297-1001-539

DMS-100 Family

Distributed Processing Peripheral (DPP)

Hardware Component Replacement Guide

DPP001 and up Standard 01.03 September 2000

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DMS-100 Family

Distributed Processing Peripheral (DPP)

Hardware Component Replacement Guide

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About this document

When to use this document

This document describes the hardware component replacement procedures for the Distributed Processing Peripheral (DPP). This document replaces the *DPP Card Replacement Guide* (297-1001-536) and contains the disk replacement procedures formerly found in the *DPP Recovery and Routine Maintenance Guide* (297-1001-537) and the power and ground requirements formerly found in the *DPP Alarm Clearing and Performance Monitoring Guide* (297-1001-543). All three of these documents have been cancelled.

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-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check 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:

- *Distributed Processing Peripheral (DPP) Administration Guide*, 297-1001-331.
- *Common Customer Data Schema*, 297-1001-451.
- *Distributed Processing Peripheral (DPP) Commands and Messages Guide*, 297-1001-545.

What precautionary messages mean

The types of precautionary messages used in NT documents include warning and caution messages. Warning and caution messages indicate possible risks.

Example of the precautionary messages follow.

WARNING Possibility of equipment damage

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

CAUTION Possibility of service interruption or degradation.

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

Replacing circuit packs

How to use this document

Use the procedures in this document when replacing circuit packs in the DPP. A general description of each circuit pack is first presented, then the replacement procedures are given. Next, information about option settings and circuit pack layout is presented.

General information about circuit pack failures

Circuit pack failure usually causes the DPP to go to an alarm condition and switch system control to the standby processor - away from the processor with the faulty circuit pack. The DPP's response to failure depends on how the Error Map (ERRMAP) is set up.

Level 0 alarm failures do not cause a processor switch. Level 1, 2, and 3 alarm failures do require a processor switch. Level 1 is the least severe, and level 3 is the most severe.

Perform a manual processor switch away from the side with the suspected circuit pack; refer to Procedure 1-1.

General Troubleshooting Guidelines

The circuit packs used here are only examples. This troubleshooting procedure is valid for any combination of circuit pack printouts.

Enter the command TEST ACT or TEST STDBY and the following printout may appear:

```
DPP STANDBY/ACTIVE FAULT (cr)
ERROR DETECTED ON PROC (A or B) (cr)
CPU CARD    /  SLOT:A1     EQPEC=6M62 (cr)
EPROM PCA   /  SLOT:A2     EQPEC=6M63 (cr)
MEM EXPN    /  SLOT:A3     EQPEC=6M64 (cr)
```

Perform Procedure 1-1.

Procedure 1-1
DPP troubleshooting procedure - no specific fault indicator available

Step	Action	Notes
1	Make sure the DPP is in an ONLY processor mode for the processor that does not have the fault.	See Procedure 1-2.
2	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line Data Stream Interface (DSI) Printed Circuit Assemblies (PCAs): >DOS S DSIMAINT MEMWRITE 1 2204 00 (cr) >DOS S DSIMAINT MEMWRITE 2 2204 00 (cr)	
3	Power down the processor in error - this should be the off-line processor. Reseat the circuit packs listed in the printout and wait 30 seconds. Apply power to the processor and wait for the appearance of the "S/W LOADED" message, if the system is not equipped with NT6M94xx PCAs, or "CP ACTIVE" message, if the system is equipped with NT6M94xx PCAs.	
4	Test the processors with the TEST ACT and TEST STDBY commands. If the tests pass, place the DPP in the PRIME processor mode and let soak for two days.	
5	After the soak period, retest both processors with the TEST ACT and TEST STDBY commands.	
6	If the test passes, fill out the "Fault Analysis Sheet" or write the observed fault on a sheet of paper. Enclose this sheet with the suspected card when returning for repair.	
7	If the test fails or the problem reappears after the soak time, perform steps 8 through 12.	

Procedure 1-1
DPP troubleshooting procedure - no specific fault indicator available

Step	Action	Notes
8	Activate the ONLY mode for the on-line processor. Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line DSI PCAs: >DOS S DSIMAINT MEMWRITE 1 2204 00 (cr) >DOS S DSIMAINT MEMWRITE 2 2204 00 (cr) Power down the off-line processor.	
9	Replace the NT6M62xx PCA with a spare and apply power to the processor.	The NT6M62xx PCA is the CPU PCA in slot 1.
10	Test the processors with the TEST ACT and TEST STDBY commands.	
11	If the test passes, place the DPP in the PRIME processor mode and let it soak for two days.	
12	If the test immediately fails or the error reoccurs during the soak time, repeat step 8, replacing NT6M63xx in step 9. If after replacing NT6M62xx and NT6M63xx, the problem reappears, repeat from step 8, replacing NT6M64xx in step 9.	NT6M63xx: EPROM PCA, slot 2. NT6M64xx: DRAM PCA, slot 3.
13f	If the test passes, place the DPP in the PRIME processor mode and let it soak for two days.	
14	Repeat 5 through 7 again.	
15	If trouble persists, contact next level of support.	

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Note: Reseating the PCAs listed in the TEST ACT or TEST STDBY command clears the problem in some cases. If the error does not reoccur during the soak time after reseating the PCAs, then the reseating will have cleared the problem.

Changing processor modes

If preparing to change a circuit pack and you need to change mode, use the following procedure.

Procedure 1-2
DPP circuit packs replacement - changing processor modes

Step	Action	Notes
1	Press the processor A/B Select Switch to the position (A or B) that matches the active processor.	
2	Press the O/P Mode Switch to the ONLY position.	
3	Turn the Mode Switch.	Turn to the right and release.
4	Observe that the active processor unit ONLY status lamp lights. Wait for the log message, ”Processor force selected - nonredundant.” Go to one of the procedures referenced in step 5, as required.	DPP will go into alarm.
5	Go to the appropriate chapters in this document for replacement procedures for the PCAs. The document is organized according to PCA.	

Central Processor Unit (CPU) circuit pack (NT6M62BA)

General description

The CPU circuit pack is located in slot 1 of the A and B chassis. The CPU, which has Direct Memory Access (DMA), organizes data flow throughout the DPP. 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 circuit pack) through the various program steps.

The DMA IC is a Z80-compatible device, responsible for data transfer to and from Random Access Memory (RAM) and the DSI circuit packs.

The CTC IC handles interrupts from various devices within the DPP that request access to the bus for data transfer. AC power (the 60 Hz signal supplied from the external ac transformer, if equipped) is supplied to the Power and Alarm Communications PCA. Here it is converted to 60 Hz pulses and supplied to the CTC so it can generate the interrupt. 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.

The clock signal used to drive the Z80 microprocessor originates from a crystal on the CPU circuit pack.

Central processor unit LED display

The CPU circuit pack contains a seven-segment display Light Emitting Diode (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. See Table 2-1.

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 circuit pack. The data byte and hardware status lines are decoded by an Erasable Programmable Read Only Memory (EPROM). Output conditions may appear as shown in Table 2-2.

There are various option settings on this circuit pack. See Table 2-3. Figure 2-1 shows the option locations and circuit pack layout.

Replacing CPU circuit pack

To replace the CPU circuit pack, use the following procedure.

Procedure 2-1
Replacing CPU circuit pack (NT6M62BA) - slot 1

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
6	To remove the front panel of the DPP, 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.
7	Get the replacement circuit pack from the spares kit.
8	Remove the protective electrostatic bag and place it on a suitable, grounded surface.

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Procedure 2-1
Replacing CPU circuit pack (NT6M62BA) - slot 1

Step	Description
9	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
10	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 DPP: 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.
11	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
12	Remove the suspected faulty circuit pack.
13	The replacement pack option settings must be set to match the settings listed in Table 2-3 prior to installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
14	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
15	Put faulty pack in the empty electrostatic bag.

Procedure 2-1
Replacing CPU circuit pack (NT6M62BA) - slot 1

Step	Description
16	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
17	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
18	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
19	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
20	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.

Procedure 2-1
Replacing CPU circuit pack (NT6M62BA) - slot 1

Step	Description
21	Verify replacement circuit pack has corrected original error.
22	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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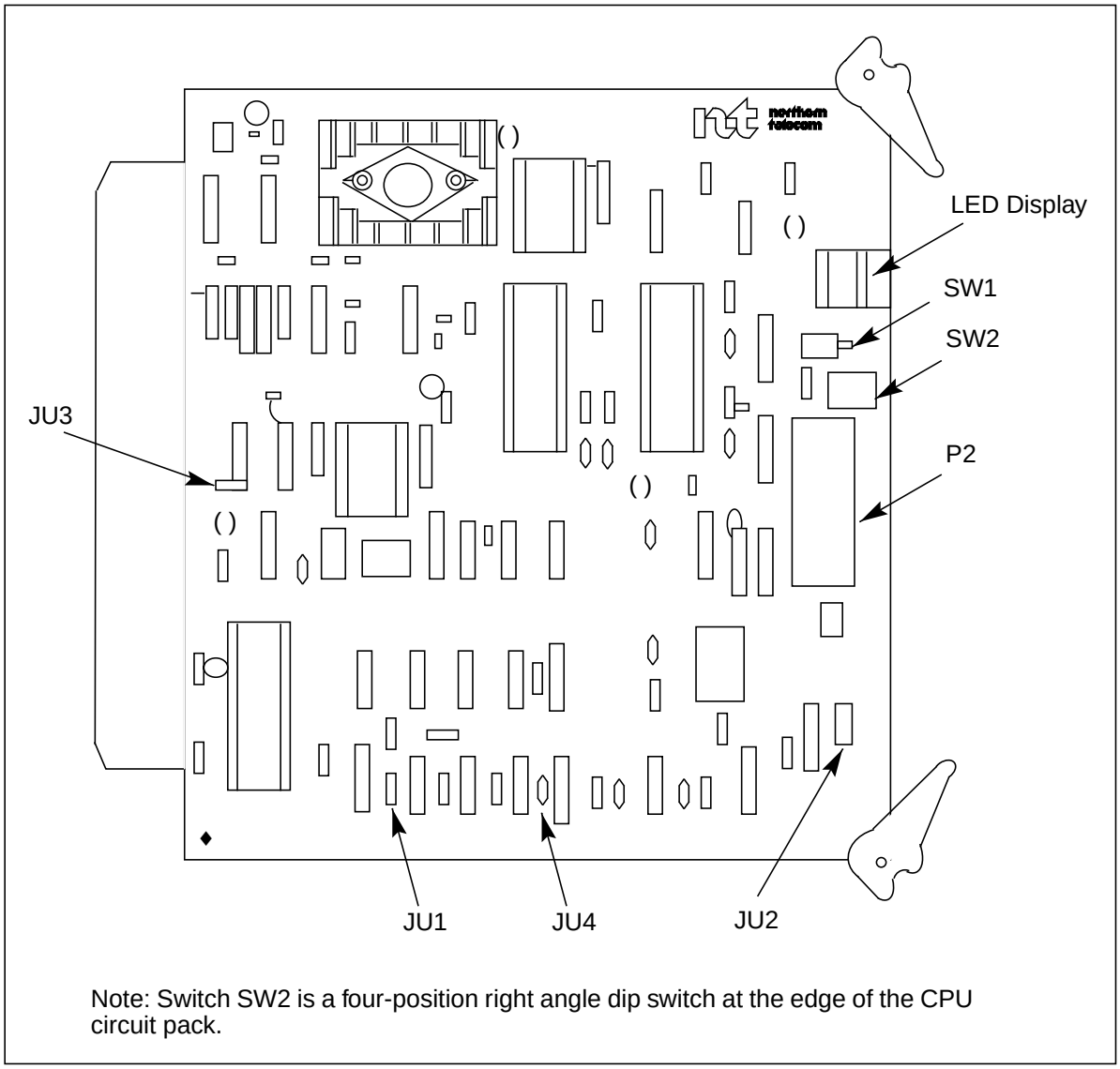
Figure 3-1
CPU with DMA (A1 and B1) circuit pack (NT6M62BA options



Note: Switch SW2 is a four-position right angle dip switch at the edge of the CPU circuit pack.

Table 2-1
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.
1.		None		Planned processor switch.
Ξ.		None		All systems operational.

Table 2-2
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.

Table 2-3
CPU with DMA circuit pack (A1 and B1) options - part number: NT6M62BA

Device type number	Position/setting		Function	Setting Factory	Setting On-site
Jumper (J3)	PINS: 2-3 1-2:	8 KHz clock from DMS-100 enabled. 60 Hz clock from AC adapter, if present.	Determines whether the DPP uses 8 KHz from the DMS-100 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.	Configuredf or 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				

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Table 2-3
CPU with DMA circuit pack (A1 and B1) options - part number: NT6M62BA

Device type number	Position/setting		Function	Setting Factory	Setting On-site
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	
DIP Switch (SW2-3) (SW2-4)	Display Mode34 Err Cont PortOnOff I/O 6 PortOffOn (Invalid)OnOn (Invalid)OffOff		Monitors Error Control. Monitors data written to I/O 6 Port.	3 = On 4 = Off	
Rotary Switch	None used				
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.

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EPROM circuit pack (NT6M63xx)

General description

This PCA, in slot 2 of the A and B chassis, stores the main program for DPP 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.

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

There are jumper settings on the EPROM. Refer to Tables 3-1, 3- 2, and 3-3. Figure 3-1 shows the jumper locations and circuit pack layout.

Replacing EPROM integrated circuits

The DPP contains EPROM firmware routines. EPROM ICs contain operational programming for some DPP system functions. The EPROM's fixed memory is factory programmed with necessary control instructions. After installation in the DPP, 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 DPP functions, install an EPROM IC with different programmed instructions.

Refer to Procedure 3-1 for removal, installation, and handling precautions when changing DPP 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 circuit pack. Another method is to replace the entire circuit pack.

> ***Note:*** If replacing EPROM ICs, check the reference number on the circuit pack 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 circuit packs. Excessive force can bend or break pins or cause hairline cracks in the copper foils.
- Make sure the notch on the EPROM matches the notch on the socket.

Procedure 3-1
EPROM IC installation procedure

Step	Description	Notes
	**CAUTION** Since all DPP circuit packs are static sensitive; be careful when handing them (refer to Note 1).	
1	Locate the two EPROM ICs on the circuit pack (refer to Note 2)	This IC is labeled with a coded number for identification.
2	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.	Use an IC extractor tool or a small blade regular screwdriver. Do not throw the EPROM away; return it to Nortel.

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Procedure 3-1
EPROM IC installation procedure

Step	Description	Notes
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 this protective package to store the old EPROM IC until verifying the new one.
4	Position the marked end of the new IC over the marked end of the notch and carefully insert the pins into the socket.	Notches or dots identify the location of pin 1 on both ICs and IC sockets.
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	Update the label every time an EPROM is changed on that circuit pack (refer to Note 3).	Each circuit pack 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.

Note 1: 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 2: If none of the ICs on the circuit packs has a printed label, see Table 3-1 for the index of tables and figures for the circuit pack options. Locate the correct table and figure for the circuit pack.

Note 3: Changing the EPROM on a circuit pack may change the circuit pack's PEC/REL level. The change kit provides the new labels. Also update any spare parts and office records.

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Replacing the EPROM circuit pack

To replace the EPROM circuit pack, perform the steps in the following procedure.

Procedure 3-2
Replacing EPROM circuit pack (NT6M63BF, NT6M63CF, NT6M63CH, NT6M63CJ, NT6M63CL, and NT6M63FE) - slot 2

Step	Description
	**CAUTION** Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	**WARNING** Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
1	To remove the front panel of the DPP, 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.
2	Get the replacement circuit pack from the spares kit.
3	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
4	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
5	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 DPP: 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 3

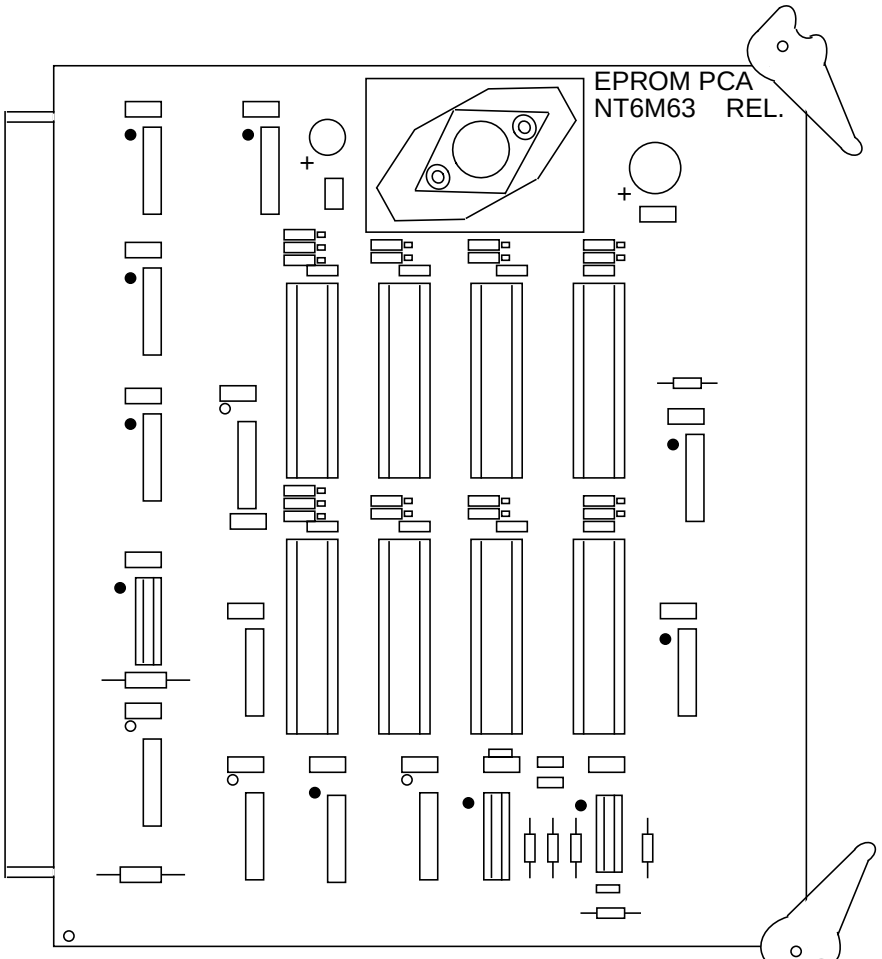
Procedure 3-2
Replacing EPROM circuit pack (NT6M63BF, NT6M63CF, NT6M63CH, NT6M63CJ, NT6M63CL, and NT6M63FE) - slot 2

Step	Description
Note: This will create an alarm.	
6	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
7	Remove the suspected faulty circuit pack.
8	The replacement pack option settings must be set to match the settings listed in Table 3-1, 3-2 or 3-3 prior to installation.  **CAUTION** Failure to set-up options correctly may cause AMA loss.
9	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
10	Put faulty pack in the empty electrostatic bag.
11	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
12	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.

Procedure 3-2
Replacing EPROM circuit pack (NT6M63BF, NT6M63CF, NT6M63CH, NT6M63CJ, NT6M63CL, and NT6M63FE) - slot 2

Step	Description
13	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
14	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
15	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.
16	Verify replacement circuit pack has corrected original error.
17	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

Figure 3-1
EPROM (A2 and B2; see note) circuit pack options



Note: This figure represents the following part numbers:

NT6M63BF (Non-Turbo DPP systems)
NT6M63CF (Non-Turbo DPP systems)
NT6M63CH (Non-Turbo DPP systems)
NT6M63CJ (Turbo DPP systems)
NT6M63CL (Non-Turbo DPP systems)
NT6M63FE (Turbo DPP systems)

Table 3-1
EPROM circuit pack (A2 and B2) options - part number: NT6M63BF, NT6M63CL, NT6M63CH, NT6M63CF; Non-Turbo DPPs

Device	Setting Factory On-site	Function	IC Configuration
Jumper (P2)	Out	Indicates presence of DRAM PCA.	
Jumper (P3) (P4) (P5) (P6) (P7) (P8)	 1-2 1-2 1-2 1-2 1-2 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** P3 P4 P5 / P6 P7 P8 **Devices** 2016 1-2 1-2 2-3 (for U5) 2782 1-2 1-2 1-2 (for U6) 2764 1-2 1-2 1-2 6264 2-3 1-2 1-2 27128 1-2 2-3 1-2
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** P9 P10 / P11 P12 / P13 P14 / P15 P16 / P17 P18 / P19 P20 **Devices** 2016 2-3 1-2 (for U7) 2782 1-2 1-2 (for U8) 2764 1-2 1-2 (for U9) 6264 1-2 2-3 (for U10) (for U11) (for U12)

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Table 3-1
EPROM circuit pack (A2 and B2) options - part number: NT6M63BF, NT6M63CL, NT6M63CH, NT6M63CF; Non-Turbo DPPs

Device	Setting Factory On-site	Function	IC Configuration
Jumper (P21) (P22) (P23)	 Out In In	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
Jumper (P24)	 1-2	Memory paging is disabled.	
Strap	None Used		
DIP Switch	None Used		
Rotary Switch	None Used		
Switch	None Used		

Note: There are no customer-definable options on this circuit pack. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

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Table 3-2
EPROM circuit pack (A2 and B2) options - part number: NT6M63CJ; Turbo DPPs

Device (number)	Setting: Factory	Setting: On-site	Function	IC Configuration
Jumper (P2)	Out		Indicates presence of DRAM PCA.	
Jumper (P3)	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 P3 P6 / P4 P7 / P5 P8 / Devices (for U5) (for U6)** 2016: 1-2, 1-2, 2-3 2782: 1-2, 1-2, 1-2 2764: 1-2, 1-2, 1-2 6264: 2-3, 1-2, 1-2 27128: 1-2, 2-3, 1-2
(P4)	1-2			
(P5)	1-2			
(P6)	1-2			
(P7)	1-2			
(P8)	1-2			
Jumper (P9)	1-2		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 P9 P11 P13 P15 P17 P19 / P10 P12 P14 P16 P18 P20 / Devices (for U7) (for U8) (for U9) (for U10) (for U11) (for U12)** 2016: 2-3, 1-2 2782: 1-2, 1-2 2764: 1-2, 1-2 6264: 1-2, 2-3
(P10)	2-3			
(P11)	1-2			
(P12)	2-3			
(P13)	1-2			
(P14)	2-3			
(P15)	1-2			
(P16)	2-3			
(P17)	1-2			
(P18)	2-3			
(P19)	1-2			
(P20)	2-3			
Jumper (P21)	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
(P22)	In			
(P23)	In			
Jumper (P24)	1-2		Memory paging is disabled.	
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			

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Table 3-2
EPROM circuit pack (A2 and B2) options - part number: NT6M63CJ; Turbo DPPs

Device (number)	Setting: Factory	Setting: On-site	Function	IC Configuration
Switch	None Used			

Note: There are no customer-definable options on this circuit pack. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

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Table 3-3
EPROM circuit pack (A2 and B2) options - part number: NT6M63FE; Turbo DPPs

Device (number)	Setting: Factory	Setting: On-site	Function	IC Configuration
Jumper (P2)	Out		Indicates presence of DRAM PCA.	
Jumper (P3)	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 P3 P4 P5 P6 P7 P8 / Devices (for U5) (for U6)** 2016: 1-2 1-2 2-3 2782: 1-2 1-2 1-2 2764: 1-2 1-2 1-2 6264: 2-3 1-2 1-2 27128: 1-2 2-3 1-2
(P4)	2-3			
(P5)	1-2			
(P6)	1-2			
(P7)	2-3			
(P8)	1-2			
Jumper (P9)	1-2		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 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 / Devices (for U7) (for U8) (for U9) (for U10) (for U11) (for U12)** 2016: 2-3 1-2 2782: 1-2 1-2 2764: 1-2 1-2 6264: 1-2 2-3
(P10)	2-3			
(P11)	1-2			
(P12)	2-3			
(P13)	1-2			
(P14)	2-3			
(P15)	1-2			
(P16)	2-3			
(P17)	1-2			
(P18)	2-3			
(P19)	1-2			
(P20)	2-3			

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Table 3-3
EPROM circuit pack (A2 and B2) options - part number: NT6M63FE; Turbo DPPs

Device (number)	Setting: Factory	Setting: On-site	Function	IC Configuration
Jumper (P21)	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
(P22)	Out			
(P23)	Out			
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 circuit pack. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

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Memory expansion circuit pack (NT6M64AA)

General description

The Expanded Memory circuit pack in slot 3 of the A and B chassis provides DRAM for temporarily storing various data in the DPP. DRAM is refreshed periodically by the CPU to maintain its programmed state. Each expanded memory circuit pack contains up to 256 Kbytes (262,144 bytes) of DRAM. On the system level, DRAM provides storage of temporary data, such as system calculations, and updating of statistics.

See Table 4-1 for the jumper option settings on this circuit pack (these are standard, not user-defined). Figure 4-1 shows jumper location and circuit pack layout.

Replacing Memory Expansion circuit pack

To replace the Memory Expansion circuit pack, use the following procedure.

Procedure 4-1
Replacing Memory Expansion circuit pack (NT6M64AA) - slot 3

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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.
20	Get the replacement circuit pack from the spares kit.
21	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
22	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
23	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 DPP: 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.

Procedure 4-1
Replacing Memory Expansion circuit pack (NT6M64AA) - slot 3

Step	Description
24	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
25	Remove the suspected faulty circuit pack.
26	The replacement pack option settings must be set to match the settings listed in Table 4-1 prior to installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
27	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
28	Put faulty pack in the empty electrostatic bag.
29	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
30	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
31	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.

Procedure 4-1
Replacing Memory Expansion circuit pack (NT6M64AA) - slot 3

Step	Description
32	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
33	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.
34	Verify replacement circuit pack has corrected original error.
35	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Figure 3-1
Memory Expansion (A3 and B3) circuit pack (NT6M64AA) options

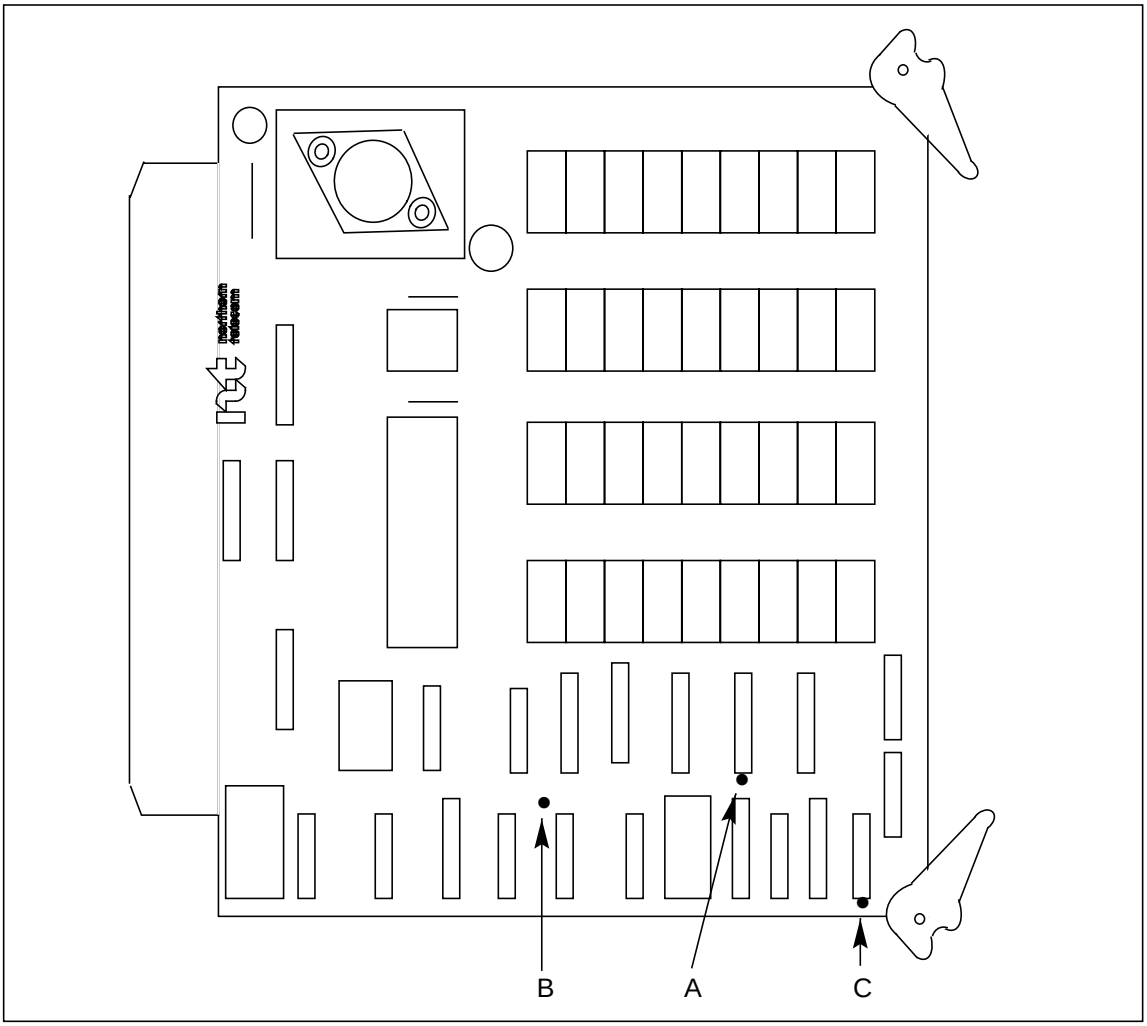

Table 4-1
Memory Expansion circuit pack (A3 and B3) options - part number: NT6M64AA

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper A	Out In Out In	Card 1 Card 2 Card 1 (64K only) Card 2 (64K only)	Out (card 1 in A3)	Must be the same as the factory setting.
Jumper B	In In Out Out	Card 1 Card 2 Card 1 (64K only) Card 2 (64K only)	In (card 1 in A3)	Must be the same as the factory setting.
Jumper C	Out Out In In	Card 1 Card 2 Card 1 (64K only) Card 2 (64K only)	Out (card 1 in A3)	Must be the same as the factory setting.
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Error Control II and Error Control II Jumper circuit packs (NT6M65AA and NTM609AB)

General description

The Error Control II circuit pack is located in slot 5 of the A chassis, and the Error Control II Jumper circuit pack is in slot 5 of the B chassis.

The Error Control II circuit pack constantly checks the system to verify satisfactory operation and to immediately sense and react to a fault. The Error Control II Jumper circuit pack contains a loop to feed data from the B processor bus to the Error Control II circuit pack in the A chassis. This jumper also has a switch to bypass the Error Control II circuit pack if it needs replacing.

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

This circuit pack contains no customer-selectable option settings. See Table 5-1 and Figure 5-1 for the circuit pack layout.

Error Control II circuit pack jumper LED

The LED on the Error Control II Jumper circuit pack (slot 5; B chassis) lights to indicate the toggle switch on the circuit pack has been activated, up position. This toggle switch is activated during replacement of the Error Control II circuit pack (slot 5; A chassis). See Table 5-1.

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

Replacing Error Control II circuit pack

When replacing the Error Control II circuit pack in slot A5 (A chassis), use the following procedure.

Procedure 5-1
Replacing Error Control II (A5) circuit pack - part number NT6M65AA

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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.
20	Get the replacement circuit pack from the spares kit.
21	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
22	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
23	Place the B processor unit an ONLY mode. At the Switch and Status Panel of the DPP: 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. ***Note:*** This will create an alarm. `ONLY MODE NON-REDUNDANT`

Procedure 5-1
Replacing Error Control II (A5) circuit pack - part number NT6M65AA

Step	Description
24	Remove power from the standby chassis (A processor) by operation of the +8 V dc red rocker switch on the power supply.
25	On the Error Control II Jumper circuit pack 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.
26	This Switch serves a dual function. First, it removes the B chassis power-feed from the Error Control II circuit pack in the A chassis. Second, it locks the error control functions to the B chassis.
27	Remove the Error Control II circuit pack in the A chassis (slot 5).
28	Insert the spare Error Control II circuit pack in the A chassis (slot 5), making sure it is fully seated.
29	Put faulty pack in the empty electrostatic bag.
30	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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
31	Return the toggle switch on the Error Control II Jumper circuit pack 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)
32	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR STDBY 00 (cr)** Alarms will stay clear on the standby processor if there are no faults.

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Procedure 5-1
Replacing Error Control II (A5) circuit pack - part number NT6M65AA

Step	Description
33	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
34	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.
35	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Replacing Error Control II Jumper circuit pack

When replacing the Error Control II Jumper circuit pack, use the following procedure.

Procedure 5-2
Replacing Error Control II Jumper (B5) circuit pack - part number NTM609AB

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
36	To remove the front panel of the DPP, 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.
37	Get the replacement circuit pack from the spares kit.
38	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
39	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor.
40	Place the A processor unit an ONLY mode. At the Switch and Status Panel of the DPP: 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.
41	Remove power from the standby chassis (B processor) by operation of the +8 V dc red rocker switch on the power supply.
42	Remove the Error Control II Jumper circuit pack in the B chassis (Slot 5).

Procedure 5-2
Replacing Error Control II Jumper (B5) circuit pack - part number NTM609AB

Step	Description
43	Insert the spare Error Control II Jumper circuit pack in the B chassis (Slot 5), making sure it is fully seated.
44	Put faulty pack in the empty electrostatic bag.
45	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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
46	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR STDBY 00 (cr)** Alarms will stay clear on the standby processor if there are no faults.
47	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.

Procedure 5-2
Replacing Error Control II Jumper (B5) circuit pack - part number NTM609AB

Step	Description
48	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
49	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Table 5-1
Error control II circuit pack (A5) options - part number: NT6M65AA

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 4: See Figure 5-1.

Note 5: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Table 5-2
Error control II jumper circuit pack (B5) 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 circuit pack in A5 is off.[3]	Error control functions transferred to this circuit pack.	Used only during corrective maintenance on the Error Control II circuit pack (A5).	
	Off =	down position = power feed to Error Control II circuit pack in A5 is on.	Error control functions operate normally.		

Note 6: See Figure 5-2.

Note 7: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Note 8: The LED (DS1) lights when toggle switch (SW1) is moved to the (up) On position.

Figure 3-1
Error Control II (A5) circuit pack (NT6M65AA) options

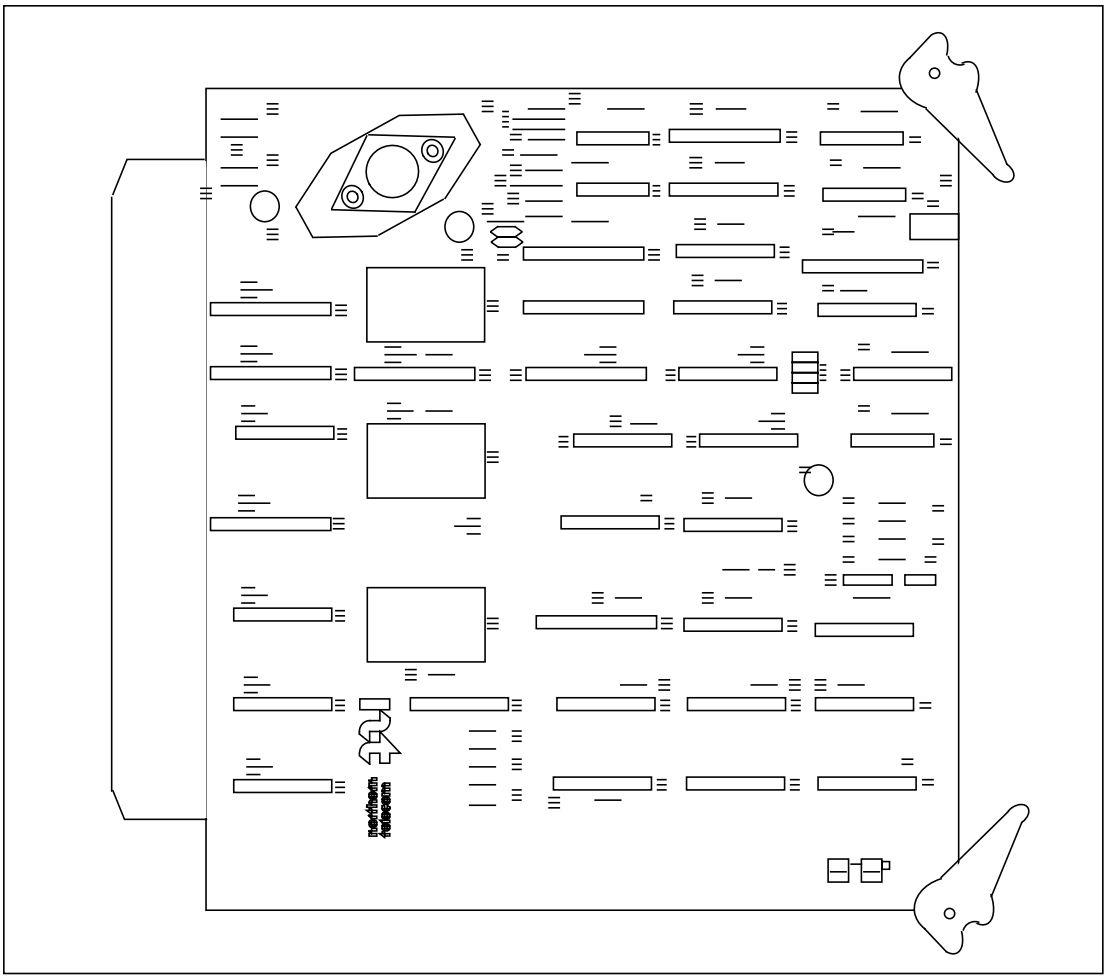
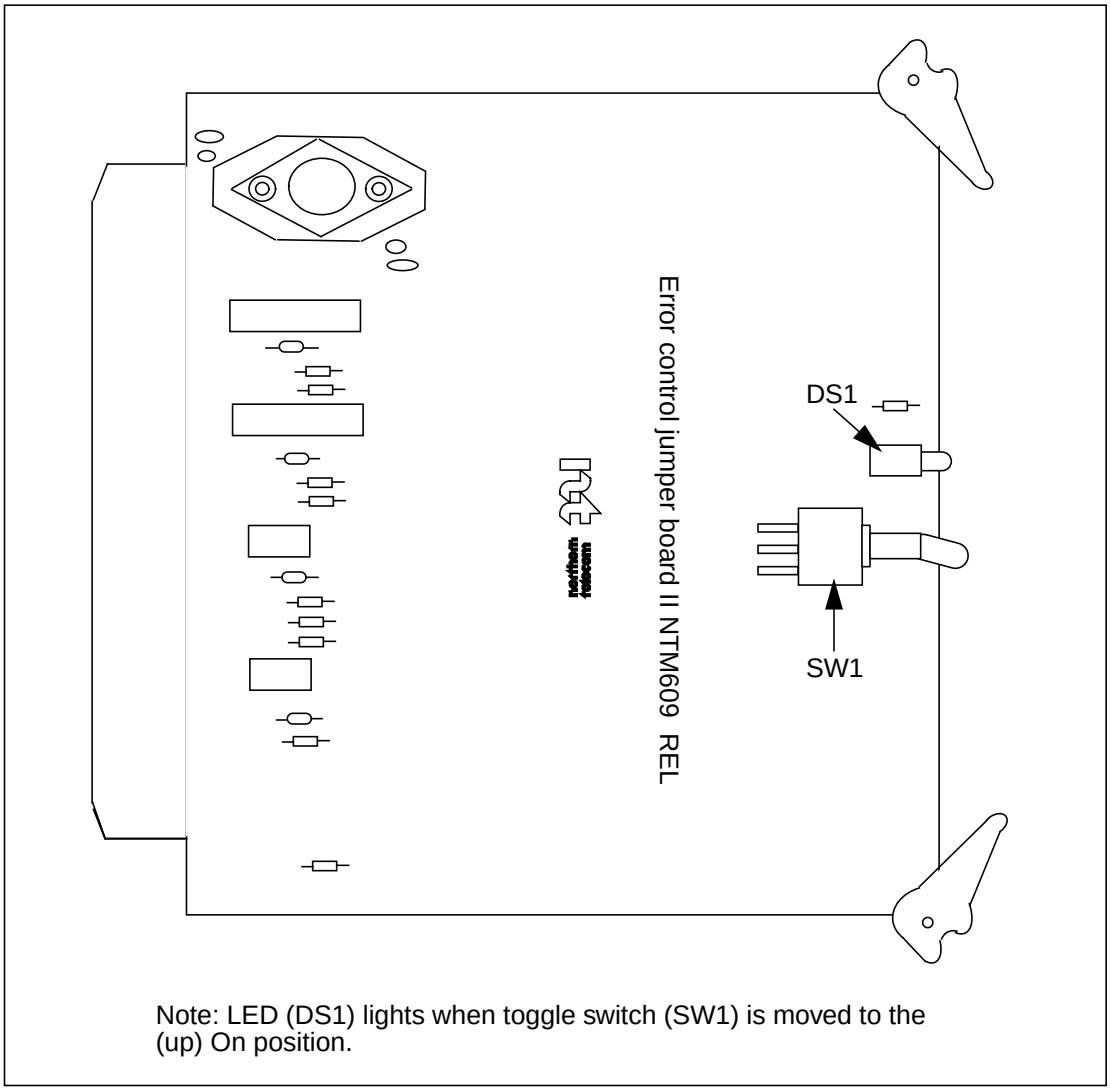


Figure 3-1
Error Control II Jumper (B5) circuit pack (NTM609AB) options



Note: LED (DS1) lights when toggle switch (SW1) is moved to the (up) On position.

Quad SIO circuit pack (NT6M60xx)

General description

Located in slot 6 of each chassis, the Quad Serial Input/Output (QSIO) has one port for maintenance terminal communications, one port for polling call record data if 56K polling feature is unequipped, and two ports for the I/O controllers for serial communication with the DMS-100 (MAP). Each port maintains an independent, selectable baud rate for the transmit and receive functions. On later release QSIOs the transmit clock may be generated externally or internally. On the NT6M60AA QSIO, the receive clock can be set for internal only. On the NT6M60BA QSIO, the receive clock can be set for internal or external. See Table 6-1.

The QSIO circuit pack is a peripheral I/O device to the DPP on-line processor. It provides an interface to system data, addresses, and control signals. The eight-bit data bus is powered by a tristate 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 tristate octal buffer. Another tristate octal buffer circuit buffers the ten control lines used by the processor.

The QSIO circuit pack reports internal faults to the active processor by generating signal interrupts. To minimize the signal's propagation delay through the circuit pack, a bypass circuit is used in the Programmable Array Logic (PAL). The interrupt output (-INT) is buffered by a quad 2-input positive NAND buffer chip to connect to the system interrupt line.

The QSIO circuit pack 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 circuit pack 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: Enter the baud rate set command BAUD to establish software control of the QSIO channel. Refer to the *DPP Commands and Messages Guide* for further information.

Replacing QSIO circuit pack

To replace the QSIO circuit pack, use the following procedure.

Procedure 6-1
Replacing QSIO circuit pack (NT6M60AA or NT6M60BA) - slot 6

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
16	To remove the front panel of the DPP, 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 circuit pack from the spares kit.
18	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
19	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.

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Procedure 6-1
Replacing QSIO circuit pack (NT6M60AA or NT6M60BA) - slot 6

Step	Description
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 DPP: 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.
21	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
22	Remove the suspected faulty circuit pack.
23	The replacement pack option settings must be set to match the settings listed in Table 6-1 or 6-2 prior to installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
24	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
25	Put faulty pack in the empty electrostatic bag.
26	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.

Procedure 6-1
Replacing QSIO circuit pack (NT6M60AA or NT6M60BA) - slot 6

Step	Description
27	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
28	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
29	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
30	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.

Procedure 6-1
Replacing QSIO circuit pack (NT6M60AA or NT6M60BA) - slot 6

Step	Description
31	Verify replacement circuit pack has corrected original error.
32	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Table 6-1
QSIO circuit pack (A6 and B6) options - part number: NT6M60AA

Device type (number)		Position/setting	Function	Setting	
				Factory	On-site
Jumper (A)		In	+12 V dc, if BR1941 chip is used.	In	Must be the same as the factory setting.
		Out	No +12 V dc if WD1943 chip is used.		
Strap		None used			
DIP Switch (S2)	S2-1	Baud A to RXCA	DIP switches S2 and S3 are used to select synchronous or asynchronous mode for the four channels of the QSIO. The baud rate selection and mode of operation at rotary switches S4, S5, S6, and S7 is controlled by S2 and S3 according to the following chart.	Off	Must be the same as the factory setting.
	S2-2	RCA to RXCA		On	
	S2-3	Baud B to RXCB		On	
	S2-4	RCB to RXCB		Off	
DIP Switch (S3)	S3-1	Baud C to RXCA		On	
	S3-2	RCC to RXCA		Off	
	S3-3	Baud D to RXCB		On	
	S3-4	RCD to RXCB		Off	

Note: This PCA will *only* allow external timing to be set in the modem.

DIP switch	Controls the operation of	Select synchronous	Select asynchronous
S2-1	S4	Off	On
S2-2		On	Off
S2-3	S5	Off	On
S2-4		On	Off
S3-1	S7	Off	On
S3-2		On	Off
S3-3	S6	Off	On
S3-4		On	Off

Table 6-1
QSIO circuit pack (A6 and B6) options - part number: NT6M60AA

Device type (number)	Position/setting			Function	Setting	
					Factory	On-site
DIP Switch (S1)	Position 0 1 2 3 4	= 5 6 7 8 9	Address A B C D E F	Select the logical address of the SIO circuits.	A	Must be the same as the factory setting.

Note: Baud rate selection for the four DPP channels is made at the four rotary switches (S4, S5, S6, and S7) on the front of the circuit pack. The baud rate selected can be set for synchronous or asynchronous operation at S2 and S3. The chart shows conversion for asynchronous to synchronous baud rates and rotary switch position for the applicable selection.

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[5]	F	19200[5]	N/A

Rotary Switch (S4)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[5]	BX.25 Polling Link (Synchronous channel; 2400 baud) Channel A baud rate select. (Odd numbers appear as dashes on the face of the rotary switch.)	5 (4800 baud) pending (This switch is inactive for DPP systems with 56K polling.)	May be 4, 5 or 6, de-pending on the polling speed.

Table 6-1
QSIO circuit pack (A6 and B6) options - part number: NT6M60AA

Device type (number)	Position/setting			Function	Setting	
					Factory	On-site
Rotary Switch (S5)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[5]	IOC Link (MMI Link to DMS-100) (Asynchronous channel; 2400 baud) Channel B baud rate select. (Odd numbers appear as dashes on the face of the rotary switch.)	A (2400 baud)
Rotary Switch (S7)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[5]	IOC Link (MMI Link to DMS-100) (Asynchronous channel; 2400 baud) Channel C baud rate select. (Odd numbers appear as dashes on the face of the rotary switch.)	A (2400 baud)
Rotary Switch (S6)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[5]	Local Printer - (Asynchronous channel; 2400 baud) Channel D baud rate select. (Odd numbers appear as dashes on the face of the rotary switch.)	A (2400 baud) (Rover terminal; typically not used)
Switch	None used					

Note 4: See Figure 6-1.

Note 5: This circuit pack does not support polling on digital data lines; use for an analog network only.

Note 6: The MMI Link (DPP to DMS-100 two-way communication channel connected to connector J2 is MMI Link 1.

Note 7: The MMI Link (DPP to DMS-100 two-way communication channel connected to connector J3 is MMI Link 2.

Note 8: Listed for reference only; not supported in software.

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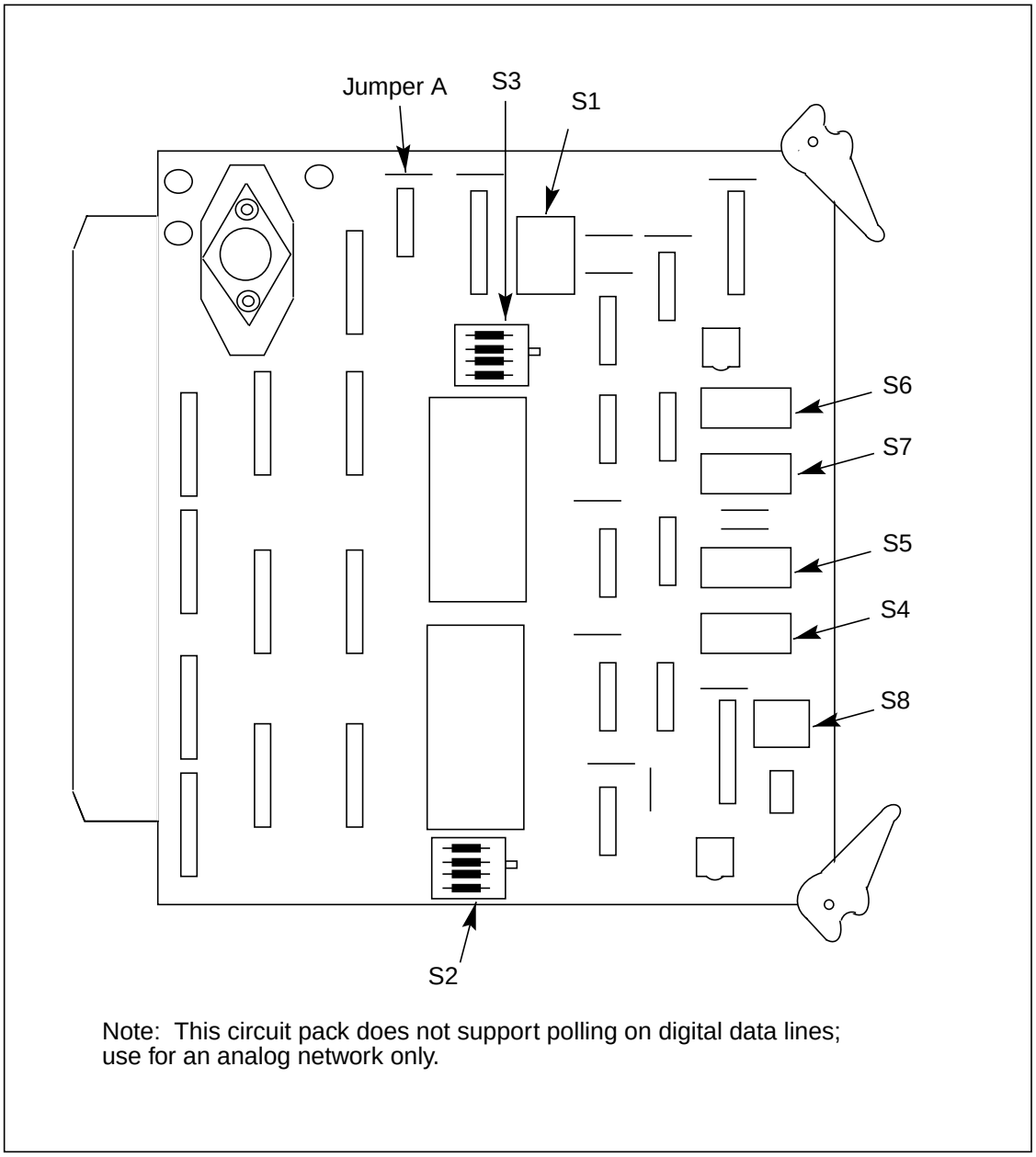
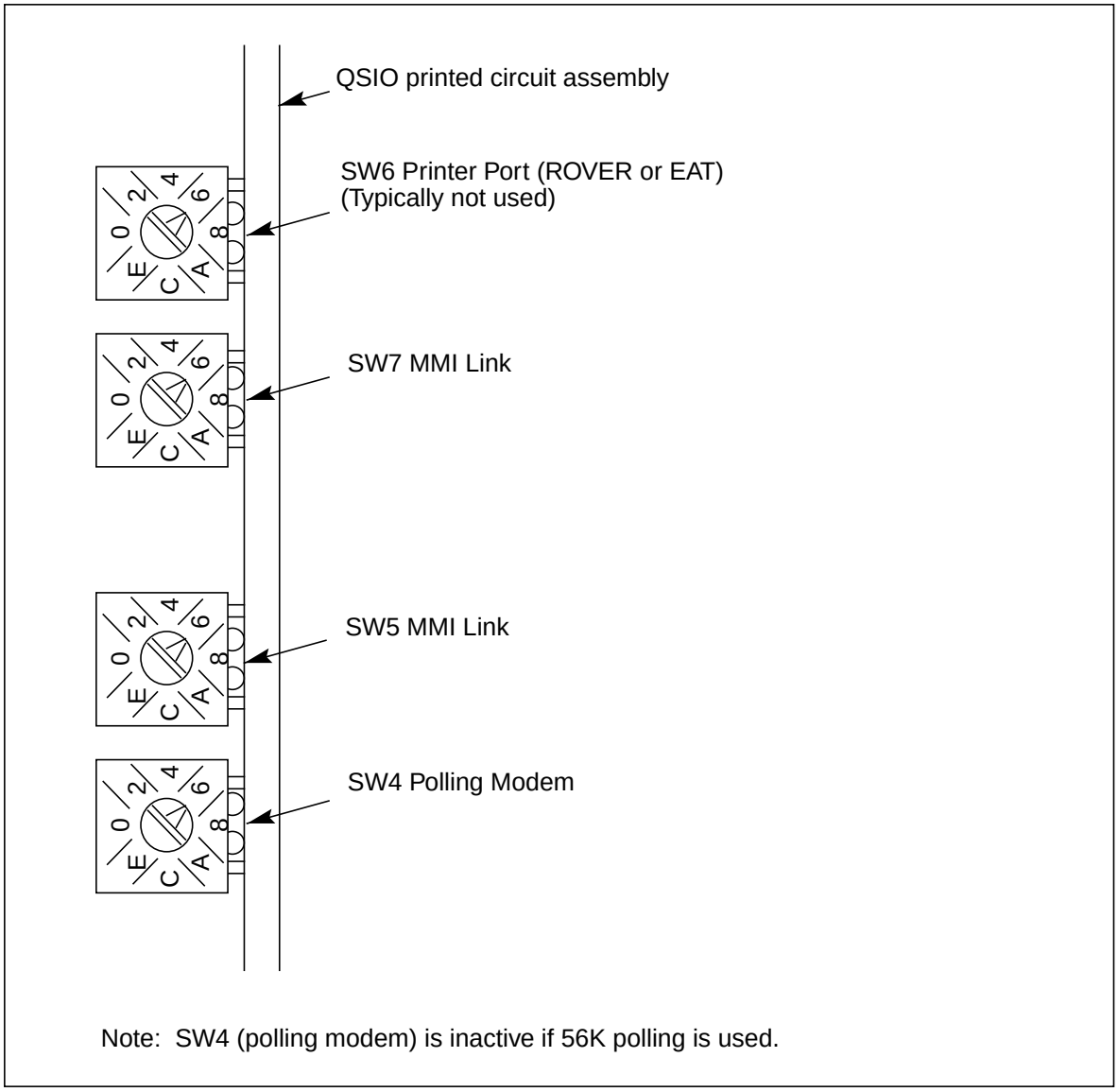
Figure 3-1
QSIO circuit pack (NT6M60AA) options - slot 6



Note: This circuit pack does not support polling on digital data lines; use for an analog network only.

Figure 3-1
QSIO (A6 and B6) circuit pack (NT6M60AA) baud rate selector switches



Note: SW4 (polling modem) is inactive if 56K polling is used.

Table 6-2
QSIO circuit pack (A6 and B6) options - part number: NT6M60BA

Device type (number)	Position/setting		Function	Setting	
				Factory	On-site
Jumper (J2)	1-2 2-3	Transmit internal Transmit external	Channel A transmit clock	1-2	
Jumper (J3)	1-2 2-3	ASYNC SYNC	Channel A receive clock	2-3	
Jumper (J4)	1-2 2-3	Transmit internal Transmit external	Channel B transmit clock	1-2	
Jumper (J5)	1-2 2-3	ASYNC SYNC	Channel B receive clock	1-2	
Jumper (J6)	1-2 2-3	Transmit internal Transmit external	Channel C transmit clock	1-2	
Jumper (J7)	1-2 2-3	ASYNC SYNC	Channel C receive clock	1-2	
Jumper (J8)	1-2 2-3	Transmit internal Transmit external	Channel D transmit clock	1-2	
Jumper (J9)	1-2 2-3	ASYNC SYNC	Channel D receive clock	1-2	
Jumper (J10)	In Out	Select internal timing source (DPP). Select external timing source (Modem).	Select internal or external source for channel A transmit clock	In	
Jumper (J11)	In Out	Select internal timing source (DPP). Select external timing source (Modem).	Select internal or external source for channel B transmit clock	In	
Jumper (J12)	In Out	Select internal timing source (DPP). Select external timing source (Modem).	Select internal or external source for channel C transmit clock	In	
Jumper (J13)	In Out	Select internal timing source (DPP). Select external timing source (Modem).	Select internal or external source for channel D transmit clock	In	
Strap		None used			

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Table 6-2
QSIO circuit pack (A6 and B6) options - part number: NT6M60BA

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
DIP Switch (S6)	1 On channel A select Off (normal setting)	NOT USED.	Off	
	2 On channel B select Off (normal setting)		Off	
	3 On channel C select Off (normal setting)		Off	
	4 On channel D select Off (normal setting)		Off	

Note: Baud rate selection for the four DPP channels is made at the four rotary switches (S2, S3, S4, and S5) on the front of the circuit pack. 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.

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[7]	F	19200[7]	N/A

Rotary Switch (S2)	0	50	8	1800	BX.25 Polling Link (Synchronous channel; 2400 baud) Channel A baud rate select.	4 (2400 baud) (This switch is inactive for DPP systems with 56K polling.)
	1	75/1200	9	2000		
	2	110	A	2400		
	3	134.5	B	3600		
	4	150/2400	C	4800		
	5	300/4800	D	7200		
	6	600/9600	E	9600		
	7	1200	F	19200[7]		

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Table 6-2
QSIO circuit pack (A6 and B6) options - part number: NT6M60BA

Device type (number)	Position/setting				Function	Setting	
						Factory	On-site
Rotary Switch (S3)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[7]	MMI Link (Asynchronous channel; 2400 baud) Channel B baud rate select.	A (2400 baud)	
Rotary Switch (S4)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[7]	MMI Link (Asynchronous channel; 2400 baud) Channel C baud rate select.	A (2400 baud)	
Rotary Switch (S5)	0 1 2 3 4 5 6 7	50 75/1200 110 134.5 150/2400 300/4800 600/9600 1200	8 9 A B C D E F	1800 2000 2400 3600 4800 7200 9600 19200[7]	Local Printer - (Rover terminal; typically not used) (Asynchronous channel; 2400 baud) Channel D baud rate select.	A (2400 baud)	

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Table 6-2
QSIO circuit pack (A6 and B6) options - part number: NT6M60BA

Device type (number)	Position/setting			Function	Setting	
					Factory	On-site
DIP Switch (S1)	Position	=	Address	Select the logical address of the SIO circuits.	A	Must be the same as the factory setting.
	0	5	A			
	1	6	B			
	2	7	C			
	3	8	D			
	4	9	E			
			F			

Note 9: See Figure 6-3.

Note 10: This circuit pack supports polling on digital data lines or on analog network. For digital data lines check that:

a. the P/A Comm circuit pack at A16 is part number NT6M84BA
b. the Four Channel COMM circuit pack at A17 is release 03 or later
c. the Collector supports the digital data line feature.

Note 11: Factory settings shown are for an analog network.

Note 12: The internal transmit timing source is generated on the QSIO circuit pack. The external transmit timing source is brought in from a source outside the DPP, usually associated with a modem generated timing source from a digital data line.

Note 13: The MMI Link (DPP to DMS-100 two-way communication channel) connected to connector J2 is MMI Link 1.

Note 14: The MMI Link (DPP to DMS-100 two-way communication channel) connected to connector J3 is MMI Link 2.

Note 15: Listed for reference only; not supported in software.

Usage Notes:

Note 16: Use the following guidelines to determine the on-site settings for J2 through J13:
If BX.25 polling is being done over a digital data line:

a. J2 2-3 external transmit clock timing for channel A.
b. J10 Out external transmit clock timing for channel A.
c. Verify that the settings on QSIO J2-J13 agree with the settings on the P/A Comm (A16) circuit pack when working with digital data lines.

Note 17: SW4 (BX.25 polling baud rate) (for DPP w/o 56K polling)

4 for 2400 baud
5 for 4800 baud
6 for 9600 baud

Note 18: SW5 (local printer speed) 7 for 1200 baud

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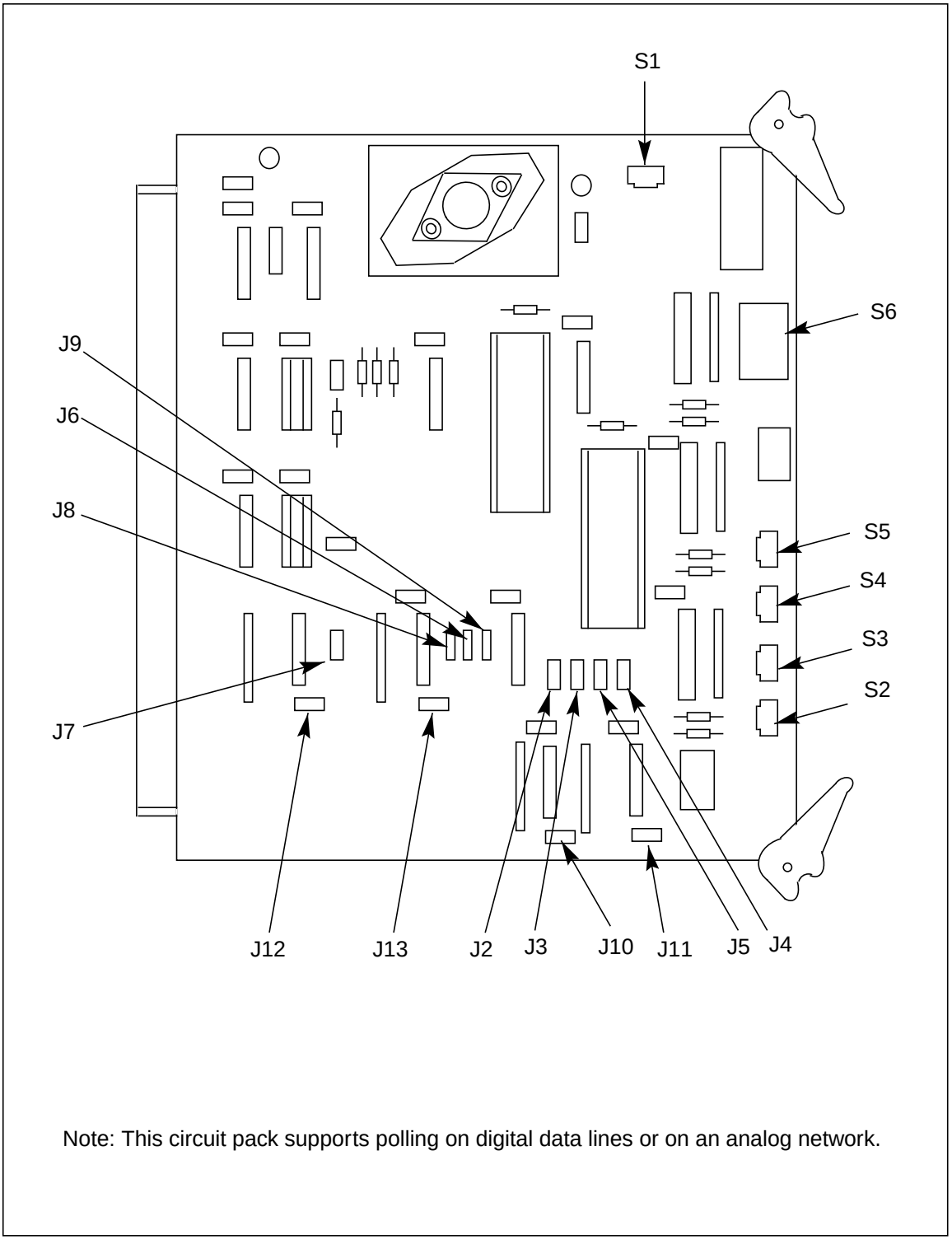
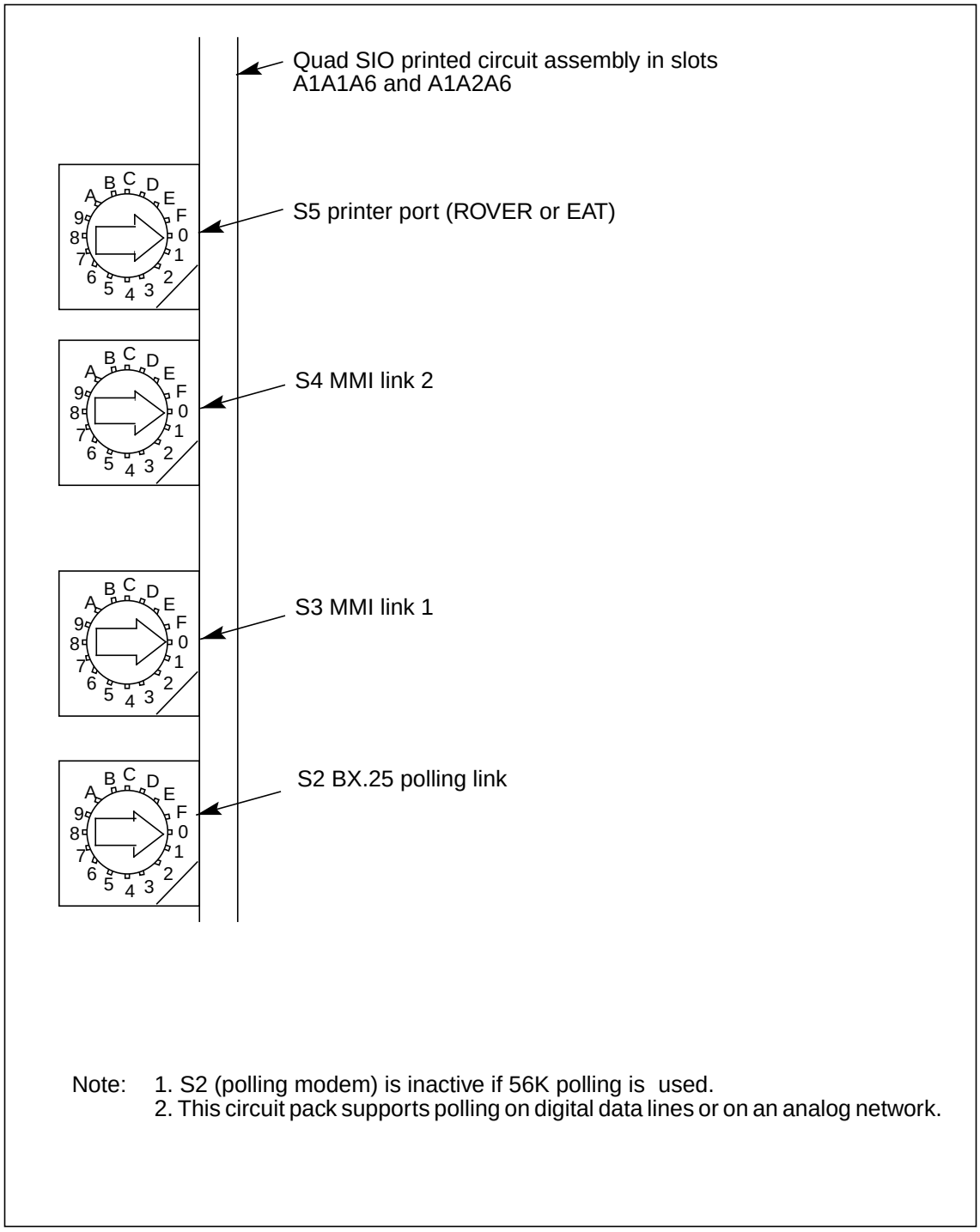
Figure 3-1
Quad SIO (A6 and B6) circuit pack (NT6M60BA) options



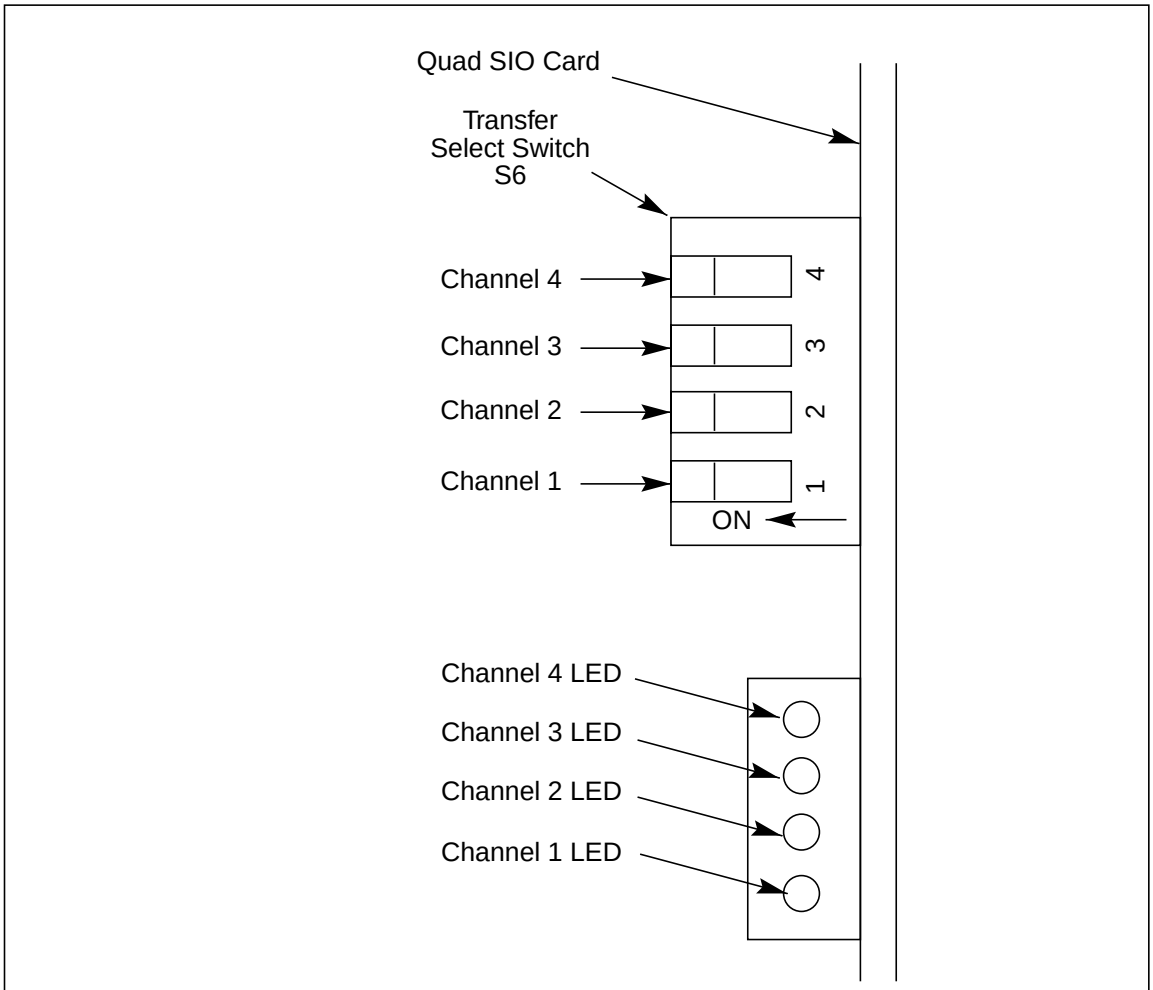
Note: This circuit pack supports polling on digital data lines or on an analog network.

Figure 3-1
Quad SIO (A6 and B6) circuit pack (NT6M60BA) baud rate selector switches



Note: 1. S2 (polling modem) is inactive if 56K polling is used.
2. This circuit pack supports polling on digital data lines or on an analog network.

Figure 3-1
Quad SIO (A6 and B6) circuit pack (NT6M60BA) peripheral switches and indicators



SWITCH S8 CHANNEL POSITIONS

FUNCTION	POSITION	LED
NORMAL	OFF	OFF
FORCED STAND-BY	ON	ON

Notes:
1. This circuit pack supports polling on digital data lines or on an analog network.
2. 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 S8 switch settings (1 through 4) must be off.

56K Interface circuit pack (NT6M94xx) - Turbo only

General description

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

56K Interface circuit pack 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 circuit pack 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 circuit pack (12 MHz) exceeds chip capability. The 6MHz (12 MHz divided by two) provided by the CPU is too slow for adequate SCC response.

Table 7-1 shows the five option jumpers on the circuit pack. Figure 7-1 shows jumper locations and circuit pack layout.

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

The 56K Interface circuit pack capabilities and functions include:

- Interface between DPP system backplane and 56K Crossover circuit pack.
- 512 bytes of bidirectional FIFO RAM for data passing to/from main CPU.
- Noninterrupt driven (polled) data and command port implementation allowing installation in any DPP 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. With DMA interface, yields baud rates greater than 56K bps.
- 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, 56Kbps/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 circuit pack. Interface to the 56K Crossover circuit pack is through the backplane via two 20 pin ribbon cables: one 40-pin cable with two 20-pin connectors.

Replacing the 56K Interface circuit pack

To replace the 56K Interface circuit pack, use the following procedure.

Procedure 7-1
Replacing the 56K Interface circuit pack - slot 7: part numbers NT6M94AA and NT6M94BA

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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.
20	Get the replacement 56K Interface circuit pack from the spares kit.
21	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
22	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
23	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 DPP: 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: `ONLY MODE NON-REDUNDANT`

Sheet 1 of 4

Procedure 7-1
Replacing the 56K Interface circuit pack - slot 7: part numbers NT6M94AA and NT6M94BA

Step	Description
24	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.
25	Remove the suspected faulty circuit pack.
26	Before installing the replacement PCA, any option jumper settings must be set to match the settings listed in Table 7-1.
	CAUTION Failure to set-up options correctly may cause an AMA loss.
27	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
28	Put faulty pack in the empty electrostatic bag.
29	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
30	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
31	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)** If all tests do not pass, contact the next level of support.

Procedure 7-1
Replacing the 56K Interface circuit pack - slot 7: part numbers NT6M94AA and NT6M94BA

Step	Description
32	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.
33	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
34	If alarm status shows active alarms, troubleshoot all alarm conditions. Enter: (at the terminal) **>TEST ACT (cr)** **>TEST STDBY (cr)** ***Note:*** The tests will take several minutes to execute, and the **program test** is the last test to run.

Procedure 7-1
Replacing the 56K Interface circuit pack - slot 7: part numbers NT6M94AA and NT6M94BA

Step	Description
35	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.
36	Test the Active processor. Enter: (at the terminal) **>TEST ACT (cr)** **>CP TEST ACT (cr)** **>TEST STDBY (cr)** **>CP TEST STDBY (cr)** ***Note:*** The tests will take several minutes to execute, and the **program test** is the last test to run.
37	Verify that the replacement circuit pack has corrected the original error.
38	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Table 7-1
56K interface circuit pack (A7 and B7) options - part numbers: NT6M94AA and NT6M94BA

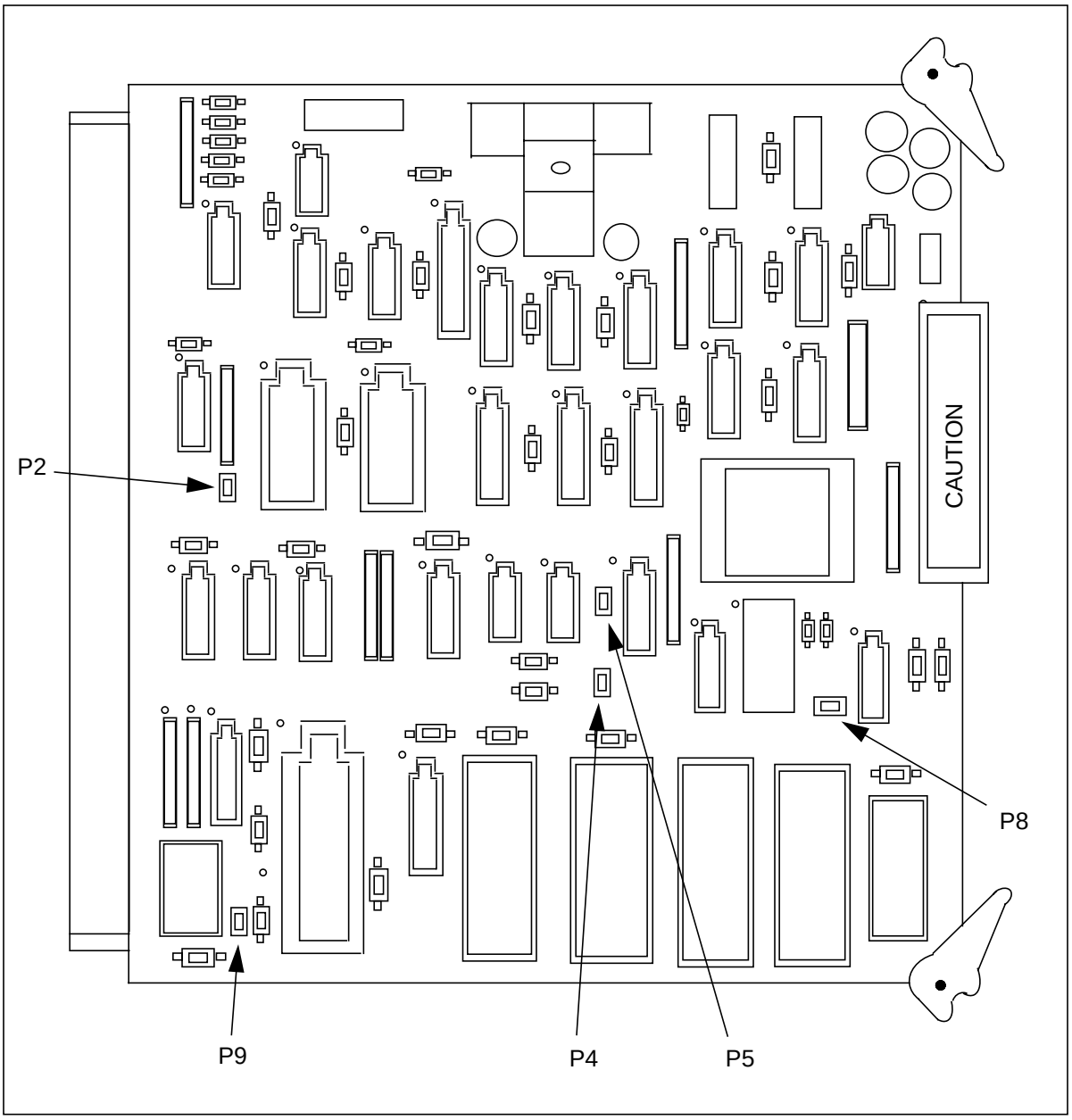
Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper (P2)	Out = select card 1 In = select card 2	Card 1 or 2 address selection	Out	
Jumper (P4)	Out = 256K (27C256) In = 512K (27C512)	256K/512K EPROM enable	Out	
Jumper (P5)	Out = disable watch dog timer In = enable watch dog 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 4: See Figure 7-1.

Note 5: There are no customer-definable options on this circuit pack. Information is shown for reference only. This data is to be used for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set-up the same as the circuit pack being replaced.

End

Figure 3-1
56K Interface (A7 and B7) circuit pack (NT6M94AA and NT6M94BA) options



High Performance Disk Interface circuit pack (NT6M66xx)

General description

The High Performance (H.P.) Disk Interface circuit pack, in slot 11 of the A and B chassis, is a smart circuit assembly, with its own Z80 microprocessor, EPROM, local RAM, and dual-ported RAM. It is a peripheral of the microprocessor on the main CPU at slot 1. The H.P. Disk Interface circuit pack is used only in Non-Turbo DPP systems equipped with 5 1/4" disk drives (72-, 140- or 380-Mbyte).

The H.P. Disk Interface circuit pack is the link to the disk drive and transfers data to and from the bus used for recording on or reading from the disk. The stored program on the H.P. Disk Interface circuit pack provides the write and read commands to the disk drive.

System interface is via the 100-pin edge connector.

See Table 8-1 for the two option jumpers on the circuit pack. Figure 8-1 shows jumper locations and circuit pack layout.

Replacing the H.P. Disk Interface circuit pack

To replace the H.P. Disk Interface circuit pack, use the following procedure.

Procedure 8-1
Replacing H.P. Disk Interface circuit pack (NT6M66AC, NT6M66AH or NT6M66AL) - slot 11

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
22	To remove the front panel of the DPP, 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.
23	Get the replacement circuit pack from the spares kit.
24	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
25	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
26	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 DPP: 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 3

Procedure 8-1
Replacing H.P. Disk Interface circuit pack (NT6M66AC, NT6M66AH or NT6M66AL) - slot 11

Step	Description
Note: This will create an alarm.	
27	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
28	Remove the suspected faulty circuit pack.
29	The replacement pack option settings must be set to match the settings listed in Table 8-1 or 8-2 before installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
30	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
31	Put faulty pack in the empty electrostatic bag.
32	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
33	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.

Procedure 8-1
Replacing H.P. Disk Interface circuit pack (NT6M66AC, NT6M66AH or NT6M66AL) - slot 11

Step	Description
34	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
35	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
36	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.
37	Verify replacement circuit pack has corrected original error.
38	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Table 8-1
Disk interface circuit pack (A11 and B11) options - part number: NT6M66AC and/or NT6M66AL; 72-Mbyte and 140-Mbyte disk drives

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper	None used			
A	In	Enable disk port interrupt	In	
R	In	Watchdog timer reset	In	
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			

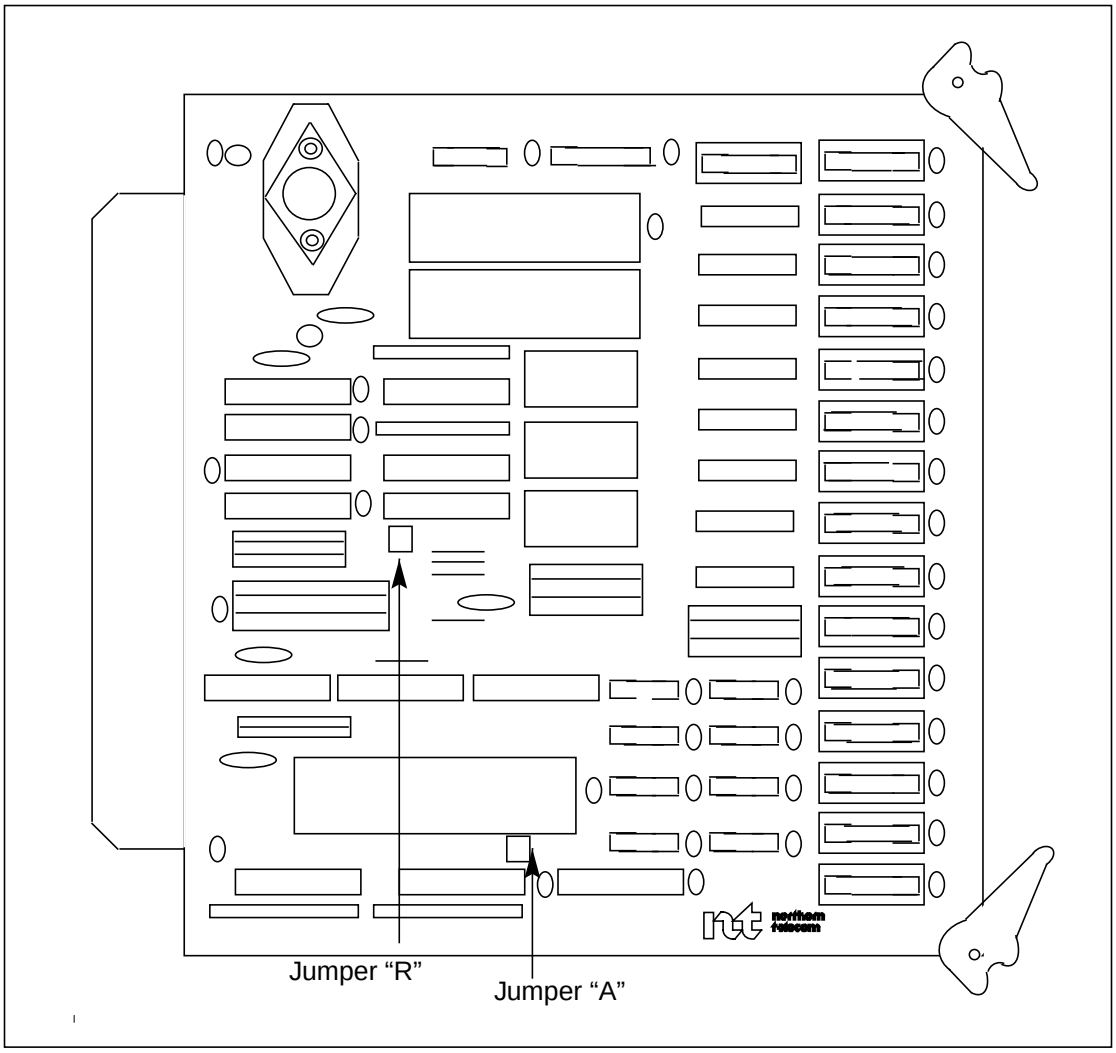
Note: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Table 8-2
Disk interface circuit pack (A11 and B11) options - part number: NT6M66AH; 380-Mbyte disk drives, DPP systems w/o 56K polling

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper	None used			
A	In	Enable disk port interrupt	In	
R	In	Watchdog timer reset	In	
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			

Note: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Figure 3-1
Disk Interface circuit pack (NT6M66AC, NT6M66AH, and NT6M66AL) options - slot 11



SCSI circuit pack (NT6M66xx) - Turbo only

General description

The Small Computer System Interface (SCSI) Interface circuit pack, in slot 11 of the A and B chassis of a Turbo DPP system, is a smart circuit assembly with its own 64180 microprocessor, EPROM, local RAM, and dual-ported RAM. It is considered a peripheral of the microprocessor on the main CPU (A1).

The SCSI circuit pack 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 circuit pack provides read and write commands to the disk drive.

This circuit pack 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 Main CP at slot 1. The SCSI circuit pack provides the following capabilities:

- Interface to implement 380-Mbyte disk drives with the 56K polling feature; must be equipped when 760-Mbyte, 1-Gigabyte and 2-Gigabyte disk drives are used.
- Interface between DPP 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).

- NCR 5386 SCSI Bus Controller running at 10 mHz. Cycle-Steal DMA yields approximately 0.4 Mbytes per second across the SCSI bus (only on NT6M66BA or NT6M66BD cards).
- 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).
- RS-232 compatible port for local diagnostics.

System interface is via the 100-pin edge connector.

Note: On the NT6M66BA and NT6M66BD cards, the EPROM at U3 is a 27C512 type. Removing jumper P1 and making the appropriate changes to the decode PAL at U23 allows a 27C256 type to be used.

See Table 9-1 for option settings on this circuit pack. Figure 9-1 shows the jumper locations and circuit packs' layout.

Replacing the SCSI circuit pack

To replace the SCSI circuit pack, use the following procedure.

Procedure 9-1
Replacing SCSI circuit pack (NT6M66BA, NT6M66BD or NT6M66CA) - slot 11

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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.
20	Get the replacement circuit pack from the spares kit.
21	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
22	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
23	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 DPP: 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.

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Procedure 9-1
Replacing SCSI circuit pack (NT6M66BA, NT6M66BD or NT6M66CA) - slot 11

Step	Description
Note: This will create an alarm.	
24	Enter the following commands to write the value 00 in the DRAM memory address 2204 for the off-line DSI cards: **>DOS S DSIMAINT MEMWRITE 1 2204 00 (cr)** **>DOS S DSIMAINT MEMWRITE 2 2204 00 (cr)**
25	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
26	Remove the suspected faulty circuit pack.
27	The replacement pack option settings must be set to match the settings listed in Table 9-1 before installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
28	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
29	Put faulty pack in the empty electrostatic bag.
30	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.

Procedure 9-1
Replacing SCSI circuit pack (NT6M66BA, NT6M66BD or NT6M66CA) - slot 11

Step	Description
31	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
32	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
33	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
34	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.

Procedure 9-1
Replacing SCSI circuit pack (NT6M66BA, NT6M66BD or NT6M66CA) - slot 11

Step	Description
35	Verify replacement circuit pack has corrected original error.
36	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Table 9-1
SCSI circuit pack (A11 and B11) options - part number: NT6M66BA; 380-Mbyte disk drives with 56K polling and 760-Mbyte Disk Drives and NT6M66BD; no longer supported

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper P1	Out = 256K (27C256) In = 512K (27C512)	256K/512K EPROM enable	In	
P4	Out = NMI disable In = NMI enable	NMI control	In	
P5	Out = Watchdog disable In = Watchdog enable	Watchdog timer control	In	
P6	Out = Normal Arbitration In = Arbitration gated with BUSY	Arbitration - In position is compatible with standard disk crossover PCAs	Out	
P7	Out = BSYIN/BSYOUT separate In = BSYIN/BSYOUT tie together	In position is compatible with standard disk crossover PCAs	Out	
P8	Out = A select In = Select disk crossover A	Out position is compatible with standard disk crossover PCAs	In	
P9	Out = CPU clock disable In = CPU clock enable	CPU clock control	In	
P11	Out = SCCI clock disable In = SCCI clock enable	CPU 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 circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or pack replacement to make sure the replacement pack is set up the same as the pack being replaced.

Figure 3-1
SCSI circuit pack (NT6M66BA; 380-Mbyte disk drives with 56K polling and 760-Mbyte disk drives and NT6M66BD; no longer supported) options - slot 11

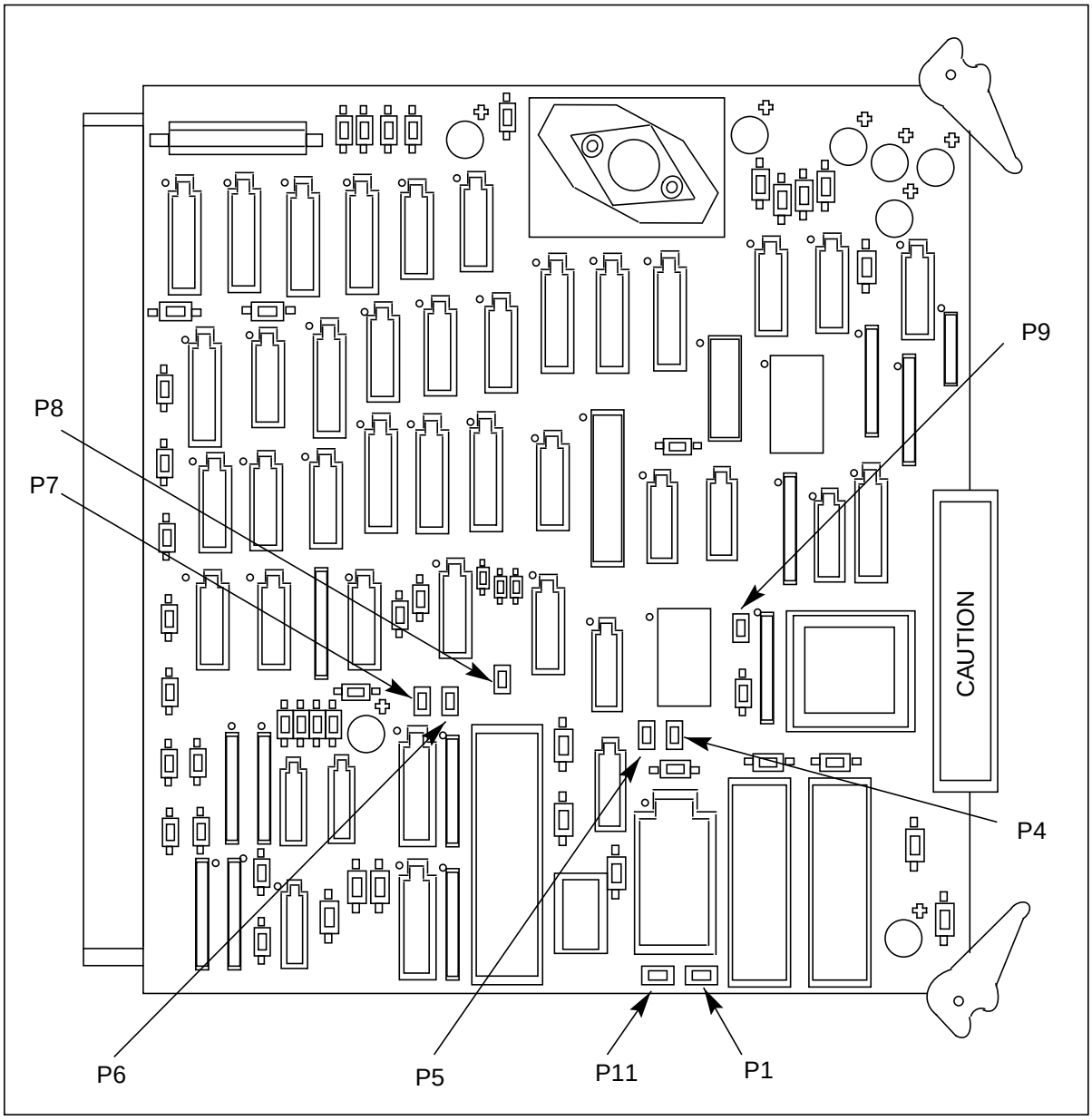
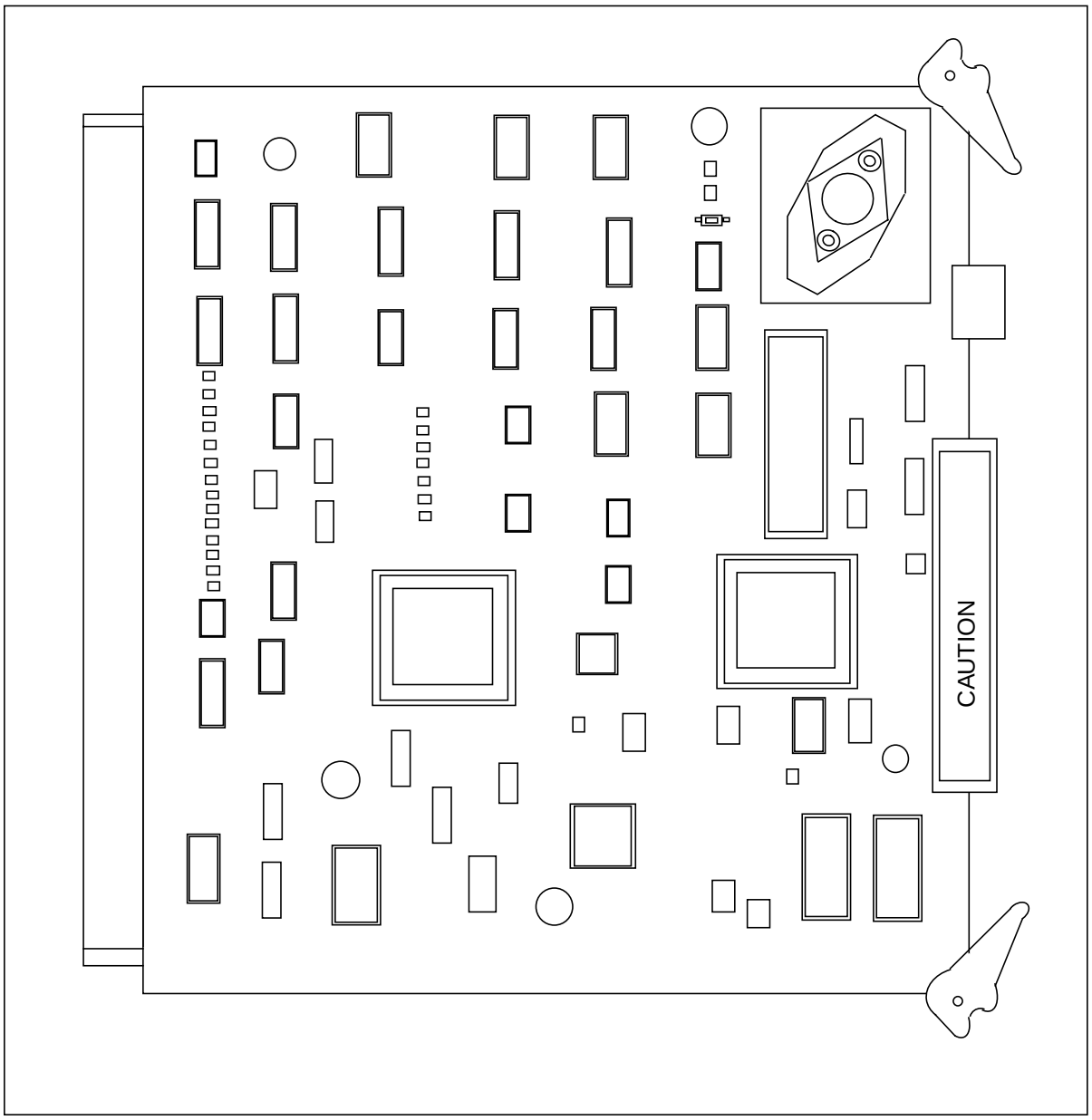


Table 9-2
SCSI circuit pack (A11 and B11) options - part number: NT6M66CA; 1- and 2-Gbyte disk drives

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 circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or pack replacement to make sure the replacement pack is set up the same as the pack being replaced.

Figure 3-1
SCSI circuit pack (NT6M66CA; 1- and 2-Gbyte disk drives) options - slot 11



Data Stream Interface circuit pack (NT6M70xx)

General description

The DPP application eliminates the Magnetic Tape Drives (MTDs) used with the DMS-100 to collect AMA. Data Stream Interface (DSI) circuit packs (slots 12 and 13 in the A and B chassis) in the DPP replace the MTDs.

The DSI packs are smart circuit assemblies, each with its own Z80 microprocessors, EPROM resident software programs, and RAM. Since MTD emulation requires the DPP to maintain redundant communication with the DMS-100 Mag Tape Ports, the DSI circuit packs are active devices. The DSI software program receives and processes commands the DMS-100 normally sends to the MTD. This software also responds with the status and strobe signals the MTDs normally return to the DMS-100. Furthermore, these packs handle the call record data from the DMS-100.

Primary function

The DSI circuit packs' main function is to receive call record AMA data blocks from the DMS-100, 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 DMS-100 MTD ports come through the interface box ribbon cables and adapters and arrive at the DSI circuit packs' input ports.

Cable adapter assemblies

The MTD data path from the DMS-100 to DPP is through DSI cable adapter assemblies in interface boxes installed near the DPP. These assemblies duplicate the connections for the cables that normally interface the DMS-100 to the MTDs. The DMS-100 MTD ports plug into an interface box that provides connectors for the control and status, read, and write leads from the DMS-100. System signals are passed through the interface boxes to J connectors on the DPP. From the J connectors, the signals are routed internally to the DPP DSI circuit packs.

See Table 10-1 for option settings on this circuit pack. Figure 10-1 shows the jumper locations and circuit packs' layout.

Procedure 10-1
Replacing DSI circuit pack (NT6M70AA, NT6M70CF or NT6M70AC) - slots 12 and 13

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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.
20	Get the replacement circuit pack from the spares kit.
21	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
22	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor. Verify that the release number for any applicable firmware on the replacement circuit pack is the same or higher as the release number found on the faulty circuit pack.
23	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 DPP: 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.

Procedure 10-1
Replacing DSI circuit pack (NT6M70AA, NT6M70CF or NT6M70AC) - slots 12 and 13

Step	Description
24	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
25	Remove the suspected faulty circuit pack.
26	The replacement pack option settings must be set to match the settings listed in Table 10-1 or Table 10-2 before installation.  CAUTION Failure to set-up options correctly may cause AMA loss.
27	Insert the spare circuit pack in the vacated card slot, making sure it is fully seated.
28	Put faulty pack in the empty electrostatic bag.
29	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
30	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
31	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.

Procedure 10-1
Replacing DSI circuit pack (NT6M70AA, NT6M70CF or NT6M70AC) - slots 12 and 13

Step	Description
32	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
33	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.
34	Verify replacement circuit pack has corrected original error.
35	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

Table 10-1
DSI circuit packs (slots 12 and 13) options - part number: NT6M70AA and NT6M70CF

Device type (number)	Position/setting	Function	Setting Factory	Setting On-site
Strap	None used			
DIP Switch Slot 12 (S1)			@S1 1 = On 6 = On 8 = On 10 = On 2 = Off 3 = Off 4 = Off 5 = Off 7 = Off 9 = Off	Must be the same as the factory setting.
DIP Switch Slot 13 (S1)			@S1 6 = On 8 = On 10 = On 1 = Off 2 = Off 3 = Off 4 = Off 5 = Off 7 = Off 9 = Off	Must be the same as the factory setting.
DIP Switch Slots 12 and 13 (S2)			@S2 1 = On 4 = On 2 = Off 3 = Off	Must be the same as the factory setting.
Rotary Switch	None used			
Switch	None used			
Jumper	None used			

Note 3: See Figure 10- 1.

Note 4: There are no customer-definable options on this circuit packs. Information is shown for reference purposes only. This data is to be used for verification during initial DPP system installation and/or circuit packs replacement to make certain that the replacement circuit packs is set-up the same as the circuit packs being replaced.

Figure 3-1
DSI (slots 12 and 13) circuit packs (NT6M70AA and NT6M70CF) options

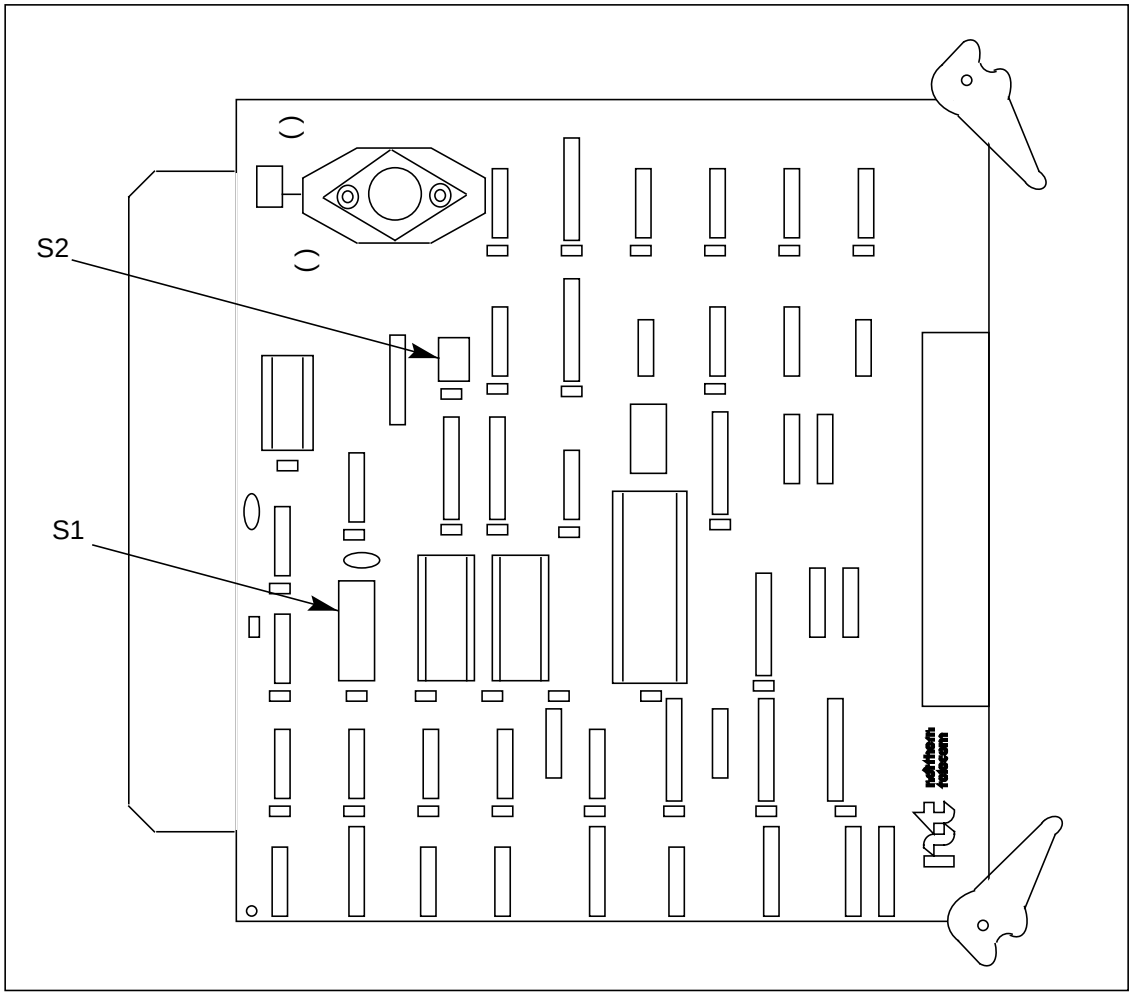


Table 10-2
DSI circuit packs (slots 12 and 13) options - part number: NT6M70AC

Device type (number)	Position/setting		Function		Setting: Factory	Setting: On-site
Strap	x = strap to center post A B C D E F G H		U42 and U41 Chip type; strap to use with:			
	X		2732A	U42	B, D	Must be the same as the factory setting.
	X X		2764	U42		
	X X X		27128	U42		
	X X X		27256	U42		
	X		27512	U42		
	X		8K x 8 RAM2	U52[2]	G	
	X		32K x 8 RAM2	U52[2]		
	U42 EPROM SIZE	2764	Straps: B, D		In (Typical)	Note: PIN 1 is shown as white dot on PCB. 1=A,D,G
		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[2]	8K x 8	SW1 position: 8 9		On (Typical) Off	
		32K x 8	SW1 position: 9 8		On (Alternate RAM) Off	
	U52 RAM SIZE[2]	8K x 8	Straps: G		In (Typical)	
		32K x 8	Straps: H		In	
DIP Switch Slot 12 (S1)	(X = On) 1 2 3 4 5 6 7 8 9		Select:		@S1	Must be the same as the factory setting.
	1 and 2 Off		DSI1		2 = On	
	X		DSI2		3 = On	
	X		DSI3		7 = On	
	X X		DSI4		8 = On	
		X	32K x 8 RAM1 U41[2]		1 = Off	
		X	8K x 8 RAM1 U41[2]		4 = Off	
		X	12.5 ips		5 = Off	
		X	25/37.5 ips		6 = Off	
		X	45 ips		9 = Off	
		X	0.4 to 0.8 MS			
		X	0.6 to 1.6 MS			
			ms = microsecond			

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Table 10-2
DSI circuit packs (slots 12 and 13) options - part number: NT6M70AC

Device type (number)	Position/setting	Function	Setting: Factory	Setting: On-site
DIP Switch Slot 13 (S1)	(X = On) 1 2 3 4 5 6 7 8 9 1 and 2 Off X X X X X X X X X	Select: DSI1 DSI2 DSI3 DSI4 32K x 8 RAM1 U41[3] 8K x 8 RAM1 U41[3] 12.5 ips 25/37.5 ips 45 ips 0.4 to 0.8 MS 0.8 to 1.6 MS ms = microsecond	@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)			@S2 1 = On 4 = On 2 = Off 3 = Off	Must be the same as the factory setting.
Rotary Switch	None used			
Jumper	All out			
Switch	None used			

Note 5: There are no customer-definable options on this circuit packs. Information is for reference only. Use this data for verification during initial DPP system installation and/or circuit packs replacement to make sure the replacement circuit packs are set up the same as the circuit packs being replaced.

Note 6: 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.

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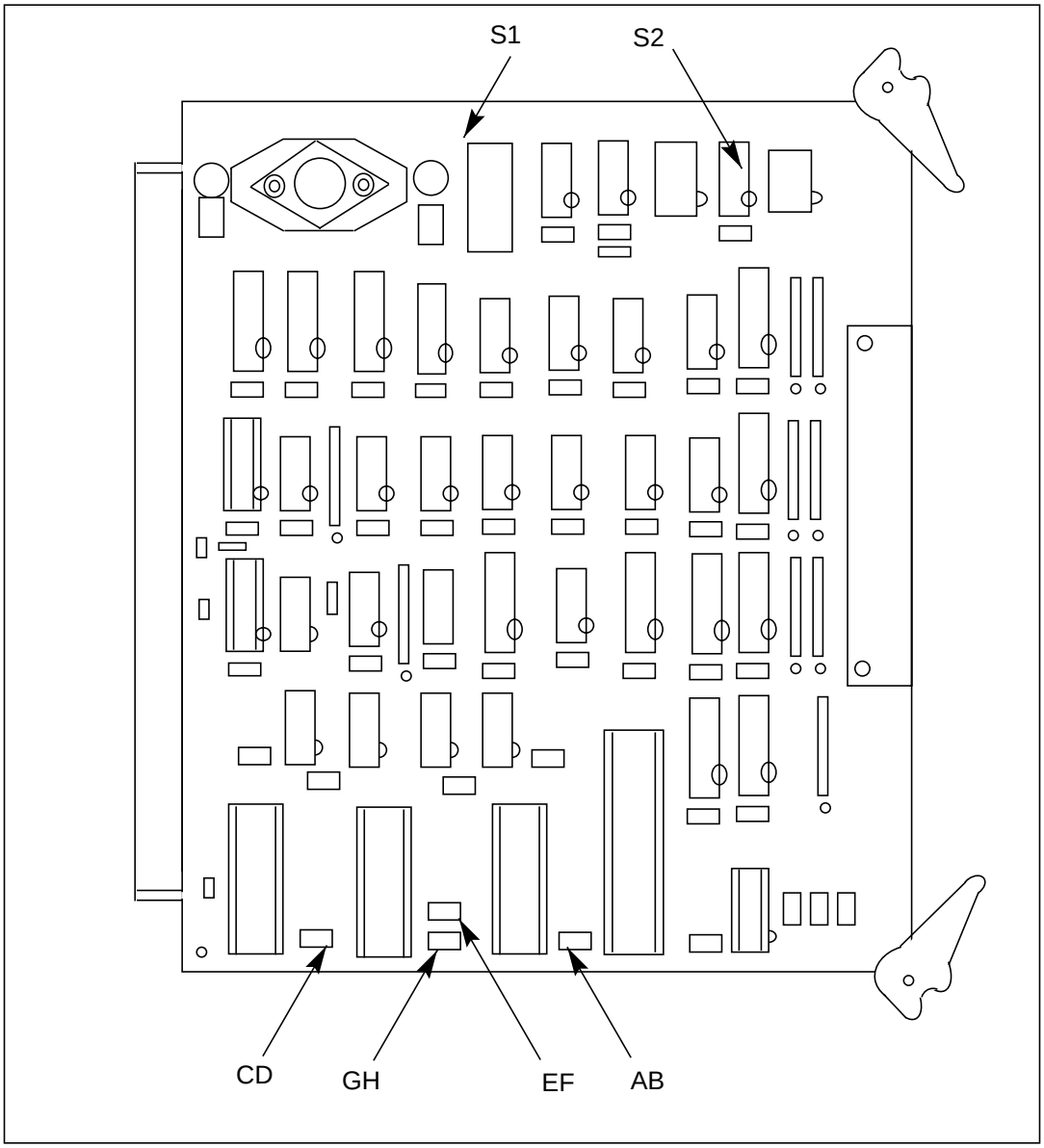
Figure 3-1
Data stream interface (A12, B12, A13, and B13) circuit packs (NT6M70AC) options



Bus terminator circuit pack (NT6M68AA)

General description

The bus terminator circuit pack, 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.

See Table 11-1 for the option settings on this circuit pack. Figure 11-1 shows the circuit pack layout.

Replace Bus Terminator circuit pack

First identify the failing circuit pack to determine which processor (A or B) is off-line. See the following procedure for replacing this pack.

Procedure 11-1
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	Get the DPP's model number from the DPP nameplate (A chassis, rear panel) WARNING Perform this procedure during low traffic.
20	To remove the front panel of the DPP, 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.
21	Get the replacement circuit pack from the spares kit.
22	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
23	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor.

Procedure 11-1
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
24	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 DPP: 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.
25	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
26	Remove the cables from the front of the DSI circuit packs (slots 12 and 13). Cable on the left goes to slot 12; cable on the right goes to slot 13.
27	Remove the DSI circuit packs (slots 12 and 13) and the Disk/SCSI Interface circuit pack (slot 11). Removing these packs creates room. Identify the DSI circuit packs to ensure that they are returned to the correct slot.
28	Remove the two screws from the ribbon cable shield. Save the screws and shield.
29	Hold the cables out of the way. Remove the suspected faulty Bus Terminator circuit pack (using firm, even pressure) by inserting a finger in the hole in the circuit pack.
30	Insert the replacement Bus Terminator circuit pack. This pack requires high insertion force for proper seating. Use a thimble or other mechanical aid.
31	Put faulty pack in the empty electrostatic bag.
32	Fold the DSI cables back into position along the outer wall of the chassis.
33	Remount the ribbon cable shield over the DSI cables. If the shield does not fit properly, check the folding of the DSI cables. Do not crimp these cables.

Sheet 2 of 4

Procedure 11-1
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
34	Insert the two screws to hold the cable shield in place. Do not overtighten.
35	Reinsert the DSI circuit packs (slots 12 and 13) and the Disk/SCSI Interface circuit pack (slot 11). Return the DSI circuit packs to the appropriate locations.
36	Reattach the DSI cables.
37	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
38	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
39	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.
40	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
41	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.

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Procedure 11-1
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers G12 or earlier (e.g., D09 or E12)

Step	Description
	WARNING This should not be done at a high traffic period, it may cause a loss of AMA.
42	Verify replacement circuit pack has corrected original error.
43	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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Procedure 11-2
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers H01 or later

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
44	Get the DPP's model number from the DPP 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.
45	To remove the front panel of the DPP, 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.
46	Get the replacement circuit pack from the spares kit.
47	Remove the protective electrostatic bag and place it on a suitable, grounded surface.
48	Make sure the replacement circuit pack matches the faulty circuit packs part number and has the correct revision level. Also, make sure the suspected faulty pack is in the standby processor.

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Procedure 11-2
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers H01 or later

Step	Description
49	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 DPP: 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.
50	Remove power from the standby DPP chassis by operation of the +8 V dc red rocker switch on the power supply. (A or B, the one with the suspected fault.)
51	Remove the cables from the front of the DSI circuit packs (slots 12 and 13). Cable on the left goes to slot 12; cable on the right goes to slot 13.
52	Remove the DSI circuit packs (slots 12 and 13) and the Disk/SCSI Interface circuit pack (slot 11). Removing these packs creates room. Identify the DSI circuit packs to ensure that they are returned to the correct slot.
53	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 DPP. The cardboard prevents the loss of the screws to be removed.
54	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 DPP mounting bracket. If the DPP 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 DPP shipping items.
55	Hold the cables out of the way. Remove the suspected faulty Bus Terminator circuit pack (using firm, even pressure) by inserting a finger in the hole in the circuit pack.
56	Insert the replacement Bus Terminator circuit pack. This pack requires high insertion force for proper seating. Use a thimble or other mechanical aid.

Sheet 2 of 4

Procedure 11-2
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers H01 or later

Step	Description
57	Put faulty pack in the empty electrostatic bag.
58	Fold the DSI cables back into position along the outer wall of the chassis.
59	Remount the ribbon cable shield over the DSI cables. If the shield does not fit properly, check the folding of the DSI cables. Do not crimp these cables.
60	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.
61	Reinsert the DSI circuit packs (slots 12 and 13) and the Disk/SCSI Interface circuit pack (slot 11). Return the DSI circuit packs to the appropriate locations.
62	Reattach the DSI cables.
63	Apply power to the DPP 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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
64	To clear any alarms on the standby processor, enter the following at the maintenance terminal: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
65	To place the active processor unit in PRIME mode, perform the following steps at the Switch and Status Panel of the DPP: 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.

Procedure 11-2
Replacing Bus Terminator circuit pack (NT6M68AA) - version numbers H01 or later

Step	Description
66	To clear all alarms on the active processor, enter the following at the maintenance terminal: **>RSERR ACT 00(cr)** Alarms will clear if there are no faults.
67	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.
68	Verify replacement circuit pack has corrected original error.
69	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

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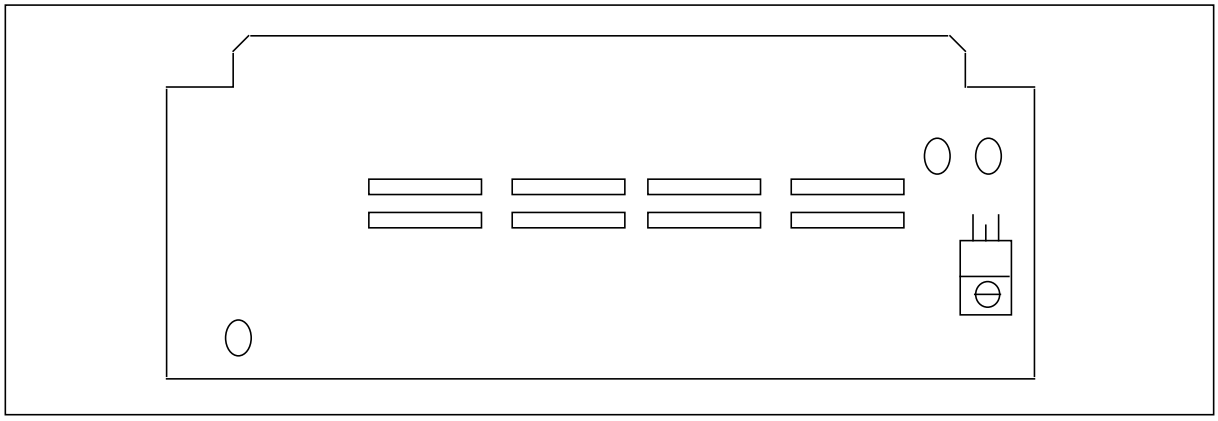
Table 11-1
Bus Terminator circuit pack (slot 14) options - part number: NT6M68AA

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 circuit packs. Information is shown for reference purposes only. This data is to be used for verification during initial DPP system installation and/or circuit packs replacement to make certain that the replacement circuit packs is set-up the same as the circuit packs being replaced.

Figure 3-1
Bus Terminator (slot 14) circuit packs (NT6M68AA) options



Power and Alarm Communications circuit pack (NT6M84xx)

General description

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

The P/A Comm circuitry detects the loss of output voltages from the DPP 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, signalling an alarm condition.

This circuitry also provides operating power for the circuit pack. 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 circuit pack as long as at least DPP 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 circuitry also generates external alarms using signals from the Error Control II circuit pack. Three relays on this pack signal alarm conditions to devices outside the DPP. The circuits which drive these relays are also on the circuit pack. The three relays follow:

- K1 - Minor Alarm
- K2 - Major Alarm
- K3 - Critical Alarm.

The ac clock circuit generates timing pulses from a 19 V ac, 60 Hz external source, if equipped. Two such circuits can be provided, one for each DPP chassis. In the circuit, a 60 Hz input is fed to an ac optocoupler to prevent ground noise. The optocoupler produces a 120 Hz signal, divided by two to

produce a 60 Hz signal. This signal drives a transistor, providing extra drive capability for sending to the CTC on the CPU circuit pack.

The P/A Comm pack contains up to eight serial channels; only four are used. These four are configured as a 2-input, 1-output switch. The input is connected to the Quad SIO circuit packs in the DPP card racks. The input interface consists of eight signal lines (plus ground) for each channel. These lines are connected to a tristatable octal buffer integrated circuit. The -ASEL signal from the Error Control II circuit pack determines the input-to-output connection.

The P/A Comm circuit pack may use either internal or external transmit clocks for all eight channels. Select the clock source by switches S1 and S2, located as shown in Figure 12-2. Externally transmitted clock signals from the eight outputs are connected to clock lines on the Quad SIO circuit pack. See Table 12-1, Table 12-2, and Table 12-3.

Replacing P/A COMM circuit pack

To replace the P/A Comm circuit pack, use the following procedure.

Procedure 12-1
Replacing the P/A Comm circuit pack (NT6M84AA or NT6M84BA)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
28	Make sure no polling is occurring. Wait for a low traffic period, if possible.
29	Remove the slotted screws that fasten the outer edges of the rear panel assembly to the cabinet.
30	Remove the front panel of the A chassis. Put the two panels in a safe place to prevent bending and scratching.

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Procedure 12-1
Replacing the P/A Comm circuit pack (NT6M84AA or NT6M84BA)

Step	Description
31	Remove the power from the circuit pack 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 DPP status panel lights will all be off. This is normal. Silence the alarm at the switching system and go to step 5.
32	Remove the screws that fasten the P/A Comm circuit pack. Gently remove the circuit pack from its mounting position.
33	Make sure any circuit pack option settings are set the same as the settings listed in Table 12-1, 12-2 or 12-3 prior to installation. ***Note:*** Improper performance can be caused by incorrect settings, and produce fault-like symptoms in the DPP.
34	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.
35	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.
36	Properly reroute all cables. Make sure all wires and cables are routed so they are not pinched.

Procedure 12-1
Replacing the P/A Comm circuit pack (NT6M84AA or NT6M84BA)

Step	Description
37	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
38	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR 00 STDBY (cr)** Alarms will clear on the standby processor if there are no faults.
39	If DPP status panel shows processor is in **ONL** mode go to step 13, otherwise go to step 14.
40	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.
41	Verify replacement circuit pack has corrected original error.
42	Test the polling function on the Non-Turbo DPP only.
43	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 DPP 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.

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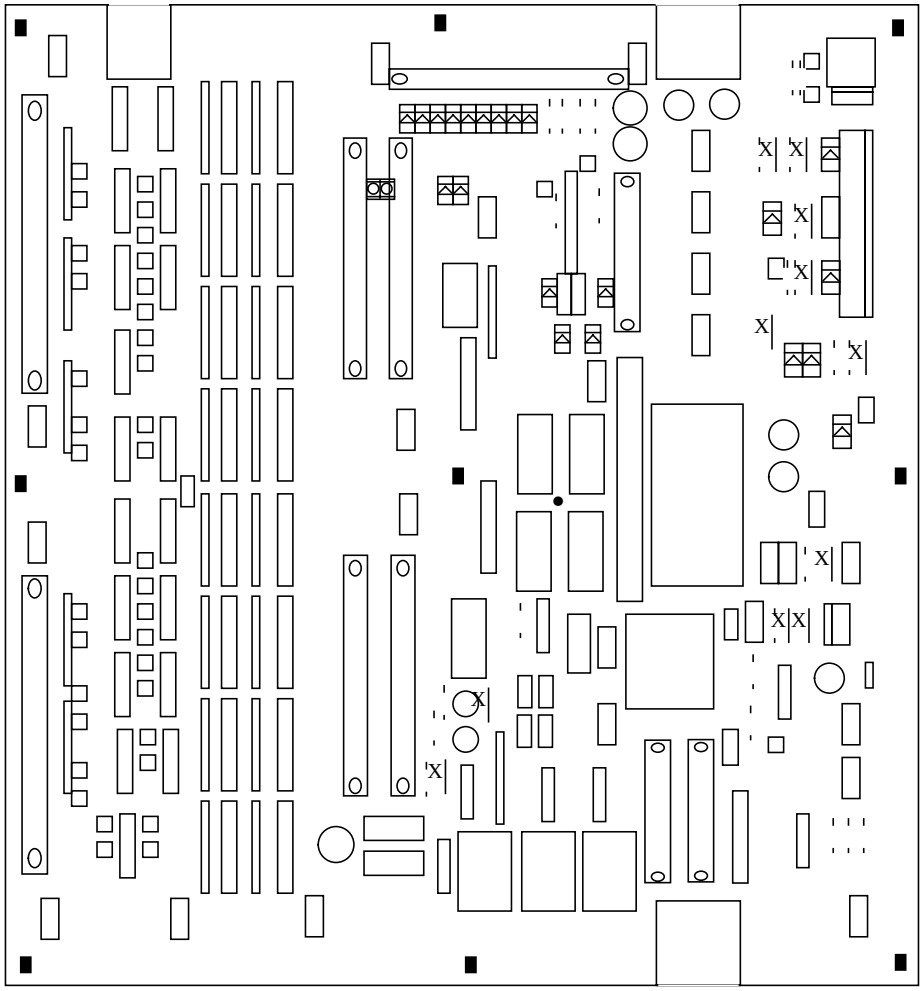
Figure 3-1
P/A Comm (A16) circuit pack (NT6M64AA; release 01-06) options



Notes:
1. This circuit pack does not support polling on digital data lines; use for an analog network only.
2. There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

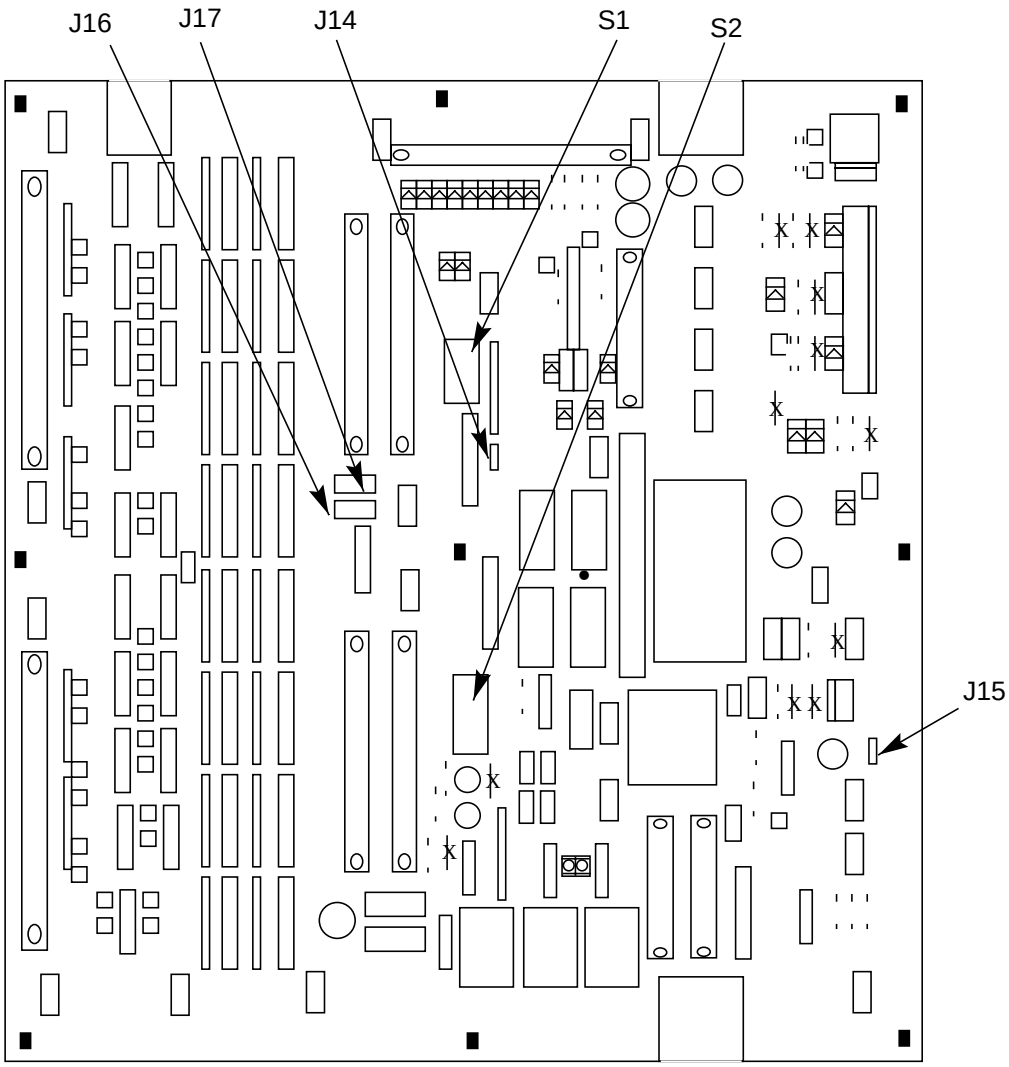
Table 12-1
P/A Comm circuit pack (A16) options - part number: NT6M84AA (release 01-06)

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 3: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Note 4: This circuit pack does not support polling on digital data lines; use for an analog network only.

Figure 3-1
Power and alarm communications (A16) circuit pack (NT6M84AA; release 07 and NT6M84BA) options



Notes: 1. The NT6M84AA, release 07, does not support polling on digital data lines; use for an analog network only.

2. The NT6M84BA supports polling on digital data lines and analog networks.

Table 12-2
Power and alarm communications circuit pack (A16) options - part number: NT6M84AA (release 07)

Device type (number)	Position/setting		Function	Setting	
				Factory	On-site
Jumper (J14)	1-2 2-3	ASEL Control CPUSEL Control	Crossover Control Select - Control the leads from the Error Control II circuit pack to determine which CPU has control of the Crossover circuitry.	1-2	Must be the same as the factory setting.
Jumper (J15)	1-2 2-3	Rover terminal jack enabled. Rover terminal jack disabled.	Rover terminal select control.	1-2	Must be the same as the factory setting.
Jumper (J16)	1-2 2-3	channel 4 on the Quad SIO controlled by the Quad SIO and the setting of J14. channel 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 the same as the factory setting.
Jumper (J17)	1-2 2-3	channel 4 on the Quad SIO controlled by the setting of J14. channel 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 the same as the factory setting.

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Table 12-2
Power and alarm communications circuit pack (A16) options - part number: NT6M84AA (release 07)

Device type (number)	Position/setting			Function	Setting	
					Factory	On-site
Strap	None used					
DIP Switch (S1)[4]	Chan. No.	Int/ Ext	SW1-SW2 Setting			
	1	Int	SW1-1, 5 Off	With SW2, transmit clock selection, (internal or external)	Off	
		Ext	SW1-1, 5 On			
	2	Int	SW1-2, 6 Off		Off	
		Ext	SW1-2, 6 On	With SW1, transmit clock selection, (internal or external)		
	3	Int	SW1-3, 7 Off		Off	
		Ext	SW1-3, 7 On			
	4	Int	SW1-4, 8 Off		Off	
		Ext	SW1-4, 8 On	(Internal clock is from the Quad SIO in slot A1AxA6.)		
Rotary Switch	None used					
Switch	None used					

Note 5: See Figure 12-2.

Note 6: This circuit pack does not support polling on digital data lines; use for an analog network only.

Note 7: Do not set these switches (S-1 and S-2) to the On position; doing so disables the communication path through the associated channel.

Note 8: S1 and S2 settings are customer-definable based on whether communications are over digital or analog lines. See the following chart for digital guidelines. Use these guidelines for to determine the site settings for SW1 and SW2.

a. If channel A, J1 (BX.25 Polling for DPP systems w/o 56K polling) is done over a digital line:
   SW1 positions 1 and 5 ON
   all others Off

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Table 12-3
Power and alarm communications circuit pack (A16) options - part number: NT6M84BA

Device type (number)	Position/setting		Function	Setting	
				Factory	On-site
Jumper (J14)	1-2 2-3	ASEL Control CPUSEL Control	Crossover Control Select - Control the leads from the Error Control II circuit pack to determine which CPU has control of the Crossover circuitry.	1-2	Must be the same as the factory setting.
Jumper (J15)	1-2 2-3	Rover terminal jack enabled. Rover terminal jack disabled.	Rover terminal select control.	1-2	Must be the same as the factory setting.
Jumper (J16)	1-2 2-3	channel 4 on the Quad SIO controlled by the Quad SIO and the setting of J14. channel 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 the same as the factory setting.
Jumper (J17)	1-2 2-3	channel 4 on the Quad SIO controlled by the setting of J14. channel 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 the same as the factory setting.
Rotary Switch	None used				
Switch	None used				

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Table 12-3
Power and alarm communications circuit pack (A16) options - part number: NT6M84BA

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Strap	None used			

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Table 12-3
Power and alarm communications circuit pack (A16) options - part number: NT6M84BA

Device type (number)	Position/setting			Function	Setting	
					Factory	On-site
DIP Switch (S1)[4]	Chan. No.	Int/ Ext	S1-S2 Setting			
	1	Int	S1-1, 5 Off	With S2, transmit clock selection, (internal or external)	Off	
		Ext	S1-1, 5 On			
	2	Int	S1-2, 6 Off	With S1, transmit clock selection, (internal or external)	Off	
		Ext	S1-2, 6 On			
	3	Int	S1-3, 7 Off	(Internal clock is from the Quad SIO in slot A1AxA6.)	Off	
		Ext	S1-3, 7 On			
	4	Int	S1-4, 8 Off			
		Ext	S1-4, 8 On			

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Table 12-3
Power and alarm communications circuit pack (A16) options - part number: NT6M84BA

Device type (number)		Position/setting		Function	Setting	
					Factory	On-site
DIP Switch (S2)[4]	Chan. No.	Int/ Ext	S1-S2 Setting			
	5	Int	S2-1, 5 Off	(External clock is derived by looping around the TCIn signals.)	Off	
		Ext	S2-1, 5 On			
	6	Int	S2-2, 6 Off		Off	
		Ext	S2-2, 6 On			
	7	Int	S2-3, 7 Off		Off	
		Ext	S2-3, 7 On			
	8	Int	S2-4, 8 Off		Off	
		Ext	S2-4, 8 On			

Note 9: This circuit pack supports polling on digital data lines or on an analog network. For use with digital lines check that:
a. DPP systems is BCS25-35
b. Quad SIO circuit pack at A6 and B6 is part number NT6M60BA
c. Four Channel Comm circuit pack at A17 is release 03, or later
d. Collector supports the digital data line feature.

Note 10: Factory settings shown are for an analog network only.

Note 11: S1 and S2 settings are customer-definable based on whether communications use analog or digital data lines. See the following chart for the digital application to determine the on-site settings for SW1 and SW2:
a. If channel A, J1 (BX.25 Polling for BCS25-35 DPP systems w/o 56K polling) is done over a digital data line:
SW1 positions 1 and 5 On
All other Off

Note 12: Make sure the settings for internal and external transmit receive clocks agree with the settings on the QSIO circuit packs in A6 and B6 before working with digital data lines.

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Disk Crossover and Disk Controller circuit packs (NT6M72xx and 680-9143)

General description

The Disk Crossover (Xovr) circuit packs provide the data and control paths between the Disk Interface circuit pack in the card rack and the disk drives for Non-Turbo DPP systems. For crossover information in Turbo DPP systems, refer to the *SCSI Crossover circuit pack* section.

The Disk Crossover circuit pack is on the inside of the hinged panel, A15 and B15, at the rear of each DPP chassis. This pack provides a crossover data path between the processors and the disk. The program in the active processing unit controls this pack which simultaneously routes data from the active Disk Interface circuit pack to both disk drives.

For 380- and 760-Mbyte and 1- and 2-Gigabyte disk drives, the Disk Controller circuit pack is inside the disk drive. For the 72- and 140-Mbyte drives, the Disk Controller circuit pack is on the top of the disk assembly. This circuit pack is in the data path between the Disk Xovr circuit pack and the disk drive. The Disk Controller circuit pack is a smart circuit assembly, containing a processor, RAM, EPROM, and additional control circuitry. Control signals (status commands, write signals, and read signals) are passed through this pack, which initiates the appropriate operation in the disk drive.

See Table 13-1 for the jumper option setting on the Disk II Crossover circuit pack. Figure 13-1 shows the jumper location and circuit pack layout. The Disk Controller options are described in Table 13-2.

Replacing Disk Crossover circuit pack

To replace the Disk Crossover circuit pack, use the following procedure.

Procedure 13-1
Replacing the Disk XOVR circuit pack (NT6M72AC, NT6M72AD or NT6M72AE)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
17	Make sure no polling is occurring. Wait for a low traffic period, if possible.

18	Locate the failing Disk Crossover circuit pack 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 Disk Crossover circuit pack.
	
	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`

Procedure 13-1
Replacing the Disk XOVR circuit pack (NT6M72AC, NT6M72AD or NT6M72AE)

Step	Description
19	Place the DPP into an ONLY processor mode. The processor mode should match the disk mode. At the Switch and Status Panel of the DPP: 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.
20	Loosen the slotted screws which fasten the outer edges of the appropriate rear panel assembly to the cabinet.
21	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.
22	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 circuit pack at A15 is being replaced, use a Styrofoam block or another insulating material, about 1" x 1" x.5", to insulate the pins of the 16-pin cable on the P/A Comm circuit pack to prevent accidental shorting against the chassis.
23	Remove power cable (J4), then any cables and screws connected to the suspected circuit pack. ***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.
24	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 Disk XOVR card in the A chassis, be sure to place the jumper on pin A and the center pin. When replacing the Disk XOVR card in the B chassis, be sure to place the jumper on pin B and the center pin.

Procedure 13-1
Replacing the Disk XOVR circuit pack (NT6M72AC, NT6M72AD or NT6M72AE)

Step	Description
25	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.

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Procedure 13-1
Replacing the Disk XOVR circuit pack (NT6M72AC, NT6M72AD or NT6M72AE)

Step	Description
26	Reattach any cables removed in step 7 in reverse order. ***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.
27	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 DPP 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)
28	Remove the insulating material, if used. Route all wires and cables to avoid pinching or crimping when the rear panel is reinstalled.
29	Lift the hinged circuit assembly gate back to its vertical position and tighten the two screws loosened in step 6.

Procedure 13-1
Replacing the Disk XOVR circuit pack (NT6M72AC, NT6M72AD or NT6M72AE)

Step	Description
30	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.
31	Clear any alarms on the DPP. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** **>RSERR STDBY 00 (cr)** Alarms will stay clear on the DPP if there are no faults.
32	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.
33	When all maintenance activities are complete, be sure to replace the front panel of the DPP 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.

Figure 3-1
Disk II Crossover (A15 and B15) circuit pack (NT6M72AC, NT6M72AD, and NT6M72AE; 72-, 140- and 380-Mbyte disk drives for Non-Turbo DPPs

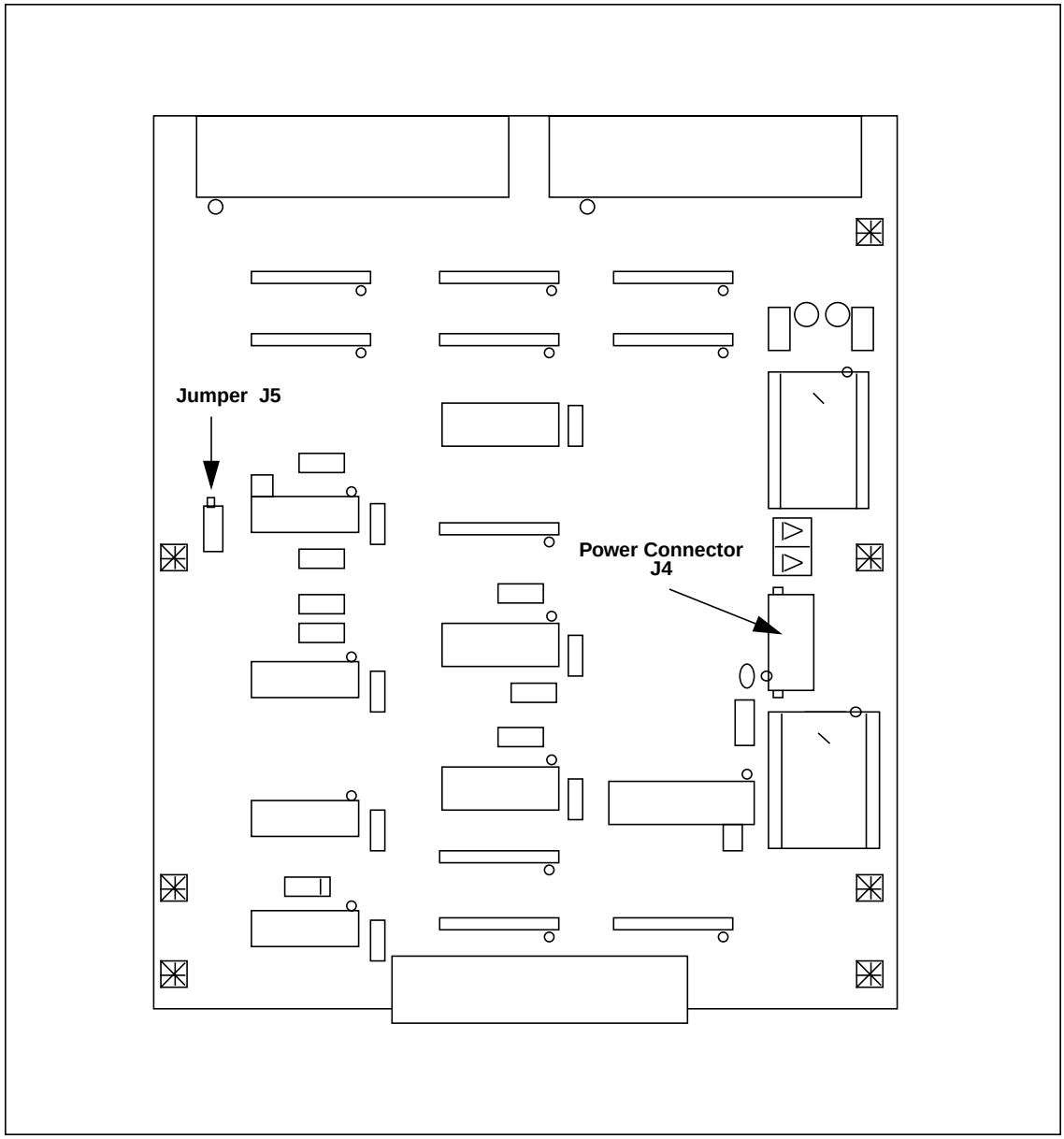


Table 13-1
Disk II crossover circuit pack (A15 and B15) options - part number: NT6M72AC, NT6M72AD, and NT6M72AE; 72-, 140, and 380-Mbyte disk drives for Non-Turbo DPPs

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper (J5)	Center pin to A pin Center pin to B pin	Processor A select Processor B select	Refer to notes 3 and 4.	
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note 5: Make sure any circuit pack option settings are correct before replacement. Improper performance can be caused by incorrect settings, and produce fault-like symptoms in the DPP.

Note 6: See Figure 13- 1.

Note 7: For circuit packs at A15, make sure jumper J5 is set for selection of the disk drive in the A chassis.

Note 8: For circuit packs at B15, make sure jumper J5 is set for selection of the disk drive in the B chassis.

Disk controller circuit pack

Located directly on top of the 72-Mbyte and 140-Mbyte disk drives, this circuit pack provides data management and data control for Winchester-type disk drives. The disk controller circuit pack uses as its host interface the industry standard 8-bit, parallel, bidirectional SCSI bus.

See Table 13-2 for the option settings on this circuit pack. Figure 13-2 shows option locations and circuit pack layout.

Note: This pack is not field changeable.

Figure 3-1
Disk Controller (A21A1 and B21A1) circuit pack (680-9143) options

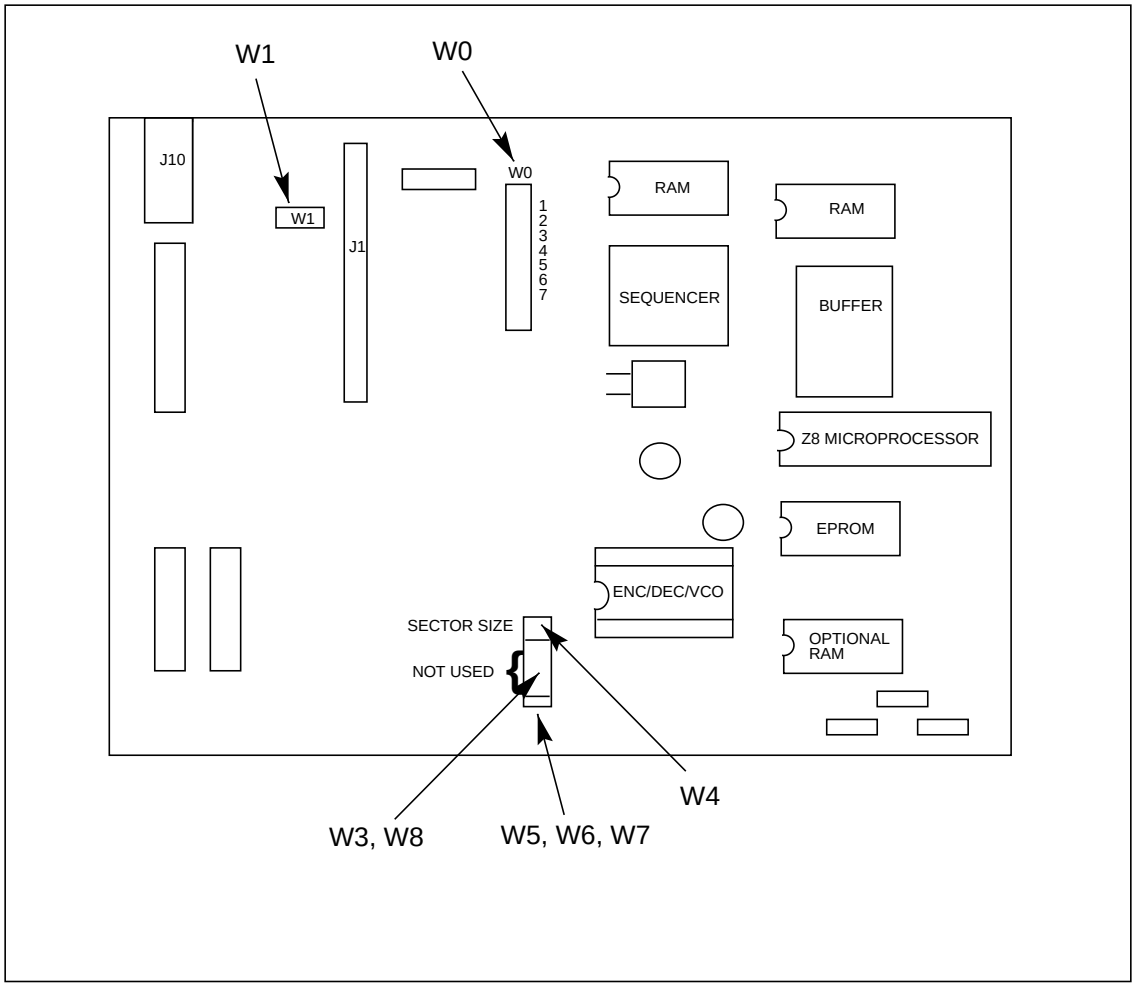


Table 13-2
Disk Controller circuit pack (A21A1 and B21A1) options - part number: 680-9143

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper (W0)	State Pri. 0 shorted; I.D. = 0 1 shorted; I.D. = 1 2 shorted; I.D. = 2 3 shorted; I.D. = 3 4 shorted; I.D. = 4 5 shorted; I.D. = 5 6 shorted; I.D. = 6 7 shorted; I.D. = 7	SCSI Controller ID. Defines the SCSI device priority. ID 7 is the highest priority in a multi-controller configuration.	0	Must be the same as the factory setting.
Jumper (W1)	1 - 2 = parity enabled 2 - 3 = parity disabled	Host Parity	1-2	Must be the same as the factory setting.
Jumper (W2)	Not used			
Jumper (W3) (W4)	W3 W4 Bytes Per Sector open open 128 short open 256 open short 512 short short 1024	Select disk drive Sector Size	W3 open W4 short	Must be the same as the factory setting.
Jumper (W5) (W6) (W7) (W8)	Function established in the copper tracings; do not modify	Logical Unit Number Assignment.	Out Out Out Out	Must be the same as the factory setting.
Strap	None used			
DIP Switch	None used			
Rotary Switch	None used			
Switch	None used			

Note 9: There are no customer-definable options on this circuit pack. Information is for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Note 10: Only present on the 72-Mbyte and 140-Mbyte disk drives.

SCSI Crossover circuit pack (NT6M93xx) - Turbo only

General description

The SCSI Crossover (Xovr) circuit packs 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 circuit packs in the DPP (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 Xovr circuit packs (40-pin connectors Jl & J2) consist of 8 data lines with parity and 12 control lines. One port is provided for each of the two SCSI Interface cards. 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 XOVR circuit packs provide the following functions:

- Interface between DPP system backplane (SCSI Interface circuit pack) and SCSI Disk Drives.
- Support for crossover and disk selections for the SCSI Interface circuit pack.
- Support for disconnect/reconnect feature.
- Full hardware implementation; no software required.
- Two 40-Pin access ports; one for each SCSI Interface circuit pack.
- 50-pin access port for the disk drive.
- 4-pin power connector identical to current crossover card.
- Either disk drive tristatable off the SCSI bus in case of a fault.

See Table 14-1 for the jumper setting on this circuit pack. Figure 14-1 shows the circuit pack layout.

Replacing SCSI Crossover circuit pack

To replace the SCSI Crossover circuit pack, use the following procedure.

Procedure 14-1
Replacing the SCSI XOVR circuit pack (NT6M93AA or NT6M93BA)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
18	Make sure no polling is occurring. Wait for a low traffic period, if possible.

19	Locate the failing SCSI Crossover circuit pack 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 circuit pack.
	
	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`

Sheet 1 of 4

Procedure 14-1
Replacing the SCSI XOVR circuit pack (NT6M93AA or NT6M93BA)

Step	Description
20	Place the DPP into an ONLY processor mode. The processor mode should match the disk mode. At the Switch and Status Panel of the DPP: 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.
21	Loosen the slotted screws which fasten the outer edges of the appropriate rear panel assembly to the cabinet.
22	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.
23	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 circuit pack at A15 is being replaced, use a Styrofoam block or another insulating material, about 1" x 1" x.5", to insulate the pins of the 16-pin cable on the P/A Comm circuit pack to prevent accidental shorting against the chassis.
24	Remove power cable (J4), then any cables and screws connected to the suspected circuit pack. ***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.
25	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 XOVR card in the A chassis, be sure to place the jumper on pin A and the center pin. When replacing the SCSI XOVR card in the B chassis, be sure to place the jumper on pin B and the center pin.

Procedure 14-1
Replacing the SCSI XOVR circuit pack (NT6M93AA or NT6M93BA)

Step	Description
26	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.
27	Reattach any cables removed in step 7 in reverse order. ***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.
28	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 DPP 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)
29	Remove the insulating material, if used. Route all wires and cables to avoid pinching or crimping when the rear panel is reinstalled.
30	Lift the hinged circuit assembly gate back to its vertical position and tighten the two screws loosened in step 6.

Procedure 14-1
Replacing the SCSI XOVR circuit pack (NT6M93AA or NT6M93BA)

Step	Description
31	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.
32	Clear any alarms on the DPP. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** **>RSERR STDBY 00 (cr)** Alarms will stay clear on the DPP if there are no faults.
33	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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.
34	When all maintenance activities are complete, be sure to replace the front panel of the DPP 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.

Figure 3-1
SCSI Crossover (A15 and B15) circuit pack (NT6M93AA; 380- and 760-Mbyte disk drives for Turbo DPPs) options

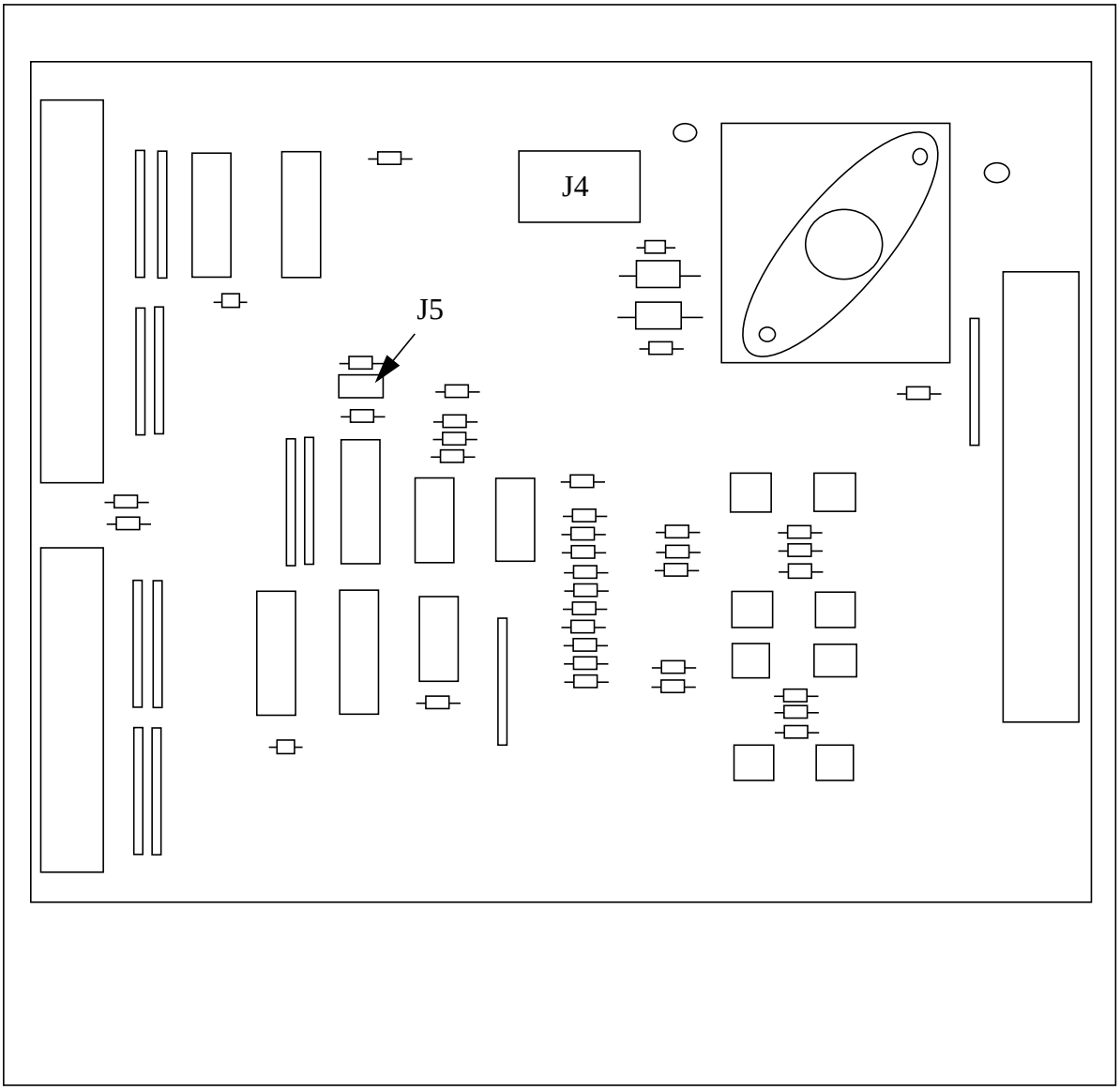


Figure 3-1
SCSI Crossover (A15 and B15) circuit pack (NT6M93BA; 1- and 2-Gigabyte disk drives for Turbo DPPs) options

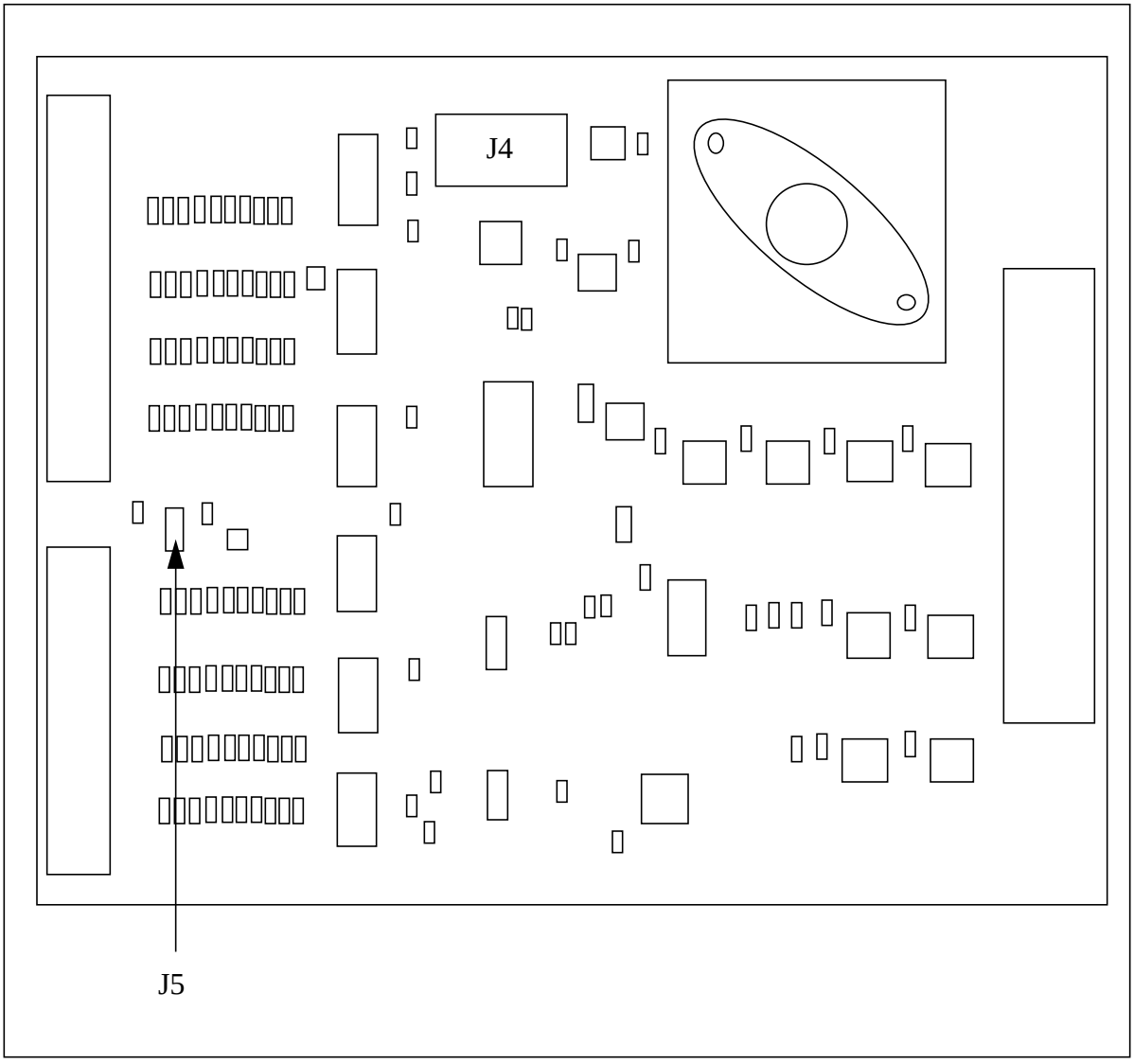


Table 14-1
SCSI crossover circuit pack (A15 and B15) options - part number: NT6M93AA, (380- and 760-Mbyte disk drives); NT6M93BA, (1- and 2-Gigabyte disk drives)

Device type (number)	Position/setting		Function	Setting	
				Factory	On-site
Jumper (J5)	1-2 2-3	disk A disk 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: Make sure any circuit pack option settings are correct before replacement. Improper performance can be caused by incorrect settings, and produce fault-like symptoms in the DPP.

Note 4: For circuit packs at A15, make sure jumper J5 is set for selection of the disk drive in the A chassis.

Note 5: For circuit packs at B15, make sure jumper J5 is set for selection of the disk drive in the B chassis.

56K Crossover circuit pack (NT6M48AA) - Turbo only

General description

The 56K Crossover (XOVR) circuit pack provides the following capabilities:

- Interface between the DPP system backplane (56K Interface circuit pack at A7 and B7) and 56K Connector circuit pack.
- Support for XOVR and interface selections for the Serial Communication Controller (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 circuit packs.
- A 60-pin access for the 56K Connector circuit pack.
- 12-pin power connector like the one on the P/A Comm circuit pack.

56K XOVR circuit pack layout is shown in Figure 15-1. Table 15-1 provides option setting information.

Replacing 56K Crossover circuit pack

To replace the 56K Crossover circuit pack, use the following procedure.

Procedure 15-1
Replacing the 56K XOVR circuit pack (NT6M48AA)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
18	Make sure no polling is occurring. Wait for a low traffic period, if possible.
19	Remove the slotted captive screws that fasten the outer edges of the B rear panel assembly to the cabinet.
20	Remove the front panel of the A chassis. Put the two panels in a safe place to prevent bending and scratching.
21	Remove the power from the 56K Crossover circuit pack 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.

22	Remove the screws that fasten the 56K Crossover circuit pack. Gently remove the circuit pack from its mounting position.
23	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.

Procedure 15-1
Replacing the 56K XOVR circuit pack (NT6M48AA)

Step	Description
24	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.
25	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.
26	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
27	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults.
28	After RSERR, alarms may reappear. Perform diagnostics on both the standby and active processors. Enter: (at the terminal) **>TEST ACT (cr)** **>CP TEST ACT (cr)** **>TEST STDBY (cr)** **>CP TEST STDBY (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 DPP maintenance manual and/or contact the next level of support.

Procedure 15-1
Replacing the 56K XOVR circuit pack (NT6M48AA)

Step	Description
29	Display all active alarms. Enter: (at the terminal) **>ERRMAP ALARMS (cr)** If active alarms are present, troubleshoot using the DPP maintenance manual and/or contact the next level of support.
30	Verify replacement circuit pack has corrected original error.
31	Test the polling function.
32	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 DPP 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

Figure 3-1
56K Crossover (B16) circuit pack (NT6M48AA) options

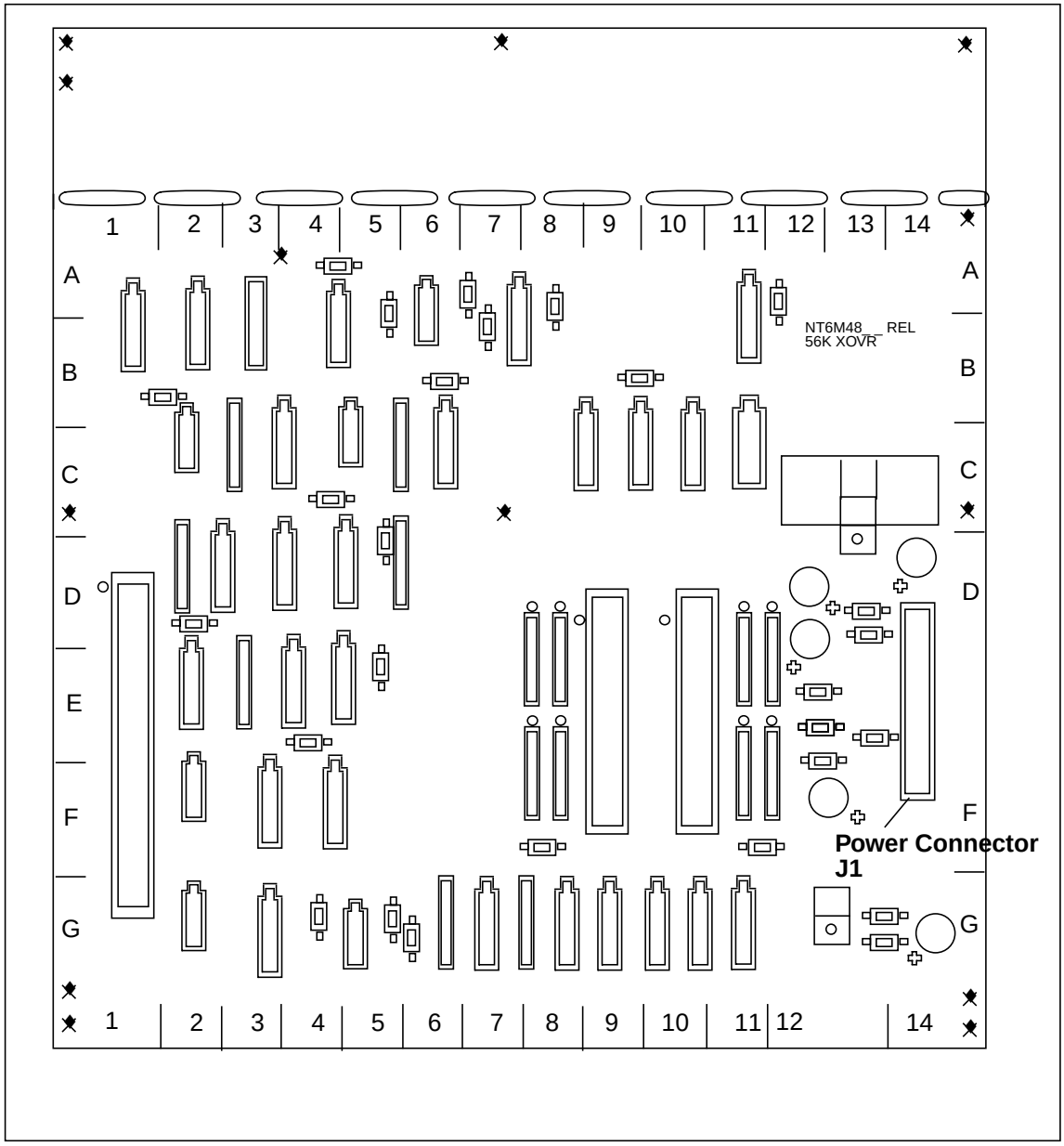


Table 15-1
56K crossover circuit pack (B16) options - part number: NT6M48AA

Device type (number)	Position/setting	Function	Setting	
			Factory	On-site
Jumper	None Used			
Strap	None Used			
DIP Switch	None Used			
Rotary Switch	None Used			
Switch	None Used			

Note 4: There are no customer-definable options on this circuit pack. Information is shown for reference only. Use this data for verification during initial DPP system installation and/or circuit pack replacement to make sure the replacement circuit pack is set up the same as the circuit pack being replaced.

Note 5: See Figure 15- 1.

Four-Channel Communication circuit pack (NT6M85AA)

General description

The Four-Channel Communication (Comm) circuit pack provides the physical interface between the DPP's serial communication channels and external devices. It is located on the Connector Mounting panel on the right side of the upper chassis, as viewed from the front. This pack supports four serial channels. It provides pin-out connection between a single 50-pin ribbon cable and four DB-25 connectors. The circuit pack 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 circuit pack 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 interface (unused) to modem/telephone line and serial channels.
- physical interface serial channels and the P/A Comm circuit pack.

Interface between this circuit pack and the P/A Comm circuit pack 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.

Figure 16-1 shows the jumper locations and circuit pack layout. See Table 16-1 for the jumper settings.

Replacing the Four-Channel Comm circuit pack

To replace the Four-Channel Comm circuit pack, use the following procedure.

Procedure 16-1
Replacing the Four-Channel Comm circuit pack (NT6M85AA)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
16	Make sure no polling is occurring. Perform this procedure during a maintenance window.
17	Notify technical assistance personnel of the temporary loss of MMI and polling links. The polling link for DPP systems without 56K polling is routed through the P/A Comm circuit pack. DPP systems with 56K polling use a path through the 56K Xovr to the 56K Connector circuit pack.
18	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.
19	Remove any cables attached to the ports J1 through J4 (A chassis). Mark these cables for later replacement.
20	Detach the slotted captive screws that secure the panel in the A chassis that holds the P/A Comm and the Disk or SCSI Xovr circuit packs. Lower the panel to allow access into the rear of the A chassis.
21	Remove the ribbon cable connector attached to the Four-Channel Comm circuit pack.
22	Remove the eight standoffs on the outside of the panel that attach the Four-Channel Comm circuit pack. 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.

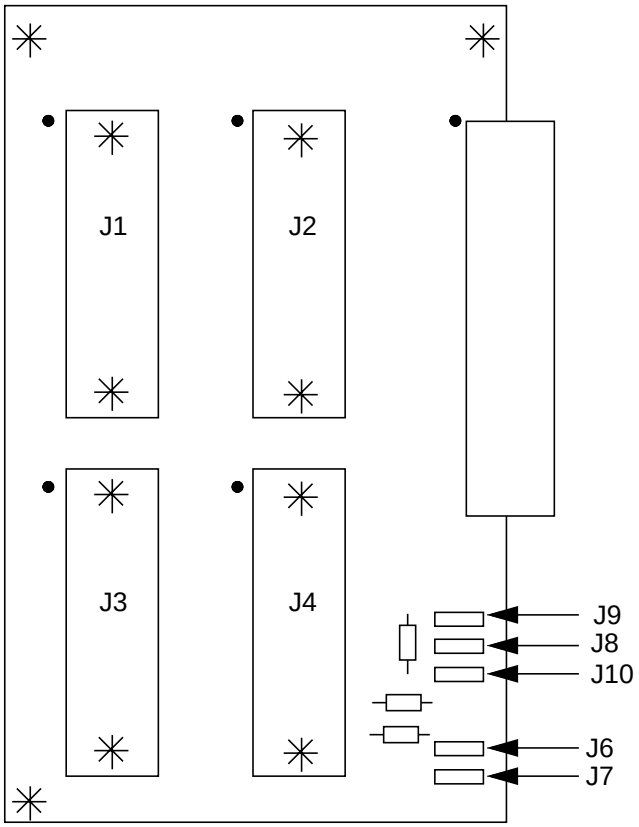
Sheet 1 of 2

Procedure 16-1
Replacing the Four-Channel Comm circuit pack (NT6M85AA)

Step	Description
23	Gently remove the Four-Channel Comm circuit pack from its position. Verify the options on the pack.
24	Insert the replacement pack in the vacated position.
25	Replace the eight standoffs removed in step 7. Do not tighten down the standoffs until all of them have been inserted.
26	Attach the ribbon cable connector removed in step 6 to the replacement Four-Channel Comm circuit pack.
27	Swing the panel holding the P/A Comm and Disk or SCSI Xovr circuit packs back into position and reattach the slotted captive screws.
28	Reattach any cables removed in step 4, as labeled, to the associated ports (J1 through J4).
29	Seat the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed.
30	Verify that the MMI and polling (for Non-Turbo systems only) functions are operating properly. The procedure is complete.

Sheet 2 of 2

Figure 3-1
Four-Channel Communications (A17) circuit pack (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 printed circuit assemblies.

Table 16-1
Four-Channel Communications circuit pack (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			
Switch	None Used			

Note 3: ADU operation is not used on the DPP.

Note 4: See Figure 16- 1.

56K Connector circuit pack (NT6M49AA) - Turbo only

General description

The 56K Connector circuit is used with the Turbo feature. This circuit pack supports four serial channels, ports J11 through J14 on the right side of the DPP chassis, when viewed from the front. It provides pin-out connection between a single 50-pin ribbon cable and four DB-25 connectors. It is totally passive, containing connectors only, no active circuitry. It supports all EIA interface leads for synchronous operation.

This circuit pack provides the following functions:

- up to four channels of EIA RS-232 compatible serial interface (DTE interface); system architecture allows only one active interface at a time.
- physical interface between the serial channels and the 56K XOVR panel.

Interface between this panel and the 56 XOVR circuit pack 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.

Replacing the 56K Connector circuit pack

To replace the 56K Connector circuit pack, use the following procedure.

Procedure 17-1
Replacing the 56K Connector circuit pack (NT6M49AA)

Step	Description
	CAUTION Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	WARNING Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
16	Make sure no polling is occurring. Perform this procedure during a maintenance window.
17	Notify technical assistance personnel of the temporary loss of polling links (ports J11 through J14). DPP systems with 56K polling use a path through the 56K Xovr to the 56K Connector circuit pack.
18	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.
19	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.
20	Detach the slotted captive screws that secure the panel in the B chassis that holds the 56K Xovr and the SCSI Xovr circuit packs. Lower the panel to allow access into the rear of the B chassis.
21	Remove the ribbon cable connector attached to the 56K Connector circuit pack.
22	Remove the eight stand-offs on the outside of the panel that attach the 56K Connector circuit pack. 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.
23	Gently remove the 56K Connector circuit pack from its position.

Procedure 17-1
Replacing the 56K Connector circuit pack (NT6M49AA)

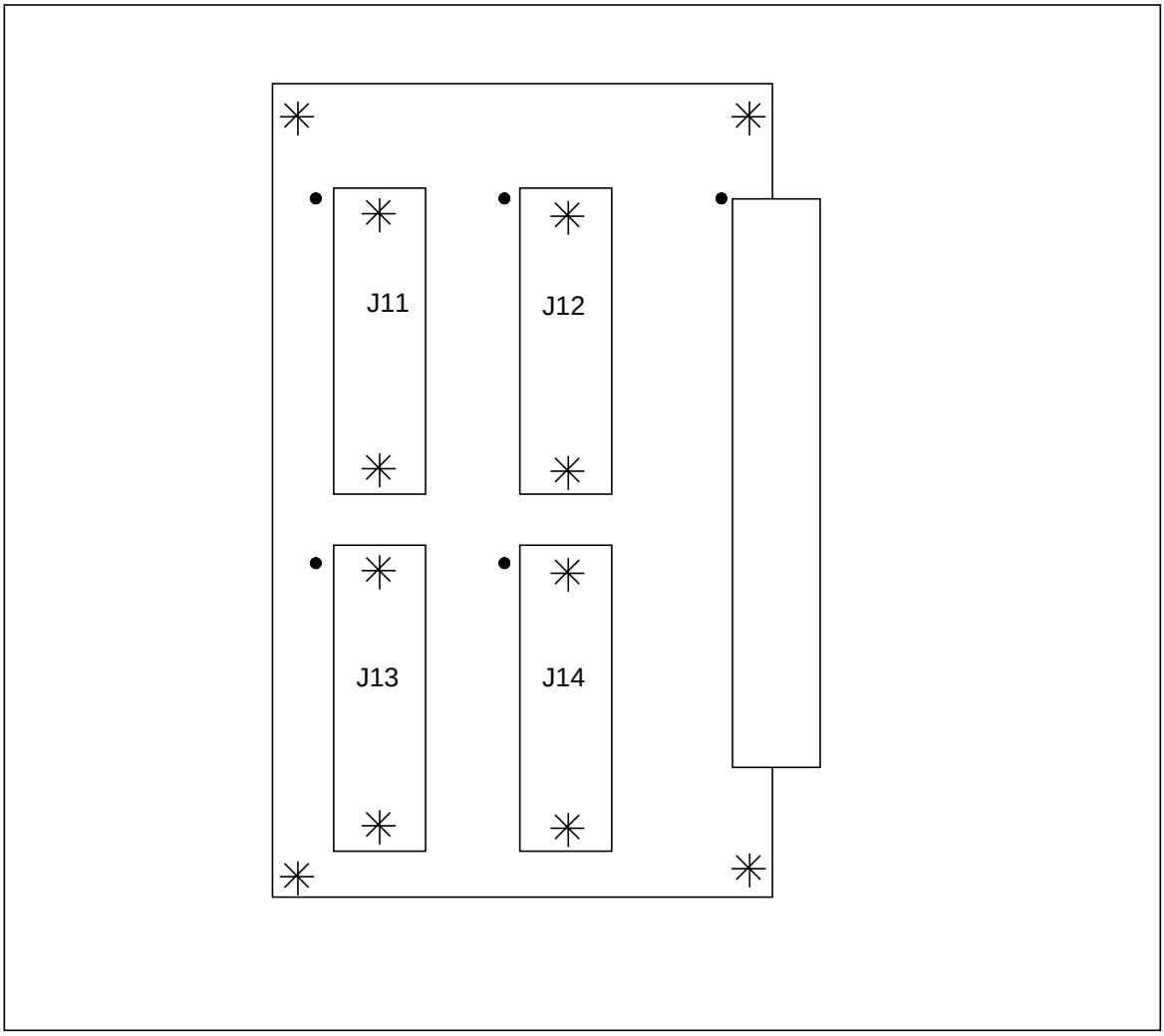
Step	Description
24	Insert the replacement pack in the vacated position.
25	Replace the eight standoffs removed in step 7. Do not fully tighten down the standoffs until all of them are inserted.
26	Attach the ribbon cable connector removed in step 6 to the replacement 56K Connector circuit pack.
27	Swing the panel holding the 56K Xovr and SCSI Xovr circuit packs back into position and reattach the slotted captive screws.
28	Reattach any cables removed in step 4, as labeled, to the associated ports (J11 through J14).
29	Seat the rear panel in its fully seated position and reinstall the slotted pan head screws previously removed.
30	Verify that the polling function is operating properly. The procedure is complete.

Sheet 2 of 2

Table 17-1
56K Connector circuit pack (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			
Switch	None Used			

Figure 3-1
56K Connector panel assembly (B26) circuit pack (NT6M49AA) options



Power Supply (NT6M71AB)

Powering down DPP for maintenance

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

- +8.5 V dc power down
- -48 V dc power down.

+8.5 V dc power down, removal, or maintenance of circuit packs requires removing the +8.5 V dc output from the DPP power supply. The circuit breaker is a push ON (1), push OFF (O) rocker switch. Press the rocker switch to the OFF (O) position to manually open the +8.5 V dc line. To reset an automatically tripped circuit breaker, first push the OFF (O) side of the circuit breaker, then push the ON (1) side.

-48 V dc Power Down. Power down the -48 V dc C.O. input power for maintenance on the following:

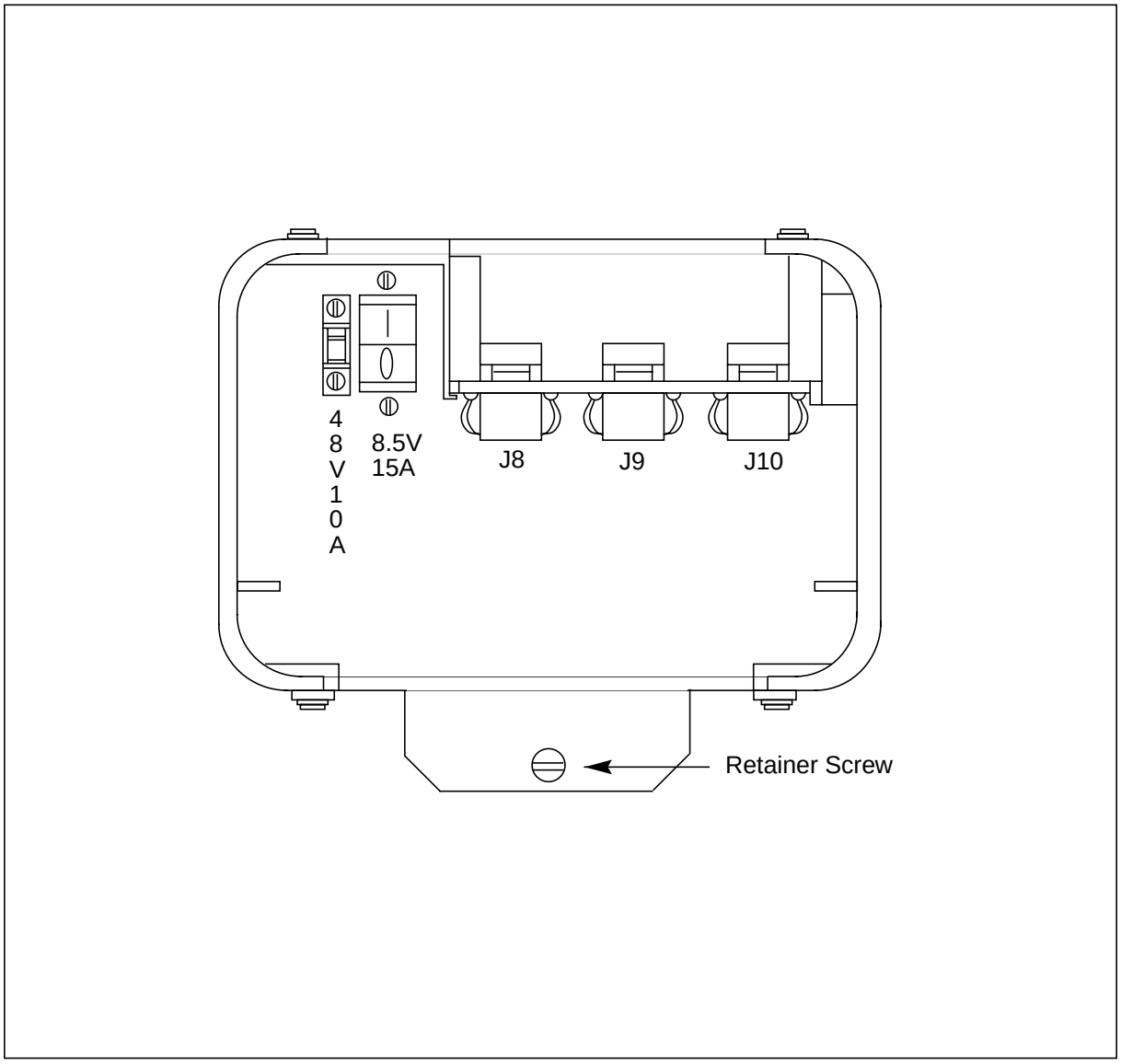
- Power supply
- Cooling fan (except for brief periods of time, i.e., when the required spare parts are near at hand).

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 DPP to improve convection cooling. Perform the necessary functions. Power down the -48 V dc when the fan is inoperable for extended periods of time to prevent damage from overheating.

For maintenance, power down the -48 V dc 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 V dc fuse from the power supply to power down the DPP in an emergency.

Figure 3-1
DPP Power Supply Assembly



Leave the disk drives untouched for at least 30 seconds after power down since vibration during power down may damage the disk drive.

DPP system fuses

DPP fuses are located on the front panel of the DPP power supply.

The power supply has the -48 V dc circuit fused. A GMT-type fuse is used. These fuses have a spring-loaded colored flag which opens when the fuse is

blown. To replace, pull the blown fuse straight out from the fuse holder and insert the new fuse of the same type and rating.

A clear fuse cover is furnished for covering the fuse as a safety precaution. After performing fuse replacement, remember to install the cover.

The power supply has a circuit breaker to protect the +8.5 V dc line.

Figure 18-1 shows the location of the fuses and Table 18-1 gives fuse replacement information.

Table 18-1
Fuse replacement information

Fuse function	Fuse function	Amperes (color)	Fuse type and replacement part number
Power Supply	-48 V dc from CO	10 (Grn)	10 ampere fuse: Buss GMT-10 NT part No: A0108995
Fan Filter PCA Assembly	-48 V dc from CO	.5	.5 ampere fuse NT part No: A0109762

Replacing power supply for maintenance

If removing a power supply, follow Procedure 18-1. The only tool needed is a small flat-blade screwdriver. If necessary, have replacement fuses on hand.

Procedure 18-1
Power supply (NT6M71AB) replacement

Step	Description
	**CAUTION** Since all DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	**WARNING** Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
16	Remove the front panel of the DPP. 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.
17	Put the processors into an Only mode. At the Switch and Status Panel of the DPP: 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.

Procedure 18-1
Power supply (NT6M71AB) replacement

Step	Description

18	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`

19	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.
20	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.
21	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.
22	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.

Procedure 18-1
Power supply (NT6M71AB) replacement

Step	Description
23	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.
24	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.
25	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.
26	Restore the -48 V dc power source at the main fuse panel.
27	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. For TURBO DPP systems, wait for the **CP Active** message to be displayed.
28	Place the active processor unit in PRIME mode. At the Switch and Status Panel of the DPP: 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 18-1
Power supply (NT6M71AB) replacement

Step	Description
29	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)
30	To clear any alarms on the standby processor. At the maintenance terminal, enter: **>RSERR STDBY 00 (cr)** Alarms will clear on the standby processor if there are no faults
31	To clear any alarms on the active processor. At the maintenance terminal, enter: **>RSERR ACT 00 (cr)** Alarms will clear if there are no faults.
32	When all maintenance activities are complete, be sure to replace the front panel of the DPP, 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

For information on power and ground requirements for the DPP, refer to the *Appendix - DPP Power and Ground Requirements* section in this document.

Disk Drive (NT6M72xx)

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 (cr) key sequence 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.

Power up the new disk drive once it is fully installed. See Table 19-1 for allowed disk drive mode changes. See Figure 19-1 during the replacement procedure.

Table 19-1
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	
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 initialized.
DWN	B ONLY	Y	Allowed if the B disk is initialized.
A ONLY	DWN	Y	Changes A disk to uninitialized. Only used during maintenance procedures.
B ONLY	DWN	Y	Changes B disk to uninitialized. Only used during maintenance procedures.

1 This change is to be used for specific DISK FULL recovery procedures only. Contact Nortel if it becomes necessary to use this mode change.

Removing the Faulty Disk Drive

Procedure 19-1
Remove Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

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 DPP circuit packs are static sensitive, be careful when handling them. Wear a wrist grounding strap when working with the DPP.
	**WARNING** Since the DPP is powered up during this procedure, observe all safety procedures for operations on live equipment.
19	To remove the front panel of the DPP, 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 19-1
Remove Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
20	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)**
21	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.
22	Remove the two screws from the disk drive handle mount.
23	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.

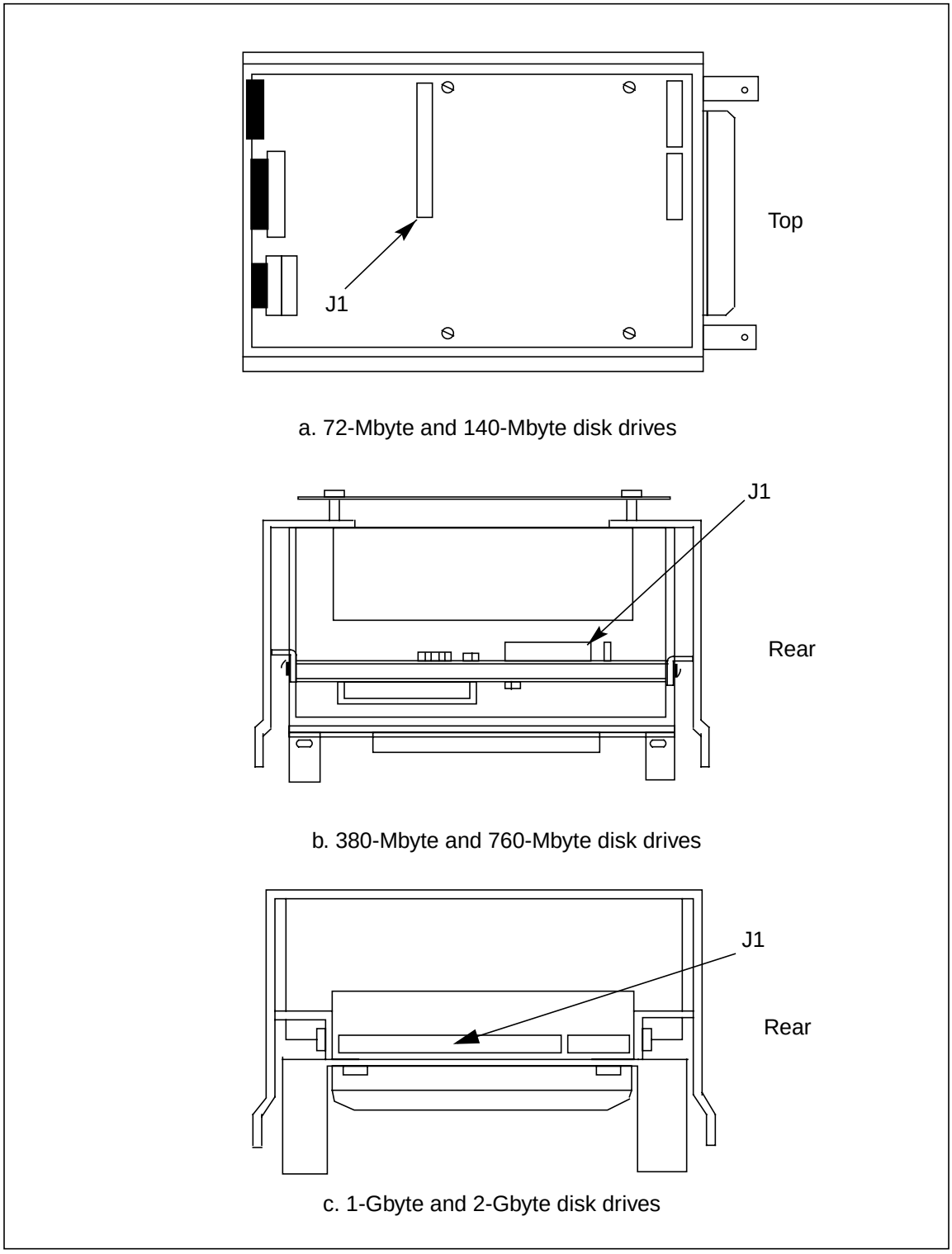
Note: For 72 and 140 MB disk drives, the **J1** connector is on the **top** of the disk drive assembly. For 380 MB, 760 MB, 1 GB, and 2 GB disk drives, the **J1** connector is on the **rear** of the disk drive assembly.

Procedure 19-1
Remove Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
24	Disconnect the ribbon cable from J1; use the cables pull tab. Note the direction of the brown stripe on the cable (PIN 1).
25	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
END OF THE PROCEDURE FOR REMOVING A FAULTY DISK DRIVE.	

Sheet 3 of 3

Figure 3-1
Location of J1 on disk drive



Installing the Replacement Disk Drive

IMPORTANT WARNING:
If changing the B disk in a TURBO DPP or a 380 MB NON-TURBO DPP, set the options correctly on the disk drive. Incorrect option settings will cause the disk to fail.

Table 19-2
Option settings to configure disk drives (A or B)

Disk	Vendor	Jumper	Pins - B Disk Drive	Pins - A Disk Drive
2 GB	Seagate ST-32151N	J6	1-2 (IN)	J6 (OUT)
2 GB	Seagate ST-32430N	J5	5-6 (IN)	4-6 (IN) or OUT
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
760 MB	Sequel (Maxtor)	J2	9-10 (IN)	J2 (OUT)
760 MB	Seagate (Imprimis)	J4	5-6 (IN)	OUT
760 MB	Micropolis	J2	IDO (IN)	OUT
380 MB Turbo	Sequel (Maxtor)	N/A	JP35 (IN)	JP35 (OUT)
380 MB Non-Turbo	Sequel (Maxtor)	N/A	JP35 (OUT)	JP35 (OUT)

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
26	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 NOTES: For 72 and 140 MB disk drives, the **P1** ribbon cables Brown stripe (PIN 1) must be toward the **RIGHT**, as viewed from the front. For 380 and 760 MB disk drives, the **P1** ribbon cables Brown stripe (PIN 1) must be toward the **LEFT**, as viewed from the front. For 1 and 2 GB disk drives, the **P1** ribbon cable is keyed to prevent improper installation.
27	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.
28	Replace the two screws for the disk drive handle mount.
29	Reconnect the disk power cable by inserting the plug **P8** into connector **J8**.
30	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.
31	Select the next step using the following criteria: a. If replacing a 380 MB Non-Turbo disk, a 380 MB, 760 MB, 1 GB, or 2 GB Turbo disk, go to **step 7**. b. If replacing a 72 or 140 MB Non-Turbo disk, go to **step 8**.

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description

32	Make the disk system redundant by changing the ONLY disk mode to PRIME disk mode. This step is used for 380 MB Non-Turbo and 380 MB, 760 MB, 1 GB and 2 GB Turbo disk drives. 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.
	
	a. If replacing a 380 MB Non-Turbo disk and the response is DISK NOT INITIALIZED, go to **step 12**.
	
	b. If replacing a 380 MB, 760 MB, 1 GB, or 2 GB Turbo disk, and the response is DISK NOT FORMATTED, go to **step 13**.
	
	Otherwise, go to **step 11**.

33	Reinitialize the new disk. This is for 72 and 140 MB Non-Turbo disk drives only.  **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.

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
34	Enter: (at the terminal) **>DISK INIT 1x (cr)** where: x = A or B Proper response: `INIT COMPLETE` If the response is `NO DISK PARAMETERS`, go to **step 14**.
35	Enter in the defective track(s) from the disk manufacturer's defect (bad track) list. Enter: (at the terminal) **>DISK DEFMAP x (cr)** where: x = A for newly installed disk A = B for newly installed disk B System response is a prompt: ENTER HEAD AND CYLINDER # FROM DEFECT MAP. ENTER Q TO EXIT HEAD>
	Obtain the disk manufacturer's bad track map. Enter the HEAD No. xx (1 to 2 digits), from the disk manufacturer's bad track map. System response: CYLINDER> Enter the CYLINDER No. xxx (1 to 3 digits), from the disk manufacturer's bad track map. System response: xx BAD TRACKS HEAD> (xx = number of bad tracks masked out.)

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
	Note: If the response indicates either the HEAD or CYLINDER is out of range, the BAD TRACKS counter will not be incremented and the value entered is not needed for this application. Continue entering HEAD and CYLINDER numbers until the end of the disk manufacturer's bad track map is reached. When done entering the bad tracks, enter Q at the HEAD> prompt, to exit the DEFMAP utility. System response: `DEFMAP DONE`
36	Make the disk system redundant; change the ONLY disk mode to a PRIME disk mode. Enter (at the terminal): **>DISK MODE xP (cr)** where x = currently active disk (A or B) i.e., if DISK MODE is currently AO then type AP if DISK MODE is currently BO then type BP. Proper response: `DISK MODE xP` (where x = A or B) This may take minutes to hours depending on the disk size and the usage. Use the DISK USAGE command to determine disk usage. If the disk system does not achieve redundancy, contact the next level of support. Otherwise, continue with **step 11**.
37	When all maintenance activities are complete, be sure to replace the front panel of the DPP. 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.

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
38	380 MB Non-Turbo Disk Reinitialization This command is to be used when the DPPs response to the DISK MODE xx command is `DISK NOT INITIALIZED`.

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.

39 Enter: (at the terminal)

>DISK INIT 1x (cr)

where: **x** = **A** for disk drive A
= **B** for disk drive B

Proper response:

`INIT COMPLETE`

If the response is INIT COMPLETE**,** go to **step 7**. If the response is NO DISK PARAMETERS**,** go to **step 17**. If the DISK INIT FAILS, switch processors and retry the command. If the DISK INIT fails on the **other** processor, call the next level of support.

40 380 MB, 760 MB, 1 GB, and 2 GB Turbo Disk Format

This command is to be used when the DPP's response to the **DISK MODE xx** command is `DISK NOT FORMATTED`.

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.

Procedure 19-2
Install Replacement Disk Drive (NT6M72AA, NT6M72BA, NT6M72DA, NT6M72DD, NT6M72EA, NT6M72GA, and NT6M72HA)

Step	Description
41	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.
42	DISK PARAMETERS FOR 72 to 380 MB Non-Turbo DISK DRIVES. Enter: (at the terminal) **>DISK PARAM (cr)** Enter the number from the displayed list that describes the type of the replacement disk drive. If replacing a 72 or 140 MB Non-Turbo disk drive, go to **step 8**. If replacing a 380 MB Non-Turbo disk drive, go to **step 12**.

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List of terms

AC

Alternating Current

AMA

Automatic Message Accounting

An automatic recording system that documents all of the necessary billing data of subscriber-dialed long distance.

BELLCORE

Bell Communications Research

A group responsible for coordinating Bell Operating Company projects and setting standards for the industry.

BX.25

Bellcore X.25

A Bellcore defined version of the X.25 communications protocol.

CPU

Central Processing Unit

DC

Direct Current

DMA

Direct Memory Access

DPP

Distributed Processing Peripheral

A peripheral device of the DMS-100 that functions as an AMA data collector and an AMA transmitter in the AMATPS of the DMS-100. The DPP collects

AMA data from the DIRP, 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. The DPP performs the AMA Transmitter (AMAT) functions independently of the DMS-100, thereby off-loading the AMAT functions from the DMS-100 Central Control Complex (CC)

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 DPP 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.

EAT

Emergency Administration Terminal

EMI

Electromagnetic Interference

EPROM

Erasable Programmable Read Only Memory

A read-only memory in which stored can be erased by ultraviolet light and reprogrammed.

ESD

Electrostatic Discharge

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.

IOC

Input/Output Controller

IOE

Input/Output Equipment

MAP

Maintenance and Administrative Position

A group of components that provide a human-machine interface between OTC personnel and the DMS-100 Family. A MAP consists of Visual Display Unit, voice communications module, testing facilities and MAP furniture.

MD

Manufacture Discontinued

Indicates a product that is no longer in production, but is currently in use in the field.

MTD

Magnetic Tape Drive

NTP

Northern Telecom Practices

PCA

Printed Circuit Assembly

PEC

Product Equipment Code

RAM

Random Access Memory

SCSI

Small Computer System Interface

SIO

Serial Input/Output

Circuitry in the DPP that passes data from the DPP to external devices. The DPP employs four such circuits in its Quad SIO PCA that provides communications paths between the DPP and DMS-100/DPP maintenance interface, the DPP Emergency Administrative Terminal (EAT), and the remote polling center link.

Appendix - DPP power and ground requirements

DC power requirements

The DPP system receives dc power from the CO dc power system. Minimum operating voltage is -44 Vdc; maximum is -56 Vdc, although to operate properly, the DPP suffers no damage if a temporary low voltage condition occurs. However, voltages in excess of -56 Vdc may cause damage to DPP hardware. Figures 21-1, 21-2, and 21-3 show the DPP dc power connections.

The DPP 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 DPP are:

- 35 dBmv - 0-5 MHz
- 30 dBmv - 5-50 MHz.

Power alarm condition reporting

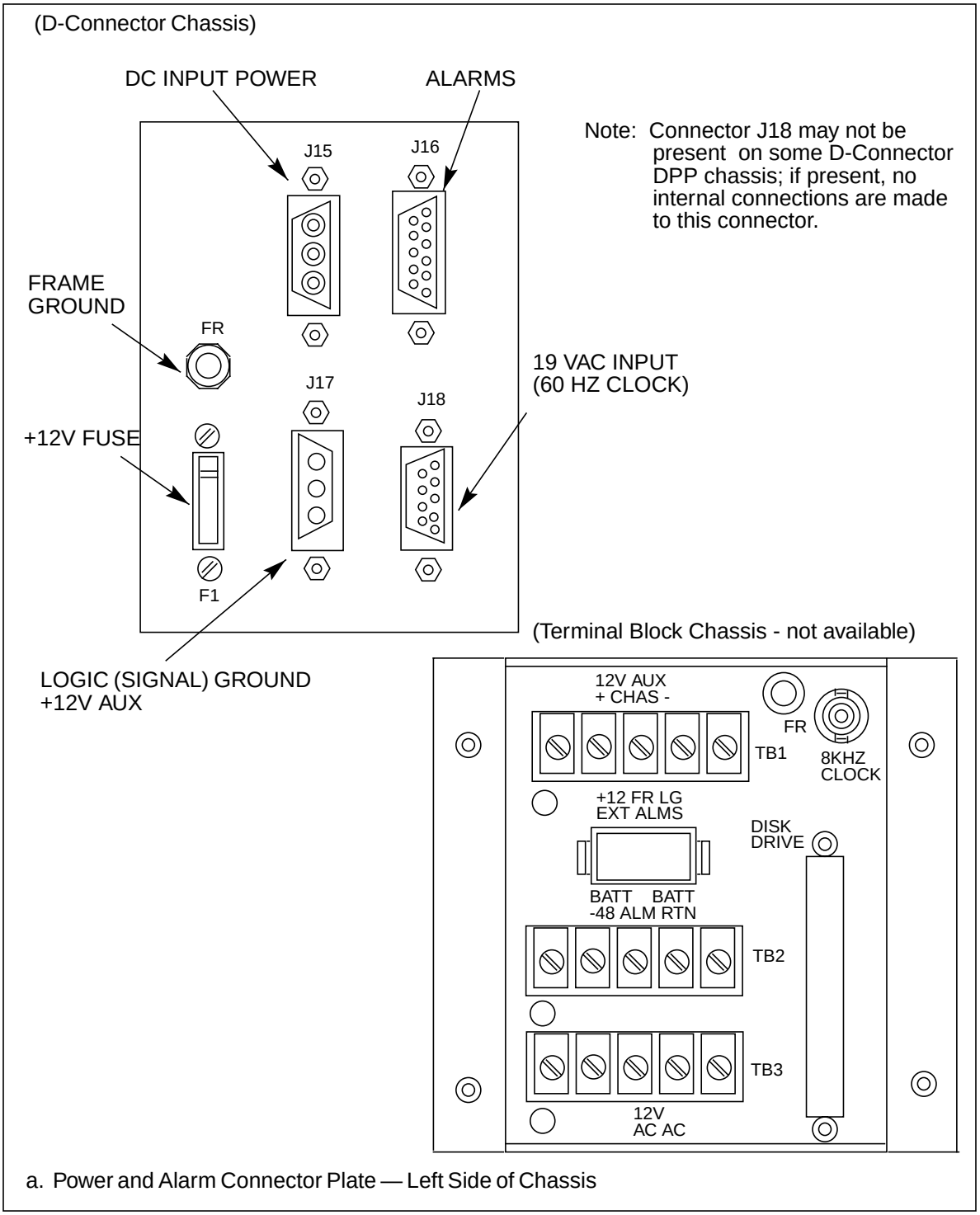
If a blown fuse is sensed on the -48 Vdc input line of the DPP power supply, the system places -48 Vdc on a normally open terminal of the chassis (A or B) that contains the blown fuse. If a low voltage condition from the power supply is sensed, telephony ground (battery return) is placed on a normally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

AC power requirements

Note: Use of the ac transformer is optional. Consult with technical assistance personnel for further information if the ac option is in use on the DPP. Use of the ac transformer requires a 110 Vac input to the DMS-100 frame. This condition may cause an infraction of IFG.

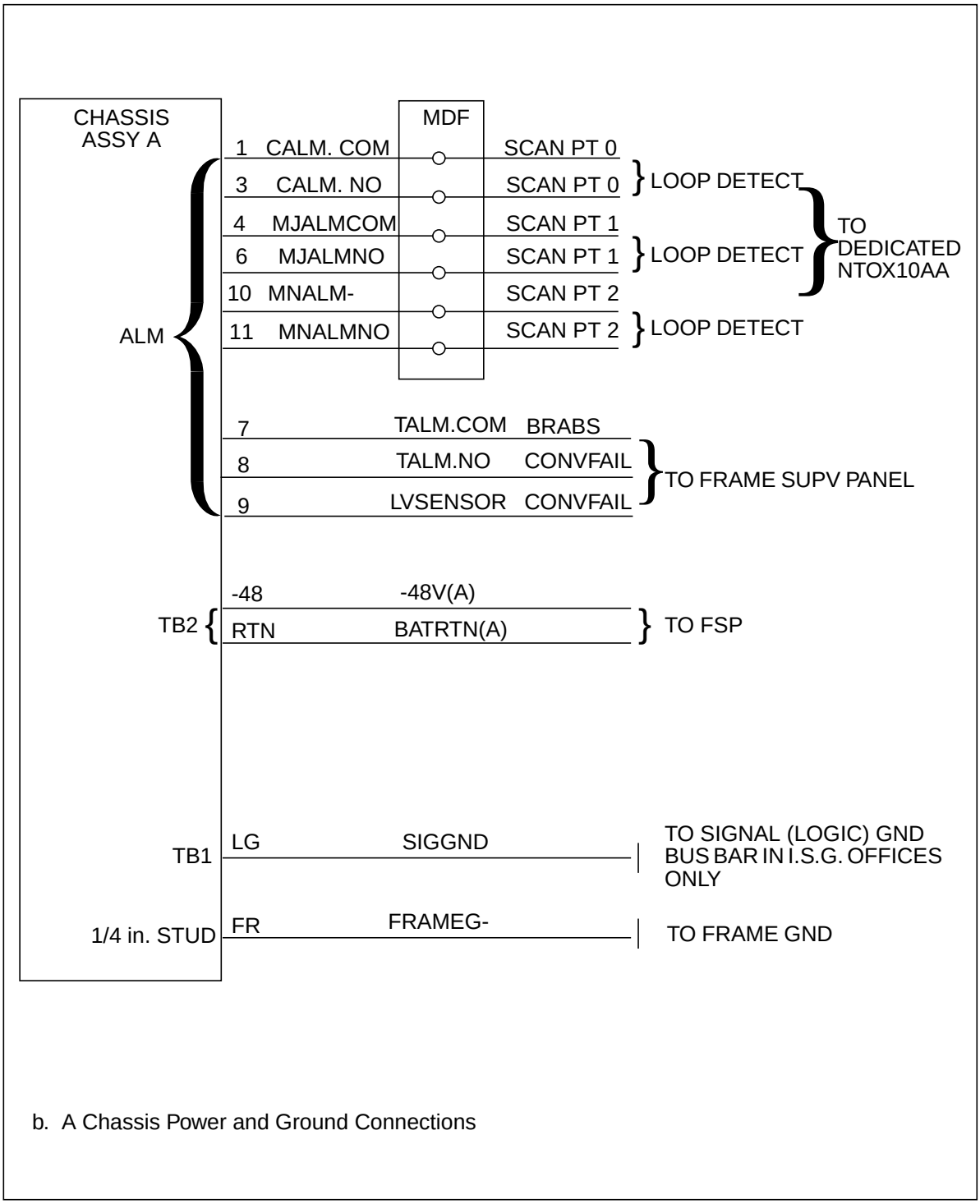
The DPP has available an optional ac transformer to make use of an external ac power source for the operation of the internal system clock. The minimum operating ac voltage is 98 Vac, 60 Hz, maximum is 135 Vac, 60 Hz. The source for the ac voltage is a commercial 110 Vac, 60 Hz convenience outlet. Transformer output is approximately 19 Vac. Current drain on the commercial ac source is approximately 100 ma, if used. Figures 21-1, 21-2, 21-3 provide ac connection details.

Figure 3-1
DPP power and alarm bulkhead connectors (sheet 1 of 3)



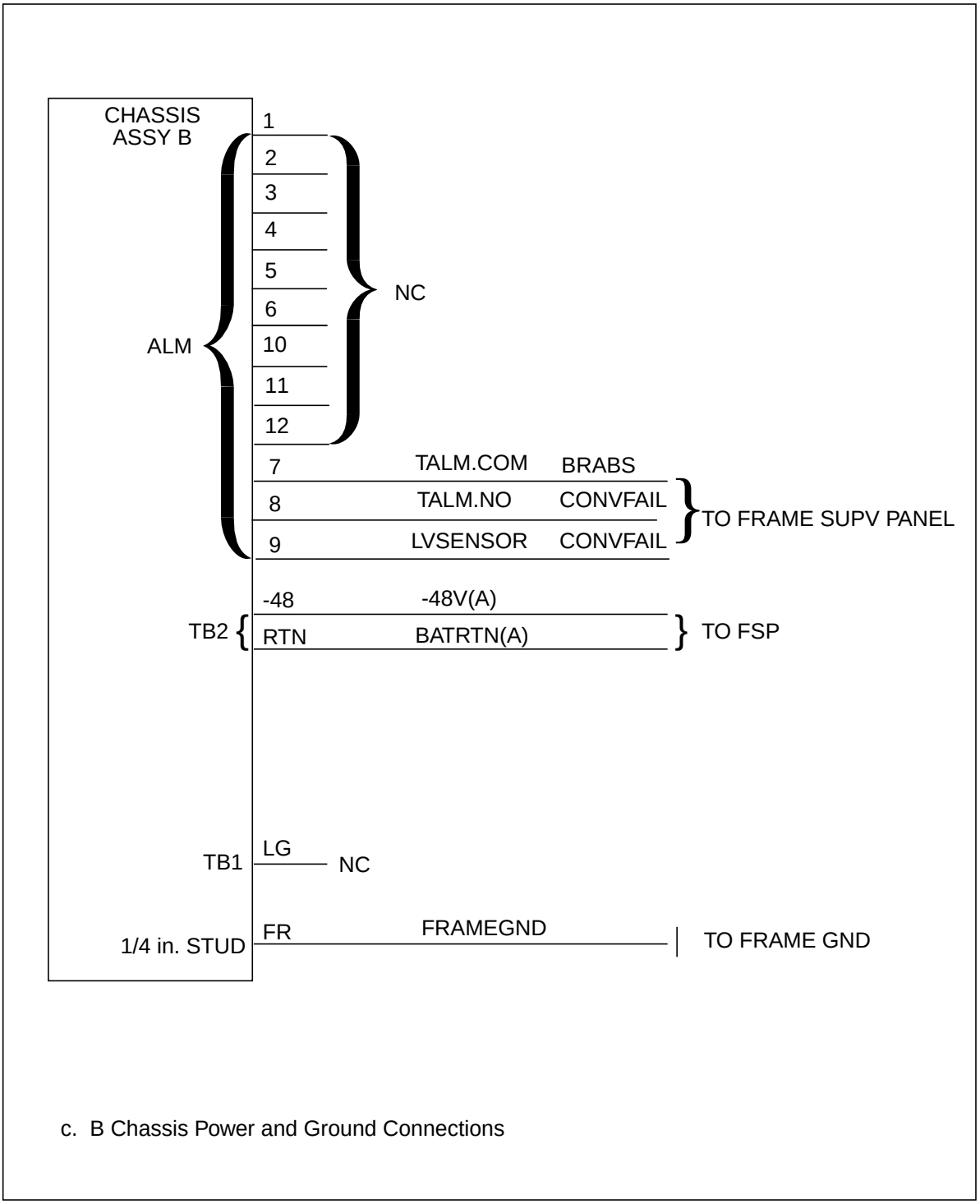
a. Power and Alarm Connector Plate — Left Side of Chassis

Figure 3-1
DPP power and alarm bulkhead connectors (sheet 2 of 3)



b. A Chassis Power and Ground Connections

Figure 3-1
DPP power and alarm bulkhead connectors (sheet 3 of 3)



c. B Chassis Power and Ground Connections

In the event of ac power failure, the system automatically switches to an internally powered dc clock. An information message is output to the terminal, as shown by:

>> KEY “ACR” ON AC RECV. <<

Note 1: This message is not valid for Turbo DPP systems and Non-Turbo DPP systems equipped with 1-Gigabyte disk drives.

When ac power has been restored, the system clock can be manually reactivated and set to the proper time.

Note 2: The ERRMAP entry, NO CLK TIME SET, can be set to INHIBIT if the ac transformer option is not used.

DPP external connector wiring

Refer to Figures 21-1, 21-2, and 21-3 and Table 21-1 for DPP external connector wiring. The table is partitioned into two categories: (1) DPP systems with terminal block (TB) connectors, and, (2) DPP systems with D-type connectors (D-Conn). References to the applicable figures are provided.

Grounding interface

Internal grounding of the DPP is a star-type arrangement, with battery, logic, and frame grounds isolated from each other. Connections for each of the grounds are indicated on the power and alarm connector panels. Refer to Figure 21-4.

No arrangements are required for the ac ground conductors. The ac ground for the clock is terminated at the wall transfer.

Note: The 8 KHz connector is not present on later model DPP systems; those equipped in the EMC chassis.

Figure 3-1
DPP system grounding interface to central office grounding system

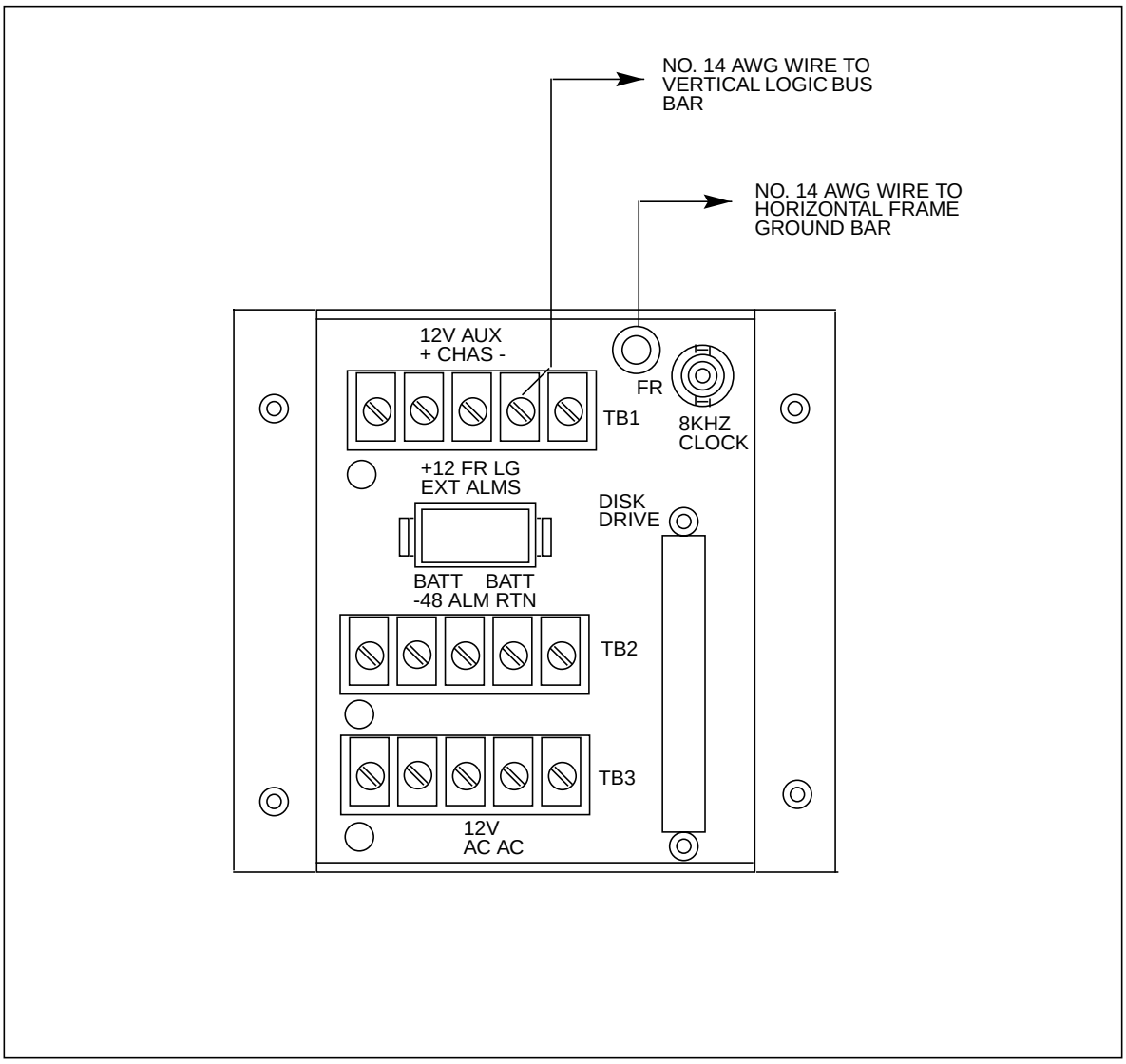


Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
The following information is for the A Chassis					
Ground	TB	TB1	- (LG) (3)	LOGIC GROUND (signal ground)	Logic ground for DPP; Connect to vertical ground bar; Isolated System Ground (I.S.G bus bar)
Ground	TB	FR	1/4 inch stud	Frame Ground	Frame ground connection to the DMS-100 IOE frame ground bus bar
Power	TB	TB2	-48 (1)	-48 Vdc (A)	-48 Vdc CO power to the A chassis
Power	TB	TB2	RTN (3)	BATRTN (A)	-48 Vdc battery return for A chassis
Power	D-Conn	J15	N/A (1)	-48 Vdc	-48 Vdc CO power to the A chassis
Ground	D-Conn	J15	N/A (2)	Frame Ground	Optional frame ground; normally not connected; use the Frame Ground stud; refer to Figure 21-1.
Ground	D-Conn	J	Shield of connector	Shield Ground	To connector shell for full EMC compliance
Power	D-Conn	J15	N/A (3)	-48 Vdc return	Return line for -48 Vdc
Alarm	TB	J15	CRITICAL (1)	CRIT COM	Center (common) pin of contact set controlled by critical alarm relay
N/A	TB	J15	(2)	N/A	No connection

Sheet 1 of 9

Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	TB	J15	(3)	CRIT	NO CRITICAL ALARM: open ANY CRITICAL ALARM: connected to pin 1
Alarm	TB	J15	MAJOR (4)	MAJ COM	Center (common) pin of contact set controlled by the major alarm relay
Alarm	TB	J15	(5)	N/A	No connection
Alarm	TB	J15	(6)	MAJ	NO MAJOR ALARM: open ANY MAJOR ALARM: connected to pin 4
Alarm	TB	J15	TEMP (7)	TEMP COM	Center (common) pin of contact set controlled by temp alarm relay
Alarm	TB	J15	TEMP (8)	TEMP	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 7
Alarm	TB	J15	POWER (9)	LVOLT	VOLTAGE NORMAL: open LOW VOLTAGE: connected to battery ground
Alarm	TB	J15	MINOR (10)	MINOR COM	Center (common) pin of contact set controlled by the minor alarm relay
Alarm	TB	J15	MINOR (11)	MIN	NO MINOR ALARM: open ANY MINOR ALARM: connected to pin 10

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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	TB	J15	(12)	N/A	No connection
Alarm	D-Conn	J16	CRITICAL (1)	CRIT COM	Center (common) pin of contact set controlled by Critical Alarm relay
Alarm	D-Conn	J16	CRITICAL (2)	CRIT	NO CRITICAL ALARM: closed, connected to pin 1 ANY CRITICAL ALARM: open
Alarm	D-Conn	J16	CRITICAL (3)	CRIT	NO CRITICAL ALARM: open ANY CRITICAL ALARM: connected to pin 1
Alarm	D-Conn	J16	MAJOR (4)	MAJ COM	Center (common) pin of contact set controlled by the major alarm relay
Alarm	D-Conn	J16	MAJOR (5)	MAJ	NO MAJOR ALARM: closed, connected to pin 1 ANY MAJOR ALARM: open
Alarm	D-Conn	J16	MAJOR (6)	MAJ	NO MAJOR ALARM: open ANY MAJOR ALARM: connected to pin 1
Alarm	D-Conn	J16	TEMP (7)	TEMP ALM	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 8

Sheet 3 of 9

Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	D-Conn	J16	TEMP (8)	TEMP	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 7
Alarm	D-Conn	J16	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.					
Alarm	D-Conn	J16	MINOR (10)	MIN COM	Center (common) pin of contact set controlled by the minor alarm relay
Alarm	D-Conn	J16	MINOR (11)	MIN	NO MINOR ALARM: closed, connected to pin 10 ANY MINOR ALARM: open
Alarm	D-Conn	J16	MINOR (12)	MIN	NO MINOR ALARM: open ANY MINOR ALARM: connected to pin 10
Alarm	D-Conn	J16	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.					
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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	D-Conn	J16	POWER (14)	PWR ALM	NO LOW VOLTAGE CONDITION: connected to pin 9 LOW VOLTAGE IN EITHER CHASSIS: open
Alarm	D-Conn	J16	FUSE (15)	FUSE ALM	-48 Vdc FUSE INTACT: open -48 Vdc FUSE “BLOWN”: -48 Vdc on pin 15
Ground	TB	TB1	- (LG) (3)	LOGIC GROUND (signal ground)	Logic ground for DPP; Connect to vertical ground bar; Isolated System Ground (I.S.G bus bar)
Ground	TB	FR	1/4 inch stud	Frame Ground	Frame ground connection to the DMS-100 IOE frame ground bus bar
Power	TB	TB2	-48 (1)	-48 Vdc (A)	-48 Vdc CO power to the B chassis
	TB	TB2	RTN (3)	BATRTN (B)	-48 Vdc battery return for B chassis
	D-Conn	J17	N/A (1)		No connection
	D-Conn	J17	N/A (1)		No connection
	D-Conn	J17	N/A (2)		No connection
Ground	D-Conn	J17	-(LG) (3)	Logic Ground	Logic ground connection

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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Power	D-Conn	J18	N/A (2)		No connection
Power	D-Conn	J18	N/A (3)		No connection
Power	D-Conn	J18	N/A (4)		No connection
Power	D-Conn	J18	N/A (6)		No connection
Ground	D-Conn	J18	FG (7)	Frame Ground	Optional frame ground connection; normally not connected; use the Frame Ground Stud; refer to Figure 21-1.
Power	D-Conn	J18	N/A (8)		No connection
Power	D-Conn	J18	N/A (9)		No connection
The following information is for the B Chassis					
Alarm	TB	J16	N/A (1)		No connection
Alarm	TB	J16	N/A (2)		No connection
Alarm	TB	J16	N/A (3)		No connection
Alarm	TB	J16	N/A (4)		No connection

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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	TB	J16	N/A (5)		No connection
Alarm	TB	J16	N/A (6)		No connection
Alarm	TB	J16	TEMP (7)	TEMP ALM	Center (common) pin of contact set controlled by temp alarm relay
Alarm	TB	J16	TEMP (8)	TEMP	TEMP WITHIN ACCEPTABLE LIMITS: open TEMP OUT OF RANGE: connected to pin 7
Alarm	TB	J16	POWER (9)	LVOLT	VOLTAGE NORMAL: open LOW VOLTAGE: connected to battery ground
Alarm	TB	J16	N/A (10)		No connection
Alarm	TB	J16	N/A (11)		No connection
Alarm	TB	J16	N/A (12)		No connection
Alarm	D-Conn	J16	N/A (1)		No connection
Alarm	D-Conn	J16	N/A (2)		No connection
Alarm	D-Conn	J16	N/A (3)		No connection

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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	D-Conn	J16	N/A (4)		No connection
Alarm	D-Conn	J16	N/A (5)		No connection
Alarm	D-Conn	J16	N/A (6)		No connection
Alarm	D-Conn	J16	TEMP (7)	TEMP ALM	WITHIN UPPER LIMITS: open ABOVE UPPER HEAT LIMIT: connected to pin 8
Alarm	D-Conn	J16	TEMP (8)	TEMP ALM	WITHIN UPPER LIMITS: open ABOVE UPPER HEAT LIMIT: connected to pin 7
Alarm	D-Conn	J16	N/A (9)		No connection
Alarm	D-Conn	J16	N/A (10)		No connection
Alarm	D-Conn	J16	N/A (11)		No connection
Alarm	D-Conn	J16	N/A (12)		No connection
Alarm	D-Conn	J16	N/A (13)		No connection

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Table 1-1
DPP power and alarm bulkhead connector wiring

Signal type	Chassis type	Conn. desig.	Pin desig. (number)	Signal name	Description
Alarm	D-Conn	J16	N/A (14)		No connection
Alarm	D-Conn	J16	FUSE (15)	FUSE ALM	-48 Vdc FUSE INTACT: open -48 Vdc FUSE BLOWN: -48 Vdc on pin 15

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DMS-100 Family

Distributed Processing Peripheral (DPP)

Hardware Component Replacement Guide

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