset, cleared by input of RSERR command. Alarm returns if condition persists
Sheet 3 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
11, TEC DATA OVERFLO Critical, 0	Cause:input data buffer overflow when disk storage process is overloaded
	Test:buffer check on the input block ready for processing. Error is detected when no more buffers are available
	Reset:RSERR input clears alarm; may be set again when another TEC/DSI block is received
	Notes:alarm and message repeats for new data blocks if the TEC/DSI buffer overflow condition does not clear
12, NO CLK TIME SET Minor, 0	Cause:clock time lost due to power failure on the Active Processor
	Test:test and set every minute
	Reset:SETCLK command resets and clears the alarm. RSERR command only clears the alarm before the next minute check
	Notes:message and alarm are set and printed only once unless the alarm is reset with the RSERR command
13, PLANNED SWITCH PSwitch, 0	Cause:by the BMC system performing a processor switch at 3 a.m.
	Test:every day at 3 a.m.
	Notes:a.performed only if there is no active non-zero level alarm b. MP SWITCH message printed at this scheduled switch
14, ONLY NON-REDUND Minor, 0 (continued on next page)	Cause:set when the craftsperson manually sets the processor to the ONLY (non-redundant) mode
	Test:continuously; immediately after the change to ONLY mode
Sheet 4 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
14, ONLY NON-REDUND Minor, 0	Reset:a.only by changing the processor mode to redundant (PRIME) mode
	b.RSERR command does not clear this alarm
	Notes:set only if the processor is an Active Processor
15, STNBY COMM DOWN Major, 0	Cause:failure of PIO communications to the Standby Processor
	Test:PIO is tested from the wait loop. If the test fails three times in a row, a flag is set. This flag is cleared if the PIO test passes. Flag is checked every minute. If it is found to be set, the alarm is set
	Reset:when the failure of the PIO clears, the alarm is automatically cleared. RSERR command clears the alarm, but the alarm is set again at the next minute if the error condition still exists
16, PROM CKSUM FAIL Major, 3	Cause:EPROM firmware checksum error
	Test:a.checksum test is continuously performed in main processor waiting loop
	b.checked when performing a processor switch
	Reset:cleared by input of RSERR command. Alarm returns if error condition persists.
Sheet 5 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
17, DSK 70% PRIMARY Minor, 0	Cause:disk usage has exceeded 70% of available disk space
	Test:on every minute boundary
	Reset:RSERR input command clears the alarm; alarm is set at the next minute if the disk usage is greater than 70%
	Notes:a.not checked and set if the disk usage is greater than 90%; alarm DSK 90% PRIMARY is set
	b.BMC system starts deleting secondary data files when the disk usage approaches 70%. When there are no more secondary files to delete, this alarm is set
18, DSK 90% PRIMARY Minor, 0	Cause:disk usage has reached 90% of available disk space
	Test:on every minute boundary
	Reset:RSERR input command clears the alarm; alarm is set at next minute if the disk usage is greater than 90%
	Notes:when disk usage exceeds 90% of available space, all LOG files are deleted at once
19, OFFLIN DSK FULL Major, 0	Cause:when disk usage is greater than 99% of available space and the disk mode drops to ONLY (non-redundant) mode
	Test:on every minute boundary
	Reset:clear (poll) the off-line disk and enter RSERR command
	Notes:when disk usage reaches 99% of available space, the disk system goes to ONLY (non-redundant) mode

Sheet 6 of 10

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
20, DSK STORE LIMIT Critical, 0	Cause:a.both disks are full
	b.number of versions of a file type (AMA or LOG) has reached 255
	Test:on every minute boundary
	Reset:enter RSERR command to clear alarm; alarm is set again the next minute if the error condition still exists
	Notes:TEC/DSI PCA shows EOT status for both causes.
21, DISK WRITE FAIL Major, 2	Cause:a.failure to create or open an index file b. failure to obtain a buffer for call record(s) c. failure to write a call record block
	Test:alarm set when one of the causes listed above occurs
	Reset:RSERR command clears the alarm
	Notes:alarm and message set every time one of the causes listed above occurs
22, DSK INDEX ERROR Minor, 0	Cause:a.bad version/sequence number when creating an index file using the IDXMAINT command
	b.index file is full
	c.if a new AMA or LOG file is created (due to a FILE FULL or other condition) and a bad index file exists or is created, this alarm and the BAD xxxIDX FILE message results
	Test:a.no periodic check, tested when executing the IDXMAINT command
	b.on system boot
	Reset:RSERR command clears alarm
	Notes:alarm and message set and printed whenever error occurs

Sheet 7 of 10

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
23, NO INDEX FILE Major, 0	Cause:index file open fail or index file not found
	Test:no periodic check; tested when trying to open, delete, or update the index file
	Reset:RSERR command clears alarm
	Notes:alarm and message set and printed whenever error occurs
24, DIRECTORY FULL Critical, 0	Cause:when creating a new call record file and the maximum number of files in the directory has been reached
	Test:when attempting to create a new call record file
	Reset:when directory is full, RSERR command clears the alarm until next attempt to create a new call record file
	Notes:alarm and message set and printed only once per occurrence
25, SITE FILE ERROR Minor, 0	Cause:site data file read/write error has occurred
	Test:a.invoking input commands SITDAT READ or WRITE b. scheduled SITDAT read on every hour boundary
	Reset:cleared by input of the RSERR command
26, STAT FILE ERROR Minor, 0	Cause:statistics file create, open, delete, and read error occurs when: a.executing REPORT command b. updating the statistics file every hour c. closing the statistics file at midnight every day
	Test:no periodic check, tested whenever the causes listed above occur
	Reset:cleared by RSERR command
Sheet 8 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
27, EXCESS INV BLKS Minor, 0	Cause:receipt of number of invalid blocks greater than specified invalid block limit
	Test:performed whenever a call record block is received (there is no periodic check)
	Reset:no automatic reset, alarm is cleared by input of RSERR command
	Notes:message and alarm set only once
28, CP NOT AVAIL. Major, 1	Cause:one of several CP error messages
	Test:every CP access
	Reset:cleared by RSERR command
	Notes:refer to Table 3-1 for corresponding CP error messages
29, CP FAULT Major, 1	Cause:one of several CP error messages
	Test:every CP access
	Reset:cleared by RSERR command
	Notes:refer to Table 3-1 for corresponding CP error messages
30, DSK ERROR ALARM Critical, 0	Cause:disk interface sets alarm by counting the errors, until the error count is greater than the threshold. The interface then drops one of the error disks and sets the alarm
	Test:event driven test; test is performed by firmware
	Reset:cleated by RSERR command
Sheet 9 of 10	

Table 3-2
Description of ERRMAP Entries

EVT#, message, alarm, level	Comments
31, DISK MODE ALARM Major, 0	Cause:by change of disk mode from PRIME to ONLY
	Test:a.disk mode check at minute boundary, if disk is found to be in ONLY mode, alarm is set
	b.execute DISK MODE command to change disk mode to ONLY mode
	c.show disk mode and disk mode is in ONLY mode, alarm is set
	Reset:cleared by RSERR command; alarm sets on next minute boundary. Check whether disk mode is still ONLY
32, DSK CARD HW ERR Major, 2	Cause:disk DPR and disk queue error
	Test:a.performed by invoking TEST or DPRTST command b. when performing a processor switch c. performed continuously
	Reset:cleated by RSERR command
	Notes:a.DPRTST repeatedly sets and prints the alarm and message
	b.CPU check only sets the alarm; no message is printed
33, DISK ER MESSAGE Minor, 0	Cause:one of several low-level disk error messages
	Test:every disk data access
	Reset:cleared by RSERR command
	Notes:refer to Table 3-1 for the corresponding disk error messages
Sheet 10 of 10	

1.To display all alarms and their level assignments, enter the following at the maintenance terminal:

>**ERRMAP (cr)**

The system responds as shown below.

CURRENT ALARM ASSIGNMENTS ARE:

```
DEV/EVT# NAME            ALARM   LEVEL
 * 01    NO BLK LAST PER   MINOR    1
   02    TEC STNBY FAIL    MINOR    0
   03    TEC PRIME FAIL    MAJOR    1
 * 04    D-RAM ERROR       MAJOR    1
    .
    .
    .
   33    DISK ER MESSAGE   MINOR    0

  * INDICATES CURRENTLY ACTIVE ALARM(S)
   TO CHANGE  ERRMAP  TABLE, ENTER:
   ERRMAP  DEV/EVT#  ALARMTYPE  LEVEL
   EXAMPLE:   ERRMAP  2  MINOR  1
```

2.To display only the active alarms for both processors, enter the following at the maintenance terminal:

>ERRMAP ALARMS (cr)

The system responds with the activated alarms in the following form:

```
ACTIVE ALARMS
   A 16   ONLY NON-REDUND MINOR 0
STANDBY ALARMS
   B NO ALARMS
```

3.To assign or change an alarm event, type, or level, enter the following at the maintenance terminal:

CAUTION
This command may cause the loss of billing data. Consult with technical assistance personnel before changing alarm level assignments.

Note 12:   The value of ERRMAP event 13, PLANNED SWITCH, cannot be modified.

>ERRMAP event alarmtype level (cr)

where: event - 0 - 99 = Device/Event #
        alarmtype - INHIBIT, MINOR, MAJOR, or CRITICAL.
            level 0 - No processor switch on alarm.
                    1 - If the standby alarm is 0 and the active alarm is 1,
                        switch processors.

2 - If the standby alarm is less than 2 and the active alarm
is 2, switch processors.
3 - If the standby alarm is less than 3 and the active alarm
is 3, switch processors.

Note 13:   To clear an active alarm after the condition is no longer
present, enter RSERR and 00 to reset all alarms, or DEVICE/EVENT# (1
or 2 digits) to clear a specific alarm. For more information, refer to the
RSERR command (refer to the *Command and Message Guide* section).

If a Level 0 alarm occurs, no Processor switch takes place. Levels 1-3
establish the priorities of the remaining alarms. If an alarm occurs that is a
higher level alarm than the highest level active alarm on the standby side, a
processor switch takes place.

Note 14:   Use the SITDAT WRITE and LINIT commands to save
changes and to send the changes to the CP.

Leading Pad Character
The communication protocol with the remote collector allows for different
lead characters. The leading pad character **cannot** start with a Hex "E". To
match the leading character from the BMC with the HOC, the LPAD
command is used. To change the one byte leading pad character in the
BISYNC protocol, enter the following at the maintenance terminal:

>LPADxx (cr)

where: xx - two HEX digits (0-9, A- F). The leading pad character cannot
start with an "E".

Note: This information is supplied by the site data center on a site-by-
site basis.

Valid Call Record Parameters
The Valid Parameter, VALPARM, command is used to examine or change the
maximum cumulative number of invalid data items which can be received
before an error, or alarm, is generated, set the log header function, and specify
the number of AMA blocks required to close an AMA file at the start of
polling. The data item is a data block. The invalid data item count is reset by
the CLRSTATS command and automatically at midnight. This also controls
output of block headers as a log message.

To set the invalid data item threshold, enter the following at the maintenance
terminal:

>VALPARM INVALID xxxxxx (cr)

where: xxxxxx - number of data items (0 to 65,355).

The system responds with the following message:

AMA INVALID ALARM THRESHOLD - nnnnn

where: nnnnn - number of invalid data items before an alarm is generated.

To examine or change the number of AMA blocks required to automatically close the AMA at the start of polling:

1.Enter the following command at the terminal to change the number of AMA blocks required (default is 200):

>**VALPARM BLOCKS xxxxx (cr)**

where: xxxxx - number of blocks (1-65,535).

The system responds with the following message:

BLOCKS TO CLOSE FILE = xxxxx

> *Note:*   Use the SITDAT WRITE and LINIT commands to save any changes and to send the changes to the CP.

2.Enter the following command at the terminal to examine the number of AMA blocks:

>**VALPARM BLOCKS (cr)**

The system responds with the following message:

BLOCKS TO CLOSE FILE = xxxxx
LOGGING OF AMA HEADERS ENABLED

System Security

Each user and command on the BMC is assigned a password and a priority value. This value is used to determine a security level. Each level has a set of commands which user may access. A user may only have access to command which has the same or lower priority level. An attempt to access commands of higher priority results in a PRIVILEGED COMMAND response. Careful assignment of user and command priorities effectively controls the use of the commands.

Passwords

Passwords are character strings entered by the requesting user, which are required to permit access. Each user on the system must use a password. A user may be an individual or a computer system. The BMC has a default password which allows the entry of site data and other system parameters.

The default password is USER.1 for the BMC. Passwords are controlled by the PSWD command.

CAUTION
It is recommended that the default password be changed after entry of system parameters to restrict access.

Priorities

Priorities are limiters which are placed on users and commands to control use of the system and the commands. The BMC has three levels of priorities (1, 2, and 3). One (1) is the lowest priority level, with the user restricted to commands of priority 1. The greater the restriction placed on a user, the lower the user's priority level. The greater the restriction on a command, the higher the command's priority level. A command with a priority 1 indicates its usage is open to all users. All commands have a default priority of three. Once a command priority has been changed, it cannot be reset unless the site data is deleted. Priority examples are given with commands. Refer to Table 3-3. The final priority level for each user and command is the responsibility of the System Administrator.

Table 3-3
BMC commands

Command	Description	Priority
AMAHRS	Sets the time interval to check that call records are received from the Switching System	Mainly System Administration, Maintenance may require access (Priority 2)
BAUD	Sets polling link baud rate	Mainly System Administration, Maintenance may require access (Priority 2)
BUFSZ	Sets internal BMC polling frame size	Mainly System Administration, Maintenance may require access (priority 2).
BVALID	Identifies the Switching System to which the BMC is connected	Mainly System Administration, Maintenance may require access (priority 2)
BYE	Allows user to exit BMC	Locked at priority 1
Sheet 1 of 4		

Table 3-3
BMC commands

Command	Description	Priority
CLK	Display BMC system time	Locked at priority 1
CLRSTATS	Clears today's statistics files (record may be lost)	Mainly System Administration, Maintenance may require access (Priority 2)
CLSACT	Close specified file to further writes	Mainly System Administration, Maintenance may require access (Priority 2)
CP	Perform specified actions on the Communication Processor	Maintenance requires access (Priority 2)
DELFILE	Delete specified file	Mainly System Administration, Maintenance may require access (Priority 2)
DISK	Define/examine operating parameters of the BMC disk drives	Mainly System Administration, Maintenance may require access (Priority 2)
DMASTAT	Examine current or last status of BMC Direct Memory Access functions	Mainly maintenance (priority 2)
DMPFILE	Output contents of the specified file in HEX	Mainly maintenance (Priority 2)
DPRTST	Test BMC RAM	Mainly maintenance (Priority 2)
ERRMAP	Examine/set alarms and alarm handling	System Administration, and Maintenance (Priority 2)
IDXMAINT	Control status and handling of system files	Mainly System Administration, Maintenance may require access (Priority 2)
KYWD	Used to examine or change the remote BMC-to-HOC password	System Administration only (priority 3)
LINIT	Initialize BMC receive data buffers	Mainly System Administration, Maintenance may require access (Priority 2)

Sheet 2 of 4

Table 3-3
BMC commands

Command	Description	Priority
LNKDSC	Disconnects active communication link for five seconds (Drops DTR)	Mainly maintenance (Priority 2)
LSTACT	List active files	General activity (Priority 1)
LSTDIR	List BMC files	General activity (priority 1)
MPRI	Set command priorities	Mainly System Administration, Maintenance may require access (Priority 2)
PSWD	Set user passwords	Mainly System Administration, Maintenance may require access (Priority 2)
REPORT	Request system reports	General activity (Priority 1)
RSCMD	Halt execution of active command and reset status	General activity (Priority 1)
RSERR	Rest system errors	Mainly maintenance (Priority 2)
SELGRP	Selects a specific group of block sequence numbers	Mainly System Administration, Maintenance may require access (Priority 2)
SETCLK	Set BMC system clock	General Activity (Priority 1)
SETTERM	Set terminal logoff function	Mainly System Administration, Maintenance may require access (Priority 2)
SITDAT	Read or save site data information	Mainly System Administration, Maintenance may require access (Priority 2)
SWACT	Switch active processors	Mainly maintenance (Priority 2)
SYSUTIL	Examine and control BMC ports	Mainly maintenance (Priority 2)
TECMAINT	Control TEC/DSI port functions	Mainly maintenance (Priority 2)
TECRAM	Examine TEC/DSI RAM	Mainly maintenance (Priority 2)
Sheet 3 of 4		

Table 3-3
BMC commands

Command	Description	Priority
TEST	Test major BMC functions	Mainly maintenance (Priority 2)
VALPARM	Set number of cumulative invalid data items before error	Mainly System Administration, Maintenance may require access (Priority 2)
VS	Examine BMC operating program version	General activity (priority 1)
XDIR	Prints all files currently on disk	General Use (priority 1)
Sheet 4 of 4		

Machine-Machine Security Data

The BMC processes Telephone Company sensitive billing information. To protect this data, the BMC has provisions for setting up security measures governing machine (HOC - BMC) access to the system. The KYWD command fulfills this security requirement. This command establishes a keyword that must be verified by the HOC before remote access is permitted. Once this security data is entered, BMC can only be accessed if the correct password is provided.

Polling Device Password

The KYWD command is used to set the five character communications link password. This password is used by remote systems to identify themselves as authorized users of the BMC. The five character password is to be used the remote polling system to gain access to the BMC. The default value for the KYWD Password is HOST.0. This command should be given the highest priority.

CAUTION
To avoid conflict of data on the BMC disk drives, **do not** use this command when the user interface is directed to the Standby Processor.

To list the password table, enter the following at the maintenance terminal:

>**KYWDL (cr)**

To change the remote password, enter the following at the maintenance terminal:

>**KYWD nC keywrd (cr)**

where: n - remote station number (usually 1).
        keywrd - six alphanumeric characters used to identify the remote
                 station.

> **CAUTION**
> Use the SITDAT WRITE and LINIT command to save any change and send the new value to the CP.

Human-Machine Security

Human-machine security consists of a user password and the priorities established for each command on the system. Each user has a password and a priority. The priority defines the level of operation for the user within the system. A user may only access or use commands with the same or lower priority. If a user has a priority of 1, the user may use commands of priority 1. The same user is restricted from using commands of priority 2 and 3. Through careful use of passwords and priorities, the data on the system can be secured. User passwords and priorities are set by the PSWD command. Command priorities are set by the MPRI command.

User Passwords

The PSWD command is used to set passwords and priority level for each of the ten allowable BMC users. The Switching System and a remote polling system are not considered users. This command has subtasks and returns a PSWD> prompt.

> **CAUTION**
> To avoid conflict of data on the BMC disk drives, **do not** use this command when the user interface is directed to the Standby Processor.

The input form of this command is as follows:

>**PSWD (cr)**

To list the password table, enter the following at the maintenance terminal:

 PSWD>L (cr)   (l - list command)

The system responds as shown below:

```
USR  PASWRD    PRI
---  ------    ---
01   PSWRD1    3
02   PSWRD2    3
03   PSWRD3    2
04   PSWRD4    1
```

> *Note 15:*   The output shown is for example purposes only.

To change a password (same or lower priority level), enter the following at the maintenance terminal:

PSWD>nC paswrd p (cr)

where: n - user number
         C - change subtask
    paswrd - six uppercase characters (new password)
         p - priority level (0, 1, 2, or 3).

For example, if user password No. 2 is to be changed from ESCC02 priority 3 to ESCC03 with a priority of 1, the input form is:

>PSWD (cr)
PSWD>2C ESCC03 1 (cr)

In this case, Password No. 2, which was previously ESCC02 with a priority of 3 changes to the new password ESCC03, with a priority of 1 as shown:

```
USR   PASWRD    PRI
---   ------    ---
01    SYSTEM    3
02    ESCC03    1
03    AMACC2    2
04    SCC002    1
```

> *Note 16:*   Use the SITDAT WRITE and LINIT commands to save any changes and send the new values to the CP.

Command Priorities

The MPRI command is used to assign or examine the priority level of a command. The priority level is used to control access to the use of a command. Only software commands can have a priority change. Software commands have a default priority of 3. Firmware command have a non-adjustable priority of 3. Command functions and possible priorities are listed in table 3.

> *Note 17:*   Valid priorities are in the range 01 to 03. 01 is the lowest (least restrictive). 03 is the highest (most restrictive).

Note 18: This table includes examples that are based on dividing the commands into functional groups. The four groups are: System Administration (priority 3), Maintenance (priority 2), General Use (priority 1), and Nortel field service personnel only (Priority 3).

Note 19: Priorities of firmware commands (i.e., DISK and DOS) cannot be modified.

To assign or change the access priority level of a command, enter the following at the maintenance terminal:

>**MPRI C cmd p (cr)**

where: C - command argument
       cmd - command
         p - priority level (1, 2, or 3).

The system responds as shown below:

COMMAND PRIORITY IS x

where: x - new command priority number assigned.

To display a priority currently assigned to specific commands, enter the following at the maintenance terminal:

>**MPRI E cmd (cr)**

where: E - examine/display command argument
      cmd - command to be examined.

The system responds as shown below:

COMMAND PRIORITY IS x

Note 20: Use the SITDAT WRITE and LINIT commands to save any changes and send the new value to the CP.

Automatic Logoff

The Set Terminal Timeout (SETTERM TIMEOUT) command is used to examine or assign the length of time that no activity can take place on a terminal before the BMC performs an automatic logoff of that terminal.

To display the terminal time-out value, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT (cr)**

The system responds as shown below:

TERMINAL TIME-OUT - xxx

where: xxx - terminal time-out value in minutes.

To set the value for the terminal time-out, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT nnn (cr)**

where: nnn - minutes before a logoff (1 to 120).

The system responds as shown below:

TERMINAL TIME-OUT - xxx

To disable the auto log-off function, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT 00 (cr)**

The system responds as shown below:

TERMINAL TIME-OUT - 00

> *Note:*   Use the SITDAT WRITE and LINIT commands to save any changes and send the new values to the CP.

Recovery from Lost Passwords

On power-up, the BMC activates all terminals. If no activity takes place on the terminals for three minutes, the BMC automatically logs off all terminals. For the first three minutes, the password SYSTEM is in effect. After the initial Automatic Logoff, one of the ten passwords must be used. Recovery from a lost password requires removal of power, re-application of power, and entering the system with the SYSTEM password.

BYE Command

The BYE command is used by the user to exit the BMC. This command should be entered at the end of an operation by each human user. This command must have a low priority.

To log off the system, enter the following at the maintenance terminal:

>**BYE (cr)**

The system responds as shown below:

(log message) USER x LOGGED OUT

where: x - user number.

Figure 3-1
System Administration Site Data Worksheet - Sheet 1 of 3

Office Identification and Switching System Type (BVALID) _____

Time to confirm call record blocks are being received from
the Switching System (AMAHRS)   Start hour _____ (00-23)

End hour _____ (00-23)

Minutes of no blocks before error _____ (00-59)

Polling Call Record Buffer Size (BUFSZ) _____

Polling Link Clock Source (CP CLOCK) _____
(INTERNAL or EXTERNAL)

Polling Modem Line Control (CP CONTROL) _____ (HD or FD)

Polling Link Interface (CP INTERFACE) _____ (RS232 or V35)

Polling Leading Pad Character (LPAD) _____

Polling Device Password (KYWD) _____

Polling Link Baud Rate (BAUD 1) _____ (1200, 2400, 4800, or 9600)

Polling Link Baud Rate (BAUD 2) _____ (1200, 2400, 4800, or 9600)

User Passwords and Priorities (PSWD)

User Num.	Password	Priority
01	_____	_____
02	_____	_____
03	_____	_____
04	_____	_____
05	_____	_____
06	_____	_____
07	_____	_____
08	_____	_____
09	_____	_____
10	_____	_____

Terminal Logoff Function (SETTERM) _____ (ON or OFF)

Inactive time before logoff _____ (00-120 minutes)

Number of cumulative invalid Call Record
Blocks before error (VALPARM INVALID) _____ (0-65,535)

Figure 3-1
System Administration Site Data Worksheet - Sheet 2 of 3

Command Priorities

Command	Description	Priority
AMAHRS	Set call record confirm receipt time	_____
BAUD	Set polling link baud rate	_____
BUFSZ	Set polling Frame Buffer Size	_____
BVALID	Set Site Dependent Data	_____
BYE	User logoff function (locked at priority 1)	
CLK	Request BMC time (locked at priority 1)	
CLRSTATS	Delete today's statistical files	_____
CLSACT	Close active file	_____
CP	Interact with Communication Processor	_____
DELFILE	Delete file	_____
DISK	Set BMC disk drive parameters	_____
DMASTAT	Request BMC DMA status	_____
DMPFILE	Output specified file in HEX	_____
DPRTST	Test BMC RAM	_____
ERRMAP	Set, examine alarm handing parameters	_____
IDXMAINT	Set, examine file handing parameters	_____
KYWD	Set HOC password	_____
LINIT	Initialize incoming data buffers	_____
LNKDSC	Disconnect DRT for five seconds	_____
LPAD	Set leading pad character	_____
LSTACT	List active files	_____
LSTDIR	List BMC disk files	_____
MPRI	Set command priorities	_____
PSWD	Set user password and priorities	_____
REPORT	Request BMC statistical reports	_____
RSCMD	Halt execution of system command	_____
RSERR	Reset error condition	_____
SELGRP	Sets specific block sequence numbers	_____
SETCLK	Set system clock	_____
SETTERM	Set terminal logoff function	_____
SITDAT	Control site data	_____
SWACT	Switch active processor	_____
SYSUTIL	Set and examine system ports	_____
TECMAINT	Control TEC/DSI operating parameters	_____

Figure 3-1
System Administration Site Data Worksheet - Sheet 3 of 3

Error Alarm Handling

EVT	Name	CRIT	MAJ	MIN	INHIB	Level	Notes
				Alarm			
01	NO BLK LAST PER	____	____	____	____	____	
02	TEC STNBY FAIL	____	____	____	____	____	
03	TEC PRIME FAIL	____	____	____	____	____	
04	D_RAM ERROR	____	____	____	____	____	
05	SIO-1 FAILURE	____	____	____	____	____	
06	ERROR CTL CONFL	____	____	____	____	____	
07	ERROR CTL INCON	____	____	____	____	____	
08	DMA COMM FAIL	____	____	____	____	____	
09	PROC STAT ALARM	____	____	____	____	____	
10	PROG CKSUM ALM	____	____	____	____	____	
11	TEC DATA OVERFLO	____	____	____	____	____	
12	NO CLK TIME SET	____	____	____	____	____	
13	PLANNED SWITCH	____	____	____	____	____	
14	ONLY NON-REDUND	____	____	____	____	____	
15	STNBY COMM DOWN	____	____	____	____	____	
16	PROM CKSUM FAIL	____	____	____	____	____	
17	DSK 70% PRIMARY	____	____	____	____	____	
18	DSK 90% PRIMARY	____	____	____	____	____	
19	OFFLIN DSK FULL	____	____	____	____	____	
20	DSK STORE LIMIT	____	____	____	____	____	
21	DISK WRITE FAIL	____	____	____	____	____	
22	DSK INDEX ERROR	____	____	____	____	____	
23	NO INDEX FILE	____	____	____	____	____	
24	DIRECTORY FULL	____	____	____	____	____	
25	SITE FILE ERROR	____	____	____	____	____	
26	STAT FILE ERROR	____	____	____	____	____	
27	EXCESS INV BLKS	____	____	____	____	____	
28	CP NOT AVAIL.	____	____	____	____	____	
29	CP FAULT	____	____	____	____	____	
30	DSK ERROR ALARM	____	____	____	____	____	
31	DISK MODE ALARM	____	____	____	____	____	
32	DSK CARD HW ERR	____	____	____	____	____	
33	DISK ER MESSAGE	____	____	____	____	____	
		CRIT	MAJ	MIN	INHIB	Level	

Section 060-INDP-410
Command and Message Guide

This document lists and defines the BMC commands and major messages. General command, syntax and, human-machine interface requirements are listed first. Major procedures are discussed in functional groups. Commands and messages are discussed in greater detail in separate paragraphs. Tables are included that summarize and list commands and messages both functionally and alphabetically.

Human-Machine Interface

The Human-Machine interface is through a terminal that is attached to the BMC or through a terminal and a Switching System that is attached to the BMC (DMS-10 applications only). Individual sites may vary but, generally, only one terminal is used with each system.

Command Abort Sequence

Any terminal keyboard entry can be aborted before the carriage return with a CONTROL Z (CTRL/Z). A CRTL/Z is entered by pressing and holding the Control key and pressing the Z key. No carriage return is required. The BMC (terminal) skips to the next line and is ready for command input. This action is equivalent to erasing (deleting) all of the typed characters.

Switching System Specific Commands

This document contains command information which relates to two different Switching System types, the DMS-10 and DMS-100. Any command or message that pertains to only one Switching System type is marked as follows:

- *****DMS-100***** for DMS-100 Switching Systems.

- *****DMS-10***** for DMS-10 Switching Systems.

Priority Levels

Each user and command on the system is assigned a priority. This value is used to determine a security level. Each level has a set of commands which the user may access. A user may only have access to commands which have

the same or lower level priority. Any attempt to access commands of higher priority results in an ILLEGAL COMMAND or PRIVILEGED COMMAND response. The user level, the command priorities, and how to set priorities is discussed in the *System Administration Guide* section.

Prompts

Some commands have several options or subtasks. These commands return a prompt with the command name. This task prompt allows direct entry and repetition of any of the command's subtasks. If another subtask is to be performed, only the subtask name is required. The entire command name does not have to be repeated. To leave the command task, use the CTRL/Z, escape sequence.

For example, to read data from a specific TEC/DSI port, and write to the port, enter the following at the maintenance terminal:

>TECMAINT EXAMINE 1 xxxx (cr)

where: s   - TEC/DSI to examine (1 or 2)
         xxxx - address to examine in HEX (0000-FFFF).

The system displays the port contents and returns a command prompt:

TECMAINT>IOREAD 1 xx (cr) (read port xx)

System displays the port contents. To leave the TECMAINT command task, press CRTL/Z (press and hold the CONTROL key and press the Z key).

TECMAINT>CTRL/Z

BMC software commands

The BMC software commands are divided into the following functional areas:

- Alarm Manipulation commands

- Command Reset command

- CP commands

- Craftsperson assistance command

- Disk operation commands

- DMA commands

- File index manipulation commands

- File manipulation commands

- Polling link adjustment commands
- Processor activity command
- Read/write operation commands
- Security commands
- Site data entry commands
- Software version command
- Statistics commands
- System clock commands
- TEC/DSI commands
- Test commands.

The commands that make up these functional areas are listed in the subsections that follow.

Alarm manipulation commands

The alarm manipulation commands return the BMC to a baseline operating state after error and alarm conditions have been encountered. The alarm manipulation commands are as follows:

- ERRMAP
- RSERR.

ERRMAP

ERRMAP, a maintenance command, displays a list of all alarms, their current level assignments, and whether or not the alarm is currently active. The ERRMAP command also permits the user to change alarm level assignments. The following table lists the valid subcommands for the ERRMAP command.

**Table 4-1
ERRMAP subcommands**

Subcommand	Description
ERRMAP	Displays a list of alarms, their current level assignments, and indicates whether they are currently asserted for the active BMC processor.
ERRMAP event alarm level	Changes the alarm type and/or alarm level for a specified device or event number on the active BMC processor. event = three digit number that specifies the device or event number. Range: 1-99. alarm = specifies the alarm type assigned to a particular device or event number. The following alarm types are valid: INHIBIT MINOR MAJOR CRITICAL. level = one digit number that indicates the seriousness of the fault. Range: 0-3 (3 is the highest alarm level).
ERRMAP ALARMS	Displays a list of alarms that have been asserted on both BMC processors.
DOS S ERRMAP	Displays a list of alarms, their current level assignments, and indicates whether they are currently asserted for the standby BMC processor.
DOS S ERRMAP event alarm level	Changes the alarm type and/or alarm level for a specified device or event number on the standby BMC processor.

Table 4-2 lists and describes the alarm types. Table 4-3 lists and describes the alarm level parameters.

Note: Any active alarm listed may be cleared using the RSERR command. The RSERR command is described later in this subsection.

Table 4-2
Alarm type descriptions

Alarm_type	Description
INHIBIT	Indicates a particular alarm has been deactivated for printout and reporting purposes; the error message prints out, but the alarm is not set. The condition still exists; for each subsequent occurrence of the alarm, no further audible/visual indications are provided.
MINOR	Indicates that one processor unit (A or B) has developed a fault condition, but there has been no degradation of system performance as relates to overall design capability. This situation does not require immediate attention, though delay could lead to a worsening of the situation.
MAJOR	Indicates that the system is in danger of loss of operational capability. A fault, or faults, condition exists, which, if not corrected, may result in loss of functional capability. Major alarms are normally configured such that if corrective action is not taken immediately, there is a high probability of subsequent faults resulting in loss of data.
CRITICAL	Indicates that the system is no longer capable of performing its design function of data collection, retrieval, and forwarding. The situation requires immediate corrective action so that the performance of the system may return to its design function. CRITICAL alarms are normally configured such that the probability of data loss is very high.

Table 4-3
Alarm level descriptions

Level	Description
0	A fault that a processor switch cannot clear, such as BOTH DISKS FULL, no processor switch occurs.
1	The least serious fault. If the standby processor alarm level is less than 1, a processor switch occurs.

Table 4-3
Alarm level descriptions

Level	Description
2	A moderately serious fault. If the standby processor alarm level is less than 2, a processor switch occurs.
3	The most serious fault. If the standby processor alarm level is less than 3, a processor switch occurs.

CAUTION
Changing alarm level assignments may cause a loss of billing data. The alarm level and type for event 13, PLANNED SWITCH, cannot be modified.

Note: Consult with technical assistance personnel before changing alarm level assignments.

Examples of command usage
To display the current alarm types, level assignments, and currently active alarms on the active processor, type in the following command:

>ERRMAP (cr)

The system responds by displaying the current BMC alarm status and assignments for the active processor in the following format:

CURRENT ALARM ASSIGNMENTS ARE:

DEV/EVT#.NAMEALARMLEVELNOTES
01NO BLK LAST PERMINOR 0
02TEC STNBY FAILMINOR 0
.
. (one line for each device/event)
.

* INDICATES CURRENTLY ACTIVE ALARM(S)
TO CHANGE ERRMAP TABLE, ENTER:
ERRMAP DEV/EVT# ALARMTYPE LEVEL
EXAMPLE: ERRMAP 2 MINOR 1

The following table lists the valid device/event names for the all of the BMC systems.

Table 4-4
ERRMAP device/event names

Event	Event name	Alarm	Level
1	NO BLK LAST PER	Minor	0
2	TEC STNBY FAIL	Minor	0
3	TEC PRIME FAIL	Major	1
4	D_RAM ERROR	Major	1
5	SIO-1 FAILURE	Major	1
6	ERROR CTL CONFL	Major	0
7	ERROR CTL INCON	Major	0
8	DMA COMM FAIL	Major	2
9	PROC STAT ALARM	Major	2
10	PROG CKSUM ALM	Major	3
11	TEC DATA OVRFLO	Critical	0
12	NO CLK TIME SET	Minor	0
13	PLANNED SWITCH	Pswitch	0
14	ONLY NON-REDUND	Minor	0
15	STNBY COMM DOWN	Major	0
16	PROM CKSUM FAIL	Major	3
17	DSK 70% PRIMARY	Minor	0
18	DSK 90% PRIMARY	Major	0
Sheet 1 of 2			

Table 4-4
ERRMAP device/event names

Event	Event name	Alarm	Level
19	OFFLIN DSK FULL	Major	0
20	DSK STORE LIMIT	Critical	0
21	DISK WRITE FAIL	Major	2
22	DSK INDEX ERROR	Minor	0
23	NO INDEX FILE	Major	0
24	DIRECTORY FULL	Critical	0
25	SITE FILE ERROR	Minor	0
26	STAT FILE ERROR	Minor	0
27	EXCESS INV BLKS	Minor	0
28	CP NOT AVAIL.	Major	1
29	CP FAULT	Major	1
30	DSK ERROR ALARM	Critical	0
31	DISK MODE ALARM	Major	0
32	DSK CARD HW ERR	Major	2
33	DISK ER MESSAGE	Minor	0
Sheet 2 of 2			

To assign or change an alarm event, alarm type, or alarm level for the active processor only, enter the following command:

>**ERRMAP event alarm level (cr)**

The system responds by displaying an ERRMAP printout with the changed data. Be sure to issue the SITDAT WRITE and LINIT commands to save new data to disk and send the new values to the CP.

In order to INHIBIT a selected alarm for the active processor, enter the following command:

>ERRMAP event INHIBIT 0 (cr)

To view or retire active alarms on standby processor, enter the following command:

>DOS S ERRMAP (cr)

The system responds by displaying the current BMC alarm status and assignments for the standby processor.

Sometimes you will want to view alarms on both processors. To do this, enter the following command:

>ERRMAP ALARMS (cr)

The system responds with an ERRMAP printout showing the alarm status and assignments for both processors.

RSERR
RSERR, a maintenance command, clears active device/event alarms after the condition that caused the alarm is no longer present. Use the ERRMAP command to verify that the alarms have been cleared.

Table 4-5
RSERR subcommands

Subcommands	Description
RSERR event	Clears the asserted event or device alarms for the active BMC processor after the alarm condition is no longer present.
DOS S RSERR event	Clears the asserted event or device alarms for the standby BMC processor after the alarm condition is no longer present.

Examples of command usage
To clear active alarms on the active processor (alarms clear if no fault condition exists), enter the following command:

>RSERR event (cr)

where: event -two-digit event or device alarm number. Event 00 is used to clear all asserted alarms.

The system responds by displaying the following message:

ALARM CLEARED

To clear active alarms on the standby processor (alarms clear if no fault condition exists), enter the following command:

>DOS S RSERR event (cr)

The system responds by displaying the following message:

ALARM CLEARED

Command execution control command

The command execution control command, as listed below, allows a command currently being executed to be aborted and the BMC returned to conditions that existed before the command was entered.

RSCMD

RSCMD is used to reset the BMC to the state the BMC was in prior to issuing the previous command. This may be used to halt a command in progress and reset the system.

Example of command usage

To abort the execution of a BMC command, enter the following command:

>RSCMD (cr)

Upon halting the command execution, the system displays the following message:

COMMAND STOPPED

CP commands

The following CP commands are used only on Turbo BMC systems:

- CP BOOT ACT
- CP BOOT ADD
- CP BOOT DELETE
- CP BOOT LIST
- CP BOOT STDBY
- CP CLOCK
- CP CONTROL
- CP EXAMINE
- CP INTERFACE

- CP LOOP ACT
- CP LOOP STDBY
- CP MEMWRITE
- CP TEST ACT
- CP TEST STDBY
- CP VS ACT
- CP VS STDBY.

CP BOOT ACT
CP BOOT ACT, a maintenance command, allows the user to direct the BMC to reload the CP on the active processor by sending it the files listed in the file BOOTCP.

Example of command usage
To load the contents of the BOOTCP file to the active CP, issue the following command:

>CP BOOT ACT (cr)

The system responds with the following:

CP RESTART
CP RELOAD
CP RESTART
CP ACTIVE

where:

filename - name of the BOOTCP file.

> *Note:* Use this command only when specifically called for as part of another procedure; maintenance or special.

CP BOOT ADD
CP BOOT ADD, a maintenance command, adds a new file name in the BOOTCP file.

Example of command usage
To add a new file name to the BOOTCP file, issue the following command:

>CP BOOT ADD filename version (cr)

where:

filename- six character load file name
version- 1 to 2 digit numeric file version number (range: 1-99; version
0 is not allowed).

The list of file names and version stored in the file BOOTCP is displayed. The
new one should appear at the end of the list.

Note 5: Make a copy of the file names (and versions) for future
reference.

Note 6: Make sure the file name and version entered into the BOOT file
matches a file present on the disk.

CP BOOT DELETE
CP BOOT DELETE, a maintenance command, allows the user to remove the
last file name from the BOOTCP file.

Example of command usage
To remove the last file name from the BOOTCP file, enter the following
command:

>CP BOOT DELETE (cr)

The list of file names and version stored in the file BOOTCP displays minus
the deleted file is displayed.

CP BOOT LIST
CP BOOT LIST, a maintenance command, allows the user to direct the BMC
to display the contents (file names) of the file BOOTCP.

Example of command usage
Use the following command to display the contents (file names) of the files in
BOOTCP:

>CP BOOT LIST (cr)

The system displays the list of file names and version stored in the file
BOOTCP. If the BOOT file is empty, the message displayed by the system is
as follows:

CP BOOT LIST EMPTY

CP BOOT STDBY
CP BOOT STDBY, a maintenance command, allows the user to direct the
BMC to reload the CP on the standby processor by sending it the files listed in
the file BOOTCP.

Example of command usage
To load the contents of the BOOTCP file to the standby CP, issue the
following command:

>CP BOOT STDBY (cr)

The system responds with the following:

CP RESTART
CP RELOAD
CP RESTART
CP ACTIVE

where:

filename - name of the BOOTCP file.

> *Note:*   Use this command only when specifically called for as part of
> another procedure; maintenance or special.

CP CLOCK
CP CLOCK, a site data command, allows the user to examine or change
source of clock used in polling for a specific link. If set to EXTERNAL, BMC
uses an external device for its clock source. If set to INTERNAL, BMC uses
the baud rate specified when the baud command was entered to generate its
own transmit clock.

Examples of command usage
Issue the following command to examine the CP clock source currently
assigned to the polling channels:

>CP CLOCK (cr)

The system displays the clock source data for the two polling links as in the
following example:

LINK# 01: CLK SRC= yyyyyyyy
LINK# 02: CLK SRC= yyyyyyyy

where:

yyyyyyyy - clock source, INTERNAL or EXTERNAL.

Use the following command to change the CP clock source:

>CP CLOCK link source (cr)

where:

link - one digit link number, either 1 or 2
source - clock source, INTERNAL or EXTERNAL.

The system displays clock source data for the specified link.

LINK# 0x: CLK SRC= yyyyyyyy

where:

  x - link - one digit link number, either 1 or 2.

Use the SITDAT WRITE and LINIT commands to transfer the data to the
disk and update the CP with the new values.

CP CONTROL

CP CONTROL is a site data command used to examine or change the polling
modem line control setting. The polling modem line control can be set to Half
Duplex (HD - the default value) or Full Duplex (FD). CP CONTROL should
be set to HD when the polling modem requires Bell 208 compatibility. If the
polling modem is V.32 (or V.34/V.FC) compatibility, CP CONTROL should
be set to FD.

CAUTION
The value of this command should not be modified except
during initial installation or polling modem replacement.

Examples of command usage
To examine the polling modem line control setting, enter the following at the
maintenance terminal:

>CP CONTROL (cr)

The system responds as follows:

LINE CONTROL SET TO xxxx DUPLEX

where:

xxxx - modem line control type (HALF or FULL).

To change the polling modem line control setting, enter the following at the
maintenance terminal:

>**CP CONTROL xx (cr)**

where:

xx - modem line control type; **HD** - Half Duplex or **FD** - Full Duplex.

The system responds as follows:

LINE CONTROL SET TO xxxx DUPLEX

> *Note:* Follow this command with the SITDAT WRITE and LINIT
> commands to make the change permanent and update the CP with the new
> values.

CP EXAMINE
CP EXAMINE, a maintenance command, allows users to examine the
contents of CP memory.

Example of command usage
Enter the following command to examine the contents of CP memory:

>**CP EXAMINE mem_addr numb_of_lines (cr)**

where:

mem_addr- memory address (Range: 0-1FFFF for 128K systems;
  0-3FFFF for 256K systems; and 0-7FFFF for 512K
  systems)

numb_of_lines- number of lines of data desired starting at address "x",
  with each line containing sixteen bytes (Range: 1-16).

The system displays the requested data.

> *Note 7:* If a range is not specified for numb_of_lines, system defaults to
> a value of '1'.

> *Note 8:* This command should only be used under the direct supervision
> of technical support personnel.

CP INTERFACE
CP INTERFACE, a site data command, allows users to examine or change the
type of interface used in polling for a specific link. If the interface is set to
RS232, BMC uses the RS-232 interface for its polling port. If the interface is
set to V35, BMC uses the V.35 interface for its polling port.

Examples of command usage
To examine the CP INTERFACE currently assigned, issue the following
command:

>**CP INTERFACE (cr)**

The system displays the interface data for the polling links:

LINK xx, INTERFACE = yyyy

where:

xx- one digit link number, either 1 or 2
yyyy- interface used (RS232 or V35).

To change the CP INTERFACE in use, issue the following command:

>**CP INTERFACE link interface (cr)**

where:

link- one digit link number, either 1 or 2
interface- interface used RS232 or V35.

When the system makes the requested change, it displays the CP
INTERFACE data for the changed link.

LINK xx, INTERFACE = yyyy

> *Note:* Use the SITDAT WRITE and LINIT commands to make the
> change permanent and update the CP with the new values.

CP LOOP ACT and CP LOOP STDBY
CP LOOP ACT and CP LOOP STDBY, both maintenance commands, allow
the user to test the Reliable File Transfer (RFT) interface between the MP and
the CP by sending a 1531-byte test data block to the CP, returning it to the
MP, and validating the content of the received data against the original data
block.

> *Note:* Report any failure, by type, to technical support personnel
> immediately.

Example of command usage
Issue the following command to perform the loop test on the CP for the active
processor:

>**CP LOOP ACT (cr)**

There will be one of two responses from the system. If the test passes, the system displays the following:

CP LOOP TEST PASSED

If the test fails, the system displays the following:

LOOP_BACK TEST NOT ACCEPTED

To perform the loop test on the CP for the standby processor, use the following command:

>**CP LOOP STDBY (cr)**

The system displays messages for the standby CP similar to the messages returned for the active processor in the previous example for the results of the CP loop around test.

CP MEMWRITE
CP MEMWRITE, a maintenance command, allows the user to write data to the CP memory.

Example of command usage
To write data to a specific CP memory address, issue the following command:

>**CP MEMWRITE mem_addr data (cr)**

where:

mem_addr- memory address (Range: 0-1FFFF for 128K systems;
   0-3FFFF for 256K systems; and 0-7FFFF for 512K
   systems)
data- data bytes to be written starting at mem_addr, with a space
   dividing each byte (i.e., hh hh hh hh. . . hh - individual data
   bytes).

CAUTION

Improper use of this command may result in an attempt to write data to a non-existent memory location, or, cause erroneous data to be written to a memory location that is already in use by other data. Do not use this command without first contacting technical assistance personnel to determine that it is proper to do so.

The system displays the following message:

CP_MMI_TSK - Memory Write Completed

CP TEST STDBY and CP TEST ACT

CP TEST ACT and CP TEST STDBY, both maintenance commands, enable the user to request a series of tests be run on the active or standby CPs. Running these tests on both the active and standby processors simultaneously yields mingled responses. Therefore, it is recommended that for clear results, perform the tests on each processor individually and separately.

>   *Note 9:*   Refer to the *System Description* section for more information on the tests for the CPs.

>   *Note 10:*   This test cannot execute if a polling session is in progress.

Example of command usage

Use the following command to request that the series of tests be run on the CP for the active processor:

>**CP TEST ACT (cr)**

The system displays the test results for the active CP as follows, (this example assumes all tests pass):

>   *Note 11:*   The order listed below is provided for example only. The CP tests are dependent on system resources to execute and may not complete as shown.

CP ROM Checksum Test Passed
CP PRG Checksum Test Passed
CP RAM Test Passed
CP DMA Test Passed
CP SCC Loopback Test Passed on Channel A
CP SCC Loopback Test Passed on Channel B

If a test fails, the message for that test will state FAIL, for example:

CP ROM Checksum Test Failed

Use the following command to request that the series of tests be run on the CP for the standby processor:

>**CP TEST STDBY (cr)**

The system displays the test results for the standby CP similar to those for the active CP.

CP VS ACT and CP VS STDBY

 CP VS ACT and CP VS STDBY, both administration/maintenance commands, enable the user to request the version of the software and firmware programs from the CPs on the active and standby processors.

Example of command usage
Issue the following command to request the firmware/software versions of the active CP:

>CP VS ACT (cr)

The system displays the firmware and software data in the following format:

aaa-CPFbbb-cc dd ee-fff-gggg hh:ii:jj:mm
CPS-6M9bbb-cc dd ee-fff-gggg hh:ii:jj:mm

where:

aaa- firmware program number
CPF- mnemonic for CP Firmware
CPS - mnemonic for CP Software
bbb - system type (BMC)
cc- release increment
dd- checksum byte
ee-fff-gggg- program creation date (day-month-year)
hh:ii:jj:mm- program creation time of day (hour:minute:seconds:hun-
    dreths of second).

Issue the following command to request the firmware/software version data of the standby CP:

>CP VS STDBY (cr)

The system displays the firmware and software data, as requested, from the standby CP in the same manner as shown above.

Craftsperson assistance command
The craftsperson assistance command, as listed below, can be used to provide a quick-reference of any BMC software commands.

HELP
HELP is an administration command that outputs a list of BMC software commands.

Example of command usage
Issue the following command to print a list of BMC software commands:

>HELP (cr)

The system displays a list of BMC software commands. The output is similar to that shown here.

BUFSZ BVAL KYWD LPAD SELGRP VALPARM
IDXMAINT TECMAINT SYSUTIL SITDAT CLRSTATS
SWACT ERRMAP RSERR VS AMAHRS LNKDSC LINIT
CLSACT DELFILE LSTDIR DMPFILE LSTACT DMASTAT
REPORT TECRAM BAUD TEST SETCLK TDIF MPRI
PSWD SETTERM DPRTST RSCMD CP HELP

The above commands are software-based commands only. The firmware-based commands (DOS, BOOT, STIM, DELETE, and XDIR) are available for use along with the software commands. Refer to the *BMC Firmware Commands* subsection for more information.

Disk operation commands

Disk operation commands are used to control the activity of the hard disk(s). These commands are intended primarily for installation and maintenance functions. Consequently, the priority level of these commands should be high enough to prevent casual or unauthorized alteration of disk activity. The disk operation commands are as follows:

- DISK EXAMINE

- DISK FORMAT

- DISK IOREAD

- DISK IOWRITE

- DISK MEMWRITE

- DISK MODE

- DISK RESTART

- DISK USAGE

- DISK VS.

> ⚠ **CAUTION**
> The DISK commands can destroy and alter data on disk. These commands should be used only by authorized maintenance personnel.

DISK EXAMINE
The DISK EXAMINE command checks the disk processor memory by displaying the number of bytes specified starting at a specified address.

Example of command usage
Use the following command to check disk processor memory:

>DISK EXAMINE address bytes (cr)

where:

address- address to examine. Range: 0-FFFFF
bytes- specifies the number of bytes to examine. Range: 1-99.

> **CAUTION**
> This command should only be used under the direct supervision of experienced support personnel.

DISK FORMAT
The DISK FORMAT command allows the user to format a selected disk drive.

Example of command usage
Use the following command to format a disk drive.

>**DISK FORMAT drive (cr)**

where:

drive - specifies the disk drive (A or B).

The system responds with the following messages:

DISK FORMAT STARTED
FORMAT DONE

> **CAUTION**
> Use of the DISK FORMAT command may cause loss of data. Ensure that the operational disk drive is in DISK ONLY mode prior to entering commands.

DISK IOREAD
The DISK IOREAD command displays the contents of the specified disk processor I/O port address.

Example of command usage
To display the contents of the specified I/O port address, enter the following command:

>**DISK IOREAD port (cr)**

where:

port - I/O port address. Range: 0-FF.

After the port contents are displayed, the system responds with the following message:

OUTPUT COMPLETE

DISK IOWRITE
The DISK IOWRITE command writes data to the specified I/O disk processor port address.

Example of command usage
To write data to a specific port I/O address, enter the following command:

>**DISK IOWRITE port data (cr)**

where:

port- I/O port address. Range: 0-FF.
data- data to be written. Range: 0-FF.).

The system responds with the following message:

WRITE MEMORY COMPLETE

DISK MEMWRITE
The DISK MEMWRITE command writes a specified data string to disk processor memory starting at a specified address.

CAUTION 1

Improper use of this command can result in an attempt to write data to a non-existent memory location. The WRITE MEMORY COMPLETE response message indicates that the input key sequence was proper and the memory write process was completed; however, this does not guarantee that the data was actually written to the disk memory.

CAUTION 2
Improper use of this command may cause erroneous data to be written to a memory location that is actually in use by other data. Do not use this command without first contacting technical assistance personnel.

Example of command usage
Use this command to write data to disk processor memory:

>**DISK MEMWRITE address datalist (cr)**

where:

address- hex value that specifies the address. Range: 0-FFFF
datalist- string of hexadecimal data elements. There is a limit of 16
   data elements. Each data element has a range of 0-FF.

After the operation is successfully performed, the following message is issued:

WRITE MEMORY COMPLETE

DISK MODE
DISK MODE allows the user to examine the current disk mode, or, to establish a new disk mode.

Examples of command usage
To examine the current disk mode value, enter the following command:

>**DISK MODE (cr)**

The system responds with the following message:

DISK MODE: xxxx

where:

xxxx - current disk mode value. Table 4-6 defines the valid values.

Table 4-6 Disk mode definitions	
Mode	**Description**
AO	A Only - BMC processors read data from and write data to the disk in the A chassis ONLY.
BO	B Only - BMC processors read data from and write data to the disk in the B chassis ONLY.
AP	A Prime - BMC MP writes duplicate information to both disks (A and B). Disk in A chassis is said to be the PRIME disk and the active processor reads data from that disk and accesses the disk in the B chassis at the same time.
BP	B Prime - BMC MP writes duplicate information to both disks (A and B). Disk in B chassis is said to be the PRIME disk and the active processor reads data from that disk and accesses the disk in the A chassis at the same time.
NONE	BMC is unable to access either disk for read or write functions. This indicates: - a failure to set up disk mode at the factory (initial installation) - hardware failure (i.e., improper installation cabling, rough handling of disk drive assembly, or a PCA failure).

To change the current disk mode, enter the following command:

>**DISK MODE value (cr)**

where:

value- a valid disk mode. Refer to Table 4-7 for a list of the allowed disk drive unit mode changes.

Table 4-7
Allowed disk mode changes

Initial Mode	Final Mode	Change Allowed ?	Remarks/Conditions
AP	AO	Y	
AP	BP	Y	
AP	BO	Y	
AO	AP	Y	Allowed if the B disk is initialized. System response: `DISK BACKUP STARTED`
AO	BP	N	
AO	BO	Y	This mode change is used for specific DISK FULL recovery procedures only. Contact your next level of support if it becomes necessary to use this mode change.
BP	BO	Y	
BP	AP	Y	
BP	AO	Y	
BO	BP	Y	Allowed if the A disk is initialized. System response: `DISK BACKUP STARTED`
BO	AO	Y	This mode change is used for specific DISK FULL recovery procedures only. Contact your next level of support if it becomes necessary to use this mode change.
BO	AP	N	
DWN	AO	Y	Allowed if the A disk is formatted.
DWN	BO	Y	Allowed if the B disk is formatted.

Table 4-7
Allowed disk mode changes

Initial Mode	Final Mode	Change Allowed ?	Remarks/Conditions
AO	DWN	Y	This mode change is used for maintenance purposes only. Contact your next level of support if it is necessary to use this mode change.
BO	DWN	Y	This mode change is used for maintenance purposes only. Contact your next level of support if it is necessary to use this mode change.

WARNING
Changing modes from AO to BO and then changing to BP will cause all data on the A drive to be lost. The same applies moving from BO to AO then to AP (data on the B drive is lost).

The system responds with the following message:

DISK MODE: xxxx

CAUTION
Issuing the command DISK MODE DWN will cause a loss of all files from the hard disk resulting in the loss of all disk content.

DISK RESTART
The DISK RESTART command causes the SCSI Interface PCA to perform a reset.

Example of command usage
To perform a SCSI Interface PCA reset, enter the following command:

>**DISK RESTART (cr)**

> ⚠ **CAUTION**
> Use of this command can cause loss of billing data.

The system responds with the following messages:

DISK MODE: xx
GOOD LOGIDX FILE
CP RESTART
GOOD AMAIDX FILE

DISK USAGE
DISK USAGE displays the number of Allocation Units on the disk that have been used, compared to the total number available.

Example of command usage
To display the disk usage date, enter the following command:

>**DISK USAGE (cr)**

The disk usage statistics are displayed as follows:

xxxxx/yyyyy ALLOCATION UNITS USED

where:

xxxxx - number of allocation units in use
yyyyy - total number of allocation units available.

DISK VS
DISK VS displays the current disk interface program version.

Example of command usage
To display the current disk interface program version, enter the following command:

>**DISK VS (cr)**

The system displays the disk firmware information in the following format:

DKF 6Maaaa-bb cc dd-eee-ffff gg:hh:jj:kk
filename

where:

DKF- disk firmware mnemonic
aaaa- Product Engineering Code (PEC)
bb- release increment
cc- checksum byte
dd-eee-ffff- date of firmware creation (day-month-year)
gg:hh:jj:kk- time of firmware creation (hour:minute:seconds:hundreth
  of seconds)
filename- firmware filename.

DMA commands

The DMA commands are used to examine the data stored in the BMC RAM.
These commands are intended primarily for the maintenance function. The
DMA commands are:

- DMASTAT IMMED

- DMASTAT LAST.

DMASTAT IMMED

The DMASTAT IMMED command displays the current operating parameters
of the BMC system memory.

Example of command usage

Issue the following command to examine the present device status:

>DMASTAT IMMED (cr)

The system displays the present device status as follows:

```
PORT RAM  BYTES STAT
DMA aa   bbbb cccc  dd
TEC ee   ffff gggg  zz
```

where:

aa - port address for DMA
bbbb- address of last byte written
cccc- bytes transferred -1
dd- DMA status byte (refer to Table 4-8 for a listing of valid values)
ee- TEC/DSI port address
ffff- address of first byte written

gggg- block size

zz- command byte (refer to Table 4-8 for a listing of valid values).

Table 4-8
Status and command byte values

dd	Description	zz	Description
01	DMA cycle has occurred	01	Write
02	Read	02	DMA Ready on
03	Erase	08	DMS interrupt not pending
04	Backspace	10	No data match (N/A)
05	File mark	20	Bytes transfer limit not reached
06	Rewind	+8	Tape operation in progress

DMASTAT LAST

The DMASTAT LAST command displays the DMA status at the end of the last transfer.

Example of command usage

Use the following command to examine the last device status:

>**DMASTAT LAST (cr)**

The system displays the last device status in the same format as the DMASTAT IMMED command, described above.

File index manipulation commands

File index manipulation commands verify, examine, create, or edit index files that are created to keep track of files generated by the BMC and call records received from the Switching System or operating programs from the Nortel host. The file index manipulation commands are as follows:

- IDXMAINT CHECK
- IDXMAINT CLOSE
- IDXMAINT CREATE DIR
- IDXMAINT CREATE FILE
- IDXMAINT DELETE

- IDXMAINT DIR CLOSED
- IDXMAINT DIR OPEN
- IDXMAINT EXAMINE
- IDXMAINT SUMMARY
- SELGRP.

Note 12:   An Index file can only contain 200 closed files and 1 open file. There can be numbers from 1 to 255 in extreme circumstances.

Note 13:   Index files store all closed versions of a file type. All blocks in the new index file, beginning with the disk sequence number indicated by PRI, primary, are marked to poll. If no data file is open for write, all 255 versions are examined for inclusion in the index file. If more than 200 closed versions plus one open version are found to exist, the new AMAIDX is created but a BAD AMAIDX FILE alarm occurs.

IDXMAINT CHECK
The IDXMAINT CHECK command checks the specified index file.

Example of command usage
To check a specific index file, use the following command:

>**IDXMAINT CHECK file_type (cr)**

where:

file_type - specifies file type; valid values: AMA or LOG.

If the index file is acceptable, the system displays the following message:

GOOD xxxIDX FILE

where:

xxx - file_type (AMA or LOG).

If the index file is not acceptable, the system response is the following message:

BAD xxxIDX FILE

Note: Refer to the *Maintenance Procedures Guide* section.

IDXMAINT CLOSE

The IDXMAINT CLOSE command closes the AMA or LOG file that is currently open for read. The file may have been opened by polling (AMA files) or the IDXMAINT EXAMINE command.

Example of command usage

To close any file that is open for reading, issue the following command:

>**IDXMAINT CLOSE (cr)**

The system responds with the following message:

READ FILE CLOSED

> *Note:*   This command operates only on AMA or LOG files, and then only on the currently open READ file.

```
+---------------------------------------------------------------+
|                           CAUTION                             |
|   /!\           The CLOSE option aborts a polling             |
|                 session that is in progress. Verify this      |
|                 input with technical assistance               |
|                 personnel before proceeding.                  |
+---------------------------------------------------------------+
```

IDXMAINT CREATE DIR

The IDXMAINT CREATE DIR command creates a new index file, which is a file listing all closed files by type like an electronic index-card file. That is, if you have five AMA files and six LOG files, the AMA files will be listed together and the LOG files will be listed together.

Examples of command usage

Use the following command to create a new index file containing only primary (unpolled) data:

>**IDXMAINT CREATE DIR file_type vers (cr)**

where:

file_type- specifies file type; may be AMA or LOG.
vers- 3-digit decimal value; specifies oldest file version number of
   the data file available in the index; range: 1-255.

The system responds with the following messages:

file_type FILE ESTABLISHED
GOOD file_typeIDX FILE

Use the following command to create a new index file containing primary and secondary (polled) data:

>**IDXMAINT CREATE DIR file_type vers1 blk_num vers2 (cr)**

where:

file_type- specifies file type; may be AMA or LOG.
vers1- 3-digit decimal value; specifies the starting version number
           of the new index; range: 1-255.
blk_num- specifies disk sequence number of the first primary block.
   The valid range is 0-65,656.
vers2- 3-digit decimal value; specifies the file version number in
   which the specified sequence number appears; range: 1-255.

> *Note:*   The second file version number parameter in the above command is used to indicate which iteration of the sequence number should be the first primary data block. The BMC can have as many as six iterations of a single sequence number on disk. Refer to the *SELGRP* section for more information.

The system responds with the same messages as shown above.

CAUTION
Use of this command can cause loss of billing data.

IDXMAINT CREATE FILE
IDXMAINT CREATE FILE closes the currently open file and creates a new open file for writing call, log, or exception records. It enables you to close an open file so that it can be polled. This command also updates the index.

Example of command usage
To create a new file for writing records, issue the following command:

>**IDXMAINT CREATE FILE file_type (cr)**

where:

file_type - AMA or LOG.

<table>
<tr><td>⚠</td><td>CAUTION

Use of this command may cause loss of billing data.</td></tr>
</table>
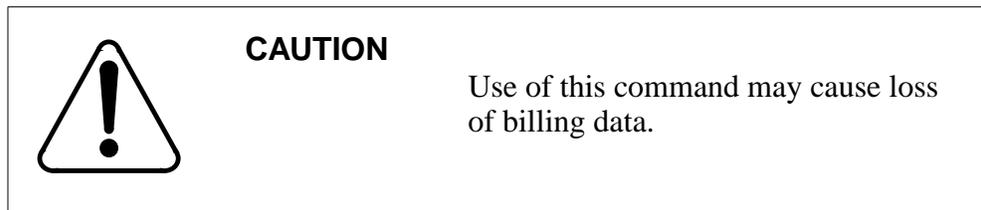
The following messages are displayed:

file_type WRITE FILE CLOSED
VS vvv: bbb BLKS, ddd aaaaaaa file_type SEQ# nnnnnn

where:

vvv- file version just closed
bbb- number of data blocks contained in the file
ddd- file position in the directory
aaaaaaa- file polling status (PRIMARY or SECNDRY)
nnnnnn- sequence number of the first block in the file.

   Note: LOG files are reset to 10 DA SECNDRY.

IDXMAINT DELETE
IDXMAINT DELETE deletes the oldest indexed data file that has been marked as secondary. This command **does not** delete primary data.

Example of command usage
Enter the following command to delete a specified file (secondary files only):

>**IDXMAINT DELETE file_type (cr)**

where:

file_type - AMA or LOG.

The system displays the following message:

CR FILE DELETED

IDXMAINT DIR CLOSED
The IDXMAINT DIR CLOSED command allows the user to check the status of a specific closed file or range of closed files that are part of the index.

Examples of command usage
To print the status of closed call record, log, or exception data files, use the following command:

>**IDXMAINT DIR CLOSED file_type ver (cr)**

where:

file_type- AMA or LOG
ver- decimal number that specifies the number of file numbers
   requested. Range: 1-255.

The system responds with the following message:

VS vvv: bbb BLKS, dddd aaaaaaa file_type SEQ# nnnnnn
.
. (one line for every version number requested)
.
END OF xxxIDX FILE (if the end of the index is reached)

where:

vvv- file version number
bbb- number of data blocks currently contained in the file.
dddd- position of the file in the directory. If the polling status of the
   file is PRIMARY, dddd is the number of primary blocks in
   the file. If the polling status of the file is SECNDRY, dddd is
   the file retention period.
aaaaaaa- polling status of the file, PRIMARY or SECNDRY
   (secondary).
nnnnnn- first sequence number in the file.
xxx- file_type (AMA or LOG).

IDXMAINT DIR OPEN
The IDXMAINT DIR OPEN command allows the user to check the status of
a specific open file.

Examples of command usage
To print the status of closed call record, log, or exception data files, use the
following command:

>**IDXMAINT DIR OPEN file_type (cr)**

where:

file_type- AMA or LOG.

The system responds with the following message:

VS vvv: bbb BLKS, dddd PRIMARY file_type SEQ# nnnnnn

where:

vvv- file version number
bbb- number of data blocks currently contained in the file.
dddd- number of primary blocks in the file.
nnnnnn- first sequence number in the file.

IDXMAINT EXAMINE
The IDXMAINT EXAMINE command allows the user to examine selected blocks from the BMC disk. The following table lists the subcommands and parameters for the IDXMAINT EXAMINE command.

Table 4-9
IDXMAINT EXAMINE subcommands

Subcommand	Description
file_type format seq	Examines selected blocks from the BMC disk
file_type HDR seq	Examines the header of the block starting at the specified sequence number.
file_type NEXT num	Examines the sequential record blocks, if the file is open for read. Format remains the same as the previously entered value.

Examples of command usage
Use the following command to examine a selected block from the BMC disk.

>IDXMAINT EXAMINE file_type format seq (cr)

where:

file_type- specifies file type; may be AMA or LOG.
format- specifies output format; values: ASCII (LOG only), EBCDIC,
   HEX, PACKED (AMA only).
seq- 6-digit decimal value; specifies sequence number. Range is
   000000-999999.

For file type AMA, the BMC responds:

IDXMAINT EXAMINE file_type format seq

The first 14 bytes are the block header. The rest of the block is AMA data records. The format of the block header is described in the following table.

Table 4-10
Block header format

Byte	Description
Byte 1-4	Block Sequence Number (0-999999). Coded in binary/right justified
Byte 5-6	Block size (in bytes, including the header).
Byte 7	AMA records in block
Byte 8	Flag Byte
Byte 9-12	Date and time block was written to disk (month, day, hour, minute in Binary Coded Decimal [BCD]).
Byte 13-14	Bytes not used.

For a LOG file type, the system displays the following message:

IDXMAINT EXAMINE LOG format seq

> *Note 14:*   If this command is entered while call record polling is under way, the system displays:

READ FILE IN PROCESS
POLLING IN PROCESS

> *Note 15:*   When printing log files with this command, the log message appears in ASCII regardless of the format specified.

Use the following command to examine the header of the block starting at the specified sequence number.

>**IDXMAINT EXAMINE file_type HDR seq (cr)**

The system responds by displaying the header for the specified block. The format of the block header is listed in Table 3-10.

Use the following command to examine sequential record blocks.

>**IDXMAINT EXAMINE file_type NEXT num (cr)**

where:

num - specifies the number of blocks to be examined. Range: 1-255.

> *Note 16:*   For the IDXMAINT EXAMINE file_type NEXT num command to be valid, it must immediately follow the IDXMAINT EXAMINE file_type format seq_no command.

IDXMAINT SUMMARY
IDXMAINT SUMMARY prints a summary of index files and oldest version with records to poll.

Example of command usage
To obtain a summary of the status of all files for a specified record type:

>**IDXMAINT SUMMARY file_type**

where:

file_type - AMA or LOG.

For file_type AMA, the system displays the following message:

AMA FILE: bb VSNS, cccccc BLKS, dddddd PRIMARY
SEQ # eeeeee FIRST, ffffff PRIM, gggggg NEXT IN
VS hhh: jjjjj BLKS, kkk PRIMARY, AMA SEQ # nnnnnn

where:

bb- number of versions in file
cccccc- number of blocks in file
dddddd- number of primary (unpolled) blocks
eeeeee- sequence number of oldest block in file
ffffff- sequence number of first primary data block
gggggg- sequence number of next block to be input
hhh- version of first closed file with primary data
jjjjj- number of blocks
kkk- number of primary blocks in the file
nnnnnn- first sequence number in the file.

The normal system response for file_type LOG is the same as for file_type AMA, except the third line of data is omitted (LOG files are always SECONDARY files and cannot be polled).

SELGRP
SELGRP allows the user to select a specific group of secondary data
sequence numbers when sequence numbers have rolled over. The BISYNC
protocol restarts sequence numbering at zero after 65,535.

> *Note:*   The value of SELGRP affects any IDXMAINT commands that
> reference the sequence number (i.e., IDXMAINT EXAMINE). If the
> value of SELGRP exceeds the number of sequence number rollovers that
> have occurred, a not found condition is generated when a secondary poll
> request or an appropriate IDXMAINT command is issued.

Examples of command usage
To select a group of sequence numbers, enter the following at the
maintenance terminal:

>**SELGRP x (cr)**

where:

x- group number (0-6); 0 is the newest group number and the default
   setting. 1-6 are the intermediate group numbers where 1 is the next
   newest group number and 6 is the oldest group number.

To examine the setting of the SELGRP key, enter the following at the
maintenance terminal:

>**SELGRP E (cr)**

The system responds with the newest group number or the intermediate group
number (01-06).

File manipulation commands
File manipulation commands examine or change disk file parameters. The file
manipulation commands are as follows:

- CLSACT
- DELFILE
- DMPFILE
- LSTACT
- LSTDIR ACT
- LSTDIR ALL
- LSTDIR FILE.

CLSACT

CLSACT closes the specified active file. A closed file can no longer be written to, but it can be read. It is important that the file to be closed does not contain data that has to be retrieved. Use the LSTACT command to obtain a list of open files.

⚠ **CAUTION**

Closing an active data file may result in the loss of billing data. This command should only be used under the supervision of experienced support personnel.

Example of command usage

Issue the following command to close an active file:

>**CLSACT file_id (cr)**

where:

file_id - 2-digit value that specifies file identification. Range: 1-15.

The system responds to the command with the following message:

FILE CLOSED

DELFILE

DELFILE deletes a specified file or a range of version numbers of a specified file from the BMC system directory. The valid parameters are listed below in Table 3-11.

Table 4-11
DELFILE parameters

Parameter	Description
name ver	Deletes a specified file from the BMC system directory.
name ver1 ver2	Deletes a range of version numbers of a specified file from the BMC system directory.

> **CAUTION**
> Exercise care in deleting files. Do not delete billing records or the site data unless necessary.

Examples of command usage
To delete a file from the BMC system directory, issue the following command:

>**DELFILE name ver (cr)**

where:

name- six character variable that specifies the file name.
ver- decimal value that specifies the file version. Range: 0 and 1-255
  (version 0 is the latest version).

The system responds to the command with the following message:

VERSION ver DELETED

To delete a range of file versions for a specific file from the BMC system directory, issue the following command:

>**DELFILE name ver1 ver2 (cr)**

where:

ver1- specifies the beginning of the range of file version numbers to be
  deleted. Range: 1-255.
ver2- specifies the end of the range of file version numbers to be
  deleted. Range: 1-255 (must be greater than ver1).

The system responds to the command as shown above, with a output line for each version.

DMPFILE
DMPFILE is a maintenance file command that displays a specified number of blocks from a BMC system file. This command is used to verify the integrity of files stored on the BMC. The contents of the file are formatted in ASCII and hexadecimal for output.

Example of command usage
Use the following command to dump the contents of a specific file:

>**DMPFILE name ver start count (cr)**

where:

name- specifies file name, up to six characters
ver- specifies file version number. Range: 0-255 (0 is the latest
    version)
start- specifies starting block. Range: 0-999,999
count- specific number of blocks to dump. Range: 0-9,999.

The system responds with the following message:

ii nnnnnn tt vvv yy..ddd rrrrr bbbb asaoahlb ss pppppp uuuuuu cccccc

where:

ii- file ID (if file is open for write); 11 if closed for write
nnnnnn- file name
tt- file type. Values: 00 (if file 4K buffered [8 sectors]) or 01 (if
    file is 0.5K buffered [1 sector])
vvv- file version
yy..ddd- creation date (year..day of year)
rrrrr- retention period (days)
bbbb- file's block size
asaoahlb- path to last block in file
as- (00Hex...10Hex)
ao- (00Hex...FFHex)
ah- (00Hex...08Hex) if file type is 00Hex or (00Hex...10Hex) if
    file type is 01Hex
lb- (00Hex...1000Hex/Block size) if file type is 00Hex or
    (00Hex...200Hex/Block size) if file type is 01Hex
ss- file status. Values: 02 (file closed), 11 (file open for write) or
    21 (file open for read)
pppppp- sector address of file's directory entry
uuuuuu- user data/starting sequence number
cccccc- number of data blocks in the file.

> *Note:* The specified blocks of a file are formatted in HEX and ASCII
> and displayed, preceded by the file's directory entry. Version 0 is the
> newest version.

LSTACT
LSTACT is a file management command that displays a list of all currently
open data files.

Example of command usage
To display a list of all currently open data files, enter the following command:

>**LSTACT (cr)**

The system displays the following message:

FILE OPEN: aa bb cc ddddd
ee files listed

where:

aa- ID number of the open file
bb- status of the open file. Values: 11 (file is open for write), 21 (file
    is open for read), or 31 (file is open for write append)
cc- file type. Values: 00 (4 kbyte buffered) or 01 (0.5 kbyte buffered)
ddddd- file block size
ee- number of files listed.

LSTDIR
LSTDIR displays a listing of one or more file directory entries. The LSTDIR command is similar to the LSTACT command except that the LSTDIR command provides additional data. The valid subcommands for the LSTDIR command are listed in Table 3-12.

Table 4-12
LSTDIR subcommands

Subcommand	Description
ACT file_id	Displays the active file entry. This command is entered after LSTACT is used to determine file ID numbers.
ALL	Displays a list of all files contained in the disk directory.
FILE name ver	Displays the directory entry of a specified file.
FILE name ver1 ver2	Displays the directory entry of a specified range of files.

Examples of command usage
To list an active file entry, enter the following command:

>**LSTDIR ACT file_id (cr)**

The file responds with the following data:

ii nnnnnn tt* tw** vvv yy..ddd rrrrr bbbb asaoahlb ss pppppp uuuuuu cccccc

---

where:

ii- file ID (if file is open for write); 11 if closed for write
nnnnnn- file name
tt*- file type. Values: 00 (if file 4K buffered [8 sectors]) or 01 (if
   file is 0.5K buffered [1 sector])
tw**- file type - number of sectors read from disk or written to disk in a
   single operation. Range: 0-F (hex)
vvv- file version
yy..ddd- creation date (year..day of year)
rrrrr- retention period (days)
bbbb- file's block size
asaoahlb- path to last block in file
as- (00Hex...10Hex)
ao- (00Hex...FFHex)
ah- (00Hex...08Hex) if file type is 00Hex or (00Hex...10Hex) if file
   type is 01Hex
lb- (00Hex...1000Hex/Block size) if file type is 00Hex or
   (00Hex...200Hex/Block size) if file type is 01Hex
ss- file status. Values: 11 (file open for write), or 21 (file open for
   read), or 31 (file is open for write append)
pppppp- sector address of file's directory entry
uuuuuu- user data/starting sequence number
cccccc- number of data blocks in the file.

To list all files in the disk directory, issue the following command:

>LSTDIR ALL (cr)

The disk directory data is displayed in the following format (the filenames
and version numbers are sorted alphabetically).

filename aaa   filename aaa   filename aaa   filename aaa
   :   :   :   :   filename aaa   filename aaa   filename aaa   filename aaa
bbb FILES LISTED
xxxxx/yyyyy ALLOCATION UNITS USED

where:

filename- names of files in disk directory
aaa- file version number
bbb- number of files listed
xxxxx - number of allocation unit in use
yyyyy - total number of allocation units available.

Use the following command to list a file's directory entry:

>LSTDIR FILE name ver (cr)

where:

name- specifies the file name, up to six characters
ver- specifies file version. Range: 0 and 1-255 (0 is the latest version).

The system responds with a message in the same format as listed above in the description of the LSTDIR ACT command. The valid values are different for two of the items of the message. The value of ii (file ID) is always 00 and the value of ss (file status) is 00, 02 (file closed, possibly open for read), or 11 (file open for write). Use the following command to display the directory entries for a specified range of files.

>LSTDIR FILE name ver1 ver1(cr)

where:

ver1- specifies the beginning of the range of file versions. Range:
  1-255
ver2- specifies the end of the range of file versions. Range: 1-255
  (must be larger than ver1).

The system displays the disk directory data for the range of files specified in the format described above.

Polling link adjustment commands

The polling link commands provide control of the port and activity of the HOC polling link. The polling link commands are as follows:

- LINIT

- LNKDSC.

CAUTION

Use of these commands aborts a polling session in progress.

LINIT

LINIT is a maintenance command that initializes the AMA Teleprocessing SCC and the associated software; causes the DTR on the active link to drop momentarily, which disconnects the link. This command should be entered immediately after the LNKDSC command.

Example of command usage

Issue the following command to initialize the polling links:

>LINIT (cr)

The system responds with the following messages:

LINK INITIALIZED
CP RESTART
CP ACTIVE

LNKDSC
LNKDSC is a maintenance command that initializes the data areas used for the collection of incoming frames from the incoming polling link; causes the DTR on the active link to drop for five seconds, which disconnects the link.

Note: Immediately follow this command with the LINIT command.

Example of command usage
To disconnect the active link, enter the following command:

>LNKDSC (cr)

The system responds with the following messages:

LINKS DISCONNECTED
CP RESTART
CP ACTIVE

Processor activity commands
The processor activity commands allows the user switch from one active processor to another. The processor activity commands are as follows:

• SWACT

• SWACT FORCE.

SWACT
SWACT is a maintenance command that is used to initiate a switch from the currently active BMC processor to the currently inactive (standby) BMC processor.

⚠	**CAUTION**
	Use of this command during periods of high traffic may result in the loss of some AMA data recording during the processor switch.

Example of command usage
To initiate a processor activity switch from the active processor to the standby processor, issue the following command:

>**SWACT (cr)**

The system displays the following messages (order may vary):

MP SWITCH
DISK MODE: xP
SITDAT FILE DISK JOB COMPLETE
TDYSTS FILE DISK JOB COMPLETE
GOOD LOGIDX FILE(may be displayed)
GOOD AMAIDX FILE(may be displayed)
CP RESTART
CP ACTIVE

where:

x - disk drive for the processor that has been made active (A or B).

> *Note:*   The activity switch will take about 10 seconds. Please wait for a response from the BMC before issuing another command.

SWACT FORCE
SWACT FORCE is a maintenance command that is used to reset the alarms on the standby BMC processor and perform a processor activity switch.

Example of command usage
To clear the active event/device alarms for the currently standby processor, followed by a processor activity switch, issue the following command:

>**SWACT FORCE (cr)**

The system displays the following message:

ALL ALARMS CLEARED

The rest of the messages are the same as the SWACT command.

> *Note:*   This command sets the highest error control alarm condition, causing a processor switch when in the prime (redundant) mode. The alarm is automatically reset in 30 seconds.

Read/write operation commands
Read/write commands provide maintenance functions to the user that allow access to the BMC system functional components for diagnostic and fault isolation purposes. The read/write operation commands are as follows:

- • SYSUTIL EXAMINE
- • SYSUTIL IOREAD
- • SYSUTIL IOWRITE
- • SYSUTIL MEMWRITE.

SYSUTIL EXAMINE

The SYSUTIL EXAMINE command allows the user to examine the data at a specified address. The subcommands and related parameters for this command are listed in the following table.

Table 4-13
SYSUTIL EXAMINE subcommands

Subcommand	Description
D page addr nlines	Examines the specified data space information at the specified address.
P addr nlines	Examines the specified program space information at the specified address.

Examples of command usage

To examine a specified number of lines of data space information at a specified address and page, use the following command:

>**SYSUTIL EXAMINE D page addr nlines (cr)**

where:

page- specifies page in memory. Range: 0 and 2-7.
addr- specifies the address. Range: 0-FFFF.
nlines- specifies the number of program lines to be displayed.

> *Note:* Page is required for data space only.

CAUTION 1
If pages 2 through 7 are selected, a DRAM error may occur, possibly resulting in a processor activity switch.

> ⚠ **CAUTION 2**
> Improper use of this command may result in an attempt to write data to a non-existent memory location, or, cause erroneous data to be written to a memory location that is already in use by other data. Do not use this command without first contacting technical assistance personnel to determine that it is proper to do so.

The system displays the requested data in the following format:

xxxx yy yy yy yy yy yy yy yy yy yy yy yy yy yy yy
xxxx yy yy yy yy yy yy yy yy yy yy yy yy yy yy yy

where:

xxxx - data address
yy   - data bytes (hex).

To examine a specified number of lines of program space information at a specified address, enter the following command:

>**SYSUTIL EXAMINE P addr nlines (cr)**

The system displays the program space data in the same format as the data space information is displayed, as shown above.

SYSUTIL IOREAD
SYSUTIL IOREAD reads data from a specified I/O port.

Example of command usage
Use the following command to read data from a specified I/O port:

>**SYSUTIL IOREAD port (cr)**

where:

port- specifies the port. Range: 0-FF.

The system displays the requested data from the specified I/O port as follows:

xx

where:

xx - data byte read from specified port.

SYSUTIL IOWRITE
SYSUTIL IOWRITE writes data to a specified I/O port.

Example of command usage
To write data to a specified I/O port, use the following command:

>**SYSUTIL IOWRITE port data (cr)**

where:

port- specifies the port. Range: 0-FF.
data- data to be written. Range: 0-FF.

The system displays the following message after writing the data to the
specified I/O port:

DATA ENTERED

	CAUTION
⚠	Use of this command may cause a loss of data.

SYSUTIL MEMWRITE
SYSUTIL MEMWRITE specifies that data is to be written to a specified
address in RAM. The subcommands and related parameters for this command
are listed in the table below.

Table 4-14
SYSUTIL MEMWRITE subcommands

Subcommand	Description
D page addr datalist	Examines the specified data space information at the specified address.
P addr datalist	Examines the specified program space information at the specified address.

Examples of command usage
To write the specified data at a specified data space address and page, use the
following command:

>**SYSUTIL MEMWRITE D page addr nlines (cr)**

where:

page- specifies page in memory. Range: 0 and 2-7.
addr- specifies the address. Range: 0-FFFF.
datalist- string of hexadecimal data elements. There is a limit of 16
   data elements. Each data element has a range of 0-FF.

   Note: Page is required for data space only.

CAUTION 1
If pages 2 through 7 are selected, a DRAM error may
occur, possibly resulting in a processor activity switch.

CAUTION 2
Improper use of this command may result in an attempt to
write data to a non-existent memory location, or, cause
erroneous data to be written to a memory location that is
already in use by other data. Do not use this command
without first contacting technical assistance personnel to
determine that it is proper to do so.

The system displays the requested data in the following format:

DATA ENTERED

To write data to a specified address in the program space, enter the following
command:

>**SYSUTIL MEMWRITE P addr datalist (cr)**

The system displays the same message as shown above.

Security commands

Security commands relate to the BMC's ability to control access and prevent
unauthorized changes to the system. These commands should have the
highest priority. For further information on system security refer to the *System
Administration Guide* section. The security commands are as follows:

- LOGIN

- MPRI

- PSWD

- SETTERM.

LOGIN

Individual users input a valid password to log into the BMC and the operating programs. This password is entered at the beginning of a maintenance session. The BMC will not respond to commands until the password is entered. The password is not echoed back to the maintenance terminal as it is entered. Entering an invalid password results in no response from the BMC. The valid passwords are set by the system administrator and are maintained in the site data file. This is discussed in greater detail in the S*ystem Administration Guide* section.

> *Note:*   The BMC will respond to commands without entering a password in the first minute after a cold startup is performed.

Example of command usage

To gain access to the BMC, enter the following at the maintenance terminal:

>**xxxxxx (cr)**

where:

xxxxxx - a valid password.

The system responds according to the Switching System, as shown below:

xxxxxx USER yy LOGGED IN (DMS-10)
xxxxxx USER yy ON TERMINAL zz LOGGED IN (DMS-100)

where:

xxxxxx- six-character alphanumeric password.
yy- user number (01-10).
zz - terminal number.

MPRI

MPRI is used to assign or examine the priority level of a command. The priority level is used to control access to the use of a command. The MPRI subcommands are described in the following table:

Table 4-15
MPRI subcommands

Subcommand	Description
C cmd p	Changes the access priority level of a command.
E cmd	Examines the access priority level of a command.

Note 4:   Valid priorities are in the range 1 to 3; 1 is the lowest (least restrictive), 3 is the highest (most restrictive).

Note 5:   Only software commands can have a priority change. Software commands have a default priority of 3. Firmware commands (i.e., DISK or DOS) have a non-adjustable priority of 3.

Note 6:   Command priorities and security issues are discussed in greater detail in the *System Administration Guide* section.

Examples of command usage

To assign or change the access priority level of a command, enter the following at the maintenance terminal:

>**MPRI C cmd p (cr)**

where:

cmd- command that is to have its access priority level changed
p- new priority level.

The system responds with the following message:

COMMAND PRIORITY IS x

where:

x - command priority number.

Note 7:   Use the SITDAT WRITE and LINIT commands to save any changes and restart the CP with the updated values.

To examine/display access priority currently assigned to specific commands, enter the following at the maintenance terminal:

>**MPRI E cmd (cr)**

The system responds with the following message:

COMMAND PRIORITY IS x

PSWD
PSWD is used to examine or assign the ten user passwords. These passwords control access to the BMC and associated commands. The password has a priority level that relates to the priority of individual commands. The PSWD subcommands are listed in the following table:

Table 4-16
PSWD subcommands

Subcommand	Description
A paswrd p	Adds a new password to the password table and assigns an access priority to that password.
nC paswrd p	Changes a currently assigned password or assigns a new priority level to that password.
nD	Deletes a specific user password and priority level from the password table.
L	Lists the entire password table with the priority level assigned to each.

Note 8:   Passwords, priorities, and the relation to system security are discussed in greater detail in the *System Administration Guide* section.

Examples of command usage
To add a new password to the password table, and assign access priority to that password, enter the following at the maintenance terminal:

>**PSWD A paswrd p (cr)**   (default password is USER.1)

where:

paswrd- six character, alphanumeric password
p- priority (lowest = 0, highest = 3).

Note 9:   Use the SITDAT WRITE and LINIT commands to save the changes and update the CP with the new values.

Note 10:   The new password is added to the first available empty slot in the password table.

To change a currently assigned password or assign a new priority level to that password, enter the following at the maintenance terminal:

>**PSWD nC paswrd p (cr)**

where:

n -user number (0-9).

To delete a specific user's password and priority level from the password table, enter the following at the maintenance terminal:

>**PSWD nD (cr)**

where:

n - user number to delete (0-9).

To list an entire password table and associated priority level, currently assigned to each, enter the following at the maintenance terminal:

>**PSWD L (cr)**

The system responds with the password table, similar to the following:

USR   PASWRD   PRI

01   SYSTEM   3
03   OPERAT   2
04   AMACC2   1 (continues up to user 10)

SETTERM
SETTERM is used to examine or assign the length of time that no activity can take place at a terminal before the BMC performs an automatic logoff of that terminal.

Examples of command usage
To display the current terminal time-out value, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT (cr)**

The system responds with the following message:

TERMINAL TIME-OUT = xxx

where:

xxx - terminal time-out value in minutes.

To set the value for the terminal time-out, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT xxx (cr)**

where:

xxx - minutes before a logoff. Range: 1-120.

The system responds with the following message:

TERMINAL TIME-OUT = xxx

To disable the auto log-off function, enter the following at the maintenance terminal:

>**SETTERM TIMEOUT 0 (cr)**

The system responds with the following message:

TERMINAL TIME-OUT = 00

> *Note:*   Use the SITDAT WRITE and LINIT commands to save any changes and update the CP with the new values.

Site data entry commands

Site data entry commands are used during installation and testing to tailor the BMC to the telephone company site. These commands allow the user to define the Switching System associated with the BMC, and match the BMC operating parameters with the characteristics of the particular telephone company site. Usage of these commands is discussed in greater detail in the *System Administration Guide* section. Site data is read from memory at the beginning of each hour. Consequently, any new site data entered must be saved to disk prior to each hour to prevent it from being overwritten. The SITDAT WRITE command saves site data to disk and the LINIT command restarts the CP so that the new site data values are active in the CP. The site data entry commands are as follows:

- AMAHRS
- BAUD
- BUFSZ
- BVALID
- KYWD

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- LPAD

- SITDAT

- VALPARM BLOCKS

- VALPARM INVALID.

AMAHRS
AMAHRS is a Site Data command used to display or set the time interval to verify that AMA records have been received from the Switching System. The command requires the start and end times to perform the check and the amount of time that can pass before an alarm is generated if no blocks are received. Times are based on a 24 hour clock (00 to 23).

Examples of command usage
Use the following command to examine the hour boundaries currently assigned:

>AMAHRS (cr)

The system displays the currently assigned hour boundaries as follows:

BLOCK CHECK START xx END yy HOURS, INTERVAL OF zz MINUTES

where:

xx - hour to start the block check. Range: 00-23 (default is 00).
yy - hour to stop the block check. Range:00-23 (default is 23).
zz - minutes of no blocks before alarm (default is 60).

Issue the following command to change the hour boundaries currently assigned. The command requires the start and end times to perform the check; checks are made on the hour. (If a data block has not been received between the hour boundaries, an alarm is generated.)

>AMAHRS xx yy zz (cr)

The system displays the following message after changing the hour boundaries:

BLOCK CHECK START xx END yy HOURS, INTERVAL OF zz MINUTES

> *Note 11:*   For full-time block checks, enter 00 for Start, and 23 for Stop.

> *Note 12:*   If no block checks are required, enter 00 for Start and 00 for Stop and 00 for Interval.

BAUD
BAUD is used to examine or change the polling baud rate for a specific
polling link. This baud rate is only used when the BMC is running on its
internal clock.

Examples of command usage
To examine the BAUD rate(s) currently assigned, enter the following
command:

>BAUD (cr)

The system displays a message similar to the following showing the baud rate
data for the two polling links:

FOR LINK #1, BAUD RATE = xxxx, T1 = yy, and N2 = zz
FOR LINK #2, BAUD RATE = xxxx, T1 = yy, and N2 = zz

where:

xxxx- baud rate for the link. Values: 1200, 2400, 4800, or 9600
yy- value of T1 timer, in seconds
zz- value of retry counter, N2.

To affect a change of the BAUD rate data for a specific link, issue the
following command:

>BAUD link rate (cr)

where:

link- one digit link number, either 1 or 2.
rate- baud rate. Values: 1200, 2400, 4800, or 9600.

> *Note:*   BMC BISYNC systems can use the V.35 interface. BMC
> software controls the throughput, allowing a maximum effective baud rate
> of 9600.

The system displays the following message:

FOR LINK aa, BAUD RATE = xxxx, T1 = yy, and N2 = zz

where:

aa - link number.

The values of yy and zz cannot be set by the user.

BUFSZ

The Buffer Size (BUFSZ) command is used to set or examine the number of bytes in the messages sent to the HOC. The size may be from 64 bytes (minimum) to 512 bytes (maximum) in 32 byte increments (64, 96, 128... 512). If the frame size is not a 32 byte increment, the BMC will truncate to the nearest 32 byte increment.

Examples of command usage

To examine the frame size, enter the following at the maintenance terminal:

>**BUFSZE (cr)**

The BMC responds with the frame size.

To specify the frame size, enter the following at the maintenance terminal:

>**BUFSZxxx (cr)**

where:

xxx - frame size in 32 byte increments.

BVALID

Site data command used to examine or change the site identification and Switching System type.

Examples of command usage

To examine the values, enter the following at the maintenance terminal:

>**BVALIDE (cr)**

The system responds with a four-digit string. The first two digits represent the site id and the second two digits represent the Switching System type.

To change the site data, enter the following at the maintenance terminal:

>**BVALID aabb (cr)**

where:

aa - site id
bb - Switching System type.

> *Note:* These values are provided by the operating company.

KYWD
The KYWD command is used to examine or set the machine-machine security keyword that uniquely identifies the HOC as a device that is authorized to access the BMC. A remote device must supply the keyword before access is permitted.   The default value for the KYWD is HOST.0.

Examples of command usage
To display the keyword currently assigned to the HOC, enter the following at the maintenance terminal:

>**KYWDL (cr)**

To assign or change the keyword currently assigned to the HOC, enter the following at the maintenance terminal:

>**KYWDnC keywrd (cr)**

where:

n- single digit remote station number
keywrd- six character alphanumeric keyword.

LPAD
The LPAD command is used to examine or change the one byte, leading pad character used in the BISYNC protocol used during call record polling. The leading pad character cannot start with an E.

Examples of command usage
To examine the pad character, enter the following at a maintenance terminal:

>**LPADE (cr)**

To change the pad character, enter the following at the maintenance terminal:

>**LPADxx (cr)**

where:

xx - two digit HEX pad character (0-9 and A-D,F). The first pad
        character digit cannot begin with "E".

SITDAT

The SITDAT command examines and updates the site data in the BMC. The subcommands for SITDAT are listed in the following table.

Table 4-17
SITDAT subcommands

Subcommand	Description
READ	Reads (restores) site data parameters from BMC disk and overwrites site data stored in main memory (RAM). Upon execution, changes made since the last SITDAT WRITE are overwritten by the values stored on the disk. A site data read is done automatically on BMC power-up, processor switch, processor reset, and at an hour boundary.
WRITE	Updates (saves) site information entered in the BMC and writes site data from memory to disk.

CAUTION

Use of this command affects site data on disk or memory.

Examples of command usage

To read BMC site data from disk to RAM, issue the following command:

>**SITDAT READ (cr)**

The system displays the following message:

SITDAT FILE DISK JOB COMPLETE

To write BMC site data from RAM to disk, issue the following command:

>**SITDAT WRITE (cr)**

The system displays the following message:

SITDAT FILE DISK JOB COMPLETE

> *Note 13:* The BMC automatically updates site data from disk to RAM every hour. When changing site data, observe the following guidelines: Use the SITDAT WRITE command to make any changes permanent. Normally, the SITDAT WRITE command is used after the following commands have been used to change site data.

Note 14:   Each hour, the BMC updates the site data in RAM from disk. Site data stored on disk is copied to RAM every hour. If any site data is changed and not written to disk, changed data is overwritten by the old data stored on disk when the hourly data update occurs. For this reason, be aware of the approaching hour boundary when making any site data changes.

Note 15:   When a feature is added that requires the addition of a new site data variable, the existing SITDAT file in no longer usable. Prior to the installation of the software containing this feature, all current site data settings must be noted so that they can be re-entered after the new software is activated. The existing SITDAT file should also be deleted. Failure to do so will result in the output of the INVALID SITE DATA FILE log report and all site data variables will be reset to their default values.

VALPARM BLOCKS

The VALPARM BLOCKS command examines or changes the minimum number of blocks contained in the current write AMACRD file before the file is closed at the point of an initial primary poll.

Examples of command usage

Use the following command to display the current block count threshold for the AMACRD file.

>**VALPARM BLOCKS (cr)**

The system displays a message showing the current value of the block count threshold.

BLOCKS TO CLOSE FILE = num

where:

num - current block count threshold for the AMACRD file.

The block count threshold has a maximum value of 65,535 (range: 1-65,535). However, the maximum file size of the AMACRD file is 10,080 blocks. When the AMACRD file reaches the maximum file size, the file is closed, regardless of the value set using VALPARM BLOCKS. Setting the block count threshold to a value greater than the maximum file size ensures that the AMACRD file closes only when it reaches the maximum file size.

Note: Setting the block count threshold to a value greater than 10,080 ensures optimal disk storage usage. Setting the block count threshold to a value less than 10,080 causes disk fragmentation.

The following example shows how to modify the value of the block count threshold for the AMACRD file.

>**VALPARM BLOCKS num (cr)**

The system displays the following message:

BLOCKS TO CLOSE FILE = num

⚠️ **CAUTION**

A change in validation parameters can affect polling validation.

VALPARM INVALID
The VALPARM INVALID command displays or changes the value of the invalid block (record) quantity threshold.

Examples of command usage
To display the invalid block quantity threshold currently assigned, issue the following command:

>**VALPARM INVALID (cr)**

The system responds with a message showing the current invalid block quantity threshold.

AMA INVALID ALARM THRESHOLD = value

where:

value - indicates the current alarm threshold value. Range: 1-65,535.

To change or display the invalid block quantity threshold currently assigned, issue the following command:

>**VALPARM INVALID value (cr)**

The system displays the following message:

AMA INVALID ALARM THRESHOLD = value

Software version command

The software version command, VS, is included for diagnostic and support purposes. This command displays the version of the firmware and software the BMC is running.

VS

VS displays software program version ID and firmware version ID.

Example of command usage

To display the software and firmware program version for the active processor, issue the following command:

\>**VS (cr)**

The system displays the firmware and software data in the following format:

MPS-rrrrrr-ss dd ee-fff-gggg hh:ii:jj.kk
tttttt
MPF-rrrrrr-ss dd ee-fff-gggg hh:ii:jj.kk
uuuuuu

where:

rrrrrr- program PEC
ss- release increment
dd- checksum byte
ee-fff-gggg- program creation date (date-month-year)
hh:ii:jj:kk- program creation time of day (hour:minutes:seconds: hundreths of seconds)
tttttt- main software load
uuuuuu- boot firmware load.

Note: The software PECs are 6M02nn for DMS-10 systems and 6M06nn for DMS-100 systems. The firmware PEC is 6M63nn. Make a copy of the version data for future reference.

To display the software and firmware program version for the standby processor.

\>**DOS S VS (cr)**

The system displays the requested firmware and software data from the standby processor in the same formats shown above.

Statistics commands

The statistics commands provide a means of obtaining and printing summaries of critical system activities on a daily basis. Reports can be obtained for a given day or the previous day. The statistics commands are as follows:

- CLRSTATS
- REPORT AMA
- REPORT COM
- REPORT DISK.

CLRSTATS

CLRSTAT is used to clear today's statistics files for AMA, COM, and DISK data. Statistical records are lost.

> **CAUTION**
>
> This command erases current statistical data. Use the REPORT commands to print statistics data before clearing.

Example of command usage

To clear statistical data files for AMA, COM, and DISK data for the current day, enter the following command at the maintenance terminal:

>CLRSTAT (cr)

The system executes the command; current data for AMA, COM, and DISK statistics is cleared from disk; and the following message displays:

TDYSTS FILE DISK JOB COMPLETE

REPORT AMA

REPORT AMA is used to request AMA statistical reports from BMC unit for the current day or the previous day.

Example of command usage

Use the following command to obtain the AMA activity report:

>REPORT AMA period (cr)

where:

period -specifies the report period. Values: TDAY (activity for current day) or YDAY (activity for one day previous).

The system displays the requested report as follows, all fields are eight digits with leading 0s suppressed.

```
period'S REPORT
AMA STATISTICS
AMA BLKS RECEIVED . . . .xxxxxxxx (From TEC/DSI Interface)
AMA BLKS PROCESSED. . . .xxxxxxxx (Sent to disk)
INVALID BLK COUNT . . . .xxxxxxxx (Exception file blocks)
INVALID REC COUNT . . . .xxxxxxxx (Exception record blocks)
AMA BLOCKS LOST . . . . .xxxxxxxx (Blocks overwritten)
AMA RECORDS LOST. . . . .xxxxxxxx (Failed writing to disk)
FORMAT RU TO DISK . . . .xxxxxxxx (Records formatted by BMC)
FORMAT CR TO DISK . . . .xxxxxxxx (Formatted call records)
TOTAL AMA POLLED (PRI). .xxxxxxxx (Total Primary blocks polled)
TOTAL AMA POLLED (SEC). .xxxxxxxx (Total Secondary blocks polled)
```

The AMA BLKS RECEIVED field contains the number of AMA data blocks received by the MP from the Switching System through the TEC/DSI PCA.

The AMA BLKS PROCESSED field contains the number of AMA data blocks whose call records have been validated by the MP and sent to DPR storage, prior to writing to disk.

The INVALID BLK COUNT field contains the number of AMA data blocks that have failed validation.

The INVALID REC COUNT field contains the number of unformatted call records encountered.

The AMA BLOCKS LOST field contains the number of AMA data blocks overwritten in TEC/DSI or in the MP (TEC BUFFER OVERFLO), or not written to disk due to a disk error.

The AMA RECORDS LOST field contains the number of records not written to disk due to a disk write failure.

The FORMAT RU TO DISK field contains the number of call records sent by the Switching System in raw unit form (unformatted) that have been formatted by the BMC and sent to disk.

The FORMAT CR TO DISK field contains the number of call records written to the disk.

The TOTAL AMA POLLED (PRI) field contains the total number of Primary AMA blocks polled since midnight.

The TOTAL AMA POLLED (SEC) field contains the total number of Secondary AMA blocks polled since midnight.

If no data is found in the previous day's statistics file, the following message is generated:

NO DATA ACCUMULATED

REPORT COM
REPORT COM is used to request polling summary reports from the BMC unit for the current or previous day.

Example of command usage
To obtain the polling summary report, enter the following command:

>**REPORT COM period (cr)**

where:

period -specifies the report period. Values: TDAY (activity for current day) or YDAY (activity for one day previous).

The system responds with the following report:

period'S REPORT
POLLING SUMMARY(BLOCKS)
AMA. xxxxxxxx
REPOLL xxxxxxxx

The AMA field contains the number of primary AMA blocks that have been polled for the report period.

The REPOLL field contains the number of secondary AMA blocks that have been polled for the report period.

REPORT DISK
REPORT DISK is used to request disk statistical reports from BMC unit for the current day or the previous day.

Example of command usage
To obtain the disk activity report, enter the following command:

>**REPORT DISK period (cr)**

where:

period -specifies the report period. Values: TDAY (activity for current day) or YDAY (activity for one day previous).

The system responds with the following report:

```
period'S REPORT
DISK STATISTICS
DISK. . . . . . . . . .AB
VENDOR ID . . . . . . . .xxxxxxxx xxxxxxxx
PRODUCT ID. . . . . . .xxxxxxxxxxxxxxxx
PRODUCT ID. . . . . . . xxxxxxxxxxxxxxx
REVISION LEVEL. . . . . .xxxx xxxx
DISK CAPACITY (LB). . . .xxxxxxx xxxxxxxx
USER CAPACTIY (LB). . . .xxxxxxxx xxxxxxxx
MANUFACTURE DEFECTS . . .xxxxxxxx
GROWN DEFECTS . . . . . .xxxxxxxx
SCSI BUS ERRORS . . . . .xxxx xxxx
DISK ERRORS . . . . . . .xxxxxxxx
PEAK LOAD . . . . . . . .xx
```

The SCSI BUS ERRORS field contains the number of failed attempts to communicate with indicated disk controller via the SCSI bus.

The DISK ERRORS field contains the number of errors reported by indicated disk controller.

The HIGH QUE USE field reports the highest number of read/write accesses that been simultaneously waiting to complete during the reporting period.

The VENDOR ID field identifies the manufacturer of the disk drive.

The REVISION LEVEL field indicates the revision level of the disk drive firmware.

The DISK CAPACITY (MB) field indicates the size of the disk drive in megabytes.

The MANUFACTURE DEFECTS field contains the number of disk defects mapped out by the manufacturer.

The GROWN DEFECTS field contains the number of defects found and mapped out during system operation.

The PEAK LOAD field contains the highest number of disk jobs waiting to be processed during a specified time period (i.e., per 24 hour interval).

The PRODUCT ID field contains the product number identified by the manufacturer.

The DISK CAPACITY (LB) field indicates the size of the disk drive in logical blocks.

The USER CAPACITY (LB) field indicates the amount of disk drive space, in logical blocks, that is available to the user.

> *Note 16:*   If this report is requested while the disk system is in AO or BO, the report column for off-line disk contains the characters N/A for VENDOR ID, REVISION LEVEL, DISK CAPACITY, MANUFACTURE DEFECTS, and GROWN DEFECTS. SCSI BUS ERRORS, DISK ERRORS, and PEAK LOAD are still reported. PEAK LOAD reports as 0.

> *Note 17:*   If the disk mode is NONE, N/A appears in both columns for VENDOR ID, REVISION LEVEL, DISK CAPACITY, MANUFACTURE DEFECTS, and GROWN DEFECTS. SCSI BUS ERRORS, DISK ERRORS, and PEAK LOAD are still reported. PEAK LOAD reports as 0.

System clock command

The system clock command, SETCLK, is used to change the internal or external clock setting for the BMC. These commands are used to maintain date and time stamping of BMC activities, log message, and time synchronization.

SETCLK
SETCLK sets the BMC clock.

Example of command usage
To set the BMC system clock, issue the following command:

>**SETCLK yy MM dd hh mm ss day (cr)**

where:

yy- year (Range: 00-99)
MM- month (Range: 01-12)
dd- date (Range: 01-31)
hh- hour (Range: 00-23)
mm- minute (Range: 00-59)
ss- second (Range: 00-59)
day- day of week (Range: MON, TUE, WED, THU, FRI, SAT, SUN).

The system displays the time and date as follows:

yy-mm-dd hh:mm:ss day PROC x

where:

x - processor ID (Range: A or B).

TEC/DSI commands

The TEC/DSI commands relate to the control over and examination of the characteristics of the circuits that interface the BMC with the Switching System. The TEC/DSI commands are as follows:

- TECMAINT EXAMINE

- TECMAINT IOREAD

- TECMAINT IOWRITE

- TECMAINT MEMWRITE

- TECMAINT SELECT

- TECMAINT SHOW

- TECRAM.

TECMAINT EXAMINE

The TECMAINT EXAMINE command displays data at a specified address.

Example of command usage

To display data at a specified address, use the following command:

>TECMAINT EXAMINE side address (cr)

where:

side- TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI PCA in slot 12)
address- four-digit hex value that specifies a memory address range. Range: 0000-FFFF.

> *Note:*   TEC/DSI memory is from 2000 to 4000 hex.

The system displays the data at the specified memory address.

TECMAINT IOREAD

The TECMAINT IOREAD command displays data from a specified port.

Example of command usage

Use the following command to display data from a specified port:

>TECMAINT IOREAD side port (cr)

where:

side- TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI
  PCA in slot 12)
port- decimal number that specifies a port. Range: 0-255.

The system displays the data at the specified port address.

TECMAINT IOWRITE
TECMAINT IOWRITE writes data to a specified TEC/DSI port address.

Example of command usage
Use the following command to write data to a specified TEC/DSI port
address:

>**TECMAINT IOWRITE side port data (cr)**

where:

side- TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI
  PCA in slot 12)
port- decimal number that specifies a port. Range: 0-255.
data- data to be written to a TEC/DSI port. Range: 00-FF.

CAUTION
Improper use of this command may result in an attempt to
write data to a non-existent memory location, or, cause
erroneous data to be written to a memory location that is
already in use by other data. Do not use this command
without first contacting technical assistance personnel to
determine that it is proper to do so.

TECMAINT MEMWRITE
The TECMAINT MEMWRITE command writes data to TEC/DSI memory
starting at a specified address.

Example of command usage
Use the following command to write data to a specific TEC/DSI memory
address.

>**TECMAINT MEMWRITE side address datalist (cr)**

where:

side- TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI
   PCA in slot 12)
address- four-digit hex value that specifies a memory address range.
   Range: 0000-FFFF
datalist- data bytes to be written to the specified TEC/DSI memory
   address. The command accepts a maximum of 16 data bytes.
   Each byte is a two-digit hex number. Range: 00-FF. The data
   bytes are presented in the following format: hh hh hh hh hh...

   Note: TEC/DSI memory is from 2000 to 4000 hex.

TECMAINT SELECT
The TECMAINT SELECT command selects a TEC/DSI port for
maintenance.

Example of command usage
Use the following command to select a TEC/DSI port for maintenance.

>**TECMAINT SELECT side (cr)**

where:

side - TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI
         PCA in slot 12).

The system responds with the following message:

TEC side SELECTED

	CAUTION
⚠	Use of the SELECT option may cause a loss of billing data.

TECMAINT SHOW
The TECMAINT SHOW command displays requested data on specified TEC/DSI PCA. The following table lists the subcommands for the TECMAINT SHOW command.

Table 4-18
TECMAINT SHOW subcommands

Subcommand	Description
side ERROR	Displays the Cyclic Redundancy Check (CRC), parity and communication TEC/DSI errors from the specified TEC/DSI.
side STATUS	Displays the last command, status and number of block received from the specified TEC/DSI.
side VS	Displays the program version from the specified TEC/DSI.

Note: The firmware command, DOS S, can be inserted before these commands (i.e., DOS S TECMAINT SHOW side VS) to apply these commands to the standby processor.

Examples of command usage
Use the following command to display CRC, parity and communication TEC/DSI error data on a specified TEC/DSI PCA:

>TECMAINT SHOW side ERROR (cr)

where:

side - TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI PCA in slot 12).

The system responds with the following message:

CRC/PAR/COM = ww,xx,yy,zz

where:

ww- number of CRC errors detected since last rewind
xx- number of Byte Parity (PAR) errors detected since last rewind
yy- number of TEC/DSI communication to CPU failures since last rewind
zz- number of System communication failures to send messages to TEC/DSI since last key request.

Use the following command to display last command, status and number of blocks received data on a specified TEC/DSI PCA:

>**TECMAINT SHOW side STATUS (cr)**

The system displays the TEC/DSI status report as follows:

MTUxx: CMD-yy, STA-zz, BLK-aaaaa

where:

xx - TEC/DSI port address. Values: B0 (TEC/DSI PCA in slot 13) or
     B2 (TEC.DSI PCA in slot 12).
yy - command. Refer to Table 3-19 for a listing of the valid values.
zz - status. Refer to Table 3-19 for a listing of the valid values.
aaaaa- number of data blocks received since last tape rewind.

Table 4-19
Valid values for command and status bytes

yy	Description	zz	Description
01	WRITE	01	BUSY
02	READ	02	READY
03	ERASE	04	WRITE ENABLED
04	BACKSPACE	08	AT LOAD POINT
05	FILE MARK	10	AT END OF TAPE
06	REWIND	20	REWINDING
08	TAPE OPERATION IN PROCESS	40	ALARM
10	DMA TIMEOUT	80	ON-LINE
20	DMA OR CMD ERROR		
40	DMA IN PROGRESS		

Note: All of the other values are combinations of the codes listed. In the event this printout indicates a faulty condition, record the values for use in conjunction with Nortel field service personnel in the troubleshooting efforts.

Use the following command to display the firmware program version on a specified TEC/DSI PCA:

>TECMAINT SHOW side VS (cr)

The system responds with the following message:

aaa-bbb-e mm/dd/yy

where:

      aaa   - program dash number
      bbb   - firmware identifier
      e   - one character decimal patch level
      mm/dd/yy - assembly date (month/day/year).

> *Note:* Ensure that the office records show the same version data as indicated in the output message.

TECRAM
The TECRAM command allows the user to examine the latest data block in the TEC/DSI RAM input data buffer. This command can be used as part of the maintenance function to verify the integrity of a block received from the Switching System.

Example of command usage
Issue the following command to display the contents of the test or data block from the TEC/DSI RAM in the specified format:

>TECRAM format (cr)

where:

format - format of output: ASCII, EBCDIC, HEX, or PACKED.

The system displays the contents of the last block entered in the data buffer in the specified format.

hh hh hh hh hh hh hh hh hh
hh hh hh hh hh hh hh hh hh

where:

hh - one byte of data

If no data block is in RAM, the following message is generated:

END

Test commands

The test commands provide a low level of diagnostics. These commands are used to verify the operating condition of major components of the BMC. The test commands are as follows:

- DPRTST

- TEST

- VALPARM LOGHDR.

DPRTST

DPRTST tests the DPR. This test is run by the standby processor on the memory on the standby side; run automatically at 50 minutes after the hour, every hour.

Example of command usage

To execute the DPR test on the standby processor, enter the following command:

>**DPRTEST (cr)**

The system responds with the results of the DPR test execution.

DPR TEST PASSED

TEST

The BMC has a built-in-test facility which assures the working condition of major BMC components.   The TEST command tests the system RAM, the disks, the clock function, the internal counters and timers, the serial ports, the parallel ports, the error function, the TEC/DSI functions and components, the firmware, and the disk-based program on the standby processor. Primarily a maintenance function, this command assists in fault isolation.

Examples of command usage

To request that the series of tests be run on the active processor, issue the following command:

>**TEST (cr)**

The system displays the test results for the active processor as follows:

DPR TEST PASSED
DSK TEST PASSED
CLK TEST PASSED
CTC TEST PASSED
SIO TEST PASSED
ERR TEST PASSED

B0 TEC TEST PASSED
B2 TEC TEST PASSED
DMA TEST PASSED
RAM TEST PASSED
ROM TEST PASSED
PRG TEST PASSED

> *Note 18:*   These tests run independently. The test completion order
> shown above is only an example. The order in which the tests complete
> can vary.

To request that the series of tests be run on the standby processor, issue the
following command:

>**DOS S TEST (cr)**

The system displays the test results for the standby processor. The display is
the same as for active processor.

> *Note 19:*   The DSK test is not run on the standby processor.

> *Note 20:*   Complete group of tests requires about three minutes to
> perform.

VALPARM LOGHDR
The VALPARM LOGHDR command displays or changes the value of the log
header display.

Examples of command usage
To display the current status of the log header display, use the following
command:

>**VALPARM LOGHDR (cr)**

The system responds with a message showing the current status of the log
header display.

LOGGING OF AMA HEADERS ENABLED (ON option)
or
LOGGING OF AMA HEADERS DISABLED (OFF option)

To change the status of the log header display, use the following command:

>**VALPARM LOGHDR xxx (cr)**

where:

xxx -status of log header display.

ON   -specifies that block headers are to be displayed as they are
being written to disk.
OFF -specifies that the block headers are not to be displayed as
they are being written to disk.

The system displays the following message:

LOGGING OF AMA HEADERS ENABLED (ON option)
or
LOGGING OF AMA HEADERS DISABLED (OFF option).

CAUTION

Use of the LOGHDR ON option should
be limited to testing. This option causes
log headers to be printed as they are
written to disk, and can adversely affect
the performance of the BMC during
high-traffic conditions and during a
SWACT. Do not use the LOGHDR ON
option during periods of high traffic or
when a SWACT is performed.

Note: The default value of VALPARM LOGHDR is OFF. When the
value is changed to ON, the system resets the value to OFF when a
processor switch occurs (manually or automatically).

Firmware Commands

The BMC firmware contains the initial program loading, boot, instructions
and a set of low level commands. The low level commands in the BMC
EPROM are the system monitor. The monitor has the ability to communicate
with either processor, to receive a file download, boot the system from disk,
and delete files from disk. The BMC monitor command duplicates some of
the software commands. The monitor commands are included in case some
difficulties   are encountered with the disk-based operating software. If the
system software is running, it is recommended that all tasks be accomplished
with the software commands. If the system software is not running, or is
corrupted, the tasks can only be accomplished with the firmware monitor
commands.

BYE

The logoff (BYE) command is used by every user of the BMC to disconnect
the active status of the terminal.

Example of command usage
To exit the BMC human-machine interface, enter the following at the maintenance terminal:

>**BYE (cr)**

The system responds with the following message:

yy-mm-dd hh:mm:ss PROC-x USER yy LOGGED OUT

where:

yy - year
mm - month
dd - date
day - day of week (Mon - Sat)
hh:mm:ss - system time (hours/minutes/seconds)
x - active BMC processor (A or B)
yy - user number.

Each user of the BMC should use the BYE command to exit the system. If no activity takes place at the terminal for a preset length of time, the BMC automatically logs the user off (refer to the *SETTERM* subsection).

CLK

CLK is used to display the BMC system time and the active processor.

Examples of command usage
To display the time, enter the following at the maintenance terminal:

>**CLK (cr)**

The system responds with the following message:

day yr/mo/dd hh:mm/ss proc-x

where:

day - day of the week (Mon. - Sat.).
yr - year.
mo - month.
dd - date.
hh:mm:ss - time (hours/minutes/seconds).
x - active processor (A or B).

DELETE

DELETE is used to remove a specified file or range of files from the BMC system directory. Files are stored on the BMC in different versions. The disk directory can hold 255 versions of a given file type. The BMC stores files in sequential order (starts with zero and creates new file until 255 versions of the file have been created). Once the highest possible number of versions is reached (255), the BMC version counter returns to one (overwrites the oldest version)..

CAUTION
Exercise care in the use of this command; site data, programs, or billing data may be lost if this command is misused.

Note 21:   The DELETE command can only be used when no program is running.

Examples of command usage
To delete a single disk file, enter the following at the maintenance terminal:

>DELETE aaaaaa vvv (cr)

where:

aaaaaa - filename.
vvv - version number (0-255).

> *Note 22:* The above deletes one disk file version.

To delete a range of versions, enter the following at the maintenance terminal:

>**DELETE aaaaaa xxx:yyy (cr)**

where:

xxx - starting file version (0-255)
yyy - ending file version (0-255).

DISK

DISK is used to perform various disk operations. The firmware version of this command is identical to the software version. Refer to the *DISK* subsection of the *Software Commands* subsection for more information.

DMSO ***DMS-10 ONLY***

DMSO is used with the DMS-10 Switching System; the BMC can disengage the Switching System remote terminal through the SDI port. If disengaged, the command responses are not routed to the remote terminal. The terminal may be reactivated by entering a command at the remote terminal and routing the command to the Switching System port to which the BMC is attached, SDI port.

Example of command usage
To disengage the DMS-10 remote terminal, enter the following at the maintenance terminal:

>**DMSO x gg (cr)**

where:

x - terminal position (1-6)
gg - terminal assignment (00-99).

> *Note:* Output to the remote terminal is preceded by: MSG xx (xx is the terminal number of the SDI port).

DMSP ***DMS-10 ONLY***

DMSP is used with the DMS-10 Switching System; it is used to set or examine the password used by the BMC to log into the DMS-10 maintenance port at BMC start-up or reboot.

Examples of command usage

To examine the system password, enter the following at the maintenance terminal:

>**DMSP (cr)**

To change the system password, enter the following at the maintenance terminal:

>**DMSP xxxx (cr)**

where:

xxxx - four-character ASCII value of the DMS-10 main password.

>   *Note:*   Use the SITDAT WRITE and LINIT commands to save any changes and update the CP with the new values.

CAUTION

The passwords stored in the DMS-10 and BMC must match when log terminals have been assigned using the DMST command or BMC system performance will be quickly reduced due to a backup of system messages.

DMST ***DMS-10 ONLY***

DMST is used with the DMS-10 Switching System; the BMC can route messages to a Switching System terminal.

Examples of command usage

To examine the log terminal assignments, enter the following at the maintenance terminal:

>**DMST (cr)**

To change log terminal assignments, enter the following at the maintenance terminal:

>**DMST x gg (cr)**

where:

x - terminal position (1-6)
gg - terminal assignment (00-99 or D).

If "D" is specified as the gg variable, the command is used to delete the log terminal assignment.

> *Note:* Use the SITDAT WRITE and LINIT commands to save any changes and update the CP with the new values.

CAUTION
The passwords assigned using the DMSP command must match the password stored in the DMS-10 when log terminals have been assigned or BMC system performance will be quickly reduced due to a backup of system messages.

DOS

DOS provides several miscellaneous system configuration and maintenance functions. These basic firmware resident functions are available in the absence of a software load.

Examples of command usage
To create, open and edit a patch file, enter the following at the maintenance terminal:

>DOS FILE (cr)

1. The BMC prompts for the file name, enter the file name at the maintenance terminal:

FILE>aaaaaa (cr)

where:

aaaaaa - file to be created.

2. The BMC prompts for the file's data, enter the data at the maintenance terminal:

DATA>xxxxxx dd dd ...(cr)

where:

xxxxxx -address to be loaded.
dd dd - bytes to load.

3. To restart data entry for the file being edited, enter the following at the maintenance terminal:

R (cr)

4. To exit a file edit task with no file created, enter the following at the maintenance terminal:

   Q (cr)

5. To save and exit the file, enter the following at the maintenance terminal:

X (cr)

The BMC uses a list of filenames to load the application programs. To append a filename to an existing boot list, enter the following at the maintenance terminal:

>DOS LA (cr)

1. The BMC prompts for the file name, enter the file name at the maintenance terminal:

   FILE>aaaaaa (cr)

2. The BMC prompts for the file version, enter the following at the maintenance terminal:

   VER>xx (cr)

   where:

xx - file version (1-99).

   Note 23:   If no boot file exists, one is created containing the filename specified.

To load program files specified in the boot file into memory, enter the following at the maintenance terminal:

>DOS LB (cr)

   Note 24:   Operating program space in memory is loaded with FF's (HEX) before any program files are loaded.

As each file is loaded, the BMC responds as shown below:

S/W LOADED

To delete the last file name from the list contained in the boot file, enter the following at the maintenance terminal:

>**DOS LD (cr)**

To list the contents of a boot file, enter the following at the maintenance terminal:

>**DOS LL (cr)**

To read 16 bytes of firmware or software memory, starting at a specified address, enter the following at the maintenance terminal:

>**DOS M xxxxx (cr)**

where:

xxxxx - starting address in HEX (0000-3FFFF).

To write bytes of data to program memory (firmware cannot be changed), starting at a specified address, enter the following at the maintenance terminal:

>**DOS M xxxx aa bb... (cr)**

where:

xxxx - starting address
aa, bb - data to be written.

To read data from memory, enter the following at the maintenance terminal:

>**DOS M xxxx /. (cr)**

where:

xxxx - starting address.

To communicate with the standby processor, enter the following at the maintenance terminal:

>**DOS S cmd (cr)**

where:

cmd - any software or firmware command.

   Note 25:   Disk commands cannot be directed to the standby processor.

To display the firmware version, enter the following at the maintenance terminal:

>**DOS VS (cr)**

STIM

STIM is a firmware command used to set the BMC system clock.

Note 26:   When software is up and running, STIM command is not permitted. If software is running, use the SETCLK command.

Example of command usage
To set the BMC system clock, enter the following at the maintenance terminal:

>**STIM year month date hour min sec day (cr)**

where:

year- (00-99)
month- (01-12)
date- (01-31)
hour - (00-23)
min- (00-59)
sec- (00-59)
day- (MON, TUE, WED, THU, FRI, SAT, or SUN).

Note 27:   Leading zeros may be omitted. Spaces are required between values.

The system responds by displaying the time, date, and processor ID.

yy-mm-dd hh:mm:ss day PROC x

where:

yy - year (00-99)
mm - month (01-12)
dd - date (01-31)
hh - hour (00-23)
mm - minute (00-59)
ss - second (00-59)
day - day of week (MON, TUE, WED, THU, FRI, SAT, SUN)
x - processor ID (A or B).

XDIR

XDIR is used to list all files currently in the BMC disk system directory. The output also contains the number of used tracks on disk and the total number of tracks available for use.

Examples of command usage
To list all files in the directory, enter the following at the maintenance terminal:

>XDIR (cr)

The system responds with the following messages:

filename xx filename xx
filename xx filename xx
filename xx filename xx
        :   :
yy FILES LISTED
ppp/ggg tracks used - rr%
m/n bad tracks (m = A drive, n = B drive)

where:

filename - filename
xx - file version
yy - total number of files listed
ppp - number of tracks used
ggg - total number of tracks available
rr - percentage of disk used
m - number of bad tracks on disk A
n - number of bad tracks on disk B.

BMC System Message Functions

Messages are printed on the maintenance terminal as a response to command input or as program output. BMC messages inform the user of the status of the hardware and program operation. BMC messages include operational, alarm, and exception reports.

The BMC displays a number of messages that begin with variables. The variables range from two to seven characters in size and are alphanumeric. When searching alphabetic listings for messages that begin with variables, search for the first non-variable letter. In some cases, a log message is printed in response to BMC activity. Log messages are printed at the maintenance terminal. Log messages are identified by a banner that includes the time and date. To avoid confusion and simplify message organization, the log message banner is not shown with the message in this section. The format for the log message banner is:

yy-mm-dd hh:mm:ss day PROC x
pppsxxxnni

where:

yy - calender year (00-99)
mm - month (01-12)
dd - day (1-31)
hh:mm:ss - time of day (0-23:0-59:0-59)
day - day (MON, TUE, WED, THU, FRI, SAT, or SUN)
x - active processor (A or B)
ppp - message type
  blank - informational
   * - minor alarm
   ** - major alarm
   *C - critical
s - alarm level (0-3)
xxx - message reason code in HEX
nn - log sequence number
i - message source
  blank - active processor
  > - standby processor.

If the system clock is not set, the time of day in the message is replaced by:
>> SET CLOCK <<. Some messages are printed when there is a restart.
These messages do not require any user action. They are:

ST CP LOAD FAIL
ERROR DETECTED ON PROC - A or B
CPU CARD FAIL
STBY BOOT IN PROC

> *Note:*   Some of the BMC error messages are not documented. These
> undocumented messages, also known as information messages, always
> appear after the messages that are documented in this guide. The
> craftsperson should always refer to the documented messages and follow
> the associated troubleshooting procedure(s). The undocumented
> messages contain design-specific information, and as such are beyond the
> scope of this guide. If normal troubleshooting procedures do not resolve
> the problem, the undocumented messages should be recorded and the next
> level of support should be contacted.

BMC System Information Message Descriptions

The following table describes the messages issued by the BMC as part of normal functioning. The messages listed in this section do not require any maintenance activities.

Table 4-20
BMC BISYNC Information Messages

Message Text	Description
AMA BLOCKS SENT: xxxxxxxx	Output at the conclusion of a polling session to report the number of AMA blocks sent to the HOC by the BMC.
AMA FILE DELETED	Output when a AMAfile is deleted using the IDXMAINT DELETE command or at predetermined intervals.
AMA SEQ: yyyyyy	Output while a polling session is in progress. Message indicates the first AMA block sequence number of an AMACRD file version sent to the HOC by the BMC.
AMA SEQ #yyyyyy	Verifies the identity of the AMA call records being read, when the first record of a new file is requested by the IDXMAINT EXAMINE command.
AMA WRITE FILE CLOSED	Output in response to the IDXMAINT CREATE FILE command when one of the following occurs: a. when the current write data file is closed. b. power-up. c. polling. d. on a reset.
CALL RECORD BLOCK TO DISK	Indicates that the log header block feature is enabled and a data block is received. *Note:* This message is preceded by a message that has18 bytes of data.
CLOCK ALARM RESET	Output in response to the SETCLK command, when the NO CLOCK TIME SET alarm is active.
CP DGN - Testing interrupted by a polling	Output in response to the CP TEST ACT and CP TEST STDBY commands when the tests are running and a polling session starts. Polling has a higher system priority.
(Sheet 1 of 4)	

Table 4-20
BMC BISYNC Information Messages

Message Text	Description
CP DGN - Testing not performed due to a polling	Output in response to the CP TEST ACT and CP TEST STDBY commands when a polling session is in progress.
DISK: REASSIGN STARTED	Indicates that the scheduled bad disk sector relocation process has started.
(log message) INCOMING CALL FROM sss ACCEPTED ON LINK nn	Where: sss - remote station ID nn - incoming link number. Output to indicate acceptance of data link setup from a specified remote station on a specified incoming link.
INVALID DISK COMMAND	Output in response to the DISK DEFMAP command. BMC systems with 3 1/2" disk drives do not support this command.
LOG FILE DELETED	Output when a LOG file is deleted using the IDXMAINT DELETE command or at predetermined intervals.
LOG SEQ #yyyyyy	Verifies the identity of the LOG call records being read, when the first record of a new file is requested by the IDXMAINT EXAMINE command.
LOG WRITE FILE CLOSED	Output in response to the IDXMAINT CREATE FILE command when one of the following occurs: a. when the current write data file is closed. b. power-up. c. polling. d. on a reset.
MAINT FILE UPDATED	Output at midnight each day. Indicates that the Today's statistics file has been moved to the Yesterday's statistics file and that the old statistics have been deleted.
NO COMMAND IN PROGRESS	Output in response to RSCMD command when there is no command in progress.
NO DATA ACCUMULATED	Output when no data is found in yesterday's statistics file.

(Sheet 2 of 4)

Table 4-20
BMC BISYNC Information Messages

Message Text	Description
NO SECONDARY BLOCKS EXIST	Output when the BMC Status File Report does not contain any secondary data blocks.
NO SESSION DATA ON DISK	Output when the Data Transfer Session report is requested, and no session is in progress and no previous session data is available on disk.
READ FILE CLOSED	Output in response to the IDXMAINT EXAMINE/CLOSE/CREATE DIR command, if an attempt is made to examine a non-existing version of a file or attempting to examine data (AMA) upon reaching the end of a file.
SELGRP ACTIVE: x	where: x - currently active SELGRP command value. Output in response to a Secondary AMA data poll request request from the HOC. Indicates the SELGRP value that the BMC is set to while the HOC polls Secondary AMA data from the BMC.
SES CON	Indicates a successful Session Connect.
SES DIS	Indicates a successful Session Disconnect.
STANDBY PROC ON LINE - ALARM RESET	Output when communications between the active and standby processors have been restored after having been down.
WARNING: TIMEOUT IN 1 MIN	Indicates that approximately one minute remains before the BMC invokes its auto-logoff feature. User is automatically logged off at the end of the elapsed time out.
xxxxxx DOWNLOAD COMPLETE	where: xxxxxx - filename of the downloaded file. Output on the completion of a download procedure.

(Sheet 3 of 4)

Table 4-20
BMC BISYNC Information Messages

Message Text	Description
xxxxxx DOWNLOAD STARTED	where: xxxxxx - filename of the downloading file. Output on the starting of a download procedure.
YDYSTS FILE DISK JOB COMPLETE	Issued when a disk update of the YDYSTS file has been completed.
(Sheet 4 of 4)	

BMC System Error Message Descriptions

BMC system error message descriptions are provided, in alphabetical order, on the following pages. Each message listed indicates whether the message is the result of a system error and, in such cases, is referenced to the *Maintenance Procedures Guide* subsection for corrective procedures.

Table 4-21
? message

1	? Display: Maintenance terminal	Cause: bell (chime) sounds and the message is output automatically when the system does not understand a user command that has been entered.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Verify the syntax of the command.

Table 4-22
00 PIO TEST FAILED message

7	00 PIO TEST FAILED Display: Log message	Cause: a failure occurred during the Inter-Processor I/O communication test.
8	Alarm Level: No processor switch	Reason Code = 15 Corresponds to ERRMAP entry: STNBY COMM DOWN System Default: Type:MajorLevel:0
9	Customer-Selected Alarm Level	Type:Level:

Table 4-22
00 PIO TEST FAILED message

0	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
1	System Recovery Action	None
2	Craftsperson Activity:	If the standby processor is off, this message is normal. If the standby processor is on, refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-23
ACTIVE PROC ALARM - NO SWITCH message

3	ACTIVE PROC ALARM - NO SWITCH Display: Log message	Cause: active processor is in alarm and therefore should have switched prior to this printout. The switch did not take place for one of the following reasons: a. **standby processor is not powered up** b. **standby processor is in a higher alarm condition than the active processor.**
4	Alarm Level: No processor switch possible	Reason Code = 40 Corresponds to ERRMAP entry: STNBY COMM DOWN System Default: Type:MajorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:

Table 4-23
ACTIVE PROC ALARM - NO SWITCH message

7	System Recovery Action	None; system processors are unable to reconfigure.
8	Craftsperson Activity:	Verify the position of the Status Panel rockers. If the rockers are set to "O" and the ONL lamp is lit, determine whether troubleshooting is in progress. If troubleshooting is not in progress, set the A/B rocker to the same value as the active processor, depress "P" and turn the key. If the rockers are not set to "O", refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-24
BAD BAUD RATE message

9	BAD BAUD RATE VALID RATES ARE 1200 2400 4800 9600 Display: Maintenance terminal	Cause: output when a baud rate other than one of the options listed above is used in the BAUD command.
10	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
11	Customer-Selected Alarm Level	Type:Level:
12	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
13	System Recovery Action	None; this message is output in response to a faulty keyboard entry.
14	Craftsperson Activity:	Enter the correct baud rate. Enter a valid rate listed in the error message. Refer to the section for the BAUD command in this document.

Table 4-25
BAD CKSM message

5	BAD CKSM Display: Maintenance terminal	Cause: A program load from disk failed because the calculated checksum did not compare to the file checksum stored on the disk. This is an indication that one of the following occurred: a. **the program on disk is corrupted.** b. **the disk system is failing.** c. **a memory PCA is failing.** d. **an attempt to load to EPROM address was made.**
6	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: PROG CHKSM ALM System Default: Type:MajorLevel:3
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
9	System Recovery Action	Three attempts are made to reload.
0	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-26
BAD INTERFACE

1	BAD INTERFACE Display: Maintenance terminal	Cause: output when an incorrect value was input for the CP INTERFACE command.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None, faulty keyboard entry.
6	Craftsperson Activity:	Enter the correct interface type. Refer to section on the CP INTERFACE command in this document.

Table 4-27
BAD LINE CONTROL SELECTION message

7	BAD LINE CONTROL SELECTION, VALID SELECTIONS - FD or HD Display: Log message	Cause: output when a line control parameter other than one of the two listed in the message is used with the CP CONTROL command.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:MajorLevel:3
9	Customer-Selected Alarm Level	Type:Level:

Table 4-27
BAD LINE CONTROL SELECTION message

0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
4	System Recovery Action	None
2	Craftsperson Activity:	Enter the correct line control type (listed in message). Refer to the *CP CONTROL* subsection in this document for more information.

Table 4-28
BAD LINK # message

3	BAD LINK # VALID LINK #S ARE 1 OR 2 Display: Maintenance terminal	Cause: output when a link number other than 1or 2 is used in the BAUD command.
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	None, faulty keyboard entry.
8	Craftsperson Activity:	Enter the correct link number (1 or 2). Refer to section on the BAUD command in this document.

Table 4-29
BAD S/W CKSM message

9	BAD S/W CKSM Display: Maintenance terminal	Cause: output when the checksum test on software program file(s) failed on download.
8	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: PROG CHKSM ALM System Default: Type:MajorLevel:3
7	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	The system makes 3 (three) attempts to automatically reload the program from the standby chassis.
4	Craftsperson Activity:	Contact your next level of support.

Table 4-30
BAD xxxIDX FILE message

5	(log message)
	`BAD AMAIDX FILE or`
	(log message)
	`BAD LOGIDX FILE`
	
	Display: Log message
		Where:
		AMA (toll data) - corruption of the AMA index file. Call record data sent to HOC may be invalid
		LOG (log messages) - corruption of message index file
		
		Cause: corruption of the named index file.

6	Alarm Level: Minor; no processor switch (If 3 consecutive messages appear, alarm is MAJOR.)	Reason Code = 04 Corresponds to ERRMAP entry: DSK INDEX ERROR System Default: Type:MinorLevel:0

Table 4-30
BAD xxxIDX FILE message

5	Customer-Selected Alarm Level	Type:Level:
5	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
0	Craftsperson Activity:	Refer to the *Index Corruption Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-31
BLOCK LENGTH ERROR DETECTED message

6	BLOCK LENGTH ERROR DETECTED Display: Log message	Cause: output when a block length error is detected by the TEC/DSI PCA. This message also indicates that the number of invalid blocks received exceeds the threshold limit for the invalid blocks set using the VALPARM BLOCKS command.
2	Alarm Level: No processor switch	Reason Code = N/A Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MajorLevel:0
6	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
6	System Recovery Action	None
6	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-32
BLOCK PARITY ERROR DETECTED message

5	BLOCK PARITY ERROR DETECTED Display: Log message	Cause: output when a block parity error is detected by the TEC/DSI PCA. This alarm is generated when the number of invalid blocks received exceeds the threshold limit for invalid blocks set using the VALPARM BLOCKS command.
6	Alarm Level: No processor switch	Reason Code = 42 Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MajorLevel:0
0	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
7	System Recovery Action	None
2	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-33
BLOCK REJECTED: xxxx BYTES message

3	BLOCK REJECTED: xxxx BYTES Display: Log message	Where: xxxx = number of bytes in the rejected block. Cause: output when a block greater than 2050 bytes is received by the TEC/DSI PCA from the Switching System. The block is not read into the CPU.
4	Alarm Level: No processor switch	Reason Code = 42 Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MajorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
7	System Recovery Action	None; incoming block is rejected.
8	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-34
BOOT FILE EMPTY message

5	BOOT FILE EMPTY Display: Log message	Cause: output because the file, BOOTFL, is found to contain an empty list (no software in the file) while attempting a re-boot operation.
0	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
8	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
8	System Recovery Action	None
8	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-35
BOTH DISKS FULL message

5	(log message) `BOTH DISKS FULL` Display: Log message	Cause: output when the amount of disk space for storing AMA data has reached 100 percent of available space.
6	Alarm Level: two disks 100% = Critical no processor switch	Reason Code = 08 Corresponds to ERRMAP entry: DSK STORE LIMIT System Default: Type:CriticalLevel:0

Table 4-35
BOTH DISKS FULL message

7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
9	System Recovery Action	System has already set disk status nonredundant.
9	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section to alleviate this condition. (Call for technical assistance if doubt arises at any step.)

Table 4-36
BX.25 INTER-TASK COMM ERROR message

9	(log message) BX.25 INTER-TASK COMM ERROR Display: Log message	Cause: polling task on the MP cannot communicate with the CP. Generally, any error producing this message will also be caught by the RFT task or MP/CP audit task.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
9	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:

Table 4-36
BX.25 INTER-TASK COMM ERROR message

⑤	System Recovery Action	Polling ceases.
⑥	Craftsperson Activity:	If this message is persistent, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-37
Bx TEC BUSY message

⑦	B0 TEC BUSY B2 TEC BUSY Display: Maintenance terminal	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output during TEST command execution if the standby TEC/DSI PCA is busy.
⑧	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
⓪	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
⓪	System Recovery Action	None
②	Craftsperson Activity:	Verify test at another time.

Table 4-38
Bx TEC COLD START message

❶	(log message) B0 TEC COLD START (log message) B2 TEC COLD START Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output at initial power-up, or after four warm starts (message is from the TEC/DSI PCA).
❷	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 25 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
❸	Customer-Selected Alarm Level	Type:Level:
❹	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
❺	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.**
❻	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-39
Bx TEC COMM FAIL message

0	(log message) B0 TEC COMM FAIL (log message) B2 TEC COMM FAIL Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output when the processor cannot communicate with the TEC/DSI PCA. Tested automatically every 20 minutes.
0	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 24 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
3	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.**
4	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-40
Bx TEC DMA FAIL message

5	(log message) B0 TEC DMA FAIL (log message) B2 TEC DMA FAIL Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output when a DMA transfer of a data block has not been initiated within 16 milliseconds of the acknowledged request. Message is from the TEC/DSI PCA.
6	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 25 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
9	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.**
0	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-41
Bx TEC NOT READY message

2	(log message) B0 TEC NOT READY (log message) B2 TEC NOT READY Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output when there is a loss of unit select from the Switching System.
2	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 25 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
5	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.**
6	Craftsperson Activity:	Verify whether the MTU port(s) are active in the Switching System. If so, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-42
Bx TEC TIME OUT message

7	(log message) B0 TEC TIME OUT (log message) B2 TEC TIME OUT Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output when a request for the transfer of a data block (read or write) is ignored. Message is from the TEC/DSI PCA. May be caused by the Switching System attempting to read data that the BMC does not presently have available, usually during a test sequence (i.e., attempt to read header data without a rewind command first).
8	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 25 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
3	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.**
2	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-43
Bx TEC WARM START message

3	(log message) B0 TEC WARM START (log message) B2 TEC WARM START Display: Log message	Where: x = TEC/DSI Port ID = 0 = TEC/DSI PCA in slot 13. = 2 = TEC/DSI PCA in slot 12. Cause: output at restart with RAM intact (program not returning watchdog command). Message is from the TEC/DSI PCA.
8	Alarm Level: Processor switch: if the message is from the active TEC/DSI PCA during normal operation = Major Alarm, Level 1. No switch: if the message is from the standby TEC/DSI PCA during normal operation = Minor Alarm, Level 0. None: if at power-up.	Reason Code = 25 Corresponds to ERRMAP entry: TEC STNBY FAIL Minor Alarm, Level 0 (or) TEC PRIME FAIL Major Alarm, Level 1 System Default: Type:See Alarm LevelLevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
7	System Recovery Action	a. **Processor switch if the message is from the active TEC/DSI PCA port.** b. **No processor switch if the message is from the standby TEC/DSI PCA port.** c. **Normal after power-up.**
8	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-44
CALL RECORD BLOCK FROM TEC INCORRECT message

9	(log message) CALL RECORD BLOCK FROM TEC INCORRECT Display: Log message	Cause: output for one of the following reasons: a. **data block received from the Switching System is not a valid LSSGR billing data block.** b. **communications between the BMC MP and a TEC/DSI PCA is faulty.** c. **communication between Switching System and a TEC/DSI PCA is faulty.**
0	Alarm Level: No processor switch	Reason Code = N/A Corresponds to ERRMAP entry: EXEC INVALID REC System Default: Type:MajorLevel:0
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	Alarm is set.
4	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedure Guide* section.

Table 4-45
COMMAND ALREADY IN PROGRESS message

5	COMMAND ALREADY IN PROGRESS Display: Maintenance terminal	Cause: output in response to commands (those which generate large amounts of output) if the user tries to execute other commands before completion of the active command. An I/O process can only be created if no other I/O task is currently scheduled.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None; BMC system ignores the newly input command.
10	Craftsperson Activity:	a. **Retry command at a later time (wait for the present command to complete execution).** b. **Attempt to abort the current command by issuing the RSCMD command.** c. **If message repeats after 3 retries, call for technical assistance.**

Table 4-46
COMM DOWN TO STANDBY PROCESSOR message

5	COMM DOWN TO STANDBY PROCESSOR Display: Log message	Cause: processor communication with the standby processor is not possible for one of the reasons listed below. This message is cleared automatically when the condition causing it to occur is corrected. **a.** **standby processor is turned off.** **b.** **standby processor is in the monitor mode.** **c.** **standby processor is in a fault condition.**
2	Alarm Level: No processor switch possible	Reason Code = 38 Corresponds to ERRMAP entry: STANBY PROC N/A System Default: Type:MajorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	None; BMC is unable to switch processors.
6	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 4-47
CP ACTIVATE FAIL message

3	CP ACTIVATE FAIL Display: Log message	Cause: 56K Interface responded incorrectly to an attempt to start the downloaded 56K Interface software.
8	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
6	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface processor cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
2	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-48
CP AUDIT FAIL message

❽	CP AUDIT FAIL Display: Log message	Cause: 56K Interface responded improperly to an audit command.
❽	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
❺	Customer-Selected Alarm Level	Type:Level:
❻	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
❺	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface PCA cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
❻	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If this message is seen repeatedly from the same processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-49
CP BOOT LIST EMPTY message

0	CP BOOT LIST EMPTY Display: Log message	Cause: output when no load file names are found in the 56K Interface boot list file, BOOTCP, during the booting procedure.
1	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface PCA cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
4	Craftsperson Activity:	Refer to the description of the CP BOOT command in this document.

Table 4-50
CP BX CODE xx WAS yy message

5	CP BX CODE xx WAS yy Display: Log message	Where: xx = expected code. yy = received code. Cause: output when the polling task on the MP is unable to communicate with the CP.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: N/AAudible: N/A Customer-Selected Status Panel:Audible:
9	System Recovery Action	Polling ceases.
0	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide.* If this message is seen repeatedly from the same processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section*.*

Table 4-51
CP COMMAND NOT ACCEPTED message

1	(log message) CP COMMAND NOT ACCEPTED Display: Log message	Cause: output when the CP will not accept site data written to or read from the disk such as on the hour. It is output as a response to any CP command that is not accepted.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: N/AAudible: N/A Customer-Selected Status Panel:Audible:
5	System Recovery Action	None.
6	Craftsperson Activity:	If a SITDAT WRITE or SITDAT READ command was issued, try again. If this message persists, switch processors. If that does not resolve the problem, contact your next level of support.

Table 4-52
CP CM CODE xx WAS yy message

☎	CP CM CODE xx WAS yy Display: Log message	Where: xx = expected code. yy = received code. Cause: output when the CP command code is not as expected for the CP command task.
☎	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
☎	Customer-Selected Alarm Level	Type:Level:
☎	Other Alarm Indications	Default: Status Panel: N/AAudible: N/A Customer-Selected Status Panel:Audible:
☎	System Recovery Action	None
☎	Craftsperson Activity:	Repeat the command task by re-entering the command. If the problem persists, reload the CP using the LINIT command.

Table 4-53
CP DATA ERR message

9 CP DATA ERR Display: Log message	Cause: output when an error is detected while transferring data between the CP and MP.	
8 Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1	
5 Customer-Selected Alarm Level	Type:Level:	
8 Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:	
5 System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface PCA cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.	
8 Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide.* If this message is seen repeatedly from the same processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.	

Table 4-54
CP DMA Test: DMA Busy message

9	CP DMA Test: DMA Busy Display: Maintenance terminal	Cause: response to the CP TEST ACT or CP TEST STDBY command; this message should never appear. If the CP TEST ACT or CP TEST STDBY command is entered during a polling session, the message, CP DGN - Testing not performed due to a polling, should appear. If the message, CP DMA Test: DMA Busy, does appear, this implies there is a hardware or internal software problem on the 56K Interface PCA.
9	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
9	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
9	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If this message is seen repeatedly from the same processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-55
CP DMA Test Failed message

🔲	CP DMA Test Failed Display: Maintenance terminal	Cause: 56K Interface DMA test failed.
🔲	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
🔲	Customer-Selected Alarm Level	Type:Level:
🔲	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
🔲	System Recovery Action	Processor switch
🔲	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-56
CP I/O FAILURE message

2	CP I/O FAILURE Display: Log message	Cause: hardware status from the 56K Interface contains an illogical value.
2	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1

Table 4-56
CP I/O FAILURE message

1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface processor cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
4	Craftsperson Activity:	Refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-57
CP LOAD FAIL message

1	CP LOAD FAIL Display: Log message	Cause: 56K Interface PCA rejected a load file from the MP.
2	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:

Table 4-57 **CP LOAD FAIL message**	
2 System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface processor cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
2 Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide.*

Table 4-58 **CP LP CODE xx WAS yy message**	
2 CP LP CODE xx WAS yy Display: Log message	Where: xx = correct byte value. yy = incorrect byte value from the CP. Cause: output when the loopback test byte comparison fails.
2 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT System Default: Type:MajorLevel:1
2 Customer-Selected Alarm Level	Type:Level:
2 Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
2 System Recovery Action	If this occurs in the Active processor, it is switched to the Standby processor.
2 Craftsperson Activity:	Try the CP Loopback test on the appropriate processor. If this message is seen repeatedly from the same processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section*.*

Table 4-59
CP_MMI_TSK - Memory RD/WR bad address received from the MP message

9	CP_MMI_TSK - Memory RD/WR bad address received from the MP Display: Maintenance terminal	Cause: response to CP MEMWRITE and CP EXAMINE commands; output when an address too large for the system configuration is entered; message is from the MP.
0	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None
4	Craftsperson Activity:	Refer to the sections for the CP MEMWRITE and CP EXAMINE commands in this document.

Table 4-60
CP Modem Loopback Test Failed on SCC Channel x message

5	CP Modem Loopback Test Failed on SCC Channel x Display: Maintenance terminal	Where: x = channel identifier (A or B) Cause: modem loopback test failed on the channel identified by 'x'.
0	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 4-60
CP Modem Loopback Test Failed on SCC Channel x message

7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
0	Craftsperson Activity:	Verify using the CP TEST ACT and CP TEST STDBY commands. If the test still fails, refer to the *56K Crossover PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-61
CP MS CODE xx WAS yy message

1	CP MS CODE xx WAS yy Display: Log message	Where: xx = expected code. 　　　　yy = received code. Cause: output when certain message parameter values are not within an acceptable range for the CP message task.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: N/AAudible: N/A Customer-Selected Status Panel:Audible:

Table 4-61
CP MS CODE xx WAS yy message

System Recovery Action	None	
Craftsperson Activity:	Try to repeat this task with a key command. If the problem persists, reload the CP using the LINIT command.	

Table 4-62
CP PRG Checksum Test Failed message

CP PRG Checksum Test Failed Display: Maintenance terminal	Cause: 56K Interface program checksum test failed due to 56K Interface RAM chip corrupted or a bad software load.	
Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT System Default: Type:MajorLevel:1	
Customer-Selected Alarm Level	Type:Level:	
Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:	
System Recovery Action	Processor switch.	
Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.	

Table 4-63
CP RAM Test Failed message

2	CP RAM Test Failed Display: Maintenance terminal	Cause: the 56K Interface RAM test failed. A RAM chip may be corrupted or the parity circuitry has failed.
4	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT System Default: Type:MajorLevel:1
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel: MajorAudible: Major Customer-Selected Status Panel:Audible:
7	System Recovery Action	Processor switch.
8	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If this message is seen repeatedly on this processor, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-64
CP RESTART FAIL message

1	CP RESTART FAIL Display: Log message	Cause: 56K Interface PCA responded improperly to a reset condition.
2	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
6	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If problems continue, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-65
CP ROM Checksum Test Failed message

⚫	CP ROM Checksum Test Failed Display: Maintenance terminal	Cause: the 56K Interface EPROM checksum test failed. The EPROM is corrupted or there is a bad checksum byte.
⚫	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT System Default: Type:MajorLevel:1
⚫	Customer-Selected Alarm Level	Type:Level:
⚫	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
⚫	System Recovery Action	Processor switch.
⚫	Craftsperson Activity:	Refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-66
CP ROM CKSM ERR message

Z	CP ROM CKSUM ERR Display: Maintenance terminal	Cause: the 56K Interface EPROM checksum test failed. The EPROM is corrupted or there is a bad checksum byte.
Z	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
Z	Customer-Selected Alarm Level	Type:Level:
Z	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
Z	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
Z	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-67
CP SCC Channel x Busy message

Z	CP SCC Channel x Busy	Where: x = channel identifier (A or B)
	Display: Maintenance terminal	Cause: response to the CP TEST ACT or CP TEST STDBY command; this message should never appear. If the CP TEST ACT or CP TEST STDBY command is entered during a polling session, the message, CP DGN - Testing not performed due to a polling, should appear. If the message, CP SCC Channel x Busy, does appear, this implies there is a hardware or internal software problem on the 56K Interface PCA.
Z	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
Z	Customer-Selected Alarm Level	Type:Level:
Z	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
Z	System Recovery Action	None
Z	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-68
CP SCC Channel x test: DMA Busy message

1	CP SCC Channel x test: DMA Busy Display: Maintenance terminal	Where: x = channel identifier (A or B) Cause: response to the CP TEST ACT or CP TEST STDBY command; this message should never appear. If the CP TEST ACT or CP TEST STDBY command is entered during a polling session, the message, CP DGN - Testing not performed due to a polling, should appear. If the message, CP SCC Channel x test: DMA Busy, does appear, this implies there is a hardware or internal software problem on the 56K Interface PCA.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 4-69
CP SCC Loopback Test Failed on Channel x message

❷	CP SCC Loopback Test Failed on Channel x Display: Maintenance terminal	Where: x = channel identifier (A or B) Cause: 56K Interface SCC loopback test failed for the designated channel.
❷	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT System Default: Type:MajorLevel:1
❷	Customer-Selected Alarm Level	Type:Level:
❷	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
❷	System Recovery Action	Processor switch.
❷	Craftsperson Activity:	Refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-70
CP ST CODE xx WAS yy message

1	CP ST CODE xx WAS yy Display: Log message	Where: xx = expected code. yy = received code. Cause: output when the CP command code is not as expected for the CP statistics task.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: N/AAudible: N/A Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Try to repeat this task with a key command. If the problem persists, reload the CP using the LINIT command.

Table 4-71
CP TASK ERR message

❶	CP TASK ERR Display: Log message	Cause: an illogical condition was detected by the 56K Interface PCA system software.
❷	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
❸	Customer-Selected Alarm Level	Type:Level:
❹	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
❺	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
❻	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If problems continue, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-72
CP TIMEOUT message

🮲	CP TIMEOUT Display: Maintenance terminal	Cause: the 56K Interface failed to respond to a continuous audit or synchronization command.
🮲	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: CP FAULT CP NOT AVAIL. System Default: Type:MajorLevel:1
🮲	Customer-Selected Alarm Level	Type:Level:
🮲	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	System attempts a 56K Interface restart. If the 56K Interface cannot successfully complete a restart, the alarm is upgraded to CP NOT AVAILABLE.
2	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If problems continue, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-73
CP xxx_TSK_ERR: y message

3	CP xxx_TSK_ERR: y Display: Log message	Where: xxx =DGN - error during a diagnostic task execution. MMI - error during an MMI task execution. MSG - error during a message task execution. RPT - error during a report task execution. y = error code 0 - internal software error 1 - unknown (error) message received from MP 2 - invoking MP failed via RFT 3 - reading data from MP failed via RFT 4 - writing data to MP failed via RFT. Cause: a CP task encounters an internal error.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: N/AAudible:N/A Customer-Selected Status Panel:Audible:
3	System Recovery Action	None.
8	Craftsperson Activity:	Refer to the *56K Interface PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section. If problems continue, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 4-74
CTC MP-ST-ALM message

9	(log message) CTC MP-ST-ALM (Counter Timer Circuit Microprocessor-Status-Alarm) Display: Log message	Cause: output to report a processor status alarm.
9	Alarm Level: Processor switch	Reason Code = 17 Corresponds to ERRMAP entry: PROC STAT ALM System Default: Type:MajorLevel:2
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel: MajorAudible:Major Customer-Selected Status Panel:Audible:
2	System Recovery Action	Processor system is made non-redundant.
2	Craftsperson Activity:	If this message is seen repeatedly from the same processor, replace the CPU PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-75
DATA BUFFER EXCEEDED ALARM message

7	DATA BUFFER EXCEEDED ALARM Display: Log message	Cause: a block has been received that overwrites the oldest data block not yet processed (buffer full). The BMC was not able to write a block to disk because the buffers were full. This condition results in a loss of AMA data. This can occur when: a. **amount of traffic (AMA data) from the Switching System is too fast for the BMC to accept; exceeds four blocks per second (more blocks have been received by the CPU from the TEC/DSI than can be processed; some blocks have been lost).** b. **SCSI Interface PCA is faulty.**
8	Alarm Level: No processor switch	Reason Code = 22 Corresponds to ERRMAP entry:TEC DATA OVERFLO System Default: Type:CriticalLevel:0
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:CriticalAudible: Critical Customer-Selected Status Panel:Audible:
1	System Recovery Action	Block is rejected.
2	Craftsperson Activity:	If the AMA data rate is greater than four blocks a second, contact technical support. If the AMA data rate is not greater than four blocks a second, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-76
DATA IGNORED message

3 DATA IGNORED Display: Maintenance terminal	Cause: indicates a program data record was incorrectly entered while using a patch file command.
4 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5 Customer-Selected Alarm Level	Type:Level:
6 Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
7 System Recovery Action	Input is rejected.
8 Craftsperson Activity:	Refer to the section for the DOS firmware command in this document.

Table 7-77
DATA NOT AVAILABLE message

9 DATA NOT AVAILABLE Display: Maintenance terminal	Cause: output when, during polling of data, the end of file is reached or no more pollable data is available.
0 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
2 Customer-Selected Alarm Level	Type:Level:

Table 7-77
DATA NOT AVAILABLE message

2	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	EOT message is sent to HOC.
4	Craftsperson Activity:	Input the IDXMAINT SUMMARY AMA command. Verify that the number of blocks to poll is greater than the value assigned using VALPARM BLOCKS command. If yes, verify the sequence number requested by the HOC matches the BMC sequence number to poll.

Table 7-78
DEL. FAIL or DELETE FILE FAILED message

5	DEL. FAIL or DELETE FILE FAILED Display: Log message	Cause: the attempt to delete a file failed due to a lack of the file (file does not exist) or other problem.
6	Alarm Level: Based on the corresponding disk error message	Reason Code = N/A Corresponds to ERRMAP entry: See Alarm Level System Default: Type: See Alarm Level Level: N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
9	System Recovery Action	Based on corresponding disk error message.
0	Craftsperson Activity:	Verify that the correct file name is being used. Refer to the section on the DOS firmware command in this document.

Table 7-79
DISK ALARM x message

1	DISK ALARM x Display: Log message	Where: x = disk drive (A or B) Cause: message is output to report that an alarm threshold value has been exceeded. Output for the following reasons: a. **five consecutive non-recoverable disk errors on one side (A or B).** b. **three failed retries at resetting the SCSI bus and reassigning disk parameters to the OMTI disk controller after a disk bus error.** c. **a non-recoverable disk error while the SCSI Interface is retrieving data for initialization from a disk that had good status.** d. **five failed retries at updating sector zero on the same side.**
2	Alarm Level: disk mode switch	Reason Code = 27 Corresponds to ERRMAP entry: DSK ERROR ALARM System Default: Type:CriticalLevel:0
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
5	System Recovery Action	Disk mode goes to non-redundant (one disk is now in ONLY mode).
6	Craftsperson Activity:	Refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-80
DISK BUFFER NOT AVAILABLE message

3	(log message) DISK BUFFER NOT AVAILABLE Display: Log message	Cause: no disk buffer is available when attempting to write statistical data to files on disk.
8	Alarm Level: No processor switch	Reason Code = N/A Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
4	System Recovery Action	None; (input is rejected).
2	Craftsperson Activity:	If this message is seen repeatedly, refer to the *56K Interface PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-81
DISK COMMAND xx ATTEMPTED WHILE DISK BUSY message

3 (log message) DISK COMMAND xx ATTEMPTED WHILE DISK BUSY DISK JOB: yy, PARAMETERS: aa bb cc(1) cc(2) cc(3) dd(1) dd(2) SIDE z Display: Log message	Where: xx - two letter code for the disk command that was being transferred to or carried out by the OMTI disk controller. yy - two letter code for the disk job in progress. = CK = check for ready Directory updates after dynamic relocation: After a directory track has been relocated: D0 = read prime D1 = seek prime D2 = seek standby D3 = write prime D4 = write standby After a data track has been relocated: D5 = seek prime D6 = seek standby D7 = write prime D8 = write standby Formats:FA = A FB = B Relocate track from prime; — used by backup: L1 = read prime L2 = seek prime L3 = seek standby L4 = write prime L5 = write standby Assign disk parameters.: PA = To APB = To B RC = recalibrate Reads: RA = from A RB = from B From prime: R1 = read prime = R2 = read standby (if read prime failed) Relocate track from standby (if standby succeeded) R3 = read standby R4 = seek prime R5 = seek standby R6 = write prime R7 = write standby Backup track — used by backup: T1 = seek primeT2 = seek standby T3 = read prime T4 = write standby Writes: WA = To AWB = To B To both when redundant: W1 = seek prime W2 = seek standby W3 = write prime W4 = write standby

Table 7-81
DISK COMMAND xx ATTEMPTED WHILE DISK BUSY message

1	(continued)	Parameters = aa bb cc(1) cc(2) cc(3) dd(1) dd(2) aa =quantity of sectors involved, (in Hex). bb =drive unit number, (in Hex). cc(1) cc(2) cc(3) = logical sector number, (in Hex). dd(1) dd(2) = buffer address, (in Hex). z = indicates one of two redundant sides. A = disk A B = disk B Cause: output when the SCSI bus handler of the DPP SCSI Interface is called to initiate a disk operation and a previous SCSI bus cycle is still in progress.
4	Alarm Level: two disks 100% = Critical no processor switch	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
7	System Recovery Action	Disk mode may go to non-redundant.
8	Craftsperson Activity:	If disk mode went to non-redundant status, refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-82
DISK DIRECTORY FULL message

9	(log message) DISK DIRECTORY FULL Display: Log message	Cause: output when the disk directory meets the following conditions: a. **maximum number of files that can exist is exceeded. When an attempt is made to create an AMA index file fails because the disk directory is full, an attempt is made to delete the oldest secondary file. When the file is deleted, the log messages related to the deletion of secondary AMA files are output (no alarm is generated).** b. **If this same failure occurs when there are no secondary AMA files to delete, an attempt is made to delete LOG files (no alarm is generated).** c. **If this error occurs and there are no secondary AMA or LOG files to delete, an EOT message is output to both ports and a DIRECTORY FULL alarm is generated.**
8	Alarm Level:	Reason Code = 08 Corresponds to ERRMAP entry: DIRECTORY FULL System Default: Type:CriticalLevel:0
5	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
5	System Recovery Action	EOT is generated to both MTU ports in the Switching System (BMC is not receiving AMA data).
5	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-83 **DISK DPR FAULT message**	
5 (log message) DISK DPR FAULT Display: Log message	Cause: output when an error is detected during the self-check (test) on the DPR.
6 Alarm Level: Processor switch	Reason Code = 30 Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
7 Customer-Selected Alarm Level	Type:Level:
8 Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
9 System Recovery Action	Processor switch, if five or more occurrences in one hour are recorded.
0 Craftsperson Activity:	If a processor switch has occurred, replace the CPU PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-84
DISK MODE ALARM message

❶ DISK MODE ALARM Display: Log message	Cause: disk system found to be nonredundant at hour boundary. **a. fault caused disk system to become nonredundant.** **b. one disk is 100% full; system becomes nonredundant to use second disk for additional primary data.**	

⚠ **CAUTION**
Use extreme care before proceeding under this condition; call technical assistance if you are unsure which procedures to follow.

❷ Alarm Level: Disk mode non-redundant	Reason Code = 34 Corresponds to ERRMAP entry: DISK MODE ALARM System Default: Type:MajorLevel:0
❸ Customer-Selected Alarm Level	Type:Level:
❹ Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
❺ System Recovery Action	Disk mode goes to ONLY mode.
❻ Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-85 **DISK MODE: NONE message**		
❻	DISK MODE: NONE Display: Log message	Cause: response to a manual request for current disk mode status and neither disk is formatted. This message is also output upon system restart, if neither is formatted.
❻	Alarm Level:	Reason Code = N/A Corresponds to ERRMAP entry: DISK MODE ALARM System Default: Type:MajorLevel:0
❽	Customer-Selected Alarm Level	Type:Level:
❼	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❼	System Recovery Action	Disk mode goes to ONLY mode.
Z	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-86
DISK NOT READY SIDE x message

3	(log message) DISK NOT READY SIDE x Display: Log message	Where: x = disk drive (A or B) Cause: output when the system SCSI Interface is going through initialization and the indicated drive unit does not return READY status after 30 seconds.
4	Alarm Level: Disk mode non-redundant	Reason Code = 30 Corresponds to ERRMAP entry: DISK MODE ALARM System Default: Type:MajorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
7	System Recovery Action	Disk mode is changed to ONLY if disk is not being formatted.
8	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-87 **DISK QUEUE ERROR message**	
7 (log message) DISK QUEUE ERROR Display: Log message	Cause: output if no free command nodes are available.
0 Alarm Level:	Reason Code = 29 Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
1 Customer-Selected Alarm Level	Type:Level:
2 Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3 System Recovery Action	Retry
4 Craftsperson Activity:	If this message is seen repeatedly from the same processor, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-88
DISK TEST FAILED message

5	DISK TEST FAILED Display: Maintenance terminal	Cause: output when the disk test requested has failed.
6	Alarm Level:	Reason Code = N/A Corresponds to ERRMAP entry: DSK ERROR ALM System Default: Type:CriticalLevel:0
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
9	System Recovery Action	Retry
0	Craftsperson Activity:	Refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

**Table 7-89
DISK USE > xx% message**

❾	DISK USE > xx%	Where: xx = disk use percent; Values: 70, 90 or 99.
	Display: Log message	Cause: output anytime disk usage reaches 70, 90, or 99% of capacity.
❷	Alarm Level:	Reason Code = 05

Case 1:disk mode redundant

a.   **primary AMA data has reached 70% of capacity, there is a Minor alarm only; secondary AMA and LOG data is not deleted.**

b.   **primary AMA data has reached 90% of capacity, there is a Major alarm, after all secondary AMA and LOG data has been deleted. (one disk is made off-line, and the ONLY disk is used to store all incoming data).**

c.   **primary AMA data has reached 99% of capacity, there is a Critical alarm.**

Case 2: disk mode non-redundant; one disk already at maximum AMA capacity and the other disk is operating in the ONLY mode. On the ONLY disk, which is currently the ONLY disk available to accept incoming data:

d.   **primary AMA data has reached 70% of capacity, there is a Minor alarm only.**

e.   **primary AMA data has reached 90% of capacity, there is a Major alarm.**

f.   **primary AMA data has reached 99% of capacity, there is a Critical alarm, it is no longer possible to store additional data; EOT is returned to the Switching System (see BOTH DISKS FULL message).**

Corresponds to ERRMAP entry:
DSK 70% PRIMARY (at the 70% level)
DSK 90% PRIMARY (at the 90% level)
DSK STORE LIMIT (at the 100% level)

System Default:
Type:See Alarm LevelLevel:

Table 7-89
DISK USE > xx% message

	Customer-Selected Alarm Level	Type:Level:
	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
	System Recovery Action	System performs disk recovery procedure; sets DISK MODE ONLY when one disk reaches 100% full.
	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-90
DISK USE > xx% PRIMARY DATA message

	DISK USE > xx% PRIMARY DATA Display: Log message	Where: xx = disk use percent; values: 70, 90, 99. Cause: output anytime disk usage reaches 70, 90, or 99% of capacity.
	Alarm Level:	Reason Code = 05 Case 1:disk mode redundant a. **primary AMA data has reached 70% of capacity, there is a Minor alarm only; secondary AMA and LOG data is not deleted.** b. **primary AMA data has reached 90% of capacity, there is a Major alarm, after all secondary AMA and LOG data has been deleted.** c. **primary AMA data has reached 99% of capacity, there is a Critical alarm. (one disk is made off-line, and the ONLY disk is used to store all incoming data).**

Table 7-90
DISK USE > xx% PRIMARY DATA message

2	(continued)	Case 2:disk mode non-redundant; one disk already at maximum AMA capacity and the other disk is operating in the ONLY mode. On the ONLY disk, which is currently the ONLY disk available to accept incoming data:
		d. primary AMA data has reached 70% of capacity, there is a Minor alarm only.
		e. primary AMA data has reached 90% of capacity, there is a Major alarm.
		f. primary AMA data has reached 99% of capacity, there is a Critical alarm, it is no longer possible to store additional data; EOT is returned to the Switching System (see BOTH DISKS FULL message).
		Corresponds to ERRMAP entry: DSK 70% PRIMARY DSK 90% PRIMARY DSK STORE LIMIT (100% primary)
		System Default: Type:See Alarm LevelLevel:
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible:
		Customer-Selected Status Panel:Audible:
0	System Recovery Action	System performs disk recovery procedure; sets DISK MODE ONLY when one disk reaches 100% full.
0	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-91
DISK VS NOT FOUND message

❶	(log message) DISK VS NOT FOUND Display: Log message	Cause: output on a processor switch, power-up, or when booting the Active Processor, if the disk version sent from the disk is not in the table of disk versions in the software (defaults are set to NO BAD TRACK MAPping and small file size if this situation occurs). This indicates that one of the following has occurred: a. **disk program (firmware EPROM on the SCSI Interface PCA) is incorrect.** b. **Message ROM (MSGROM) has been corrupted.** c. **software version being used is out of date or incompatible with the disk program being used.** d. **communication with the disk is being corrupted.**
❷	Alarm Level: No disk mode change	Reason Code = N/A Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
❸	Customer-Selected Alarm Level	Type:Level:
❹	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
❺	System Recovery Action	Defaults are set to no bad track mapping and small file size for AMA, LOG and EXC files.
❻	Craftsperson Activity:	a. **Check the office records or packing list to determine the disk firmware version number. Compare that version number with the number returned by the following command. Enter (at the terminal):** **>DISK VS (cr)**

Table 7-91
DISK VS NOT FOUND message

6 (continued)	If the version number is incorrect, there may be a disk system problem. Proceed to step f. If the version number is correct, proceed to step b.
	b. Switch processors. Refer to the *Switch and Status Panel Operation* **subsection in the** *Maintenance Procedures Guide* **section.**

⚠ **CAUTION**
This action may cause a loss of data

Once processor switch activity has ceased, observe whether the error message repeats. If the error message does not repeat, proceed to step f. If the error message repeats, proceed to step c.

c.   Power down the Standby Processor. After the disk drive has stopped completely, power-up the standby processor. When power-up activity ceases, proceed to step d.

d.   Enter the following command to perform a processor switch:

>SWACT (cr)

After processor switch activity ceases, proceed to step e.

e.   Determine whether the problem message repeats. If the message does not repeat, the procedure is complete. Report this incident to Nortel as soon as possible. If the error message repeats, call your next level of support.

f.   Check the office records or packing list to determine the system software version number. Compare that version number with the number returned by the following command. Enter (at the terminal):

>VS (cr)

Table 7-91
DISK VS NOT FOUND message

6	(continued)	If the version number is incorrect, contact your next level of support to load the correct software to the BMC system.
		If the error message does not repeat after installation of the new software, the procedure is complete. If the message does repeat, proceed to step g.

       g. **Change the EPROM chips on the SCSI Interface PCAs. Refer to the** *Replacing EPROM ICs* **subsection of the** *Maintenance Procedures Guide* **section for more information.**

Note: It may be necessary to reformat the disk if the disk program is changed.

       If the error message does not repeat after installation of the new firmware, the procedure is complete. If the message does repeat, proceed to step h.

       h. **Replace the SCSI Interface PCAs using the procedure in the** *Maintenance Procedures Guide* **section.**

       If the error message does not repeat after installation of the new PCAs, the procedure is complete. If the message repeats, return PCAs to their original position and proceed to step i.

       i. **Call your next level of support.**

Table 7-92
DISK x HAS INSUFFICIENT CAPACITY message

❽	DISK x HAS INSUFFICIENT CAPACITY Display: Maintenance terminal	where: x = disk drive (A or B). Cause: occurs when: a. **user attempts to change the disk mode from NONE to ONLY and the selected disk drive unit supports less memory space than required for the software load (1 gigabyte).** b. **user attempts to change the disk mode from ONLY to PRIME and the user capacity of the shadow disk drive unit has less memory space than required for the software load (1 gigabyte).**
❶	Alarm Level:	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:MinorLevel:0
❶	Customer-Selected Alarm Level	Type:Level:
❷	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
❸	System Recovery Action	None.
❹	Craftsperson Activity:	Refer to the *Disk Drive Capacity Error Procedure* in the *Maintenance Procedures Guide* section.

Table 7-93
DISK: BACKUP FAILED message

5	DISK: BACKUP FAILED Display: Log message	Cause: output upon termination due to a failure of the disk backup operation. Backup operation attempted as a result of an ONLY to PRIME disk mode change request. Output for the following reasons: a. **disk not properly initialized.** b. **faulty SCSI Interface PCA.** c. **faulty disk drive.** d. **faulty power supply.** e. **faulty SCSI Crossover PCA.**
6	Alarm Level: DISK MODE non-redundant	Reason Code = N/A Corresponds to ERRMAP entry: System Default: Type:MinorLevel:1
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	Disk mode non-redundant; (response to keyboard entry)
0	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-94
DISK: BOTH DISKS CONTAINED PREFERRED STATUS message

2	(log message) DISK: BOTH DISKS CONTAINED PREFERRED STATUS Display: Maintenance terminal	Cause: output when: a. **SCSI Interface is going through initialization; both disks are found to contain status data indicating that each disk should be the only on-line and active disk.** b. **a new disk is placed into the BMC system and a CPU switch occurs. (The default is disk A ONLY mode.)**
2	Alarm Level: No disk mode switch	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
2	System Recovery Action	None
2	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-95
DISK: BUS CONTROLLER FAILED SELF TEST message

Z	DISK: BUS CONTROLLER FAILED SELF TEST, DISK: x	Where: x = disk drive (A or B)
	Display: Log message	Cause: output when the SCSI Interface or the SCSI bus controller fails its self test. Self test is done automatically after any bus reset.
2	Alarm Level: No change in disk mode	Reason Code = 27
		Corresponds to ERRMAP entry: DISK ER MESSAGE
		System Default: Type:MinorLevel:0
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor
		Customer-Selected Status Panel:Audible:
3	System Recovery Action	BMC disk system reattempts self-test. If the test fails, the system is made non-redundant.
2	Craftsperson Activity:	Refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-96
DISK: BUS CONTROLLER INTERRUPT WHILE IDLE message

3	(log message) DISK: BUS CONTROLLER INTERRUPT WHILE IDLE AUXILIARY STATUS: xx, INTERRUPT STATUS yy Display: Log message	Where: xx = contents of the bus controller auxiliary status register (in Hex). yy = contents of the bus interrupt status register (in Hex). Cause: output when the SCSI Interface or the SCSI bus controller generates an unexpected interrupt.
4	Alarm Level: Possible change in disk mode	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
7	System Recovery Action	None
8	Craftsperson Activity:	Refer to the description of the TEST command in this document. If the problem continues, refer to the *Disk Drive Diagnostics Procedure* in the *Maintenance Procedures Guide* section.

Table 7-97
DISK: BUS DATA TRANSFER BYPASSED AUXILIARY message

9 (log message)
DISK: BUS DATA TRANSFER
BYPASSED AUXILIARY
STATUS: xx, INTERRUPT STATUS:
yy STAGE: aa   DRIVE: bb DISK
COMMAND: cc dd(1) dd(2)... dd(n)
DISK JOB: ee,
PARAMETERS: ff gg hh(1) hh(2)
hh(3) kk(1) kk(2)
SIDE z

Where:
xx = contents of the bus controller auxiliary status register (in Hex).
yy = contents of the bus interrupt status register (in Hex).
aa = a two letter code indicating the state of the SCSI bus cycle that the system SCSI Interface was in when the error occurred.

= ID = Idle= SL = Select = CM = Command
= DT = Data= D2 = Data2 = RQ = Request
= R2 = Request2= ST = Status = MG = Message
= DC = Disconnect

bb = drive unit number (in Hex) ranging from 0 to 15, plus the two highest order bits have special meaning. The 80-bit ON indicates a data output was to occur. This occurs in writes and parameter assignments. The 40-bit ON indicates that this message normally would be suppressed, but the printing of error messages on all tries has been enabled. Normally, only the last try of any disk operation generates an error message.
cc = cc dd(1) dd(2)... dd(N) = the first two letters are a two letter code for the disk command that was being transferred to or carried out by the OMTI disk controller
ee = a two letter code for the disk job in progress.

= CK = check for ready

Directory update after dynamic relocation:

 After a directory track has been relocated:
D0 = read prime D1 = seek prime D2 = seek standby
D3 = write prime D4 = write standby

After a data track has been relocated:
D5 = seek prime D6 = seek standby D7 = write prime
D8 = write standby

Formats:FA = AFB = B

Table 7-97		
DISK: BUS DATA TRANSFER BYPASSED AUXILIARY message		
1	(continued)	Relocate track from prime; — used by backup: L1 = read prime L2 = seek prime L3 = seek standby L4 = write prime L5 = write standby Assign disk parameters.: PA = To A PB = To B RC = recalibrate Reads: RA = from A RB = from B From prime: R1 = read prime R2 = read standby (if read prime failed) Relocate track from standby (if standby succeeded) R3 = read standby R4 = seek prime R5 = seek standby R6 = write prime R7 = write standby Backup track — used by backup: T1 = seek prime T2 = seek standby T3 = read prime T4 = write standby Writes: WA = To A WB = To B To both when redundant: W1 = seek prime W2 = seek standby W3 = write prime W4 = write standby Parameters: ff gg hh(1) hh(2) hh(3) kk(1) kk(2) ff = quantity of sectors involved (in Hex). gg = drive unit number (in Hex). hh(1) hh(2) hh(3) = logical sector number (in Hex). kk(1) kk(2) = buffer address (in Hex) z = indicates one of two redundant sides (A or B) Cause: output when an error occurs during an SCSI bus cycle between the SCSI bus controller and the OMTI disk controller.
0	Alarm Level: No change in disk mode	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
4	Customer-Selected Alarm Level	Type:Level:

Table 7-97
DISK: BUS DATA TRANSFER BYPASSED AUXILIARY message

2	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
3	System Recovery Action	Disk mode goes to ONLY mode.
4	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-98
DISK: BUS ERROR, m message

5	DISK: BUS ERROR, m PHASE: nJOB: w COMMAND: x DISK: y, z Display: Log message	Where: m = bus error no response - SCSI bus or TIMEOUT Informational SCSI messages 5836 SPC Hardware Error Parity Error Invalid Drive Requested Active Drive Requested Unexpected Interrupt, Bus Service Unexpected Interrupt, Disconnected Unexpected Interrupt, Function Complete Unexpected Interrupt, Invalid Command Unexpected Interrupt, Reselected Unexpected Interrupt, Selected Message Not Supported, Extended Message Message Not Supported, Linked Command Message Not Supported, Reserved Code Message Not Expected, Command Complete Message Not Expected, Save Data Pointers Message Not Expected, Restore Pointers Message Not Expected, Disconnect Message Not Expected, Message Reject Message Not Expected, Identify n = SCSI phase name Bus FreeSelection ReselectionMessage In Message OutCommand In Command OutData StatusUnknown

Table 7-98
DISK: BUS ERROR, m message

1	(continued)	w = Job name Read Redundant Write Redundant Read Single Write Single Backup Read Disk Capacity Read Number Reassign Bad Sector of Defects Format Inquiry Check Disk x = Command Name Format Unit Inquiry Mode Select Mode Sense ReadRead Capacity Read Defect MRead Defect G Reassign BlockRequest Sense Rezero UnitSeek Test Unit ReadyWrite y = Disk Drive (A or B) z = Disk Drive Operating Mode PrimeStandby ActiveOff-Line Cause: output when the SCSI bus fails to execute a bus phase properly.
✆	Alarm Level: disk mode change	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
✇	Customer-Selected Alarm Level	Type:Level:
✈	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
✉	System Recovery Action	Disk mode goes to ONLY mode.
✊	Craftsperson Activity:	If the attempt is successful, system continues normally. If the attempt is unsuccessful, refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-99
DISK: COMMAND ERROR message

5	DISK: COMMAND ERROR, COMMAND: xJOB: w SECTOR: ab cd ef gh DISK: y, zSENSE: r, s	Where: w = Job name Read Redundant Write Redundant Read Single Write Single Backup Read Disk Capacity Read Number Reassign Bad Sector of Defects Format
	Display: Log message	x = Command Name Format UnitInquiry Mode SelectMode Sense ReadRead Capacity Read Defect MRead Defect G Reassign BlockRequest Sense SeekRezero Unit WriteTest Unit Ready y = disk drive (A or B) z = Disk Drive Operating Mode PrimeStandby ActiveOff-Line abSector = Hex address cdLogical Blockof a failed sector. efAddress gh

Note: SECTOR data appears only if the disk drive returns a sector number as part of this output.

		r, s = Sense key and Code key pair returned from request sense. (If either of these fields is a two-digit hex value, the disk drive returned a vendor unique value for that field. Consult disk drive vendor supplied documentation for further details.) Recoverable Error, Recoverable Read Error with ECC Not Ready Drive Not Ready Drive Not Selected Illegal Function for Device Type

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Table 7-99
DISK: COMMAND ERROR message

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1   (continued)   Medium Error,
                                        ID Field CRC Error
                                        Uncorrectable Error
                                        No ID Field Address Mark
                                        No Data Field Address Mark
                                        Block Not Found
                                        Seek Error
                                        Format Failed
                                        No Defect Spare Location Available

                                        Hardware Error,
                                        No Seek Complete
                                        Write Fault
                                        Drive Not Ready
                                        Drive Not Selected
                                        No Track Zero
                                        No ID Field Address Mark
                                        RAM Failure
                                        SCSI Msg Reject Error
                                        SCSI Hardware Error
                                        Select Reselect Failed

                                        Illegal Request,
                                        Primary Defect List Not Found
                                        Invalid Block Address
                                        Invalid Field in CDB
                                        Invalid LUN
                                        Invalid Field in Parameter List

                                        Unit Protection,
                                        Write Protect
                                        Medium Change
                                        Power Up or Reset
                                        Mode Select Change Condition

                                        Data Protect,
                                        Write Protect

                                        Aborted Command,
                                        Parity Error
                                        Initiator Detected Error
                                        Illegal Message

                                        Cause: output when a disk command fails

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Table 7-99
DISK: COMMAND ERROR message

3	Alarm Level: Possible disk mode change	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
5	System Recovery Action	Varies, depending upon the specific error type.
6	Craftsperson Activity:	If the disk system is made non-redundant, refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-100
DISK: DMA INTERRUPT message

3	(log message) DISK: DMA INTERRUPT DMA REGISTERS: xx(1) xx(2) xx(3) xx(4) xx(5) xx(6) xx(7) Display: Log message	Where: xx = DMA register data Cause: SCSI Interface DMA controller generates an interrupt.
4	Alarm Level: No change in disk mode	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:

Table 7-100
DISK: DMA INTERRUPT message

⓿	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
❻	System Recovery Action	Attempt to change disk mode to ONLY mode.
❷	Craftsperson Activity:	If the attempt is successful, system continues normally. If the attempt is unsuccessful, refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-101
DISK: FAILURE GOING ON LINE message

❽	DISK: FAILURE GOING ON LINE Display: Log message	Cause: output upon termination due to a failure of bringing a formerly off-line disk drive unit back on-line.
❹	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DSK ERROR ALM System Default: Type:N/ALevel:N/A
❺	Customer-Selected Alarm Level	Type:Level:
❻	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
❼	System Recovery Action	Disk system is placed in disk ONLY mode.
❻	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-102
DISK: MULTIPLE REASSIGN CONDITION message

0	DISK: MULTIPLE REASSIGN CONDITION Display: Maintenance terminal	Cause: this message follows a DISK: COMMAND ERROR message. An additional bad sector has been located on the disk. Relocation cannot be scheduled; data in that sector is lost.
0	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	Disk system is placed in or remains in an ONLY mode.
4	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-103
DISK: PROCEDURE IN PROGRESS message

5	DISK: PROCEDURE IN PROGRESS Display: Maintenance terminal	Cause: output if any of the following are attempted while any of the following are already in progress. a. **disk format** b. **disk initialization.** c. **disk mode changes.**
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None; input request is rejected.
0	Craftsperson Activity:	Attempt command at a later time.

Table 7-104
DISK: REASSIGN COMPLETED message

8	DISK: REASSIGN COMPLETED Display: Log message	Cause: output when a bad disk sector relocation is complete.
2	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:0

Table 7-104
DISK: REASSIGN COMPLETED message

🔢	Customer-Selected Alarm Level	Type:Level:
🔢	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
🔢	System Recovery Action	Updates bad sector information stored on disk directory track. Reflected in the DISK USAGE and DISK REPORT fields.
🔢	Craftsperson Activity:	None.

Table 7-105
DISK: REASSIGN DATA NOT RECOVERED message

🔢	DISK: REASSIGN DATA NOT RECOVERED Display: Log message	Cause: this message follows a DISK: COMMAND ERROR message. The bad sector relocation has failed; data for this sector is lost.
🔢	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: DSK CRD HW ERR System Default: Type:MajorLevel:2
🔢	Customer-Selected Alarm Level	Type:Level:
🔢	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
🔢	System Recovery Action	Disk system is placed in non-redundant mode.
🔢	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-106
DISK: REASSIGN SCHEDULED message

❾	DISK: REASSIGN SCHEDULED Display: Log message	Cause: this message follows a DISK: COMMAND ERROR message. The bad sector relocation has been scheduled for relocation on the disk. Relocation begins during a period of low, or no disk activity.
❽	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: DSK CRD HW ERR System Default: Type:MajorLevel:2
❺	Customer-Selected Alarm Level	Type:Level:
❻	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
❼	System Recovery Action	Disk system is placed in non-redundant mode if number of bad sectors are encountered.
❽	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-107
DISK: RST-7 message

❾	DISK: RST-7 Display: Log message	Cause: SCSI Interface CPU executes an illegal instruction.
❷	Alarm Level: No change in disk mode	Reason Code = 27 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0

Table 7-107
DISK: RST-7 message

🔲	Customer-Selected Alarm Level	Type:Level:
🔲	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
🔲	System Recovery Action	Disk system restarts task.
🔲	Craftsperson Activity:	If this message is seen more than once, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-108
DISK: x FAILURE message

🔲	DISK: x FAILURE Display: Log message	Where: x = specific device (that failed) = PROCESSOR = EPROM = PRAM1 = SRAM = STACK = PC RANGE = SRAM2 Cause: SCSI Interface PCA has failed a major diagnostic routine.
🔲	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
🔲	Customer-Selected Alarm Level	Type:Level:

Table 7-108
DISK: x FAILURE message

⓪	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
⓪	System Recovery Action	Processor Switch
⓪	Craftsperson Activity:	If this message is seen more than once, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-109
DMA BUSY message

②	DMA BUSY Display: Maintenance terminal	Cause: output when a DMA function is requested while the DMA is busy (while TEST command is running).
②	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
②	Customer-Selected Alarm Level	Type:Level:
②	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
②	System Recovery Action	None
②	Craftsperson Activity:	If this message is seen during periods of low traffic, replace the CPU PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-110
DMA TIME OUT ALARM message

Z (log message) DMA TIME OUT ALARM PORT RAM BYTES STAT DMA B1 C800 0000 3A TEC Bx C800 03C2 zz Display: Log message Data shown above is for example only.	Where: B1 = port address used by DMA. C800 = address of last byte written. 0000 = bytes transferred -1. 3A = DMA status byte. Bx = TEC/DSI port address C800 = address of first byte written. 03C2 = block size. zz = command byte (in Hex) = 01 = WRITE= 02 = READ = 03 = ERASE= 04 = BACKSPACE = 05 = FILEMARK= 06 = REWIND TAPE = 08 = OPERATION= 09-0E = TAPE OPERATION = 10-1E = DMA TIMEOUT = 20-2E = DMA OR CMD ERROR = 40-4E = DMA IN PROGRESS All other command byte values are combinations of the above listed codes. Cause: output as a DMA status report from the main command (DMA status report).

Note: In the event that the value of the command byte (as listed above) indicates a faulty condition, record the values for use in conjunction with Nortel field service personnel in the trouble shooting efforts.

Z Alarm Level: Processor switch	Reason Code = 35 Corresponds to ERRMAP entry: DMA COMM FAIL System Default: Type:MajorLevel:2
Z Customer-Selected Alarm Level	Type:Level:
Z Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:

Table 7-110
DMA TIME OUT ALARM message

2	System Recovery Action	None
2	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide section*.

Table 7-111
DOWNLOAD REQUESTED message

2	DOWNLOAD REQUESTED Display: Terminal message	Cause: output when the software is not running.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
2	System Recovery Action	None
2	Craftsperson Activity:	Contact the next level of support to get software downloaded to BMC disk.

Table 7-112
DPR TEST FAILED message

0	(log message) DPR TEST FAILED ADR:xxxx RD:yy WR:zz Display: Maintenance terminal	Where: xxxx = DPR address where the fault occurred (in Hex). yy = incorrect value read from memory (in Hex). zz = expected value that was written to memory (in Hex). Cause: output when the DPR test, initiated by the TEST command, or the DPRTST command, and executed on the standby processor, does not obtain the expected results
0	Alarm Level: Processor switch	Reason Code = 21 Corresponds to ERRMAP entry: DSK CRD HW ERR System Default: Type:MajorLevel:2
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	None
4	Craftsperson Activity:	Replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* for the in the *Maintenance Procedures Guide* section.

Table 7-113
DPR TEST NOT SUPPORTED message

5	DPR TEST NOT SUPPORTED Display: Maintenance terminal	Cause: a DPR test is normally conducted automatically at 10 before the hour, each hour of the day. This test is conducted in order to verify that communication is possible with the SCSI Interface. If the SCSI Interface processor did not understand (recognize) the type of message it receives, this message is displayed.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
10	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-114
D-RAM ERROR xx AT yyyy message

1	(log message) D-RAM ERROR xx AT yyyy Display: Log message	Where: xx = interrupt register value (page number, hi bit is parity bit). yyyy = next program address to be executed. Cause: output when a parity error interrupt is received from the DRAM memory assembly.
2	Alarm Level: Processor switch	Reason Code = 9 Corresponds to ERRMAP entry: D_RAM ERROR System Default: Type:MajorLevel:1
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	Processor switch; after five consecutive attempts in one hour.
6	Craftsperson Activity:	If this message is seen repeatedly, refer to the *DRAM PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-115
DSK MSG xx: message

7 DSK MSG xx:		Where: xx = cross-references to software message(s). These responses appear during disk activities in the monitor mode. System software is not running.

00 = MSG RCVD PARM DISK   02 = WRT MEM COMPLETE   04 = OUTPUT COMPLETE
0B = RST-7   0C = QTY BAD TRACKS   0D = INIT COMPLETE
0E = INIT FAILED   0F = UNINIT SYS OR BAD DISK   10 = VERSION MSG
12 = INIT NOT ALLOWED   13 = NO DSK PARM   14 = DSK FAIL GOING ON LINE
15 = NO DSK ON LINE   16 = BOTH DSK PREFERRED   17 = ILLEGAL MODE CHANGE
18 = DSK NOT READY   19 = DSK ALARM   1A = DSK MODE
1B = SIDE   1C = DMA REGISTERS   1D = DMS INTRPT
1E = FAILED SELF TEST   1F = INTRPT WHILE IDLE   20 = CMD ERROR
21 = DSK JOB   22 = CMD ATTEMPTED   23 = STATUSES, STAGE,
                    WHILE BUSY   DRIVE, CMD
24 = BUS ERROR   25 = DATA XFER BYPASSED   26 = DSK NOT INITED
27 = PARM CHANGE NOT   28 = FORMAT NOT ALLOWED   29 = TIME OUT
     ALLOWED
2A = DSK PROC IN PROG   2B = FORMAT DONE   2C = FORMAT FAILED
2D = BACKUP FAILED

   Display: Maintenance terminalCause: disk message(s) as output during boot mode.

8	Alarm Level: N/A; (the BMC system is already in a catastrophic alarm condition for some other reason)	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
1	System Recovery Action	If a disk error message was indicated in "xx", the recovery action is based on the indicated disk error message.
2	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-116
EC-CF-ALM message

3	(log message) EC-CF-ALM (Error Control-Conflict-Alarm) Display: Log message	Cause: output after a conflict in error control commands. A conflict can occur when both processors are in the same state (both active or both standby).
4	Alarm Level: No processor switch	Reason Code = 14 Corresponds to ERRMAP entry: ERR CTL CONFL System Default: Type:MajorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
7	System Recovery Action	System selects one processor to be active.
8	Craftsperson Activity:	Refer to the *System Reboot Procedure* in the *Maintenance Procedures Guide* section. If the problem continues, refer to the *Error Control II PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-117
EC-IC-ALM message

1	(log message) EC-IC-ALM (Error Control-Illegal Command-Alarm) Display: Log message	Cause: output automatically after an illegal error control command.
2	Alarm Level: No processor switch	Reason Code = 18 Corresponds to ERRMAP entry: ERROR CTL INCON System Default: Type:MajorLevel:0
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	None.
6	Craftsperson Activity:	Refer to the *System Reboot Procedure* in the *Maintenance Procedures Guide* section. If the problem continues, refer to the *Error Control II PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-118
ERROR DETECTED ON PROC x message

5	(log message) ERROR DETECTED ON PROC x Display: Log message	Cause: message displayed in response to the TEST (keyboard entry) command, where the BMC processor detects a problem with one or more of the PCAs. (This message is accompanied by a card entry message, listing the potential assembly failures.)
6	Alarm Level: No processor switch	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	As specified for the associated PCA error message.

10	Craftsperson Activity:	a. **Refer to the associated PCA error message for more definitive information of the fault.**
		
		    i. **Reference the procedure sheet for any other PCA error messages that appear.**
		
		    ii. **Do any craftsperson activity procedures in the associated PCA error procedure sheets. (If unsuccessful, proceed with step b.)**
		
		b. **Call for technical assistance.**

Table 7-119
ERROR OPENING ACTIVE FILE message

1	(log message) ERROR OPENING ACTIVE FILE Display: Log message	Cause: indicates that the Active Call Record file contained within the Active File Table cannot be opened.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Contact next level of support

Table 7-120
ERROR READING CALL RECORDS message

7	(log message) ERROR READING CALL RECORDS Display: Log message	Cause: output to indicate the inability to read call records from disk. This is usually associate with the DISK: COMMAND ERROR.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DISK READ ERROR System Default: Type:MajorLevel:0-3
9	Customer-Selected Alarm Level	Type:Level:

Table 7-120
ERROR READING CALL RECORDS message

0	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
4	System Recovery Action	Determined by associated disk error messages.
2	Craftsperson Activity:	Refer to the associated disk error messages.

Table 7-121
EXCESSIVE INVALID BLOCKS message

3	(log message) EXCESSIVE INVALID BLOCKS Display: Log message	Cause: exception report printed whenever the daily count of invalid call record blocks reaches the threshold value specified by the VALPARM INVALID site data entry.
4	Alarm Level: Processor switch	Reason Code = 26 Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
7	System Recovery Action	Processor switch
8	Craftsperson Activity:	Contact the next level of support to verify and correct the data coming into the BMC from the Switching System.

Table 7-122
EXCESSIVE INVALID RECORDS message

9	(log message) EXCESSIVE INVALID RECORDS Display: Log message	Cause: exception report printed whenever the daily count of invalid call records reaches the threshold value specified by the VALPARM INVALID site data entry.
6	Alarm Level: Processor switch	Reason Code = 26 Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
5	System Recovery Action	Processor switch
6	Craftsperson Activity:	Refer to the *Block Display Procedure* in the *Maintenance Procedures Guide* section.

Table 7-123
FALSE DMA INTERRUPT message

5	FALSE DMA INTERRUPT Display: Log message	Cause: output when an erroneous interrupt signal is received indicating the end of a DMA transfer that has never occurred.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DMA COMM FAIL System Default: Type:MajorLevel:2
5	Customer-Selected Alarm Level	Type:Level:

Table 7-123
FALSE DMA INTERRUPT message

8	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
9	System Recovery Action	May cause a processor switch.
6	Craftsperson Activity:	Replace the CPU PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-124
FALSE DMA TIMEOUT message

6	FALSE DMA TIMEOUT Display: Log message	Cause: output when an erroneous interrupt signal is received indicating the end of a DMA transfer that has never occurred, resulting in an expiration of the DMA transfer timer.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DMA COMM FAIL System Default: Type:MajorLevel:2
6	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
6	System Recovery Action	May cause a processor switch.
6	Craftsperson Activity:	Replace the CPU PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-125
FILE BUSY, TRY AGAIN message

6	FILE BUSY, TRY AGAIN Display: Maintenance terminal	Cause: response to an IDXMAINT EXAMINE or IDXMAINT SUMMARY command while the file is temporarily unavailable.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
0	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	Requested is aborted.
2	Craftsperson Activity:	Attempt command when polling is complete.

Table 7-126
FILE READ IN PROCESS message

3	FILE READ IN PROCESS Display: Maintenance terminal	Cause: response to an IDXMAINT EXAMINE or IDXMAINT SUMMARY command while call record polling is under way.
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:

Table 7-126
FILE READ IN PROCESS message

6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	Requested is aborted.
8	Craftsperson Activity:	Attempt command when polling is complete.

Table 7-127
FL EOB message

5	(log message) FL EOB (False End-of-Block) Display: Log message	Cause: output when a tape command line goes true, when it was expected to go false. The command line is not equal to 0. This output should not appear during normal operation; used by Nortel for test and verification purposes only. Ignore this message if it appears when changing TEC/DSI PCAs or removing TEC/DSI cables.
6	Alarm Level: if active unit = processor switch = Major alarm; Level 1 if standby unit = no processor switch = Minor alarm; Level 0	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:See Alarm LevelLevel:N/A
8	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:See Alarm Level Audible: Customer-Selected Status Panel: Audible:

Table 7-127
FL EOB message

8	System Recovery Action	a. **If the message is from the active unit (Major Alarm, Level 1), a processor switch occurs.** b. **If the message is from the standby unit (Minor Alarm, Level 0), no processor switch occurs.**
8	Craftsperson Activity:	Verify cable placement and status of MTU ports on the Switching System. In addition, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-128
FORMAT FAILED message

8	FORMAT FAILED Display: Maintenance terminal	Cause: output on termination due to failure of the format operation as a result of the DISK FORMAT A (or B) command.
	Note: The DISK FORMAT x command is used in extreme emergencies ONLY and then under the direction of the Nortel Technical Support personnel.	
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None (disk task is terminated)
9	Craftsperson Activity:	Refer to the *Disk Drive Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-129
FORMAT IN PROGRESS message

9	FORMAT IN PROGRESS Display: Maintenance terminal	Cause: output if the DISK FORMAT x or DISK MODE x command is entered and either disk is currently being formatted.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
9	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	Disk task is terminated.
9	Craftsperson Activity:	Wait until the FORMAT DONE message is seen, then continue.

Table 7-130
FORMAT NOT ALLOWED message

🗇 FORMAT NOT ALLOWED Display: Maintenance terminal	Cause: printed in response to the DISK FORMAT command when both drives are on-line. Also output in response to DISK FORMAT when the BMC is in ONLY mode and the disk selected for formatting is the active disk.
Note: Use the DISK FORMAT x command only in extreme emergencies and then only under the direction of Nortel field support.	
🗇 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9 Customer-Selected Alarm Level	Type:Level:
🗇 Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
🗇 System Recovery Action	Termination of disk job.
🗇 Craftsperson Activity:	Check to determine which disk drive is to be formatted and input the correct disk drive. Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section if the problem continues.

Table 7-131
ILLEGAL COMMAND message

● ILLEGAL COMMAND	Cause: firmware message that responds, when:
Display: Maintenance terminal	**a.** **user enters a command that was not recognized by the system.**
	b. **user has an insufficient priority level to use the command.**
	c. **user enters a command on a processor that is not running a program.**
● Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
● Customer-Selected Alarm Level	Type:Level:
● Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
● System Recovery Action	None
● Craftsperson Activity:	Verify the syntax of the command using the associated section of this document.

Table 7-132
ILLEGAL DISK MODE CHANGE REQUEST message

0	ILLEGAL DISK MODE CHANGE REQUEST Display: Maintenance terminal	Cause: output in response to DISK MODE command when requested mode change is illegal. Message is output whenever one of the following disk mode changes is requested: A ONLY to A ONLYB ONLY to B ONLY B ONLY to A PRIMEA PRIME to A PRIME NONE to A PRIMEA ONLY to B PRIME B PRIME to B PRIMEDWN to B PRIME A PRIME to DWNB PRIME to DWN DWN to DWN
0	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	Termination of input request job.
4	Craftsperson Activity:	Refer to the DISK MODE command section of this document for the list of valid disk mode changes.

Table 7-133
ILLEGAL PASSWORD message

5	ILLEGAL PASSWORD Display: Maintenance terminal	Cause: output when the user does not include the proper six alphanumeric characters of a password in an attempt to enter a new password into the BMC.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
0	Craftsperson Activity:	Verify that the password is correct and is entered in upper case characters only.

Table 7-134
ILLEGAL PRIORITY message

2	ILLEGAL PRIORITY Display: Maintenance terminal	Cause: output in response to either the PSWD or the MPRI command when the user enters an invalid priority number when setting up the command that is not within the system parameter limits.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-134
ILLEGAL PRIORITY message

2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
1	System Recovery Action	None; input is rejected
8	Craftsperson Activity:	Refer to the associated command subsections in this document for correct syntax.

Table 7-135
ILLEGAL TIME-OUT PARAMETER message

7	ILLEGAL TIME-OUT PARAMETER Display: Maintenance terminal	Cause: output in response to a SETTERM TIMEOUT key command when the user-requested time-out value is beyond the established threshold (valid values are between 0 and 120 minutes).
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None; input is rejected
2	Craftsperson Activity:	Refer to the associated command subsection in this document for correct syntax.

Table 7-136
ILLEGAL USER NUMBER message

3	ILLEGAL USER NUMBER Display: Maintenance terminal	Cause: output in response to the PSWD command when a specified user number in a command does not exist in the password list. Valid password numbers are 0-9.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None; input is rejected
8	Craftsperson Activity:	Refer to the associated command subsection in this document for correct syntax.

Table 7-137
IMPROPER FILE TYPE message

9	IMPROPER FILE TYPE Display: Maintenance terminal	Cause: output in response to the IDXMAINT command, if the user enters an unknown FILE TYPE keyboard command argument (valid entries are: AMA or LOG).
9	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-137
IMPROPER FILE TYPE message

1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	Requested action is terminated.
4	Craftsperson Activity:	Reenter the command with the proper file type (AMA, or LOG). Refer to the IDXMAINT command section of this document.

Table 7-138
IMPROPER FORMAT TYPE message

5	IMPROPER FORMAT TYPE Display: Maintenance terminal	Cause: output in response to the IDXMAINT EXAMINE keyboard command, when the specified format type is inappropriate for the given file type. (valid values: ASCII, HEX, PACKED, and EBCDIC)
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:

Table 7-138
IMPROPER FORMAT TYPE message

✆	System Recovery Action	None
✆	Craftsperson Activity:	Refer to the IDXMAINT command section of this document for the correct syntax. Reenter the command with a valid format type.

Table 7-139
IMPROPER LINK DISCONNECT: RETRY LIMIT message

🔔	IMPROPER LINK DISCONNECT: RETRY LIMIT Display: Log message	Cause: output when the BMC turns over the line to the HOC, but the HOC does not respond with the correct protocol.
🔔	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
🔔	Customer-Selected Alarm Level	Type:Level:
🔔	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
🔔	System Recovery Action	Link is disconnected by BMC.
🔔	Craftsperson Activity:	If seen repeatedly, refer to the *Polling Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-140
IMPROPER LINK DISCONNECT: TIMEOUT message

3	IMPROPER LINK DISCONNECT: TIMEOUT Display: Log message	Cause: output when the BMC tries to become the "talker", but does not get a response from the HOC after 12 attempts.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
6	System Recovery Action	Link is disconnected by BMC.
2	Craftsperson Activity:	If seen repeatedly, refer to the *Polling Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-141
INCOMING CALL REJECTED nn message

❽	(log message)
	INCOMING CALL REJECTED nn
	
	Display: Log message
		Where: nn = reason for call rejection:
		    01 = remote station password rejected.
		    02 = local password rejected.
		
		Cause: output to indicate that the remote station request to set up a data link was denied due to a security violation.

❻	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
❺	Customer-Selected Alarm Level	Type:Level:
❻	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❺	System Recovery Action	Link is disconnected by BMC.
❻	Craftsperson Activity:	Verify the correct KYWD and COLLPSW settings with HOC personnel.

Table 7-142
INPUT BLOCK CHECKSUM ERROR message

0	INPUT BLOCK CHECKSUM ERROR Display: Log message	Cause: output when a call record block record block received from the Switching System is in error.
1	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None
4	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-143
INVALID ADDR message

5	INVALID ADDR Display: Maintenance terminal	Cause: a program load from disk failed because one of the program records had a load address out of the allowed loading range.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:

Table 7-143
INVALID ADDR message

Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
System Recovery Action	BMC attempts to reboot software three times, then aborts, leaving BMC without active software.
Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide section*.

Table 7-144
INVALID BLOCK DETECTED message

INVALID BLOCK DETECTED Display: Log message	Cause: output when an invalid block is detected by the TEC/DSI PCA. This message also indicates a generic invalid block error. An alarm is generated only when the number of invalid blocks received exceeds the threshold limit for invalid blocks as defined using the VALPARM INVALID command.
Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: EXCESS INV BLKS System Default: Type:MinorLevel:0
Customer-Selected Alarm Level	Type:Level:
Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
System Recovery Action	None
Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-145
INVALID CALL RECORD FORMAT message

☷	INVALID CALL RECORD FORMAT Display: Log message	Cause: output for the following reasons: a. **call record received from the Switching System is not a valid LSSGR billing call record.** b. **communications between the MP and a TEC/DSI PCA is faulty.** c. **communication between the Switching System and a TEC/DSI PCA is faulty.**
☷	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
☷	Customer-Selected Alarm Level	Type:Level:
☷	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
☷	System Recovery Action	None.
☷	Craftsperson Activity:	Refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-146
INVALID NUMBER ENTERED message

9 INVALID NUMBER ENTERED Display: Maintenance terminal	Cause: output in response to an IDXMAINT EXAMINE or IDXMAINT CREATE DIR keyboard command when a numerical field is entered incorrectly.
8 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5 Customer-Selected Alarm Level	Type:Level:
8 Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7 System Recovery Action	None.
8 Craftsperson Activity:	Verify the syntax of the command using the associated section of this document. Reenter the command with a valid number.

Table 7-147
INVALID RANGE message

9 INVALID RANGE Display: Maintenance terminal	Cause: output when incorrect parameters are entered in conjunction with the AMAHRS command.
0 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
0 Customer-Selected Alarm Level	Type:Level:

Table 7-147
INVALID RANGE message

Ø	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
Ø	System Recovery Action	None.
Ø	Craftsperson Activity:	Refer to the AMAHRS command section of this document for the correct syntax.

Table 7-148
INVALID SECURITY COMMAND message

Ø	INVALID SECURITY COMMAND Display: Maintenance terminal	Cause: output in response to a command entry that is not recognized by the BMC.
Ø	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
Z	Customer-Selected Alarm Level	Type:Level:
Ø	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
Ø	System Recovery Action	None.
Ø	Craftsperson Activity:	Refer to the PSWD command subsection for the correct syntax.

Table 7-149
INVALID SLGRP: EMBEDDED COMMAND IGNORED message

2	INVALID SELGRP: EMBEDDED COMMAND IGNORED Display: log message	Cause: output in response to Secondary AMA data poll request from the HOC. Indicates that the poll request failed when an invalid SELGRP command value (greater than six) was sent in the Secondary AMA data poll request message.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
2	System Recovery Action	None.
2	Craftsperson Activity:	Contact the personnel at the HOC to inform them that the SELGRP value that they specified in the polling request message was invalid. The SELGRP value must be between zero and six to be valid. Refer to the *Secondary Data Polling Procedure* to see the steps that must be performed by the HOC personnel to poll Secondary AMA data.

Table 7-150
INVALID SITE DATA FILE message

7	INVALID SITE DATA FILE Display: Log message	Cause: output when the site data file read from disk is rejected because it is the wrong size.
8	Alarm Level: No processor switch	Reason Code = 14 Corresponds to ERRMAP entry: SITE FILE ERROR System Default: Type:MinorLevel:0
9	Customer-Selected Alarm Level	Type:Level:
10	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
2	System Recovery Action	None.
2	Craftsperson Activity:	Refer to the *Site File Error Procedure* in the *Maintenance Procedures Guide* section.

Table 7-151
IPCOM LOAD ERROR message

2	(log message) IPCOM LOAD ERROR Display: Log message	Cause: the booting of the standby processor failed because a program block Inter-Processor Communications (IPCOM) transfer failed and was detected by the standby. (Message is from the standby processor.)
2	Alarm Level: Processor switch inhibited	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:MajorLevel:3

Table 7-151
IPCOM LOAD ERROR message

2	Customer-Selected Alarm Level	Type:Level:
3	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
2	System Recovery Action	System make three attempts to load.
3	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-152
KERNEL SERVICE ERROR - xxx message

2	KERNEL SERVICE ERROR - xxx Display: Maintenance terminal	Where: xxx -error code. Valid codes: 1 - operations with task id 0 are invalid 2 - invalid task id is specified 3 - requested task is not active 4 - requested task is already active 5 - too many tasks 26 - no free dynamic memory available 27 - requested block size is too large 28 - block is not allocated to this task 29 - invalid pointer is specified 30 - specified block tag does not exist 31 - no timers available 32 - specified timer does not exist 33 - too late to cancel specified timer 35 - no dispatch queue nodes available Cause: output when one of the protocol tasks of the CP on the 56K Interface PCA has detected an error in a 56K kernel operation. In general, occurrence of this error indicates that CP software has been corrupted.
3	Alarm Level: N/A	Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-152
KERNEL SERVICE ERROR - xxx message

1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
3	System Recovery Action	Polling may be affected by the error condition that caused the message to print.
4	Craftsperson Activity:	a. **If the message persists, reboot the CP using the following command:** **>CP BOOT ACT (cr)** If the error message does not repeat, the procedure is complete. If the message does repeat, proceed to step b. b. **Replace the SCSI Interface PCA in the Standby Processor. Refer to the associated procedure in the** *Maintenance Procedures Guide* **section.** If after PCA replacement the error message repeats, return the PCA to its original position and proceed to step c. c. **Call your next level of support.**

Table 7-153
KEY COMMAND NOT AVAILABLE message

5 KEY COMMAND NOT AVAILABLE Display: Maintenance terminal	Cause: output when: a. **firmware keyboard command is entered when an equivalent software command is available. (Software is running in the BMC system.)** b. **message (input) is a keyboard command involving a disk operation that was given to the standby processor.**	
6 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A	
7 Customer-Selected Alarm Level	Type:Level:	
8 Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:	
9 System Recovery Action	Request is aborted.	
10 Craftsperson Activity:	Refer to the software commands subsection of this document for the valid commands.	

Table 7-154
KEY "SETCLK", THEN ENTER DATE, TIME, AND DAY message

2	KEY "SETCLK", THEN ENTER DATE, TIME, AND DAY Display: Maintenance terminal	Cause: output when the clock data fields do not contain valid values, such as at system power-up. a. **an alarm is set in the ERRMAP list.** b. **message appears again if the alarm is cleared, but no valid time is entered.**
2	Alarm Level: No processor switch	Reason Code = N/A Corresponds to ERRMAP entry: NO CLK TIME SET System Default: Type:MinorLevel:0
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
2	System Recovery Action	No processor switch.
2	Craftsperson Activity:	Refer to the SETCLK command subsection for the correct syntax.

Table 7-155
LAST GOOD #xxxxxx, GOT #yyyyyy message

Z	LAST GOOD #xxxxxx, GOT #yyyyyy Display: Maintenance terminal	where: xxxxxx = sequence number of the last valid AMA block retrieved from DPR. yyyyyy = sequence number of the block received is out of sequence or BMC has already received another block with that sequence number. Cause: usually output as additional information, along with the xxx DUPLICATE BLOCKS REJECTED message to identify an AMA data block that has been duplicated.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
1	System Recovery Action	Block is not sent to the HOC if polling.
2	Craftsperson Activity:	Refer to the *Index Corruption Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-156
LINK DISCONNECTED message

2	LINK DISCONNECTED Display: Log message	Cause: output when an HOC-to-BMC Session has ended.
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	Session is terminated and link status is reinitialized.
8	Craftsperson Activity:	If this message is seen repeatedly, refer to the *Polling Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-157
LINK TRANSMIT WINDOW message

9	(log message) LINK TRANSMIT WINDOW Display: Log message	Cause: output when a BISYNC communication timeout has occurred, usually in addition to the LINK xx RETRY THRESH EXCEEDED, MSG: mm nn message.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-157
LINK TRANSMIT WINDOW message

❶	Customer-Selected Alarm Level	Type:Level:
❷	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❸	System Recovery Action	Link is terminated by the BMC.
❹	Craftsperson Activity:	If seen repeatedly, refer to the *Polling Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-158
LINK xx RETRY THRESH EXCEEDED, MSG: mm nn message

❺	LINK xx RETRY THRESH EXCEEDED, MSG: mm nn Display: Log message	Cause: output when, during the polling process, the HOC responds with a NAK or WAK message more than 32 times.
❻	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
❼	Customer-Selected Alarm Level	Type:Level:
❽	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❾	System Recovery Action	Link is disconnected by BMC.
❿	Craftsperson Activity:	If seen repeatedly, refer to the *Polling Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-159
LOG FILE DELETED message

Z	(log message) LOG FILE DELETED Display: Log message	Cause: output when the LOG files are deleted to make room for primary AMA files; occurs when disk usage percentage reaches 90% and when the files DA TO DLET value has reached 0.
Z	Alarm Level: No processor switch	Reason Code = 07 Corresponds to ERRMAP entry: DSK 90% PRIMARY System Default: Type:MajorLevel:0
Z	Customer-Selected Alarm Level	Type:Level:
Z	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
Z	System Recovery Action	None.
Z	Craftsperson Activity:	If an alarm is generated, refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-160
MPSR ERR message

Z	(log message) MPSR ERR Display: Maintenance terminal	Cause: output when the MP session report task encounters an error.
Z	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-160
MPSR ERR message

7	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
1	System Recovery Action	Session is terminated.
2	Craftsperson Activity:	If the problem persists, contact your next level of support.

Table 7-161
MP SWITCH message

1	(log message) MP SWITCH (Microprocessor Switch) Display: Log message	Cause: indicates a processor switch occurred and which processor is on-line (from the processor ID of the log message). Output when: a. **automatic 3:00 a.m. processor switch occurs.** b. **processor switch occurs manually (craftsperson activity).** c. **processor switch alarm occurs.**
2	Alarm Level: Processor switch	Reason Code = 12 Corresponds to ERRMAP entry: PLANNED SWITCH System Default: Type:PswitchLevel:0
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:

Table 7-161
MP SWITCH message

7 System Recovery Action	Processor switch occurred.
8 Craftsperson Activity:	Refer to the associated error messages if an alarm is generated.

Table 7-162
MTUxx: CMD-yy, STA-zz, BLK-aaaa message

9 (log message) MTUxx: CMD-yy, STA-zz, BLK-aaaa Display: Maintenance terminal	Where: xx = TEC/DSI port address (B0 or B2). = B0 = message is from TEC/DSI PCA in slot 13. = B2 = message is from TEC/DSI PCA in slot 12. yy = command byte (in Hex) zz = status byte (in Hex) aaaa = number of data blocks received since last tape rewind.

CMDDESCRIPTIONSTADESCRIPTION
01WRITE01BUSY
02READ02READY
03ERASE04-07WRITE ENABLED
04BACKSPACE08-0FAT LOAD POINT
05FILE MARK10-1FAT END OF TAPE
06REWIND20-3FREWIND
08-0ETAPE OPERATION40-7FALARM
10-1EDMA TIMEOUT80-FCON LINE
20-2EDMA OR CMD ERROR
40-4EDMA IN PROGRESS

All other values are combinations of the above listed codes (i.e., STA 82 = AT LOAD POINT, READY).

Cause: outputs at TEC/DSI error (TEC/DSI status report).

Note: In the event that the values (as listed above) indicate a faulty condition, record the values for use in conjunction with Nortel field service personnel in the trouble shooting efforts.

Table 7-162
MTUxx: CMD-yy, STA-zz, BLK-aaaa message

❶	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
❷	Customer-Selected Alarm Level	Type:Level:
❸	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❹	System Recovery Action	None
❺	Craftsperson Activity:	Refer to the associated error messages if an alarm is generated. In addition, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-163
NO BLOCK LAST ii MINUTES message

❶	NO BLOCK LAST ii MINUTES Display: Log message	Where: ii = number of minutes (1-60). Cause: output on the boundary if, for the past boundary no data blocks were received from the Switching System and the boundary is between the limits specified by the AMAHRS site data parameters.
❷	Alarm Level: No processor switch	Reason Code = 28 Corresponds to ERRMAP entry: NO BLK LAST PER System Default: Type:MinorLevel:0
❸	Customer-Selected Alarm Level	Type:Level:

Table 7-163
NO BLOCK LAST ii MINUTES message

❷	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
❸	System Recovery Action	Alarm, no processor switch.
❹	Craftsperson Activity:	Verify traffic/AMA data level in Switching System is at least one block per *ii* minutes. Also, refer to the *No Block Last Hour Procedure* in the *Maintenance Procedures Guide* section.

Table 7-164
NO BOOT ON DISK message

❶	NO BOOT ON DISK Display: Log message	Cause: output when a booting operation failed due to the lack of, or the inability of the disk system to find the file BOOTFL on disk. Associated with other alarms.
❷	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
❸	Customer-Selected Alarm Level	Type:Level:
❹	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
❺	System Recovery Action	None
❻	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-165
NO CMD message

7	(log message) NO CMD (No Command) Display: Log message	Cause: output when a tape command line goes false, when it was expected to go true. The command code is 0. This output should not appear during normal operation; used by Nortel for test and verification purposes only. Ignore this message if it appears when changing TEC/DSI PCAs or removing TEC/DSI cables.
8	Alarm Level: if active unit = processor switch = Major alarm; Level 1 if standby unit = no processor switch = Minor alarm; Level 0	Reason Code = N/A Corresponds to ERRMAP entry: TEC PRIME FAIL or TEC STNBY FAIL System Default: Type:See Alarm LevelLevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
10	Other Alarm Indications	Default: Status Panel:See Alarm Level Audible: Customer-Selected Status Panel: Audible:
3	System Recovery Action	a. **If the message is from the active unit (Major Alarm, Level 1), a processor switch occurs.** b. **If the message is from the standby unit (Minor Alarm, Level 0), no processor switch occurs.**
2	Craftsperson Activity:	Verify cable placement and status of the MTU ports in the Switching System. In addition, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-166 NO DATA AVAILABLE message	
3 NO DATA AVAILABLE Display: Maintenance terminal	Cause: output when the sequence number requested by the HOC in the polling request is not present within the index for the embedded SELGRP setting.
4 Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5 Customer-Selected Alarm Level	Type:Level:
6 Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7 System Recovery Action	None.
8 Craftsperson Activity:	HOC personnel have attempted to poll a sequence number using an embedded SELGRP value that does not contain that sequence number. Refer to the *Secondary Data Polling Procedure* in the *Maintenance Procedures Guide* section.

Table 7-167
NO DISK ON LINE message

9	(log message) NO DISK ON LINE Display: Log message	Cause: output when a disk job attempts to select the PRIME or STANDBY disk drive unit before either of the disk drive unit(s) have been put on-line.
0	Alarm Level: N/A	Reason Code = 27 Corresponds to ERRMAP entry: DSK MODE ALARM System Default: Type:MajorLevel:0
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	None.
4	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-168
NO FILE AVAILABLE message

9	NO FILE AVAILABLE Display: Maintenance terminal	Cause: output when the requested file does not exist, is not open, or does not have the necessary characteristics for the designated operation.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:

Table 7-168
NO FILE AVAILABLE message

8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
0	Craftsperson Activity:	Refer to the description of the IDXMAINT CREATE FILE command in this document.

Table 7-169
NO FILE CREATED message

3	NO FILE CREATED Display: Log message	Cause: output when a patch file was not created after attempting to write patch data.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Refer to the description of the DOS File firmware command.

Table 7-170
NO S/W ON DISK message

3	NO S/W ON DISK Display: Log message	Cause: output when a program boot from disk failed when the following events occur: a. **system cannot find one of the files entered in the boot list.** b. **program file does not exist on disk.**
8	Alarm Level: N/A (other alarms are present)	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
8	System Recovery Action	None
2	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-171
NO SECNDRY FILES TO DELETE message

7	(log message) NO SECNDRY FILES TO DELETE Display: Log message	Cause: output when no secondary files can be deleted to make room for primary files. Occurs when the disk(s) are over 70 percent full.
8	Alarm Level: Based on associated disk usage message: DSK 70% PRIMARY - Minor; 0 or DSK 90% PRIMARY - Major; 0	Reason Code = 06 Corresponds to ERRMAP entry: N/A System Default: Type:See Alarm LevelLevel:0
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:See Alarm Level Audible: Customer-Selected Status Panel:Audible:
1	System Recovery Action	No processor switch.
2	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-172
NO SEL message

3	(log message) NO SEL (No Select) Display: Log message	Cause: output when a tape command line status is TRUE, but is not accompanied by Unit Select Status (USEL). This output should not appear during normal operation; used by Nortel for test and verification purposes only. Ignore this message if it appears when changing TEC/DSI PCAs or removing TEC/DSI cables.
4	Alarm Level: if active unit = processor switch = Major alarm; Level 1 if standby unit = no processor switch = Minor alarm; Level 0	Reason Code = N/A Corresponds to ERRMAP entry: TEC PRIME FAIL or TEC STNBY FAIL System Default: Type:See Alarm LevelLevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:See Alarm Level Audible: Customer-Selected Status Panel: Audible:
7	System Recovery Action	a. **If the message is from the active unit (Major Alarm, Level 1), a processor switch occurs.** b. **If the message is from the standby unit (Minor Alarm, Level 0), no processor switch occurs.**
8	Craftsperson Activity:	Verify cable placement and status of the MTU ports in the Switching System. In addition, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-173
NO SITE DATA ON DISK message

1	NO SITE DATA ON DISK Display: Log message	Cause: output when an attempt to read or write site data to RAM is made, but the file does not exist.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel: Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Refer to the *Site File Error Procedure* in the *Maintenance Procedures Guide* section.

Table 7-174
NO SUCH KEYBOARD COMMAND message

1	NO SUCH KEYBOARD COMMAND Display: Maintenance terminal	Cause: output in response to the MPRI command, when the user tries to change or examine a keyboard command priority that does not exist.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:

Table 7-174
NO SUCH KEYBOARD COMMAND message

8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None
0	Craftsperson Activity:	Refer to the MPRI command subsection.

Table 7-175
OFFLINE DISK FULL message

3	OFFLINE DISK FULL Display: Log message	Cause: output when the standby disk is full.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:MajorLevel:0
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	Refer to the *Disk Drives Full Procedure* in the *Maintenance Procedures Guide* section.

Table 7-176
OFF-LINE DISK HAS UNPOLLED DATA message

3	(log message) OFF-LINE DISK HAS UNPOLLED DATA Display: Log message	Cause: when the BMC disk system becomes filled up with call record data while in a PRIME disk mode, the standby disk automatically goes to off-line mode. This message is displayed immediately after the establishment of the DISK ONLY mode.
8	Alarm Level: Disk mode is non-redundant	Reason Code = N/A Corresponds to ERRMAP entry: OFFLIN DSK FULL System Default: Type:MajorLevel:0
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
4	System Recovery Action	None
2	Craftsperson Activity:	a. **Request a polling session.** b. **Refer to the *Disk Drives Full Procedure* in the *Maintenance Procedures Guide* section.** c. **Contact your next level of support if you encounter any difficulty at any time.**

Table 7-177
ONLY MODE NON-REDUNDANT x message

3	ONLY MODE NON-REDUNDANT x Display: Log message	Where: x = A or B processor (A or B). Cause: output when the user has manually switched the system to processor x in the ONLY mode.
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: ONLY NON-REDUND System Default: Type:MinorLevel:0
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
7	System Recovery Action	None
8	Craftsperson Activity:	None

Table 7-178
PARITY ERROR: x DETECTED message

0	PARITY ERROR: x DETECTED Display: Log message	Where: x = indicate which side detected the error. = SCSI Interface = MP Cause: output whenever a parity error is detected by the MP in DPR, or by SCSI Interface in DPR or PRAM.
0	Alarm Level: Major	Reason Code = N/A Corresponds to ERRMAP entry: DSK CARD HW ERR System Default: Type:MajorLevel:2
5	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	Processor switch.
5	Craftsperson Activity:	Refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-179
PASSWORD ALREADY EXISTS message

5	PASSWORD ALREADY EXISTS Display: Maintenance terminal	Cause: output in response to the PSWD command, when the user tries to add a password that already exists in the password list.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None.
0	Craftsperson Activity:	Verify PSWDL to determine existing passwords and priorities.

Table 7-180
PASSWORD DOES NOT EXIST message

6	PASSWORD DOES NOT EXIST Display: Maintenance terminal	Cause: output in response to the PSWD command, when the user attempts to delete a password that does not exist in the password list.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
6	Customer-Selected Alarm Level	Type:Level:

Table 7-180
PASSWORD DOES NOT EXIST message

6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
6	System Recovery Action	None.
6	Craftsperson Activity:	Verify PSWDL to determine the current passwords.

Table 7-181
PASSWORD TABLE FULL message

6	PASSWORD TABLE FULL Display: Maintenance terminal	Cause: output in response to the PSWD command when the user attempts to add a password when the allowable passwords limit has already been reached (limit of 10 user passwords on the BMC).
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
0	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	None.
2	Craftsperson Activity:	Use the PSWDL command to view the password list.

Table 7-182
POLLING IN PROCESS message

3	POLLING IN PROCESS Display: Maintenance terminal	Cause: output in response to the IDXMAINT EXAMINE FILE keyboard (command) request, when: a. **call record polling is under way.** b. **an attempt is made to read from a new file before the last file is closed.**
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	The request is aborted.
8	Craftsperson Activity:	a. **Retry the input at a later time. Enter: (at the terminal)** **>IDXMAINT CLOSE (cr)**
	CAUTION **This input aborts the polling session and may cause a loss of data.**	
		b. **If the problem persists, switch processors.** c. **If message continues to be output after several attempts over a period of time, call for technical assistance.**

Table 7-183
PROG CHKSUM ALM VAL = nn message

7	(log message) PROG CHKSUM ALM VAL = nn Display: Log message	Where: nn = difference from 0 of the calculated checksum Cause: output when a program memory verification has failed for a downloaded program.
6	Alarm Level: Processor switch	Reason Code = 10 Corresponds to ERRMAP entry: PROG CKSUM ALM System Default: Type:MajorLevel:3
5	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
3	System Recovery Action	A processor switch occurs and an attempt is made to reload from the standby processor.
2	Craftsperson Activity:	Refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-184
PROLONGED FILE BUSY CLEARED message

5	PROLONGED FILE BUSY CLEARED Display: Log message	Cause: output when a disk file busy flag has been set for about 10 seconds following the input of an AMA data block.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DSK CRD HW ERR System Default: Type:MajorLevel:2
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
9	System Recovery Action	Flag is cleared and the block is processed.
9	Craftsperson Activity:	If seen repeatedly from the same processor, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-185
PROM CHKSUM ALM VAL = nn message

1	(log message) PROM CHKSUM ALM VAL = nn Display: Log message	Where: nn = difference from 0 of the calculated checksum Cause: output when a PROM program memory verification has failed.
2	Alarm Level: Processor switch	Reason Code = 16 Corresponds to ERRMAP entry: PROM CKSUM ALM System Default: Type:MajorLevel:3
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
5	System Recovery Action	Processor switch.
6	Craftsperson Activity:	Replace the EPROM PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-186
PURCHASED CAPACITY NOT AVAILABLE message

7	(log message) PURCHASED CAPACITY NOT AVAILABLE Display: Log message	Cause: output when the amount of storage capacity (in Logical Blocks) on the disk drive does not meet the minimum requirements to support the software.
8	Alarm Level:	Reason Code = 0 Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0
9	Customer-Selected Alarm Level	Type:Level:
0	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
0	System Recovery Action	Disk remains off-line.
0	Craftsperson Activity:	Refer to the *Disk Drive Capacity Error Procedure* in the *Maintenance Procedures Guide* section.

Table 7-187
RAM TEST FAILED message

0	RAM TEST FAILED Display: Log message	Cause: output when a RAM data byte check fails.
0	Alarm Level: Processor switch	Reason Code = N/A Corresponds to ERRMAP entry: D_RAM ERROR System Default: Type:MajorLevel:1

Table 7-187
RAM TEST FAILED message

	Customer-Selected Alarm Level	Type:Level:
	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
	System Recovery Action	Processor switch.
	Craftsperson Activity:	Refer to the *DRAM PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-188
REPORT IN PROGRESS message

	REPORT IN PROGRESS Display: Maintenance terminal	Cause: output when a report request is attempted while a report is being generated.
	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None, response to keyboard entry.
4	Craftsperson Activity:	Attempt report at a later time.

Table 7-189
SCSI: INTERRUPT FROM INVALID DEVICE message

5	SCSI: INTERRUPT FROM INVALID DEVICE Display: Log message	Cause: the SCSI Controller received an interrupt from an invalid source. Probably caused by an incorrectly strapped disk drive.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	Disk remains off-line.
0	Craftsperson Activity:	Verify the disk drive strapping. If correct, refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-190
SCSI: INTERRUPT WHILE IDLE message

2	SCSI: INTERRUPT WHILE IDLE Display: Log message	Cause: the SCSI Controller received an interrupt from an invalid source. Probably caused by an incorrectly strapped disk drive.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DISK ER MESSAGE System Default: Type:MinorLevel:0

Table 7-190
SCSI: INTERRUPT WHILE IDLE message

❷	Customer-Selected Alarm Level	Type:Level:
❷	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
❸	System Recovery Action	None.
❽	Craftsperson Activity:	Verify the disk drive strapping. If correct, refer to the *Disk Drive Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-191
SDI COM FAIL message

❼	(log message) SDI COM FAIL Display: Log message	Cause: occurs when the DMS-10 password is set (using the DMSP command), but the login fails to due a communications problem or incorrect password.
❽	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
❾	Customer-Selected Alarm Level	Type:Level:
❶	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:

Table 7-191
SDI COM FAIL message

3	System Recovery Action	None
2	Craftsperson Activity:	a. **Verify the value of the password set in the DMSP command.**
		b. **If the value of the password is correct, contact the next level of support to resolve a communication problem. If the value of the password is incorrect, reset the value of DMSP. Proceed to step c.**
		c. **Enter the SITDAT WRITE command to save the new password to disk. If this message occurs again, contact the next level of support to resolve a communication problem.**

Table 7-192
>> SET CLOCK << message

3	>> SET CLOCK << Display: Maintenance terminal	Cause: output when the system time field becomes scrambled.
8	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:

Table 7-192
>> SET CLOCK << message

☞	System Recovery Action	None
☞	Craftsperson Activity:	a. **Set the system clock using the SETCLK command. Refer to the *SETCLK* subsection for more information.** b. **Verify that the system time is updated using the CLK command. Refer to the *CLK* subsection for more information.** c. **If the incorrect time is displayed, contact your next level of support.**

Table 7-193
STANDBY PROC NOT AVAILABLE message

☞	(log message) STANDBY PROC NOT AVAILABLE Display: Log message	Cause: output when: a. **Error Control II PCA has determined that either the standby processor is in a higher alarm condition than the active processor, or that it is not powered up.** b. **response to a SWACT key command, or at 3:00 a.m. when a PREPARE TO SWITCH STATUS is not received from the Error Control II PCA.**
☞	Alarm Level: No processor switch possible	Reason Code = 40 Corresponds to ERRMAP entry: ONLY NON-REDUND System Default: Type:MajorLevel:0
☞	Customer-Selected Alarm Level	Type:Level:
☞	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:

Table 7-193
STANDBY PROC NOT AVAILABLE message

3	System Recovery Action	None
4	Craftsperson Activity:	Verify the Status Panel rockers. If the rockers are set to **O** and the ONL lamp is lit, determine whether troubleshooting is in progress. If troubleshooting is not in progress, set the rocker to **P** and turn the key. If the rockers are not set to **O**, refer to the *Boot Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-194
STBY BOOT FAIL message

5	STBY BOOT FAIL Display: Maintenance terminal	Cause: an attempt at booting the standby processor has failed due to the active processor detecting an IPCOM transfer problem, or because the standby processor has requested a premature halt to the operation from the active due to an error on the standby side.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	Based on the corresponding error message(s).
10	Craftsperson Activity:	Refer to the craftsperson activities for the associated error message(s).

Table 7-195
STRCT CODE INDEX OUT OF RANGE message

5	SRTCT CODE INDEX OUT OF RANGE Display: Log message	Cause: structure code generated by the Switching System is not supported by the BMC system.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
5	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
5	Craftsperson Activity:	Contact your next level of support if the problem persists. Problem may be in the Switching System.

Table 7-196
TAPE BLOCKS LOST = xxx message

3	(log message) TAPE BLOCKS LOST = xxx Display: Log message	Where: xxx = number of tape blocks lost (at the TEC/DSI PCA). Cause: output when AMA tape data block(s) are lost. Tape blocks can be lost for the following reasons: a. **when the current active AMA validation process has used up all of the available AMA buffers** b. **no buffers are available to handle the incoming block from the TEC/DSI PCA and the data block is lost.** c. **during any CPU switch:**
4	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
5	Customer-Selected Alarm Level	Type:Level:
6	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
7	System Recovery Action	None.
8	Craftsperson Activity:	Refer to the associated error messages in this document. Also, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-197	
TEC BUFFER OVERFLOW: xx BLOCKS message	
❽ (log message) TEC BUFFER OVERFLOW: xx BLOCKS Display: Log message	Where: xx = number of blocks not yet processed and overwritten by new blocks from the TEC/DSI PCA, when no empty buffers are available. Cause: output when: a. **call record from the Switching System are not being read from the buffer.** b. **block size is incorrect from the buffer.** c. **input block rate from the Switching System is excessive.**
❻ Alarm Level: No processor switch	Reason Code = 22 Corresponds to ERRMAP entry:TEC DATA OVERFLO System Default: Type:CriticalLevel:0
❺ Customer-Selected Alarm Level	Type:Level:
❻ Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
❺ System Recovery Action	No processor switch.
❻ Craftsperson Activity:	If the block rate has not increased, rotate the MTU ports in the Switching System. If the problem remains, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-198
TIME OUT message

0	TIME OUT Display: Maintenance terminal	Cause: output as part of an error message when a disk command is not successfully executed within an allocated time period.
1	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
1	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
3	System Recovery Action	None; task is terminated.
4	Craftsperson Activity:	Verify that the disk mode is PRIME. If not, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-199
UNINITIALIZED SYSTEM OR BAD DISK message

5	UNINITIALIZED SYSTEM OR BAD DISK Display: Maintenance terminal	Cause: output in response to a request to change disk mode from an ONLY mode to a PRIME mode when the off-line disk is uninitialized.
6	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
9	System Recovery Action	None

0	Craftsperson Activity:	a. **See the disk error message displayed along with this message for more definitive information of the fault.**
		
		    i. **Reference the table for any other disk error messages that appear.**
		
		    ii. **Perform any craftsperson activity procedures related to those error messages. (If unsuccessful, go to step b).**
		
		b. **Call for technical assistance.**

Table 7-200
UNKNOWN DISK MESSAGE xx message

☎	UNKNOWN DISK MESSAGE xx Display: Log message	Where: xx = message ID (in hex - 00-FF) Cause: output whenever a message ID is received by the MP from the SCSI Interface that is invalid.
☎	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
☎	Customer-Selected Alarm Level	Type:Level:
☎	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
☎	System Recovery Action	None.
☎	Craftsperson Activity:	If seen repeatedly, replace the SCSI Interface PCA using the *Miscellaneous PCA Replacement Procedure* in the *Maintenance Procedures Guide* section.

Table 7-201 **UNSUPPORTED STRCT CODE xxxxxx message**		
🏵	(log message) UNSUPPORTED STRCT CODE xxxxxx Display: Log message	Where: xxxxxx - structure code value Cause: structure code generated by the Switching System is not supported by the BMC system.
🏵	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
🏵	Customer-Selected Alarm Level	Type:Level:
🏵	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
🏵	System Recovery Action	Retry
🏵	Craftsperson Activity:	Contact your next level of support if the problem persists. Problem may be in the Switching System.

Table 7-202
VERSION POOL EXHAUSTED message

●	VERSION POOL EXHAUSTED Display: Log message	Cause: output when the number of versions of a file type (AMA or LOG) reaches 200.
●	Alarm Level:	Reason Code = 2B Corresponds to ERRMAP entry: DSK STORE LIMIT System Default: Type:CriticalLevel:0
●	Customer-Selected Alarm Level	Type:Level:
●	Other Alarm Indications	Default: Status Panel:CriticalAudible:Critical Customer-Selected Status Panel:Audible:
●	System Recovery Action	An EOT message is output to both TEC/DSI ports; blocking data input from the Switching System.
●	Craftsperson Activity:	Contact your next level of support.

Table 7-203
WR CMD message

❾	(log message) WR CMD (Wrong Command) Display: Log message	Cause: output when an illogical combination of tape commands is sensed. Forward and reverse bits are set. This output should not appear during normal operation; used by Nortel for test and verification purposes only. Ignore this message if it appears when changing TEC/DSI PCAs or removing TEC/DSI cables.
❿	Alarm Level: if active unit = processor switch = Major alarm; Level 1 if standby unit = no processor switch = Minor alarm; Level 0	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
⓫	Customer-Selected Alarm Level	Type:Level:
⓬	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
⓭	System Recovery Action	a. **If the message is from the active unit (Major Alarm, Level 1), a processor switch occurs.** b. **If the message is from the standby unit (Minor Alarm, Level 0), no processor switch occurs.**
⓮	Craftsperson Activity:	Verify cable placement and status of the MTU ports in the Switching System. In addition, refer to the *TEC/DSI PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-204
WRITE TO DISK FAILED message

⚫	WRITE TO DISK FAILED Display: Log message	Cause: a failure occurred when trying to write a block to disk during a download session.
⚫	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
⚫	Customer-Selected Alarm Level	Type:Level:
⚫	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
⚫	System Recovery Action	None; task is terminated
⚫	Craftsperson Activity:	a. **Switch processors.** b. **Retry the task.** c. **If the message does not repeat, procedure complete. If unsuccessful, go to step d.** d. **Call for technical assistance.**

Table 7-205
xx BLKS NOT UPDATED message

2	(log message) xx BLKS NOT UPDATED Display: Log message	Where: xx = excess block count. Cause: output when the update count (number of call record blocks sent) exceeds the number of call record blocks on disk remaining to be polled.
2	Alarm Level: N/A	Reason Code = 02 Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
2	Customer-Selected Alarm Level	Type:Level:
2	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
2	System Recovery Action	None
2	Craftsperson Activity:	Verify the AMAIDX using the IDXMAINT CHECK AMA command. If the AMAIDX is fine, no further action is required.

Table 7-206
xx SIO TEST FAILED message

Z	A2 SIO TEST FAILED A4 SIO TEST FAILED A6 SIO TEST FAILED Display: Log message	Where: xx = port definition: A2 =communications port; Modem/HOC link. (download link and first polling link) A4 =maintenance port; BMC is unable to obtain a Switching System prompt from the maintenance interface port (terminal 2 for DMS-100, SDI port for DMS-10. A6 =maintenance port; teleprinter. Cause: output to indicate that an SIO on a Quad SIO PCA) channel failed.
8	Alarm Level: Two Man/Machine SIO Links Fail = Major Alarm One Man/Machine SIO Links Fail = Minor Alarm HOC or EAI Fail = Minor Alarm	Reason Code = 15 Corresponds to ERRMAP entry: SIO-1 FAILURE System Default: Type: See Alarm Level Level:
9	Customer-Selected Alarm Level	Type:Level:
Q	Other Alarm Indications	Default: Status Panel: See Alarm Level Audible: Customer-Selected Status Panel: Audible:
2	System Recovery Action	None
2	Craftsperson Activity:	Refer to the *Quad SIO PCA Diagnostic Procedure* in the *Maintenance Procedures Guide* section.

Table 7-207
xxx DUPLICATE BLOCKS REJECTED message

1	(log message) xxx DUPLICATE BLOCKS REJECTED Display: Log message	Where: xxx = number of blocks rejected. Cause: during the screening process performed by the BMC (on all outgoing call record blocks to the HOC), a block sequence number was of lower numerical value than the one preceding it.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	Block is rejected; not sent to the HOC.
6	Craftsperson Activity:	Display the block sequence number in question. Refer to the *Block Display Procedure* in the *Maintenance Procedures Guide* section. Also refer to the *TEC/DSI PCA Diagnostic Procedure* in the same section.

Table 7-208
xxxIDX FILE FAILURE message

1	AMAIDX FILE FAILURE LOGIDX FILE FAILURE Display: Maintenance terminal	Cause: output when an attempt to update a record index file fails.
2	Alarm Level: Processor switch occurs	Reason Code = 03 Corresponds to ERRMAP entry: DSK INDEX ERROR System Default: Type:MinorLevel:0
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
5	System Recovery Action	Processor switch
6	Craftsperson Activity:	Refer to the *Index Corruption Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-209
xxxIDX FILE FULL message

5	(log message) AMAIDX FILE FULL (log message) LOGIDX FILE FULL Display: Log message	Cause: the index file designated contains 200 versions and an attempt is made to create another xxxCRD file.
6	Alarm Level: No disk mode change	Reason Code = 07 Corresponds to ERRMAP entry: DSK INDEX ERROR System Default: Type:MinorLevel:0
7	Customer-Selected Alarm Level	Type:Level:
8	Other Alarm Indications	Default: Status Panel:MinorAudible:Minor Customer-Selected Status Panel:Audible:
9	System Recovery Action	LOGCRD file deleted automatically for LOGIDX files only.
10	Craftsperson Activity:	Verify the file status using the IDXMAINT SUMMARY AMA command. If all blocks are primary, contact the HOC to establish polling.

Table 7-210
xxxIDX FILE OPEN ERROR : 03 message

🔒	(log message) AMAIDX FILE OPEN ERROR : 03 (log message) LOGIDX FILE OPEN ERROR : 03 Display: Log message	Cause: disk file error message that is output when a disk file operation could not open an index file.
🔒	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: DSK INDEX ERROR System Default: Type:MajorLevel:0
🔒	Customer-Selected Alarm Level	Type:Level:
🔒	Other Alarm Indications	Default: Status Panel:MajorAudible:Major Customer-Selected Status Panel:Audible:
🔒	System Recovery Action	None
🔒	Craftsperson Activity:	Refer to the *Index Corruption Recovery Procedure* in the *Maintenance Procedures Guide* section.

Table 7-211
xxx SEQ #yyyyyy NOT IN FILE message

1	AMA SEQ #yyyyyy NOT IN FILE LOG SEQ #yyyyyy NOT IN FILE Display: Maintenance terminal	Where: yyyyyy= Sequence Number (0-999999) Cause: response to IDXMAINT EXAMINE or IDXMAINT CREATE DIR keyboard request, when a sequence number for specified file type cannot be found on disk.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
5	System Recovery Action	The display function requested is terminated.
6	Craftsperson Activity:	Verify that the sequence number requested is valid using the IDXMAINT DIR xxx 255 command.

Table 7-212
xxx WRITE FILE CLOSED message

1	AMA WRITE FILE CLOSED LOG WRITE FILE CLOSED Display: Maintenance terminal	Cause: output when the current data write file is closed, using the IDXMAINT CREATE FILE command or during polling.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A
3	Customer-Selected Alarm Level	Type:Level:
4	Other Alarm Indications	Default: Status Panel:N/AAudible:N/A Customer-Selected Status Panel:Audible:
5	System Recovery Action	None
6	Craftsperson Activity:	If the message appears excessively, contact your next level of support.

Table 7-213
xxxxxx DOWNLOAD ABORTED message

1	xxxxxx DOWNLOAD ABORTED Display: Maintenance terminal	Where: xxxxxx = filename of file being downloaded. Cause: output whenever a software download procedure is aborted, regardless of reason.
2	Alarm Level: N/A	Reason Code = N/A Corresponds to ERRMAP entry: N/A System Default: Type:N/ALevel:N/A

Table 7-213
xxxxxx DOWNLOAD ABORTED message

🔒	Customer-Selected Alarm Level	Type:Level:
🔒	Other Alarm Indications	Default: Status Panel:Audible: Customer-Selected Status Panel:Audible:
🔒	System Recovery Action	None
🔒	Craftsperson Activity:	Contact the next level of support.

Table 7-214
xxxxxx FILE yyyyyy ERROR: ee message

🔒	xxxxxx FILE yyyyyy ERROR: ee Display: Maintenance terminal AMACRD AMAIDX LOGCRD SITDAT 6M02xx (DMS-10)	Where: xxxxxx = File Name (file name is determined at time of creation for software files; at time of implementation for patch files) BOOTCP DATSES LOGIDX MAINF2 TDYSTS YDYSTS 6M06xx (DMS-100) yyyyyy = Operation that returned the error = CREATE= OPEN= WRITE = READ= CLOSE= SAVE = REQBUF= DELETE= DIRTRY ee = Operation Error Code

Table 7-214
xxxxxx FILE yyyyyy ERROR: ee message

= 00 =	indicates file is closed	= 01 =	directory full
= 02 =	active file table full	= 03 =	no such file
= 04 =	file not closed	= 05 =	file not open
= 06 =	file expired	= 07 =	error writing last block
= 08 =	Quad SIO error	= 09 =	file write protected
= 10 =	channel busy	= 11 =	end of file
= 12 =	file not open for reading	= 13 =	hardware error
= 14 =	illegal file ID	= 15 =	illegal buffer ID
= 16 =	buffer overflow	= 17 =	no more room on disk
= 18 =	empty file is closed	= 19 =	illegal file name

Cause: an error occurred accessing the specified file during the specified operation.

🔔	Alarm Level: See the procedure for the particular message.	Reason Code = N/A Corresponds to ERRMAP entry: See the procedure for the particular message. System Default: Type:See Alarm LevelLevel:1
🔔	Customer-Selected Alarm Level	Type:Level:
🔔	Other Alarm Indications	Default: Status Panel:See Alarm Level Audible:Major Customer-Selected Status Panel: Audible:
🔔	System Recovery Action	As specified for the associated error message.
🔔	Craftsperson Activity:	If the SITDAT files are seen, refer to the *Site File Error Procedure* in the *Maintenance Procedures Guide* section. If BOOTCP files are seen, refer to the *Boot File Recovery Procedure* in the same section. If TDYSTS or YDYSTS files are seen, refer to the *Statistical File Error Procedure* in the same section. For any other files, contact the next level of support.

Section 060-INDP-510
System Operation Guide

The BMC is designed to be a fully-automatic device that provides storage of call record data. The BMC acquires data from the Switching System through a Magnetic Tape Port (MTP) and emulates all communication and control signals expected by the Switching System. The BMC stores received data on hard disk until the HOC requests the files be downloaded. Call record data can be transferred to a HOC through either dedicated or dial-up lines. When in communication with the HOC, the BMC is under functional control of the HOC. The BMC gives priority to the acquisition of data from the Switching System over polling of data to the HOC. The logical organization of data flow is diagramed in Figure 5-1. Figure 5-2 is a block diagram of major functional components.

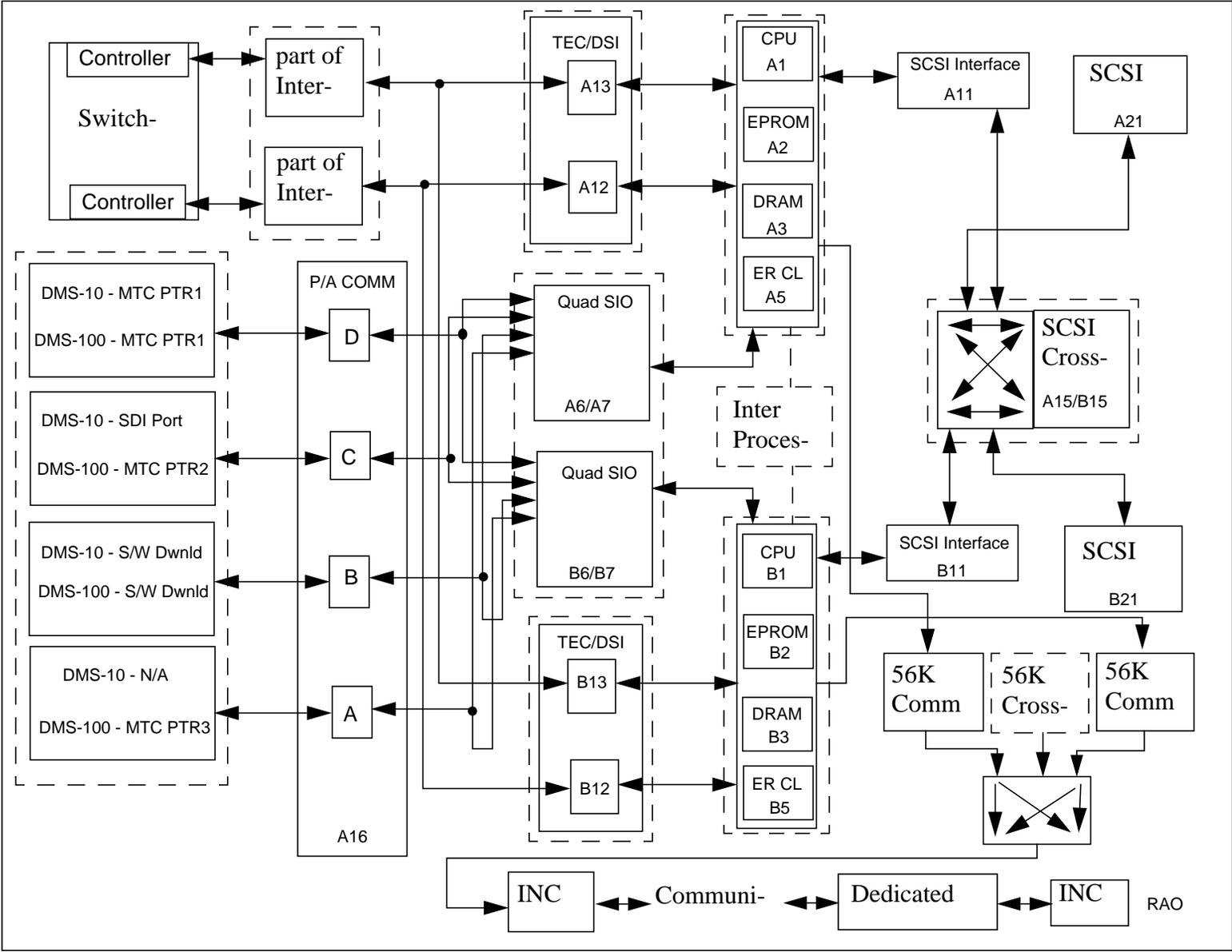**Figure 3-1**
Simplified block diagram of BMC operation
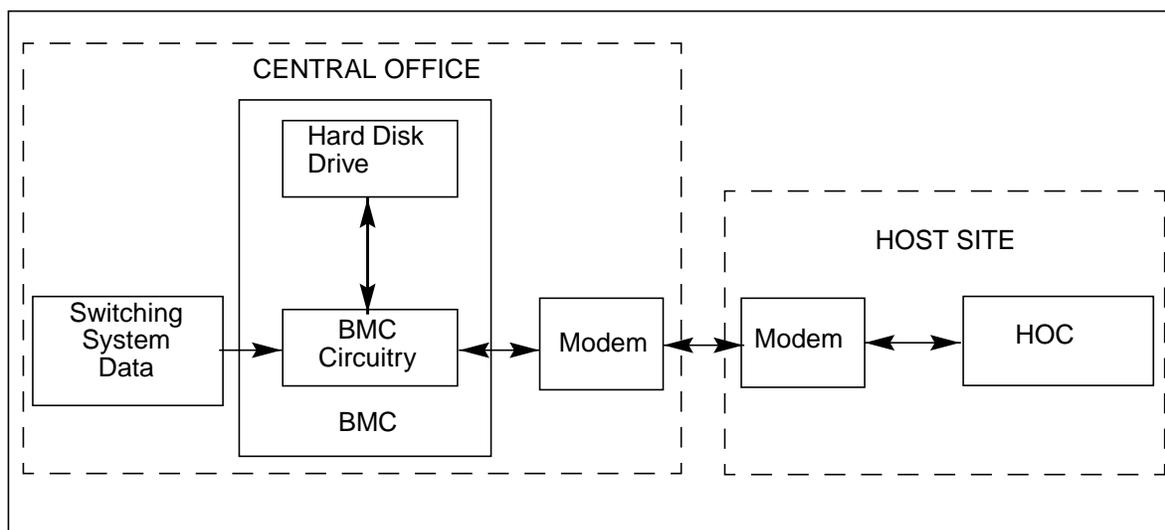
Figure 3-1
BMC Data Paths

The automatic operation of the BMC means that little user intervention is required. To provide greater understanding of operation, the transfer of data from the Switching System, the translation for intermediate storage, the polling of data to the HOC, and maintenance communications are described in this section.

Offload of data from the Switching System

The following section details the information related to the offload of data from the Switching System to the BMC.

Acquisition and Storage of Data

The transfer of call record data from the Switching System is through the Switching System's active MTP to the BMC through Switching System-specific Interface Box(es). Call record data is organized into blocks. These blocks can be from 9 to 2048 bytes long. The length of the block is dependent on the site data previously entered into the BMC memory. If call record data is less than the specified number of bytes, the remainder of the block is filled with hexadecimal AAs. Refer to the *System Description* section. Data is passed from the MTP to the BMC through Switching System specific Interface Box(es).

Interface Boxes

Interface Boxes provide the electrical and physical connection between the Switching System MTP and the TEC/DSI PCAs of the BMC. The Interface Boxes match the electrical characteristics of the physical layer protocol of the Switching System with the physical layer protocol of the BMC. The exact nature of the interface depends on the particular Switching System type. Interface Boxes are discussed in greater detail in the applicable Switching System Specific Data section. The Switching System characteristics are matched to the characteristics of the TEC/DSI PCAs.

TEC/DSI PCAs

The TEC/DSI PCAs are controlled by an on-board microprocessor and firmware instruction set. Each of these PCAs emulates the control signals and protocol requirements of an MTU. During data transfer, the active tape port sends a port select signal to the BMC. This signal is applied to both TEC/DSI PCAs, one in the active processor and one in the standby processor. This signal alerts the BMC as to which port is to be used and to treat all data from the other port as test data.   The TEC/DSI software responds to the commands that are normally sent to the tape drives, and provides the status, control, and strobe signals normally expected. The TEC/DSI PCAs form part of the physical layer and most of the link layer protocols for communication between the BMC and the Switching System. The TEC/DSI PCAs accept data from the MTP and places it in RAM for processing by the active processor.

Note: TEC PCAs are found in BMC systems configured for use with DMS-10 Switching Systems. DSI PCAs are found in BMC systems configured for use with DMS-100 Switching Systems.

BMC II System RAM

When the Switching System transmits data blocks, a signal is sent to the active processor to accept the block. The data block is transferred to an assigned buffer in the active processor's RAM over the BMC data bus. The buffer used depends upon whether the block contains test or call record data.

Test data blocks may be sent back to the Switching System for verification, but are not written to disk. A six block buffer in the main CPU is used to hold and validate call record data as specified by the site data of the system.

Note: Validation parameters verify that the block received is a valid data block. Parameters may be established to act on all fields of a data block (call record entries), or, only one field of the block (for example, block type).

Data Validation

Call records from the Switching System are validated and labeled while in BMC RAM. A sixteen byte identification header prefix and a four byte error control suffix are added to the call record block before it is written to disk. During the validation process, statistical and daily information is gathered and stored in separate files. Those labeled call record blocks and other information are sent to the active processor's SCSI Interface PCA under control of the CPU. The data may be written to both disks to provide backup of call record data (PRIME disk mode) or may be written to one disk (ONLY disk mode). The disk mode is independent of the processor mode. The active processor (A or B) may write to either disk (A or B) in either mode (PRIME or ONLY).

Call records are stored on disk in LSSGR format, along with the identification prefix and error control suffix data added by the BMC during the validation process. The sequence and source data are used by the BMC to uniquely identify call record data blocks. During the validation checks, all criteria relative to validation, thresholds, and alarms are used in examining the data block. If the block does not meet validation, an exception report is displayed on the terminal. In extreme cases, a processor alarm is generated.

Data Storage

Validated call records are loaded into a disk buffer. These buffers are located on the SCSI Interface PCA (slots A11 and B11). When a buffer is full, it is written to disk, while the other buffer is made available to receive call records. The SCSI Interface PCAs take the BMC call record blocks and organize them into units for disk storage (sectors). Data in the SCSI Interface

PCA is presented to the Disk Controller in the Disk Drive Assemblies in a form which can be handled by the disk drives. The SCSI Interface PCAs are intermediaries between RAM and the Disk Drive Assemblies.

The Disk Controllers control the location and labeling of call record data blocks on each disk. The Disk Assemblies contain Disk Controllers that control the activity of the drive and handle the physical movement of the drives. In PRIME disk mode, identical data is written to the primary disk, then to the standby disk for redundant data on the disks. The data is physically written to the disk drives by the SCSI Interface PCA in the active processor. The SCSI Interface PCA in the standby processor does not have physical access to the disk drives.

Data Types

Disk drives provide a data storage system by recording different types of information in separate files. The files are standard on the BMC Systems, whether or not they are used. Data received from the Switching System is recorded in the appropriate file on the disk. Files for record storage are listed in Table 5-1.

Table 8-1
BMC file names

File Name	File Contents
AMACRD	AMAT call record files
AMAIDX	AMAT call record index file that contains an index to the stored AMACRD files, which exist in two forms: • **Primary (unpolled)** • **Secondary (polled).**
LOGCRD	Contains a listing of log messages.
LOGIDX	Index file that contains an index to the stored LOGCRD files, which exist in two forms: • **Primary (unpolled)** • **Secondary (polled).**
SITDAT	Contains site specific data entered at start-up or updated as user requirements change.
Sheet 1 of 2	

Table 8-1
BMC file names

File Name	File Contents
TDYSTS and YDYSTS	Contains maintenance and statistical data concerning BMC unit operation.
Program Files	Contain the BMC unit program files.
Sheet 2 of 2	

To guard against data loss in the event of a loss of power, new AMA data is temporarily written to disk every minute. If a power fault causes a loss of memory, billing data is retrievable from the disk. The restored buffer, partially loaded, continues to receive call records until full, when the data is written to disk.

> *Note:*   If a statistical report is requested, call records held in temporary storage on disk are not included in the printout. File statistics are updated only when those call records are on disk.

Storage Types

The storage capacity of the disks allows several days of records to be stored as backup records. Once filled with primary, unpolled data, the BMC switches from redundant storage (files copied to the standby disk at the same time as they are being written the active disk) to non-redundant storage. This results in an overwrite of the redundant files on the standby disk. If both disks become filled with data, an EOT signal is returned to the Switching System, since no more data can be stored. Disk capacity is available to allow for storage of several days of records while any polling difficulties are resolved, to reduce the incidence of data loss. Ensuring that a disk drive is polled often enough to avoid problems is a function of office engineering. The BMC is not designed to guarantee sufficient disk space to accommodate an extended polling outage.

Polling of data by the HOC

This section details the information related to the polling of data on the BMC by the HOC.

HOC Communication

The HOC must initiate the retrieval and polling of call record data. The HOC uses a prearranged schedule to contact the BMC and poll data. Polling

schedules are a function of the expected traffic at the various CO sites. The HOC can request status, a file transfer, or abort the session. All of these activities must be initiated by the HOC.

BMC Communication

The HOC initiates remote operation through a modem over either dial-up or dedicated lines. The modem links are capable of transmitting data at speeds of 1200, 2400, 4800, and 9600. The communications protocol used is BISYNC for 1200, 2400, 4800, and 9600 baud.

> *Note:* The BMC BISYNC System with the common hardware platform can communicate data using the RS-232 or V.35 interface. The software limits the maximum baud rate to 9600 baud.

When the HOC requests a session connect, the incoming modem receives the HOC modem's carrier signal and automatically responds with carrier detect. The incoming modem is connected through the Power and Alarm Communication PCA, which communicates with the active processor. The modem attached to the BMC transmits a carrier that is recognized by the HOC modem and the physical link is established, and the HOC and BMC are in Contention mode. HOC bids for the line by transmitting an ENQ message to the BMC. The BMC acknowledges the HOC bid for control of the line with an ACK0 message. The HOC goes into Talker mode, and transmits a Text message containing the HOC password and the poll request. This HOC password must match the polling password of the BMC. If this message is not in the proper form or the password is incorrect, the BMC (in Listener mode) transmits an EOT message and then an DLE EOT message to the HOC to abort the session. If the Text message is valid, the BMC transmits an Acknowledgment (ACK1) message. After the acknowledgment, the HOC sends the session back into Contention mode with an EOT message. The BMC then bids for the line with transmission of an ENQ message. HOC responds with an ACK0 message. After receipt of the acknowledgment, the BMC goes into Talker mode and begins transmission of the polling data as Text messages. The HOC, in Listener mode, acknowledges the receipt of the Text messages with ACK0/ACK1 message (alternating). After all of the data has been transmitted, the BMC sends an Disconnect (DISC) message. The HOC responds with an ACK0/ACK1 message. The BMC then transmits an EOT message and an DLE EOT message to end the session.

BMC Status Request

The BMC CPU monitors and reports BMC activity and the status of the files on the system through activity reports. Upon request, the BMC transmits any available report to the HOC. These reports inform the HOC of BMC activity, indicating whether files are open for read, open for write, closed, transmitted, or unequipped. This informs the HOC what the BMC is doing and which files are primary (unpolled) or secondary (polled).

File Transfer

During a polling session, the HOC interprets which files are to be polled and request a file transfer. During a transfer of files, the BMC determines the file requested by the HOC. The CPU directs that the file move from disk to the SCSI Interface PCA, and then to RAM. The CPU directs the file to the 56K Interface PCA for file transfer.

Once a file is successfully transferred, the BMC sets the File Sent flag (mark file as secondary). If a bad transmission or missing data is sensed, retransmissions of specific blocks can be requested by the HOC. The HOC can request up to thirty retransmissions (one request; 29 retries) before disconnecting. After polling, the HOC may ask for another file, request a system report, or abort the session.

The modems communicate over the link until the BMC has transmitted all of the required data. During polling, a low level dialogue takes place, which verifies that blocks of data are being transmitted and received properly.

File Management

At the completion of sending all data requested, the HOC disconnects the link.

Note: During polling, the only activities that are indicated on the terminal are when the session was established and when the session was disconnected.

Maintenance Communication

Two RS-232C communication links on the Quad SIO PCA are reserved for communication links between the BMC and a customer-supplied terminal for maintenance communication. The first link provides local maintenance terminal access. The second link provides maintenance access via SDI port (DMS-10 only). There is a third link on the Quad SIO PCA that is used for program download by Nortel. Like the modem links, the printer communication path connects the printer to the Power and Alarm Communications PCA before reaching the Quad SIO PCA. This link provides the Human-Machine Interface for the BMC. The type of information passed over this link includes commands, messages, and alarm information.

The information on the RS-232 link is routed from the Power and Alarm Communication PCA to the Quad SIO PCA in the active processor. Commands received over this link are treated as interrupts by the BMC CPU. The active processor interprets the command and acts on it. During normal operation, log and error messages are generated by the BMC. These messages are output through the Quad SIO PCA to the maintenance terminal.

Section 060-INDP-610
Maintenance Procedures Guide

The following paragraphs provide the instructions for the use of this section. This section is divided into the following subsections:

- Equipment Description

- Routine Maintenance Procedures

- Diagnostic Procedures.

- Hardware Replacement.

The Equipment Description subsection provides a general listing of the overall physical structure of the BMC. For a thorough description of the BMC, refer to the *System Description* section.

The Routine Maintenance Procedures subsection lists the maintenance procedures that should be performed regularly to ensure proper functioning of the BMC. These procedures include fuse replacement, fan cleaning, and fan replacement.

The Diagnostic Procedures subsection contains the diagnostic procedures that are used to resolve the error conditions indicated by an error message. The *Command and Message Guide* section contains a complete listing of BMC error messages. The descriptions of the error messages in the *Command and Message Guide* section refer to the maintenance procedures in this section, when necessary.

The Hardware Replacement subsection contains the procedures necessary for replacement of the various hardware elements of the BMC. These elements include the PCAs, Power Supplies, and Disk Drives.

Equipment Description

The BMC is a self-contained rack-mountable unit used by a telephone company to collect and transmit AMA data. The hardware elements that comprise the BMC are listed in Table 6-1.

Table 6-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
N/A	BMC II	Billing Media Converter II (system) **(1) NT8M01GC -** BMC BISYNC with 1-GB disk drives for DMS-10 **(2) NT8M04GC -** BMC BISYNC with 1-GB disk drives for DMS-100
A		A Processor (Upper) Chassis - N/A
A1	CPU	Central Processor Unit Logic w/DMA PCA - **NT6M62BA**
A2	EPROM	Erasable, Programmable, Read-Only Memory PCA **(1) NT6M63FI** - for DMS-10 Switching Systems **(2) NT6M63FL** - for DMS-100 Switching Systems
A3	DRAM	Memory Expansion PCA - **NT6M64AA**
A5	ERC	Error Control II PCA - **NT6M65AG**
A6	QUAD SIO	Quad Serial Input/Output PCA - **NT6M60BA**
A7	56K INTF	56K Interface PCA - **NT6M94AA**
A11	SCSI INTF	SCSI Interface PCA - **NT6M66CA**
A12 & A13	TEC/DSI	Tape Emulation Circuit/Data Stream Interface PCA **(1) NT6M89BD** - TEC for DMS-10 Switching System **(2) NT6M70BD** - DSI for DMS-100 Switching System
A14	BUS TERM	Bus Terminator PCA - **NT6M68AA**

Sheet 1 of 4

Table 6-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
A15	SCSI XOVR	SCSI Crossover PCA (located on inner portion of hinged panel at rear of upper chassis) - **NT6M93BA**
A16	P/A COMM	Power and Alarm Communications PCA (located on the outer portion of hinged panel at rear of upper chassis) - **NT6M84BA**
A17	4-CHAN	Four Channel Communication PCA (located on the upper connector panel on left side of the chassis [viewed from the rear] - **NT6M85AA**
A18	FAN	a. Fan Mounting Bracket Assembly - **NT6M55DD** b. Fan, 48 V dc - A0287304 c. Fan Filter PCA - **NT6M56AD** at location A18A1 d. Fan Foam Filter - A0379820
A19		Switch and Status Panel **- NT6M59AA**
A20		Power Supply Assembly - **NT6M71AB**
A21	DISK	Disk Drive Assembly - **NT6M72GA** 3 1/2" disk drive with a 1-Gbyte capacity
B		B Processor (Lower) Chassis - N/A
B1	CPU	Central Processor Unit Logic w/DMA PCA - **NT6M62BA**
B2	EPROM	Erasable, Programmable, Read-Only Memory PCA **(1) NT6M63FI** - for DMS-10 Switching Systems **(2) NT6M63FL** - for DMS-100 Switching Systems
B3	DRAM	Memory Expansion PCA - **NT6M64AA**
B5	ERCJ	Error Control II Jumper PCA - **NTM609AB**
		Sheet 2 of 4

Table 6-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
B6	QUAD SIO	Quad Serial Input/Output PCA - **NT6M60BA**
B7	56K INTF	56K Interface PCA - **NT6M94AA**
B11	SCSI INTF	SCSI Interface PCA - **NT6M66CA**
B12 & B13	TEC/DSI	Tape Emulation Circuit/Data Stream Interface PCA **(1) NT6M89BD** - TEC for DMS-10 Switching System **(2) NT6M70BD** - DSI for DMS-100 Switching System
B14	BUS TERM	Bus Terminator PCA - **NT6M68AA**
B15	SCSI XOVR	SCSI Crossover PCA (located on inner portion of hinged panel at rear of upper chassis) - **NT6M93BA**
B16	56K XOVR	56K Crossover PCA (located on outer portion of lower hinged panel at rear of chassis) - **NT6M48AA**
B18	FAN	a. Fan Mounting Bracket Assembly - **NT6M55DD** b. Fan, 48 V dc - A0287304 c. Fan Filter PCA - **NT6M56AD** at location B18A1 d. Fan Foam Filter - A0379820
B19		a. Filler Panel Interface Panel - **NT8M59BB** b. Fan Assembly (inner chassis; behind the panel) - **NT6M56AA** at location B19A
B20		Power Supply Assembly - **NT6M71AB**
		Sheet 3 of 4

Table 6-1
List of assemblies and subassemblies

Reference designator	ABBR name	Full name - part number - usage notes
B21	DISK	Disk Drive Assembly **- NT6M72GA** a. 3 1/2" disk drive with a 1-Gbyte capacity b. use option jumper to identify the B disk at position B21
B26		56K Connector - **NT6M54AL** a. 56K Connector Panel; includes 56K connector PCA, **NT6M49AA** b. located on the lower connector panel on the left side of the chassis, as viewed from the rear
A2		Interface Box **(1) 214299** - for DMS-10 Switching System **(2) NT6M98AA** - for DMS-100 Switching System
A3		Interface Box - **214299** - for DMS-10 Switching System
		Sheet 4 of 4

PCA Locations

Subassembly and PCA locations are listed in Table 6-1 and illustrated in Figure 6-1. The illustration shows that two PCA racks (A and B) are used. PCAs designated A1 through A14 are in the A (upper) chassis; B1 through B14 are in the B (lower) chassis. The A and B prefix designations are not marked on the equipment.

All BMC equipment employs a standard complement of PCAs to provide basic system operation. The following PCAs are rack-mounted in BMC systems:

- two - CPU Logic PCAs
- two - EPROM PCAs
- two - DRAM Expansion PCAs
- one - Error Control II PCA (A chassis)
- one - Error Control II Jumper PCA (B chassis)
- two - Quad SIO PCAs
- two - 56K Interface PCAs
- two - SCSI Interface PCAs
- four - TEC/DSI PCAs
- two - Bus Terminator PCAs.

Other PCA locations

PCAs are used in locations other than the card racks as described in the following paragraphs.

There are PCAs located at the rear of the cabinet, on a hinged panel, as shown in Figure 6-2. The PCAs used at these locations are the P/A Comm PCA, SCSI Crossover PCAs (in the A chassis), and 56K Crossover (in the B chassis).

The 1-gigabyte Disk Drive Assembly is shown in Figure 6-3.

Located on the Power Filter Panel (bottom rear of both the A and B chassis) is a Fan Filter PCA. The Power Filter Panel also holds a Fan Assembly. There is another Fan Assembly located in the B chassis behind the Filler Panel.

Figure 3-1
BMC cabinet subassemblies

Switch and
Status Panel

Processor A
Circuit Boards

A1------------------------A14

Processor A chassis

A20 Power
Supply

A21 Disk
Drive A

B20 Power
Supply

B21 Disk
Drive B

Processor B chassis

Filler Panel

B1------------------------B14

Processor B
Circuit Boards

Front View (cover off)

Figure 3-1
Auxiliary circuit assembly locations

Left rear of chassis
(with cabinet back removed)

Hinged card panel
(closed)

Power and Alarm
Communications PCA
(A16) or 56K Crossover
PCA (B16)

a. View with hinged card panel closed

SCSI Crossover PCA
(A15 and B15)
(opposite side of hinged panel)

Left rear of chassis
(with cabinet back removed)

SCSI Crossover PCA
(A15 and B15)

Hinged card panel
(open)

Power and Alarm Communications
PCA (A16) or

b. View with hinged card panel open

Figure 3-1
Disk Drive Assembly
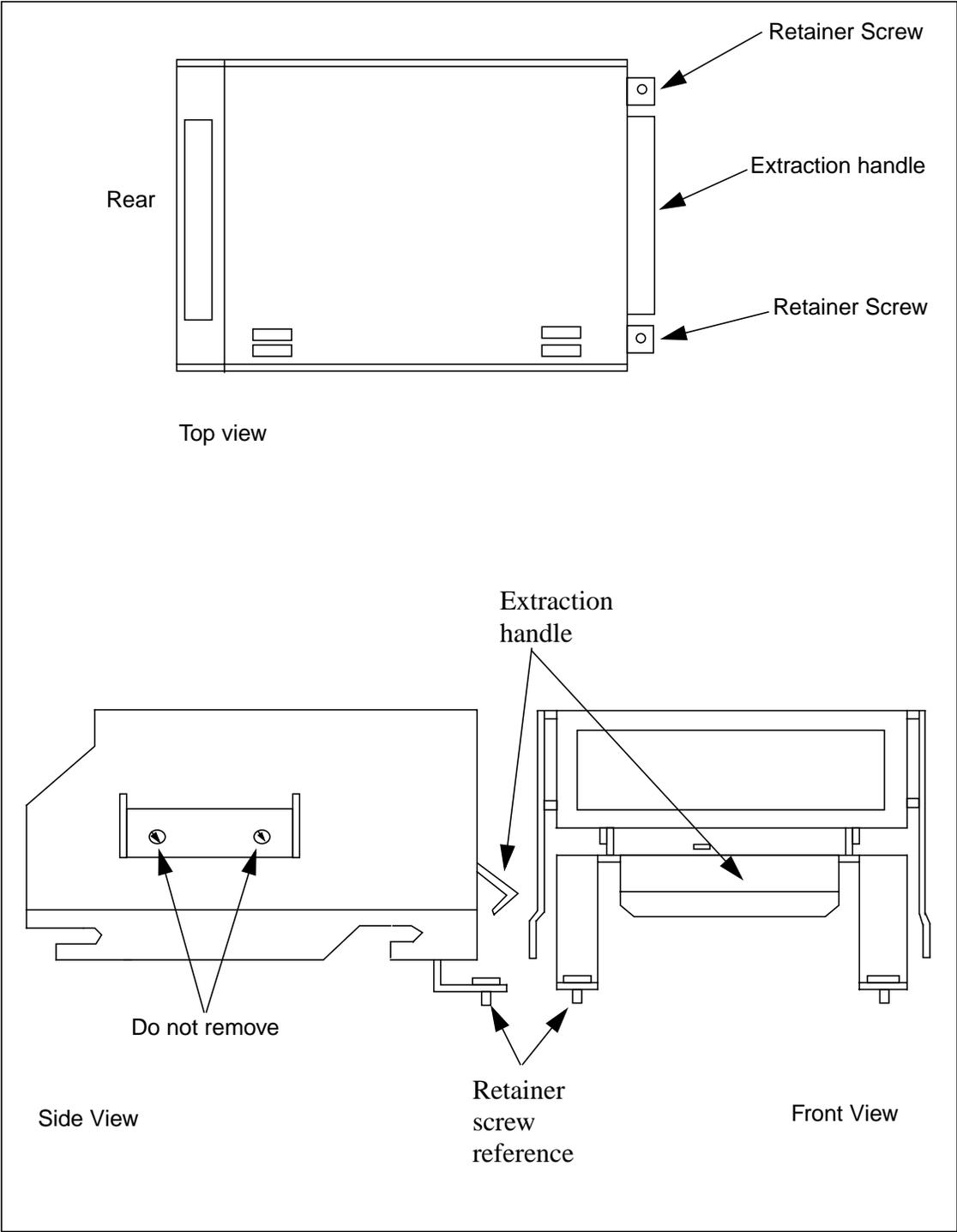
Routine Maintenance Procedures

This subsection contains the routine maintenance procedures for the BMC system.

Status and Alarm Lamp Maintenance

The Status and Alarm Lamps, located on the Switch and Status Panel, are tested periodically, using the Lamp Test (LT) rocker switch located on the front of the panel. Refer to Figure 6-4. Open the front panel of the A chassis; refer to Figure 6-5. Press the spring-loaded switch to the LT position, and all lamps light. The lamp(s) indicating the current operating status of the BMC stay lit when the switch is released.

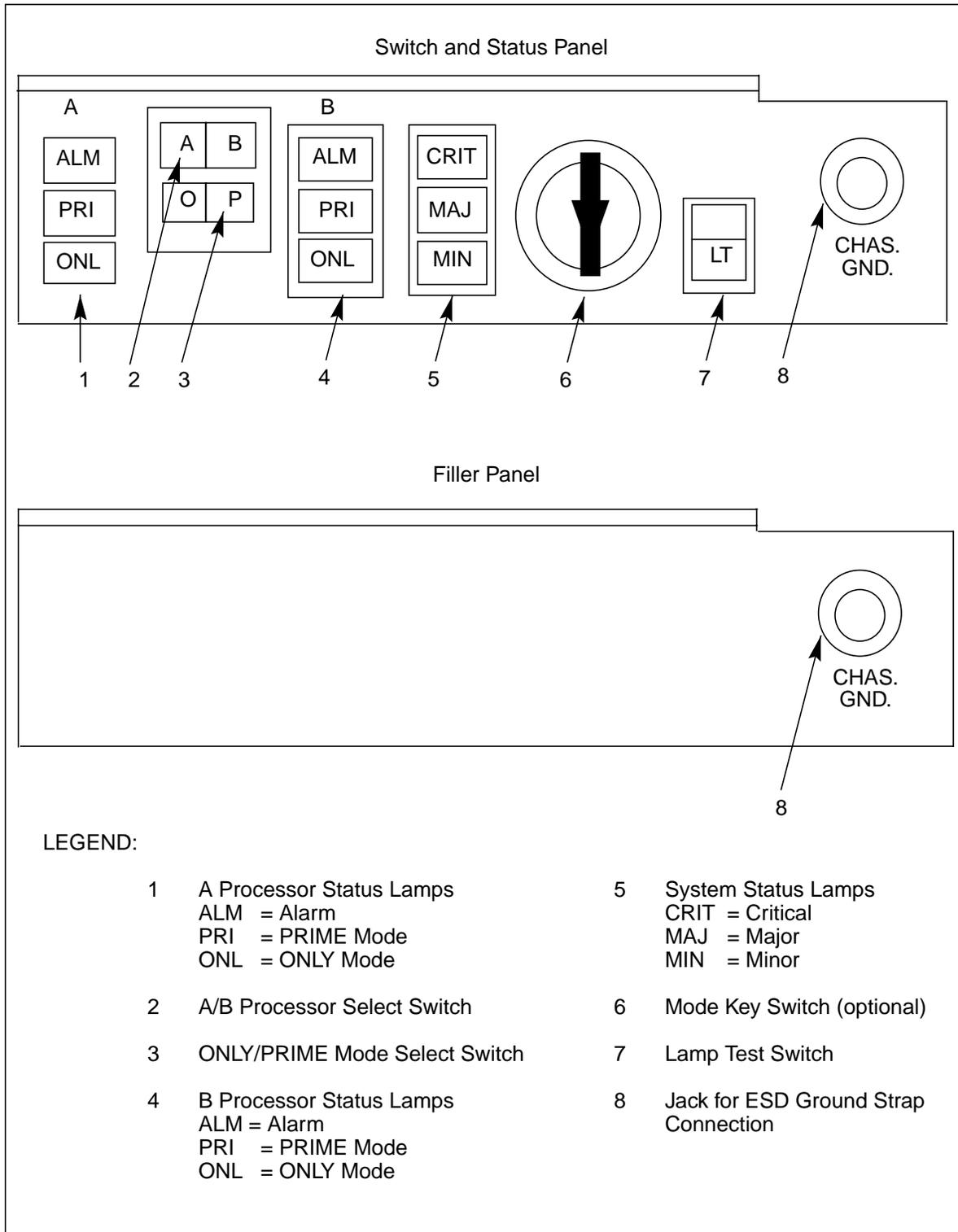The lamps used for the status and alarm indicators are special light bar devices, composed of four LEDs in each lamp. The LEDs in the lamp are individually powered; if one quadrant fails, the remaining quadrants continue to operate, keeping the indicator lit. The solid state lamps provide long trouble-free operation. Replacement status and alarm lamps should be ordered through Nortel. Refer to Table 6-2 for more information.

Table 6-2
Status and alarm lamps

Lamp	Color	Part number	CPC
ALM	Red	212934-101	A0337368
PRI	Green	212934-103	A0337369
ONL	Yellow	212934-105	A0337370
MAJ	Red	212934-107	A0337371
MIN	Yellow	212934-109	A0337372
CRIT	Red	212934-111	A0337373

Figure 3-1
BMC Switch and status panel

Switch and Status Panel

A   B

ALM   A   B   ALM   CRIT

PRI   O   P   PRI   MAJ

ONL   ONL   MIN   LT   CHAS.
GND.

1   2   3   4   5   6   7   8

Filler Panel

CHAS.
GND.

8

LEGEND:

1	A Processor Status Lamps ALM = Alarm PRI = PRIME Mode ONL = ONLY Mode	5	System Status Lamps CRIT = Critical MAJ = Major MIN = Minor
2	A/B Processor Select Switch	6	Mode Key Switch (optional)
3	ONLY/PRIME Mode Select Switch	7	Lamp Test Switch
4	B Processor Status Lamps ALM = Alarm PRI = PRIME Mode ONL = ONLY Mode	8	Jack for ESD Ground Strap Connection

Figure 3-1
Removing BMC system front panel
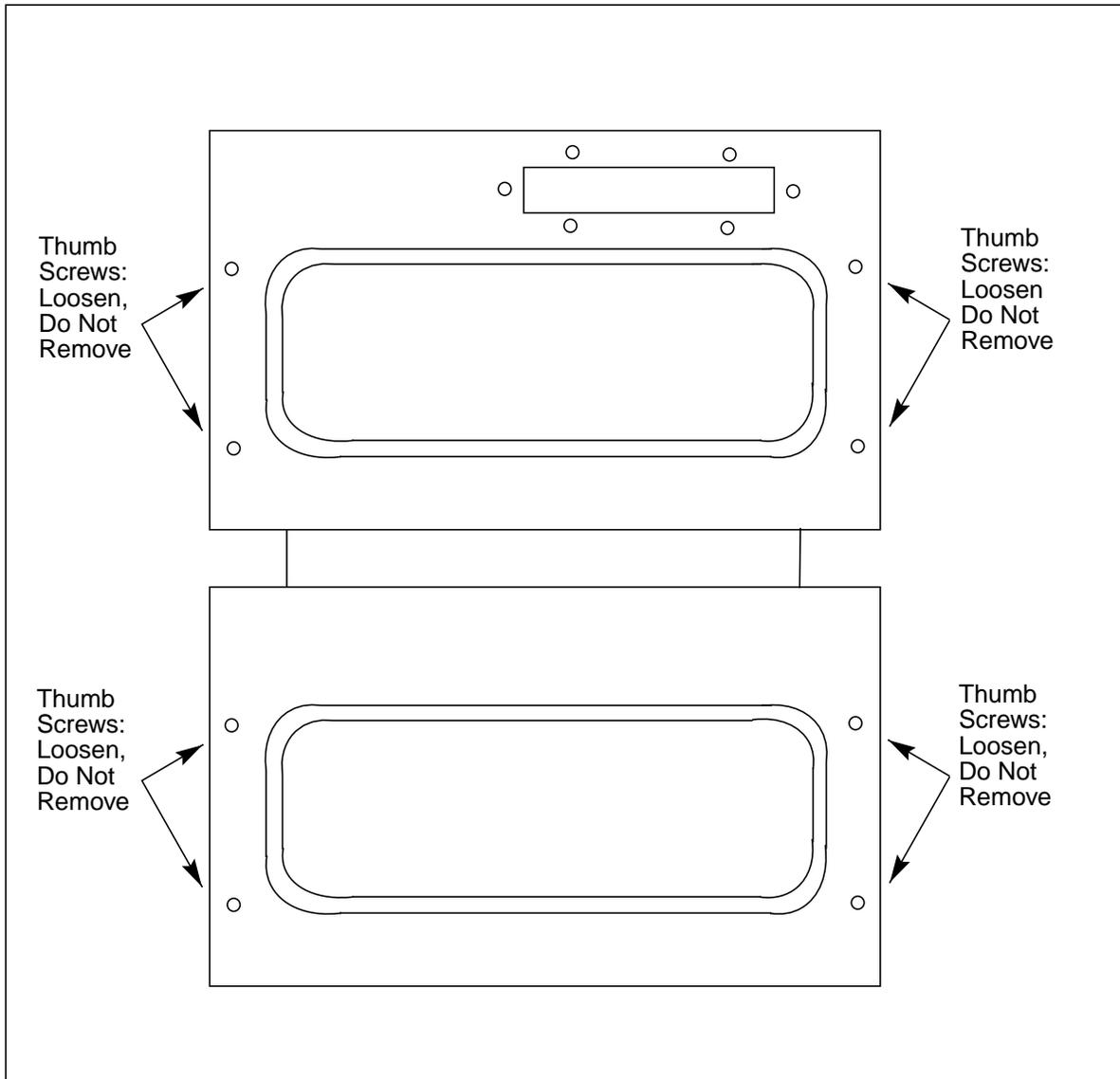
Status and Alarm Lamp Replacement

Procedure 6-1 **Status and Alarm Panel lamp test and replacement**	
Step	**Description**
⚠	**CAUTION** It is recommended that Status and Alarm lamp replacement be performed by qualified maintenance personnel.
7	Remove the front panel of the BMC, A chassis. Refer to Figure 6-5.
8	Note which lamps are already lit. The lamps reflect current BMC operating mode.
9	Press the spring-loaded switch to the LT position. If a lamp fails to light, proceed to step 3, else procedure complete; go to step 7. All lamps light; the lamp(s) indicating the current status of the BMC stay lit when the switch is released. Loosen the four captive screws located on the left and right hand sides of the front panel; **carefully** remove the front panel. Once removed, put the front panel in a safe place to avoid damage; bending and scratching.
10	Remove the defective lamp by wedging a screwdriver blade between the lamp body and the edge of the panel cut out. Use a back and forth motion until it releases from the socket. Place a finger on the side of the lamp opposite the blade and rock the lamp gently.
11	Insert the new lamp. Make sure that the leads of the new lamp do not bend during insertion.
12	Press the LT rocker switch. Verify operation of the replacement lamp.
13	Put the front panel back on the A chassis.

Error Control II PCA Jumper LED

The LED on the Error Control II Jumper PCA (slot B5) lights to indicate the toggle switch on the PCA has been activated (up position). This toggle switch is activated during replacement of the Error Control II PCA (slot A5). This LED is not cannot be replaced in the field.

TEC/DSI Alarm

The TEC/DSI Alarm is activated when the TEC/DSI PCA fails its own self-diagnostic check. At this point, the TEC/DSI PCA sends an alarm bit (EOT)

to the Switching System. The Switching System interprets the alarm bit as an indication that the active recording volume, disk drive, is full. The Switching System switches the standby volume (to the other TEC/DSI PCA) to the active position and continues sending AMA to the BMC.

Other Indicator Lamps

The lamp on the disk drive(s) is an LED and is not field replaceable. In addition, the LED display on the CPU with DMA PCA, slots A1 and B1, is not field replaceable.

System low voltage alarm

The BMC issues a system low voltage alarm when the voltage drops below the thresholds. The alarm is indicated by a frame fail lamp.

A BMC being used with DMS-100 Switching Systems can be equipped with enhanced alarm cables. These cables allow the thermal and low voltage alarms to be associated with an error message, a visual alarm and an audible alarm. The text for the error messages is determined by the user. This text is usually datafilled during initial system installation. Refer the associated IM for more information. A BMC being used with a DMS-10 Switching System cannot be equipped with the enhanced alarm cables. Use the following procedure to resolve a system low voltage alarm.

Procedure 6-2
System low voltage alarm

Step	Description

⚠ **CAUTION**
Since all PCAs in the BMC system are static sensitive, be careful handling them. Wear a wrist grounding strap when working with the BMC. There are jacks at the lower right of the Filler panel (B chassis) and the lower right of the Switch and Status panel (A chassis) to accept the banana plug connection on the end of a grounding strap.

⚠ **WARNING**
Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

Sheet 1 of 3

Procedure 6-2
System low voltage alarm

Step	Description
14	Remove the rear panel of the A chassis by taking out the eight screws that secure the panel to the chassis. Once removed, put the rear panel in a safe place to avoid damage; bending and scratching.
15	On the Power and Alarm Communications PCA, locate position J11. Do not remove this connector.
16	Using a voltmeter, test for the voltages associated with the pins listed below (use pin 7 or the screw on the heat sink for the PCA as a ground): Pin 1 = +12v (orange - A chassis) Pin 2 = -12v (yellow - A chassis) Pin 3 = +8v (green - A chassis) Pin 4 = +5v (white/red - A chassis) Pin 5 = +12v (violet - B chassis) Pin 6 = -12v (slate - B chassis) Pin 7 = ground (white) Pin 8 = +8v (brown - B chassis) Pin 9 = +5v (yellow/red - B chassis) Voltages on the pins should be above the following threshold values: +5V pins - +2.10V +8.5V pins - +6.00V +12V pins - +8.10V -12V pins - -8.60V
17	If any of the voltages are below the thresholds for the tested pins, proceed to step 9. If none of the voltages are below the thresholds for the tested pins, proceed to step 5.
18	Remove the enhanced alarm cable from the BMC at connector J16 of the A chassis.
19	Verify on pins 9 and 13 of J16 that a low voltage alarm signal is being generated using an ohmmeter. If an alarm signal is being generated, a short will be present.

Sheet 2 of 3

Procedure 6-2
System low voltage alarm

Step	Description
20	If there is a low voltage alarm signal, restore the alarm cable to its original position and proceed to step 8. If there is no low voltage alarm signal, proceed to Procedure 6-3 to troubleshoot the alarm cable. If multiple alarms are reported and the physical conditions that would produce these alarms do not exist, it is possible that the enhanced alarm cable is causing the error indications to occur.
21	Verify the condition of the fuse in the power supply for the affected chassis. If the fuse is okay, proceed to step 9. If the fuse is blown, proceed to step 10.
22	Replace the Power and Alarm Communications PCA using the procedure in the *Hardware Replacement* subsection. When finished, proceed to step 12.
23	Replace the fuse. If the fuse holds, proceed to step 12. If the fuse fails, proceed to step 11.
24	Replace the Power Supply assembly in the appropriate chassis using the procedure in the *Hardware Replacement* subsection.
25	Verify that the low voltage alarm is no longer active at the maintenance terminal.
	Sheet 3 of 3

Procedure 6-3
Enhanced alarm cable troubleshooting

Step	Description
26	Wait for the error indications to clear on the maintenance terminal and the frame fail lamp.
27	Reproduce a thermal alarm by shorting pins 7 and 8 together on the cable connector that was connected at J16 of the A and B chassis, one at a time.
28	If multiple error indications are triggered, proceed to step 6. If multiple error indications are not triggered, proceed to step 4.
29	Reproduce a low voltage alarm by shorting pins 9 and 13 together on the cable connector that was connected at J16 of the A chassis.

Procedure 6-3 **Enhanced alarm cable troubleshooting**	
Step	**Description**
30	If multiple error indications are triggered, proceed to step 6. If multiple error indications are not triggered, return to the calling procedure and continue.
31	Remove the defective enhanced alarm cable from the DMS-100 side.
32	Follow the procedure in the associated IM for installing an enhanced alarm cable to replace the defective model.

System temperature sensor(s)

The System Temperature Sensors are located inside the Power Supplies. To test the operation of the Sensor Alarm, remove the J16 connector from the input connector panel on the A or B chassis. Short pins 7 and 8 together. Listen for the Office Alarm to be activated, if equipped. Remove the jumper. Check the cable to both A and B chassis.

A BMC being used with DMS-100 Switching Systems can be equipped with enhanced alarm cables. These cables allow the thermal and low voltage alarms to be associated with an error message, a visual alarm and an audible alarm. The text for the error messages is determined by the user. This text is usually datafilled during initial system installation. Refer the associated IM for more information. A BMC being used with a DMS-10 Switching System cannot be equipped with the enhanced alarm cables. Use the following procedure to resolve a system temperature alarm.

Procedure 6-4 **System high temperature alarm**	
Step	**Description**
⚠	**CAUTION** Continuous operation of the BMC under extreme heat conditions will degrade system operation.
33	Determine the ambient temperature of the affected chassis. The ambient temperature is measured at the fan filter inputs on the rear of the BMC chassis inside the equipment bay.
	Sheet 1 of 2

Procedure 6-4
System high temperature alarm

Step	Description
34	If the ambient temperature exceeds 100°F, proceed to step 7. If the ambient temperature does not exceed 100°F, proceed to step 3.
35	Remove the enhanced alarm cable from the BMC at connector J16 of the A and B chassis.
36	Using an ohmmeter, verify on pins 7 and 8 of J16 that a thermal alarm signal is being generated.
37	If there is a thermal alarm signal, restore the alarm cable to its original position and proceed to step 6. If there is no thermal alarm signal, proceed to Procedure 6-3 to troubleshoot the alarm cable. If multiple alarms are reported and the physical conditions that would produce these alarms do not exist, it is possible that the enhanced alarm cable is causing the error indications to occur.
38	Replace the Power and Alarm Communications PCA using the procedure found in the *Hardware Replacement* subsection.
39	Determine whether the fan for the affected chassis is working properly.
40	If the fan is working properly, proceed to step 9. If the fan is not working properly, follow the recommend procedure for replacing the fan assembly found in the *Fan Maintenance Procedures* subsection.
41	Inspect the fan filter.
42	If the fan filter is dirty, follow the recommend procedure for cleaning the fan filter found in the *Fan Maintenance Procedures* subsection.
43	Allow the BMC to cool to 80oF and the thermostat should reset itself. The alarm indications at the maintenance terminal and the frame fail lamp should reset themselves.

Sheet 2 of 2

Fan Maintenance Procedures

There are three ventilation fans in the BMC. Two are on the rear of the A and B chassis. The third fan is inside the BMC in the B chassis behind the Filler Panel.

Cleaning the fan foam filter

The two fans on the rear have a foam filter under the metallic screen. Clean this foam filter at least monthly, or as conditions warrant using Procedure 6-5.

⚠️ **CAUTION**

The fan must operate during filter cleaning or replacement. Do not touch the rotating fan blades with the filter or your fingers.

Procedure 6-5
Cleaning the Fan Foam Filter

Step	Description
44	On the outside of the rear panel, insert a small, flat blade screwdriver between the lip of the filter and the rear panel sheet metal; pry up. There are four slots on the screen framework.
45	Remove the foam filter and gently wash in warm water. Let the filter dry.
46	Brush off any dust from the fan enclosure area.
47	Clean the fan filter screen with compressed air.
48	Make sure the foam filter is completely dry before reinstalling. Go to step 4.
49	Place the foam filter and screen assembly over the fan opening. Press into place.
50	Repeat steps 1-6 for the other filter.

Replacement fuses for the Fan Filter PCA (NT6M56AD - 1/4 amp 8AG, part number 680-9176-001) and foam filters (part number 680-7859 or CPC A0379820) can be ordered from Nortel.

Note: Fuse operation (a blown fuse) usually indicates a failure. Check the fan and associated cabling for shorts before replacing the fuse.

Lubricating the fans

Since the fans have permanently lubricated bearings, they never need lubricating or oil servicing.
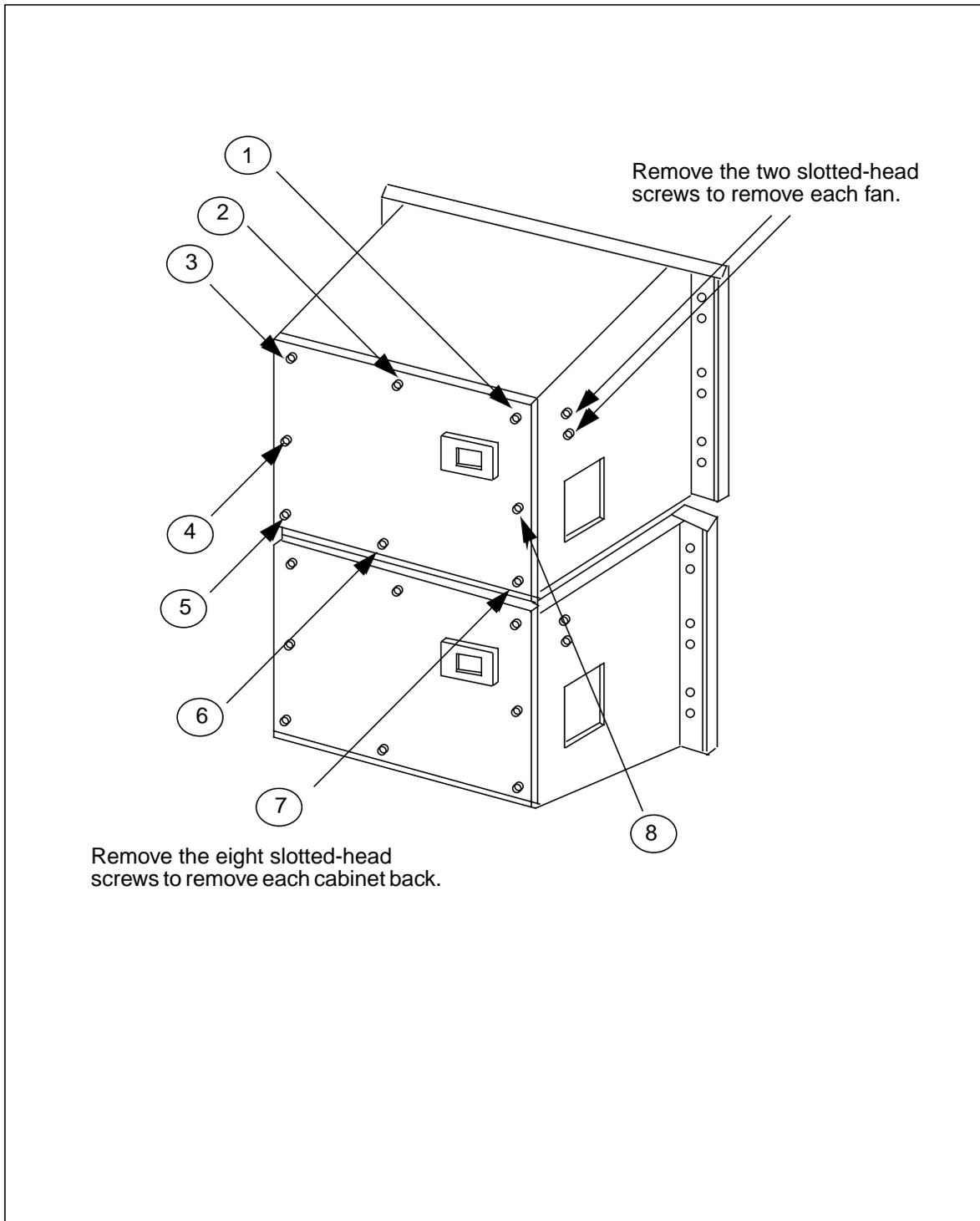
Replacing the fans

Use Procedure 6-6 when replacing the cooling fans at the rear of the BMC chassis. Before replacement, make sure the following conditions are met:

• The processor with the operational fan is in the ONLY mode of operation.

• A polling session has been completed; if possible, wait for a slow traffic period before fan replacement.

Procedure 6-6
Cooling fan replacement

Step	Description

| | **CAUTION** |
| | Since all PCAs, disk drives, and other hardware in the BMC are static sensitive, be cautious. Wear a wrist grounding strap when working with the BMC. Jacks at the lower right of the Filler panel (B chassis) and the lower right of the Switch and Status Panel (A chassis) are provided to accept the banana plug connection on the end of a grounding strap. |

| | **WARNING** |
| | Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment |

| **51** | Request a polling session from HOC personnel. Explain that maintenance activity is scheduled at the BMC and it should be polled as a precaution. |

| **52** | Remove the front panel on the A chassis. See Figure 6-5. Loosen the four captive screws on the left and right of the front panel and carefully remove it. Put it in a safe place to avoid damage. |

53	At the Switch and Status Panel:
	a. **Press the A/B processor. Select Switch to show the same as the processor with the operational fan. Make the processor with the operational fan the ONLY processor if it isn't already.**
	b. **Make the P/O processor Mode Select Switch O.**
	c. **Turn the Mode Switch Key to the right and release.**

Sheet 1 of 2

Procedure 6-6
Cooling fan replacement

Step	Description
54	Remove the rear panel of the chassis to be worked on. Figure 6-6 shows the eight screws to remove. Save the screws.
55	Remove the two screws securing the fan mounting bracket in the chassis. These screws are on the outside of the chassis, in the upper left corner of the right hand panel, as seen from the rear. See Figure 6-6. Support the fan assembly with your hand while removing the two screws.
56	Remove the fan mounting bracket from the chassis. Slide the base of the bracket 1/2-inch to the left and then pull back 1-inch from the center of the chassis until the bracket is free of the chassis base.
57	Disconnect the connector from the Fan Filter PCA. Connector is on the Fan Filter PCA on the bottom rear of the bracket.
58	Remove the fan. With the bracket balanced on the lip of the BMC chassis, remove the four bolts in the corners of the bracket. Save the bolts.
59	Mount the replacement fan. With the bracket balanced on the lip of the chassis, reinstall the four bolts in the corners of the bracket. Use the same four bolts removed in step 8.
60	Connect power to the fan. Connect power cable to the Fan PCA on the bottom rear of the chassis.
61	Install the fan mounting bracket. Push in 1-inch and to the right 1/2-inch; register and lock the slots on the bracket with the pins on the chassis base.
62	Reinstall the two screws removed in step 5 to secure the bracket in the chassis. *Note:* When replacing the bolts, carefully align them before tightening to avoid stripping. Tighten the bolts, alternating until all are equally tight. Do not "cinch down" any one bolt until all are properly aligned; no binding or force needed to turn.
63	Reinstall the rear panel of the chassis just worked on. Use the screws saved in step 4.
64	Clean the foam filter using the *Cleaning the Fan Foam Filter* procedure.
65	Reinstall the front panel on the A chassis. Snap the cover in place.

Sheet 2 of 2

Figure 3-1
Removing BMC system rear panel and fan mounting screws

Remove the two slotted-head
screws to remove each fan.

Remove the eight slotted-head
screws to remove each cabinet back.

Replacing the Fan behind the Filler Panel
Use Procedure 6-7 to replace the fan behind the Filler panel on the front of the lower processor chassis.

Procedure 6-7
Filler panel fan replacement

Step	Description

	CAUTION Since all PCAs, disk drives, and other hardware in the BMC are static sensitive, be cautious. Wear a wrist grounding strap when working with the BMC. Jacks at the lower right of the Filler panel (B chassis) and the lower right of the Switch and Status Panel (A chassis) are provided to accept the banana plug connection on the end of a grounding strap.
	WARNING Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment
66	Request a polling session from HOC personnel. Explain that maintenance activity is scheduled at the BMC and it should be polled as a precaution.
67	Remove the front panel on the A chassis. See Figure 6-5. Loosen the four captive screws on the left and right of the front panel and carefully remove it. Put it in a safe place to avoid damage.
68	At the Switch and Status Panel: a. **Determine whether the unit is in A processor mode. Proceed to step 4 if the unit is already in A ONLY mode. Otherwise, set the A/B processor switch to A.** b. **Make the P/O processor Mode Select Switch O. Make the A processor the ONLY processor.** c. **Turn the Mode Switch Key to the right and release.**
69	Remove the Filler panel from the B chassis. The Filler panel is in the same position as the Switch and Status panel on the A chassis. Remove the two slotted screws from the panel to take it out of position. Hold this panel tightly since it comes loose. The ground jack terminal wire connections are mounted on the back of the panel. Save the screws for later use.

Sheet 1 of 2

Procedure 6-7 Filler panel fan replacement	
Step	**Description**
70	Remove the Fan Assembly. Look inside the space vacated by the Filler panel and locate the two screws securing the Fan Assembly.
71	Remove the two fan mounting screws that hold the Fan Assembly in place. Save the screws for later use.
72	Slide the Fan Assembly forward out of the chassis and disconnect the power cable.
73	Remove the fan from the mounting bracket. Lay the mounting bracket in a safe place.
74	Remove the protective wire mesh screen from the fan. Clean the screen, if necessary.
75	Mount the screen on the replacement fan.
76	Install the replacement fan in the empty mounting bracket. Use the screws removed in step 8.
77	Position the mounting bracket in front of the chassis; reconnect the power cable.
78	Slide the fan mounting bracket in until it is fully seated. Make sure there are no obstructions.
79	Secure the Fan Assembly using the screws removed in step 6. *Note:* When replacing the bolts, carefully align them before tightening to avoid stripping. Tighten the bolts, alternating until all are equally tight. Do not "cinch down" any one bolt until all are properly aligned; no binding or force needed to turn.
80	Mount the Filler panel in the chassis using the screws saved from step 4.
81	Reinstall the front panel on the A chassis.
Sheet 2 of 2	

Diagnostic Procedures

The following procedures are provided to help acquire information that can be used to discover the reason for an error condition. Once the cause of the error has been discovered, the user is referred to a procedure to use to resolve the problem. In some cases, the only resolution to the problem is to alert the technical assistance group.

56K Interface PCA Diagnostic Procedure

The following procedure is used to diagnose problems with the 56K Interface PCA.

Procedure 6-8
56K Interface PCA Diagnostic

 Step   **Description**

Note 3: This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede every command entered.

Note 4: There are numerous log messages that may be displayed regarding the 56K Interface PCA. Those messages will translate into either a CP NOT AVAIL or CP FAULT message in the ERRMAP display.

---

82   Enter the following commands at the maintenance terminal to list the BMC alarms and identify the active processor.

   >ERRMAP ALARMS (cr)

   System responds with a list of alarms on the active and standby processors. CP alarms indicate a problem in the 56K Interface PCA.

   >CLK (cr)

   System responds with the time stamp and identity of the active processor.

 Note: The A processor is the top shelf and the B processor is the bottom shelf. The active processor can also be identified by the location of the lighted green lamp on the status panel.

---

83   Enter the following command at the terminal to attempt to communicate with the processor where the alarm occurred.

   >CP VS ACT (cr)
   or
   >CP VS STDBY (cr)

   System responds with three lines of information, with the second line containing the software version loaded on the selected 56K Interface PCA. If there is no response or the response indicates the CP is not available, go to step 3. If the 56K Interface PCA responds with the software version number, go to step 5.

Sheet 1 of 4

Procedure 6-8
56K Interface PCA Diagnostic

Step	Description
84	Enter the following commands to verify that the BOOTCP file contains the software load and version number of the program file on the disk. **>CP BOOT LIST (cr)** System response: `filename vers` where: filename- name of the CP boot file. vers- version number. **>LSTDIR FILE BOOTCP 1 255 (cr)** System response: `xx BOOTCP xx vers xx xx xx xx xx xx xx xx xx` The value of xx is not important to this procedure. There will be one response line for each file found on the disk. It is normal for only one version of the BOOTCP file to be on the disk. Compare the list of files output from the LSTDIR command to verify that a file matching the result of the CP BOOT LIST is on the disk. If the BOOTCP file was found on the disk, go to step 4. If the BOOTCP file was not found, contact your next level of support.
85	Enter the following command to attempt to reboot the suspect 56K Interface PCA: **>CP BOOT ACT (cr)** or **>CP BOOT STDBY (cr)** A CP ACTIVE message is displayed once the program successfully loads. The BMC attempts to load the software program into the 56K Interface PCA up to three times. If booting the 56K Interface PCA fails, replace the 56K Interface PCA using the procedure in the *Hardware Replacement* subsection. When the PCA replacement is completed, repeat this procedure from the beginning. If the 56K Interface PCA has already been replaced and the CP boot still fails, contact your next level of support. If the CP program loads, continue with step 5.
	Sheet 2 of 4

Procedure 6-8
56K Interface PCA Diagnostic

Step	Description
86	If an error was observed on the ERRMAP, reset the alarm using the following command: **>RSERR 00 (cr)** or **>DOS S RSERR 00 (cr)** ALL ALARMS CLEARED message is issued and the status panel alarm lamp goes out. If the alarm returns, replace the 56K Interface PCA using the procedure in the *Hardware Replacement* subsection. When the PCA replacement is completed, repeat this procedure from the beginning. If the 56K Interface PCA has already been replaced and the alarm returns, contact your next level of support. If the alarm clears OK or there was no alarm, continue with step 6.
87	Enter the following command to test the software on the 56K Interface PCA being tested: **>CP TEST ACT (cr)** or **>CP TEST STDBY (cr)** System responds with a list of tests and the pass/fail results. If any of the CP tests fail, replace the 56K Interface PCA using the procedure in the *Hardware Replacement* subsection. When the replacement is completed, repeat this procedure from the beginning. If the 56K Interface PCA has already been replaced and any of the CP tests fail, contact your next level of support. If 56K Interface PCA being tested is on the standby side and the CP tests pass, go to step 7. If 56K Interface PCA being tested is on the active side and the CP test pass, go to step 8.
88	Place the processor with the 56K Interface PCA being tested in the prime mode. At the Switch and Status panel of the BMC: • **Press the A/B Select Switch to match desired processor.** • **Press the O/P Mode Select Switch to P.** • **Turn the Mode Switch to the right and release.** • **BMC outputs several messages indicating the processor switch activity.**

Sheet 3 of 4

Procedure 6-8
56K Interface PCA Diagnostic

Step	Description

CAUTION
Loss of AMA can occur when the processors are switched during high traffic.

89	Have the HOC perform a polling session to complete the verification of the 56K Interface PCA functionality. If the polling session terminates normally, this procedure is complete. If the polling session fails, contact your next level of support.

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Block Display Procedure

The following procedure is used to verify block integrity. To verify block integrity when the sequence number is known, begin with step 7. To verify block integrity when sequence number is not known, begin with step 2.

Procedure 6-9
Block Display

Step	Description
90	If the user wishes to look at current incoming AMA data. Enter the following command to verify the incoming block at the TEC/DSI PCA: **>TECMAINT SHOW side STATUS (cr)** where: side - TEC/DSI port ID: 1 (TEC/DSI PCA in slot 13) or 2 (TEC/DSI PCA in slot 12). Note which port has block count increasing, this is the currently active AMA/MTU port. When block count has increased or block error message is observed, go to step 3.
91	Determine the date and time needed to display by looking at the logs surrounding the error message.

Sheet 1 of 3

Procedure 6-9
Block Display

Step	Description
92	Enter the following command to query the currently open AMA file. Note the starting sequence number for this version. **>IDXMAINT DIR OPEN AMA (cr)** If looking for AMA currently being written, go to step 6.
93	Enter the following command to display the last block in the previous version: **>IDXMAINT EXAMINE AMA PACKED seq_num (cr)** where: seq_num - starting sequence number of version that was open minus 1. Refer to the header and data definitions tables (Tables 6-3 and 6-4) at the end of this procedure to determine date and time block was received.
94	Does date and time of block header correspond to the date and time when error occurred? Reference step 2. If date and time correspond, refer to Tables 6-3 and 6-4 to analyze what might be wrong with the block completing this procedure. If date and time do not correspond, determine whether the date and time of the error occurs prior to or after the block that was displayed. If date and time of the error occurs prior to the displayed block, decrease sequence number and proceed with step 6 until date and time range is reached. If date and time of the error occurs after the displayed block, proceed to step 6.

Sheet 2 of 3

Procedure 6-9
Block Display

Step	Description
95	Enter the following command to close the open file: **>IDXMAINT CREATE FILE AMA (cr)** System response: `AMA WRITE FILE CLOSED`
96	Enter the following command to display the sequence number: **>IDXMAINT EXAMINE AMA PACKED seq_num (cr)** If the BMC responds with a DATA NOT AVAILABLE message, proceed to step 2. Refer to Tables 6-3 and 6-4 at the rear of this procedure for definition. At this point user should be able to find block(s) in question and look at call records within the block. If analysis of the header and data do not show a problem, call your next level of support. This procedure is complete.

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Example of Displayed Block
  96-05-21 13:04:08 TUE PROC-B
  OOOXXX AMA SEQ #61524

  00 00 FO 54 F5 05 1A 00 05 20 11 42 00 00
    00330000AA00020COOIC70120CO0000CO000000COCOCOCOOOC503C6641210CIC
  00503C7724380C1140598CO00000119COCO11C00300000AAOOOOICO06C70120C

  .   .   .
  .   .   .
  ....0002266COCO11CBBBBBBBBBBBBBBBBBBBB

Table 6-3
Header Definitions

Data	Byte	Definition
00 00 FO 54	1-4	Block Sequence Number (hex)
F5 05	5-6	Block size in bytes (hex)
1A	7	Number of AMA calls in the block (hex)
00	8	Flag byte
05	9	Month block was received by BMC
20	10	Day block was received by BMC
11	11	Hour block was received by BMC
42	12	Minute block was received by BMC
00 00	13-14	Unused bytes

Table 6-4
Data Definitions

Position	Definition
00330000AA	4 bytes before AA are Record Descriptor Word (RDW) for following call record
AA	Start of new call record
5 characters after AA	Structure code for call, refer to the *Commands and Messages Guide* section for breakdown of fields and definitions
C	Field separator within call record
011CBBBBBB	Last two bytes of block (includes C) is CRC for parity
BBBBBB	As at end of block are fill characters from Switching System

Boot Recovery Procedure

This procedure assumes the user has been referred here by a failure message. There are a number of different alarms that could refer the user to this procedure. This procedure should only be started when user has verified the alarm is on the standby processor using the ERRMAP ALARMS command.

If alarm appears on the standby processor, begin with step 2. If alarm is on the active processor, begin with step 1. If both processors respond with an ILLEGAL COMMAND message, begin with step 10.

Procedure 6-10
Boot Recovery

Step	Description
97	Enter the following command to switch processors: **>SWACT (cr)** If processor switch does not occur, depress the A/B rocker switch to match the standby processor. Depress the O/P rocker switch to **O**. Turn the keyswitch to the right and release.
98	Enter the following commands to determine whether the software file name is correctly entered in the bootfile. **>DOS LL (cr)**Displays current boot file. *Note:* If response is BOOT FILE EMPTY, enter the DOS LA and DOS LL commands as shown in step 3.
	System responds with the bootfile name and version number. **>LSTDIR ALL(cr)**If not running software, go to step 10. System responds with a listing of the files on the disk along with their version numbers. Program file name should appear in LSTDIR (refer to Table 6-5). Verify program file name and version number listed in DOS LL matches one of the files found in LSTDIR. If program file name and version numbers match, proceed to step 4. If program file name and version number do not appear in LSTDIR listing or if the program file name is not known, contact your next level of support.

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Procedure 6-10
Boot Recovery

Step	Description
99	If program file name and version number from DOS LL command does not match the file name listed from LSTDIR ALL command, enter the following commands to recreate the boot file.
	>DOS LD (cr) Must be entered for each file listed with DOS LL; there is no response to this command.
	>DOS LL (cr) Should respond BOOT FILE EMPTY, if not repeat DOS LD until boot file is empty.
	>DOS LA (cr) Add program file name and version number to boot file.

Note: Respond to the FILE> prompt with the program file name and respond to the VER> with the version number.

	System responds with the new boot file name and version number.
	>DOS LL (cr) Verify correct entry of file name and version number.
100	Power down the standby processor by depressing the rocker switch on the power supply.
101	After 15 seconds, activate the power supply rocker switch by pressing it toward **I**.
102	User should observe the LED display on the CPU PCA is a lower case 'r.'. When this display changes to any other character, there should be some steady activity on the disk drive LED followed by a terminal message STBY BOOT IN PROC.

Note: BMC will automatically attempt to load the program file three times. If the BMC loads successfully, proceed to step 7. Otherwise, perform the following steps.

Sheet 2 of 6

Procedure 6-10
Boot Recovery

Step	Description
	If the processor does **NOT** boot the program file, replace the EPROM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM PCA does **NOT** allow the processor to boot the program file, replace the CPU PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM and CPU PCAs does **NOT** allow the processor to boot the program file, replace the DRAM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing all of the above PCAs does **NOT** allow the processor to boot the program file, call your next level of support.
103	After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the program file name. If there are any other failure messages, troubleshoot using the appropriate procedure(s) recommended in the *Commands and Messages Guide* section.
104	Verify processors are prime by observing the status panel at the top of the BMC. If the ONL lamp is lit, depress the A/B rocker switch toward A or B, whichever has the green PRI lamp lit. Depress the O/P rocker switch to **P** and turn the key switch to the right and release. The ONL lamp should extinguish.
105	Enter the following command to check processor integrity: **>ERRMAP ALARMS (cr)** Enter the following command to test the newly loaded processor: **>DOS S TEST (cr)** After the PGM TEST PASSED message is observed all tests are complete. Follow step 16 and return to this point. If there are no alarms, this procedure is complete. If there are any alarms, troubleshoot using the appropriate procedure(s).

Note: The following step is to be used only when both processors respond to the ERRMAP ALARMS command with an ILLEGAL COMMAND message.

Sheet 3 of 6

Procedure 6-10
Boot Recovery

Step	Description
106	Enter the following commands to verify whether there is a boot file and program file on disk at this time.

      >XDIR (cr) Responds with disk directory.

      >DOS LL (cr) Displays current boot file.

Note: If response is BOOT FILE EMPTY, enter the DOS LA and DOS LL commands (step 3), then return to step 11.

      Program file name should appear in XDIR. Verify program file name and version number listed in DOS LL matches the information found in XDIR.

      If program file name and version numbers match, proceed to step 11. If program file name and version number do not appear in XDIR listing or if the program file name is not known, contact your next level of support and request a program download. If program file name and version number from XDIR does not match the file name listed from DOS LL, recreate the boot file by following step 3 and then return to step 11.

Step	Description
107	Power down the standby processor by depressing the rocker switch on the power supply.
108	After 15 seconds, activate the power supply rocker switch by pressing it toward **I**.
109	User should observe the LED display on the CPU PCA is a lower case 'r.'. When this display changes to any other character, there should be some steady activity on the disk drive LED followed by a terminal message STBY BOOT IN PROC.

Note: BMC will automatically attempt to load the program file three times. If the BMC loads successfully, proceed to step 14. Otherwise, perform the following steps.

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Procedure 6-10
Boot Recovery

Step	Description
	If the processor does **NOT** boot the program file, replace the EPROM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM PCA does **NOT** allow the processor to boot the program file, replace the CPU PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM and CPU PCAs does **NOT** allow the processor to boot the program file, replace the DRAM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing all of the above PCAs does **NOT** allow the processor to boot the program file, call your next level of support.
110	After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the software file name. If there are any other failure messages, troubleshoot using the appropriate procedure(s).
111	Enter the following command to check processor integrity: **>ERRMAP ALARMS (cr)** If there are no alarms, enter the following command to test the newly loaded processor: **>DOS S TEST (cr)** After the PGM TEST PASSED message is observed all tests are complete.
112	Switch to the newly loaded processor by depressing the O/P rocker switch to **P**. Then, depress the A/B rocker switch to match the newly loaded processor and turn the key switch to the right and release. BMC should respond with appropriate processor switch messages.
113	Power down the new standby processor by depressing the rocker switch on the power supply.
114	After 15 seconds, activate the power supply rocker switch by pressing it toward **I**.
115	User should observe the LED display on the CPU PCA is a lower case 'r.'. When this display changes to any other character, there should be some steady activity on the disk drive LED followed by a terminal message STBY BOOT IN PROC.

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Procedure 6-10
Boot Recovery

Step	Description
	Note: BMC automatically attempts to load the program file three times. If the BMC loads successfully, proceed to step 20. Otherwise, perform the following steps.
	If the processor does **NOT** boot the program file, replace the EPROM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM PCA does **NOT** allow the processor to boot the program file, replace the CPU PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing the EPROM and CPU PCAs does **NOT** allow the processor to boot the program file, replace the DRAM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.
	If replacing all of the above PCAs does **NOT** allow the processor to boot the program file, call your next level of support.
116	After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the software file name. If there are any other failure messages, troubleshoot using the appropriate procedure(s).
117	Proceed to step 9 to verify alarm status.
	Sheet 6 of 6

Table 6-5
BMC BISYNC Program File Names

Software Type	DMS-10	DMS-100
Main Processor	02ANxx (see note)	06AOxx
Communication Processor	9449xx	9449xx
Note: xx represents the release level of the software file.		

Disk Drive Capacity Error Procedure

This procedure is used when error messages indicate that a currently equipped disk drive has insufficient disk capacity to support the BMC system software.

Procedure 6-11 Disk Drive Capacity Error	
Step	**Description**
118	Enter the following command to determine the number of AUs on the disk drive in error. **>DISK USAGE (cr)**
119	If the disk drive in error is supplied by Nortel, proceed to step 3. Otherwise proceed to step 4.
120	Verify that the PEC of the disk drive in error is NT6M72GA. If the PEC of the disk drive in error is not NT6M72GA, the disk drive must be replaced with the appropriate type. Proceed to step 5. If the PEC of the disk drive in error is NT6M72GA, contact the next level of support.
121	If the response indicates that the number of Allocation Units (AUs) on the disk drive in error is below 15, 258, the disk drive has less than 1-gigabyte in capacity. It must be replaced. Proceed to step 5. If the response indicates that the number of AUs on the disk drive is above 15, 258, contact the next level of support.
122	Replace the disk drive in error with another disk drive with the same capacity as the operating drive using the disk replacement procedure defined in the *Hardware Replacement* subsection.

Disk Drive Diagnostic Procedure

The following procedure is used to diagnose disk drive errors in the BMC.

> *Note 5:*   This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

Note 6: This procedure assumes that the disk subsystem worked at one time and no PCAs or disks have been replaced by previous troubleshooting activity.

Note 7: Disk subsystem alarms often appear in groups and troubleshooting activity requires using all the presented information to correctly diagnose the problem.

Procedure 6-12
Disk Drive Diagnostic

Step	Description

123 Enter the following commands to list the BMC alarms and identify the disk mode.

>**ERRMAP ALARMS (cr)**List the current BMC alarms.

System responds with a list of alarms on the active and standby processors. CP prefixed ERRMAP alarms indicate a problem in the 56K Interface PCA.

>**DISK MODE (cr)**Determine the current BMC disk mode.

System response: DISK MODE xx

where: xx - current disk mode (AO, BO, AP, BP, or NONE)

>**REPORT DISK x (cr)**List the disk statistics report for today (x = TDAY) and yesterday (x = YDAY).

System responds with a report listing details of both the disk drives. Take note of the presence of SCSI BUS ERRORS and/or DISK ERRORS for each of the disk drives.

Note: The A disk is in the top shelf and the B disk is in the bottom shelf.

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124 If the messages DSK 70% PRIMARY, DSK 90% PRIMARY, DSK STORE LIMIT, or DIRECTORY FULL occur, there may be problems related to polling.

Perform the *Polling Diagnostic Procedure* to clear the problem. If there is no polling problem, proceed to step 10.

Note: High usage alarms are usually related to polling problems. Contact the HOC to confirm polling is working correctly.

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Procedure 6-12
Disk Drive Diagnostic

Step	Description
125	If the DISK MODE ALARM is observed with the OFFLIN DSK FULL there may be AMA on the off-line disk that has not yet been polled. Refer to the *Disk Full Procedure* subsection for the procedure to recover from full disks before proceeding with this procedure
126	The DSK CARD HW ERR points towards a problem with a SCSI Interface PCA. There may be a DISK MODE ALARM or DISK ER MESSAGE also listed. Replace the SCSI Interface PCA using the procedure in the *Hardware Replacement* subsection. If the disk mode is AO or BO, make the disk redundant and go to step 7. **CAUTION** If disk usage alarms were observed (as seen in step 2), do not make the disk redundant, since this will result in lost AMA. Proceed to step 2.
127	A DISK MODE ALARM and DISK ER MESSAGE on the ERRMAP display where the current disk mode is AO or BO and there is no DSK CARD H/W ERROR. *Note:* BUS ERRORS and DISK ERRORS are part of a multiline message. There will also be an indication of SIDE x (where x = A or B). The SIDE x identifies the disk where the problem originated. If the disk report has SCSI BUS ERRORS and/or DISK ERRORS present on the off-line disk, Verify the BMC logs or the BMC output when the errors occurred then, perform the Disk Drive replacement procedure in the *Hardware Replacement* subsection, then return to step 1. If disk report has SCSI BUS ERRORS and/or DISK ERRORS present on both disk drives, contact your next level of support.

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Procedure 6-12
Disk Drive Diagnostic

Step	Description

128   Put the **other** processor in the PRIME mode. The **other** processor is defined as that processor that does not have the suspected faulty pack. At the Switch and Status panel of the BMC:

- **Press the A/B Select Switch to match the other processor.**

- **Press the O/P Mode Select Switch to P.**

- **Turn the Mode Switch to the right and release.**

- **BMC outputs message responses that indicate processor switch activity.**

CAUTION
Loss of AMA can occur when the processors are switched during high traffic.

129   Enter the following command to attempt to change to prime disk mode.

>DISK MODE xP (cr)

where: x - A or B.

System responds with a DISK MODE AP/BP message, or a failure indication where the disk mode did not change.

Note: Disk mode changes can take several hours on disks with a large amount of data present. If the mode change is in progress and the command above is entered again, the response is DISK MODE CHANGE IN PROGRESS. Wait for the mode change before any additional maintenance activity.

If the disk mode changes to AP or BP, continue with step 9. If the first disk mode change fails, perform step 6, then repeat step 7. If the disk mode changes to AP or BP only after performing step 6, continue with step 8. If the mode change fails a second time, perform the Disk Drive replacement procedure in the *Hardware Replacement* subsection, then go to step 9.

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Procedure 6-12
Disk Drive Diagnostic

Step	Description
130	Enter the following command to test the standby SCSI Interface PCA. **>DPRTST (cr)** System responds with the results of the test. If the test fails, replace the SCSI Interface PCA from the affected chassis using the procedure in the *Hardware Replacement* subsection. If the test passes, continue with step 9.
131	Enter the following commands to reset any alarms, change processor mode and confirm the disk mode remains in the prime mode. **>RSERR 00 (cr)** or **>DOS S RSERR 00 (cr)** All alarms cleared and the alarm light on the status panel will go out if the alarm is cleared. At the Switch and Status panel of the BMC: • **Press the A/B Select Switch to match the other processor.** • **Press the O/P Mode Select Switch to P.** • **Turn the Mode Switch to the right and release.** • **BMC outputs message responses that indicate processor switch activity.**

CAUTION
Loss of AMA can occur when the processors are switched during high traffic.

Enter the following command to determine the current BMC disk mode.

>DISK MODE (cr)

System response: `DISK MODE xx`

If the disk mode remains AP or BP, the procedure is complete. If the disk mode returns to AO or BO, replace the SCSI Interface PCA in the affected chassis using the procedure in the *Hardware Replacement* subsection. If all efforts to make the disk redundant fail, contact your next level of support.

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Procedure 6-12
Disk Drive Diagnostic

Step	Description

132 High disk usage when there is no polling problem indicates that files may exist outside the indices. Enter the following commands to determine the files contained in the AMAIDX and LOGIDX.

>IDXMAINT DIR CLOSED AMA 200 (cr)

System responds with a list of AMACRD file versions contained in the index.

>LSTDIR FILE AMACRD 1 255 (cr)

System response: xx AMACRD xx vv xx xx xx xx xx xx xx xx xx

where: vv - version number (value of xx is not important to this procedure).

There will be one entry for each file listed. If no files are found, the message will indicate no files listed.

>IDXMAINT DIR CLOSED LOG ver (cr)

System responds with a list of LOGCRD file versions contained in the index.

>LSTDIR FILE LOGCRD 1 255 (cr)

System response: xx LOGCRD xx vv xx xx xx xx xx xx xx xx xx

If no files are found the message indicates no files listed. Compare the LSTDIR results and the IDXMAINT results to determine whether any of the version are outside the index. Record the file type and version numbers for any files found that are outside the indices. If AMACRD or LOGCRD files exist outside the indices, go to step 12. If files are not found outside the indices, go to step 11.

133 Enter the following command to check the BMC for additional duplicate files that can be deleted.

>XDIR (cr)

System responds with a list of files and versions on the disk. The XDIR result should be examined for files other than AMACRD and LOGCRD to determine whether there are additional files that can be deleted. If not sure about the files found, consult your next level of support before proceeding to step 12. If files are found that can be deleted continue with step 12. If no additional files are found, go to step 13.

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Procedure 6-12
Disk Drive Diagnostic

Step	Description

| **134** | AMACRD, LOGCRD or other duplicate files found can be deleted. Repeat the following command for each file type that is to be deleted. If there is any question about the files found in either step 10 and 11, contact your next level of support before those files are deleted. |

>**DELFILE xxxxxx vv ee (cr)**

where:
xxxxxx- file name
vv- starting version number
ee- ending version number

WARNING
Make sure that no AMACRD file versions contained in the indices are deleted.

CAUTION
Other maintenance activity may have caused files to be placed outside the indices. Make sure that AMACRD files do not contain information that needs to preserved for other maintenance activity.

| **135** | Enter the following command to check the disk usage to determine current amount of disk space being used. |

>**DISK USAGE (cr)**

System response: xxxx/yyyy

where:
xxxx - amount of space used on the disk
yyyy - amount of available space on the disk

Divide xxxx by yyyy and multiply the result by 100 to get the percentage of the disk used. If the usage is less than 70% the procedure is complete. If the usage is still excessive contact your next level of support.

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Disk Drive Full Procedure

This procedure assumes the user has already determined that there is not a disk hardware failure using the procedure in the *Disk Diagnostic Procedure* subsection.

Note 8:   Verify data center is able to poll before starting this procedure.

Note 9:   Arrangements MUST be made with data center to poll while this procedure is in progress.

Note 10:   Data center must determine sequence number of missing data for use in this procedure.

> **CAUTION**
> This procedure MUST be performed during low traffic, or while AMA is routed to another storage device.

Procedure 6-13
Disk Drive Full

Step	Description
136	Enter the following command to determine current disk mode: **>DISK MODE (cr)** *Note:* This procedure is written as if the disk mode at this point is AO. If disk mode is BO, reverse references to A and B throughout this procedure.
137	Have data center poll any unpolled data from disk that is currently on-line. **CAUTION** Do not proceed until data center has completed polling.

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Procedure 6-13
Disk Drive Full

Step	Description
138	Enter the following command to verify that all data is polled: **>IDXMAINT SUMMARY AMA (cr)** Response should indicate 00000000 PRIMARY on the first line. If response does not indicate 00000000 PRIMARY, have data center poll again. If AMA continues to be written while polling is taking place, reschedule activity for another time when traffic is slower or reroute traffic to another device.
139	Enter the following command to change disk mode to access AMA from disk B that needs to be polled by the HOC: **>DISK MODE BO (cr)** System response: DISK MODE BO
140	Enter the following commands to verify that AMAIDX is correct and that data needed by HOC is available. **>IDXMAINT CHECK AMA (cr)** System response: GOOD AMAIDX FILE **>IDXMAINT DIR CLOSED AMA 255 (cr)** System responds with the versions contained in the AMAIDX and the starting sequence number of each version. If AMAIDX is not good, use the procedure in the *Index Corruption Recovery Procedure* subsection to create a new AMAIDX. If sequence numbers needed by data center are not within the boundaries of the starting sequence numbers listed above, proceed to step 10.
141	Have data center poll data.

Note: Incoming AMA data will be written during the time data center is polling.

CAUTION
Do not proceed until data center has completed polling.

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Procedure 6-13
Disk Drive Full

Step	Description
142	Enter the following command to verify all data is polled: **>IDXMAINT SUMMARY AMA (cr)** If response indicates 00000000 PRIMARY on the first line, proceed to step 8. If response does not indicate 00000000 PRIMARY, have data center poll again.
143	Enter the following command to verify disk usage to determine whether it is at an acceptable level. **>DISK USAGE (cr)** Example response: `00108/30517 ALLOCATION UNITS USED` Divide the number in front of the slash by the number after the slash to derive usage percentage. If usage is still above 70%, proceed to step 10. If usage is within the 70% range, proceed to step 9.
144	When polling is complete, enter the following command to make the disk mode redundant again. **>DISK MODE xP (cr)** where: x - A or B (if disk mode was changed to BO in step 4, enter B for x). Length of time to perform this step varies depending on the disk usage. When BMC responds with DISK MODE:AP/BP, this procedure is complete.
	Sheet 3 of 5

Procedure 6-13
Disk Drive Full

Step	Description

145	Enter the following command to verify whether any AMACRD files are outside of the index.
	
	>LSTDIR FILE AMACRD 1 255 (cr)
	
	System responds with a directory listing of the AMACRD files on disk.
	
	Example:`XX AMACRD XX 02 96 151 X XXXX`
	` XXXXXXX XX XXXXXX 020304 007500`
	`1 FILES LISTED`
	
	where:
	02- version number
	96- year file was created
	151- julian date file was created
	020304- starting sequence number of this file
	007500- number of blocks in this file
	
	If data needed by data center is outside the index, look for version that contains the sequence number. Refer to the procedure in the *Index Corruption Recovery Procedure* subsection to create an index that contains the needed data. If disk usage is high and there are AMACRD files that did **not** appear in the IDXMAINT DIR CLOSED AMA listing from step 5, proceed to step 12.

Sheet 4 of 5

Procedure 6-13
Disk Drive Full

Step	Description
146	Compare the printout in step 10 with a full directory listing to verify whether there are any files that need to be deleted. Enter the following (at the terminal): **>LSTDIR ALL(cr)** System responds with a directory listing of all files on this disk, by file name and version number. If there are AMACRD files that appear in this listing, but, did not appear in the IDXMAINT DIR CLOSED AMA listing from step 5, they should be deleted using step 12 below. If there are multiple listings of any other files, they should be deleted to bring the disk usage to a manageable limit. Proceed to step 12 for this procedure.
147	Enter the following command to delete unnecessary data using information provided by data center before procedure was started. If ALL data is needed, DO NOT DELETE ANY FILES. **>DELFILE xxxxxx vv ee (cr)** where: xxxxxx- file name vv- starting version number ee- ending version number.

Sheet 5 of 5

Disk Drive Recovery Procedure

Procedure 6-14
Disk Drive Fault Determination

Step	Description
148	Determine the current disk operation mode. Enter: (at the terminal) >DISK MODE (cr) System response: `DISK MODE xx` where: xx - current disk mode (AO, BO, AP, BP, or NONE) If the disk system mode shows either disk in the PRIME mode, there is no fault, procedure complete. Monitor the terminal for any disk error message repeats. If disk system status is in No Mode or the ONLY mode, go to step 2.
149	Enter the following command to attempt to make the disk system redundant. **>DISK MODE xP (cr)** where: x = A or B

Note: Wait for the appearance of the MODE xx response to this message; the length of time for the mode change procedure varies, depending upon disk size and input traffic load. If the disk system status has not changed to redundant, (disk selected in the key sequence above is still ONLY mode), proceed to step 3.

WARNING
Changing to PRIME mode may cause the AMA ports to be dropped.

CAUTION
If disk usage alarms are observed, do not change the disk mode to prime. Refer to the *Disk Full Procedure* subsection.

150	If this procedure is unsuccessful, proceed to the *Disk Drive Formatting* procedure.

Procedure 6-15
Disk Drive Formatting

Step	Description

CAUTION 1
Use the FORMAT command ONLY when in direct contact with Nortel field support personnel. This command may cause a loss of data. Perform the DISK FORMAT procedure during a period of low data gathering activity (low traffic) to avoid data losses.

CAUTION 2
Subsequent procedures call for the use of disk commands that may cause a loss of data if improperly executed. Ensure that the operational disk drive is in DISK ONLY mode prior to entering commands.

151   Enter the following command to format the disk drive

>DISK FORMAT x (cr)

where: x - off-line drive (A or B)

System response: DISK FORMAT STARTED

After completion of the FORMAT operation, the FORMAT DONE message is output. For any other response, refer to the procedure for that message and perform the activities listed.

152   Once this activity is complete, return to the message procedure you left and continue the activities.

Procedure 6-16
Make disk system ONLY mode

Step	Description

CAUTION
This action may cause a loss of data. Verify your action with technical assistance personnel.

Note: Refer to Table 6-6 for the allowed disk drive mode changes.

| **3** | Enter: (at the terminal) |

>DISK MODE xO (cr)

where: x - disk drive (A or B)

System response: DISK MODE: AO or DISK MODE: BO

| **4** | Once this activity is completed, return to the message procedure you left and continue the activities. |

Procedure 6-17
Make disk system PRIME mode

Step	Description

CAUTION
This disk command may cause a loss of data if the wrong disk is selected to be made PRIME. Make certain that the disk that is in the ONLY mode is the one selected to be made PRIME mode. Verify your action with technical assistance personnel.

Note: Refer to Table 6-6 for the allowed disk drive mode changes.

(Sheet 1 of 2)

Procedure 6-17
Make disk system PRIME mode

Step	Description
5	Enter: (at the terminal) **>DISK MODE xP (cr)** where: x - disk drive (A or B) System response: DISK MODE: AP or DISK MODE: BP This procedure can take up to three hours. When both disk drive lights are flashing, the procedure is being performed.
6	Once this activity is completed, return to the message procedure you left and continue the activities.

(Sheet 2 of 2)

Table 6-6
Allowed disk drive unit mode changes

Initial Mode	Final Mode	Allowed yes/no	Remarks/conditions
A PRIME	A ONLY	Y	
A PRIME	B PRIME	Y	
A PRIME	B ONLY	Y	
A ONLY	A PRIME	Y	Allowed if the B disk is initialized.
A ONLY	B PRIME	N	
A ONLY[1]	B ONLY[1]	Y	
B PRIME	B ONLY	Y	
B PRIME	A PRIME	Y	

(Sheet 1 of 2)

Table 6-6
Allowed disk drive unit mode changes

Initial Mode	Final Mode	Allowed yes/no	Remarks/conditions
B PRIME	A ONLY	Y	
B ONLY	B PRIME	Y	Allowed if the A disk is initialized.
B ONLY[1]	A ONLY[1]	Y	
B ONLY	A PRIME	N	
DWN	A ONLY	Y	Allowed if the A disk is properly initialized or formatted.
DWN	B ONLY	Y	Allowed if the B disk is properly initialized or formatted.
A ONLY	DWN	Y	Changes A disk to uninitialized. Not recommended.
B ONLY	DWN	Y	Changes B disk to uninitialized. Not recommended.

Note: This change is to be used for specific DISK FULL recovery procedures only. Contact Nortel if it becomes necessary to use this mode change.

(Sheet 2 of 2)

DRAM PCA Diagnostic Procedure

This procedure is used to diagnose problems on the DRAM PCA. This procedure assumes that the PCA worked at one time and has not been replaced or settings altered by previous troubleshooting activity.

Note: The D-RAM ERROR error map alarm causes a computer switch when it occurs.

Procedure 6-18
DRAM PCA (NT6M64AA) Diagnostic

Step	Description
7	Enter the following commands to determine which shelf in the BMC has the alarm.
	>ERRMAP ALARMS (cr)
	System responds with a list of alarms on active and standby processors.
	>CLK (cr)
	System responds with a time stamp and the identity of the active processor.
8	Enter the following command to reset the DRAM Alarm.
	>RSERR 00 (cr)
	Status panel display alarm light will go out if the alarms clear. Enter the following command to attempt to load the program on the standby shelf.
	>DOS S BOOT (cr)
	System responds with a software loaded message once the program successfully loads.
	The BMC will automatically attempt to load the software program up to three times. Observe the prime disk drive LED for several seconds of activity. If the alarm returns, replace the DRAM PCA in the affected chassis using the procedure in the *Hardware Replacement* subsection, then proceed to step 3. If the alarm stays clear, continue with step 3.

(Sheet 1 of 2)

Procedure 6-18
DRAM PCA (NT6M64AA) Diagnostic

Step	Description

9   The following command will perform a series of tests on the standby processor.

>DOS S TEST (cr)

System responds with a series of tests with results indicated as pass or fail. If the tests pass and the alarms stays clear, continue with step 4. If the DRAM PCA has been replaced and the DRAM test fails or a STANDBY PROCESSOR NOT AVAILABLE message occurs, contact your next level of support.

If the DRAM PCA has not been replaced and the DRAM test fails or a STANDBY PROCESSOR NOT AVAILABLE message occurs, replace the DRAM PCA in the chassis that failed using the procedure in the *Hardware Replacement* subsection. Then, repeat this procedure from the beginning.

10   Enter the following command to switch processor modes to the standby side.

>SWACT (cr)

System responds with a series of messages indicating the processor switch activity.

>CLK (cr)

System responds with a time stamp and identity of active processor.

>IDXMAINT DIR OPEN AMA (cr)

System responds with the detail of the current open AMA file where the switch is sending AMA. Repeat this command after enough time has passed and note that the number of block in the file are getting larger. If the alarms stay clear, the procedure is complete. If the alarm returns, contact your next level of support.

(Sheet 2 of 2)

Index Corruption Recovery Procedure

This procedure describes a methodology for recognizing and recovering from index file corruption which may be experienced with the BMC system. Index file corruption can occur for a variety of reasons. This procedure neither catalogs nor explains all those reasons; rather, it offers practical advice for identifying and correcting certain types of index file corruption should it occur. For each type of index file corruption discussed, the procedure to recognize it is first given, followed by the appropriate recovery procedure. This follows the natural flow of troubleshooting. Commands and responses

for the BMC are given. This procedure address the following types of index file corruption:

- Version number missing from index, but is on disk.

- Sequence numbers not incrementing properly.

- AMAIDX OPEN ERROR:03.

Version number missing from index, but is on disk

Version numbers within the index are always supposed to be *sequential and contiguous*. That is, they should start from a low version number and increment by one, without skipping any numbers (i.e., 07, 08, 09, 10, etc.). *If a version number is missing from the index, but the AMACRD file is actually on disk, then corruption has occurred*.

Recognition

AMACRD files missing from the index can be observed by displaying and comparing listings of the AMACRD files in the index to those in the directory. Additionally, check for error messages, such as BAD AMAIDX FILE, and/or the presence of alarms.

For example: Version 82 is missing from the index but the AMACRD file version 82 is in fact on the disk. Therefore the index is corrupt and must be fixed.

Procedure 6-19
Version number Missing Recognition

Step	Description
11	Display the summary of the AMACRD files in the index.

>IDXMAINT SUMMARY AMA (cr)

Example response:

AMA FILE: 03 VSNS, 0003487 BLKS, 00000042 PRIMARY
SEQ# 00000000 FIRST, 00003445 PRIM, 00003487 NEXT IN
VS 81: 3451 BLKS, 6 PRIMARY, AMA SEQ #00000000

Save this information. It will be used in a subsequent step.

(Sheet 1 of 2)

Procedure 6-19 **Version number Missing Recognition**	
Step	**Description**
12	Display the closed AMACRD files in the index. **>IDXMAINT DIR CLOSED AMA 200 (cr)** Example response: VS 81: 3451 BLKS, 6 PRIMARY, AMA SEQ #00000000 VS 83: 36 BLKS, 36 PRIMARY, AMA SEQ #00003487 END OF AMAIDX FILE
13	Display the open AMACRD file in the index. **>IDXMAINT DIR OPEN AMA (cr)** Example response: `VS 84: 0 BLKS, 0 PRIMARY, AMA SEQ #00003523` The discrepancy (a skipped version number) is evident in the listing of the closed AMACRD files in the index.
14	Display the AMACRD files in the directory. **>LSTDIR FILE AMACRD 1 255 (cr)** Example response: 00 AMACRD 60 **81** 95 263 0 1531 01521201 00 0EE508 **000000 003451** 81 is the AMACRD file version number. 000000 is the version's beginning block number. Adding 003451 (number of blocks in this version) should add up to the next beginning block number.
(Sheet 2 of 2)	

Recovery
The AMA index must be rebuilt to "close the gap" caused by the missing index entry. Note that the AMACRD files versions are sequential and contiguous. They start at version 81, increment correctly to version 82 then to version 83.   This indicates that the AMA index file corruption can be fixed.

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Procedure 6-20
Version number Missing Recovery

Step	Description
15	Identify the next sequence number of PRIMARY AMA in the index. For example: AMA FILE: 03 VSNS, 0003487 BLKS, 00000042 PRIMARY SEQ# 00000000 FIRST, **00003445** PRIM, 00003487 NEXT IN VS 81: 3451 BLKS, 6 PRIMARY, AMA SEQ #00000000 00003445 in the next sequence number of PRIMARY AMA. Using the information from the previous IDXMAINT SUMMARY AMA command, it can be seen that the first block of PRIMARY AMA is block number 3445 in AMACRD version 81.
16	Delete the old AMA index file: **>DELFILE AMAIDX 1 255 (cr)** Example response: VERSION 03 DELETED
17	Create a new index file starting with the first block of PRIMARY AMA just located. Create a new AMA index file, starting with AMACRD file version 20, with the first block of PRIMARY AMA in version 81 (block 3445). **>IDXMAINT CREATE DIR AMA 20 3445 81 (cr)** Example response: AMA FILE ESTABLISHED GOOD AMAIDX FILE
18	Display the summary of AMACRD files in the new index. The presence of the message, GOOD AMAIDX FILE, is positive indication that the new AMA index file was correctly created. This can be verified by displaying the summary of AMACRD files in the index. **>IDXMAINT SUMMARY AMA (cr)** Example response: AMA FILE: 04 VSNS, 00003487 BLKS, 00000078 PRIMARY SEQ# 00000000 FIRST, 00003445 PRIM, 00003523 NEXT IN VS 81: 3451 BLKS, 6 PRIMARY, AMA SEQ #00000000

(Sheet 1 of 2)

Procedure 6-20
Version number Missing Recovery

Step	Description
	Note that the number of PRIMARY blocks in the new index has changed from 42 to 78. This is an increase of 36 blocks. This is correct because the index file now correctly includes version 82 (which contains 36 blocks of PRIMARY AMA). *Since the BMC is actively collecting AMA data, the number of blocks in the index may increase by more than the indicated difference of 36 blocks.*
19	Display the closed AMACRD versions in the new index. Verification that the AMACRD versions are now in the proper order (sequential and contiguous) can be performed by displaying the closed AMACRD files in the index.

>IDXMAINT DIR CLOSED AMA 200 (cr)

Example response:

VS **81**: 3451 BLKS, 6 PRIMARY, AMA SEQ #00000000
VS **82**:   36 BLKS, **36 PRIMARY**, AMA SEQ #00003451
VS **83**:   36 BLKS, 36 PRIMARY, AMA SEQ #00003487

This concludes the recovery procedure for version missing from index, but is on disk.

(Sheet 2 of 2)

Sequence numbers not incrementing properly
Sequence numbers should always be *sequential and continuous*. They should increment from a lower number toward a higher number and should *never* decrement. The beginning sequence number for an AMACRD file can be calculated by adding the **beginning block number** to the **number of blocks** from the previous sequence number.

If version 106 of an AMACRD file has a starting sequence number of 602747 and contains 2968 blocks, then version 107 should have a starting sequence number of 605715 (the sum of version 106's beginning sequence number, 602747, plus the 2968 blocks in version 106).

Recognition
If sequence numbers are decrementing instead of incrementing, or if the sequence number is not the sum of the beginning sequence number of the previous version and the number of blocks in the previous version, then corruption has occurred.

Incorrectly incrementing sequence numbers may be observed by displaying a listing of the closed AMACRD files in the index. The system should also report BAD AMAIDX FILE.

Procedure 6-21
Sequence Number Not Incrementing Recognition

Step	Description
20	Check the AMA Index File. Have the BMC check the integrity of the AMA Index File. In this example, the execution of the following command will result with an error message which verifies that the AMA Index File is corrupt. **>IDXMAINT CHECK AMA (cr)** System response: `BAD AMAIDX FILE`
21	Display the summary of AMACRD files in the index. **>IDXMAINT DIR CLOSED AMA 200 (cr)** Example response: VS 106: 2968 BLKS, 99 DA SECNDRY, AMA SEQ #002747 VS 107: 1698 BLKS, 99 DA SECNDRY, AMA SEQ #005715 VS 108: 1335 BLKS, 49 PRIMARY, AMA SEQ #007413 **VS 109**: 1389 BLKS, 1389 PRIMARY, AMA SEQ **#008740** VS 110: 304 BLKS, 304 PRIMARY, AMA SEQ #010129 VS 111: 632 BLKS, 632 PRIMARY, AMA SEQ #010433 VS 112: 1085 BLKS, 1085 PRIMARY, AMA SEQ #011065 END OF AMAIDX FILE
22	Check that the sum of the beginning sequence number for a version and the blocks in that version correctly adds up to the next beginning sequence number.

In this example, the sequence number for version number 109 is incorrect. Prior to (and after) version 109, the sequence numbers are incrementing properly. The sequence number for version 109, #608740, has incorrectly been incremented by only 1327 blocks. It *should* have incremented by 1335 blocks (sequence number 607413 for version 108 plus 1335 blocks in version 108 equals sequence number 608748 for version 109). Eight blocks of PRIMARY AMA appear to be missing in version 108.

The effect is that the polling center won't be able to retrieve AMA starting at version 109, because there will be duplicate sequences in versions 108 and

109 (sequences 608740 through 608748). The actual AMA data in version 108, sequence numbers 608740 through 608748 will be different from the AMA data in version 109, sequence numbers 608740 through 608748, but the BMC will detect the duplicated sequence numbers and report, *BAD AMAIDX FILE*.

Recovery

To recover from this error, version 108 must be changed from PRIMARY to SECONDARY and the data retrieved from it in a DEMAND POLL. After the data center retrieves the data via demand poll, the old index (which contains the corrupt version 108) will be deleted, then a new index will be built starting with version 109 (which is not corrupt).

Procedure 6-22
Sequence Number Not Incrementing Recovery

Step	Description
23	Delete the corrupt AMA index file. **>DELFILE AMAIDX 1 255 (cr)** Example response: `VERSION   03 DELETED`
24	Create a temporary AMA index that includes the corrupt AMACRD file. This forces the corrupt version into SECNDRY status. For example, starting at version 106 (SECNDRY). Version 109 will become the first version having PRIMARY AMA data. **>IDXMAINT CREATE DIR AMA 100 008470 106 (cr)** Example response: AMA FILE ESTABLISHED BAD AMAIDX FILE

(Sheet 1 of 4)

Procedure 6-22
Sequence Number Not Incrementing Recovery

Step	Description
25	Display the closed AMACRD files in the index. Displaying the closed AMACRD files in the index shows that version 108 has been changed from PRIMARY to SECNDRY AMA. **>IDXMAINT DIR CLOSED AMA 200 (cr)** Example response: VS 106: 2968 BLKS, 99 DA SECNDRY, AMA SEQ #002747 VS 107: 1698 BLKS, 99 DA SECNDRY, AMA SEQ #005715 VS 108: 1335 BLKS, **99 DA SECNDRY**, AMA SEQ #007413 VS 109: 1389 BLKS, 1389 PRIMARY, AMA SEQ #008740 VS 110: 304 BLKS, 304 PRIMARY, AMA SEQ #010129 VS 111: 632 BLKS, 632 PRIMARY, AMA SEQ #010433 VS 112: 1085 BLKS, 1085 PRIMARY, AMA SEQ #011065 END OF AMAIDX FILE
26	Data center does a DEMAND POLL on the unpolled data in the corrupt version. The data center should now be able to retrieve the previously unpolled data from version 108 by executing a DEMAND POLL, starting at sequence number 008699, for 49 blocks. This starting sequence number for the demand polling is calculated by using the original sequence number of version 108 (007413) and adding the blocks in version 108 (1335) to arrive at the correct next sequence number, 008748. From this sequence number, the 49 blocks of unpolled data in version 108 are subtracted (008748 minus 49) to arrive at the actual starting sequence number, 008699. This is where the data center should start the demand poll.
27	Delete the temporary AMA index file. After the data center confirms that they have successfully retrieved the previously unpolled 49 blocks from the BMC, remove the temporary AMA index file. This does not remove the AMA data (the AMACRD files), but it does remove the AMAIDX file. The following command will remove the AMAIDX file, but a new one will be built in a subsequent step. (The new AMAIDX file that will be built shall contain the correct version numbers.) **>DELFILE AMAIDX 1 255 (cr)** Example response: VERSION 02 DELETED

(Sheet 2 of 4)

Procedure 6-22
Sequence Number Not Incrementing Recovery

Step	Description
28	Create a new AMAIDX file starting with the first good sequence number containing PRIMARY AMA. The following command creates a new AMA index, starting with version 109 as the first version having PRIMARY AMA data. All subsequent versions numbers in the index will still be PRIMARY AMA, and will be included in the new AMA index. **>IDXMAINT CREATE DIR AMA 109 (cr)** Example response: AMA FILE ESTABLISHED GOOD AMAIDX FILE
29	Confirm that there is only one AMAIDX file on the disk. The following command checks the disk to confirm that only one AMAIDX file exists. **>LSTDIR FILE AMAIDX 1 255 (cr)** Example response: 00 AMAIDX 60 29 95.349....0 .4096 01000000 00 0EE509 003523 000009 01 FILE LISTED

(Sheet 3 of 4)

Procedure 6-22
Sequence Number Not Incrementing Recovery

Step	Description
30	Delete the AMACRD files that were forced into SECNDRY status (versions 106-108): **>DELFILE AMACRD 106 108 (cr)** After the data center has confirmed the integrity of the AMA data collected during the demand poll, the AMACRD files in versions 106, 107 and 108 must be deleted.
31	For confirmation, display the closed AMACRD files in the new index. **>IDXMAINT DIR CLOSED AMA 200 (cr)** Example response: VS 109: 1389 BLKS, 1389 PRIMARY, AMA SEQ #008740 VS 110: 304 BLKS, 304 PRIMARY, AMA SEQ #010129 VS 111: 632 BLKS, 632 PRIMARY, AMA SEQ #010433 VS 112: 1085 BLKS, 1085 PRIMARY, AMA SEQ #011065 END OF AMAIDX FILE This concludes the recovery procedure for sequence numbers not incrementing properly.

(Sheet 4 of 4)

AMAIDX OPEN ERROR:03

The BMC uses the AMAIDX file to manage data AMACRD data files on the disk. The error message, AMAIDX OPEN ERROR:03, occurs when an AMAIDX file is missing from the disk.

Procedure 6-23
AMAIDX Missing Recovery

Step	Description
32	Examine available AMACRD files in the directory by typing: **>LSTDIR FILE AMACRD 1 255 (cr)**
33	Note sequence number in the versions that are displayed. For example: 00 AMACRD 60 **78** 95 349 0 1531 01006C00 00 0EE509 **063402** 000076 78 is the file's version number. 063402 is the version's beginning block number.
34	Contact data center. Verify what sequence numbers have been completely processed and will not need to be repolled, as well as what sequence number the data center needs to begin normal polling.
35	Determine which versions contain the sequence numbers obtained from the data center in step 3.
36	Create an AMAIDX containing the AMACRD versions the data center needs to poll. **>IDXMAINT CREATE DIR AMA ver1 seq_num ver2 (cr)** where: ver1- starting version number seq_num- first primary block sequence number ver2- version number in which the selected sequence number occurs.
37	Display contents of new index using the command: **>IDXMAINT DIR CLOSED AMA 255 (cr)** Example response: VS 81: .3451 BLKS, 30 DA TO DLET, AMA SEQ :000000 VS 82: ....36 BLKS, 30 DA TO DLET, AMA SEQ :003451 VS 83: ....36 BLKS, ...36 TO POLL, AMA SEQ :003487 VS 84: ..1389 BLKS, ..1389 TO POLL, AMA SEQ :003523 END OF AMAIDX FILE

(Sheet 1 of 2)

Procedure 6-23
AMAIDX Missing Recovery

Step	Description
38	If any versions were left outside the index, these versions should remain on disk until data center can confirm the data will not need to be repolled. These versions MUST be deleted using the command in step 8. Set up an appointment with customer to do this if necessary.
39	Any versions displayed in step 1 that were not included in the new AMAIDX, MUST be deleted using the following command: **>DELFILE AMACRD 78 80 (cr)**
40	Verify there is only one index in the directory by typing: **>LSTDIR FILE AMAIDX 1 255 (cr)** In the event there is more than one index, verify which index is active by typing: **>LSTDIR FILE AMAIDX 0 (cr)** Note the version number and delete any indices that are NOT needed.
41	Check validity of index using: **>IDXMAINT CHECK AMA (cr)** System response: `GOOD AMAIDX FILE` This concludes the recovery procedure for the AMAIDX OPEN ERROR:03 message.

(Sheet 2 of 2)

No Block Last Hour Diagnostic Procedure

Note: This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

Procedure 6-24
No Block Last Hour Diagnostic

Step	Description
42	Enter the following command to examine the alarms on the error map and the BMC current time. If there are any other alarms listed in the error map, troubleshoot those alarms prior to the NO BLOCK LAST PER alarm. **>ERRMAP ALARMS (cr)** System responds with a list of alarms on the active and standby processors. **>CLK (cr)** System responds with the current time and date and the identity of the active processor. **>AMAHRS (cr)** System response: `BLOCK CHECK START ss ENDING ee INTERVAL ii` where: ss- start time ee- end time ii- interval. If the BMC time is not correct, go to step 2. If the BMC time is correct, go to step 3.
43	Enter the following command to set the BMC clock to the correct time: **>SETCLK yy mm dd hh mm ss ddd (cr)** where: yy- Year mm- Month dd- Day hh- Hour mm- Minute ss- Second ddd- MON, TUE, WED, THU, FRI, SAT, or SUN. System responds with the time and date along with the active processor identity.

(Sheet 1 of 4)

Procedure 6-24
No Block Last Hour Diagnostic

Step	Description

44 Note the time that the alarm occurred. This can be done by viewing the alarm in one of the following ways:

View the printout on the central office printer, if available, go to step 5.

View the time the alarm was reported to the switch or alarm collection device, go to step 5.

Use step 4 if the BMC log files need to be examined.

45 Examine the BMC logs for the original NO BLOCK LAST PER alarm and it's time stamp with the following commands: Enter the following command to close the open LOG file to make recent messages available for viewing:

>IDXMAINT CREATE FILE LOG (cr)

System response: WRITE FILE CLOSED

Enter the following command to display a list of the log files to select a sequence number to start viewing:

>IDXMAINT DIR CLOSED LOG 200 (cr)

System responds with a list of LOG files in the LOG index. From the list of log files, select a sequence number (xxxxxx) to start viewing the logs. The time stamp on the log will help indicate if the correct log was requested. A different sequence number can be selected to reset the starting point to another time.

>IDXMAINT EXAMINE LOG ASCII xxxxx (cr)

System responds with the first message at the sequence number selected. Subsequent messages can be viewed by issuing the following command several times until all the desired information in printed: (xx = 1-99)

>IDXMAINT EXAMINE LOG NEXT xx (cr)

System responds with additional messages beginning where the previous issued command ended.

(Sheet 2 of 4)

Procedure 6-24
No Block Last Hour Diagnostic

Step	Description

Once the log messages have been viewed, the following command is issued to close the log file:

>IDXMAINT CLOSE (cr)

Response: READ FILE CLOSED

Note: The time stamps in the logs reflect the BMC time. If the BMC time is wrong, the log times will also be wrong.

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46 Did the NO BLOCK LAST PER alarm occur during a period when no AMA might be expected to be written from the switch to the BMC?

If adjusting the BMC clock corrected the problem, the procedure is now complete.   If no AMA was expected at the time of the alarm, continue with step 6. If AMA should have been written, go to step 8.

---

47 Enter the following command to change the NO BLOCK LAST PER alarm range to more suitable times.

>AMAHRS ss ee ii (cr)

System response: BLOCK CHECH START ss ENDING ee INTERVAL ii

The following command writes the new site data to disk:

>SITDAT WRITE (cr)

System response: SITDAT FILE DISK JOB COMPLETE

(Sheet 3 of 4)

Procedure 6-24
No Block Last Hour Diagnostic

Step	Description
48	Enter the following commands to clear any alarms in the BMC: **>RSERR 00 (cr)** and/or **>DOS S RSERR 00 (cr)** System responds with an ALL ALARMS CLEARED message and the status panel alarm lamp will go out.
49	Verify that the alarm clears and switch is sending AMA to the BMC. If the alarm remains clear the procedure is complete. If the alarm returns complete this procedure from the beginning to reset the AMAHRS parameter or contact your next level of support.
	(Sheet 4 of 4)

Polling Diagnostic Procedure

This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

Procedure 6-25
Polling Diagnostic

Step	Description
50	The following commands are used to list the BMC alarms and identity the active processor. This initial information is used to identify the condition of the BMC when the polling problem occurred. **>ERRMAP ALARMS (cr)**List the current BMC alarms. System response includes a list of alarms on the active and standby processors. CP alarms indicate a problem in the 56K Interface PCA. **>CLK (cr)**Determine the active processor. System responds with the current time and the identity of active processor.
51	Start a polling session and observe BMC polling modem and monitor the BMC output device for messages related to the polling activity. If the polling modem fails to answer, go to step 3. If the modem answers and there are no polling messages at the BMC, go to step 4. If there are polling messages at the BMC, go to step 9.
52	Confirm that the polling center is dialing the correct number and that the number assigned to the polling modem is functional. If the polling modem did not answer attempt to dial the modem from a local phone. If the modem still fails to answer, check the telephone line and the modem. If the phone line or modem is found defective, correct the problem and repeat this procedure from the beginning. If the modem and phone line are OK, stop this procedure and contact your next level of support.
	(Sheet 1 of 7)

Procedure 6-25
Polling Diagnostic

Step	Description
53	Switch processors and see if the problem remains the same. If there are no alarms on the BMC, enter the following command to switch the processor: **>SWACT (cr)** System responds with messages indicating the processor switch. If the data center can poll from the other shelf, refer to the procedure in the *56K Interface PCA Diagnostic Procedure* subsection to troubleshoot the shelf problem. If polling still fails on both shelves with no messages, continue with step 5.
54	Enter the following command to verify that the modem baud rate in the BMC matches the modem baud rate: **>BAUD (cr)** If the baud rate is wrong, enter the following command with the correct value: **>BAUD x yyyy (cr)** where: x- 1 or 2 yyyy- 1200, 2400, 4800, or 9600 System response: FOR LINK #x BAUD RATE = yyyy Enter the following command to verify the CP interface setting: **>CP INTERFACE (cr)** The CP Interface should be set to RS232. *Note:* It is possible to use the V.35 interface to communicate with the HOC. However, BMC software limits the baud rate to a maximum of 9600. **(Sheet 2 of 7)**

Procedure 6-25
Polling Diagnostic

Step	Description
	Go to step 14 to check the BMC and the modem clocks setting then continue with this step.

Enter the following command to write this site dependent data to disk:

>SITDAT WRITE (cr)

System response: SITDAT FILE DISK JOB COMPLETE

| 55 | When polling fails from both shelves with no messages output to the local printer check the list below for the possible actions. |

- **Check the cabling from the modem to the BMC. Correct any problem found and repeat the procedure.**

- **Power cycle and/or change the modem.**

- **Replace the 56K Crossover PCA using the procedure in the *Hardware Replacement* section. Repeat this procedure.**

- **Contact your next level of support.**

| 56 | If the Error map alarms includes the message OFFLIN DSK FULL, refer to the procedure in the *Polling Disks From a Non-Redundant Mode Procedure* subsection to recover the data now in the off-line disk. |

Note: The BMC disk system enters a non-redundant disk mode because of an inability to poll. The polling failure condition must be resolved before the recovery from the non-redundant disk mode can occur.

CAUTION
Consult with your next level of support to plan activities required to recover from the non-redundant disk mode.

| 57 | If the Error map alarms includes the message DSK STORE LIMIT, or DIRECTORY FULL, consult with your next level of support. |

(Sheet 3 of 7)

Procedure 6-25
Polling Diagnostic

Step	Description
58	If the Error map alarms includes the message INCOMING CALL REJECTED 01, there is a password problem. The host password was rejected by the BMC. Check password used by the poller and the value in the BMC site data through the command below.

Note: After entering the following command, enter CTRL Z to exit the overlay.

>KYWDL (cr)

System responds with password in BMC site data that matches the password sent by the HOC. If the BMC KYWDL is wrong, go to step 10. If the KYWDL is OK, go to step 11.

Step	Description
59	Enter the following commands to correct the KYWD password.

>KYWDxC yyyyyy (cr)

where:
x- link (1 or 2).
yyyyyy- desired password.

>KYWDL (cr)

System responds with password entered in the command above.

Note: After entering the above commands, enter CTRL Z to exit the overlay.

Proceed to step 11.

Step	Description
60	Once the passwords are exchanged, the messages INCOMING CALL FROM sss ACCEPTED ON LINK nn followed by AMA SEQUENCE #yyyyyy (where yyyyyy = next primary sequence number to be polled) are normally displayed. Additional messages may indicate that an AMA file has closed.

Each time a AMACRD file has been completely polled, the message AMA SEQUENCE #yyyyyy is output. Once all available data has been polled, the polling session ends and the message CALL CLEARED ON LINK xx is output. If all available/requested data is sent, the polling session is completed and no further action is required. If the session failed to send any or all available data, continue to step 12.

(Sheet 4 of 7)

Procedure 6-25
Polling Diagnostic

Step	Description

61   When an IMPROPER LINK DISCONNECT: RETRY LIMIT message is received, the polling problem could be caused by an incorrectly set modem line control value. Enter the following command to verify the current modem line control value:

>CP CONTROL (cr)

The system responds with the current modem line control value, either HD for Half Duplex (system default value) or FD for Full Duplex. If the modem is using Bell 208 compatibility, the line control value should be set to HD. If the modem is using V.32 (or higher) compatibility, the line control value should be set to FD.

If the modem line control value is incorrectly set, enter the command listed below. Otherwise, proceed to step 13.

>CP CONTROL xx (cr)

 where: xx - FD or HD.

Enter the following command to verify the modified modem line control value:

>CP CONTROL (cr)

If the modem line control value does not match the value desired, enter the CP CONTROL xx command again, and verify the value. Once the modem line control value is correct, enter the following command to save this value in the site data file:

>SITDAT WRITE (cr)

Proceed to step 13.

62   Enter the following command to reboot the CP:

>CP BOOT ACT (cr)

(Sheet 5 of 7)

Procedure 6-25
Polling Diagnostic

Step	Description

63   Other messages listed below are output as a result various failures.

IMPROPER LINK DISCONNECT: RETRY LIMIT
IMPROPER LINK DISCONNECT: TIMEOUT
LINK TRANSMIT TIMEOUT
LINK xx RETRY THRESH EXCEEDED< MSG: mm nn

- **Check and/or change the timing between the BMC and the modem, go to step 15, then, repeat step 14 from the beginning.**

- **Check modem transmit level (typically about -12db).**

- **Power cycle and/or change the modem.**

- **Try another telephone line.**

- **Facility problem may adversely affect polling at certain times of the day and cause no polling problems at other times. This is beyond the scope of this procedure.**

- **If none of the suggestions correct the problem, contact your next level of support.**

64   Check the modem and CP clock. The modem clock should be set opposite the CP clock setting in the BMC.

Note 4: The BMC factory default CP clock setting is INTERNAL. Setting the modem clock is beyond the scope of this document.

Note 5: Some high speed (9600 baud) modems function better when their clock is set to internal. In those cases the CP clock setting should be changed to EXTERNAL.

Enter the following command to check the BMC time parameter:

>CP CLOCK (cr)

System response indicates whether the CP clock signal is INTERNAL or EXTERNAL. If required, change the BMC timing with the following command:

>CP CLOCK x (cr)

where: x - INTERNAL or EXTERNAL.

(Sheet 6 of 7)

Procedure 6-25
Polling Diagnostic

Step	Description
	Enter the following command to write this site dependent data to disk: **>SITDAT WRITE (cr)** System response: `SITDAT FILE DISK JOB COMPLETE`
	(Sheet 7 of 7)

On-Site Procedures for Disk Drives

This section describes the procedures that are performed on-site for the BMC disk drive units.

Download and Boot Software with Software Running

The main software programs for the BMC are written on disk before the systems are shipped from Nortel. Periodic updates and patches to the software programs are issued and must be loaded onto disk as part of on-site activities. The following procedure provides the method for downloading and booting new software with the old software still running.

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
65	Interface a modem to a phone line and the BMC's downloading port at J2.
66	Adjust the baud rate, if necessary (1200-9600 per modem selection).
67	Check that space is available on disk and in the disk directory for the downloaded program. Enter (at the terminal): **>LSTDIR ALL (cr)** *Note:* Directory maximum is 383 files.
	(Sheet 1 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
68	Delete any unneeded files, if required. Enter (at the terminal): **>DELFILE filename version (cr)** Old program versions that are not expected to be run again are candidates for deletion. Save at least the three most current versions. Continue listing the directory, step 3, and deleting files, step 4, until sufficient disk space is available.
69	Inform the facility supplying the download software that the BMC is ready to receive the download. When the download starts, the LED on the disk illuminates periodically, indicating that the download is in progress and the new software is being saved on disk. Process takes several minutes. Monitor the terminal for the message: xxxxxx DOWNLOAD STARTED where: xxxxxx - filename being downloaded
70	Monitor the terminal for the message: `xxxxxx DOWNLOAD COMPLETE` Message indicates that the download is complete. The software must be added to the boot list and the processor rebooted. If this message is not received, go back to step 1 and inform the download source facility of the problem.
71	Check for the existence and name of the downloaded software file name(s). Enter (at the terminal): **>LSTDIR ALL (cr)**
	(Sheet 2 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
72	Make a copy of all site dependent data on disk, as a first step in the installation of the "new" software. The old SITDAT file on disk may be incompatible with the new software. Refer to the *System Administration Guide* section for a list of all site dependent entries. Use this information to reconstruct a new SITDAT file containing site data for use by the new software. For example, to display the site data command that defines the baud settings, enter (at the terminal): **>BAUD (cr)**
73	List the most recent version of the "old" SITDAT file. Enter (at the terminal): **>LSTDIR FILE SITDAT 0 (cr)**
74	Delete the old SITDAT file. Enter (at the terminal): **>DELFILE SITDAT 1 255 (cr)** Expected response: VS x DELETED y FILES DELETED where: x - version number y - number of files deleted.
75	Verify that the SITDAT (version) was deleted. Enter (at the terminal): **>LSTDIR FILE SITDAT 0 (cr)** If a file is listed, go back to step 10.

(Sheet 3 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
76	Make a copy of the present content of the TDYSTS file. Enter (at the terminal): **>REPORT DISK TDAY (cr)** **>REPORT AMA TDAY (cr)** **>REPORT COM TDAY (cr)** These commands print reports containing all of the statistical data items in the file about to be deleted. Since it is restarted from zero in the disk by the new software, this paper copy is obtained for possible reference.
77	Close and delete the TDYSTS file. Note the active file identification number "n" of any file listed with a block size of 256. Enter (at the terminal): **>LSTACT (cr)** Using any and all values for "n", verify which of them correspond to version numbers of file name TDYSTS. Enter (at the terminal): **>LSTDIR ACT n (cr)** Using any and all values for "n" verified as references to the file TDYSTS, close each file reference. Enter (at the terminal): **>CLSACT n (cr)** Having closed the file, which is normally kept open, it is possible to delete it from the disk. Note, however, that the data of the file still exists in the RAM of both Processors. Enter (at the terminal): **>DELFILE TDYSTS 1 255 (cr)**
78	Identify the file names that are to be removed from the software's boot file BOOTFL. Enter (at the terminal): **>DOS LL (cr)** The system responds with one or more file names. Save the file names and versions in the event it is desired to run the old software again.
	(Sheet 4 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
79	Remove the current software file names from the software boot file BOOTFL (identified by the DOS LL command) to allow insertion of the new software's file names (may need to repeat several times if more than one file is in the boot list). Enter (at the terminal): **>DOS LD (cr)**
80	Verify that the BOOTFL is now empty. Enter (at the terminal): **>DOS LL (cr)** System response: `BOOT FILE EMPTY` If a file is listed, go back to step 14.
81	Append a new software file name into the boot file BOOTFL. Enter (at the terminal): **>DOS LA (cr)** prompt: **FILE> f (cr)** where: f = filename of new software. prompt: **VER> v (cr)** where v = version number of new software.
82	Verify that the file has been appended into the BOOTFL. Enter (at the terminal): **>DOS LL (cr)** The file name is listed. If other files are to be appended, go back to step 17.
83	Power down the Standby Processor to clear all RAM and reboot the Standby Processor. Wait 15 seconds. With the power off, the copy of the obsolete TDYSTS file data in RAM is erased. Return power to the Standby Processor.

Note: All personnel perform steps 20 through 28.

(Sheet 5 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
84	Test if the software is functional. Try a few commands on the Standby Processor to verify the software. The command in this step displays the software and version IDs on the Standby Processor. If the System does not respond as expected, do not proceed, the software may be faulty. Enter (at the terminal): **>DOS S VS (cr)**
85	Switch the processor with the new software from Standby to Active. Enter (at the terminal): **>SWACT (cr)** This allows the new Standby with its old software to be "booted" with new software with subsequent commands, from the Active Processor that has the new software, while maintaining billing data processing on the newly Active Processor. Successful processor switch is indicated by the message: MP SWITCH
86	Observe the following message on the terminal: NO SITE DATA ON DISK Site data used during the boot-up is the default data. If some other error message is output out, refer to the procedure for that message in this section and perform the activities listed.
87	Power down the Standby Processor to clear all RAM and reboot the Standby Processor. Wait 15 seconds. With the power off, the copy of the obsolete TDYSTS file data in RAM is erased. Return power to the Standby Processor.
88	Test if the software is functional. Enter (at the terminal): **>DOS S VS (cr)**
89	Edit the site data parameters. Use the site data parameters from step 7 to modify the default parameters for the specific requirements of this site. This updates site data for the current Active Processor only.
	(Sheet 6 of 7)

Procedure 6-26
Download and Boot Software with Software Running

Step	Description
90	Display all site specific data and match and compare to that data extracted in step 8. Verify that all editing has been completed correctly. If there are discrepancies, go back to step 25.
91	Save the edited site specific data parameters on disk. Enter (at the terminal): **>SITDAT WRITE (cr)** The new SITDAT is read by the Processor during a Processor switch or power up, using the newly edited site data. Successful SITDAT save on disk is indicated by the expected message: SITDAT FILE DISK JOB COMPELTE
92	Newly Active Processor reads SITDAT file from disk as saved in step 27, eliminating a repeat of the manual editing of the site specific data. Enter (at the terminal): **>SWACT (cr)** A successful processor is indicated by the expected message: MP SWITCH This completes the installation.

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Emergency Download and Boot Software with Software Not Running
At power-up, the software programs are automatically downloaded from disk to RAM. The inability of the system to retrieve the program(s) from one or both disk(s) requires use of manual downloading to restart the system. The

following provides the procedure for downloading and booting the software programs with the software not running.

Procedure 6-27
Emergency Download and Boot Software with Software Not Running

Step	Description
93	Verify that power is applied to both Processors. Observe that the ON/OFF circuit breaker on the Power Supplies on both A and B chassis is in the ON setting.
94	Verify A Processor and firmware (ID) number; record this number. Enter (at the terminal): **>DOS VS (cr)**
95	Verify B Processor and firmware (ID) number; record this number. Enter (at the terminal): **>DOS S DOS VS (cr)**
96	Check the disk mode. Enter (at the terminal): **>DISK MODE (cr)** If the disk mode is NONE then proceed to step 5. Otherwise, the proceed to step 10.

Note: Perform these steps 5 through 9 ONLY if the disk mode is NONE, or refer to the procedure for the message DISK MODE: NONE; perform the craftsperson activities listed and return to step 12 upon successful completion of those activities.

Step	Description
97	Attempt to change the disk mode to A ONLY. Enter (at the terminal): **>DISK MODE AO (cr)** If any other message appears, proceed to the procedure for that message and perform the craftsperson activities listed, or proceed to step 6.

CAUTION
Do not perform step 6 if step 5 is successful; proceed to step 7. If it becomes necessary to perform step 6, contact Nortel immediately.

(Sheet 1 of 5)

Procedure 6-27
Emergency Download and Boot Software with Software Not Running

Step	Description
98	Format the A disk. Enter (at the terminal): **>DISK FORMAT A (cr)** Proper response: `FORMAT DONE`
99	Make the disk mode A ONLY. Enter (at the terminal): **>DISK MODE AO (cr)**
100	Repeat steps 4 and 5 for the B disk.
101	Make the disk mode PRIME, if the disk system is not already in a PRIME mode. Enter (at the terminal): **>DISK MODE AP (cr)** or **>DISK MODE BP (cr)**
102	Interface a modem to a phone line and the BMC modem at J2. BMC system is now ready to receive the download.
103	Adjust baud rate, if necessary (1200-9600 per modem selection).
104	Inform the facility supplying the download software that the BMC is ready to receive the download. When the download starts, the LED on the disk illuminates periodically, indicating that the download is in progress and the new software is being saved on disk. Process takes several minutes. Monitor the terminal for the message: xxxxxx DOWNLOAD STARTED where: xxxxxx - filename being downloaded

(Sheet 2 of 5)

Procedure 6-27
Emergency Download and Boot Software with Software Not Running

Step	Description

105   Monitor the terminal for the message:

    xxxxxx DOWNLOAD COMPLETE

Message indicates that the download is complete. Installation of the "new" software is now required. If this message is not received, go back to step 14 and inform the download source facility of the problem.

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106   Check the existence and spelling of the downloaded software file name(s). Enter (at the terminal):

>XDIR (cr)

Note: Optional steps. Check to make sure that the BOOTFL is empty.

Identify the file names that are to be removed from the software's boot file BOOTFL. Enter (at the terminal):

>DOS LL (cr)

One or more file names are displayed. Save the file names in the event it is desired to run the old software again.

Remove the current software file names from the software boot file BOOTFL (identified by the DOS LL command) to allow insertion of the new software's file name(s). Enter (at the terminal):

>DOS LD (cr)

Verify that the BOOTFL is now empty. Enter (at the terminal):

>DOS LL (cr)

System response: BOOT FILE EMPTY

If a file is listed, go back to optional step b, otherwise, proceed to step 15.

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Procedure 6-27
Emergency Download and Boot Software with Software Not Running

Step	Description
107	Append a new software file name, as observed in step 14, into the boot file BOOTFL. Enter (at the terminal): **>DOS LA (cr)** prompt: **FILE> f (cr)** where: f = filename of new software. prompt: **VER> v (cr)** where v = version number of new software.
108	Verify that the file has been appended in the BOOTFL. The file name just created should be listed. If the file is not listed, or if other files are to be appended, go back to step 14. Enter (at the terminal): **>DOS LL (cr)**
109	"Boot-up" the new software in the Active Processor. This may take several minutes. Several messages should appear. Enter (at the terminal): **>DOS LB (cr)**
110	Observe the following message on the terminal: S/W LOADED Message indicates successful "Boot-up"; appears once for each file in the BOOTFL. If an error message appears, refer to procedure for that message in this section.
111	Test if the new software is functional. Try a few commands on the Active Processor to verify the software. This message displays the software and firmware version IDs on the Active Processor. If the system does not respond as expected to the commands, do not proceed, the software load may be faulty. Enter (at the terminal): **>VS (cr)**
	(Sheet 4 of 5)

Procedure 6-27 **Emergency Download and Boot Software with Software Not Running**	
Step	**Description**
112	"Boot-up" the new software on the Standby Processor. Enter (at the terminal): **>DOS S DOS LB (cr)**
113	This completes the download and software boot procedure.
Note: At this time, refer to the *System Administration Guide* section and enter the site data for the BMC system.	
(Sheet 5 of 5)	

Polling disks from a non-redundant mode procedure

The BMC normally stores AMA data simultaneously on both disks. However, if the BMC cannot be polled, the disks fill up with AMA data. When both disks reach 95 percent full, the disk system goes to the nonredundant (ONLY) mode. The off-line disk is filled with AMA data that must be preserved and polled; the second disk writes over its data and continues to collect AMA data from the Switching System.

This procedure provides for polling the AMA data from both disks when the disk mode is ONLY (A or B) or non-redundant. It is expected that the inability to poll the BMC disks has been corrected before this procedure is attempted. When this procedure is complete, the BMC system is in the normal, redundant, PRIME mode.

To shorten this procedure, coordinate this activity with the HOC site at a time of minimum call record (AMA) traffic from the Switching System.

Use the following procedure to poll the primary AMA data from both disks while in nonredundant mode caused by disks filling up with AMA data.

Note: This procedure must not be performed at block input rates that exceed four blocks per minute.

Procedure 6-28
Polling disks from a nonredundant mode

Step	Description
114	Turn on the display of block headers as they are written to disk. This provides a visual indication of current AMA traffic. Enter (at the terminal): **>VALPARM LOGHDR ON (cr)**
115	Determine the current disk mode. In order to poll the AMA data, a manual disk mode change back to the original disk must be performed. The original disk has the oldest AMA data. At this time, the disk mode is set for the second disk, which is collecting new primary AMA data. Enter (at the terminal): **>DISK MODE (cr)** System response: `DISK MODE AO` or `DISK MODE BO`
116	Write any remaining call records to the AMA data file. Enter (at the terminal): **>IDXMAINT CREATE FILE AMA (cr)**
117	Display the currently active files. The active files on the current disk must be closed before switching disk modes. Enter (at the terminal): **>LSTACT (cr)** System response: `FILE OPEN: ii ss tt bbb` (line repeats for each open file) where: ii- ID of open file ss- status of open file tt- file type bbbb- file block size
118	The files identified (ii) by the output of step 4 must be closed. Continue entering the following command for each of the files in the response. Enter (at the terminal): **>CLSACT ii (cr)**

(Sheet 1 of 5)

Procedure 6-28
Polling disks from a nonredundant mode

Step	Description

119   Enter (at the terminal):

>LSTACT (cr)

Alternate between steps 5 and 6 until the following response to the LSTACT command is seen:

0 FILES LISTED

Note 6: If a block header is received at any time before moving on to step 7, repeat steps 3-6 until all active files are closed.

Note 7: When executing the CLSACT command, it is possible that a disk file error could occur. For example, FILE CLOSE ERROR:18, which is received for closing an empty file, has no impact, and should be ignored. For any other error messages, refer to the listing for that message and perform the craftsperson activities.

120   Change the disk mode. Enter (at the terminal):

>DISK MODE AO (cr) If the current disk mode is B ONLY.
or
>DISK MODE BO (cr) If the current disk mode is A ONLY.

CAUTION
Do not change the disk mode to PRIME; this would cause one of the disks to write all of its data onto the other disk. All of the data on the other disk would be lost.

121   Open a new AMA file. Enter (at the terminal):

>IDXMAINT CREATE FILE AMA (cr)

122   Initiate a polling session

Inform the HOC of your intentions. This session takes the oldest primary AMA data from the first disk. New AMA data, if received at this time, is saved on this disk. The polling session ends when all of the oldest primary AMA data has been read from this first disk.

(Sheet 2 of 5)

Procedure 6-28
Polling disks from a nonredundant mode

Step	Description
123	(Optional step) Enter the following command if you wish to keep track of the AMA files to be polled: >IDXMAINT DIR CLOSED AMA 200 (cr)
124	Write any remaining call records to the AMA data file. Enter (at the terminal): **>IDXMAINT CREATE FILE AMA (cr)** **>IDXMAINT SUMMARY AMA (cr)** Determine whether there are any more AMA blocks to be polled. This is new data. Repeat step 9. After three attempts, if new data keeps coming in and this is lowest traffic, a tape must be cut from DIRP and sent in for processing.
125	Display the currently active files. The active files on the current disk must be closed before switching disk modes. Enter (at the terminal): **>LSTACT (cr)** System response: FILE OPEN: ii ss tt bbb (line repeats for each open file)
126	The files identified (ii) by the output of step 12 must be closed. Continue entering the following command for each of the files in the response. Enter (at the terminal): **>CLSACT ii (cr)** When executing the CLSACT command, it is possible that a disk file error may occur. Refer to the *Commands and Messages Guide* section for any error messages that occur.
127	Enter (at the terminal): **>LSTACT (cr)** Alternate between steps 13 and 14 until the following response to the LSTACT command is seen: 0 FILES LISTED If a block header is received before moving onto step 15, repeat step 12-14 until all active files are closed.

(Sheet 3 of 5)

Procedure 6-28
Polling disks from a nonredundant mode

Step	Description
128	Change the disk mode. Enter (at the terminal): **>DISK MODE AO (cr)** If the current disk mode is B ONLY. or **>DISK MODE BO (cr)** If the current disk mode is A ONLY. ⚠ **CAUTION** Do not change the disk mode to PRIME; this would cause one of the disks to write all of its data onto the other disk. All of the data on the other disk would be lost.
129	Open a new AMA file. Enter (at the terminal): **>IDXMAINT CREATE FILE AMA (cr)**
130	Initiate a polling session Inform the HOC of your intentions. This session takes the oldest primary AMA data from the second disk. New AMA data, if received at this time, is saved on this disk. The polling session ends when all of the oldest primary AMA data has been read from this second disk.
131	(Optional step) Enter the following command if you wish to keep track of the AMA files to be polled: >IDXMAINT DIR CLOSED AMA 200 (cr) If new AMA is written to both of these disks during these polling sessions, continue by repeating steps 9-18 to assure that all of the primary data on one of these disks has been polled. Several combinations of disk mode changes and polling sessions may be required to poll all of the primary data. To prevent billing data loss, continue this action until no AMA data is received during a polling session.

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Procedure 6-28
Polling disks from a nonredundant mode

Step	Description
132	Change from disk ONLY mode to disk PRIME mode. Perform this step before any new AMA data is received. The present disk has no new AMA data. The command sequence preserves any new AMA data that may remain on the other disk. If the current disk mode is AO, enter (at the terminal): **>DISK MODE BO (cr)** **>DISK MODE BP (cr)** If the current disk mode is BO, enter (at the terminal): **>DISK MODE AO (cr)** **>DISK MODE AP (cr)** The disk system is now back in the redundant mode.
133	Turn off the display of block headers. Enter (at terminal): **>VALPARM LOGHDR OFF (cr)**
134	Identify any current alarms due to the nonredundant disk condition. Enter (at the terminal): **>ERRMAP (cr)**for the active processor **>DOS S ERRMAP (cr)**for the standby processor or **>ERRMAP ALARMS**for both processors
135	Clear any alarms associated with the nonredundant disk condition. For example, BOTH DISKS FULL, DISK MODE ALARM,,OFFLIN DSK FULL, DSK 70% PRIMARY, or DSK 90% PRIMARY. Enter (at the terminal): **>RSERR xx (cr)**for the active processor **>DOS S RSERR xx (cr)**for the standby processor where: xx - device/event number of the alarm listed in the ERRMAP output.
136	For any other alarms, refer to the listings in the *Commands and Messages Guide* section for any craftspersion activities. The BMC system should now be operating in normal, redundant disk mode.

(Sheet 5 of 5)

Quad SIO PCA Diagnostic Procedure

This procedure assumes that the Quad SIO PCA worked at one time and has not been replaced or settings altered by previous troubleshooting activity. Refer to the switch settings portion of this manual for switch and jumper options if it is suspected that they have been changed. This procedure also assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

Procedure 6-29
Quad SIO PCA (NT6M60xx) Diagnostic

Step	Description
137	The following commands are used to list the alarms and identify the active processor.

>ERRMAP ALARMS (cr)

System responds with a list of alarms on the active and standby processors.

>CLK (cr)

System responds with a time stamp and the identity of the active processor.

Note: The A processor is in the top shelf and the B processor is in the bottom shelf. The active processor can also be identified by the location of the lighted green lamp on the status panel.

If the SIO alarm is on the active processor and there is no communication between the user terminal and the BMC, go to step 2. If the user terminal can communicate to the BMC, go to step 3.

(Sheet 1 of 3)

Procedure 6-29
Quad SIO PCA (NT6M60xx) Diagnostic

Step	Description

138   Place the processor with the suspected faulty pack in the standby mode and repeat step 1. Put the **other** processor in the PRIME mode. The **other** processor is defined as that processor that does not have the suspected faulty pack. At the Switch and Status panel of the BMC:

- **Press the A/B Select Switch to match the other processor.**

- **Press the O/P Mode Select Switch to P.**

- **Turn the Mode Switch to the right and release.**

- **BMC outputs message responses that indicate the processor switch activity. If there is no communication to either Quad SIO PCA, go to step 6.**

- **If processor switch messages are observed, repeat step 1.**

CAUTION
Loss of AMA can occur when the processors are switched during high traffic.

139   Enter the following commands to test the affected processor:

>TEST (cr)
or
>DOS S TEST (cr)

If the Quad SIO fails, replace the Quad SIO PCA in the shelf that failed the test using the procedure in the *Hardware Replacement* subsection. Then, proceed to step 5. If the TEST response indicates the SIO passed, go to step 4.

140   Enter the following commands to reset the SIO Alarm:

>RSERR 00 (cr)
and/or
>DOS S RSERR 00 (cr)

System responds by clearing all alarms and the alarm light on the status panel goes out. If the alarm returns, replace the Quad SIO PCA in the shelf that failed the test using the procedure in the *Hardware Replacement* subsection. Then, proceed to step 5. If the alarm stays clear, go to step 5.

(Sheet 2 of 3)

Procedure 6-29
Quad SIO PCA (NT6M60xx) Diagnostic

Step	Description
141	Switch back to the processor where the alarm occurred and determine that communication to that shelf is ok. **>CLK (cr)** System responds with a time stamp and identity of the active processor. If response is normal, the procedure is complete. No further action required. If communication is still not working and the Quad SIO PCA has not been replaced, replace the Quad SIO PCA in the affected chassis using the procedure in the *Hardware Replacement* subsection. If the PCA has already been replaced and the communication is still not working on the faulty shelf, contact your next level of support.
142	To diagnose communication failures to both Quad SIO PCAs from the user's terminal, check the following items: • **Make sure the local terminal is logged into the BMC.** • **Check to determine whether the printer/Terminal used, is ok.** • **Check cabling from the printer to the BMC.** • **Replace the Power and Alarm Communications PCA using the procedure in the *Hardware Replacement* subsection. Return to step 1.** • **If none of the above items are the cause of the SIO communication problem, contact your next level of support.**

(Sheet 3 of 3)

Secondary Data Polling Procedure

The following procedure details the steps performed by HOC personnel to poll secondary AMA data from the BMC. In this procedure, the HOC personnel include an embedded SELGRP value in the polling request

message to access secondary AMA data. This procedure is provided for information only.

Procedure 6-30 **Secondary Data Polling**	
Step	**Description**
143	Modify the polling request message. Insert the SELGRP keyword, 29A (if not already present), into bytes 19-21 of the polling request message. The presence of this keyword indicates to the BMC that the value in byte 22 is the value that the SELGRP command will be set to in order to access a particular iteration of sequence numbers. ***Note:*** The SELGRP command is used on the BMC to provide an index to iterations of sequence numbers. The BMC sequence numbers range from 1-65,535, rolling over to 1 after 65,535 is reached. SELGRP allows the user to access each iteration of a sequence number. SELGRP has a valid range of 0-6. A SELGRP value of 0 would give the user access to the latest iteration of sequence numbers. As the SELGRP value increases, the age of iterations increases (i.e., a SELGRP value of 1 would give access to the previous iteration of sequence numbers, a SELGRP value of 2 would give access to the next oldest iteration of sequence numbers, etc.).

144	Modify the polling request message. Insert the desired SELGRP value (0-6) into byte 22 of the polling request message. For example, to poll 25 blocks of data starting at the fourth oldest iteration of sequence number 42,322, the polling request message would be modified to appear as follows:
	
	`1......0042322002529A4`
	`                              |-| - embedded SELGRP command value (0-6)`
	`                    |----| - SELGRP keyword`
	`               |-----| - number of blocks to poll`
	`         |------| - starting sequence number of polling session`
	`      |--| - call record type (not used)`
	`  |----| - BMC password`
	`|-| - poll request control byte`

145	Send the modified polling request message to the BMC. If the polling session successfully retrieves the secondary AMA data that you require, proceed to step 5. If the secondary polling data retrieved from the BMC does not contain the information you require, return to step 2 and use a different value of SELGRP in the message and resend the polling request. If the polling session is terminated before the secondary AMA is retrieved, proceed to step 4.
(Sheet 1 of 2)	

Procedure 6-30
Secondary Data Polling

Step	Description
146	Contact the telephone company personnel and determine the reason for the unsuccessful polling session. If the SELGRP value that is used in the polling request message is invalid (greater than 6), the session is terminated and the following message is printed by the BMC: INVALID SELGRP: EMBEDDED COMMAND IGNORED If this message is present at the BMC, return to step 2 and ensure that the SELGRP value designated in byte 22 is within the valid range (0-6). Resume executing the procedure. If the requested sequence number is not contained within the SELGRP value designated in byte 22, the session is terminated and the following message is printed by the BMC: NO DATA AVAILABLE If this message is present at the BMC, return to step 2 and select another SELGRP value to embed in the polling request message and resume executing the procedure.
	If the polling session was terminated for another reason, the telephone company personnel should perform the craftsperson activities associated with the resulting error messages. Once the problem is resolved, return to step 3 and resume executing the procedure.
147	Once all of the secondary AMA data is successfully retrieved and processed, modify the polling request message. Change the value of byte 22 to 0. This change ensures that subsequent poll requests will access primary data from the BMC.

(Sheet 2 of 2)

Site File Error Procedure

This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

A copy of the BMC site data should be available in the office records or can be obtained from the BMC using the chart of site data commands at the end of this procedure. Obtain a printout of site data before performing this procedure.

Procedure 6-31
Site File Error

Step	Description
148	The SITE FILE ERROR error map message occurs as a result of a previous SITDAT READ or SITDAT WRITE issued by the system software or the user. The following commands are used to list the BMC alarms and identify the active processor. **>ERRMAP ALARMS (cr)** System responds with a list of alarms on the active and standby processors. **>CLK (cr)** System responds with a time stamp and the identity of the active processor.
	Note: The A processor is in the top shelf and B processor is in the bottom shelf. The active processor is identified by the location of the lighted green PRI lamp on the BMC status panel.
	If there are any disk related alarms listed in the error map, troubleshoot those alarms prior to the SITE FILE ERROR alarm.
149	Enter the following commands to clear BMC error map alarms. **>RSERR 00 (cr)** and/or **>DOS S RSERR 00 (cr)** System response indicates that the alarm has been cleared.

(Sheet 1 of 4)

Procedure 6-31
Site File Error

Step	Description
150	Enter the following command to verify the alarm by attempting to read the SITDAT file. **>SITDAT READ (cr)** System response: `SITDAT FILE DISK JOB COMPLETE` If the normal response above occurs, the SITDAT file is ok and the procedure is complete. If a SITDAT READ ERROR 03 message occurs, go to step 4. Other errors reading the SITDAT file indicate that the SITDAT file may be corrupted, go to step 5 to recreate the SITDAT file.
151	The SITE FILE ERROR error map message can occur if the site file is missing or damaged when it is read from the disk. First determine whether there is a site data file on the disk. **>LSTDIR FILE SITDAT 1 255 (cr)** System response: `xx SITDAT xx yy xx xx xx xx xx xx xx xx xx` where: yy - file version number (value of xx is not important for this procedure). There will be one response line for each file found on the disk. It is normal for only one version of the SITDAT file to be on the disk. If more than one SITDAT file is on disk, go to step 5. If the response is NO FILE ON DISK, go to step 6. If one SITDAT file is on disk, go to step 7.
152	Delete all the site data files from the disk. **>DELFILE SITDAT 1 255 (cr)** System response: `x FILES DELETED` where: x - version number of file deleted.

(Sheet 2 of 4)

Procedure 6-31
Site File Error

Step	Description

153 With no site data file on the disk, a SITDAT file must be created. Enter the following command to create the SITDAT file:

>**SITDAT WRITE (cr)**

System response: `SITDAT FILE DISK JOB COMPLETE`

If the response above occurs, go to step 7. If the results of a SITDAT WRITE produces the SITE FILE ERROR error map indication, go to step 8. If a processor restart procedure has been performed and results of a SITDAT WRITE still produces the SITE FILE ERROR error map indication, go to step 9.

154 Enter the following commands to clear any alarm and read the site data file:

>**RSERR 00 (cr)**
and/or
>**DOS S RSERR 00 (cr)**

System responds with an indication that the alarm has been cleared.

>**SITDAT READ (cr)**

System response: `SITDAT FILE DISK JOB COMPLETE`

If the response SITDAT FILE DISK JOB COMPLETE occurs, go to step 8. If the results of a SITDAT READ still produces the SITE FILE ERROR error map indication, go to step 9. If a processor restart procedure has been performed and results of a SITDAT READ still produces the SITE FILE ERROR error map indication, go to step 10.

155 Confirm that the site data agrees with the office record. Refer to Table 6-7 for the commands to extract the site data from the BMC. Once the site data is confirmed the procedure is complete.

Note: Site specific data should be checked to determine that the correct datafill is present. Any time the site data is changed the SITDAT WRITE command must be used to save the changes.

(Sheet 3 of 4)

Procedure 6-31
Site File Error

Step	Description

156 The site data in memory may be corrupt. Obtain the BMC site data. Delete any site data files from the BMC disks with the following command:

>DELFILE SITDAT 1 255 (cr)

System response: `x FILE DELETED`

where: x - version number of file deleted.

Clear the BMC memory using the procedure in the *System Reboot Procedure* subsection. After completing that procedure, perform this procedure from the beginning to create a site data file.

Note 8: Site data in a BMC with suspected corrupt memory may not be reliable and should be confirmed with the office records.

Note 9: When the processors are restarted, the BMC site data will revert to the program defaults setting. The site specific data must then be reentered and saved to the disk.

If this procedure has not corrected the problem, contact your next level of support. Table 2-5 lists the commands used to display the site dependent data in the BMC. If site data changes are required, refer the *Commands and Messages Guide* section for the proper syntax to change values. The SITDAT WRITE command is required to save any site data changes to the disk.

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Table 6-7 Site Data Commands	
Commands	**Site Dependent Information**
AMAHRS	
BAUD	
BUFSZ	
BVALID	
CP CLOCK	
CP CONTROL	
CP INTERFACE	
ERRMAP	
KYWD	
LPAD	
PSWD	
SETTERM	
SITDAT READ	
SITDAT WRITE	
VALPARM BLOCKS	
VALPARM INVALID	
DMSO ***DMS-10***	
(Sheet 1 of 2)	

Table 6-7
Site Data Commands

Commands	Site Dependent Information
DMSP ***DMS-10***	
DMST ***DMS-10****	
(Sheet 2 of 2)	

Statistical File Error Procedure

This procedure assumes the user is logged into the BMC and that the BMC messages are directed to the local terminal. No output to a local terminal will occur if the user is not logged in or messages are directed to a DMS-10 printer. For DMS-10 sites using the DMS-10 printer, the appropriate MSG x (x = TTY # assigned to BMC) must precede the command entered.

Procedure 6-32
Statistical File Error

Step	Description
10	The STAT FILE ERROR error map message occurs as a result of a previous attempt to read or write data to the STAT file by the system software. Enter the following command to obtain a list of BMC alarms. **>ERRMAP ALARMS (cr)** System response includes a list of alarms on the active and standby processors. If there are any disk related alarms listed in the error map, Troubleshoot those alarms prior to the STAT FILE ERROR alarm.
11	Enter the following command to reset the errors in the BMC: **>RSERR 00 (cr)** and/or **>DOS S RSERR 00 (cr)** System response indicates that the alarm has been cleared.

<div align="center">

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</div>

Procedure 6-32
Statistical File Error

Step	Description

12 The STAT FILE ERROR error map alarm message can occur if the statistics files are damaged or multiple files are present on the disk. Enter the following commands to determine the number of each type of statistics files on the disk.

>**LSTDIR FILE TDYSTS 1 255 (cr)**
and
>**LSTDIR FILE YDYSTS 1 255 (cr)**

System response: xx nnnnnn xx yy xx xx xx xx xx xx xx xx xx

where:
nnnnnn- file name
yy- file version number (value of xx is not important to this procedure).

There will be one response line for each file found on the disk. Normally there is only one version of each TDYSTS and YDYSTS file on the disk. If more than one TDYSTS file is on disk go to step 4. If more than one YDYSTS file is on disk go to step 5. If one each of the TDYSTS and/or YDYSTS files are on disk go to step 6.

13 Determine which open file is the TDYSTS file then close the TDYSTS file. Enter the following command to list the active files:

>**LSTACT (cr)**

System responds with four open files listed with the format of FILE OPEN nn xx xx yyyy, where nn is the file identification number and yyyy is 256 (number of bytes representing the TDYSTS file). Value of xx is not important to this procedure. Enter the following command to verify that the file identification number matches the TDYSTS file:

>**LSTDIR FILE nn (cr)**

System response: xx TDYSTS xx vv xx xx xx xx xx xx xx xx xx

where: vv - file version number (value of xx is not important to this procedure).

Enter the following command to close the open TDYSTS file:

>**CLSACT nn (cr)**

System response: FILE CLOSED

(Sheet 2 of 3)

**Procedure 6-32
Statistical File Error**

Step	Description
14	Enter the following commands to delete all the statistics files from the disk and create a new open TDYSTS file: **>DELFILE nnnnnn 1 255 (cr)** where: nnnnnn - TDYSTS and/or YDYSTS System response: `x FILES DELETED` where: x - number of files deleted. **>CLRSTATS (cr)** System response: `TDYSTS FILE DISK JOB COMPLETE`
15	Enter the following command to read the contents of statistics data file: **>REPORT xxxx yyyy (cr)** where: xxxx- AMA, DISK, or COM yyyy- TDAY or YDAY. System responds with a printout of the requested information. If the reports above print out ok, procedure is complete. If the results still produces the STAT FILE ERROR error map indication and steps 4 and 5 have not been done, go to step 4. If steps 4-6 have been completed and the STAT FILE ERROR error map indication returns, continue to step 7.
16	If this procedure has not corrected the problem, contact your next level of support.
	(Sheet 3 of 3)

System Reboot Procedure

Determine which processor generated the fault message(s) by looking at the printouts when the event took place. The processor ID will be part of the log message that is associated with the fault. If there is no log message directly associated with the fault, look at the messages before and after to determine which processor generated the message.

Procedure 6-33
System Reboot

Step	Description
17	Enter the following command to verify which processor is currently active. **>CLK (cr)** System response: `yy-mm-dd hh:mm:ss DAY PROC-x` where: x - A or B indicating processor ID.
18	Make sure the processor that produced the error message is **standby**. If both processors are reporting the error, follow procedure as written and make sure both processors are rebooted. Depress the rocker switches to A or B (match the active processor determined in step 1) and **O**. Then turn the keyswitch to the right and release. Observe the ONL lamp lights under the PRI light associated with the active processor.
19	Depress the rocker switch on the power supply of the standby processor to **0**.
20	Wait 15 seconds and reactivate the rocker switch on the power supply to **I**.
21	User should observe the LED display on the CPU PCA is a lower case 'r.'. When this display changes to any other character, there should be some steady activity on the disk drive LED followed by a terminal message, STBY BOOT IN PROC.

Note: BMC will automatically attempt to load the program file three times.

(Sheet 1 of 3)

Procedure 6-33
System Reboot

 Step   **Description**

If the processor does NOT start to boot the program file, replace the EPROM PCA (NT6M63xx) using the procedure in the *Hardware Replacement* subsection and return to this point.

If replacing the EPROM PCA does NOT allow the processor to start to boot the program file, replace the CPU PCA using the procedure in the *Hardware Replacement* subsection and return to this point.

If replacing the EPROM and CPU PCAs does NOT allow the processor to start to boot the program file, replace the DRAM PCA using the procedure in the *Hardware Replacement* subsection and return to this point.

If replacing all of the above PCAs does NOT allow the processor to boot the program file, call your next level of support. If processor loads, continue with step 6.

 22   After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the program file name.

 Note: BMC will automatically attempt to load the program file three times.

After there are any error messages generated, follow the troubleshooting guidelines for that message.

 23   Observe BMC status panel for yellow ONL lamp lit associated with the green PRI lamp. If ONL is not lit, proceed to step 8. If ONL is lit, depress the O/P rocker switch toward **P** and turn the key switch. User should observe the ONL light has extinguished.

 24   Enter the following command to check processor integrity:

>ERRMAP ALARMS (cr)

If there are no alarms on the standby processor, enter the following command to test the newly loaded processor:

>DOS S TEST (cr)

After PGM TEST PASSED message is observed all tests are complete.

(Sheet 2 of 3)

Procedure 6-33 **System Reboot**	
Step	**Description**
25	Switch to the newly loaded processor by depressing the A/B rocker switch toward A or B, to match the newly loaded processor and turn the key switch. If there are no processor switch messages, enter the following command to verify alarm condition and troubleshoot any alarms that are observed: **>ERRMAP ALARMS (cr)**
26	If EC-IC-ALM or EC-CF-ALM messages have been observed, both processors need to be rebooted and user should repeat steps 2-8. All other errors should be monitored for reoccurrence, watching for whether same processor is having trouble. Otherwise this procedure is complete.
	(Sheet 3 of 3)

TEC/DSI PCA Diagnostic Procedure

This procedure should only be started when you have verified the alarm using the ERRMAP ALARMS command. If alarm appears on the standby processor, begin with step 2. If alarm is on the active processor, begin with step 1.

Procedure 6-34
TEC/DSI PCA Diagnostic

Step	Description
33	You should observe that the LED display on the CPU PCA is a lower case 'r.'. When this display changes to any other character, there should be some steady activity on the disk drive LED followed by a terminal message, STBY BOOT IN PROC.
Note:	BMC will automatically attempt to load the program file three times.
34	After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the program file name. If there are any other failure messages, troubleshoot using the appropriate procedure(s).
35	Verify the status of the TEC/DSI PCAs by entering the following commands. **>DOS S TECMAINT SHOW 1 STATUS (cr)** **>DOS S TECMAINT SHOW 2 STATUS (cr)** If command has returned, proceed to step 10. If problem remains, proceed to step 15.
36	Enter the following commands to clear any remaining alarms: **>RSERR 00 (cr)** and/or **>DOS S RSERR 00 (cr)** System response: ALL ALARMS CLEARED
37	Depress the O/P rocker switch to **P**. Turn the keyswitch to the right and release. Observe the ONL lamp is no longer lit.
38	Depress the A/B rocker switch to match the standby processor. Depress the O/P rocker switch to **O**. Turn the keyswitch to the right and release.

(Sheet 2 of 4)

Procedure 6-34
TEC/DSI PCA Diagnostic

Step	Description

39   Verify AMA/MTU port function in the Switching System.

- **Are they both up?**

- **Which port is active?**

- **Can block count increase be seen at TEC/DSI PCA when TECMAINT SHOW 1 or 2 STATUS is queried?**

- **If both ports are up, rotate them and verify block collection for other MTU port.**

If no problems are encountered, this procedure is complete. If there are errors seen, and TEC/DSI PCA has **NOT** been changed previously, proceed to step 14. If there are any errors seen, and TEC/DSI PCA has been changed previously, proceed to step 20. If there are any errors seen, and TEC/DSI and CPU PCAs have been changed, call your next level of support.

40   Enter the following command to switch away from the processor with suspect TEC/DSI PCAs:

>SWACT (cr)

BMC will respond with appropriate switch related messages. If there are no responses or processors do not switch, depress the A/B rocker switch to match the standby processor. Depress the O/P rocker switch to **O**. Turn the keyswitch to the right and release.

41   Power down standby processor by depressing the rocker switch on power supply to **0**.

42   Reverse the TEC/DSI PCAs using the following steps.

Note: Incorrect switch settings can cause a loss of AMA. Refer to the TEC/DSI PCA switch setting table in the *Hardware Replacement* subsection.

(Sheet 3 of 4)

Procedure 6-34
TEC/DSI PCA Diagnostic

Step	Description
	• **Pull ribbon cables attached to slots 12 and 13.** • **Remove the TEC/DSI PCA from slot 13.** • **Set jumper and switch settings for the slot 12 position.** • **Remove the TEC/DSI PCA from slot 12.** • **Install newly optioned TEC/DSI PCA into slot 12.** • **Option TEC/DSI PCA removed from slot 12 for placement into slot 13.** • **Install newly optioned TEC/DSI PCA into slot 13.**
43	Activate power supply rocker switch by pressing it toward **I**.
44	You should observe the LED display on the CPU PCA is a lower case 'r.'. When this display changes to another character, there should be some steady activity on the disk drive LED followed by a terminal message STBY BOOT IN PROC. *Note:* BMC will automatically attempt to load the program file three times.
45	After approximately one minute, a S/W LOADED message should be seen at the terminal, indicating the processor has loaded the software file name. If there are any other failure messages, troubleshoot using the appropriate procedure(s).
46	Verify the status of the TEC/DSI PCAs by entering the following commands. **>DOS S TECMAINT SHOW 1 STATUS (cr)** **>DOS S TECMAINT SHOW 2 STATUS (cr)** If problem follows the TEC/DSI, replace the TEC/DSI PCA using the procedure in the *Hardware Replacement* subsection. If problem remains, proceed to step 21. If problem is clear, return to step 13.
47	Replace the CPU PCA using the procedure in the *Hardware Replacement* subsection, then return to step 20. If there are any errors seen, and TEC/DSI and CPU PCAs have been changed, call your next level of support.
	(Sheet 4 of 4)

The following table lists the command and status definitions for the message sent in response to the TECMAINT SHOW command. The message is as follows:

MTU Bx: CMD-yy STA-zz BLK-nnnn

where:
x- 0 or 2 (0 = TEC/DSI PCA in slot 13, 2 = TEC/DSI PCA in slot 12).
yy- last command seen from Switching System (in hex).
zz- current status (in hex).
nnnn- block count when status was reported/requested.

Table 6-8
MTU Command and Status Definitions

Command definitions for yy	Status definitions for zz
00 - Null (power-up)	00 - Null (power-up)
01 - Write	01 - Busy
02 - Read	02 - Ready
03 - Erase	04-07 - Write Enabled
04 - Backspace	08-0F - At load point
05 - Filemark	10-1F - At end of tape
06 - Rewind	20-3F - Rewind
08-0E - Tape Operation in Process	40-7F - Alarm
10-1E - DMA Timeout	80-FC - On-line
20-2E - DMA or CMD Error	
40-4E - DMA in progress	

Note 3: All other values are combinations of the above listed codes (i.e., STA-82 is At load point, Ready).

Note 4: Commands and statuses can have code definitions that are not listed. Addition of the above codes will define the most commonly seen values for these fields. If a code appears that is not defined, follow the *TEC/DSI PCA Diagnostic Procedure*. If there is still a problem with the AMA/ MTU port, call your next level of support.

Hardware Replacement

This section contains the procedures to replace the various hardware elements of the BMC system.

Powering Down BMC System for Maintenance

Powering down the BMC system for performing maintenance on the various subassemblies is divided into two categories:

- -48 V dc power down

- +8.5 V dc power down.

-48 V dc Power Down

Power down the -48 V dc C.O. input power for performing maintenance on the following:

- Power Supply

- Disk Drive

- Cooling Fan (except for brief periods of time i.e., when the required spare parts are near at hand).

Since the processor and disk in the chassis under consideration are powered down, make certain that the processor mode and the disk mode are ONLY (toward the **other** processor and disk) **before** the power is removed.

When performing any type of maintenance on the fan (fan not running) open the front cover of the BMC system to improve convection cooling; then perform the necessary functions. The -48 V dc should be powered down when the fan is inoperable for extended periods of time to prevent damage due to overheating.

For maintenance purposes, powering down the -48 V dc is done at the circuit breakers (or other type of disconnects) provided for power distribution control. The location of the disconnects should be noted prior to performing any equipment removal procedure in the event of an emergency.

Removal of the -48 V dc fuse from the Power Supply MUST NOT be used to power down the BMC system, except in the case of an emergency. Leave the disk drives untouched for 30 seconds after power down. Vibration during power down may damage the disk drive.

+8.5 V dc Power Down

Removal, or maintenance, of PCAs in the circuit assembly rack(s) requires the removal of the +8.5 V dc output from the BMC Power Supply. The circuit breaker is a rocker switch type. Press the rocker switch to the OFF (**O**) position, to manually open the +8.5 V dc line. Press the I portion of the

rocker switch, ON, to restore the +8.5 V dc line. The disk drive in this chassis is not affected by removal of the +8.5 V dc source.

PCA Replacement Procedures

The following subsections contain the procedures necessary to replace various BMC PCAs.

Miscellaneous PCA Replacement (NT6M60xx, NT6M62xx, NT6M63xx, NT6M64xx, NT6M66xx, NT6M70xx, and NT6M89xx)
The following PCAs can be replaced using this procedure:

- CPU with DMA

- EPROM

- DRAM with Extended Memory

- Quad SIO

- SCSI Interface

- TEC/DSI.

Procedure 6-35
Miscellaneous PCA replacement

Step	Description
	CAUTION Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
	WARNING Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
48	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage, bending and scratching.

(Sheet 1 of 4)

Procedure 6-35
Miscellaneous PCA replacement

Step	Description
49	Get the replacement PCA from the spares kit.
50	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
51	Make sure the replacement PCA matches the faulty PCA's part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor. Verify that any applicable firmware for the PCA is the same or with a higher release number. Otherwise, contact your next level of support.
52	Place the processor unit with the suspected faulty PCA in the standby mode, by putting the **other** processor in the ONLY mode. The **other** processor is defined as that processor that does not have the suspected faulty PCA. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the **other** processor. b. Press the O/P Mode Select Switch to **O**. c. Turn the Mode Switch to the right and release. *Note:* This will create an alarm.
53	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
54	Remove power from the standby BMC chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
55	Remove the suspected faulty PCA.

(Sheet 2 of 4)

Procedure 6-35
Miscellaneous PCA replacement

Step	Description
56	The replacement PCA option settings must be set to match the PCA being removed, if present, prior to installation. The default option settings for each PCA are described in the tables and figures listed below: **PCARelated tableRelated figure** CPUTable 6-9Figure 6-7 EPROMTable 6-10Figure 6-8 DRAMTable 6-11Figure 6-9 Quad SIOTable 6-12Figures 6-10-6-12 SCSI InterfaceTable 6-13Figure 6-13 TEC/DSITables 6-14 and 6-15Figures 6-14 and 6-15 ⚠ **CAUTION** Failure to set-up options correctly may cause AMA loss.
57	Insert the spare PCA in the vacated card slot, making sure it is fully seated.
58	Put faulty PCA in the empty electrostatic bag.
59	Apply power to the BMC chassis by resetting the rocker switch in step 7 above. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded,** to be displayed.
60	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will clear on the standby processor if there are no faults.

(Sheet 3 of 4)

Procedure 6-35
Miscellaneous PCA replacement

Step	Description
61	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the active processor. b. Press the O/P Mode Select Switch to **P**. c. Turn the Mode Switch to the right and release.
62	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR 00(cr)** Alarms will clear if there are no faults.
63	Enter the following command at the maintenance terminal to Switch Processors to make the standby active: **>SWACT (cr)** The old standby is now the active processor. ⚠️ **WARNING** This should not be done at a high traffic period, it may cause a loss of AMA.
64	Verify replacement PCA has corrected original error.
65	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 4 of 4)

Table 6-9
CPU with DMA PCA (A1 and B1) options - part number: NT6M62BA

Device type number	Position/setting		Function	Setting Factory On-site
Note: There are no customer-definable options on this PCA. Information is shown for reference only. This data is to be used during initial BMC system installation and/or PCA replacement to ensure the replacement PCA is set-up in the same fashion as the PCA being replaced.				
Jumper (J3)	2-3 1-2:	8 KHz clock enabled. 60 Hz clock from AC adapter, if present.	Determines whether the BMC uses 8 KHz or the optional ac clock.	1-2 pin 1 is closest to gold finger contact.
Jumper (JU1)	In: Out:	Enable 8KHz clock receiver. Disable 8KHz clock receiver.	Control operation of 8KHz clock receiver.	In
Jumper (JU2)	All	Enable additional wait states.	Enable the addition of wait states (up to 5) on the ABCD inputs of the counter chip.	Configured for 1 wait state in the copper tracings
Jumper (JU3 &JU4)	Out:	Connects the internal 8KHz to pin 85 of the backplane connector.	Attachment of peripherals; not defined at this time.	Out (Currently unused)
Strap	None used			
DIP Switch (SW2-1)	On: Off:	Outputs = Inputs Output = Tristated	Control Logic Analyzer Port.	1 = Off
DIP Switch (SW2-2)	On: Off:	+5V output enabled +5V output disabled	Provide +5 V dc to Analyzer Port connector (pin 21) for powering certain types of external testers. (Limited to 250ma.)	2 = Off
(Sheet 1 of 2)				

Table 6-9
CPU with DMA PCA (A1 and B1) options - part number: NT6M62BA

Device type number	Position/setting	Function	Setting Factory On-site
DIP Switch (SW2-3) (SW2-4)	Display Mode34		
	Err Cont PortOnOff	Monitors Error Control.	3 = On
			4 = Off
	I/O 6 PortOffOn		
		Monitors data written to	
	(Invalid)OnOn	I/O 6 Port.	
	(Invalid)OffOff		
Rotary Switch	None used		

Note: For information to decode the display of the LED (DS1), refer to the label on the inside of the A front panel.

Switch SW1	Momentary Pushbutton (red)	Processor Reset.	

⚠ **CAUTION**
Do not press SW1 unless instructed to do so; activation may cause billing data loss if done on the active processor.

(Sheet 2 of 2)

Figure 3-1
CPU with DMA PCA (A1 and B1) options (NT6M62BA)

Note: Switch SW2 is a four-position right angle dip switch at the edge of the CPU circuit pack.

Table 6-10
EPROM PCA (A2 and B2) options - part numbers: NT6M63FI and NT6M63FL

Device (number)	Setting Factory	Setting On-site	Function	IC Configuration
Jumper (P2)	Out		Indicates presence of DRAM PCA.	
Jumper (P3) (P4) (P5) (P6) (P7) (P8)	1-2 2-3 1-2 1-2 2-3 1-2		Configuration set-up for devices U5 and U6, based on the EPROM IC used. The relationship between jumper settings and devices is shown in the IC configuration to the right.	**IC Type Jumpers Devices** P3P4P5(for U5) P6P7P8(for U6) 2016 1-21-22-3 2782 1-21-21-2 2764 1-21-21-2 6264 2-31-21-2 27128 1-22-31-2
Jumper (P9) (P10) (P11) (P12) (P13) (P14) (P15) (P16) (P17) (P18) (P19) (P20)	1-2 2-3 1-2 2-3 1-2 2-3 1-2 2-3 1-2 2-3 1-2 2-3		Configuration set-up for devices U7 through U12, based on the EPROM IC used. The relationship between jumper settings and devices is shown in the IC configuration to the right.	**IC Type Jumpers Devices** **P9P10(for U7)** **P11P12(for U8)** **P13P14(for U9)** **P15P16(for U10)** **P17P18(for U11)** **P19P20(for U12)** 2016 2-31-2 2782 1-21-2 2764 1-21-2 6264 1-22-3
Jumper (P21) (P22) (P23)	Out Out Out		Enable address decoding - for unpaged memory, based on the IC used. The relationship between jumper settings and devices and addresses is shown in the IC configuration to the right.	**IC Type P21 P22 P23 Addr** (8)2732 In In In 0000 (8)2764 Out In In 0000 (8)2016 In Out In 4000 (8)2016 Out Out In 8000 (8)2016 In In Out C000 (7)2732 Out In Out 0000 (2)2016 In Out Out 7000 Out Out Out
			(Sheet 1 of 2)	

Table 6-10
EPROM PCA (A2 and B2) options - part numbers: NT6M63FI and NT6M63FL

Device (number)	Setting Factory	On-site	Function	IC Configuration
Jumper (P24)	2-3		Memory paging is enabled.	
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note: There are no customer-definable options on this PCA. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement circuit pack is set up the same as the PCA being replaced.

(Sheet 2 of 2)

Figure 3-1
EPROM PCA (A2 and B2) options (NT6M63FI and NT6M63FL)
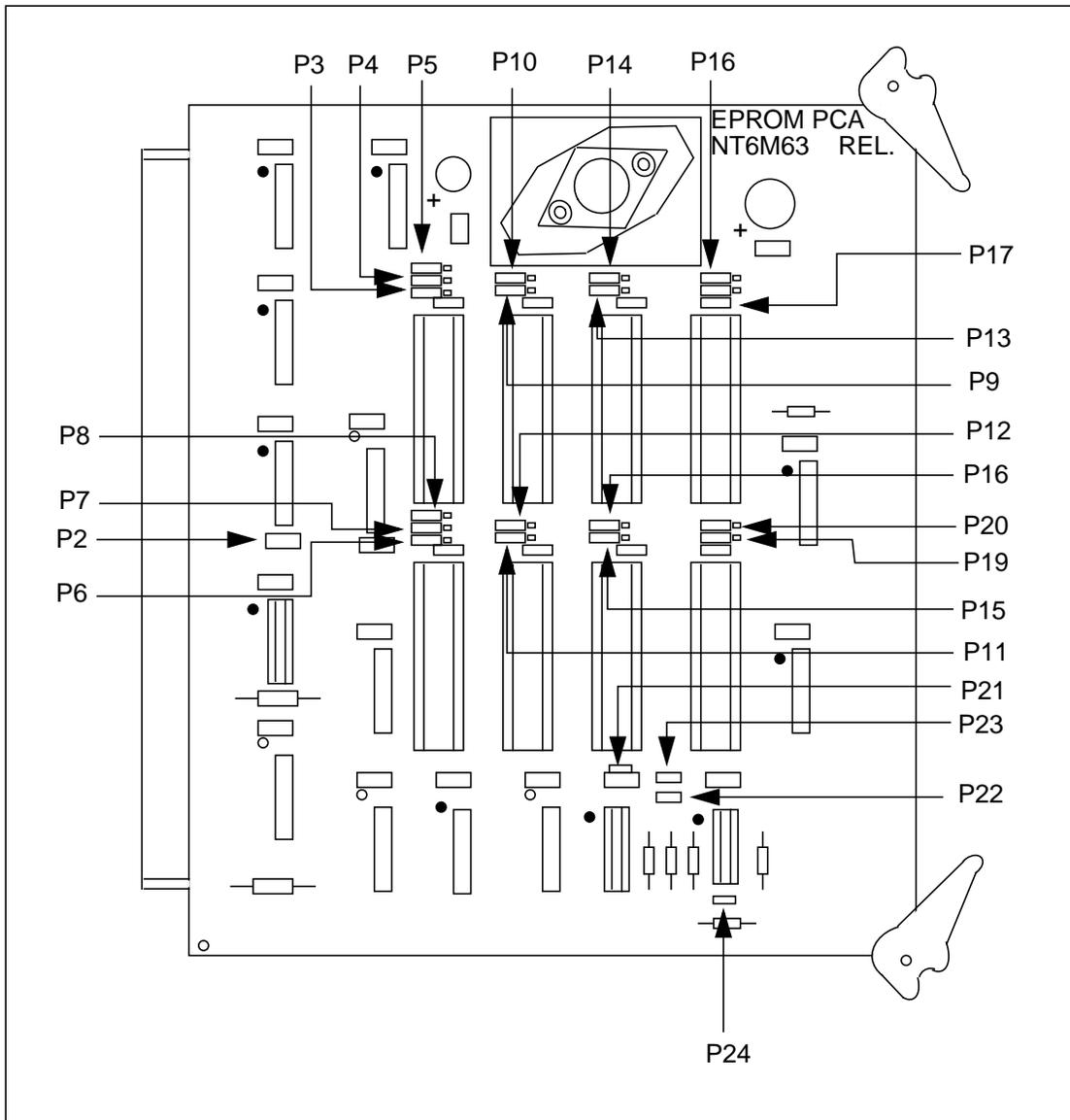
Table 6-11
DRAM Expansion PCA (A3 and B3) options - part number: NT6M64AA

Device type (number)	Position/ setting	Function	Setting Factory	On-site
Jumper A				Must be the
	Out	Card 1	Out	same as the
	In	Card 2	(card 1 in A3)	factory setting.
	Out	Card 1 (64K only)		
	In	Card 2 (64K only)		
Jumper B				Must be the
	In	Card 1	In	same as the
	In	Card 2	(card 1 in A3)	factory setting.
	Out	Card 1 (64K only)		
	Out	Card 2 (64K only)		
Jumper C				Must be the
	Out	Card 1	Out	same as the
	Out	Card 2	(card 1 in A3)	factory setting.
	In	Card 1 (64K only)		
	In	Card 2 (64K only)		
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note: There are no customer-definable options on this PCA. Information is shown for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

Figure 3-1
DRAM Expansion PCA (A3 and B3) options (NT6M64AA)

Table 6-12
Quad SIO PCA (A6 and B6) options - part number: NT6M60BA

Device type	Position/setting		Function	Setting	
				Factory	**On-site**

Note 5: This PCA supports polling on digital data lines or on analog network. For digital data lines check that:
    a. the P/A Comm PCA at A16 is part number NT6M84BA
    b. the Four Channel COMM PCA at A17 is release 03 or later
    c. the HOC supports the digital data line feature.

Note 6: The internal transmit timing source is generated on the Quad SIO PCA. The external transmit timing source is brought in from a source outside the BMC, usually associated with a modem generated timing source from a digital data line.

Note 7: Factory settings shown are for digital data line (external timing).

Note 8: Verify that the settings on the jumpers J2-J13 on the Quad SIO PCA are in agreement with the settings on the P/A Comm PCA (A16) when working with digital data lines.

Note 9:   There are no customer-definable options on this PCA. Information is shown for reference only. This data is to be used for verification during initial BMC system installation and/or PCA replacement to ensure that the replacement PCA is set-up in the same fashion as the PCA being replaced.

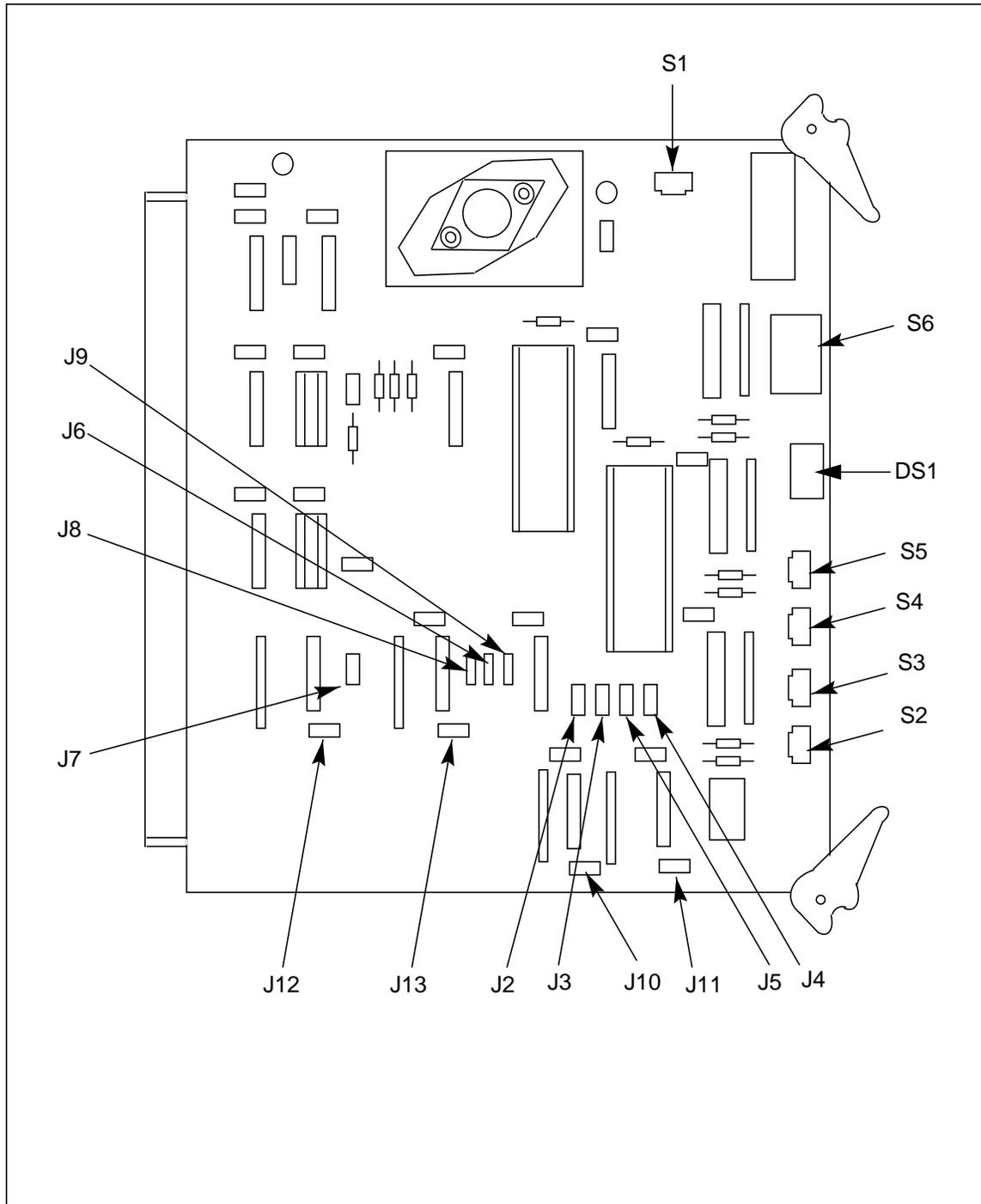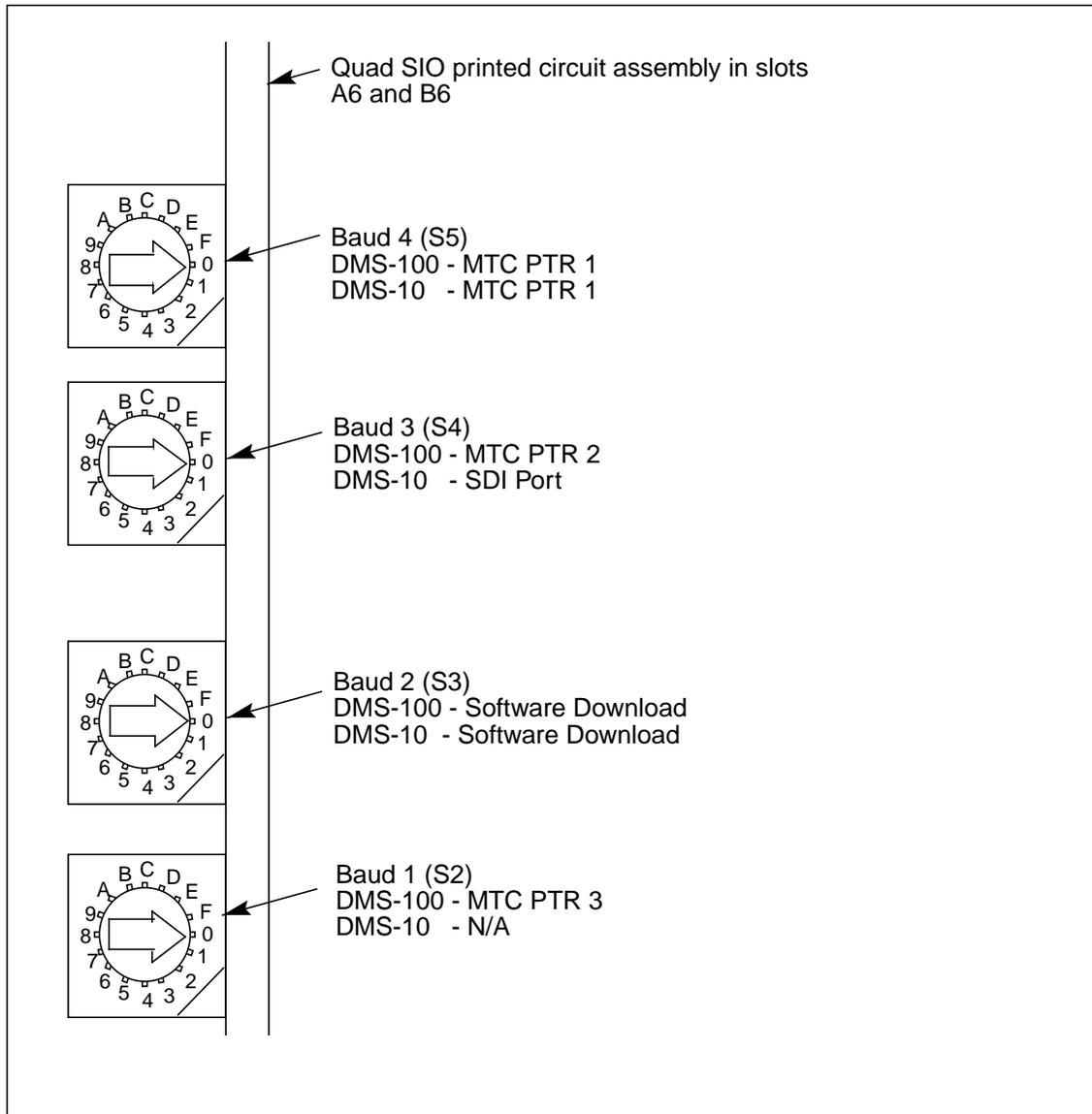| Device type	Position/setting		Function	Factory	On-site
Jumper (J2)	1-2 2-3	Channel A Tx external Channel A Tx internal	Channel A transmit clock	1-2	
Jumper (J3)	1-2 2-3	Channel A Rx internal Channel A Rx external	Channel A receive clock	2-3	
Jumper (J4)	1-2 2-3	Channel B Tx external Channel B Tx internal	Channel B transmit clock	1-2	
Jumper (J5)	1-2 2-3	Channel B Rx external Channel B Rx internal	Channel B receive clock	1-2	
Jumper (J6)	1-2 2-3	Channel C Tx external Channel C Tx internal	Channel C transmit clock	1-2	
Jumper (J7)	1-2 2-3	Channel C Rx external Channel C Rx internal	Channel C receive clock	1-2	
Jumper (J8)	1-2 2-3	Channel D Tx external Channel D Tx internal	Channel D transmit clock	1-2	

(Sheet 1 of 4)

Table 6-12
Quad SIO PCA (A6 and B6) options - part number: NT6M60BA

Device type	Position/setting		Function	Setting Factory	On-site
Jumper (J9)	1-2 2-3	Channel D Rx external Channel D Rx internal	Channel D receive clock	1-2	
Jumper (J10)	In Out	Select external timing source (Modem). Select internal timing source (BMC).	Select internal or external source for channel A transmit clock	In	
Jumper (J11)	In Out	Select external timing source (Modem). Select internal timing source (BMC).	Select internal or external source for channel B transmit clock	In	
Jumper (J12)	In Out	Select external timing source (Modem). Select internal timing source (BMC).	Select internal or external source for channel C transmit clock	In	
Jumper (J13)	In Out	Select external timing source (Modem). Select internal timing source (BMC).	Select internal or external source for channel D transmit clock	In	
Strap	None used				

DIP Switch (S6)	1 On channel A select
	  Off (normal setting)
	2 On channel B select
	  Off (normal setting)
	3 On channel C select
	  Off (normal setting)
	4 On channel D select
	  Off (normal setting)
			NOT USED.	Off
				
				Off
				
				Off
				
				Off
					Must be same as factory setting.

Note: Baud rate selection for the four BMC channels is made at the four rotary switches (S2, S3, S4, and S5) on the front of the PCA. The baud rate selected can be for a synchronous channel or an asynchronous channel. The following chart provides the conversion for asynchronous to synchronous baud rates and the rotary switch position for the applicable selection.

(Sheet 2 of 4)

Table 6-12
Quad SIO PCA (A6 and B6) options - part number: NT6M60BA

Device type	Position/setting			Function	Setting	
					Factory	On-site
Switch position	Asynch rate	Synch rate		Switch position	Asynch rate	Synch rate
0	50	800		8	1800	N/A
1	75	1200		9	2000	N/A
2	110	1760		A	2400	N/A
3	134.5	2152		B	3600	N/A
4	150	2400		C	4800	N/A
5	300	4800		D	7200	N/A
6	600	9600		E	9600	N/A
7	1200	19200		F	19200	N/A

Note: The baud rate, 19200 is listed for references purposes. This rate is not supported in software.

Rotary Switch (S2)	0	50	8	1800	DMS-100	DMS-100
	1	75	9	2000	MTC PTR LNK 3	7
	2	110	A	2400	Async channel	(1200)
	3	134.5	B	3600		
Channel	4	150	C	4800	DMS-10	DMS-10
A baud	5	300	D	7200	N/A	N/A
rate	6	600	E	9600		
select	7	1200	F	19200		

Rotary Switch (S3)	0	50	8	1800	DMS-100	DMS-100
	1	75	9	2000	Software Download	7
	2	110	A	2400	Async channel	(1200)
	3	134.5	B	3600		
Channel	4	150	C	4800	DMS-10	DMS-10
B baud	5	300	D	7200	Software Download	7
rate	6	600	E	9600	Async channel	(1200)
select	7	1200	F	19200		

(Sheet 3 of 4)

Table 6-12
Quad SIO PCA (A6 and B6) options - part number: NT6M60BA

Device type	Position/setting				Function	Setting	
						Factory	On-site
Rotary Switch (S4)	0	50	8	1800	DMS-100	DMS-100	
	1	75	9	2000	MTC PTR. LNK 2	7	
	2	110	A	2400	Async channel	(1200)	
	3	134.5	B	3600			
Channel	4	150	C	4800	DMS-10	DMS-10	
C baud	5	300	D	7200	SDI Port	7	
rate	6	600	E	9600	Async channel	(1200)	
select	7	1200	F	19200			
Rotary Switch (S5)	0	50	8	1800	DMS-100	DMS-100	
	1	75	9	2000	MTC PTR. LNK 1	7	
	2	110	A	2400	Async channel	(1200)	
	3	134.5	B	3600			
Channel	4	150	C	4800	DMS-10	DMS-10	
D baud	5	300	D	7200	MTC PTR. LNK 1	7	
rate	6	600	E	9600	Async channel	(1200)	
select	7	1200	F	19200			
Switch S1	0	0	8	8	Sets the logical address of the SIO circuits.	A	Must be same as factory setting.
	1	1	9	9			
	2	2	A	A			
	3	3	B	B			
	4	4	C	C			
	5	5	D	D			
	6	6	E	E			
	7	7	F	F			

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Figure 3-1
Quad SIO PCA (A6 and B6) options (NT6M60BA)

Figure 3-1
Quad SIO PCA (NT6M60BA) baud rate selector switches

Quad SIO printed circuit assembly in slots
A6 and B6

Baud 4 (S5)
DMS-100 - MTC PTR 1
DMS-10   - MTC PTR 1

Baud 3 (S4)
DMS-100 - MTC PTR 2
DMS-10   - SDI Port

Baud 2 (S3)
DMS-100 - Software Download
DMS-10 - Software Download

Baud 1 (S2)
DMS-100 - MTC PTR 3
DMS-10   - N/A

Figure 3-1
Quad SIO PCA (NT6M60BA) peripheral switches and indicators

SWITCH S6 CHANNEL POSITIONS

FUNCTION	POSITION	LED
NORMAL	OFF	OFF
FORCED STAND-BY	ON	ON

Note: Do not set these switches (S6-1, S6-2, S6-3, and S6-4) to the On position. This switch and LED are not active in this configuration; all S6 switch settings (1 through 4) must be off.
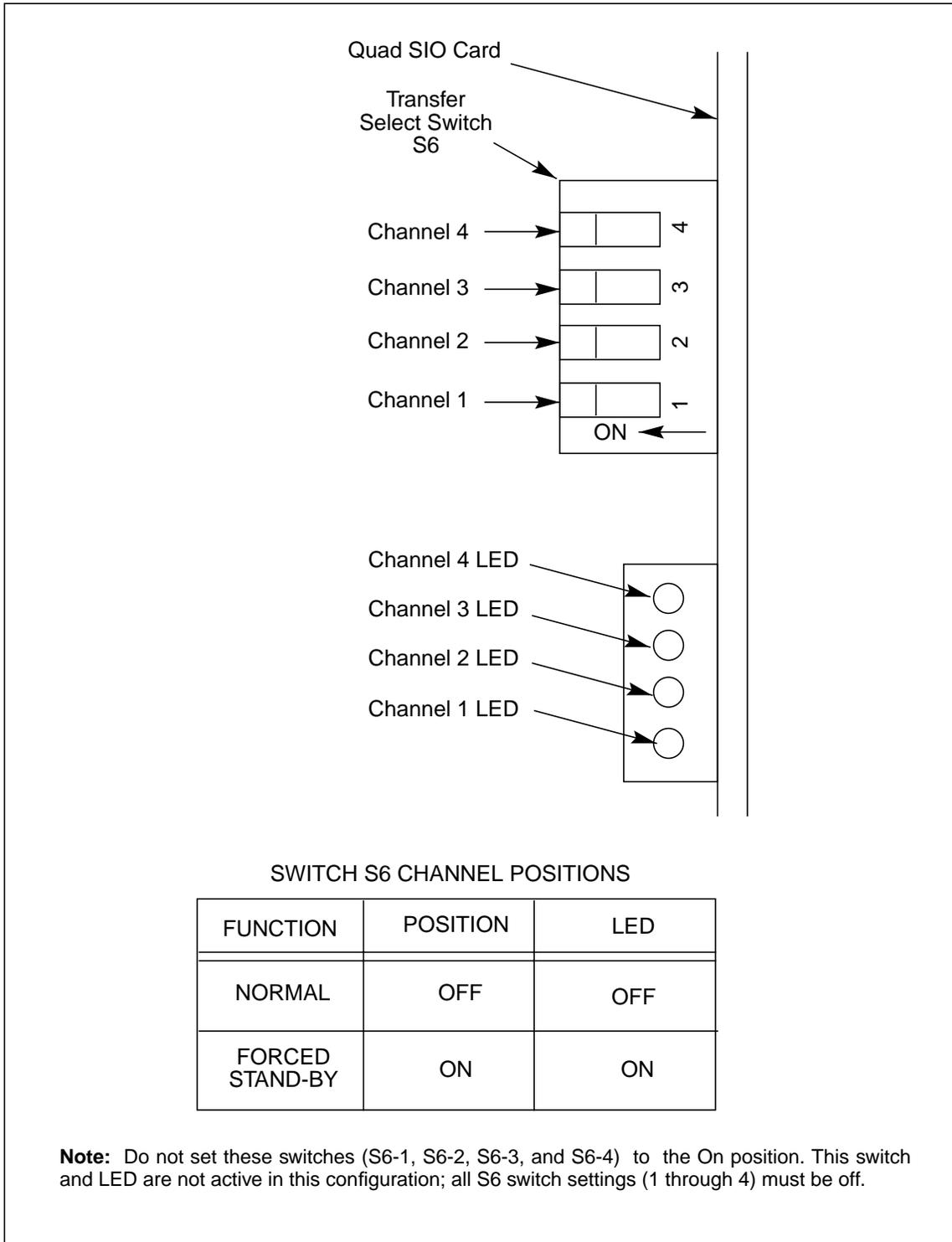
Table 6-13
SCSI Interface PCA (A11 and B11) options - part number: NT6M66CA

Device type (number)	Position/setting	Function	Setting	
			Factory	**On-site**
Jumper R11	Out - Watchdog disable In - Watchdog enable	Watchdog timer control	In	
Jumper R40	Out - NMI disable In - NMI enable	NMI control	In	
Jumper R63	Out - SCSI clock disable In - SCSI clock enable	clock control	In	
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			

Note: There are no customer-definable options on this PCA. Information is shown for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.
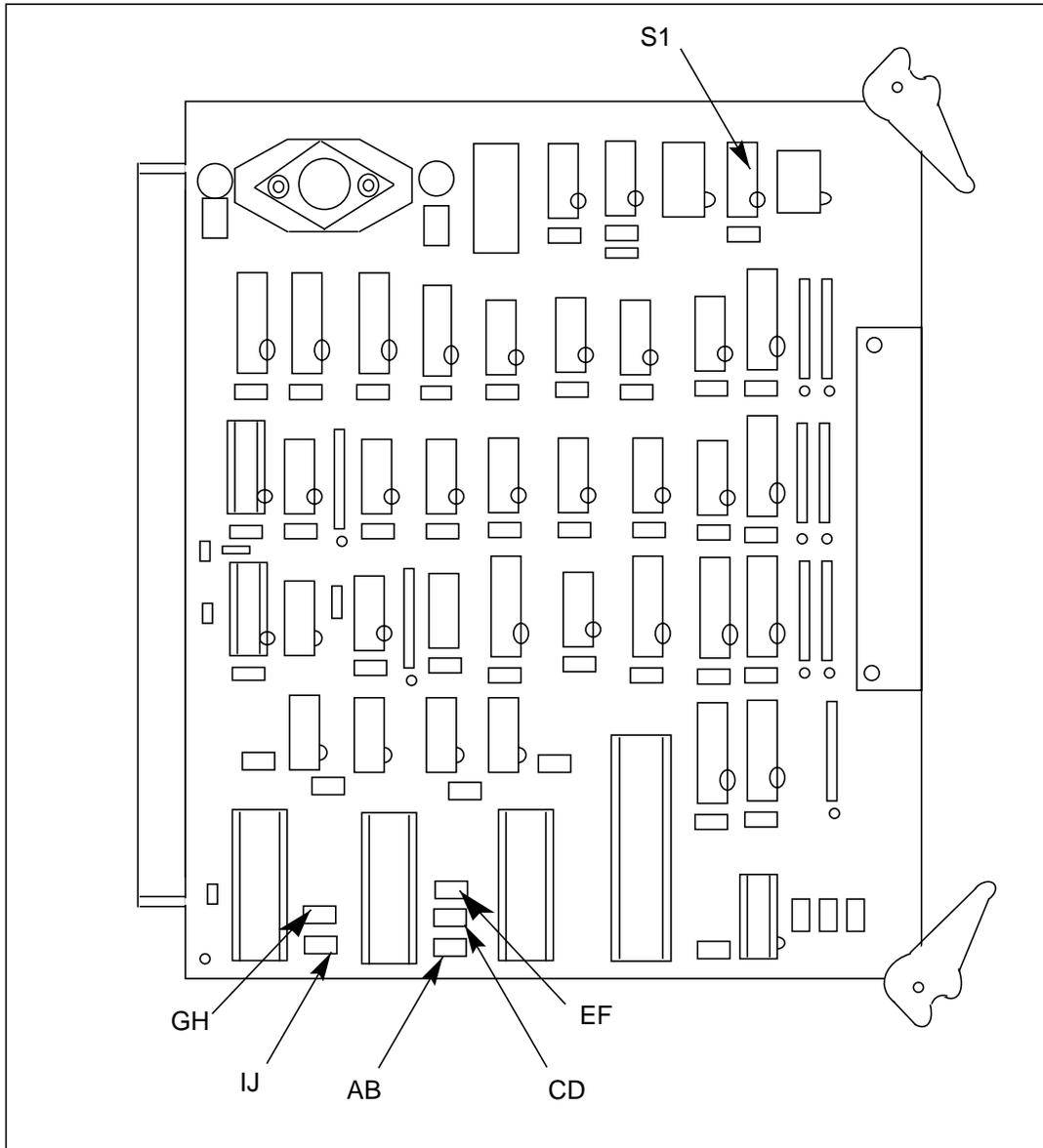
Figure 3-1
SCSI Interface PCA (NT6M66CA) options - slot 11

Table 6-14
DSI PCAs (slots 12 and 13) options - part number: NT6M70BD - DMS-100 only

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Strap	x = strap to center post	U42 and U41Chip type; strap for:		
	ABCDEFGH			
	X	2732AU42		
	XX	2764U42	B, D	Must be
	XXX	27128U42		the same
	XXX	27256U42		as the
	XXX	27512U42		factory
	X	8K x 8 RAM2U52	G	setting.
	X	32K x 8 RAM2U52		

Note: U52 is typically not equipped. Strapping is shown for reference only. Factory settings for straps S1-8 and S1-9 is subject to change based on availability of EPROM and RAM. Check the manufacturer's identification of U52, U41, and U42 to verify these settings. See the following chart for factory option settings for U41, U42, and U52.

U42 EPROM SIZE		
2764	Straps: B, D	In (Typical)
2732A	Straps: F	In
27128	Straps: B, E, D	In
27256	Straps: B, E, C	In
27512	Straps: A, E, C	In

U41 RAM SIZE		
8K x 8	SW1 position: 8	On (Typical)
	9	Off
32K x 8	SW1 position: 9	On (Alternate RAM)
	8	Off

U52 RAM SIZE		
8K x 8	Straps:G	In (Typical)
32K x 8	Straps:H	In

(Sheet 1 of 3)

Table 6-14
DSI PCAs (slots 12 and 13) options - part number: NT6M70BD - DMS-100 only

Device type (number)	Position/setting	Function	Setting Factory	On-site
DIP Switch Slot 12 (S1)	(X = On, Y = Off) 12345678 9 YY------- YX------- XY------- XX------- -------YX -------XY ----YXY-- ----YYX-- ----XYY-- --YX----- --XY-----	Select: DSI1 DSI2 DSI3 DSI4 32K x 8 RAM1 U41 8K x 8 RAM1 U41 12.5 ips 25/37.5 ips 45 ips 0.4 to 0.8 microsec 0.6 to 1.6 microsec	@S1 2 = On 3= On 7 = On 8 = On 1= Off 4= Off 5= Off 6= Off 9= Off	Must be the same as the factory setting.
DIP Switch Slot 13 (S1)	(X = On, Y = Off) 123456789 YY------- YX------- XY------- XX------- -------YX -------XY ----YXY-- ----YYX-- ----XYY-- --YX----- --XY-----	Select: DSI1 DSI2 DSI3 DSI4 32K x 8 RAM1 U41 8K x 8 RAM1 U41 12.5 ips 25/37.5 ips 45 ips 0.4 to 0.8 microsec 0.8 to 1.6 microsec	@S1 3= On 7= On 8= On 1= Off 2= Off 4= Off 5= Off 6= Off 9= Off	Must be the same as the factory setting.
DIP Switch Slots 12 and 13 (S2)	(X = On, Y = Off) S1 S2 101234 XYYXY YXYXY YYXXY XYYYX YXYYX	Read pulse width (ips -microseconds 12.52537.545 18)965.21 1685.334.86 12644.17 842.672.43 6322.08	@S2 1 = On 4 = On 2= Off 3= Off	Must be the same as the factory setting.
Rotary Switch	None used			

(Sheet 2 of 3)

Table 6-14
DSI PCAs (slots 12 and 13) options - part number: NT6M70BD - DMS-100 only

Device type (number)	Position/setting	Function	Setting Factory	On-site
Switch	None used			

Note: There are no customer-definable options on this PCA. Information is for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

(Sheet 3 of 3)

Figure 3-1
DSI PCA (A12, B12, A13, and B13) options (NT6M70BD - DMS-100)

Table 6-15
TEC PCAs (slots 12 and 13) options - part number: NT6M89BD - DMS-10 only

Device type (number)	Position/setting	Function	Setting Factory	On-site
Strap	x = strap to center post ABCDEFGHIJ	U11, U12 & U48 Chip type; strap for:		
	XX	2764U11	B, D	
	X	2732U11		
	XXX	27128U11		
	XXX	27256U11		
	XXX	27512U12		
	X	8K x 8U12		
	X	32K x 8U12	H	
	X	8K x 8U48		
	X	32K x 8U48	J	

Note: U48 is typically not equipped. Strapping is shown for reference only. Factory settings for straps S1-8 and S1-9 is subject to change based on availability of EPROM and RAM. Check the manufacturer's identification of U11, U12, and U48 to verify these settings.

U11 EPROM SIZE		
2764	Straps: B, D	In (Typical)
2732A	Straps: F	In
27128	Straps: B, E, D	In
27256	Straps: B, E, C	In
27512	Straps: A, E, C	In

U12 RAM SIZE		
8K x 8	Straps: H	In (Typical)
32K x 8	Straps: G	In

U48 RAM SIZE		
8K x 8	Straps:J	In (Typical)
32K x 8	Straps:II	In

(Sheet 1 of 2)

Table 6-15
TEC PCAs (slots 12 and 13) options - part number: NT6M89BD - DMS-10 only

Device type (number)	Position/setting	Function	Setting Factory	On-site
DIP Switch Slot 12 (S1)	(X = On, Y = Off) 12345678	Select:	@S1	Must be the same as the factory setting.
	YY------	TEC1	1 = On	
	XY------	TEC2	4= On	
	YX------	TEC3	8 = On	
	XX------	TEC4		
	--YX----	25 ips	2= Off	
	--XY----	12.5 ips	3= Off	
	------YX	0.4 to 0.8 microsec	5= Off	
	------XY	0.6 to 1.6 microsec	6= Off	
			7= Off	
DIP Switch Slot 13 (S1)	(X = On, Y = Off) 12345678	Select:	@S1	Must be the same as the factory setting.
	YY------	TEC1	4= On	
	XY------	TEC2	8= On	
	YX------	TEC3		
	XX------	TEC4	1= Off	
	--YX----	25 ips	2= Off	
	--XY----	12.5 ips	3= Off	
	------YX	0.4 to 0.8 microsec	5= Off	
	------XY	0.6 to 1.6 microsec	6= Off	
			7= Off	
Rotary Switch	None used			
Switch	None used			

Note: There are no customer-definable options on this PCA. Information is for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

(Sheet 2 of 2)

Figure 3-1
TEC PCA (A12, B12, A13, and B13) options (NT6M89BD - DMS-10 only)

Replacing EPROM integrated circuits
The BMC contains EPROM firmware routines. EPROM ICs contain operational programming for some BMC system functions. The EPROM's fixed memory is factory programmed with necessary control instructions. After installation in the BMC, the EPROM always responds in the same manner.

You may replace an EPROM IC with another EPROM IC having the same set of programmed instructions, for example when an EPROM malfunctions or fails. However, to change the way the BMC functions, install an EPROM IC with different programmed instructions.

Refer to Procedure 6-35 for removal, installation, and handling precautions when changing BMC EPROM ICs. There are two methods for changing EPROM ICs. One method is to replace the EPROM ICs and the PEC/rel label on the PCA. Another method is to replace the entire PCA (this is the preferred technique).

> *Note:*   If replacing EPROM ICs, check the reference number on the PCA diagram to make sure the right EPROM type is being used.

EPROM IC precautions
Follow these precautions when installing new or replacement EPROM ICs:

- Handle all ICs by the plastic or ceramic package, not by their metal pins.

- Do not expose the ICs to excessive force (dropping) or to large fields of electrical or magnetic energy (power transformers, static discharge). This mistreatment can cause partial or total EPROM memory loss.

- Make sure the UV window is completely covered.

- Work on a surface with a good electrical ground and do not wear clothes or footwear with a high degree of synthetic materials, especially nylon. To prevent IC damage, control or eliminate static electricity.

- The IC is designed for easy socket insertion and removal. Use only minimum pressure since excessive force can bend or break the pins. Also, use the specific tools for extracting and inserting ICs to avoid damaging them.

- Use caution when handling the ICs and the PCA. Excessive force can bend or break pins or cause hairline cracks in the copper foils.

Procedure 6-36
EPROM IC installation procedure

Step	Description
	CAUTION Since all BMC PCAs are static sensitive, take proper measures to ensure safety (refer to Note 1).
1	Locate the two EPROM ICs on the PCA (refer to Note 2). This IC is labeled with a coded number for identification.
2	Using an IC extractor tool, gently pry the EPROM IC from its socket and set it aside. Use a gentle rocking motion, alternately lifting each end a little at a time to avoid bending the pins. Do not throw the EPROM away; return it to Nortel.
3	Remove the new EPROM IC from its packing material and place it on a smooth flat surface so the pins are facing down and the coded identification label can be read from the top. Use the protective package to store the old EPROM IC until verifying the new one.
4	Notches or dots identify the location of pin 1 on both ICs and IC sockets. Position the marked end of the new IC over the marked end of the notch and carefully insert the pins into the socket.
5	Apply firm, even downward pressure on the EPROM IC until it is fully seated in the socket. The new IC may be supplied with 24 or 28 pins. If the IC has 24 pins, install it to the rear of the 28-pin socket. IC-pin 1 lines up over socket-pin 3.
6	Do not remove the coded label from the IC.
7	Each PCA with an EPROM chip (or chips) has a firmware ID label. The data for the label is on the EPROM label. The firmware id is the last number on the label. Update the label every time an EPROM is changed on that PCA (refer to Note 3).

Note 10: Perform this entire procedure on the standby processor with the system locked in ONLY processor mode. After replacement and testing on the standby side with the new firmware, perform an ONLY to ONLY processor switch and change the firmware on the now standby side.

Note 11: If none of the ICs on the PCAs has a printed label, refer to the table and figure for the PCA.

Note 12: Changing the EPROM on a PCA may change the PCA's PEC/REL level. The change kit provides the new labels. Also update any spare parts and office records.

Error Control II PCA Replacement (NT6M65AA)

When replacing the Error Control II PCA in slot A5 (A chassis), use the following procedure. Refer to Table 6-16 and Figure 6-16 for a description of the switch and jumper options for this PCA.

Procedure 6-37
Error Control II PCA replacement (NT6M65AG)

Step	Description
	CAUTION Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
	WARNING Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
66	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage; bending and scratching.
67	Get the replacement PCA from the spares kit.
68	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
69	Make sure the replacement PCA matches the faulty PCA's part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor. Verify that any applicable firmware for the PCA is the same or with a higher release number. Otherwise, contact your next level of support.
70	Place the B processor unit an ONLY mode. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to **B.** b. Press the O/P Mode Select Switch **O.** c. Turn the Mode Switch to the right and release.

(Sheet 1 of 3)

Procedure 6-37
Error Control II PCA replacement (NT6M65AG)

Step	Description

Note: This will create an alarm.
> ONLY MODE NON-REDUNDANT

71	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
72	Remove power from the standby chassis (A processor) by operation of the +8 V dc red rocker switch on the power supply.
73	On the Error Control II Jumper PCA in the B chassis (Slot 5), pull the toggle switch outward and lift the switch to the up position.

Note: The CRIT will be the only lamp lit on the status panel.

> This Switch serves a dual function. First, it removes the B chassis power-feed from the Error Control II PCA in the A chassis. Second, it locks the error control functions to the B chassis.

74	Remove the Error Control II PCA in the A chassis (slot 5).
75	Insert the spare Error Control II PCA in the A chassis (slot 5), making sure it is fully seated.
76	Put faulty PCA in the empty electrostatic bag.
77	Apply power to standby chassis (A processor) by operation of the +8 V dc red rocker switch on the power supply. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded** to be displayed.
78	Return the toggle switch on the Error Control II Jumper PCA in B5 to the down (LED off) position. This unlocks the Error Control functions. The B processor may print out this message: EC-IC-ALM (this is normal)

(Sheet 2 of 3)

Procedure 6-37
Error Control II PCA replacement (NT6M65AG)

Step	Description
79	To clear any alarms on the standby processor, enter at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will stay clear on the standby processor if there are no faults.
80	To clear any alarms on the active processor, enter at the maintenance terminal: **>RSERR 00 (cr)** Alarms will clear if there are no faults.
81	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to **B.** b. Make the O/P Mode Select Switch **P.** c. Turn the Mode Switch to the right and release.
82	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 3 of 3)

Table 6-16
Error Control II PCA options - part number: NT6M65AG

Device type (number)	Position/setting	Function	Setting	
			Factory	**On-site**
Jumper	None Used			
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note: There are no customer-definable options on this PCA. Information is shown for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

Figure 3-1
Error Control II PCA options (NT6M65AG)
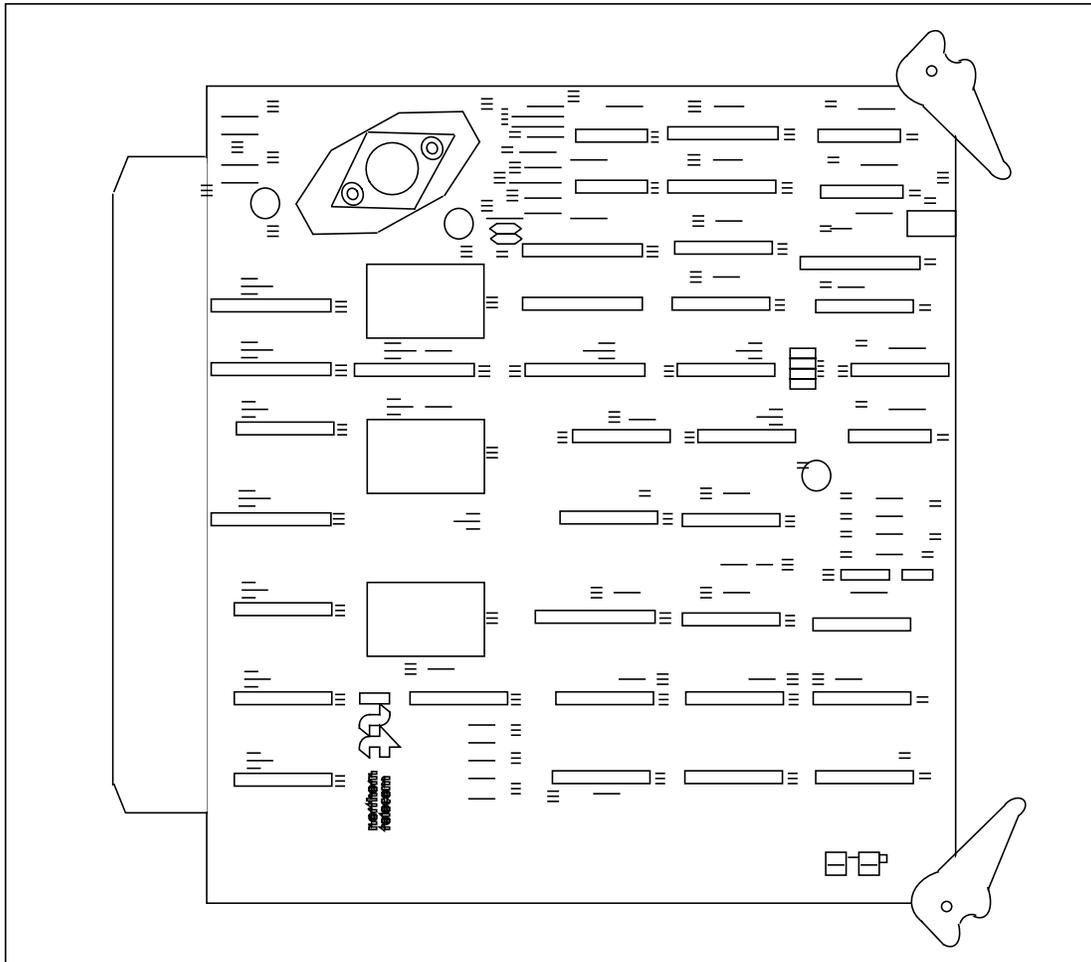
Error Control II Jumper PCA Replacement (NTM609AB)

When replacing the Error Control II Jumper PCA, use the following procedure. Refer to Table 6-17 and Figure 6-17 for a description of the switch and jumper options for this PCA.

Procedure 6-38
Error Control II Jumper PCA replacement (NTM609AB)

 Step   **Description**

⚠	**CAUTION** Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
⚠	**WARNING** Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

83   To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage; bending and scratching.

84   Get the replacement PCA from the spares kit.

85   Remove the protective electrostatic bag and place it on a suitable, grounded surface.

86   Make sure the replacement PCA matches the faulty PCA's part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor.

Verify that any applicable firmware for the PCA is the same or with a higher release number. Otherwise, contact your next level of support.

87   Place the A processor unit an ONLY mode. At the Switch and Status Panel of the BMC:

a. Press the A/B Select Switch to **A.**
b. Press the O/P Mode Select Switch **O.**
c. Turn the Mode Switch to the right and release.

Note: This will create an alarm.

(Sheet 1 of 3)

Procedure 6-38
Error Control II Jumper PCA replacement (NTM609AB)

Step	Description
88	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
89	Remove power from the standby chassis (B processor) by operation of the +8 V dc red rocker switch on the power supply.
90	Remove the Error Control II Jumper PCA in the B chassis (Slot 5).
91	Insert the spare Error Control II Jumper PCA in the B chassis (Slot 5), making sure it is fully seated.
92	Put faulty PCA in the empty electrostatic bag.
93	Apply power to standby chassis (B processor) by operation of the +8 V dc red rocker switch on the power supply. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded** to be displayed.
94	To clear any alarms on the standby processor, enter at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will stay clear on the standby processor if there are no faults.
95	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to **A.** b. Make the O/P Mode Select Switch **P.** c. Turn the Mode Switch to the right and release.

(Sheet 2 of 3)

Procedure 6-38
Error Control II Jumper PCA replacement (NTM609AB)

Step	Description
96	To clear any alarms on the active processor, enter at the maintenance terminal: **>RSERR 00 (cr)** Alarms will clear if there are no faults.
97	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.
	(Sheet 3 of 3)

Table 6-17
Error Control II Jumper PCA options - part number: NTM609AB

Device type (number)	Position/setting		Function	Setting	
				Factory	**On-site**
Jumper	None Used				
Strap	None Used				
DIP Switch	None Used				
Rotary Switch	None Used				
Switch toggle (SW1)	On =	up position = power cut to Error Control II PCA in A5 is off.	Error control functions transferred to this circuit pack.	Used only during corrective maintenance on the Error Control II PCA (A5).	
	Off =	down position = power feed to Error Control II PCA in A5 is on.	Error control functions operate normally.		

Note 13: There are no customer-definable options on this PCA. Information is shown for reference only. Use this data for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

Note 14: The LED (DS1) lights when toggle switch (SW1) is moved to the (up) On position.

Figure 3-1
Error Control II Jumper PCA options (NTM609AB)

Note: LED (DS1) lights when toggle switch (SW1) is moved to the (up) On position.
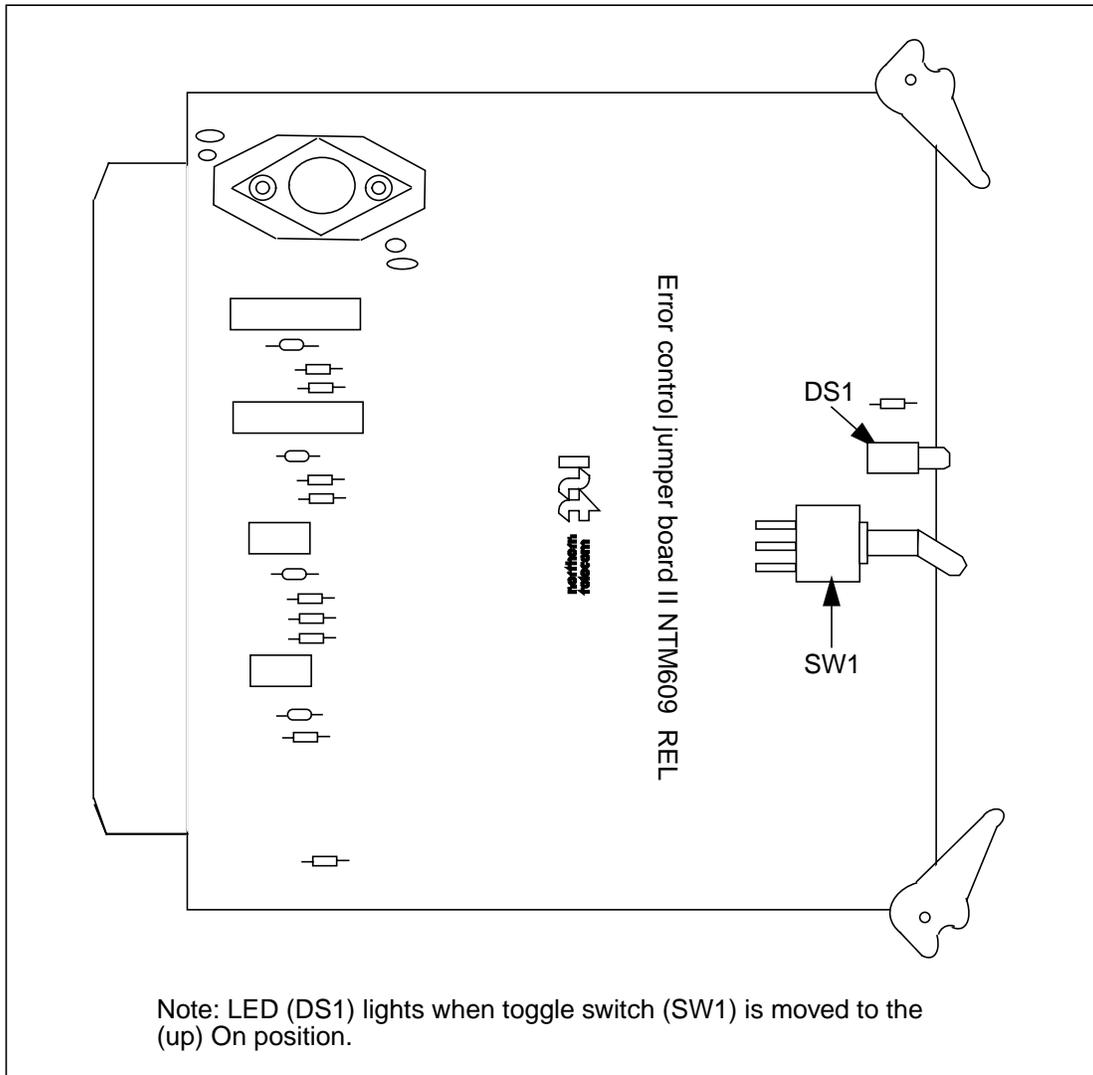
56K Interface PCA Replacement (NT6M94AA)

To replace the 56K Interface PCA, use the following procedure. Refer to Table 6-18 and Figure 6-18 for a description of the switch and jumper options for this PCA.

Procedure 6-39
56K Interface PCA replacement (NT6M94AA)

Step	Description

⚠	**CAUTION** Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
⚠	**WARNING** Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
16	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage; bending and scratching.
17	Get the replacement 56K Interface PCA from the spares kit.
18	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
19	Make sure the replacement PCA matches the faulty PCA's part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor. Verify that any applicable firmware for the PCA is the same or with a higher release number. Otherwise, contact your next level of support.
20	Place the processor unit with the suspected faulty pack in the standby mode, by putting the **other** processor in the ONLY mode. The **other** processor is defined as that processor that does not have the suspected faulty pack. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the **other** processor. b. Press the O/P Mode Select Switch to **O**. c. Turn the Mode Switch to the right and release.

(Sheet 1 of 4)

Procedure 6-39
56K Interface PCA replacement (NT6M94AA)

Step	Description

Note: This will create an alarm:
```
ONLY MODE NON-REDUNDANT
```

21	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
22	Remove power from the standby chassis (**A** or **B**; the one with the suspected fault) by operation of the +8 V dc red rocker switch on the power supply.
23	Remove the suspected faulty PCA.
24	Replacement PCA option settings must be set to match the PCA being removed, if present, prior to installation.

CAUTION
Failure to set-up options correctly may cause an AMA loss.

25	Insert the spare PCA in the vacated card slot, making sure it is fully seated.
26	Put faulty pack in the empty electrostatic bag.
27	Apply power to the BMC chassis by operation of the +8 V dc red rocker switch, reversing step 7. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded** to be displayed.
28	To clear any alarms on the standby processor, enter at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will clear on the standby processor if there are no faults.

(Sheet 2 of 4)

Procedure 6-39
56K Interface PCA replacement (NT6M94AA)

Step	Description
29	After RSERR, alarms may reappear. The command, CP TEST, forces diagnostics that confirm whether the faults were corrected. Enter (at the terminal): **>CP TEST STDBY (cr)**
30	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Verify that the A/B Select Switch is depressed to match the active processor. b. Make the O/P Mode Select Switch **P.** c. Turn the Mode Switch to the right and release.
31	To clear any alarms on the active processor, enter at the maintenance terminal: **>RSERR 00 (cr)** Alarms will clear if there are no faults.
32	If alarm status shows active alarms, troubleshoot all alarm conditions. Enter (at the terminal): **>TEST (cr)** **>DOS S TEST (cr)** *Note:* The tests will take several minutes to execute, and the **program test** is the last test to run.
33	Switch Processors to make the standby processor active. Enter (at the terminal): **>SWACT (cr)** The standby processor becomes the active processor. **WARNING** This should not be done during a high traffic period; it may cause loss of AMA.

(Sheet 3 of 4)

Procedure 6-39
56K Interface PCA replacement (NT6M94AA)

Step	Description
34	Test the Active processor. Enter (at the terminal): **>TEST (cr)** **>CP TEST ACT (cr)** **>DOS S TEST (cr)** **>CP TEST STDBY (cr)** *Note:* The tests will take several minutes to execute, and the **program test** is the last test to run.
35	Verify that the replacement PCA has corrected the original error.
36	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 4 of 4)

Table 6-18
56K Interface PCA (A7 and B7) options - part number: NT6M94AA

Device type (number)	Position/setting	Function	Setting Factory	On-site
Jumper (P2)	Out=select card 1 In=select card 2	Card 1 or 2 address selection	Out	
Jumper (P4)	Out=256K (27C256) In=512K (27C512)	256K/512K EPROM enable	Out	
Jumper (P5)	Out=disable watch dog timer In=enable watch dog timer	Watch Dog enable	Out	
Jumper (P8)	Out=disable CPU clock In=enable CPU clock	CPU clock enable	In	
Jumper (P9)	Out=disable SCC clock In=enable SCC clock	SCC clock enable	In	
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			

Note: There are no customer-definable options on this PCA. Information is shown for reference only. This data is to be used for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set-up the same as the PCA being replaced.

Figure 3-1
56K Interface PCA options (NT6M94AA)
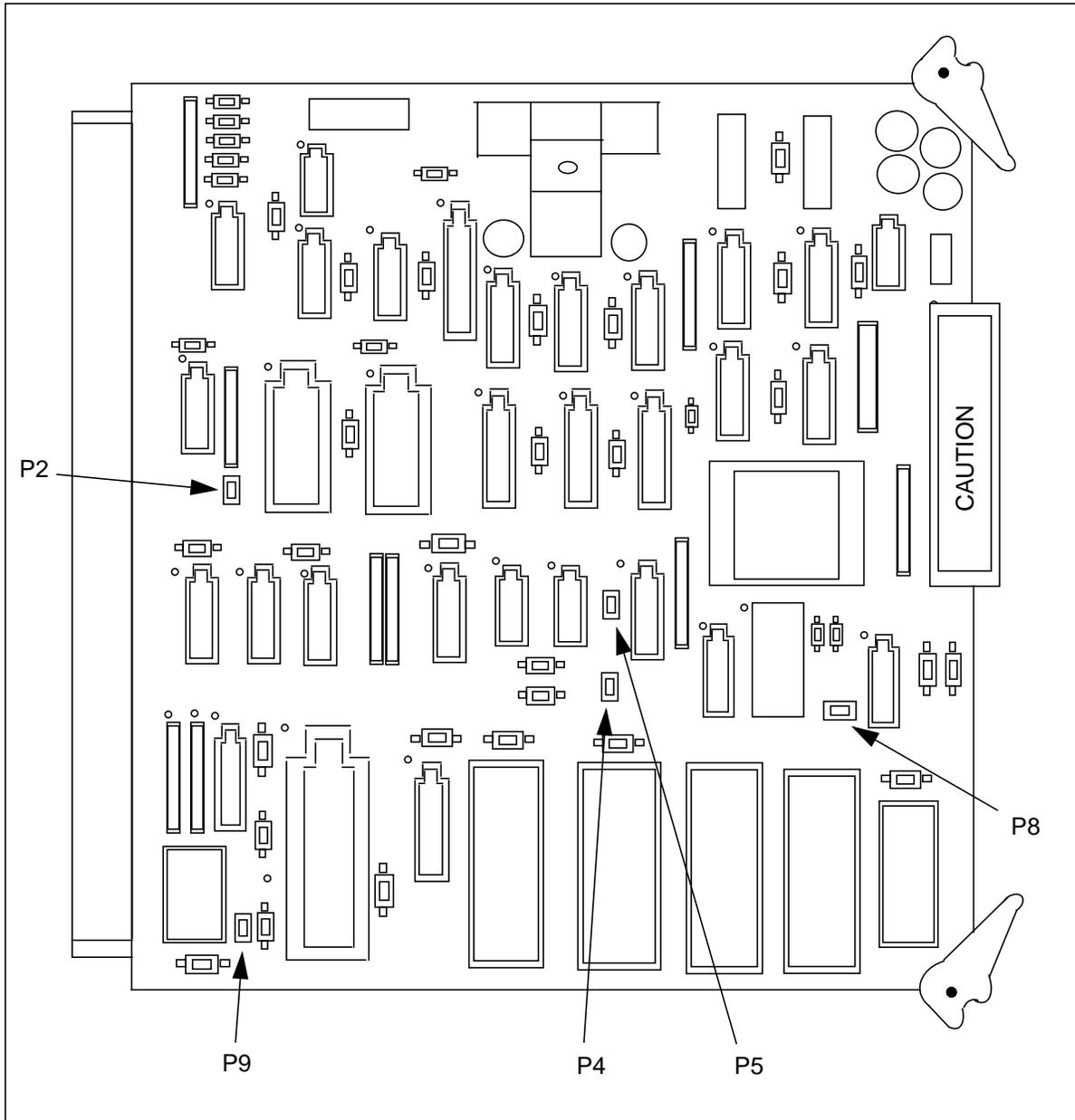
SCSI Crossover PCA Replacement (NT6M93BA)

To replace the SCSI Crossover PCA, use the following procedure. Refer Table 6-19 and Figure 6-19 for a description of the switch and jumper options for this PCA.

Procedure 6-40
SCSI Crossover PCA replacement (NT6M93BA)

Step	Description

| | **CAUTION** |
| | Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC. |

| | **WARNING** |
| | Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment. |

| 37 | Make sure no polling is occurring. Wait for a low traffic period, if possible. |

| 38 | Locate the failing SCSI Crossover PCA and change the disk mode to the **other** disk ONLY mode, if necessary. The **other** disk is the one not in the same chassis as the suspected SCSI Crossover PCA. Enter (at the terminal): |

>DISK MODE xx (cr)

where: xx = disk mode = **AO** = A ONLY
= **BO** = B ONLY

Proper response:

```
DISK MODE: AO
or
DISK MODE: BO
```

| 39 | Place the BMC into an ONLY processor mode. The processor mode should match the disk mode. At the Switch and Status Panel of the BMC: |

a. Press the A/B Select Switch to match the active disk drive.
b. Press the O/P Mode Select Switch to **O**.
c. Turn the Mode Switch to the right and release.

(Sheet 1 of 4)

Procedure 6-40
SCSI Crossover PCA replacement (NT6M93BA)

Step	Description
40	Loosen the slotted screws which fasten the outer edges of the appropriate rear panel assembly to the cabinet.
41	Pull the rear panel away from the cabinet. Remove the front panel of the chassis to improve cooling, if necessary. Put the two panels in a safe place to prevent bending and scratching.
42	Loosen the two screws at the top of the hinged card panel and remove the screw at the bottom of the hinged card panel. Let it swing slowly down from the top until it rests. *Note:* If the PCA at A15 is being replaced, use a Styrofoam block or another insulating material, about 1" x 1" x 0.5", to insulate the pins of the 16-pin cable on the P/A Comm PCA to prevent accidental shorting against the chassis.
43	Remove power cable (J4), then any cables and screws connected to the suspected PCA. *Note:* Observe the cable markings (identification) or attach labels to the cables for correct positioning for installation of replacement PCA. Gently pull the suspect assembly loose from its mounting position.
44	Verify (J5) jumper option is the same on the replacement PCA as the PCA that was removed. ⚠ **WARNING** Incorrect positioning of jumper may cause loss of AMA. When replacing the SCSI Crossover PCA in the A chassis, be sure to place the jumper on pin A and the center pin. When replacing the SCSI Crossover PCA in the B chassis, be sure to place the jumper on pin B and the center pin.
45	Mount the replacement PCA in the vacated position. *Note:* When replacing the screws, align carefully before tightening to avoid stripping. Tighten the screws, alternating until all are equally tight. Do not "cinch down" any one screw until all are properly aligned; no binding or force needed to turn.
46	Reattach any cables removed in step 7 in reverse order.

(Sheet 2 of 4)

Procedure 6-40
SCSI Crossover PCA replacement (NT6M93BA)

Step	Description

Note: Verify the cable markings (identification) or attach labels to the cables for correct positioning.

WARNING
Incorrect positioning of jumper may cause loss of AMA.

47   Verify the repair by switching disk modes back to PRIME.   Enter (at the terminal):

>DISK MODE xx (cr)

where: xx - disk mode - **AP** - A PRIME   (if mode is A only)
                 - **BP** - B PRIME   (if mode is B only)

The BMC will begin a disk copy this may take several hours, depending on how much data is on the disk and the capacity of the disk.

Proper response:

```
DISK MODE: AP  (from disk mode AO)
or
DISK MODE: BP  (from disk mode BO)
```

48   Remove the insulating material, if used. Route all wires and cables to avoid pinching or crimping when the rear panel is reinstalled.

49   Lift the hinged circuit assembly gate back to its vertical position and tighten the two screws loosened in step 6.

50   Replace the rear panel. Reinstall the slotted pan head screws previously removed in step 4.

Note: Align carefully before tightening to avoid stripping. Tighten the screws, alternating until all are equally tight. Do not "cinch down" any one screw until all are properly aligned; no binding or force needed to turn.

(Sheet 3 of 4)

Procedure 6-40
SCSI Crossover PCA replacement (NT6M93BA)

Step	Description
51	Clear any alarms on the BMC. At the maintenance terminal, enter: **>RSERR 00 (cr)** **>DOS S RSERR 00 (cr)** Alarms will stay clear on the BMC if there are no faults.
52	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the active processor. b. Press the O/P Mode Select Switch to **P**. c. Turn the Mode Switch to the right and release.
53	When all maintenance activities are complete, be sure to replace the front panel of the BMC if removed. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. At this time the procedure is complete.

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Table 6-19
SCSI Crossover PCA options - part number: NT6M93BA

Device type (number)	Position/setting	Function	Setting Factory	On-site
Jumper (J5)	1-2disk A 2-3disk B	Disk A select Disk B select	A/B (refer to notes 2 and 3)	
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note 3: There are no customer-definable options on this PCA. Information is shown for reference only. This data is to be used for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set-up the same as the PCA being replaced.

Note 4: For PCAs at A15, make sure jumper J5 is set for selection of the disk drive in the A chassis.

Note 5: For PCAs at B15, make sure jumper J5 is set for selection of the disk drive in the B chassis.

Figure 3-1
SCSI Crossover PCA options (NT6M93BA)
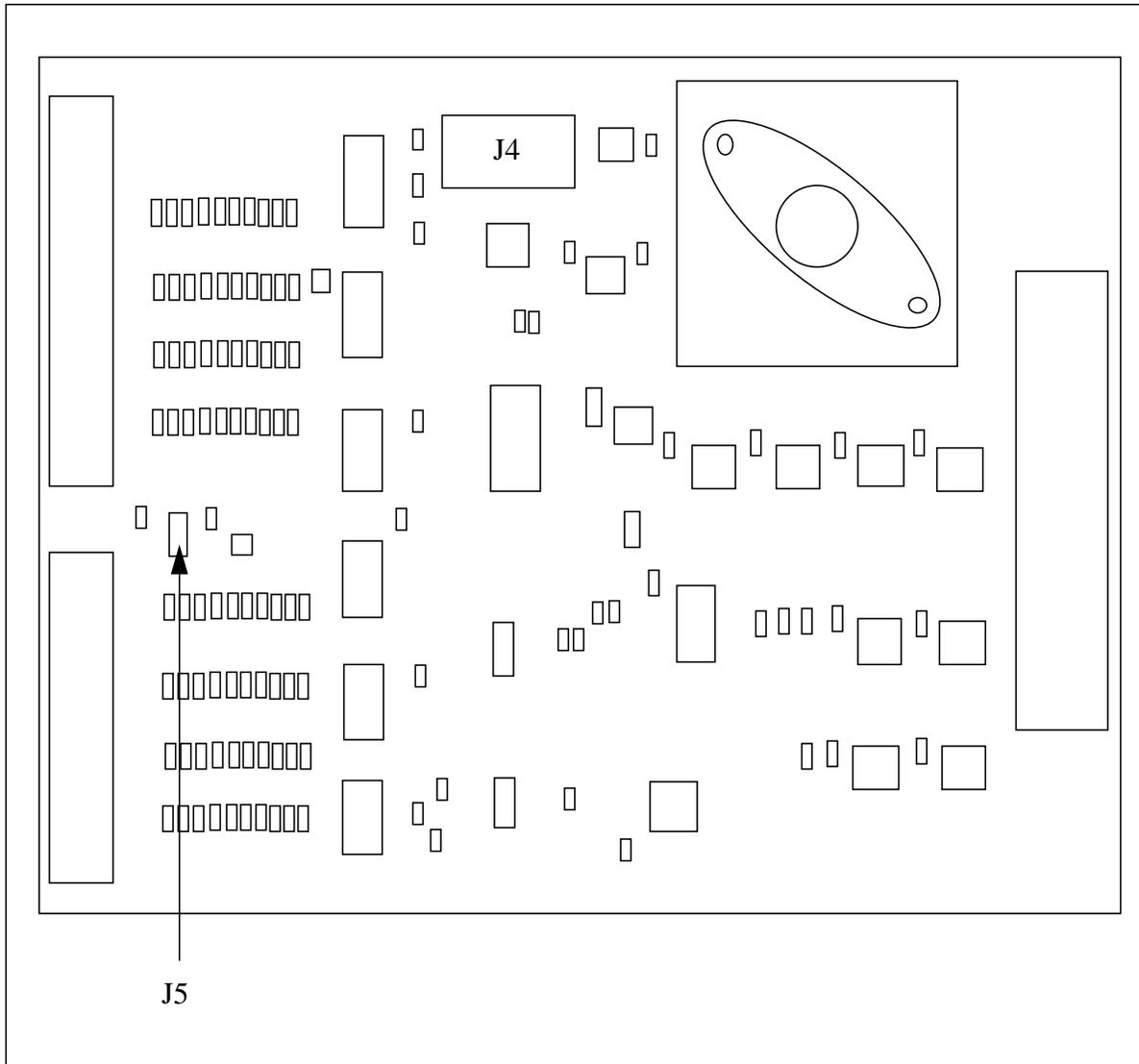
Power and Alarm Communications PCA replacement (NT6M84BA)

To replace the P/A Comm PCA, use the following procedure. Refer to Table 6-20 and Figure 6-20 for a description of the switch and jumper options for this PCA.

Procedure 6-41
Power and Alarm Communications PCA replacement (NT6M84BA)

Step	Description
	CAUTION Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
	WARNING Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
54	Make sure no polling is occurring. Wait for a low traffic period, if possible.
55	Remove the slotted screws that fasten the outer edges of the rear panel assembly to the cabinet.
56	Remove the front panel of the A chassis. Put the two panels in a safe place to prevent bending and scratching.
57	Remove the power from the PCA first by disconnecting (P11) located in the upper right quadrant. Remove the other cables. *Note:* Verify the cable markings (identification) or attach labels to the cables when removing them to facilitate replacement in the correct positions. Alarms may also activate and the BMC status panel lights will all be off. This is normal. Silence the alarm at the switching system and go to step 5.
58	Remove the screws that fasten the P/A Comm PCA. Gently remove the PCA from its mounting position.
	(Sheet 1 of 3)

Procedure 6-41
Power and Alarm Communications PCA replacement (NT6M84BA)

Step	Description

59   Make sure any PCA option settings are set the same as the ones on the PCA being replaced.

Note: Improper performance can be caused by incorrect settings, and produce fault-like symptoms in the BMC.

60   Mount the replacement assembly in the vacated position.

Note: When replacing the screws, align carefully before tightening to avoid stripping. Tighten the screws, alternating until all are equally tight. Do not "cinch down" any one screw until all are properly aligned; no binding or force needed to turn.

61   Reattach any cables removed in step 4 in reverse order.

Note: Verify the cable markings (identification) or attach labels to the cables for correct positioning.

⚠ **WARNING**
Incorrect positioning of cables will cause alarms and communication problems.

62   Properly reroute all cables. Make sure all wires and cables are routed so they are not pinched.

63   To clear any alarms on the active processor. At the maintenance terminal, enter:

>RSERR 00 (cr)

Alarms will clear if there are no faults.

64   To clear any alarms on the standby processor.   At the maintenance terminal, enter:

>DOS S RSERR 00 (cr)

Alarms will clear on the standby processor if there are no faults.

(Sheet 2 of 3)

Procedure 6-41
Power and Alarm Communications PCA replacement (NT6M84BA)

Step	Description
65	If BMC status panel shows processor is in **ONL** mode go to step 13, otherwise go to step 14.
66	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the active processor. b. Press the O/P Mode Select Switch to **P**. c. Turn the Mode Switch to the right and release.
67	Verify replacement PCA has corrected original error.
68	When all maintenance activities are complete, be sure to replace the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed. Also replace the front panel of the BMC if removed. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 3 of 3)

Table 6-20
Power and Alarm Communications PCA options (NT6M84BA)

Device Type Num.	Position/Setting	Function	Setting Factory	On-Site

Note 6: There are no customer-definable options on this PCA. Information is shown for reference only. This data is to be used for verification during initial BMC system installation and/or PCA replacement to make sure the replacement PCA is set-up the same as the PCA being replaced.

Note 7: This PCA supports polling on digital data lines or on an analog network. For use with digital lines check that:

  a. Quad SIO PCA at A6 and B6 is part number NT6M60BA.
  b. Four Channel Comm PCA at A17 is release 03, or later.
  c. HOC supports the digital data line feature.

Note 8: Factory settings shown are for a digital network only.

Note 9: S1 and S2 settings are customer-definable based on whether communications use analog or digital data lines. Refer to the following chart for the digital application to determine the on-site settings for SW1 and SW2:
a. If channel A, J1 is done over a digital data line:

  a. If MTC PTR 3 (DMS-100 only) is done over a digital data link:
     S1 positions 1 and 5 - ON (channel A - J1 connector)

  b. If software downloads are done over a digital data link:
     S1 positions 2 and 6 - ON (channel B - J2 connector)

  c. If MTC PTR 2 (DMS-100 only) is done over a digital data link:
     S1 positions 3 and 7 - ON (channel C - J3 connector)

  d. If MTC PTR 1 is done over a digital data link:
     S1 positions 4 and 8 - ON (channel D - J4 connector)

Note 10: Make sure the settings for internal and external transmit receive clocks agree with the settings on the Quad SIO PCAs in A6 and B6 before working with digital data lines.

Device Type Num.	Position/Setting	Function	Setting Factory	On-Site
Jumper J14	1-2 ASEL control 2-3 CPUSEL control	Crossover Control Select - Control the leads from the Error Control II PCA to determine which CPU has control of the Crossover circuitry	1-2	Must be same as factory setting

(Sheet 1 of 3)

Table 6-20
Power and Alarm Communications PCA options (NT6M84BA)

Device Type Num.	Position/Setting	Function	Setting Factory	On-Site
Jumper J15	1-2 Rover terminal jack enabled 2-3 Rover terminal jack disabled	Rover terminal select control	2-3	Must be same as factory setting
Jumper J16	1-2channel 4 on the Quad SIO controlled by the Quad SIO and the setting of J14. 2-3channel 4 on the Quad SIO controlled by the setting of J14 only.	Channel 4 control select - Four position switch, S6, of the Quad SIO; controls the use of the manual transfer switches for the maintenance terminal. (Under control of software only.)	2-3	Must be same as factory setting
Jumper J17	1-2channel 4 on the Quad SIO controlled by the Quad SIO and the setting of J14. 2-3channel 4 on the Quad SIO controlled by the setting of J14 only.	Channel 4 control select - Four position switch, S6, of the Quad SIO; controls the use of the manual transfer switches for the maintenance terminal. (Under control of software only.)	2-3	Must be same as factory setting
DIP Switch S1	Chan.Int/S1-S2 No.ExtSetting 1IntS1-1, 5 Off ExtS1-1, 5 On 2IntS1-2, 6 Off ExtS1-2, 6 On 3IntS1-3, 7 Off ExtS1-3, 7 On 4IntS1-4, 8 Off ExtS1-4, 8 On	With S2, transmit clock selection, (internal or external) With S1, transmit clock selection, (internal or external) Internal clock is from the Quad SIO in slots A6 and B6.	Off Off Off Off	Must be same as factory setting

(Sheet 2 of 3)

Table 6-20
Power and Alarm Communications PCA options (NT6M84BA)

Device Type Num.	Position/Setting	Function	Setting Factory	On-Site
DIP Switch S2	Chan.Int/S1-S2 No.ExtSetting	External clock is derived by looping around the TCIn signals.		Must be same as factory setting
	5IntS2-1, 5 Off ExtS2-1, 5 On		Off	
	6IntS2-2, 6 Off ExtS2-2, 6 On		Off	
	7IntS2-3, 7 Off ExtS2-3, 7 On		Off	
	8IntS2-4, 8 Off ExtS2-4, 8 On		Off	
Strap	None used			
Rotary Switch	None used			
Switch	None used			
(Sheet 3 of 3)				

Figure 3-1
Power and alarm communications PCA options (NT6M84BA)
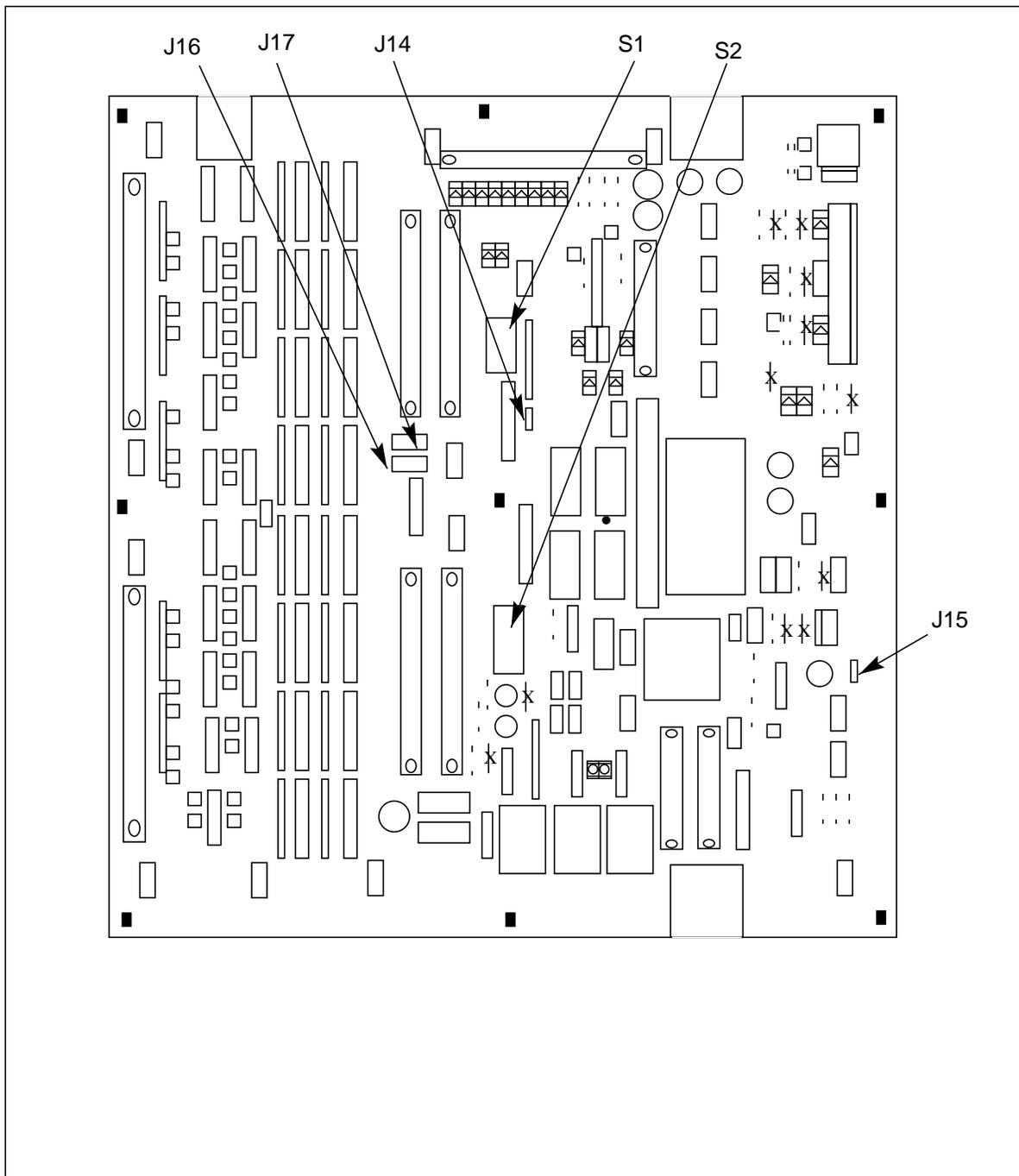
56K Crossover PCA replacement (NT6M48AA)

To replace the 56K Crossover PCA, use the following procedure. Refer to Table 6-21 and Figure 6-21 for a description of the switch and jumper options for this PCA.

Procedure 6-42
56K Crossover PCA replacement (NT6M48AA)

Step	Description

CAUTION
Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.

WARNING
Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

| 69 | Make sure no polling is occurring. Wait for a low traffic period, if possible. |

| 70 | Remove the slotted captive screws that fasten the outer edges of the B rear panel assembly to the cabinet. |

| 71 | Remove the front panel of the A chassis. Put the two panels in a safe place to prevent bending and scratching. |

| 72 | Remove the power from the 56K Crossover PCA first by disconnecting plug **P1**. Then remove the other cables. |

Note: Verify the cable markings (identification) or attach labels to the cables when removing them to facilitate replacement in the correct positions.

| 73 | Remove the screws that fasten the 56K Crossover PCA. Gently remove the PCA from its mounting position. |

| 74 | Mount the replacement assembly in the vacated position. |

(Sheet 1 of 4)

Procedure 6-42
56K Crossover PCA replacement (NT6M48AA)

Step	Description

Note: When replacing the screws, align carefully before tightening to avoid stripping. Tighten the screws, alternating until all are equally tight. Do not "cinch down" any one screw until all are properly aligned; no binding or force needed to turn.

(Sheet 2 of 4)

Procedure 6-42
56K Crossover PCA replacement (NT6M48AA)

Step	Description

75   Reattach any cables removed in step 4 in reverse order.

Note: Verify the cable markings (identification) or attach labels to the cables for correct positioning.

WARNING
Incorrect positioning of cables will cause alarms and polling problems.

76   Properly reroute all cables. Make sure all wires and cables are routed so they are not pinched or in contact with the arc of the fan blades.

77   To clear any alarms on the active processor. At the maintenance terminal, enter:

>RSERR 00 (cr)

Alarms will clear if there are no faults.

78   To clear any alarms on the standby processor.   At the maintenance terminal, enter:

>DOS S RSERR 00 (cr)

Alarms will clear on the standby processor if there are no faults.

79   After RSERR, alarms may reappear. Perform diagnostics on both the standby and active processors. Enter (at the terminal):

>DOS S TEST (cr)
>CP TEST STDBY (cr)
>TEST (cr)
>CP TEST ACT (cr)

Note: The tests will take several minutes to execute, and the **program test** is the last test to run.

If all tests do not pass, refer to the related message table in the *Command and Message Guide* section and/or contact the next level of support.

(Sheet 3 of 4)

Procedure 6-42
56K Crossover PCA replacement (NT6M48AA)

Step	Description
80	Display all active alarms. Enter: (at the terminal) **>ERRMAP ALARMS (cr)** If active alarms are present, troubleshoot using the related message table(s) in the *Command and Message Guide* section and/or contact the next level of support.
81	Verify replacement PCA has corrected original error.
82	Test the polling function.
83	When all maintenance activities are complete, be sure to replace the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed during step 2. Replace the front panel of the BMC if removed. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.
	(Sheet 4 of 4)

Table 6-21
56K Crossover PCA (B16) options - part number: NT6M48AA

Device type (number)	Position/setting	Function	Setting Factory	On-site
Jumper	None Used			
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			

Table 6-21
56K Crossover PCA (B16) options - part number: NT6M48AA

Device type (number)	Position/setting	Function	Setting	
			Factory	**On-site**
Switch	None Used			

Note: There are no customer-definable options on this PCA. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or PCA replacement to make sure the replacement PCA is set up the same as the PCA being replaced.

Figure 3-1
56K Crossover PCA options (NT6M48AA)
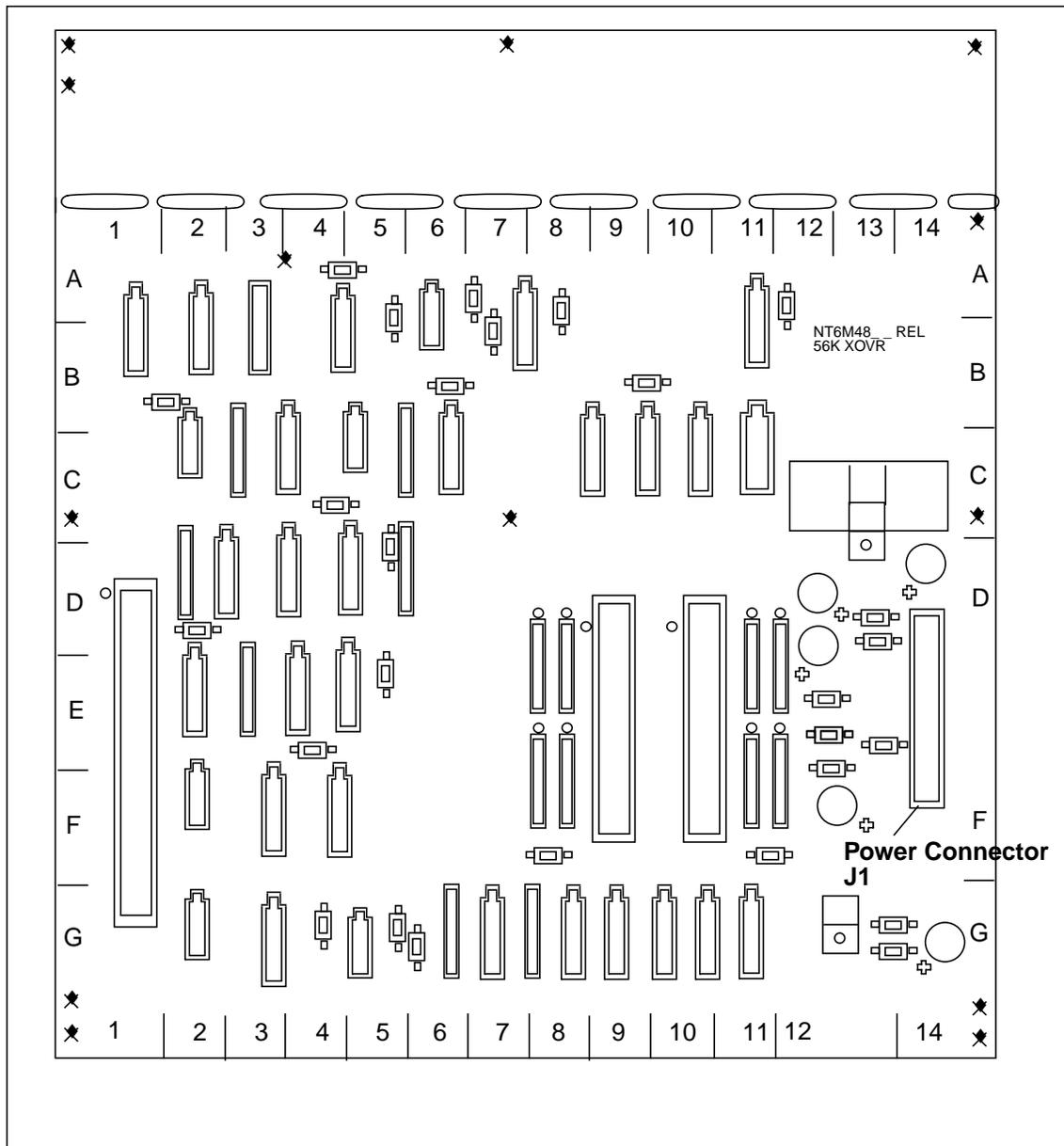
56K Connector PCA Replacement (NT6M49AA)

To replace the 56K Connector PCA, use the following procedure. Refer to Table 6-22 and Figure 6-22 for a description of the switch and jumper options for this PCA.

Procedure 6-43
56K Connector PCA replacement (NT6M49AA)

Step	Description

CAUTION
Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.

WARNING
Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

Step	Description
84	Make sure no polling is occurring. Perform this procedure during a maintenance window.
85	Notify technical assistance personnel of the temporary loss of polling links (ports J11 through J14). BMC systems use a path through the 56K Crossover to the 56K Connector PCA.
86	Remove the slotted screws that fasten the outer edges of the B rear panel assembly to the cabinet. Remove the rear panel of the B chassis.
87	Remove the cables attached to the V.35 or RS-232 ports (J11 and J12 or J13 and J14, respectively) on the B chassis. Mark these cables for later replacement.
88	Detach the slotted captive screws that secure the panel in the B chassis that holds the 56K Crossover and the SCSI Crossover PCAs. Lower the panel to allow access into the rear of the B chassis.
89	Remove the ribbon cable connector attached to the 56K Connector PCA.
90	Remove the eight stand-offs on the outside of the panel that attach the 56K Connector PCA. Use an offset ratchet driver for limited clearance.

(Sheet 1 of 2)

Procedure 6-43
56K Connector PCA replacement (NT6M49AA)

Step	Description
	Note: Be sure to hold the attached nuts and washers as you remove the standoffs. Do not allow the nuts and washers to fall into the chassis.
91	Gently remove the 56K Connector PCA from its position.
92	Insert the replacement PCA in the vacated position.
93	Replace the eight standoffs removed in step 7. Do not fully tighten down the standoffs until all of them are inserted.
94	Attach the ribbon cable connector removed in step 6 to the replacement 56K Connector PCA.
95	Swing the panel holding the 56K Crossover and SCSI Crossover PCAs back into position and reattach the slotted captive screws.
96	Reattach any cables removed in step 4, as labeled, to the associated ports (J11 through J14).
97	Seat the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed.
98	Verify that the polling function is operating properly. The procedure is complete.
	(Sheet 2 of 2)

Table 6-22
56K Connector PCA (B26) options - part number: NT6M49AA

Device type (number)	Position/setting	Function	Setting Factory	On-site
Jumper	None Used			
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			

Table 6-22				
56K Connector PCA (B26) options - part number: NT6M49AA				
Device type	**Position/setting**	**Function**	**Setting**	
(number)			**Factory**	**On-site**
Switch	None Used			

Figure 3-1
56K Connector PCA options (NT6M49AA)
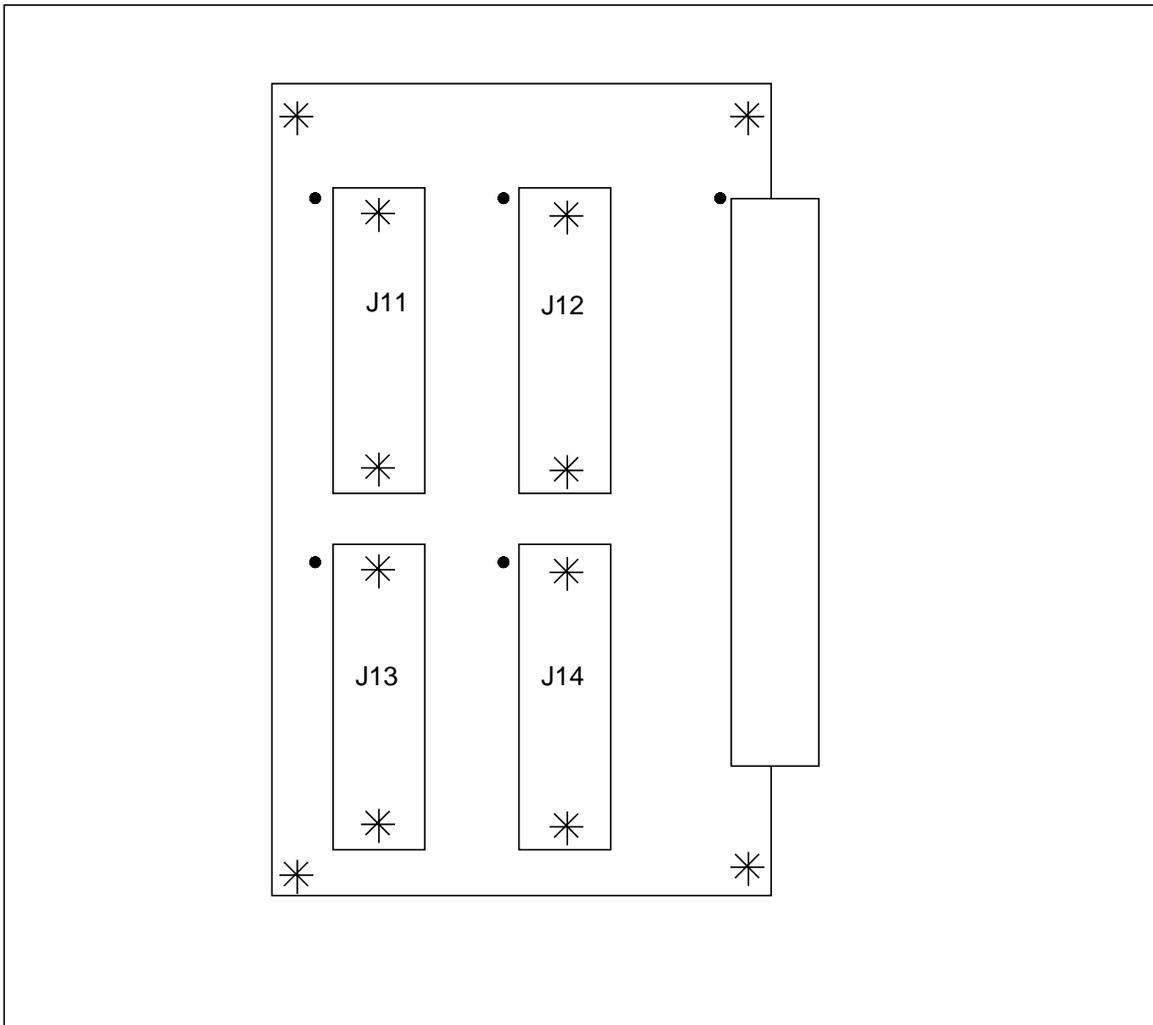
Bus Terminator PCA Replacement (NT6M68AA)

See the following procedures for replacing this PCA. Refer to Table 6-23 and Figure 6-23 for a description of the switch and jumper options on this PCA.

Procedure 6-44
Bus Terminator PCA replacement (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
	⚠ CAUTION Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
	⚠ WARNING Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
99	Get the BMC's model number from the BMC nameplate (A chassis, rear panel)
	⚠ WARNING Perform this procedure during low traffic.
100	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage, bending and scratching.
101	Get the replacement PCA from the spares kit.
102	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
103	Make sure the replacement PCA matches the faulty PCA's part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor.
(Sheet 1 of 4)	

Procedure 6-44
Bus Terminator PCA replacement (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
104	Place the processor unit with the suspected faulty pack in the standby mode, by putting the **other** processor in the ONLY mode. The **other** processor is defined as that processor that does not have the suspected faulty pack. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the **other** processor. b. Press the O/P Mode Select Switch to **O**. c. Turn the Mode Switch to the right and release. *Note:* This will create an alarm.
105	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
106	Remove power from the standby BMC chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
107	Remove the cables from the front of the TEC/DSI PCAs (slots 12 and 13). Cable on the left goes to slot 12; cable on the right goes to slot 13.
108	Remove the TEC/DSI PCAs (slots 12 and 13) and the SCSI Interface PCA (slot 11). Removing these packs creates room. Identify the TEC/DSI PCAs to ensure that they are returned to the correct slot.
109	Remove the two screws from the ribbon cable shield. Save the screws and shield.
110	Hold the cables out of the way. Remove the suspected faulty Bus Terminator PCA (using firm, even pressure) by inserting a finger in the hole in the circuit pack.
111	Insert the replacement Bus Terminator PCA. This pack requires high insertion force for proper seating. Use a thimble or other mechanical aid.
112	Put faulty pack in the empty electrostatic bag.

(Sheet 2 of 4)

Procedure 6-44
Bus Terminator PCA replacement (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
113	Fold the TEC/DSI cables back into position along the outer wall of the chassis.
114	Remount the ribbon cable shield over the TEC/DSI cables. If the shield does not fit properly, check the folding of the TEC/DSI cables. Do not crimp these cables.
115	Insert the two screws to hold the cable shield in place. Do not overtighten.
116	Reinsert the TEC/DSI PCAs (slots 12 and 13) and the SCSI Interface PCA (slot 11). Return the TEC/DSI PCAs to the appropriate locations.
117	Reattach the TEC/DSI cables.
118	Apply power to the BMC chassis by resetting the rocker switch in step 8 above. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded,** to be displayed.
119	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will clear on the standby processor if there are no faults.
120	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the active processor. b. Press the O/P Mode Select Switch to **P**. c. Turn the Mode Switch to the right and release.
121	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR 00 (cr)** Alarms will clear if there are no faults.
	(Sheet 3 of 4)

Procedure 6-44
Bus Terminator PCA replacement (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
122	Enter the following command at the maintenance terminal to Switch Processors to make the standby active: **>SWACT (cr)** The old standby is now the active processor. ⚠️ **WARNING** This should not be done at a high traffic period, it may cause a loss of AMA.
123	Verify replacement PCA has corrected original error.
124	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 4 of 4)

Procedure 6-45
Bus Terminator PCA replacement (NT6M68AA) - version numbers H01 or later

Step	Description

CAUTION
Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.

WARNING
Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

125	Get the BMC's model number from the BMC nameplate (A chassis, rear panel)

WARNING
Perform this procedure during low traffic.

Two people must reinstall the ribbon cable shield with a 2 1/2" No. 2 flat-blade screwdriver.

126	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage, bending and scratching.
127	Get the replacement PCA from the spares kit.
128	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
129	Make sure the replacement PCA matches the faulty PCAs part number and has the correct revision level. Also, make sure the suspected faulty PCA is in the standby processor.

(Sheet 1 of 4)

Procedure 6-45
Bus Terminator PCA replacement (NT6M68AA) - version numbers H01 or later

Step	Description
130	Place the processor unit with the suspected faulty pack in the standby mode, by putting the **other** processor in the ONLY mode. The **other** processor is defined as that processor that does not have the suspected faulty pack. At the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the **other** processor. b. Press the O/P Mode Select Switch to **O**. c. Turn the Mode Switch to the right and release. *Note:* This will create an alarm.
131	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
132	Remove power from the standby BMC chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
133	Remove the cables from the front of the TEC/DSI PCAs (slots 12 and 13). Cable on the left goes to slot 12; cable on the right goes to slot 13.
134	Remove the TEC/DSI PCAs (slots 12 and 13) and the SCSI Interface PCA (slot 11). Removing these packs creates room. Identify the TEC/DSI PCAs to ensure that they are returned to the correct slot.
135	From the rear of the IOE frame, insert a sheet of cardboard (approximately 12" x 12" x 1/16") under the left side of the BMC. The cardboard prevents the loss of the screws to be removed.
136	From the rear of the IOE frame, use a 2 1/2" No. 2 flat-blade screwdriver to remove the two screws holding the ribbon cable shield. The screws are approximately 2" to the rear of the BMC mounting bracket. If the BMC shipping bracket is still attached, remove it for access to the ribbon cable shield screws. Do not reinstall the shipping bracket or its screws. Store them with other BMC shipping items.

(Sheet 2 of 4)

Procedure 6-45
Bus Terminator PCA replacement (NT6M68AA) - version numbers H01 or later

Step	Description
137	Hold the cables out of the way. Remove the suspected faulty Bus Terminator PCA (using firm, even pressure) by inserting a finger in the hole in the PCA.
138	Insert the replacement Bus Terminator PCA. This pack requires high insertion force for proper seating. Use a thimble or other mechanical aid.
139	Put faulty PCA in the empty electrostatic bag.
140	Fold the TEC/DSI cables back into position along the outer wall of the chassis.
141	Remount the ribbon cable shield over the TEC/DSI cables. If the shield does not fit properly, check the folding of the TEC/DSI cables. Do not crimp these cables.
142	Insert the two screws to hold the cable shield in place. Remove the cardboard sheet after this step. Do not overtighten. This step requires one person at the rear of the IOE frame and another person at the front of the IOE frame. The person at the front of the IOE frame should hold the ribbon shield cable in place.
143	Reinsert the TEC/DSI PCAs (slots 12 and 13) and the SCSI Interface PCA (slot 11). Return the TEC/DSI PCAs to the appropriate locations.
144	Reattach the TEC/DSI cables.
145	Apply power to the BMC chassis by resetting the rocker switch in step 8 above. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded,** to be displayed.
146	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>DOS S RSERR 00 (cr)** Alarms will clear on the standby processor if there are no faults.

(Sheet 3 of 4)

Procedure 6-45
Bus Terminator PCA replacement (NT6M68AA) - version numbers H01 or later

Step	Description
147	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the BMC: a. Press the A/B Select Switch to match the active processor. b. Press the O/P Mode Select Switch to **P**. c. Turn the Mode Switch to the right and release.
148	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR 00(cr)** Alarms will clear if there are no faults.
149	Enter the following command at the maintenance terminal to Switch Processors to make the standby active: **>SWACT (cr)** The old standby is now the active processor. ⚠️ **WARNING** This should not be done at a high traffic period, it may cause a loss of AMA.
150	Verify replacement PCA has corrected original error.
151	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.
	(Sheet 4 of 4)

Table 6-23
Bus Terminator PCA options - part number: NT6M68AA

Device type (number)	Position/setting	Function	Setting Factory	On-site
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			
Jumper	None used			

Note: There are no customer-definable options on this PCAs. Information is shown for reference purposes only. This data is to be used for verification during initial BMC system installation and/or PCA replacement to make certain that the replacement PCA is set-up the same as the PCA being replaced.

Figure 3-1
Bus Terminator PCA options (NT6M68AA)
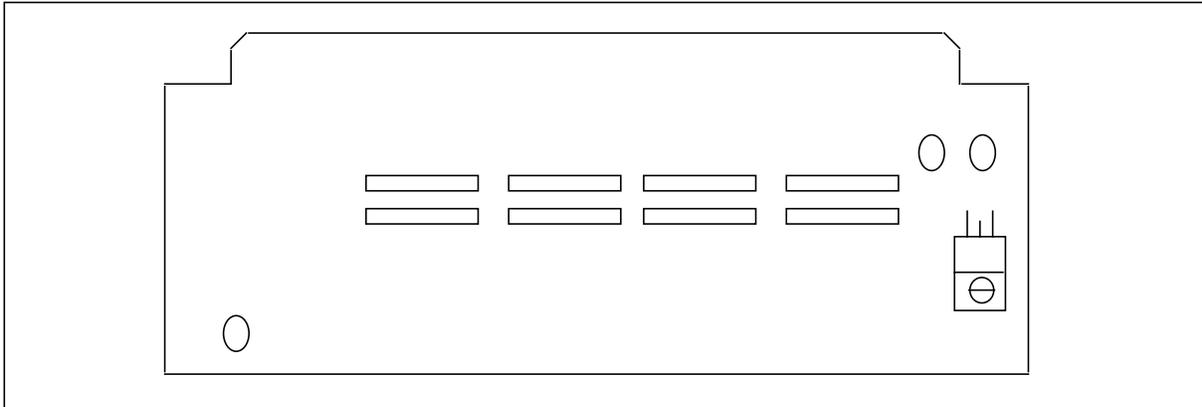
Four-Channel Communication PCA replacement (NT6M85AA)
To replace the Four-Channel Communication PCA, use the following
procedure. Refer to Table 6-24 and Figure 6-24 for a description of the
switch and jumper options on this PCA.

Procedure 6-46
Four-Channel Communication PCA replacement (NT6M85AA)

Step	Description
⚠	**CAUTION** Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
⚠	**WARNING** Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
	(Sheet 1 of 3)

Procedure 6-46
Four-Channel Communication PCA replacement (NT6M85AA)

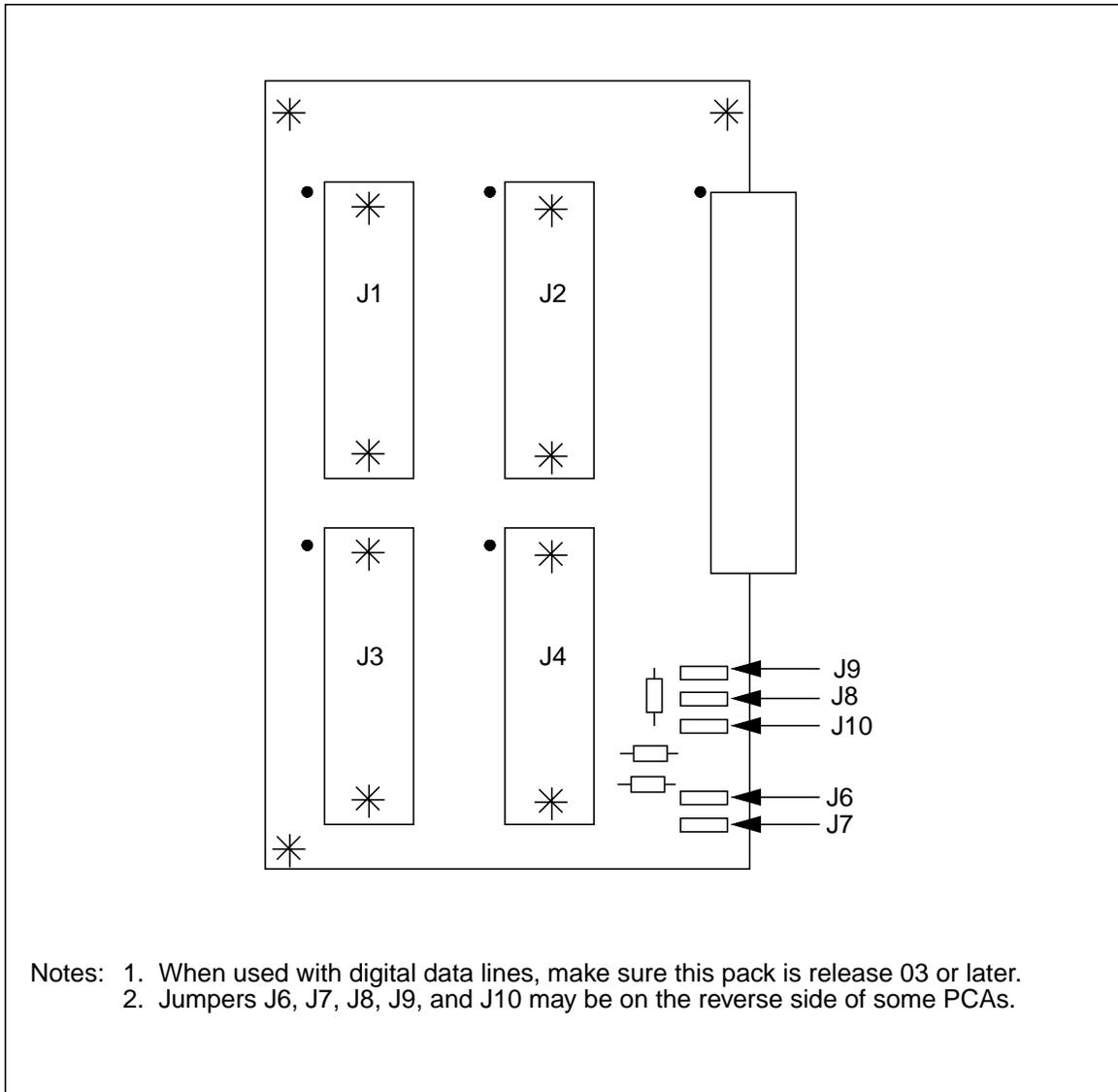| Step	Description
152	Make sure no polling is occurring. Perform this procedure during a maintenance window.
153	Notify technical assistance personnel of the temporary loss of MMI.
154	Remove the slotted screws that fasten the outer edges of the A rear panel assembly to the cabinet. Remove the rear panel of the A chassis.
155	Remove any cables attached to the ports J1 through J4 (A chassis). Mark these cables for later replacement.
156	Detach the slotted captive screws that secure the panel in the A chassis that holds the P/A Comm and the SCSI Crossover PCAs. Lower the panel to allow access into the rear of the A chassis.
157	Remove the ribbon cable connector attached to the Four-Channel Comm PCA.
158	Remove the eight standoffs on the outside of the panel that attach the Four-Channel Comm PCA. Use an offset ratchet driver for limited clearance. *Note:* Be sure to hold the attached nuts and washers as you remove the standoffs. Do not allow the nuts and washers to fall into the chassis.
159	Gently remove the Four-Channel Comm PCA from its position. Verify the options on the pack.
160	Insert the replacement PCA in the vacated position.
161	Replace the eight standoffs removed in step 7. Do not tighten down the standoffs until all of them have been inserted.
162	Attach the ribbon cable connector removed in step 6 to the replacement Four-Channel Comm PCA.
163	Swing the panel holding the P/A Comm and SCSI Crossover PCAs back into position and reattach the slotted captive screws.
164	Reattach any cables removed in step 4, as labeled, to the associated ports (J1 through J4).

(Sheet 2 of 3)

Procedure 6-46
Four-Channel Communication PCA replacement (NT6M85AA)

Step	Description
165	Seat the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed.
166	Verify that the MMI functions are operating properly. The procedure is complete.
	(Sheet 3 of 3)

Table 6-24
Four-Channel Communications PCA (A17) options - part number: NT6M85AA

Device type (number)	Position/setting	Function	Setting	
			Factory	**On-site**
Jumper (J6)	2-3	ADU Operation	1-2	Must be same as factory setting.
	1-2	No ADU operation (EIA on chan 1 & 2)		
Jumper (J7)	2-3	ADU Operation	1-2	Must be same as factory setting.
	1-2	No ADU operation (EIA on chan 1 & 2)		
Jumper (J8)	2-3	ADU Operation	1-2	Must be same as factory setting.
	1-2	No ADU operation (EIA on chan 1 & 2)		
Jumper (J9)	2-3	ADU Operation	1-2	Must be same as factory setting.
	1-2	No ADU operation (EIA on chan 1 & 2)		
Jumper (J10)	2-3	ADU Operation	1-2	Must be same as factory setting.
	1-2	No ADU operation (EIA on chan 1 & 2)		
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			

Table 6-24
Four-Channel Communications PCA (A17) options - part number: NT6M85AA

Device type (number)	Position/setting	Function	Setting	
			Factory	**On-site**
Switch	None Used			

Figure 3-1
Four-Channel Communications (A17) PCA (NT6M85AA) options

Notes: 1. When used with digital data lines, make sure this pack is release 03 or later.
2. Jumpers J6, J7, J8, J9, and J10 may be on the reverse side of some PCAs.

Power Supply Replacement (NT6M71AB)
If maintenance requires the removal of a power supply, using the following procedure. The only tool needed is a small flat-blade screwdriver. If necessary, have replacement fuses on hand.

Procedure 6-47
Power supply (NT6M71AB) replacement

Step	Description

⚠	**CAUTION** Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.
⚠	**WARNING** Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.
167	Remove the front panel of the BMC. If you are changing the A power supply remove only the A panel. If changing the B power supply, remove both the A and B front panels, this allows access to the Switch and Status Panel. Loosen the four captive screws on the left and right sides of the front panel; carefully remove the front panel. Put it in a safe place to avoid damage.

168	Put the processors into an Only mode. At the Switch and Status Panel of the BMC:
	
	a. Press the A/B Select Switch to:
	
	   A - If you are changing out the B power supply
	   or
	   B - If you are changing out the A power supply
	
	b. Press the O/P Mode Select Switch to **O.**
	
	c. Turn the Mode Switch to the right and release.

(Sheet 1 of 4)

Procedure 6-47
Power supply (NT6M71AB) replacement

Step	Description

169	Put the disk into an Only mode. Enter (at the terminal):
	
	>DISK MODE xx (cr)
	
	where: **xx** = disk mode
	        = **AO** = A ONLY (if you are changing out the B power supply).
	          OR
	        = **BO** = B ONLY (if you are changing out the A power supply).
	
	Proper response:
	
	`DISK MODE: AO`
	or
	`DISK MODE: BO`

170	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line TEC/DSI PCAs: **>DOS S TECMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S TECMAINT MEMWRITE 2 2204 00 (cr)**
171	Power down the faulty power supply. Remove power from the standby chassis by operation of the +8 V dc red rocker switch on the power supply.
172	Remove the -48 V dc source for the standby processor chassis at the main fuse panel; disk drive in this chassis should now be disabled. **WARNING** Removal of the incorrect -48 V dc source can cause loss of AMA. *Note:* This step will cause an alarm.
173	Remove the three connector plugs from the front of the power supply. Squeeze the side release clips and pull down gently; fold the cables back out of the way.

(Sheet 2 of 4)

Procedure 6-47
Power supply (NT6M71AB) replacement

Step	Description
174	Loosen the slotted-head captive screw at the bottom of the power supply. Gently pull the power supply out of the chassis. Make sure the three connectors (and cables) are out of the way during removal of the power supply unit.
175	Install the replacement power supply. Make sure all cables and connectors are out of the way of the insertion path. Make sure the proper fuses are installed in the replacement power supply.
176	Gently slide the power supply into position until it is fully seated. Tighten the slotted captive screw until snugly in place; do not bear down. If any resistance, remove the power supply and check for obstructions. Remove the obstructions and reinsert the power supply.
177	Reconnect the three connectors removed in step 5 during the removal phase. Connect the Power Supply Connectors as follows: a. J8 to P8. b. J9 to P9. c. J10 to P10.
178	Restore the -48 V dc power source at the main fuse panel.
179	Apply power to standby chassis by operation of the +8 V dc red rocker switch on the power supply. Wait for start-up activity to end and the message, **Software Loaded** or **S/W Loaded** to be displayed.
180	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the BMC: a. Depress the **P** side of the O/P Mode Select Switch. b. Turn the Mode Switch to the right and release.
	(Sheet 3 of 4)

Procedure 6-47
Power supply (NT6M71AB) replacement

Step	Description
181	Make the disk system redundant. At the maintenance terminal, enter: **>DISK MODE xx (cr)** where: **xx** = disk mode = **AP** = A PRIME (if mode is A only) or = **BP** = B PRIME (if mode is B only) The DPP will begin a disk copy, this may take several hours, depending on how much data is stored and the capacity of the disks. Proper response: `DISK MODE: AP` (from disk mode AO) or `DISK MODE: BP` (from disk mode BO)
182	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>DOS S RSERR 00 (cr)** Alarms will clear on the standby processor if there are no faults
183	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR 00 (cr)** Alarms will clear if there are no faults.
184	When all maintenance activities are complete, be sure to replace the front panel of the BMC, if removed. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The procedure is complete.

(Sheet 4 of 4)

Disk Drive Replacement (NT6M72GA)

The status of the disk drives changes to B ONLY immediately when the main processor determines that the A disk drive has a non-recoverable fault condition. Verify the status of the disk drives by entering the DISK MODE command at the maintenance terminal. Make sure that the B processor is in the ONLY mode by depressing the B processor control, then the O control on the Switch and Status Panel and turn the mode switch key clockwise. Examine the printouts on the maintenance terminal for verification of the status change.

The only tool needed is a small screwdriver. See Procedures 19-1 and 19-2 for the steps to replace a disk drive.

Removing the Faulty Disk Drive

Procedure 6-48
Remove Disk Drive (NT6M72GA)

Step	Description

Note: The following procedure is for replacing the A disk drive; use the same procedure for replacing the B disk drive by transposing references to A and B disks.

CAUTION
Since all BMC PCAs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the BMC.

WARNING
Since the BMC is powered up during this procedure, observe all safety procedures for operations on live equipment.

185	To remove the front panel of the BMC, loosen the four screws located on the left and right hand sides. Once removed, put the front panel in a safe place to avoid damage, bending and scratching.

(Sheet 1 of 3)

Procedure 6-48
Remove Disk Drive (NT6M72GA)

Step	Description
186	For the side that is operating in an ONLY disk mode, make sure that the other processor is active. The **other** processor is defined as that processor that does NOT have the failing disk drive in its chassis. To determine the current disk mode, enter (at the terminal): **>DISK MODE (cr)** Responses: **AO** = A ONLY DISK MODE **BO** = B ONLY DISK MODE **AP** = A PRIME DISK MODE **BP** = B PRIME DISK MODE i.e., If the disk mode is AP or BP, and the disk in the A chassis is the suspected bad drive, change the disk mode to B ONLY, enter: (at the terminal) **>DISK MODE BO (cr)**
187	Disconnect disk A power by removing the connector plug P8 from the power supply on the A chassis. Pinch the release clips on P8 and pull it down gently. ⚠ **CAUTION** Wait at least 30 seconds before proceeding.
188	Remove the two screws from the disk drive handle mount.
189	Grasp the disk drive in the front at the bottom, by the handle, slightly lift and pull straight forward until the J1 ribbon cable connector can be viewed. Keep one hand under the disk drive to maintain support. *Note:* The **J1** connector is on the **rear** of the disk drive assembly.

(Sheet 2 of 3)

Procedure 6-48
Remove Disk Drive (NT6M72GA)

Step	Description
190	Disconnect the ribbon cable from J1; use the cables pull tab. Note the direction of the brown stripe on the cable (PIN 1).
191	Remove the disk from the chassis. Place the disk on an antistatic surface. Fill out the disk drive fault analysis form and attach it to the disk drive
	(Sheet 3 of 3)

Installing the Replacement Disk Drive

IMPORTANT WARNING:
If changing the B disk, set the options correctly on the disk drive. Incorrect option settings will cause the disk to fail.

Table 6-25
Option settings to configure disk drives (A or B)

Disk	Vendor	Jumper	Pins - B Disk Drive	Pins - A Disk Drive
1 GB	Seagate ST-31051N	J6	1-2 (IN)	J6 (OUT)
1 GB	Seagate ST-31230N	J5	5-6 (IN)	4-6 (IN) or OUT

Procedure 6-49
Install Replacement Disk Drive (NT6M72GA)

Step	Description
192	Keeping the disk drive level, slide it into position far enough to reconnect the ribbon cable at connector J1. Connect the ribbon cable to J1.

WARNING
The disk drive cannot operate if this cable is reversed. Reversal may also cause an AMA outage.

IMPORTANT NOTE:

The **P1** ribbon cable is keyed to prevent improper installation.

Step	Description
193	Continue sliding the disk drive into its mounting position, until it begins a downward motion. Allow the disk drive to lower itself into place and continue pushing inward until it is fully seated.
194	Replace the two screws for the disk drive handle mount.
195	Reconnect the disk power cable by inserting the plug **P8** into connector **J8**.
196	Return the processor to PRIME mode. On the status panel push the **P** rocker switch down and turn the MODE SWITCH key. The ONL lamp should go out.

(Sheet 1 of 3)

Procedure 6-49
Install Replacement Disk Drive (NT6M72GA)

Step	Description

197	Make the disk system redundant by changing the ONLY disk mode to PRIME disk mode. Enter (at the terminal):
	
	>DISK MODE xP (cr)
	
	where **x** = currently active disk
	
	i.e., if DISK MODE is currently AO then type AP
	     if DISK MODE is currently BO then type BP.
	
	Proper responses:
	
	`BACKUP STARTED`
	`BACKUP COMPLETE`
	`DISK MODE AP` (or) `DISK MODE BP`
	
	This may take minutes to hours depending on the disk size and usage. Use the **DISK USAGE** command to check disk usage.
	
	If the response is DISK NOT FORMATTED, go to **step 8**. Otherwise, go to **step 7**.

198	When all maintenance activities are complete, be sure to replace the front panel of the BMC. Carefully line up the four captive screws of the front panel with their mounting holes. Tighten the captive screws; but do not bear down. The Disk Drive Replacement Procedure is now complete.
199	Disk Format This command is to be used when the BMC's response to the **DISK MODE xx** command is `DISK NOT FORMATTED`.

(Sheet 2 of 3)

Procedure 6-49
Install Replacement Disk Drive (NT6M72GA)

Step	Description

	⚠ **CAUTION** These disk commands may cause a loss of data. Make sure the operational disk drive is in an ONLY mode before entering the following commands.
200	Enter: (at the terminal) **>DISK FORMAT x (cr)** where: **x** = **A** for newly replaced disk A = **B** for newly replaced disk B Proper response: DISK FORMAT STARTED The format should take about 15-20 minutes. Proper response: FORMAT DONE If the response is FORMAT DONE, go to **step 7**. If DISK FORMAT FAILS, switch processors and retry the command. If the DISK FORMAT fails on the other processor, call the next level of support.
	(Sheet 3 of 3)

Section 060-INDP-710
DMS-10 Switch Specific Data

This section contains information concerning the data pertinent to installing and testing a BMC chassis interfaced to a Nortel DMS-10 Digital Switching System. This information includes instructions and illustrations for physically connecting the TEC Tape Port and SDI Maintenance Terminal interfaces between the DMS-10 and the BMC, and also provides procedures for testing the integrity of the interface installations. Also covered are certain specific software commands exclusive to this DMS-10 interface, and step-by-step instructions for entering the respective data. Various other site data is included for reference.

The DMS-10 interface connection and testing procedures covered in this section are part of the complete BMC installation, covered in this and other documents. Many of the procedures described in this section are referred to in other documents.

TEC/DMS-10 Interface Installation Information

The following section details the information specific to the installation of the TEC/DMS-10 interface.

Description of Interface Equipment Furnished

The following items are furnished for installation of the TEC/DMS-10 interface:

- NT3T11 Interface Boxes

- NT3T11 power cables

- Data interface ribbon cables.

NT3T11 Interface Boxes

Two NT3T11 Interface Boxes, Nortel Part No. 214299, DMS-10 (BMC system designations A2 and A3) are furnished with the BMC equipment. Refer to Figure 7-1. These boxes contain the NT3T11 PCAs that are used as cable adapters to provide the TEC interface between the DMS-10 magnetic tape ports and the inputs to the BMC.

Figure 3-1
NT3T11 Interface Box Dimensions

Top View

Rear View
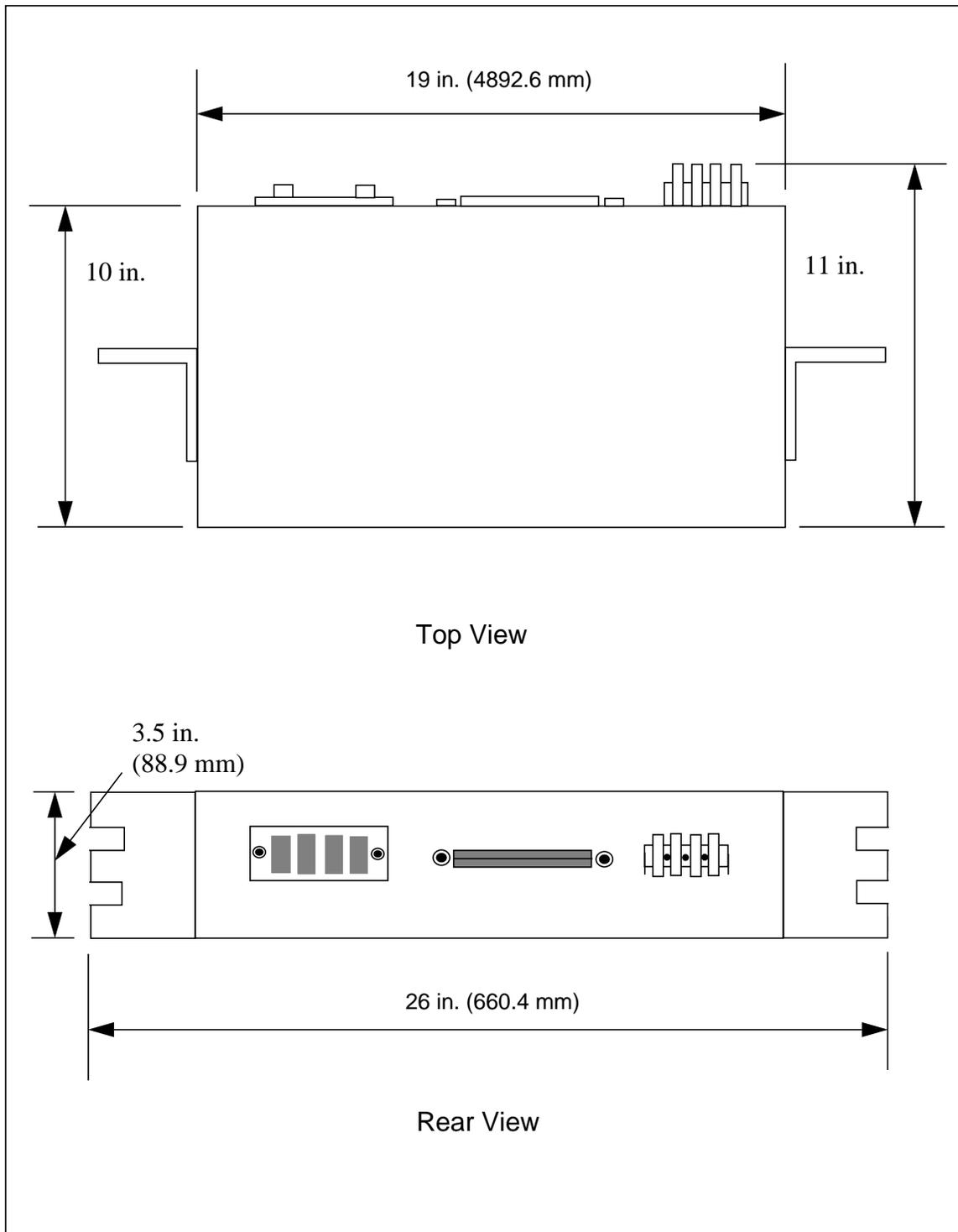
Connectors are provided on the rear of the Interface Boxes for connecting the existing cables from the DMS-10 magnetic tape ports, and for connecting the 60-conductor ribbon cables (supplied) to the BMC. The Interface Boxes are metal, and are furnished with mounting brackets and hardware.

NT3T11 Power Cables
The Interface Boxes require connection of +12 V dc from the BMC chassis (J17) to power the NT3T11 circuit packs. Two red and black wire assemblies, Nortel part No. NT8M99AA, are furnished with the BMC equipment for this purpose. Refer to Figure 7-2.

Data Interface Ribbon Cables
Two 60-pin ribbon cable assemblies are furnished with the BMC equipment for connecting the DMS-10 signals from the Interface Boxes to the inputs on the BMC chassis. Refer to Figure 7-3.

Each ribbon cable is equipped with two connectors. The cables are identified on these connectors by labels which indicate the cable wire assembly and the plug numbers, that is, W63 for part No. NT6M99AJ, or, W65 for part No. NT6M99AH. These numbers are used to locate the jacks on the equipment to which these plugs mate, as covered later in these instructions.

NT3T11 Interface Box Installation Information
The two Interface Boxes included with the equipment are used to contain the NT3T11 PCAs that provide the TEC interface between the DMS-10 tape ports and the inputs to the BMC chassis. An NT3T11 PCA consists of a PCA with mounted components, plus connectors located along one edge.
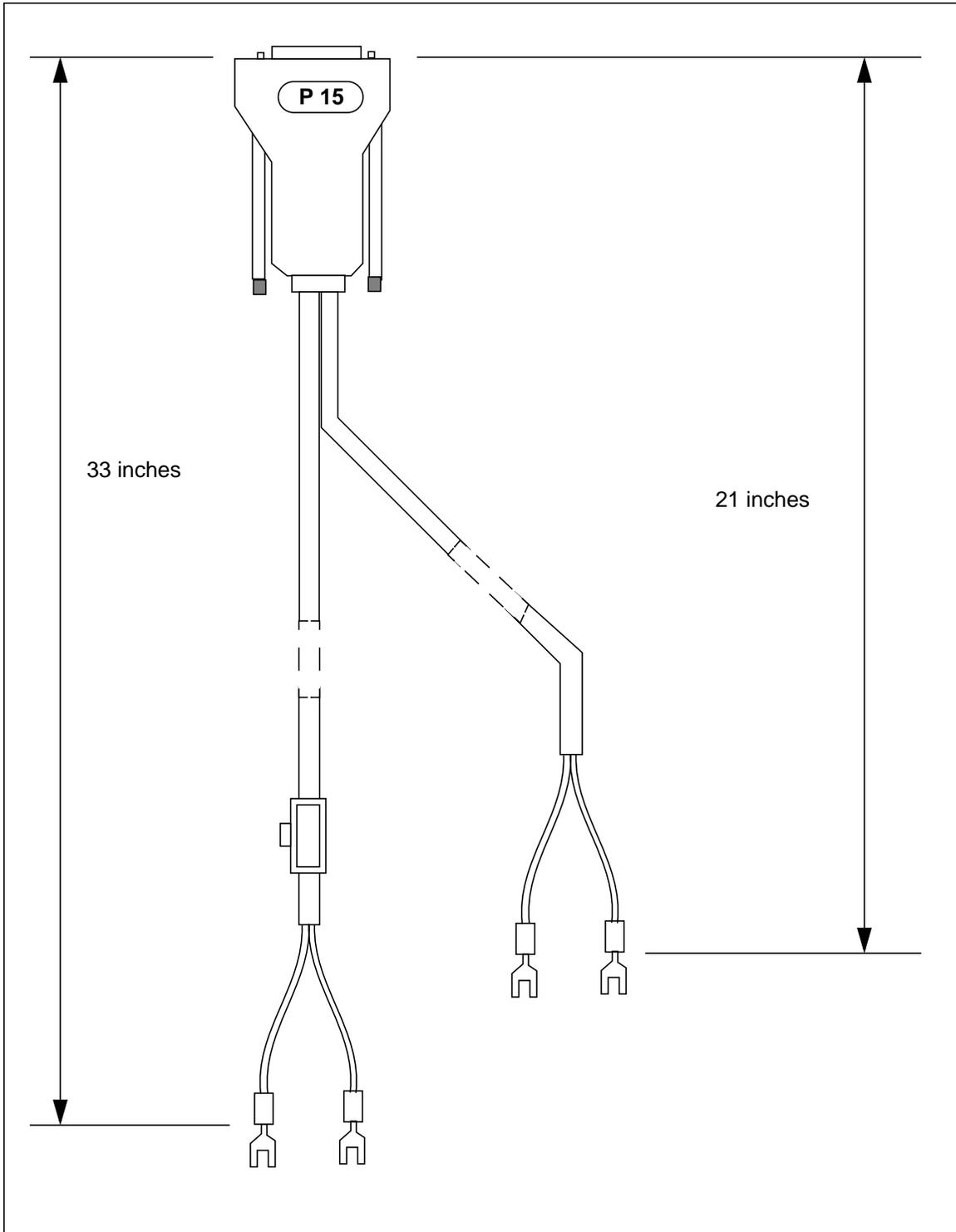
The Interface Box consists of a metal box enclosing the brackets, connectors, and wire harnesses for mounting and connecting the NT3T11 PCAs to the connectors located on the rear panel of the box.

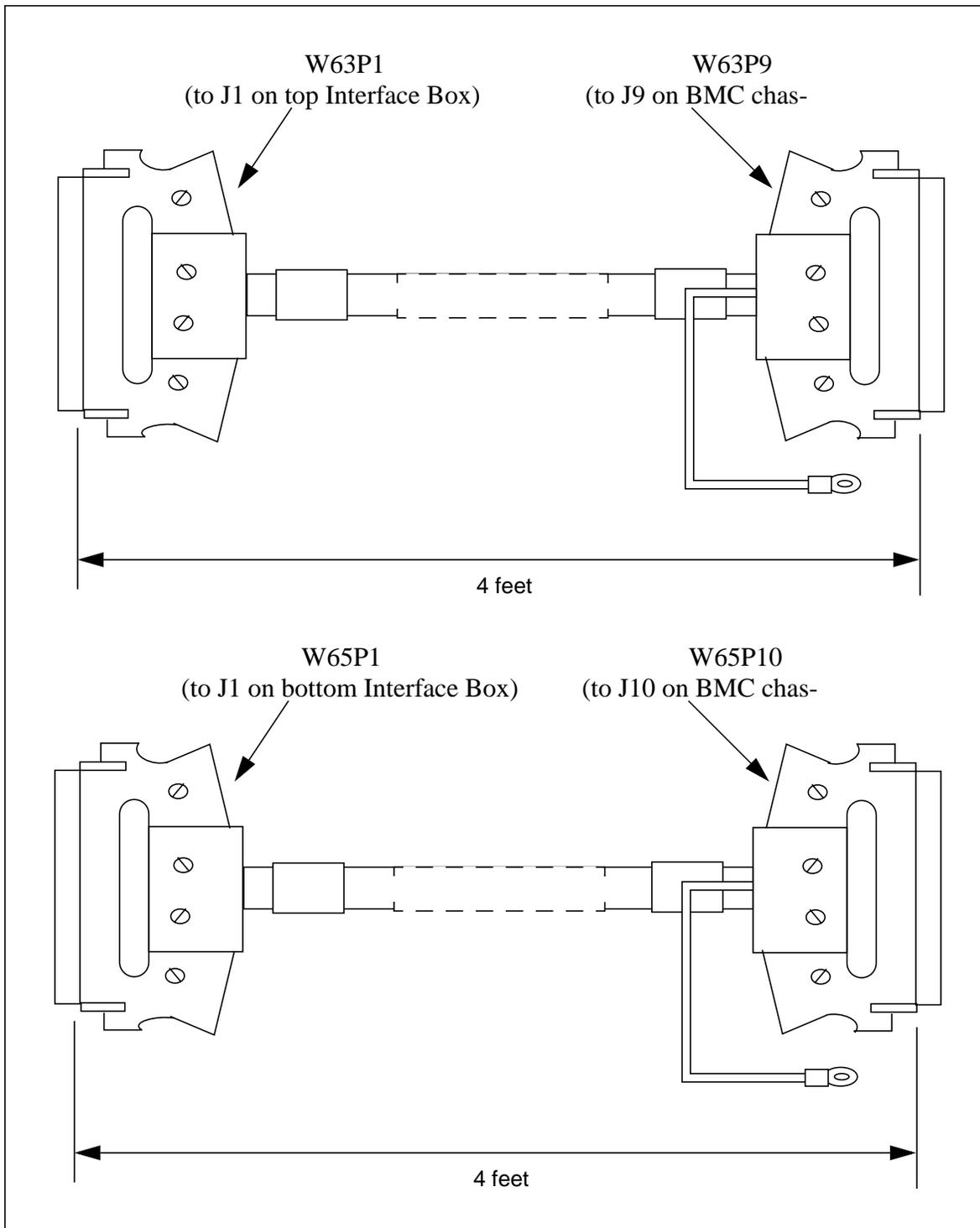## Installing NT3T11 PCAs in Interface Boxes (if required)
The NT3T11 PCAs may not be supplied pre-installed if the BMC is not purchased at the same time as the DMS-10 Switching System. When possible, NT3T11 PCAs are pre-installed into the enclosures at the factory and the Interface Boxes are ready to be installed when received.

However, in some cases the NT3T11 PCAs must be installed into the enclosures at the site. For this situation, the installer obtains the two NT3T11 PCAs from Nortel and installs them into the furnished Interface Box enclosures, according to the following procedure:

Figure 3-1
NT3T11 12 VDC Power Cables

Figure 3-1
NT3T11 - BMC Data Interface Cables

W63P1
(to J1 on top Interface Box)

W63P9
(to J9 on BMC chas-

4 feet

W65P1
(to J1 on bottom Interface Box)

W65P10
(to J10 on BMC chas-

4 feet

1.The circuitry in the NT3T11 pack is static-sensitive. Observe all precautions as relates to static-sensitive materials.

2.Remove the five Phillips-head screws from the front panel of the Interface Box and set aside. Refer to Figure 7-4.

3.Inside the enclosure, locate the two white guide rails, noting the notches on the inner side of the rails. Check inside the Interface Box, moving any wire harnesses or other obstacles out of the way for insertion of the PCA.

4.Position the NT3T11 PCA with the component side up and the edge connector of the board pointing toward the rear of the enclosure.

5.Connector-edge first, insert the side edges of the NT3T11 PCA into the guide rail notches, sliding the PCA to the rear as far as possible. Press simultaneously on both ends of the front edge of the PCA until the rear connectors can be felt to mate with the connectors in the enclosure. Make sure that the PCA is straight in the guide rails and firmly seated, since misalignment of connectors can cause intermittent circuits, and damage to the pins of the Interface Box connector.

6.Re-fasten the front panel onto the Interface Box with the five screws previously removed.

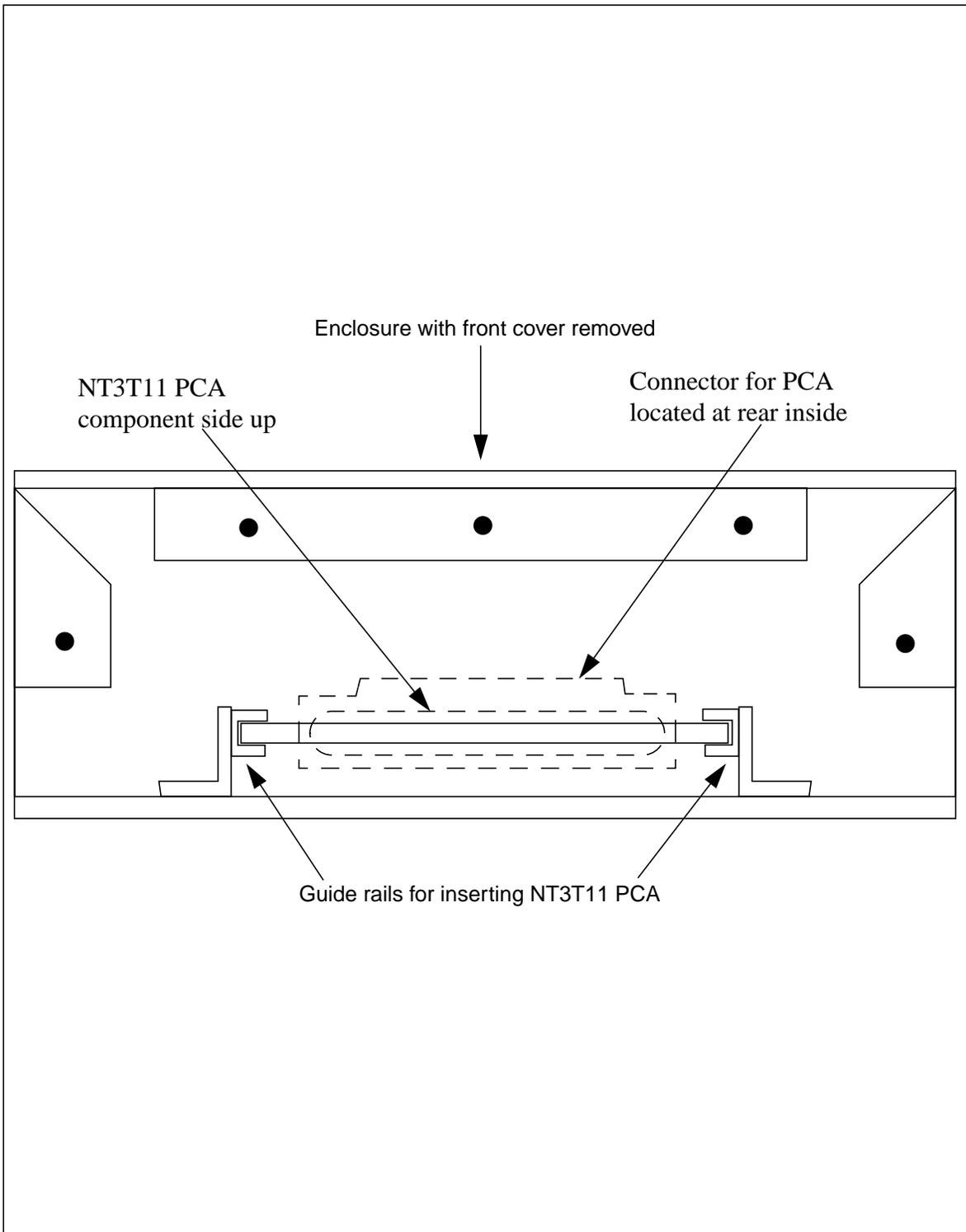### Installing the NT3T11 Interface Boxes

The NT3T11 Interface Boxes are shipped without the mounting brackets installed. The mounting brackets are included separately in the packing carton. Assemble the mounting brackets to the holes provided in the sides of the boxes, using the four mounting screws furnished with each unit. Refer to Figure 7-5. In the normal configuration, both NT3T11 Interface Boxes are installed on the same frame as the BMC; one directly above and one directly below. The Interface Box is mounted with the connector panel located at the rear.
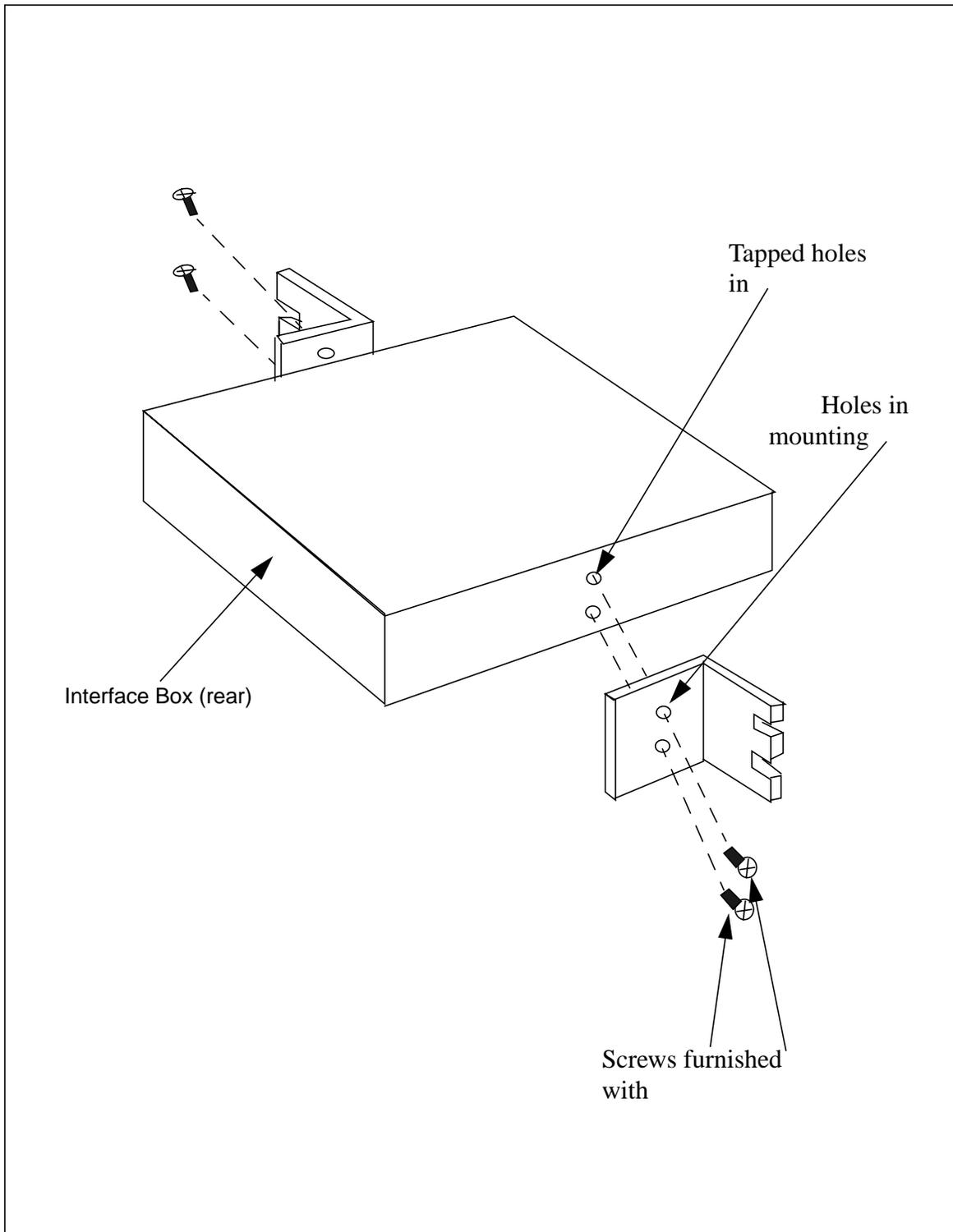
Interface Box Connectors

The rear panel of the NT3T11 Interface Box provides the connections to the BMC chassis (J17) and to the DMS-10. Refer to Figure 7-6.

The four-screw terminal board at the right is used to connect +12 Vdc from the BMC chassis to power the NT3T11 circuitry. The center 60-pin ribbon cable header, labeled J1, provides the data interface to the BMC system. The 72-pin connector at left, labeled NT3T12 CABLE, is used to connect existing cables from the DMS-10 tape ports, MTP 0 and MTP 1.
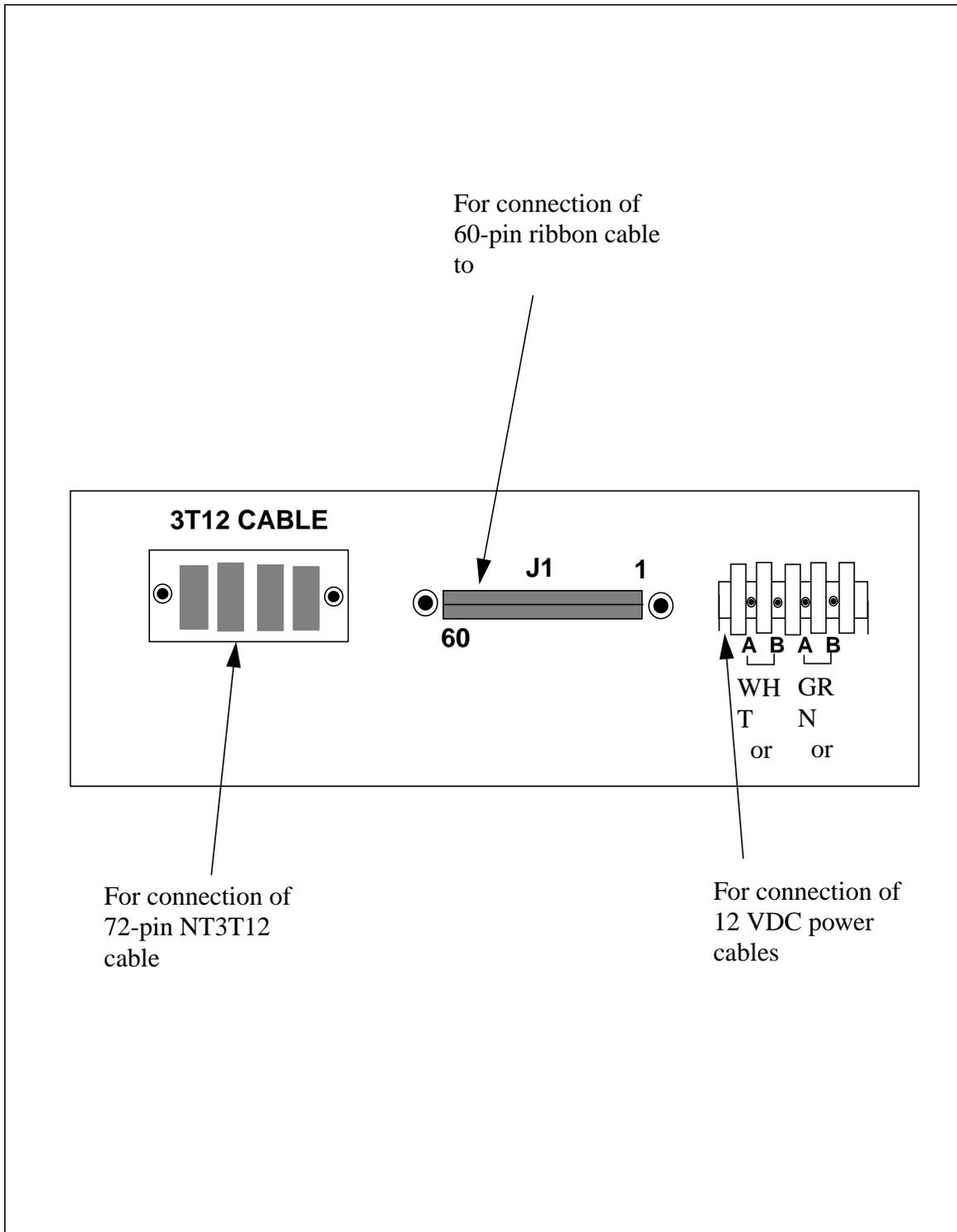
Figure 3-1
Installing NT3T11 PCA in NT3T11 enclosure

Enclosure with front cover removed

NT3T11 PCA
component side up

Connector for PCA
located at rear inside

Guide rails for inserting NT3T11 PCA

Figure 3-1
Installing NT3T11 Interface Box Mounting Brackets

Tapped holes in

Holes in mounting

Interface Box (rear)

Screws furnished with

Figure 3-1
NT3T11 Interface Box connectors (rear view)

For connection of
60-pin ribbon cable
to

3T12 CABLE

J1   **1**

60

A B   A B

WH   GR
T   N

or   or

For connection of
72-pin NT3T12
cable

For connection of
12 VDC power
cables

Within the Interface Box, the input signals from the NT3T12 connector are fed to the NT3T11PCA, combined onto one ribbon cable, then fed to the 60-pin J1 connector. The +12 V dc is fed from the input connector to the PCA to power the NT3T11 circuitry.

The front panel of the NT3T11 Interface Box is plain, designed to provide a neat appearance from the front of the frame.

Connecting +12 V DC Power to NT3T11 Interface Boxes

Locate two of the NT8M99AA cable assemblies shown in Figure 7-2. These cables are used to connect +12 V dc from the J17 connector on the side panels of the BMC chassis to the two NT3T11 Interface Boxes. Connections are made from both A and B BMC processing units to both NT3T11 Interface Boxes, so that, should either of the processing units be powered down, +12 V dc power is still applied to both NT3T11 Interface Boxes.

Note that each cable assembly consists of two lengths of wire terminated with spade lugs. Attach the cables per Figure 7-7. The other identical cable assembly connects to the B processor J17 in the same way described previously.
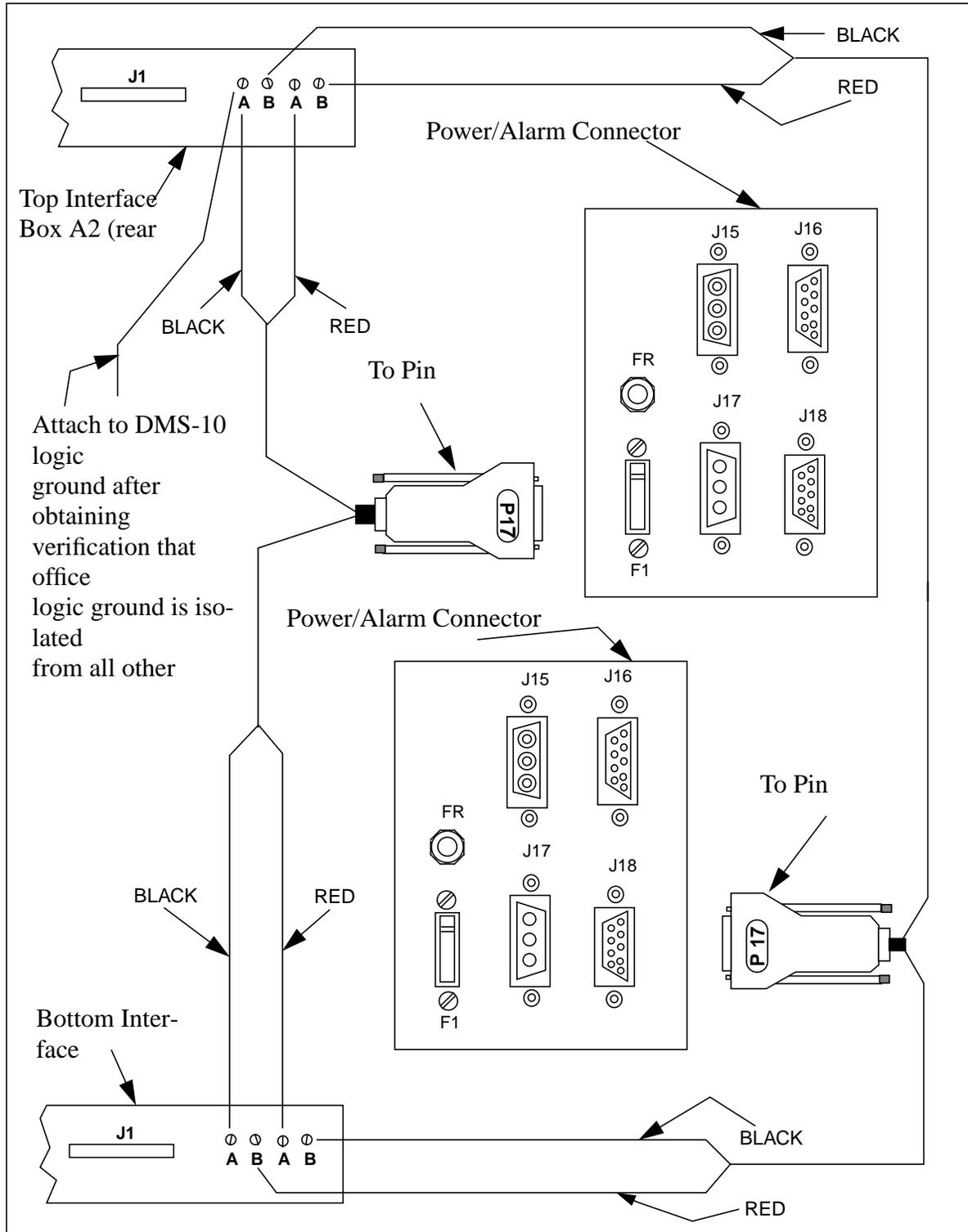
Connecting Data Ribbon Cables from NT3T11 Interface Boxes to the BMC Chassis

Locate the two 60-pin ribbon cable assemblies shown in Figure 7-3, used to connect the data lines between the NT3T11 Interface Boxes and the BMC chassis. These ribbon cables are 4 feet long, and are equipped with two 60-pin connectors and a drain wire (attaches to BMC). Check the connector shell on the connectors and the stripe on the ribbon cable to verify the pin 1 location.

Note that the two ribbon cable assemblies are identified by labels applied to the connectors. These labels indicate the cable wire number, W63 or W65, and also the plug number, P9 or P10, assigned to that specific connector. The W numbers are used to locate where the wire assembly is to be used on the BMC chassis, and the P numbers are used to indicate the matching jack numbers, J9 or J10, on the B chassis, as explained by the instructions in the following paragraph.

Locate the jacks on the equipment to which the ribbon cables connect. Refer to Figure 7-8. On the rear of the top and bottom NT3T11 Interface Boxes, locate the 60-pin connectors marked J1. On the side of the BMC B chassis, left, viewed from rear, locate the J9 and J10 60-pin connectors.

Figure 3-1
Connecting 12 VDC from BMC processor to NT3T11 Interface Boxes

Figure 3-1
Connecting data ribbon cables from NT3T11 Interface Boxes to BMC processors
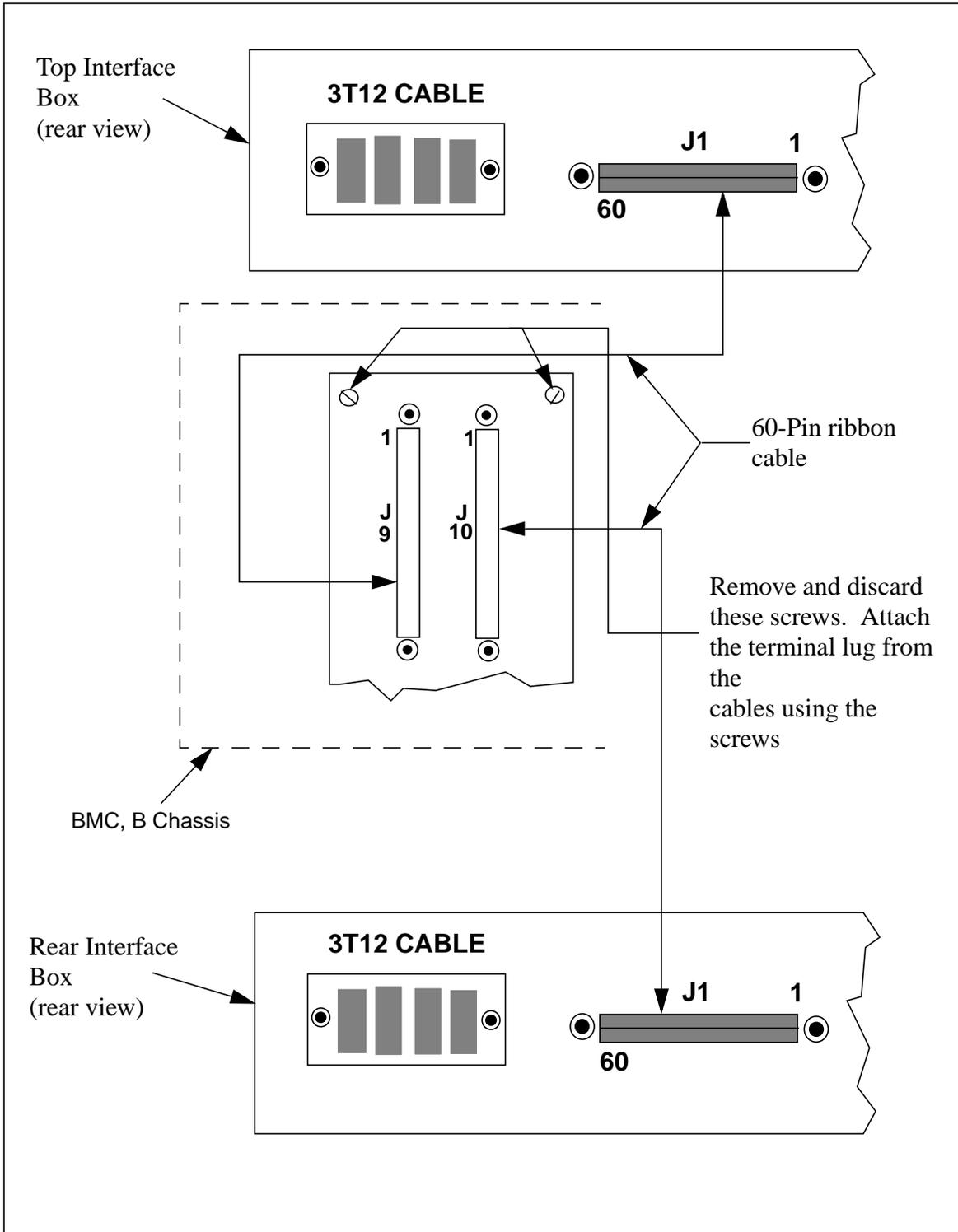
Using the ribbon cable assembly labeled W63, connect the P1 connector to the J1 jack on the top Interface Box. Neatly route that ribbon cable up to the side of the BMC, connecting the P9 connector to the J9 jack on the B chassis of the BMC. Remove and discard the screw to the left of the J9 jack. Attach the terminal lug from the cable using the screw supplied with the cable. Be sure the cable is installed with pin 1 toward the top of the connector. This connection provides the TEC interface between the DMS-10 tape port 1 and the B12 and A12 TEC PCAs in the BMC B and A processors, respectively.

Using the ribbon cable assembly labeled W65, connect the P1 connector to the J1 jack on the bottom Interface Box. Neatly route that ribbon cable down to the side of the BMC, connecting the P10 connector to the J10 jack on the B chassis of the BMC. Remove and discard the screw to the right of the J10 jack. Attach the terminal lug from the cable using the screw supplied with the cable. Be sure the cable is installed with pin 1 toward the top of the connector. This connection provides the TEC interface between the DMS-10 tape port 0 and the A13 and B13 TEC/DMS PCAs in the BMC A and B processors, respectively.

Connecting DMS-10 Tape Port Cables to NT3T11 Interface Boxes

Locate the 72-pin connectorized NT3T12 cable from the NT3T10 Magnetic Tape Controller PCA of the DMS-10 Tape Port 1 (MTP 1). Connect to the connector on the rear of the top NT3T11 Interface Box, labeled NT3T12 CABLE. Refer to Figure 7-9.

Locate the 72-pin connectorized cable from the NT3T10 Magnetic Tape Controller PCA of the DMS-10 Tape Port 0 (MTP 0). Connect to the connector on the rear of the bottom NT3T11 Interface Box, labeled NT3T12 CABLE.

Ribbon Cable Signal Lead Identification

The NT3T11 Interface Boxes and the 60-wire ribbon cables duplicate the data, control, and status lines from the DMS-10 tape ports, enabling the BMC to emulate Magnetic Tape Drive operation. For reference, the signal lines
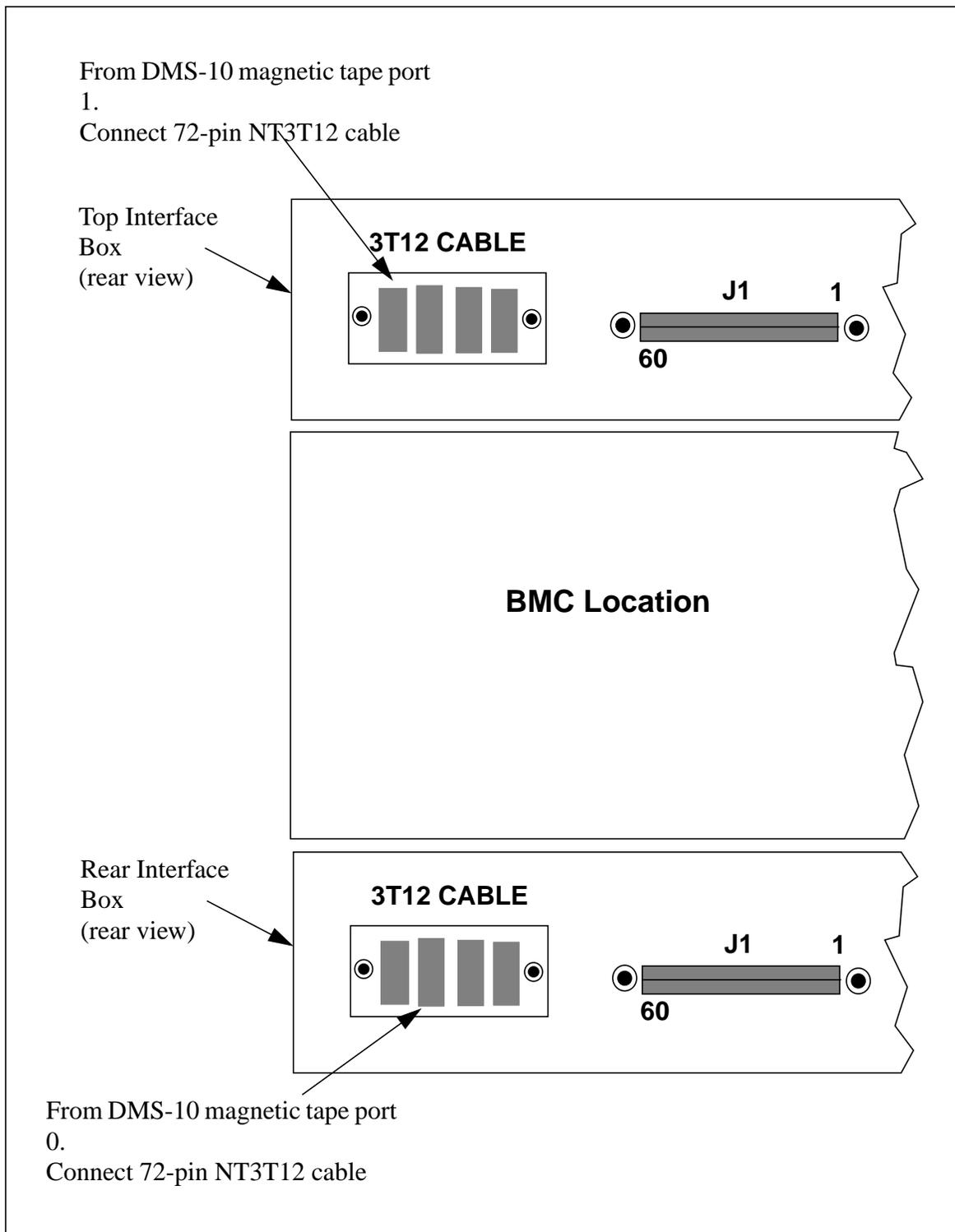
assigned to these 60-wire cables are listed in the pin connector chart. Refer to Table 7-1.

Table 7-1
DMS-10/BMC TEC Ribbon Cable Pin/Signal Assignment Chart (for reference only)

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	21	/WRS	41	/RD7
2	/FWD	22	GND	42	GND
3	GND	23	/WDP	43	/RD6
4	/REV	24	GND	44	GND
5	GND	25	/WD0	45	/RD5
6	/REW	26	GND	46	GND
7	/USEL	27	/WD1	47	/RD4
8	/WSEL	28	GND	48	GND
9	/ONLS	29	/WD2	49	/RD3
10	/REWS	30	GND	50	GND
11	/FPRS	31	/WD3	51	/RD2
12	GND	32	GND	52	GND
13	/BOTS	33	/WD4	53	/RD1
14	GND	34	GND	54	GND
15	/RDYS	35	/WD5	55	/RD0
16	/EOTS	36	GND	56	GND
17	/WENS	37	/WD6	57	/RDS
18	GND	38	GND	58	GND

Sheet 1 of 2

Table 7-1
DMS-10/BMC TEC Ribbon Cable Pin/Signal Assignment Chart (for reference only)

Pin	Signal	Pin	Signal	Pin	Signal
19	/WDS	39	/WD7	59	/RDP
20	GND	40	GND	60	GND
Sheet 2 of 2					

Note: The "/" in front of the signal name indicates that the signal uses inverted logic. This represents a departure from the BMC documents prepared by the Cook division, which indicated inverse logic using a line over the signal name.

Figure 3-1
Connecting DMS-10 Tape Port Cables to NT3T11 Interface Boxes

From DMS-10 magnetic tape port
1.
Connect 72-pin NT3T12 cable

Top Interface
Box
(rear view)

3T12 CABLE

J1   **1**

60

BMC Location

Rear Interface
Box
(rear view)

3T12 CABLE

J1   **1**

60

From DMS-10 magnetic tape port
0.
Connect 72-pin NT3T12 cable

Maintenance Terminal Information

This system typically uses the existing maintenance terminal of the DMS-10 to provide human-to-machine communications with the BMC. Communications with the BMC include such procedures as entering or changing site dependent data, requesting certain system operations, outputting specified statistical reports, and providing maintenance messages that indicate system operating condition.

Connecting Cable (Furnished) to the SDI Port

The DMS-10 provides a NT3T09 or NT3T80 SDI port for access to the BMC human/machine interface. The BMC A processor provides the appropriate J3 EIA jack for connecting the Maintenance Terminal. A cable assembly, Nortel part No. NT8M99AD, is provided for connecting the DMS-10 printer port to the BMC jack, according to the following instructions. Refer to Figure 7-10.

1. Identify the bulkhead connector mounting plate on the left side of the BMC A processor, when viewed from rear, and locate the J3 connector jack.

2. Locate the supplied cable assembly (NT8M99AD), identified by a DB-25 connector on either end, stamped XOVR and NT3T09 (or NT3T80) SDI PORT on the appropriate ends.

3. Attach the XOVR connector to the J3 connector on the left side of the BMC A processor, viewed from the rear.

4. Neatly route cable to the NT3T09, or NT3T80, printer port interface on DMS-10 and attach SDI cable connector to appropriate jack.
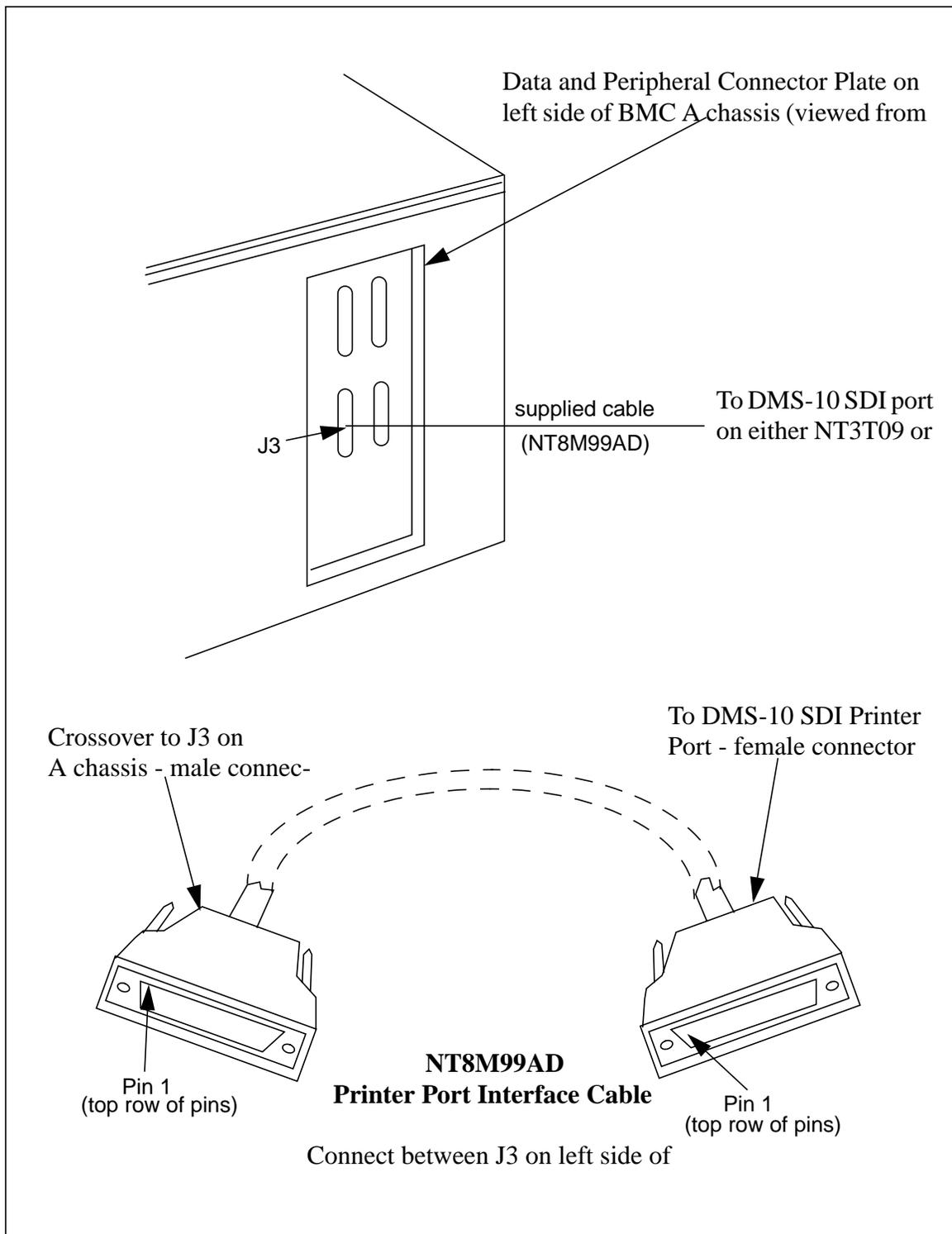
> *Note:* All printout data generated by the BMC system is also sent to maintenance terminal jacks J1 and J4 on the A processor chassis, although terminals need not be connected to these jacks, unless the customer desires and job engineers.

BMC-DMS-10 Specific Commands

Most of the commands are common to the use of the BMC in this application regardless of the type of Switching System to which it is interfaced. These commonly used commands are listed in the Command and Message Guide document, which provides lists of all BMC commands and messages.

There are certain specific BMC command entries that are exclusive to interfacing the equipment to a DMS-10. Refer to the *Command and Message Guide* section for detailed explanations of these Switch Specific commands. Also, the use of these commands are explained in various procedures used for testing interface integrity, contained further in this section.

Figure 3-1
Connecting Cable (NT8M99AD) to DMS-10 SDI port

Data and Peripheral Connector Plate on left side of BMC A chassis (viewed from

J3

supplied cable (NT8M99AD)

To DMS-10 SDI port on either NT3T09 or

To DMS-10 SDI Printer Port - female connector

Crossover to J3 on A chassis - male connec-

Pin 1 (top row of pins)

NT8M99AD
Printer Port Interface Cable

Pin 1 (top row of pins)

Connect between J3 on left side of

BMC/DMS-10 Interface Testing

With the SDI port interface made, the DMS-10 terminal can now be used to test the integrity of the equipment and the interface connection, assuring that the DMS-10 terminal and the BMC can properly communicate with each other. Before attempting the entry of any BMC command, refer to the information in the following subsection.

Command Prefix Codes

When the DMS-10 maintenance terminal is used to communicate with the BMC, a special prefix code must be typed in at the beginning of each BMC command to instruct the DMS-10 to send the attached command to the SDI port. Prefix all BMC entries from the DMS-10 terminal with:

>MSG nn (cr)

where: nn - terminal ID number of BMC SDI port assigned in IOD.

From the DMS-10 operator, determine the terminal number of the BMC SDI port to be entered as the nn in the prefix. The listing of commands in this section may or may not indicate this prefix; however, enter the prefix for any BMC command entered on a DMS-10 terminal. The commonly-used commands listed in the *Command and Message Guide* section also require this prefix.

To execute commands through the DMS-10 Interface, follow the command with two carriage returns. This improves the response time of the message output. Before the next command is entered, the user must "wake-up" the terminal by entering ####.

Logging on at the DMS-10

Installation personnel are usually responsible for performing the functional testing of the equipment. Since testing is performed through a DMS-10 maintenance terminal, test personnel should also be familiar with how to log-on via a DMS-10 terminal console. The log-on procedure is outlined below; personnel should check with a DMS-10 operator to make sure they are properly logged onto the DMS-10.

1. Enter the following on the DMS-10 terminal:

>#### (cr)

If not already logged on, the system responds as follows:

   !

If logged on, the system responds with #. Proceed to the *Functional Testing of SDI Interface Communications* subsection.

2. Enter the following if not logged on:

>**LOGI (cr)**

 The system responds as follows:

PASS?

3.Type the DMS-10 password[1], followed by (cr); keys do not echo due to security.

4. A line of text (variable per system) prints out, followed by a line feed and #, to indicate user is now properly logged on and ready to input commands.

```
x... ... ...x
#
```

5. Set up BMC communications by entering the following:

>**MSG nn SYSTEM (cr)**   (logs user into the BMC)

 Response:

MSG FROM TTY nn 96-09-10 13:25:00 USER 01 LOGGED IN TO TERMINAL xx

where: xx = terminal number

6. Record the DMS-10 password to allow BMC messages to be recognized by DMS-10 and printed to maintenance terminal by entering the following:

>**MSG nn DMSPxxxx (cr)**

where: xxxx - DMS-10 password (step 3)

 Response:

MSG FROM TTY nn xxxx

7.Record the DMS-10 maintenance terminals that the end-user wants to display the BMC messages by entering the following:

>**MSG nn DMST 1 yy (cr)**

Response:

MSG FROM TTY nn 1>yy 2> 3> 4> 5> 6>

---

[1]Refer to the DMSP command in step 6 to enter the DMS-10 password into the BMC system memory.

Note: Up to six maintenance terminals can view BMC messages. When displaying multiple lines of text, response time is slowed. The more terminals assigned with this command, the slower the response time.

8.Save the DMS-10 password and terminal settings by entering the following:

>**MSG nn SITDAT WRITE (cr)**

Response:

MSG FROM TTY nn SITDAT FILE DISK JOB COMPLETE

Functional Testing of SDI Interface Communications

Start the functional testing procedure with the BMC system rocker switches set to the A PRIME mode. Turn the key switch. Refer to the LOGIN command entry in the *Command and Message Guide* section to gain entry to the BMC. Refer to the SETTERM entry to temporarily disable the auto log-off function on the BMC. Enter on any DMS-10 system terminal the SETCLK command, preceded by the BMC - DMS-10 prefix, MSG nn, as shown:

>**MSG nn SETCLK 97 07 10 13 25 00 TUE (cr)**

The DMS-10 routes this typed command to the BMC through the SDI port (nn). The BMC records the location of the DMS-10 terminal originating the command. After the data is processed, the BMC sends the reply back through the SDI port (nn) within the DMS-10, including the address of the originating terminal. The DMS-10 routes the reply message to the original DMS-10 terminal, which prints an appropriate log message such as:

MSG FROM TTY nn 97-07-10 13:25:00 TUE PROC-A.

where: nn - terminal number of the BMC SDI port.

This message may be delayed for several seconds depending upon other DMS-10 activities.

Note: The BMC also sends replies to other terminals, as defined by the DMST key command. TTY0 indicates the default terminal. Multiple terminals can be assigned. However, the greater the number of terminals, the slower the system response time.

The originating terminal is now active to the reception of BMC output and continues to print out all BMC data, whether wanted or not, unless a command is sent to instruct the BMC to discontinue sending responses to this active terminal. At the originating DMS-10 system terminal, enter the following:

>**MSG nn DMSO (cr)**

This command disengages the current DMS-10 response at the originating terminal. Responses to BMC commands are not echoed at any terminal at which the above command is entered, until that terminal is reactivated by typing another BMC command. Thus, a DMS-10 terminal can be turned off to BMC printout by entering the DMSO command, and switched back on to receive BMC printout by using it to originate a BMC command.

Setting up DMS-10 Terminal Table for Logged BMC Messages

The BMC provides a program for setting up a table to allow logged BMC messages, such as TEC TIME OUT, to be routed to up to six specified DMS-10 printer terminals for output, using the DMST command. Refer to the *Command and Message Guide* section for details on this command.

Personnel setting up this table should consult with the DMS-10 operator to determine the terminal ID numbers, two digits, assigned to the terminals currently used in the DMS-10 system. Record these two digit ID terminal numbers, also noting the physical location of the respective terminals. Then, determine which of these terminals, up to six, are to be used to provide logged BMC message printouts.

Note: Multiple terminals can be assigned to display BMC messages. However, the greater number of terminals assigned, the slower the system response time.

Display the current table, showing the terminal numbers 1 through 6 and any DMS-10 terminal IDs already assigned, by typing, on any DMS-10 terminal, the following command:

>**MSG nn DMST (cr)**

The printout response of the table is:

1>aa 2>bb 3>cc 4>dd 5>ee 6>ff

where: aa-ff - two-digit DMS-10 terminal ID number (for a terminal ID already assigned), or two spaces (for an unused number), depending on the Nortel final test procedures.

Use the DMS-10 two digit terminal IDs already decided upon (as shown above) for the aa through ff data in the following entries to assign or change the current assignments in the table. At a DMS-10 terminal, enter the following:

>**MSG nn DMST 1 aa (cr)**

where: 1 - first terminal listing in the table
   aa - ID number assigned as the first terminal in the DMS-10 system.

For the second terminal in the table, enter the following:

>MSG nn DMST 2 bb (cr)

where: 2 - second terminal listing in the table
   aa - ID number assigned as second terminal in the DMS-10 system.

> *Note:* After the entries given in the two previous paragraphs, both the aa and bb terminals now receive any logged messages from the BMC for display.

The command on the previous page may be repeated up to four more times, for a total of six DMS-10 terminal IDs. Remember to increment the digit between DMST and the terminal number while assigning each new ID to the table. If another terminal ID was previously assigned to a position number, the ID is changed to the new ID. If the table position number is previously unused, a terminal ID is assigned.

An assigned terminal ID may be deleted from its position on the table by entering on any DMS-10 terminal the following command:

>MSG nn DMST # D (cr)

where: # - (1 through 6) item number from terminal list.

Whenever initially assigning a DMS-10 terminal ID to the table, or whenever making a change, record the new table assignment data to disk by typing the following on any DMS-10 terminal:

>MSG nn SITDAT WRITE (cr)

Note the system reply, such as shown below, on all of the DMS-10 terminals assigned in the table. A failure at this point requires re-examination of the table by re-entering the DMST command as previously instructed, and then correcting the table by reassigning terminal IDs as necessary.

MSG FROM TTY nn (LOG) PROC-A
0000IF SITDAT FILE DISK JOB COMPLETE

Correct operation in commands and responses pertinent to the previous log time and terminal table setup described previously should be sufficient in testing the maintenance terminal interface for proper installation.

TEC/Processor Interface Testing

The BMC's CPU accessibility to each of the four TEC PCAs is checked with the following procedure:

Enter (at the terminal):

>MSG nn TECMAINT SHOW 1 VS (cr)

The system responds as shown below:

xxxTEC-y mo/da/yr

where: xxx - firmware identity number
          y - patch level
    mo/da/yr - release date of firmware.

Enter (at the terminal):

>MSG nn TECMAINT SHOW 2 VS (cr)

The system responds as shown below:

xxxTEC-y mo/da/yr

User now switches BMC processors and repeats the same steps to verify accessibility to B13 and B12 PCAs. Failure at any step indicates a faulty PCA or faulty wiring on backplane of the active processor. Report any defect to Nortel Technical Support.

TEC-DMS-10 Interface Testing

It is expected that the DSM-10 user is already familiar with various DMS-10 magnetic tape commands; testing the interface between the DMS-10 and BMC should use the standard DMS-10 testing procedures.

Enter the following on the DMS-10 terminal:

>OVLY MTD (cr)   (to access the Magnetic Tape Device overlay)

>ENBL MTU 0 (cr) (to check ON LINE, NOT BUSY, and WRITE ENABLE)

>TEST MTU 0 (cr) (to write a test pattern)

>SEIZE MTU 0 (cr) (to read three blocks, check expiration date, write creation date, write tape mark, and write test block)

Note: A failure at this point indicates a faulty cable or PCA in slot A13 of the on-line BMC processor.

Make the same checks on the other tape port by entering the following on the DMS-10 terminal:

>ENBL MTU 1 (cr)   (to check ON LINE, NOT BUSY, and WRITE ENABLE)

>TEST MTU 1 (cr)   (to write a test pattern)

>SEIZE MTU 1 (cr) (to read three blocks, check expiration date, write creation date, write tape mark, and write test block)

> *Note:*   A failure at this point indicates a faulty cable or PCA in slot A12 of the on-line BMC processor.

Switch BMC processors and repeat the tests to check interface operation with the alternate BMC processor.

Peripheral Interface Information

For the BMC teleprocessing system covered by this document, peripheral and interface connections are made to the BMC jacks as shown by the block diagram in Figure 7-11.

Baud Rate Information

Baud rate selections (to match the requirements of the maintenance terminals) are made at the small rotary switches located at the front edge of the Quad SIO PCAs located in the A6 and B6 slots of the card racks. Table 7-2 provides switch numbers and positions applicable to the various baud rate settings for typical peripheral usage. Figures 7-12 and 7-13 illustrate the Quad SIO PCAs.

Figure 3-1
Peripheral Interfaces for BMC-DMS-10 system

Table 7-2
Connector to Quad SIO PCA Cross-Reference

BMC connectors on side of A chassis		Quad SIO PCA settings	
Connector	**Function**	**Rotary Switch # Settings**	**Option Jumpers Definitions**
J4	MTC PTR 1 Asychronous Channel D	S5 - Baud 4 5 - 300 7 - 1200* A - 2400 C - 4800	J81-2External Transmit Timing* 2-3Internal Transmit Timing J91-2External Receive Timing* 2-3Internal Receive Timing J13 inExternal Timing* outInternal Timing
J3	SDI Port Asynchronous Channel C	S4 - Baud 3 7 -1200 No options for this port	J61-2External Transmit Timing J71-2External Receive Timing J12 inExternal Timing No options for this port.
J2	Software Download Asynchronous Channel B	S3 - Baud 2 5- 300 7 - 1200* A - 2400 C - 4800	J41-2External Transmit Timing* 2-3Internal Transmit Timing J51-2External Receive Timing* 2-3Internal Receive Timing J11 inExternal Timing* outInternal Timing
J1	Not available	S2 - Baud 1	This port is not available
* factory setting for this switch or jumper.			
Sheet 1 of 2			

Table 7-2
Connector to Quad SIO PCA Cross-Reference

BMC connectors on side of A chassis		Quad SIO PCA settings	
Connector	**Function**	**Rotary Switch # Settings**	**Option Jumpers Definitions**

Note 6: This PCA supports polling on digital data lines or on analog network. For digital data lines check that:
   a. the P/A Comm PCA at A16 is part number NT6M84BA
   b. the Four Channel COMM PCA at A17 is release 03 or later
   c. the HOC supports the digital data line feature.

Note 7: The internal transmit timing source is generated on the Quad SIO PCA. The external transmit timing source is brought in from a source outside the BMC, usually associated with a modem generated timing source from a digital data line.

Note 8: Factory settings shown are for external timing.

Note 9: Verify that the settings on the jumpers J2-J13 on the Quad SIO PCA are in agreement with the settings on the P/A Comm PCA (A16) when working with digital data lines.

Note 10: For DIP Switch S6, do not set the switches (S6-1, S6-2, S6-3, and S6-4) to the ON position.

Note 11: For Switch S1, the switch setting must remain at A.

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Figure 3-1
Quad SIO PCA (A6 and B6) options (NT6M60BA)
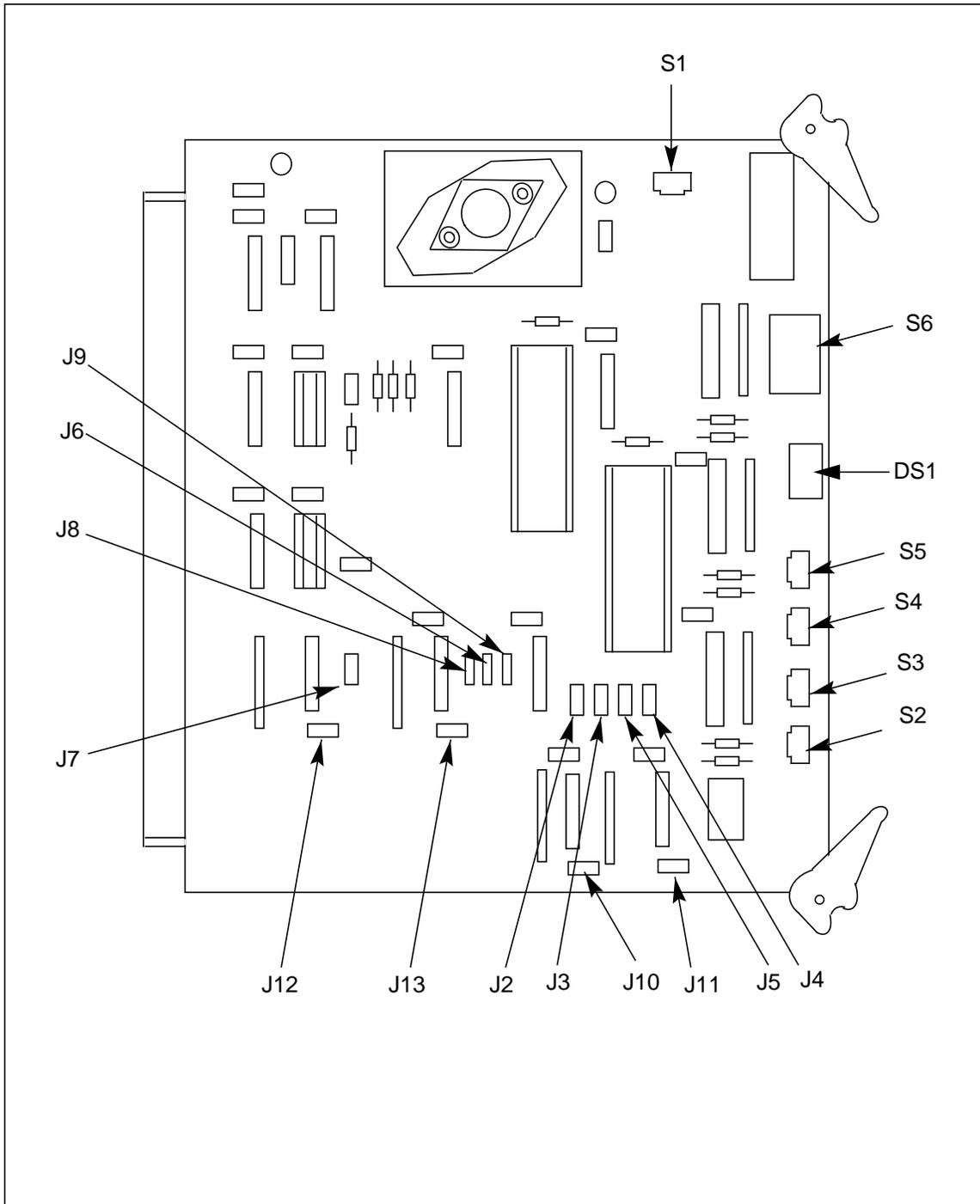
Figure 3-1
Quad SIO PCA (NT6M60BA) baud rate selector switches
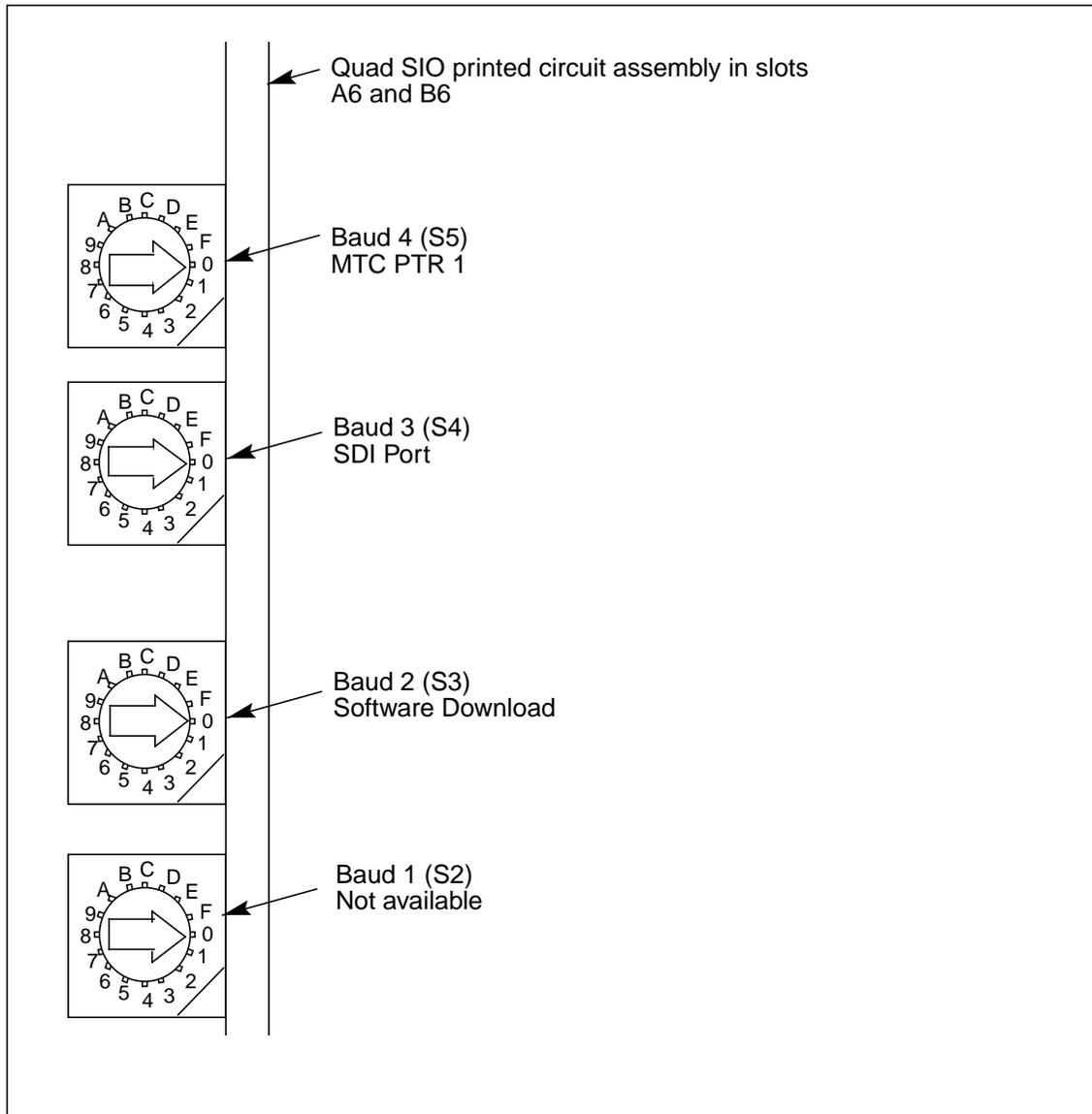
Section 060-INDP-711
DMS-100 Switch Specific Data

This document contains information concerning the switch-specific data pertinent to installing and testing a BMC chassis interfaced to a Nortel DMS-100 Digital Switching System. This information includes instructions and illustrations for physically connecting the DSI - Tape Port and maintenance terminal interfaces between the DMS-100 and the BMC, and provides procedures for testing the integrity of the interface installations.

DSI/DMS-100 Interface Installation Information

One Interface Box, Nortel Part No. NT6M98AA, is furnished with the BMC equipment used in the application with the DMS-100. This box is used to provide two signal interfaces between the DMS-100 tape ports and the inputs to the DSI PCAs in the BMC chassis. Cables and mounting hardware are included.

The Interface Box is metal and is furnished with mounting brackets for attaching the box to the frame. The Interface Box dimensions are shown in Figure 8-1. The location of where the box is to be installed is predetermined by the engineers designing the various installations, and may vary from site to site. Normally, the location is immediately above the BMC chassis.

The rear panel of the Interface Box provides the connections to the DMS-100 tape ports and to the BMC chassis. The connector panel is divided into two identical interfaces, one at the left, one at the right, as viewed from the rear. Refer to Figure 8-2. The left section provides the interface from the DMS-100 Tape Port 0; the right section the interface from the DMS-100 Tape Port 1.

The connectors J1 READ, J2 WRITE, and J3 CONTROL on the left and right sections of the Interface Box duplicate the connectors which were previously used on the MTUs, which were removed from the system and replaced by the BMC equipment. These connectors provide attachment for the existing cables from the DMS-100 tape ports, which originally connected to the tape units.

Figure 3-1
Interface Box Dimensions (Top and Front Views)

19 in. (4892.6 mm)

12-3/4

13-1/2

4-5/16 in.

4-1/8 in.

Top View

2-1/2 in.
(63.5 mm)

17-1/2 in. (444.5 mm)

25-3/4 in. (654 mm)

Front View
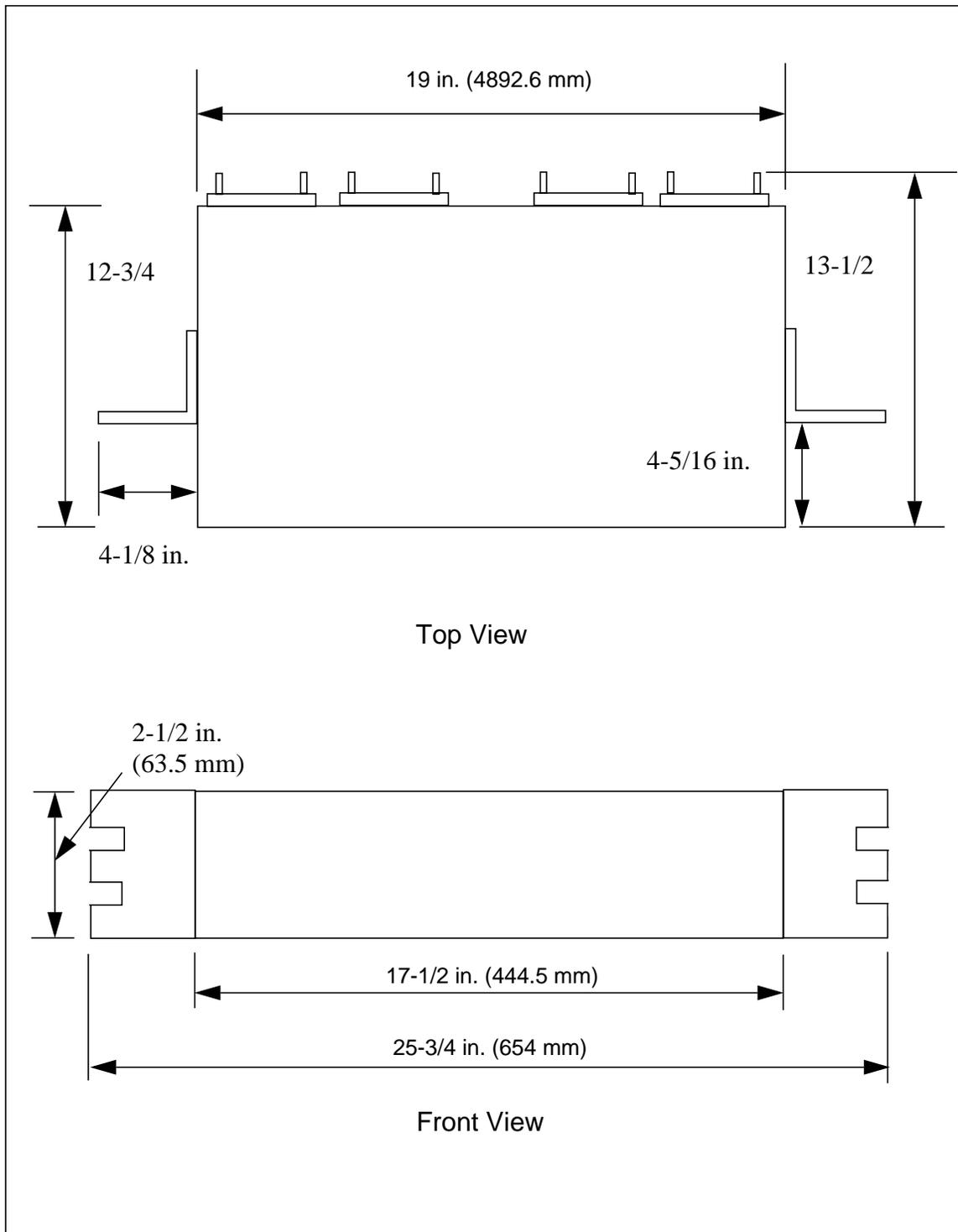
Figure 3-1
Interface Box Connectors
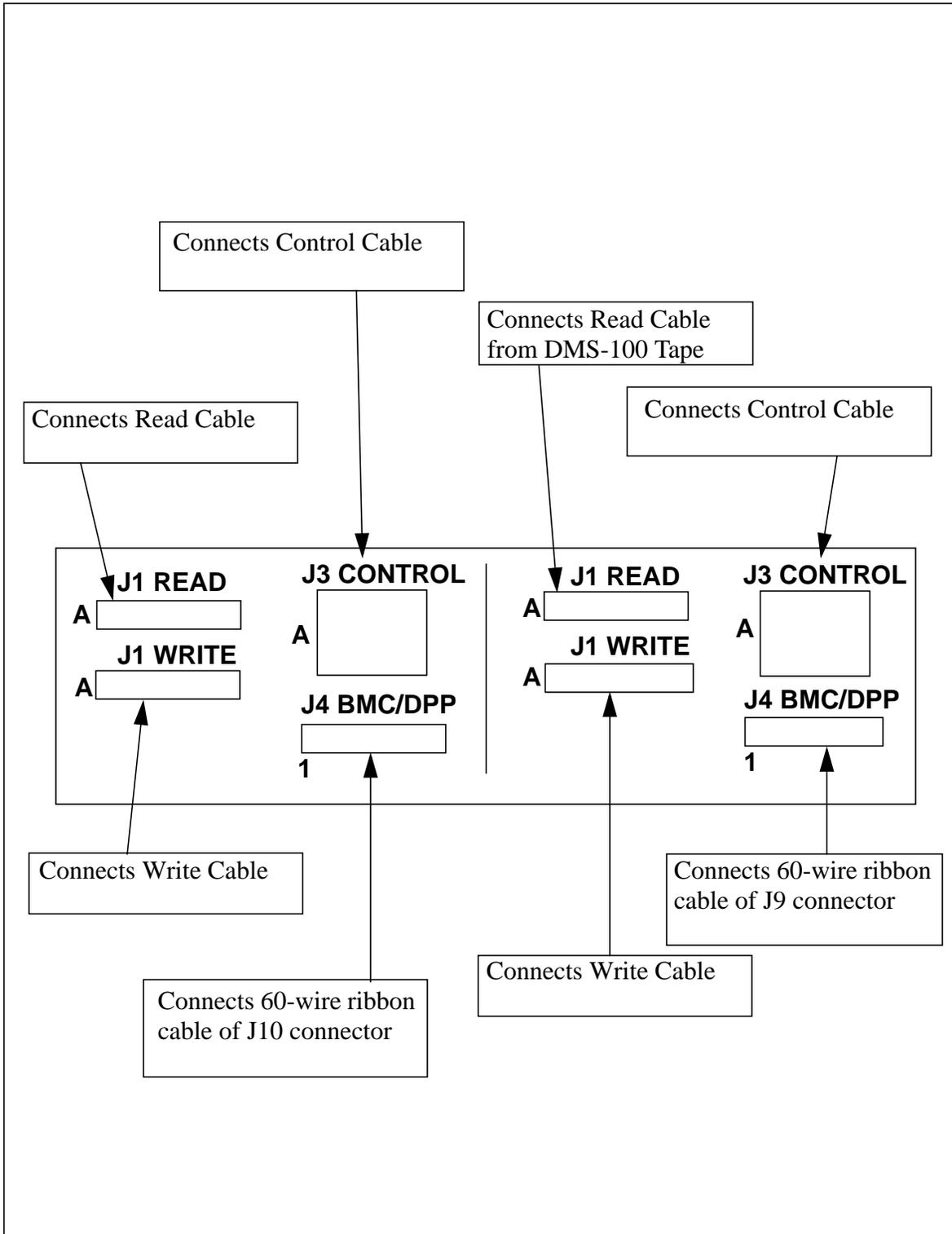
Within the Interface Box, the input signals from the J1, J2, and J3 connectors at the left are combined to form a single ribbon cable, and fed to the 60-pin J4 BMC connector at the left. The J1, J2, and J3 signals connected at the right are combined on another cable and fed to the 60-pin J4 BMC connector at the right. The front panel of the Interface Box is plain, designed to provide a neat appearance from the front of the panel.

Installing Interface Box

The Interface Box is shipped without the mounting brackets installed. Brackets are included separately in the packing carton. Assemble the mounting brackets to the tapped holes provided in the sides of the Interface Box, using the four mounting screws furnished in the small envelope. Refer to Figure 8-3.

The BMC chassis is mounted to a mounting adapter bracket (from the NT6M97AA mounting bracket kit), usually found in the Input/Output Equipment (IOE) frame, using the same hardware used to attach the chassis to the shipping frame. The Interface Box is usually installed directly below the BMC chassis on the adapter bracket in the IOE frame, using the hardware supplied. The plain panel of the Interface Box is mounted toward the front of the frame; the connector panel faces toward the rear.

Connecting Data Ribbon Cables from Interface Box to BMC Chassis

Two 60-pin ribbon cable assemblies are furnished with the BMC equipment for connecting the DMS-100 signals from the Interface Box to the inputs on the BMC chassis. Refer to Figure 8-4. Each ribbon cable is equipped with two connectors. The cables are identified on these connectors by labels that indicate the cable wire assembly and the plug numbers, such as, W63 for part No. NT6M99AJ or W65 for part No. NT6M99AH. These numbers are used to locate the jacks on the equipment to which these plugs mate, as covered later in these instructions. Note that each assembly provides two 60-pin connectors. Check each connector shell and the triangle on the connector to verify the location of pin 1.

From J4 (60-pin ribbon cable header) on left rear of Interface Box, connect ribbon cable to the J10 connector on the side panel of the B BMC chassis. Remove and discard the screw to the right of the J10 position. Attach the terminal lug from the cable using the screw supplied with the cable. Be sure the cable is installed with pin 1 toward the top of the connector. Refer to Figure 8-5. The left J4 connector provides signal leads from the DMS-100 tape port 0 to the BMC J10 connector, which interfaces to the A12 and B12 DMS-100 - DSI PCAs in the A and B chassis card racks.
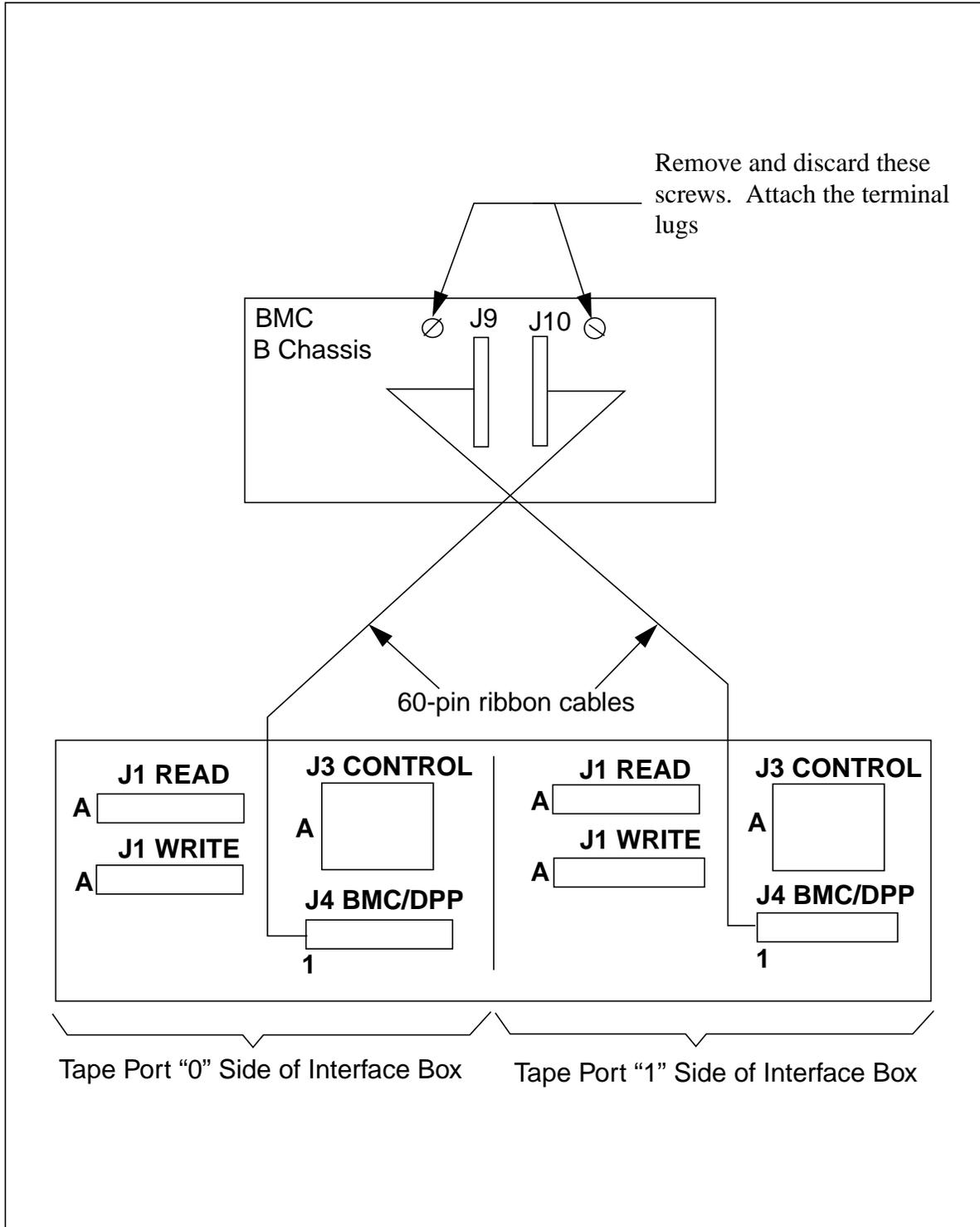
Figure 3-1
Installing Interface Box Mounting Brackets

Tapped holes
in

Holes in
mounting

Interface Box (rear)

Screws furnished
with
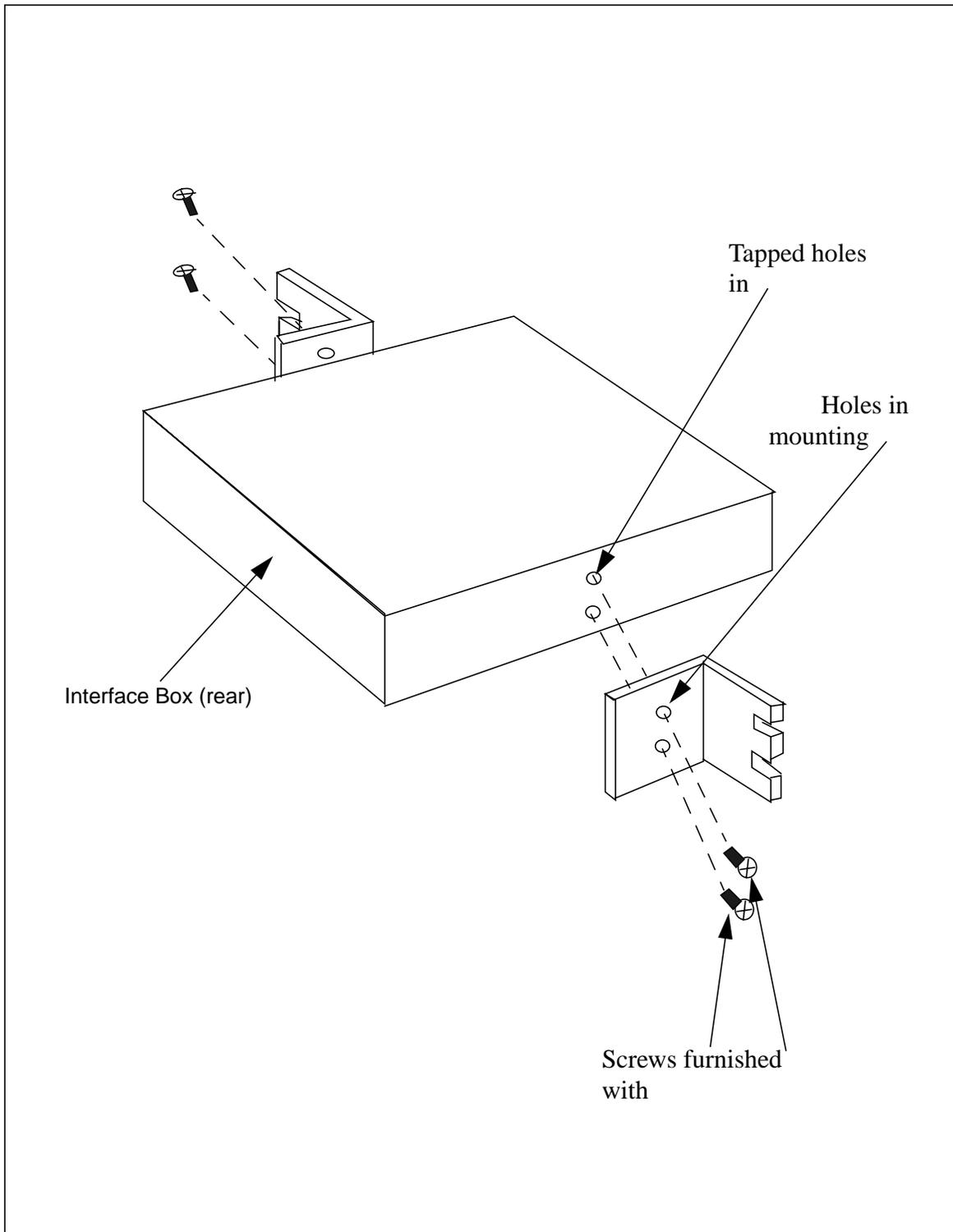
Figure 3-1
Interface Box - BMC Data Interface Cables

W63P4
(to J4, port 1 on top Interface

W63P9
(to J9 on BMC chas-

4 feet

W65P4
(to J4, port 0 on bottom Interface
Box)

W65P10
(to J10 on BMC chas-

4 feet
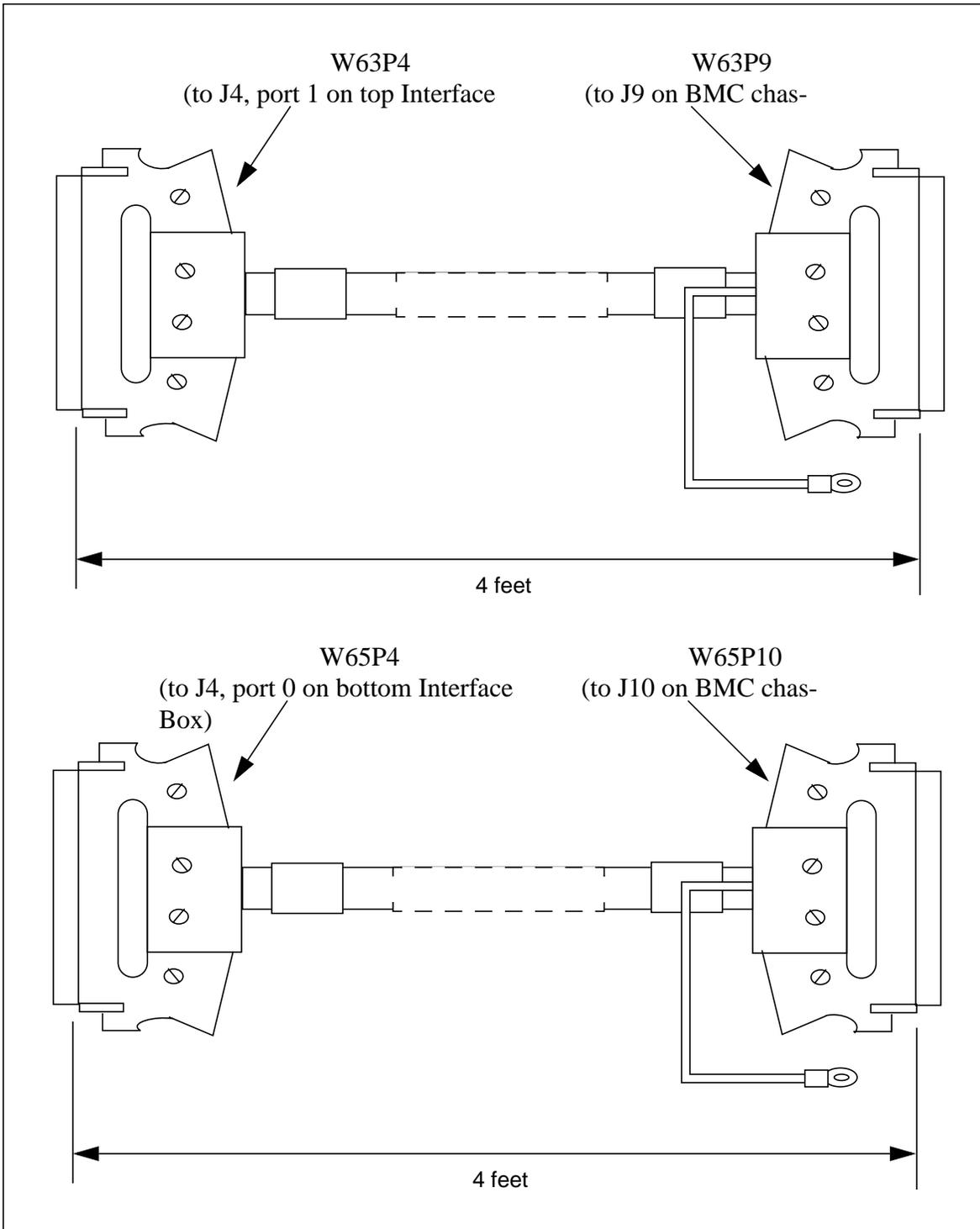
Figure 3-1
Connecting ribbon cables between Interface Box and BMC chassis

From J4, 60-pin ribbon cable header, on right rear of Interface Box, connect ribbon cable to the J9 connector on the side panel of the B BMC chassis. Remove and discard the screw to the left of the J9 connector. Attach the terminal lug from the cable using the screw supplied with the cable. Be sure the cable is installed with pin 1 toward the top of the connector. Refer to Figure 8-5. The right J4 connector provides signal leads from the DMS-100 tape port 1 to the BMC J9 connector, which interfaces to the A13 and B13 DSI PCAs in the A and B chassis card racks.

Connecting DMS-100 Tape Port Cables to Interface Box

Locate the Read, Write, and Control cables from the DMS-100 whose other ends terminate at the NT1X68 controllers.

Connect the Read, Write, and Control cables from the DMS-100 Input/Output Controller (IOC) jack locations associated with tape port 0 to the connectors on the left side of the Interface Box, J1 READ, J2 WRITE, and J3 CONTROL respectively. Refer to Figure 8-6.

Connect the Read, Write, and Control cables from the DMS-100 IOC jack locations associated with tape port 1 to the connectors on the right side of the Interface Box, J1 READ, J2 WRITE, and J3 CONTROL respectively. Refer to Figure 8-6.

Ribbon Cable Signal Lead Identification

Within the Interface Box, the three data inputs (J1, J2, and J3) for each interface are combined into a single 60-pin cable and fed to the J4 connectors. The ribbon cables connected to the J4 connectors carry the data, control, and status signals between the DMS-100 and the BMC DSI PCAs. For reference, signal lines assigned to these 60 wire cables are listed in the pin connector chart. Refer to Table 8-1.

Table 8-1
DMS-100/BMC DSI Ribbon Cable Pin/Signal Assignment Chart (for reference only)

Pin	Signal	Pin	Signal	Pin	Signal
1	/W7	21	/USEL	41	/FMK/LRC
2	GND	22	/REW	42	/HER/VRC
3	/W6	23	/WSEL	43	GND
4	GND	24	/REML	44	/R7
Sheet 1 of 2					

Table 8-1
DMS-100/BMC DSI Ribbon Cable Pin/Signal Assignment Chart (for reference only)

Pin	Signal	Pin	Signal	Pin	Signal
5	/W5	25	/CER	45	GND
6	GND	26	REV	46	/R6
7	/W4	27	GND	47	GND
8	GND	28	/FWD	48	/R5
9	/W3	29	GND	49	GND
10	GND	30	/REWS	50	/R4
11	/W2	31	/RDYS	51	GND
12	GND	32	/BOTS	52	/R3
13	/W1	33	/ONLS	53	GND
14	GND	34	/FPRS	54	/R4
15	/W0	35	/EOTS	55	GND
16	GND	36	GND	56	/R1
17	/WP	37	/RDS	57	GND
18	GND	38	GND	58	/R0
19	/WDS	39	/RP	59	/EOB
20	GND	40	/IDB/CRC	60	/WENS

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Note: The "/" in front of the signal name indicates that the signal uses inverted logic. This represents a departure from the BMC documents prepared by the Cook division, which indicated inverse logic using a line over the signal name.

Maintenance Terminal Information

This system can accept up to three maintenance terminals to provide human-to-machine communications with the BMC. Communications with the BMC include such procedures as entering or changing site dependent data, requesting certain system operations, outputting specified statistical reports, and providing maintenance messages that indicate system operating conditions.

Figure 3-1
Connection DMS-100 Tape Port Cables to Interface Box
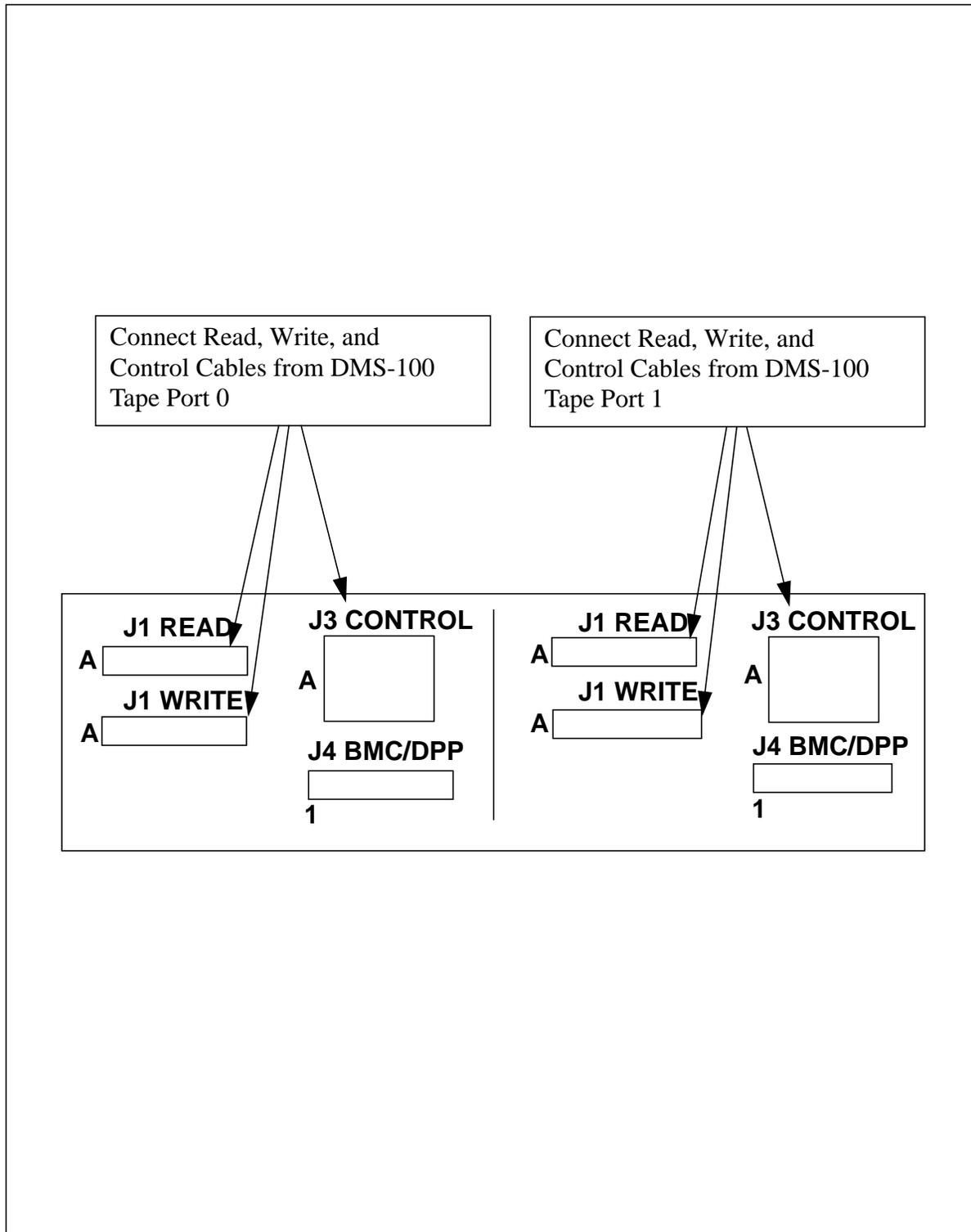
Each maintenance terminal has its own buffer, to allow command strings to be entered independently of the activity at the other terminals. The echoing of input characters is directed to the terminal from which they came. Output messages are directed to all maintenance terminals.

During periods of heavy message traffic (that is, long reports such as the error map or directory listing) all maintenance terminals slow to the speed of the slowest maintenance printer on the system. The slow condition is normal and the faster terminals resume full speed as the traffic subsides. Excess capacity has been reserved so that log messages and alarm messages are not lost during this period.

Connecting Maintenance Terminals to BMC

The BMC provides facilities for the connection of up to three maintenance terminals. At least one must be used. The customer is responsible for providing the maintenance terminals. Nortel provides an NT8M99AB cable for DTE connection to one maintenance terminal. The NT8M99AB cable has a DB25P (male) connector at the BMC end of the cable. The connector for the maintenance terminal end is dependent on the type of maintenance terminal selected by the customer.

The DB25P connectors on the Maintenance Terminal Interface Cables are connected to the Data and Peripheral Connector Panel on the left side of the BMC chassis, as follows:

- first printer interface cable to J4, A chassis
- second printer interface cable to J3, A chassis
- third printer interface cable to J1, A chassis.

The second and third interfaces (J3 and J1) may be job engineered to support remote maintenance terminals by using NT8M99AG modem cables, customer-supplied RS232C modems, and maintenance terminals.

BMC-DMS-100 Interface Testing

With the maintenance terminal interface(s) made, the maintenance terminal is now used to test the integrity of the equipment and the interface connection. Verify that the DMS-100 can generate AMA data to both tape ports. Verify that the maintenance terminal and the BMC can properly communicate with each other.

Functional Testing of Maintenance Terminal Communications

Start the functional testing procedure with the BMC rocker switches set to the A PRIME mode. Enter on any maintenance terminal the SETCLK command:

>SETCLK 97 07 10 13 25 00 TUE (cr)

The typed command is accepted by the BMC, the clock is updated, and the BMC sends a reply to the maintenance terminal, which displays an appropriate log message such as:

97-07-10 13:25:00 TUE PROC-A.

The above maintenance message is received and displayed by all the maintenance terminals connected to the BMC. Repeat this procedure for all maintenance terminals connected to the BMC.

At this time, set the BMC system to the B PRIME mode, and repeat the same procedure for all maintenance terminals connected to the BMC.

DSI/Processor Interface Testing

The BMC's CPU accessibility to each of the four DSI-DMS PCAs is checked with the following procedure:

Enter (at the terminal):

>TECMAINT SHOW 1 VS (cr)

The system responds as shown below:

xxxTEC-y mo/da/yr

where: xxx - firmware identity number
           y - patch level
   mo/da/yr - release date of firmware.

Enter (at the terminal):

>TECMAINT SHOW 2 VS (cr)

The system responds as shown below:

xxxTEC-y mo/da/yr

User now switches BMC processors and repeats the same steps to verify accessibility to B13 and B12 PCAs. A failure at any step indicates a faulty PCA or faulty wiring on the backplane of the processor that is on-line. Report any defect to Nortel.

DSI-DMS-100 Interface Testing

It is expected that the DMS-100 user is already familiar with various DMS-100 magnetic tape commands; therefore, testing the interface between the DMS-100 and the BMC should use the standard DMS-100 DIRP and AMA testing procedures.

Note: The following command entries do not provide a thorough test of AMA. Refer to the appropriate DMS-100 documentation for a comprehensive list of test command entries and mounting of AMA ports.

Enter the following on the DMS-100 Maintenance and Administration Position (MAP) terminal:

>MAPCI;MTC;IOD;IOC m;CARD n;BSY;TST;RTS (cr)

where:
m - IOC shelf to which the Interface Box (J10) is connected (MTU PORT 0)
n - IOC card position to which the Interface Box (J10) is connected.

Make the same checks on the other tape port by entering the following on the MAP terminal:

>MAPCI;MTC;IOD;IOC m;CARD n;BSY;TST;RTS (cr)

where:
m - IOC shelf to which the Interface Box (J9) is connected (MTU PORT 1)
n - IOC card position to which the Interface Box (J9) is connected.

Switch BMC processors and repeat the above testing to check interface operation with the alternate BMC processor.

Peripheral Interface Information

For the BMC-DMS-100 teleprocessing system covered by this document, peripheral and interface connections are made to the BMC system connectors per the block diagram in Figure 8-7.

Baud Rate Information

Baud rate selections to match the requirements of the maintenance terminals are made at small rotary switches located at the front edge of the Quad SIO PCAs located in the A6 and B6 slots of the card racks. Figures 8-8 and 8-9 illustrate the Quad SIO PCAs. Table 8-2 provides switch numbers and positions applicable to the various baud rate settings for typical peripheral usage.

Figure 3-1
Peripheral Interfaces for BMC-DMS-100 system

Table 8-2
Connector to Quad SIO PCA Cross-Reference

BMC connectors on side of A chassis		Quad SIO PCA settings	
Connector	Function	Rotary Switch # Settings	Option Jumpers Definitions
J4	MTC PTR 1 Asychronous Channel D	S5 - Baud 4 5 - 300 7 - 1200* A - 2400 C - 4800	J81-2External Transmit Timing* 2-3Internal Transmit Timing J91-2External Receive Timing* 2-3Internal Receive Timing J13 inExternal Timing* outInternal Timing
J3	MTC PTR 2 Asychronous Channel C	S4 - Baud 3 5 - 300 7 - 1200* A - 2400 C - 4800	J61-2External Transmit Timing* 2-3Internal Transmit Timing J71-2External Receive Timing* 2-3Internal Receive Timing J12 inExternal Timing* outInternal Timing
J2	Software Download Asynchronous Channel B	S3 - Baud 2 5- 300 7 - 1200* A - 2400 C - 4800	J41-2External Transmit Timing* 2-3Internal Transmit Timing J51-2External Receive Timing* 2-3Internal Receive Timing J11 inInternal Timing* outExternal Timing
J1	MTC PTR 3 Asychronous Channel A	S2 - Baud 1 5- 300 7 - 1200* A - 2400 C - 4800	J21-2External Transmit Timing* 2-3Internal Transmit Timing J31-2Internal Receive Timing 2-3External Receive Timing* J10 inExternal Timing* outInternal Timing

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Table 8-2
Connector to Quad SIO PCA Cross-Reference

BMC connectors on side of A chassis		Quad SIO PCA settings	
Connecto r	Function	Rotary Switch # Settings	Option Jumpers Definitions

* factory setting for this switch or jumper.

Note 7: This PCA supports polling on digital data lines or on analog network. For digital data lines check that:
  a. the P/A Comm PCA at A16 is part number NT6M84BA
  b. the Four Channel COMM PCA at A17 is release 03 or later
  c. the HOC supports the digital data line feature.

Note 8: The internal transmit timing source is generated on the Quad SIO PCA. The external transmit timing source is brought in from a source outside the BMC, usually associated with a modem generated timing source from a digital data line.

Note 9: Factory settings shown are for external timing.

Note 10: Verify that the settings on the jumpers J2-J13 on the Quad SIO PCA are in agreement with the settings on the P/A Comm PCA (A16) when working with digital data lines.

Note 11:   For DIP Switch S6, do not set the switches (S6-1, S6-2, S6-3, and S6-4) to the ON position.

Note 12: For Switch S1, the switch setting must remain at A.

Sheet 2 of 2

Figure 3-1
Quad SIO PCA (A6 and B6) options (NT6M60BA)

Figure 3-1
Quad SIO PCA (NT6M60BA) baud rate selector switches

Quad SIO printed circuit assembly in slots A6 and B6

Baud 4 (S5)
MTC PTR 1

Baud 3 (S4)
MTC PTR 2

Baud 2 (S3)
Software Download

Baud 1 (S2)
MTC PTR 3
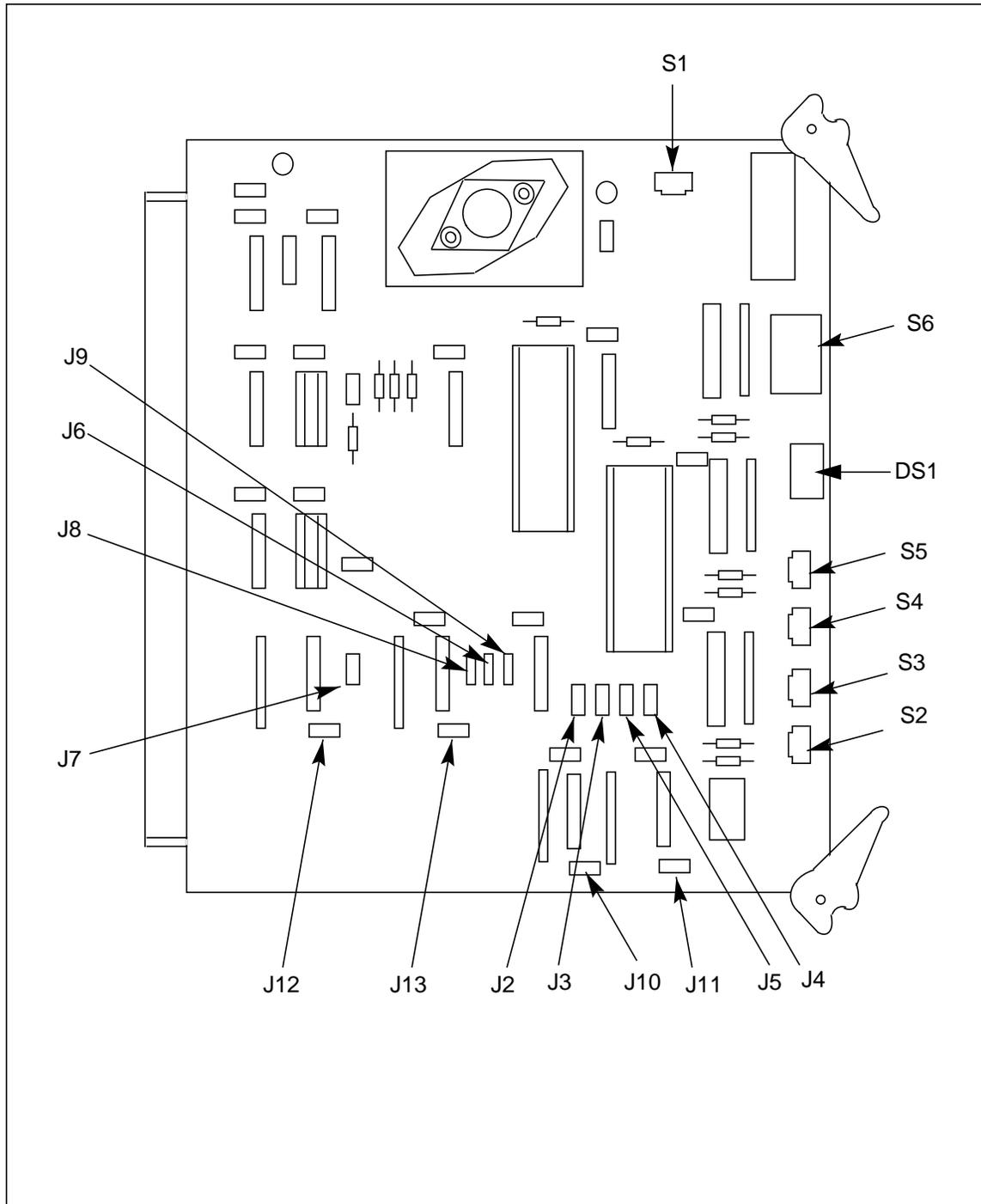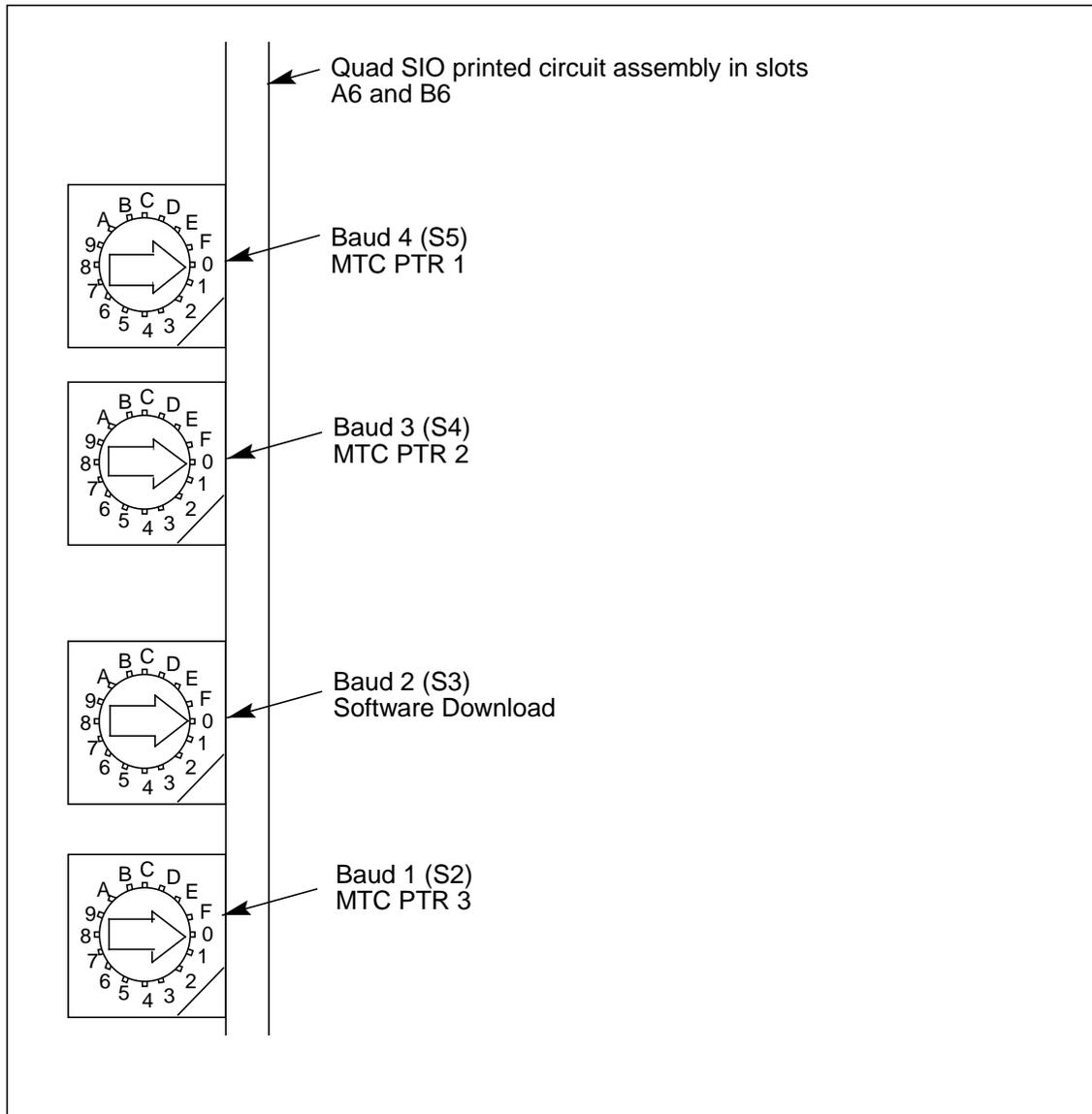
List of terms

AC

 Alternating Current

ADU

 Automatic Dial-Up

AMA

 Automatic Message Accounting

 An automatic recording system that documents all of the necessary billing data of subscriber-dialed long distance.

ASCII

 American Standard Code for Information Interchange

AU

 Allocation Unit

AWG

 American Wire Gauge

BCD

 Binary Coded Decimal

BELLCORE

 Bell Communications Research

 A group responsible for coordinating Bell Operating Company projects and setting standards for the industry.

BMC

Billing Media Converter

A peripheral device of the Switching System that functions as an AMA data collector and transmitter. The BMC collects AMA data from the switch, formats the data, stores the data on its own internal disk and transmits the data to a data collection center when polled by the collection center.

CO

Central Office

CP

Communication Processor

CPU

Central Processing Unit

CRC

Cyclic Redundancy Check

CTC

Counter Timer Circuit

DC

Direct Current

DCD

Data Carrier Detect

DIRP

Device Independent Recording Package

DMA

Direct Memory Access

DPR

Dual-Ported RAM

DRAM

Dynamic Random Access Memory

A Random Access Memory system that employs transistor capacitor storage cells. The logic state is stored in the capacitor and buffered by the transistor. The capacitive charge is only held for a short duration and must be refreshed at a periodic rate to maintain it programmed state.

DSI

Data Stream Interface

A circuit of the BMC that accepts AMA data from the DMS-100 Magnetic Tape Drive (MTDs) ports. The DSI emulates an MTD on DMS-100 MTD ports, duplicating all of the communications signals normally exchanged between the DMS-100 and an MTD.

EBCDIC

Extended Binary Coded Decimal Interchange Code

ECAC

Error Control and Alarm Circuit

EIA

Electronic Industry Association

EMI

Electromagnetic Interference

EPROM

Erasable Programmable Read Only Memory

A read-only memory in which stored can be erased by ultraviolet light and reprogrammed.

FIFO

First-In First-Out

HOC

Host Office Collector

An AMA data collection center that polls COs in its region on a prescheduled basis and complies the collected data onto a magnetic tape. The tape is used by the Revenue Account Office for computing customer billing.

IC

Integrated Circuit

IM

Installation Manual

I/O

Input/Output

IOC

Input/Output Controller

IOE

Input/Output Equipment

ISO

International Standards Organization

LED

Light-Emitting Diode

LSSGR

LATA Switching System Generic Requirements

LT

Lamp Test

MAP

Maintenance and Administration Position

MMI

Man-Machine Interface

MP

Main Processor

MTD

Magnetic Tape Drive

MTP

Magnetic Tape Port

MTU

Magnetic Tape Unit

NTP

Northern Telecom Practices

PAL

Programmed Assembly Logic

PCA

Printed Circuit Assembly

PEC

Product Equipment Code

PIO

Parallel Input/Output

PROM

Programmable Read-Only Memory

RAM

Random Access Memory

RAO

Revenue Accounting Office

RDW

Record Descriptor Word

RFT

Reliable File Transfer

ROM

Read-Only Memory

SCC

Serial Controller Chip

SCSI

Small Computer System Interface

SDI

Serial Data Interface

SIO

Serial Input/Output

Circuitry in the BMC that passes data from the BMC to external devices. The BMC employs four such circuits in its Quad SIO PCA that provides communications paths between the BMC, the Switching System maintenance terminals, and the remote polling center link.

TEC

Tape Emulation Circuit

A circuit of the BMC that accepts AMA data from the DMS-10 MTPs. The TEC emulates an MTD on DMS-10 MTPs, duplicating all of the communications signals normally exchanged between the DMS-10 and an MTD.

DMS-10 and DMS-100 Families

Billing Media Converter II

BISYNC Operation, Administration, and Maintenance Guide

**NORTEL
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