
Meridian 1

Fault Clearing

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April 2000

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About this document

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

This document gives instructions for locating and clearing faults. The procedures in this document are based on the assumption that the Meridian 1 is properly installed (for example, all card locations, option switch settings, and cable connections are correct) and was fully operational before the fault.

To use this document, you should have a basic knowledge of Meridian 1 operation and maintenance. (Contact Nortel Networks Training Centers for information on courses.) You should also read and fully understand *General Maintenance Information* (553-3001-500) before attempting to clear faults.

This document does not provide procedures for replacing equipment. See *Hardware Replacement* (553-3001-520) to replace faulty equipment.

Reference list

The following are the references in this section:

See the *Meridian 1 planning and engineering guide* for:

- *System Overview* (553-3001-100)
- *Spares Planning* (553-3001-153)
- *Equipment Identification* (553-3001-154)

See the *Meridian 1 installation and maintenance guide* for:

- *System Installation Procedures* (553-3001-210)
- *Circuit Card: Installation and Testing* (553-3001-211)
- *Telephone and Attendant Console: Installation* (553-3001-215)

- *General Maintenance Information* (553-3001-500)
- *Hardware Replacement* (553-3001-520)

See the *X11 Maintenance* (553-3001-511) for a description of all administration programs and maintenance programs, and to the *X11 System Messages Guide* (553-3001-411) for interpretation of system messages.

How to clear faults

Content list

The following are the topics in this section:

- [Reference list 13](#)
- [Fault clearing process 13](#)
- [Using this document 14](#)
- [Fault indicators 15](#)
- [System messages 15](#)
- [Visual fault indicators 17](#)
- [Maintenance display codes 18](#)
- [User reports 20](#)

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *Hardware Replacement* (553-3001-520)
- “Final maintenance procedure” on page 139

Fault clearing process

When a fault must be cleared in the Meridian 1, follow these steps:

- Observe and record all fault indicators.

- System messages, visual fault indicators, maintenance display codes, and user reports identify many problems. If the indicators are not current or seem incomplete, you may need to print the History File for previous messages, you may need to initialize the system for information on the current status, or you may need to do both.
- Look up all maintenance display codes and system messages in the *X11 System Messages Guide* (553-3001-411). The interpretation of the message or code may identify faulty equipment and tell you what action to take to clear the problem. If you cannot clear the fault through information in either of these guides, follow the process in this document to isolate and clear the fault (see “Using this document” on page 14).
- Try to test and enable disabled equipment.
- You may be able to hardware reen able circuit cards by unseating them, then reinstalling them. You may be able to software reen able cards by disabling them, then reenabling them. When the cause of a fault is not clearly evident, a software test may help you identify the problem.
- Replace equipment as necessary.

When you identify faulty equipment, follow procedures in *Hardware Replacement* (553-3001-520). When you think the fault is corrected, follow the instructions in “Final maintenance procedure” on page 139 to completely restore normal operation.

Using this document

To use the information in this document, follow the steps below:

- 1 Classify the fault by the indicators present (see “Fault indicators” on page 15). When multiple faults are indicated, clear them in the following order:
 - Power faults
 - Common equipment faults
 - Network equipment faults
 - Peripheral equipment faults
 - Trunk faults

- Attendant console faults
- Telephone faults

Note: Always clear possible power faults then common equipment faults before any other type of fault.

- 2 Go to the chapter for clearing the type of fault identified. There is a chapter for each type of fault listed above (for example, “Clearing power faults” on page 27). As closely as possible, match the problem to a symptom listed at the beginning of the chapter.
- 3 Go through the procedure for clearing each possible cause of the problem until the fault is cleared.
- 4 When the fault is corrected, follow the instructions in “Final maintenance procedure” on page 139 to completely restore normal operation.

Fault indicators

When there is a fault in the system, you may be notified by any combination of the following indicators:

- system messages
- visual fault indicators
- maintenance display codes
- user reports

Each type of indicator is described below.

System messages

System messages are codes with a mnemonic and number, such as PWR0014. The mnemonic identifies a software program or a type of message. The number identifies the specific message. Use system messages with other indicators, such as maintenance display codes and visual indicators, to identify and clear faults.

Table 1 lists the most common fault indicating messages and the type of fault they indicate. For a complete list and interpretation of system messages, see the *X11 System Messages Guide* (553-3001-411).

Table 1
System message fault indicators and related fault types

System messages	Type of fault
BSD090 PWR messages	Power
BSD080, 085, 086, 103 CED messages CIOD, CMON, and CNI messages INI001, 002, 004, 005 IOD006, 007, 060, 061, 291–297 NWS030, 102, 103, 142 SYS messages	Common equipment
BSD081, 101, 110, 111, 121, 130, 201–203, 205–209, 600, 602 CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 007–012 NWS101, 141, 201–204, 301, 401 OVD021, 022, 023, 031 TDS messages XMI messages	Network equipment
BSD301, 401, 402 ERR4062 NWS301, 401, 501 OVD001–010, 024 XMI messages	Peripheral equipment
ERR090, 220, 270 OVD003, 008, 009, 010 TRK messages	Trunk

System messages	Type of fault
BSD501	Attendant console
BSD501	Telephone
ERR500	
MWL500	
NWS501	
OVD001–002, 004, 005	
XMI messages	

Visual fault indicators

There are visual indicators on the Meridian 1 that can help you identify faults. These indicators include:

- a major or minor alarm display on the attendant console: indicates a possible power, common equipment, or network equipment fault
- circuit card light emitting diodes (LEDs): indicate that a card or a unit on a card is disabled
- column LED: indicates a fault in the column

Table 2 lists visual indicators you may see and the types of faults they indicate.

Table 2
Visual fault indicators and related fault types

Indicator	Type of fault
Major alarm on attendant consoles Red LED lit on column top cap Green LED off on module power supply Circuit breaker tripped (down) Remote alarm	Power
Major alarm on attendant consoles Red LED lit on CE card (other than the CPU interface card on the non-active CPU)	Common equipment
Minor alarm on an attendant console Red LEDs lit or flashing on associated cards	Network equipment
Red LED lit on associated card	Peripheral equipment
Red LED lit on trunk card	Trunk
Red LED lit on associated cards	Attendant console
Red LED lit on associated cards	Telephone

Maintenance display codes

Maintenance displays are located on the faceplate of some Meridian 1 circuit cards. A maintenance display shows an alphanumeric code that can indicate the status of the system and aid in fault identification. Interpretations of the maintenance display codes are listed under “HEX” in the *X11 System Messages Guide* (553-3001-411).

Each new code shown on a maintenance display overwrites the one before it. However, all codes received on common equipment displays are recorded; you can review them by printing the History File. The most recent 16 codes displayed on an NT8D01 Controller Card stay in memory. You can review them and reset the counter through the Network and Signaling Diagnostic (LD 30). You should examine previous codes, system messages, and visual indicators with the current maintenance display code to properly analyze faults.

Table 3 lists the cards with maintenance displays and the type of fault they might indicate.

Table 3
Maintenance display locations and related fault types

Maintenance display	Type of fault
NTSD03	Common equipment
NT5D20 IODU	
NT6D66, NT9D19, NT5D10 Call Processor	
NT6D63 Input/Output Processor	
NT5D61 Input/Output Disk Unit with CD-ROM	
NT8D01 Controller Card	Peripheral equipment
NT1P62 Fibre Controller Card	
NT7R52 Remote Carrier Interface Card	

User reports

Many faults reported by users, such as a damaged telephones or data sets, are obvious and can be fixed by replacing the damaged equipment.

Some faults are less obvious and may be caused by other equipment, such as a defective peripheral equipment card. To classify the fault in these cases, check for system messages and visual fault indications. You may also have the user reproduce the problem so you can determine the sequence of events that led to the fault.

Table 4 lists typical problems reported by users and the type of fault they might indicate.

Table 4
User reported problems and related fault types

User report	Type of fault
Major alarm reported by attendant	Power
No ring on 500/2500 telephones	
Major alarm reported by attendant	Common equipment
Minor alarm reported by attendant	Network equipment
Cannot transfer or conference	Peripheral equipment
Cannot dial out on 500/2500 telephones	
Trouble with calls on attendant console	
Trouble with calls on 500/2500 telephones	
Trouble with calls on SL-1, M1000, or digital telephones	
Trouble with a specific trunk	Trunk
Continuous ringing	
Trouble with calls on console and/or telephones	
Trouble with calls	Attendant console
Trouble with equipment (such as handset, headset, or display)	
Trouble with calls	Telephone
Trouble with equipment (such as handset or add-on module)	

Accessing the system

Content list

The following are the topics in this section:

- [Reference list 21](#)
- [Access through the system terminal 22](#)
- [Access through the maintenance telephone 23](#)

Reference list

The following are the references in this section:

- *X11 System Management Applications* (553-3001-301)
- *X11 System Messages Guide* (553-3001-411)

When you replace equipment, you often send commands to the system software in order to disable faulty equipment and enable and test newly installed equipment.

You send maintenance commands to the system through the system terminal or the maintenance telephone. This chapter gives the procedures for accessing the system through these devices.

Note: With software prior to X11 release 19, only one device at a time can communicate with the system. Accessing a device while another is logged in will log out the device that was already connected. The Multi User Login feature, available with X11 release 19, allows more than one device to interact with the Meridian 1. Refer to *X11 System Management Applications* (553-3001-301) for detailed information on using this feature.

Access through the system terminal

You can send maintenance commands and receive system messages by accessing the CPU through an RS-232 device, such as a video display terminal (VDT) or teletypewriter (TTY).

When you access the system through a system terminal, a login procedure is required (see Procedure 1). All system passwords are initially set as 0000, but you can change passwords in the Configuration Record (LD 17).

Note: If a sysload occurs before you save a new password in a data dump, the last active password remains valid.

Each system has two levels of passwords: level 1 is for general use; level 2 is for administrative use. Either password is accepted in the login procedure.

Procedure 1

Access through the system terminal

- 1 Press the return key.
 - If the response is a period (.), you are ready to log in to the system.
 - If the response is
OVL111 nn TTY x or **OVL111 nn SL1**
someone else is logged in to the system. When they have logged off, press return and go to Step 2.
 - If the response is
OVL111 nn IDLE or **OVL111 nn BKGD**
you are ready to log in to the system. Go to Step 2.
 - If the response is
OVL000 >
you are already logged in to the system. Go to Step 4.

Note: Responses vary with different Background Terminal packages.

- 2 Log in to the system by entering:
LOGI
then press the return key.

The normal response is
PASS?
If there is any other response, see the *X11 System Messages Guide* (553-3001-411).

- 3 Enter either the level 1 or level 2 password and press the return key. If the password is correct, the system responds with the prompt
>
- 4 Load a program by entering:
LD xx "xx" represents the number of the program
- 5 Perform tasks.
- 6 End the program by entering:
END or ****
- 7 Always end the login session with
LOGO
Background routines are then loaded automatically.

Access through the maintenance telephone

A telephone functions as a maintenance telephone when you define the class of service as MTA (maintenance set allowed) in the Multi-line Telephone Administration program (LD 11). A maintenance telephone allows you to send commands to the system through the following maintenance overlays: LD 30, LD 32, LD 33, LD 34, LD 35, LD 36, LD 37, LD 38, LD 41, LD 42, LD 43, LD 45, LD 46, LD 60, LD 61, LD 62.

Note: The Core Common Equipment Diagnostic Program (LD 135) and Core I/O Diagnostic Program (LD 137) are among the overlays that cannot be accessed through a maintenance telephone.

You can test tones and outpulsing through the maintenance telephone. Specific commands for those tests are given in the Tone and Digit Switch and Digitone Receiver Diagnostic (LD 34).

To access the system using the maintenance telephone, see Procedure 2. To enter commands, press the keys that correspond to the letters and numbers of the command (for example, to enter *LD 42 return*, key in 53#42##). Table 5 shows the translation from a terminal keyboard to a telephone dial pad.

Note: To use the maintenance telephone, the peripheral equipment loop for that telephone must be operating.

Table 5
Translation from keyboard to telephone dial pad

Keyboard				Dial pad
			1	1
A	B	C	2	2
D	E	F	3	3
G	H	I	4	4
J	K	L	5	5
M	N	O	6	6
P	R	S	7	7
T	U	V	8	8
W	X	Y	9	9
			0	0
			Space or #	#
			Return	##
			.	.
Note: There is no equivalent for Q or Z on a dial pad.				

Procedure 2**Access through the maintenance telephone**

- 1** Press the prime DN key.
- 2** Place the set in maintenance mode by entering:
xxxx91 "xxxx" is the customer Special Prefix (SPRE) number. It is defined in the Customer Data Block and can be printed using LD 21. The SPRE number is typically "1" (which means you would enter *191*).
- 3** Check for busy tone by entering "return"
##
 - If there is no busy tone, go to Step 4.
 - If there is a busy tone, a program is active. To end an active program and access the system enter

- 4** Load a program by entering:
53#xx## "xx" represents the number of the program
- 5** Perform tasks.
- 6** Enter ******** to exit the program and return the telephone to call processing mode. Background routines are then loaded automatically.

Clearing power faults

Content list

The following are the topics in this section:

- [Reference list 28](#)
- [Power faults 28](#)
- [Fault clearing procedures 30](#)
- [Circuit breakers and all column LEDs off \(DC power\) 33](#)
- [Circuit breakers on but all column LEDs off \(DC power\) 35](#)
- [Green LED off on module power supply \(DC power\) 36](#)
- [Defective blower unit indicated \(DC power\) 38](#)
- [Main circuit breaker and all column LEDs off \(AC power\) 39](#)
- [Main circuit breaker on but all column LEDs off \(AC power\) 41](#)
- [Breaker off on MPDU \(AC power\) 42](#)
- [Green LED off on module power supply \(AC power\) 44](#)
- [Defective blower unit indicated \(AC power\) 46](#)

Reference list

The following are the references in this section:

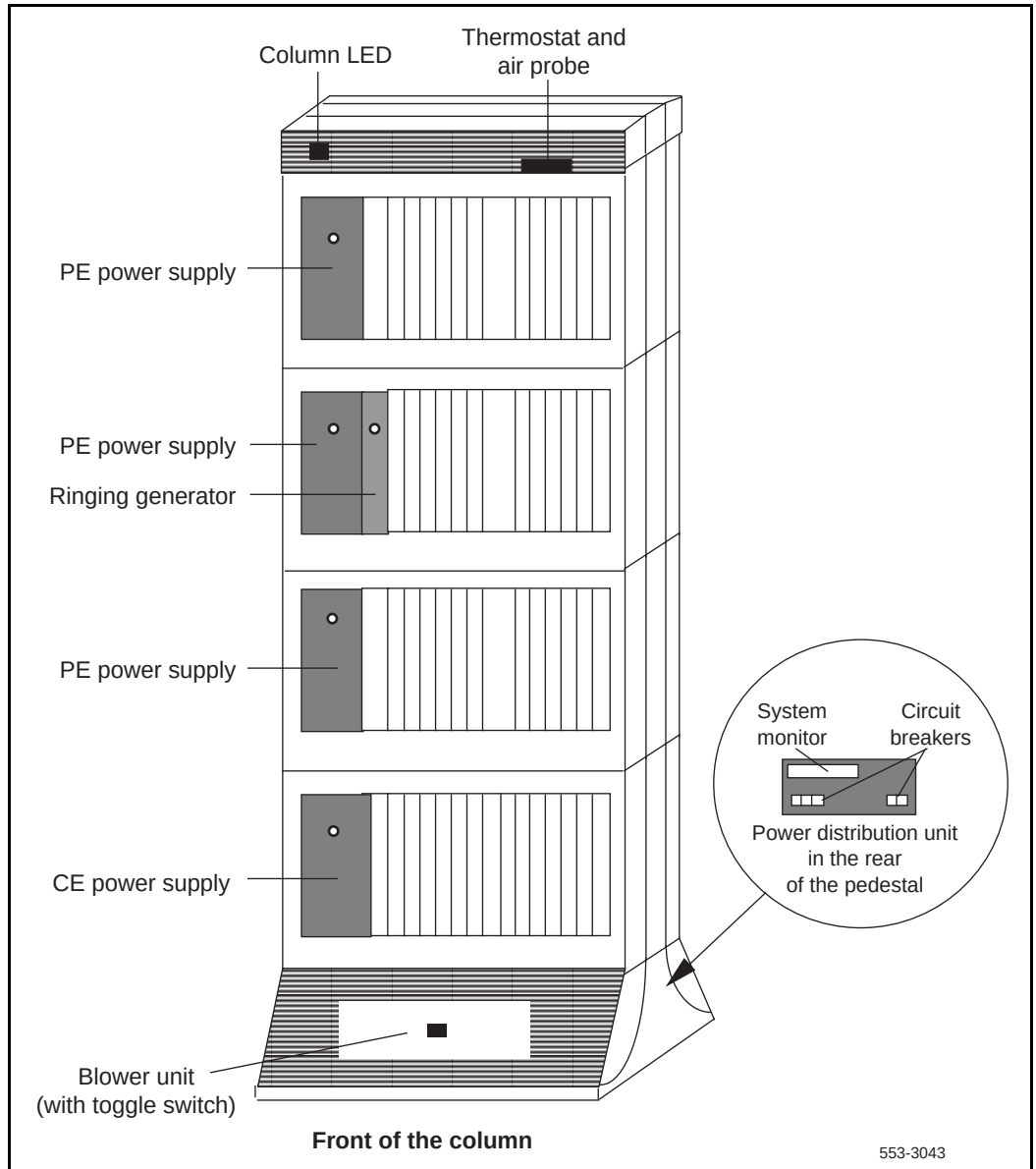
- *X11 System Messages Guide* (553-3001-411)
- *Hardware Replacement* (553-3001-520)
- *General Maintenance Information* (553-3001-500)

Power faults

Various electrical voltages are required to power the Meridian 1. These electrical voltages are developed and delivered by the power equipment system. Cooling and monitoring devices are interconnected with the power system. Figure 1 show power, cooling, and monitoring equipment that may be located in a column, including:

- air probe: increases the impeller speed as the temperature goes up (not equipped in Option 21A)
- blower unit: provides cooling for the column (not equipped in Option 21A)
- module power distribution unit (MPDU): houses circuit breakers for some module power supplies (AC power only and not equipped in Option 21A)
- In DC-powered systems, there is a switch on each power supply, so MPDUs are not required.
- power distribution unit (PDU): distributes power from the external source to module power supplies and houses the column circuit breaker(s)
- module power supply: converts voltage from the PDU to the voltages needed in each type of module
- ringing generator: provides current to ring 500/2500 telephones and to light the message waiting light on the 2500 telephones
- system monitor: monitors power and temperature conditions
- thermostat: monitors column temperature
- top cap fan: cools the power supply (Option 21A only)

Figure 1
Internal DC power equipment



Power faults can disable ringing for 500/2500 telephones, message waiting lights on 2500 telephones, all the cards in a module, all the modules in a column, or the entire system.

Fault clearing procedures

System messages with the mnemonic PWR (power) contain four fields of information about power equipment. These fields identify the type of equipment indicated (such as the blower unit) and the source of the message (system monitor, module, or module power supply). Table 6 defines the fields in PWR messages. Figure 2 shows the power equipment identified in PWR messages.

Table 6
PWR message fields

PWRxxxx (HW) (SM) (UEM) (U)		
HW	Hardware type, one of the following:	
	CRBK	Circuit breaker
	DCSP	DC power supply
	FANU	Blower unit
	PFTC	Power fail transfer
	PWSP	Module power supply, including ringing generator
	THSW	Thermal switch
	UPSA	Uninterruptible power supply (UPS) alarm
	XSMC	System monitor card
SM	System monitor (0-63) generating the message (0 is the master system monitor)	
UEM	Module (0-3) reporting the condition	
U	Number of the power supply (1-2) in the module	

Figure 2
Power equipment designations

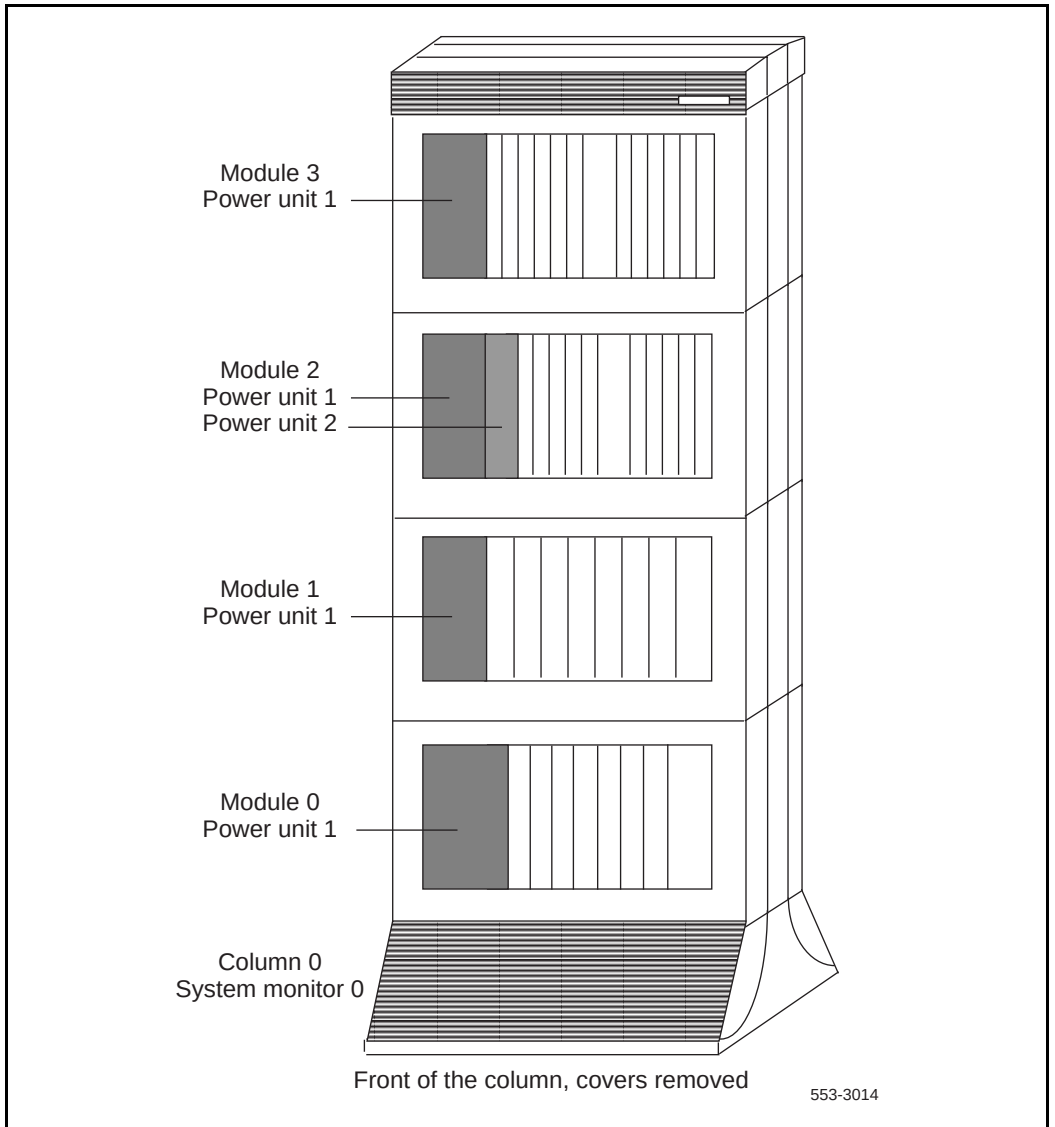


Table 7 lists common power fault indications. To clear faults, select the symptom that most resembles the fault indications, then go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: You must clear power faults before you try to clear other types of faults in the system.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “Clearing power faults” on page 27 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 7
Power fault indicators

Indicator	Possible indications
System messages	BSD090 (Program has detected a power fault indication. Check PWR messages.) PWR messages
Visual indicators	Major alarm on attendant consoles Red LED lit on column top cap Green LED off on module power supply LED lit on PFTU Circuit breaker tripped (down) Remote alarm
User reports	Major alarm reported by attendant No ring on 500/2500 telephones

WARNING

Modules covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:

Circuit breakers and all column LEDs off (DC power)

All the LEDs in a column are off and all circuit breakers on the PDU are tripped. You may receive message PWR0004, which indicates that the circuit breakers for the column have tripped. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Note: High room temperature can shut down the system. If all columns in a multi-column system are shut down, check for this external condition.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Air filter: P0699798
- Air probe harness: NT8D46AM
- System monitor cables
- Thermostat harness: NT8D46AC

Possible cause	Action
Low batteries	If a TRIP signal to the system has shut down power: — Check the cable from the external power system. — Check the batteries and service them as necessary.
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If you do not find a problem of this type, go to the next possible cause.

Possible cause	Action
Thermal overload	Make sure nothing is blocking ventilation throughout the system. Allow the system to cool for a few minutes, then reset the breakers. If the breakers trip immediately, check the thermostat harness: — Make sure the harness is securely connected to the module below it. — Use an ohmmeter to check the connector pins for the harness; if there is an open circuit between pins 3 and 4 or between pins 5 and 6, replace the harness. If the breakers do not trip immediately, check the air filter: — If the filter is dirty and undamaged, clean the filter as described in <i>General Maintenance Information</i> (553-3001-500). — If the filter is damaged in any way, replace the filter as described in <i>Hardware Replacement</i> (553-3001-520). If there is no problem with the air filter or if the breakers trip when reset, check the air probe harness: — Make sure the harness is securely connected to the module below it. — Use an ohm meter to check the connector pins for the harness; if there is an open circuit between pins 1 and 2, replace the harness. If there is no problem with this equipment, go to the next possible cause.
Defective connection to system monitor	Make sure cables to connectors J5 and J6 are securely connected to the system monitor in the column. Check the system monitor connections to each module. If the breakers trip with all cables connected, replace the cables one at a time until the breakers stay on.

Symptom:**Circuit breakers on but all column LEDs off (DC power)**

All the LEDs in a column are off but the circuit breakers on the PDU are not tripped. Use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- External rectifier
- PDU

Possible cause	Action
DC wires not connected	If the DC wires are disconnected, connect them. If the wires are already connected or if the column LEDs do not light when they are connected, go to the next possible cause.
WARNING The following test is performed on a live power connection.	
No power at DC source	Make sure the rectifier is on and connected. Make sure the rectifier is receiving power. If there is no problem with the rectifier, go to the next possible cause.
Defective power cable	With a meter, test the field wiring connections in the PDU for DC power. If there is no power, replace the cable. If there is power at the connections, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom:

Green LED off on module power supply (DC power)

The green LED is off on one of the following power supplies:

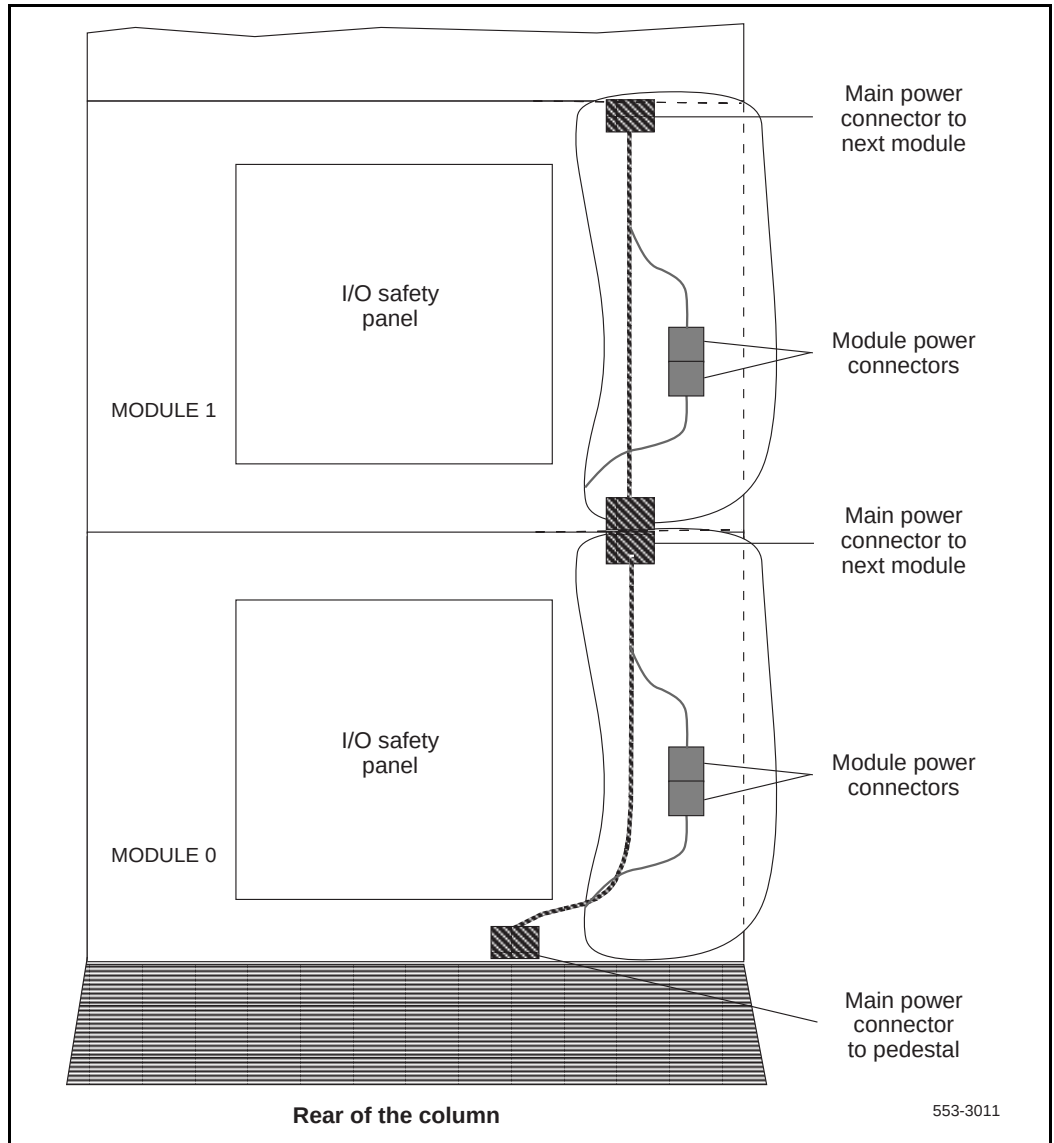
- EEPE power supply: NT5K12
- PE power supply: NT6D40
- CE power supply: NT6D41
- Ringing generator: NT6D42
- CE/PE power supply: NT6D43

You may receive a system message indicating the status of the power supply. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520).

Possible cause	Action
Disconnected power cable	Check the power cable connection to the power supply. If the cable is connected, check power cable connections to each module below the affected one (see Figure 3). If all power cables are connected, go to the next possible cause.
Defective power supply	Set the switch on the power supply to OFF (down), wait at least 60 seconds, then set the switch back to ON (up). If the LED on the power supply is still off, replace the power supply.

Figure 3
DC power cabling in rear of column



Symptom:

Defective blower unit indicated (DC power)

The blower unit circuit breaker (breaker number 5 on the PDU) is tripped and trips when reset. You may receive a system message indicating that there is a failure in the blower. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Blower unit: NT8D52DD
- PDU

Possible cause	Action
Blower unit switch turned off	Set the switch on the front of the blower unit to ON (right). Reset the circuit breaker. If the switch was already on or if the circuit breaker trips again, go to the next possible cause.
Defective blower unit	Replace the blower unit and set the circuit breaker to on. If the breaker trips, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom:

Main circuit breaker and all column LEDs off (AC power)

All the LEDs in a column are off and the main circuit breaker on the PDU is tripped. You may receive message PWR0004, which indicates that the main circuit breaker for the column has tripped. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Note: High room temperature or a power surge can shut down the system. If all columns in a multi-column system are shut down, check for these external conditions.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Air filter: P0699798
- Air probe harness: NT8D46AM
- System monitor cables
- Thermostat harness: NT8D46AC

Possible cause	Action
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If you do not find a problem of this type, go to the next possible cause.
Thermal overload	Make sure nothing is blocking ventilation throughout the system. Allow the system to cool for a few minutes then reset the breaker. If the breaker trips immediately, check the thermostat harness: — Make sure the harness is securely connected to the module below it. — Use an ohmmeter to check the connector pins for the harness; if there is an open circuit between pins 3 and 4 or between pins 5 and 6, replace the harness.

Possible cause	Action
	If the breakers do not trip immediately, check the air filter: — If the filter is dirty and undamaged, clean the filter as described in <i>General Maintenance Information</i> (553-3001-500). — If the filter is damaged in any way, replace the filter as described in <i>Hardware Replacement</i> (553-3001-520). If there is no problem with the air filter or if the breaker trips when reset, check the air probe harness: — Make sure the harness is securely connected to the module below it. — Use an ohm meter to check the connector pins for the harness; if there is an open circuit between pins 1 and 2, replace the harness. If there is no problem with this equipment, go to the next possible cause.
Defective connection to system monitor	Make sure cables to connectors J5 and J6 are securely connected to the system monitor in the column. Check the system monitor connections to each module. If the breaker trips with the cables connected, replace the cables one at a time until the breaker stays on.

Symptom:**Main circuit breaker on but all column LEDs off (AC power)**

All the LEDs in the column are off but the main circuit breaker on the PDU is not tripped. Use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- PDU: NT8D53AB
- Main power cord
- UPS

Possible cause	Action
Power cord not connected	If the power cord for the column is unplugged, plug it in. If the power cord is already plugged in or if the column LEDs do not light when it is plugged in, go to the next possible cause.
WARNING The following tests are performed on a live power connection.	
No power at outlet	With a meter or test lamp, test for AC power at the outlet. If there is no power at the outlet when AC power is supplied through a UPS unit, repair or replace the UPS following the manufacturer's instructions. If there is no power at the outlet when AC power is supplied through commercial service (not through a UPS), take the necessary steps to have the commercial power restored. If there is power at the outlet, go to the next possible cause.
Defective power cord	With a meter or test lamp, test the field wiring connections in the PDU for AC power. If there is no power, replace the power cord. If there is power at the connections, go to the next possible cause.
Defective PDU	Replace the PDU.

Symptom:

Breaker off on MPDU (AC power)

A circuit breaker on a MPDU is tripped and trips when reset. The green LED will be off on the associated power supply:

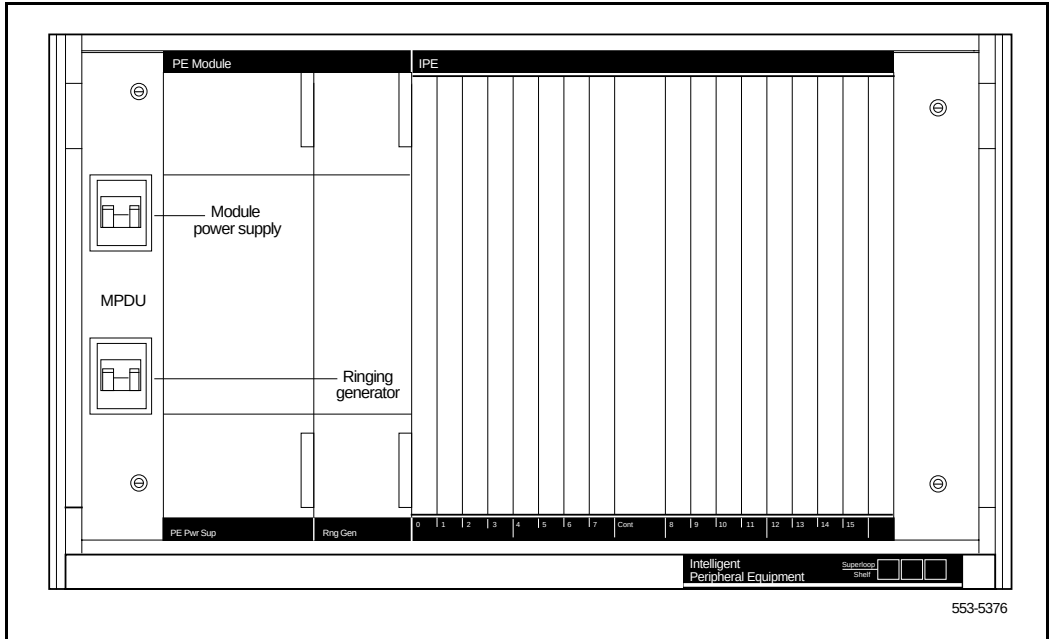
- NT8D56AA single breaker MPDU: for NT8D29 CE Power Supply
- NT8D56AC single breaker MPDU: for NT7D14 CE/PE Power Supply
- NT8D57AA dual breaker MPDU: for NT8D06 PE Power Supply and NT8D21 Ringing Generator

You may receive a system message indicating the status of the breaker. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520).

Possible cause	Action
Short circuit or damage	Look for signs of damage (such as smoke, burnt contacts, or melted insulation) that may be caused by a short circuit or misplaced equipment. If you do not find a problem of this type, go to the next possible cause.
Defective module power supply (single breaker)	Unseat the associated power supply and reset the breaker. If the breaker does not trip, replace the power supply. If the breaker trips, replace the MPDU.
Defective module power supply (dual breaker)	If one circuit breaker is tripped on a dual MPDU: — Unseat the associated power supply (see Figure 4) then reset the breaker. — If the breaker does not trip, replace the power supply. — If the breaker trips, replace the MPDU. If both circuit breakers are tripped: • Unseat both power supplies, then reset the breakers. • If either breaker or both breakers trip, replace the MPDU. If the breakers do not trip, set them to OFF (down): • Reinsert one power supply then reset the associated breaker. • If the breaker trips, replace that power supply. • If the breaker does not trip, set the breaker to OFF and unseat that power supply. • Reinsert the other power supply, then reset the associated breaker. • If the breaker trips, replace that power supply.

Figure 4
Dual circuit breaker and associated module power supplies



Symptom:

Green LED off on module power supply (AC power)

The circuit breaker on the associated MPDU is not tripped, but the green LED is off on one of the following power supplies:

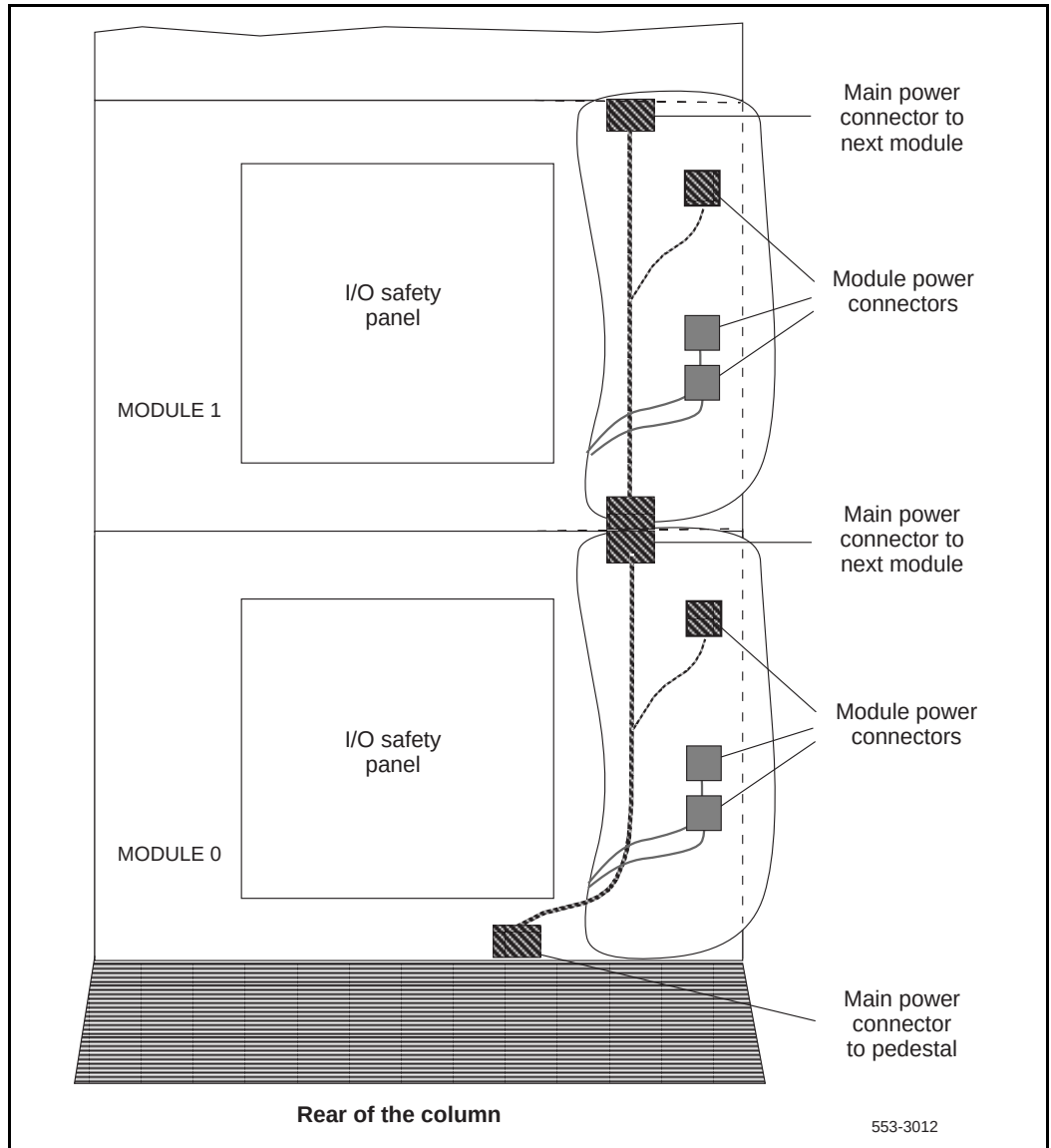
- PE power supply: NT8D06
- CE/PE power supply: NT7D14
- Ringing generator: NT8D21
- CE power supply: NT8D29

You may receive a system message indicating the status of the power supply. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520).

Possible cause	Action
Disconnected power cable	Check the power cable connection between the power supply and the back of the MPDU. If the cable is connected, check power cable connections to each module below the affected one (see Figure 5). If all power cables are connected, go to the next possible cause.
Defective power supply	Set the circuit breaker on the associated MPDU off, then back on (see Figure 4 if there are dual circuit breakers). If the LED on the power supply is still off, replace the power supply. If you replace the power supply, the LED on the replacement should light and stay lit. If it does not, go to the next possible cause.
Defective MPDU	Replace the MPDU.

Figure 5
AC power cabling in rear of column



Symptom:

Defective blower unit indicated (AC power)

The blower unit circuit breaker (located on the front of the unit) is tripped and trips when reset. You may receive a system message indicating that there is a failure in the blower. See “PWR” in the *X11 System Messages Guide* (553-3001-411) and use this procedure to clear the problem.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Blower unit: NT8D52AB
- PDU: NT8D53

Possible cause	Action
Defective blower unit	Replace the blower unit and set the circuit breaker to ON (up). If the breaker trips, go to the next possible cause.
Defective PDU	Replace the PDU.

Clearing common equipment faults

Content list

The following are the topics in this section:

- [Reference list 47](#)
- [Common equipment faults 47](#)
- [Fault clearing procedures 49](#)
- [Fault indicated on a common equipment card \(Options 51C, 61C, and 81C\) 51](#)
- [Floppy disk unit not operating 53](#)
- [IODU/C not operating 54](#)

Reference list

The following are the references in this section:

- *X11 System Messages Guide* (553-3001-411)
- *Circuit Card: Installation and Testing* (553-3001-211)
- *Hardware Replacement* (553-3001-520)
- *NT5D61 IODU/C Reference Guide*

Common equipment faults

Common equipment (CE) functions perform system control and switching. Common equipment in the Meridian 1 can include:

- **Bus Terminating Unit (BTU):** provides logical termination to CPU and network buses (Options 51, 51C, 61, 61C, 71, and 81C)

- Changeover and Memory Arbitrator (CMA) card: provides CPU access to RAM memory; allows a CPU to access redundant memory in a dual CPU system (Options 51, 61, and 71)
- Central Processing Unit (CPU): performs system call processing functions
- Call Processor (CP): performs system arithmetic and logic functions
- Data cartridge: allows access to software packages purchased
- Mass Storage Interface card (floppy disk interface card, mass storage interface card, or enhanced mass storage interface card): interface between the CPU and the mass storage unit
- Mass Storage Unit (floppy disk unit, multi drive unit, small system multi drive unit, or core multi disk unit): provides a backup for programs and data stored in system memory
- Read Only Memory (ROM) card: provides memory for the CPU; the daughterboard on the QPC687 CPU Card (Options 21, 21A), the NTND01 ICM Card (Option 21E), the QPC579 CPU Function Card (Options 51, 61, 71), or the NT6D66 Call Processor (Options 51C, 61C, and 81C)
- Serial Data Interface (SDI) card: provides ports between the CPU and external devices
- Segmented Bus Extender (SBE) card: extends the CE bus signals to the network module (Option 71)
- Core to Network Interface (CNI) card: links the CE bus with the three-port extender (3PE) card(s) in the network slots (Options 51C, 61C, and 81C)
- Three-Port Extender (3PE) card: extends CPU signals to the network (Option 61), between the SBE and the network (Option 71), and between Core Network Interface (CNI) and the network (Options 51C, 61C, and 81C).

Common equipment faults can disable the CPU or the mass storage unit and stop call processing. In addition, other types of equipment (such as network equipment) may not operate properly while there is a CE fault in the system.

Fault clearing procedures

Table 8 lists common equipment fault indications. To clear faults, select the symptom that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power faults before you try to clear common equipment faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 13 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 8
Common equipment fault indicators

Indicator	Possible indications
System messages	BSD080, 085, 086, 103
	CED messages
	INI001, 002, 004, 005
	IOD006, 007, 060, 061, 291–297
	NWS030, 102, 103, 142
Visual indicators	SYS messages
	Major alarm on attendant consoles
	Red LED lit on column top cap
Maintenance displays	Red LED lit on CE card of active CPU
	QPC580 CPU Interface
	NT8D19 Memory/Peripheral Signaling
	QPC584 Mass Storage Interface
	NT9D34 Enhanced Mass Storage Interface
	QPC742 Floppy Disk Interface
	NTND01 ICM card
	NT5D20 IOP/CMDU
	NTND10 CMA card
	NT6D66, NT9D19, NT5D10 Call Processor
	NT6D63 IOP card
	NT5D61 IODU/C card
User reports	Major alarm reported by attendant

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:**Fault indicated on a common equipment card
(Options 51C, 61C, and 81C)**

The red LED is lit or the display is indicating a fault on a common equipment card. The dual Core system will still be operating but may be limited to one CP. Option 51C with a single CPU may or may not process calls, depending on the problem. Look up system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given by these codes. If the fault does not clear, use this procedure.

Note: Make sure the normal/maintenance switch on both Call Processor cards is set to Norm for Options 61C, and 81C. Continually observe and look up system messages as you perform this procedure.

For information on switch settings for the applicable Core cards, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- CP card
- CP to CP cable: NTND11
- IODU/C card: NT5D61
- IOP/CMDU card: NT5D20
- IOP card: NT6D63
- CNI card: NT6D65
- 3PE card: QPC441
- CPNET backplane: NT9D1102 (Options 51C and 61C)
- CPNET2 backplane: NT5D2102 (Options 51C, 61C, and 81C)
- CBT card: NT6D6003
- Core or Core/Network card cage: NT6D6008, NT9D1101, or NT5D2101

Possible cause	Action
Defective serial I/O ports	Check each SDI port by entering: LD 37 STAT TTY • If software is disabled, try to enable it (software disable, hardware disable, then try to reenale). • If the card will not enable, replace it. If the CPU is still faulty, go to the next possible cause.
Defective IOP card	Check the IOP card: • Reinstall the IOP card, test it, and enable it: LD 137 DIS IOP TEST IOP ENL IOP **** If the CPU is still faulty, go to the next possible cause.
Defective CE card (lit LED)	Unseat the CP and CNI cards, then reinstall them. Make sure all cables are securely connected. If all cards do not recover, continue with this procedure. If the display on the CP card shows a fault: LD 135 TEST CPU If there is a problem with the test, CCED system messages will be generated. If the LED is lit on some other CE card, check the CNI card, enter: LD 135 TEST CNI c s where c represents the CPU 0 or 1 and s represents the card slot. If the CPU is still faulty, replace the CE cables one at a time. If CNI is faulty, disable the card before you out it. If the CPU remains faulty, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module. To be able to replace the card cage, you must first switch the system to use the alternate CPU and then disable and remove all the cards in the card cage you wish to replace.

Symptom:

Floppy disk unit not operating

There may be a lit LED on the FDU. There may be a maintenance display code on the FDI card indicating a problem with the FDU. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Take any action indicated by the maintenance display codes. Continually observe and look up system messages as you perform this procedure.

For information on switch settings, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Cable between FDU and FDI card
- Data cartridge: QMM42
- FDI card: QPC742
- FDU: NT8D68 or NTND15

Possible cause	Action
Defective FDI card or data cartridge	Unseat the FDU and FDI card, then reinstall them. Make sure the cable between the FDU and FDI is securely connected. (In a dual CPU system, check both FDI cards.) If the FDU does not recover, continue with this procedure. Check the FDI: • Make sure the data cartridge is securely attached. • Check switch settings; if necessary, correct the switch settings. • Try to enable the FDI (try to software disable, hardware disable, then reenable). • If you cannot load a program or the FDI is still disabled, replace it. • If necessary, replace the data cartridge. If the FDU is still not operating, go to the next possible cause.
Defective FDU or cable	Replace the FDU. If it is still disabled, replace the cable between the FDU and FDI.

Symptom:

IODU/C not operating

There may or may not be a lit LED on the front of the IODU/C. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Take any action indicated by the maintenance display codes. Continually observe and look up system messages as you perform this procedure.

For more information on IODU/C, please see the *NT5D61 IODU/C Reference Guide*. For information on switch settings, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- IODU/C: NT5D61
- Core/Network card cage: NT5D2101

Possible cause	Action
Defective IODU/C (lit LED)	Unseat the IODU/C, then reinstall it. If the IODU/C does not recover, continue with this procedure. Try to restore the hard drive from disks: — Stat, enable, and test the CMDU part of the IODU/C card: LD 137 STAT CMDU x TEST CMDU x DIS CMDU X SYNC ENL CMDU X If the problem continues, a CIOD system message appears and the LED lights on the faceplate. If you cannot load the program, replace the IODU/C: — If you can load the program, test the port for the system terminal you were using. — If the port is okay, test the cable to the system terminal. — If the cable is okay, check the system terminal. If the CMDU part of the IODU/C is still faulty, go to the next possible cause.
Defective IOP part of the IODU/C card	Check the IOP part of the IODU/C card: — Reinstall the IODU/C card; test and enable the IOP part of the IODU/C card. LD 137 DIS IOP TEST IOP ENL IOP If the IODU/C is still faulty, go to the next possible cause.
Defective backplane connection to IODU/C (LED not lit)	Try to test the IODU/C by entering: LD 137 TEST CMDU x “x” represents the IODU/C card number 0 or 1 If the CMDU part of the IODU/C card is still faulty, replace the IODU/C card. If the CMDU part of the IODU/C enables after it is moved, replace the card cage assembly in the module you took it from.

Possible cause	Action
CD-ROM drive not operating	For redundant systems, remove the disk from the CD-ROM drive, place it in the CD-ROM drive of the other Core, and test operation. If the CD-ROM drive is operational you may need to replace the IODU/C card with the faulty CD-ROM drive.
CD disk is damaged	If you have another CD-ROM disk, insert that CD-ROM disk into a known operational IODU/C card, and load the Software Installation Tool from the correct Install Program diskette. In the Software Installation Tool, go to the Tools Menu and select option <j> - "To check the customer-specific part of the CD-ROM." If this test is successful, the message "Checking directory /cdx/xxxx_DMR.Nxx ended successfully" is displayed.x If the test is successful, it is unlikely the CD-ROM disk is damaged. However, if the test indicates a failure to read all files on the CD-ROM disk, then the CD-ROM disk is damaged and should be replaced.
Mismatch between the Security Device and keycode.	Positively identify the NT SDID (8 digits engraved on the face of the Security Device beneath the Nortel Networks logo) with the NT SDID contained on the keycode floppy disk label, and verify the NT SDIDs match.
IODU/C Software Installation Tool does not load	Verify that the correct Install Program diskette is being used for the CP card in your system.

Clearing network equipment faults

Content list

The following are the topics in this section:

- [Reference list 58](#)
- [Network equipment faults 58](#)
- [Fault clearing procedures 59](#)
- [Disabled loop indicated by OVD message\(NT1P61 Fibre Superloop Network Card\) 61](#)
- [Disabled loop indicated by OVD message \(NT7R51 Local Carrier Interface Card\) 63](#)
- [Symptom: Disabled loop indicated by OVD message \(NT8D04 Superloop Network Card\) 67](#)
- [Loop disabled without OVD message \(NT8D04 Superloop Network Card\) 70](#)
- [Disabled loop indicated by OVD message \(QPC414 Network Card\) 73](#)
- [Loop disabled without OVD message \(QPC414 Network Card\) 76](#)
- [Disabled peripheral signaling card indicated by OVD message 79](#)
- [Peripheral signaling card disabled without OVD message 80](#)
- [Problems with transferring, placing conference calls, or Music-on-Hold 81](#)
- [Problems placing calls on 2500 telephones and some trunks 83](#)

Reference list

The following are the references in this section:

- *General Maintenance Information* (553-3001-500)
- *X11 Maintenance* (553-3001-511)
- *X11 System Messages Guide* (553-3001-411)
- *Hardware Replacement* (553-3001-520)
- *Circuit Card: Installation and Testing* (553-3001-211)
- *Traffic Measurement: Formats and Output* (553-2001-450)
- *Meridian 1 Telephones: Description and Specifications* (553-3001-108)
- *Telephone and Attendant Console: Installation* (553-3001-215)
- “Clearing attendant console faults” on page 109
- “Disabled peripheral equipment card” on page 96

Network equipment faults

Network equipment in the Meridian 1 provides speech path switching and transmits and receives signaling messages from the CPU. Network equipment can include:

- conference/tone and digit switch (CONF/TDS) card: provides conference capability, all tones for the system, and multifrequency sender (MFS) functionality
- intergroup switch (IGS) card: provides speech path switching between network groups for Options 71, and 81C
- network card: provides digital switching for the system
- The NT8D04 Superloop Network Card provides the equivalent of four network loops. The NT1P61 Fibre Superloop Network card and the NT7R51 Local Carrier Interface card provide the equivalent of two network loops.
- The NT8D18 Network/Digitone Receiver (DTR) Card provides the digital switching and MFS functionality, for Options 21A, 21, and 21E.
- peripheral signaling (PS) card: provides the signaling interface to the CPU and clocking

- The NT8D19 Memory/Peripheral Signaling Card combines the functionality of memory and peripheral signaling cards, as well as miscellaneous CPU functions, for Options 21A and 21. The NTND02 Misc/SDI/Peripheral Signaling Card combines the functionality of peripheral signaling and SDI cards, as well as miscellaneous CPU functions.
- serial data interface (SDI) card: provides the interface from the CPU to an input/output (I/O) device

Network equipment faults can cause system initializations and disable conference capability or all terminal connections (such as trunks and telephones) on a loop. Defective network equipment can make functional peripheral equipment seem faulty.

Fault clearing procedures

Manual continuity tests can be used to isolate superloop network card and IPE faults. For a description of manual continuity tests, see *General Maintenance Information* (553-3001-500). See “LD 45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Table 9 lists common network equipment fault indications. To clear faults, select the symptom that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power or common equipment faults before you try to clear network equipment faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “Clearing network equipment faults” on page 57 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Table 9
Network equipment fault indicators

Indicator	Possible indications
System messages	BSD081, 101, 110, 111, 121, 130, 201–203, 205–209, 600, 602 CNF messages DTA, DTC, DTI messages ERR020, 120, 4060 INI003, 007–012 NWS101, 141, 201–204, 301, 401 OVD021, 022, 023, 031 TDS messages XMI messages
Visual indicators	Minor alarm on an attendant console Red LEDs lit or flashing on cards
User reports	Minor alarm reported by attendant Users cannot transfer or conference Users cannot dial out on 500/2500 telephones No dial tone at all sets; no display on digital sets

Symptom:**Disabled loop indicated by OVD****message(NT1P61 Fibre Superloop Network Card)**

An overload (OVD) system message indicates that a loop on an NT1P61 Fibre Superloop Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate superloop network card and IPE faults. See “LD 45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Fibre Peripheral Controller card: NT1P62
- Fibre Superloop network card: NT1P61
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective superloop network card	Hardware disable, then reenable, the superloop network card to initiate a self-test or executing the XNTT loop command. If the test fails, check the card status. Check the status of the Fibre Superloop Network card: LD 30 STAT loop “loop” represents the loop number. Check the display and take steps to resolve the problem indicated is the status report. If you receive an OVD message, replace the superloop network card. If the card is disabled, enable it by executing the ENLL loop command. If the response is UNEQ, install the card correctly and observe self-test.
Defective controller card	Perform the Fibre Peripheral Controller card self-test: DSXP x “x” represents the controller number. If the test passed, enable the card by executing: ENXP x “x” represents the controller number. If the test failed, check the maintenance display codes on the controller card and wait for an OVD message. In the OVD message is received, replace the card. If there is no OVD message, go to the next possible cause.
Defective PE card	Reinsert the PE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software disable the card, then try to reenable it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If there is no OVD message as you insert the cards, go to the next possible cause.

Possible cause	Action
Defective fibre-optic span	To check the fibre-optic span, perform loopback test across the span. Load LD 45 and execute the XCON 6 test with Fibre Superloop Network card as the generator and detector with span looped at the Fibre Peripheral Controller card at the Fibre Remote IPE. Check the test results and proceed accordingly.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as “Clearing attendant console faults” on page 109) to fix the fault.

Symptom:

Disabled loop indicated by OVD message (NT7R51 Local Carrier Interface Card)

An overload (OVD) system message indicates that a loop on an NT7R51 Local Carrier Interface Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate superloop network card and IPE faults. See “LD 45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Remote Carrier Interface card: NT7R52
- Local Carrier Interface card: NT7R51
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective Local Carrier Interface card	Hardware disable, then reenable, the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Check the status of the Local Carrier Interface card: LD 32 STAT sl “sl” represents the loop number. Check the display and take steps to resolve the problem indicated in the status report. If you receive an OVD message, replace the superloop network card. If the card is disabled, enable it by executing the ENLL sl command. If the response is UNEQ, install the card correctly and observe self-test.
Defective Remote Carrier Interface card	Unseat all cards on the PE shelf except the Remote Carrier Interface card. Unseat and seat the Remote Carrier Interface card to start self-test. Observe self-test: If the test passed, enable the card by executing: ENXP x “x” represents the controller number. If the test failed, check the maintenance display codes on the card faceplate and wait for an OVD message. In the OVD message is received, replace the card. If there is no OVD message, go to the next possible cause.
Defective PE card	Reinsert the PE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software disable the card, then try to reenable it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If there is no OVD message as you insert the cards, go to the next possible cause.

Possible cause	Action
Defective cable	To check the carrier span, perform loopback test across the span. Load LD 45 and execute the XCON 6 test with Local Carrier Interface card as the generator and detector with span looped at the Remote Carrier Interface card at the Carrier Remote IPE. Check the test results and proceed accordingly. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as "Clearing attendant console faults" on page 109) to fix the fault.

Possible cause	Action
Defective Local Carrier Interface card	Hardware disable, then reenable, the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Check the status of the Local Carrier Interface card: LD 32 STAT sl “sl” represents the loop number. Check the display and take steps to resolve the problem indicated in the status report. If you receive an OVD message, replace the superloop network card. If the card is disabled, enable it by executing the ENLL sl command. If the response is UNEQ, install the card correctly and observe self-test.
Defective Remote Carrier Interface card	Unseat all cards on the PE shelf except the Remote Carrier Interface card. Unseat and seat the Remote Carrier Interface card to start self-test. Observe self-test: If the test passed, enable the card by executing: ENXP x “x” represents the controller number. If the test failed, check the maintenance display codes on the card faceplate and wait for an OVD message. In the OVD message is received, replace the card. If there is no OVD message, go to the next possible cause.
Defective PE card	Reinsert the PE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software disable the card, then try to reenable it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If there is no OVD message as you insert the cards, go to the next possible cause.

Possible cause	Action
Defective cable	To check the carrier span, perform loopback test across the span. Load LD 45 and execute the XCON 6 test with Local Carrier Interface card as the generator and detector with span looped at the Remote Carrier Interface card at the Carrier Remote IPE. Check the test results and proceed accordingly. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as “Clearing attendant console faults” on page 109) to fix the fault.

Symptom:

Disabled loop indicated by OVD message (NT8D04 Superloop Network Card)

An overload (OVD) system message indicates that a loop on an NT8D04 Superloop Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit or flashing. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate superloop network card and IPE faults. See “LD 45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Controller card: NT8D01
- Superloop network card: NT8D04

- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective superloop network card	Hardware disable, then reenable, the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Disconnect the loop cable(s) to the superloop network card. Enable and test each loop on the card by entering: LD 32 ENLL loop “loop” represents the loop number. Wait for an OVD message. If you receive an OVD message, replace the superloop network card. If there is no OVD message, go to the next possible cause.
Defective controller card	Unseat all cards on the PE shelf except the controller card. Reconnect the loop cable to the controller card and enable the card by entering: ENXP x “x” represents the controller number. Note: If more than one shelf is involved, follow this and subsequent procedures one at a time for each controller card. Check the maintenance display codes on the controller card and wait for an OVD message. If you receive an OVD message, unseat and reinstall the controller card to initiate a self-test. If the test fails, replace the card and reinsert cards on the PE shelf. If there is no OVD message, go to the next possible cause.
Defective PE card	Reinsert the PE cards one at a time. Wait for an OVD message after each card is inserted. If the red LED lights when a card is inserted, software disable the card, then try to reenable it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If there is no OVD message as you insert the cards, go to the next possible cause.

Possible cause	Action
Defective cable	Disconnect the loop cable at the controller card. (If there is more than one loop cables, disconnect them one at a time and follow the procedure below for each cable.) Reconnect the cable(s) to the superloop network card and wait for an OVD message. If you receive an OVD message, replace the cable. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as "Clearing attendant console faults" on page 109) to fix the fault.

Symptom:

Loop disabled without OVD message (NT8D04 Superloop Network Card)

There is probably a system message indicating the loop or loops on this card are defective or disabled, but there is no overload (OVD) message indicating the card is disabled. The LED on the faceplate may be lit or flashing. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate superloop network card and IPE faults. See “LD 45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Controller card: NT8D01
- Superloop network card: NT8D04
- IPE card
- Cable between superloop network card and controller card

Possible cause	Action
Defective superloop network card	Hardware disable, then reenable, the superloop network card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Disconnect the loop cable(s) to the superloop network card. Try to enable each loop on the card by entering: LD 30 ENLL loop “loop” represents the loop number. Test each loop by entering: LOOP loop If you receive an OVD message at this point, replace the superloop network card. If there is no OVD message and the loops will not enable, go to the next possible cause.
Defective controller card	Unseat all cards on the PE shelf except the controller card. Reconnect the loop cable to the controller card and enable the controller card by entering: LD 32 ENXP x “x” represents the controller number. Note: If more than one shelf is involved, follow this and subsequent procedures one at a time for each controller card. Check the maintenance display codes on the controller card. If you receive an OVD message at this point, unseat and reinstall the controller card to initiate a self-test. If the test fails, replace the card. Reinsert cards on the PE shelf. If there is no OVD message and the loops will not enable, go to the next possible cause.
Defective PE card	Reinsert the PE cards one at a time. If the red LED lights when a card is inserted, software disable the card, then try to reenable it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If no LEDs light and there is no OVD message as you reinsert the cards, go to the next possible cause.

Possible cause	Action
Defective cable	Disconnect the loop cable at the controller card. (If there is more than one cable, disconnect them one at a time and follow the procedure below for each cable.) Reconnect the cable(s) to the superloop network card. If you receive an OVD message at this point replace the cable. If there is no OVD message and the loops will not enable, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as “Clearing attendant console faults” on page 109) to fix the fault.

Symptom:

Disabled loop indicated by OVD message (QPC414 Network Card)

An overload (OVD) system message indicates that a loop on a QPC414 Network Card is disabled. All terminal connections on the loop are disabled. A red LED on the card may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

For information on switch settings, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Dual loop peripheral buffer (DLB) card: QPC659
- NT5K10 DLB card used in the NT5K11 EEPE module
- Network card: QPC414
- PE card
- Cable between network card and DLB card

Possible cause	Action
Defective network card	Disconnect the loop cable(s) to the network card. Enable and test each loop on the network card by entering: LD 30 ENLL loop "loop" represents the loop number. Test each loop by entering: LOOP loop Wait for an OVD message. If you receive an OVD message, replace the network card. If there is no OVD message, go to the next possible cause.

Possible cause	Action
Defective DLB card	Unseat all cards on the PE shelf except the DLB card (if there are two shelves on the loop, disconnect the cable to connector LPY): — Reconnect the loop cable to the DLB card. — If you receive an OVD message, replace the DLB card and reinsert cards on the PE shelf. If there is no OVD message: — Check switch settings on the DLB card; if necessary, correct the switch settings. — If there are two shelves on the loop, go to the next possible cause. — If there is one shelf on the loop, go to “Disabled peripheral equipment card” on page 96
Defective DLB card on second shelf (if two shelves are on the loop)	Unseat all cards on the second shelf except the DLB card. Reconnect the inter-shelf cable to the DLB card and wait for an OVD message. If there is an OVD message, replace the DLB card and reinsert cards on the PE shelf. If there is no OVD message, go to the next possible cause.
Defective NT5K10 DLB card	In Dual Loop Mode — Unseat 4 PE cards pertaining to the defective loop or In Single Loop Mode — Unseat 8 PE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective PE card. If you receive an OVD message, remove the backplane access plate at the back of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the PE cards on the shelf. Replace the backplane access plate.

Possible cause	Action
Defective PE card	Reinsert the PE cards one at a time. (If there are two shelves on the loop, follow this and subsequent procedures one at a time for each shelf.) Wait for an OVD message after each card is inserted. If the LED lights when a card is inserted, software disable the card, then try to reenale it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If there is no OVD message as you reinsert the cards, go to the next possible cause.
Defective cable between network and DLB cards	For the EEPE shelf only: remove the backplane access plate at the back of the module. Disconnect the loop cable at the DLB card. Reconnect the cable(s) to the network card and wait for an OVD message. If you receive an OVD message, replace the cable. If there is no OVD message, go to the next possible cause. For the EEPE shelf only: replace the backplane access plate.
Defective cable between shelves (if two shelves are on the loop)	Disconnect the inter-shelf cable to connector LPX on the second shelf DLB card. Reconnect the cable to connector LPY on the first shelf DLB card and wait for an OVD message. If you receive an OVD message, replace the inter-shelf cable. Reinsert cards on the PE shelf. If there is no OVD message, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as "Clearing attendant console faults" on page 109) to fix the fault.

Symptom:

Loop disabled without OVD message
(QPC414 Network Card)

There is probably a system message indicating that the loop or loops on this card are defective or disabled, but there is no overload (OVD) message indicating the card is disabled. The LED on the faceplate may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

For information on switch settings, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Dual loop peripheral buffer (DLB) card: QPC659
- NT5K10 DLB card used in the NT5K11 EEPE module
- Network card: QPC414
- PE card
- Cable between network card and DLB card

Possible cause	Action
Defective network card	Test the loops on the card by entering: LD 30 LOOP loop “loop” represents the loop number. Try to enable the loops by entering: ENLL loop Wait for an OVD message. If you receive an OVD message at this point, replace the network card. If there is no OVD message and the loops will not enable, go to the next possible cause.

Possible cause	Action
Defective DLB card	Unseat all cards on the PE shelf except the DLB card (if there are two shelves on the loop, disconnect the cable to connector LPY): — Reconnect the loop cable to the DLB card. — If you receive an OVD message at this point, replace the peripheral buffer card and reinsert cards on the PE shelf. If there is no OVD message and the loops will not enable: — Check switch settings on the DLB card; if necessary, correct the switch settings. — If there are two shelves on the loop, go to the next possible cause. — If there is one shelf on the loop, go to “Disabled peripheral equipment card” on page 96.
Defective QPC659 DLB card on second shelf (if two shelves are on the loop)	Unseat all cards on the second shelf except the DLB card. Reconnect the inter-shelf cable to the DLB card. If you receive an OVD message at this point, replace the DLB card and reinsert cards on the PE shelf. If there is no OVD message and the loops will not enable, go to the next possible cause.
Defective NT5K10 Peripheral Buffer Card	In Dual Loop Mode — Unseat 4 PE cards pertaining to the defective loop or In Single Loop Mode — Unseat 8 PE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective PE card. If you receive an OVD message, remove the backplane access plate at the back of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the PE cards on the shelf. Replace the backplane access plate.

Possible cause	Action
Defective PE card	Reinsert the PE cards one at a time. (If there are two shelves on the loop, follow this and subsequent procedures one at a time for each shelf.) If the LED lights when a card is inserted, software disable the card, then try to reenale it. If it will not enable, replace the card. If you receive an OVD message when one of the PE cards is inserted, replace that card. If no LEDs light and there is no OVD message as you reinsert the cards, go to the next possible cause.
Defective cable between network and DLB cards	For EEPE shelf only: remove the backplane access plate at the rear of the module. Disconnect the loop cable at the DLB card. Reconnect the cable(s) to the network card. If you receive an OVD message at this point, replace the cable. If there is no OVD message and the loops will not enable, go to the next possible cause. For EEPE shelf only: remove the backplane access plate at the rear of the module.
Defective cable between shelves (if two shelves on the loop)	Disconnect the inter-shelf cable to connector LPX on the second shelf DLB card. Reconnect the cable to connector LPY on the first shelf DLB card. If you receive an OVD message at this point, replace the inter-shelf cable. Reinsert cards on the PE shelf. If there is no OVD message and the loops will not enable, go to the next possible cause.
Defective terminal equipment	Check terminal equipment (such as attendant consoles and telephones) on the disabled loop. If you find defective terminal equipment, see the appropriate chapter (such as "Clearing attendant console faults" on page 109) to fix the fault.

Symptom:

Disabled peripheral signaling card indicated by OVD message

There is an overload (OVD) system message indicating that a peripheral signaling card is disabled. The LED on the faceplate may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Superloop network card or network card: NT8D04, QPC414
- PS card: QPC43
- Clock controller: QPC471, QPC775
- D-channel handler interface card: QPC757

Possible cause	Action
Defective PS card	Unseat all network cards associated with the PS card. Enable the PS card by entering: LD 32 ENPS x "x" represents the PS card number. Wait for an OVD message. If you receive an OVD message, replace the PS card. If there is no OVD message, go to the next possible cause.
Defective network card	Reinsert network cards one at a time. Wait for an OVD message after each card is inserted. If you receive an OVD message when one of the cards is inserted, replace that card. Reenable the PS card by entering: LD 32 ENPS x If you do not receive an OVD message, go to the next possible cause.

Symptom:

Peripheral signaling card disabled without OVD message

The peripheral signaling card is disabled on one shelf. The LED on its faceplate may be lit. There is no overload (OVD) message indicating a fault with this card. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Superloop network card or network card: NT8D04, QPC414
- PS card: QPC43
- Clock controller: QPC471, QPC775
- D-channel handler interface card: QPC757

Possible cause	Action
Defective PS card	Unseat all network cards associated with the PS card. Try to enable the PS card by entering: LD 32 ENPS x “x” represents the PS card number. If you receive an OVD message at this point or you cannot enable the PS card, replace it. If the PS card is still disabled, go to the next possible cause.
Defective network card	Reinsert network cards one at a time. If you receive an OVD message when one of the cards is inserted or if the card is disabled, replace that card. Reenable the PS card by entering: LD 32 ENPS x If the PS card is still disabled, go to the next possible cause.

Symptom:**Problems with transferring, placing conference calls, or Music-on-Hold**

Several users cannot transfer or place conference calls, or calls do not receive Music-on-Hold. A card that provides conference capability may be disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Conference/TDS card: NT8D17
- PS card: QPC43
- 3PE card: QPC441
- Telephone keys

Possible cause	Action
Defective conference/TDS card	If there are no messages indicating a fault on any conference loop, test each conference loop in the system by entering: LD 38 CNFC loop “loop” represents the conference loop number. Note: See the <i>X11 Maintenance</i> (553-3001-511) for other tests. If the conference loop is disabled, try to enable it by entering: LD 38 ENLX loop “loop” represents the Conference loop, which is the odd loop of the Conference/TDS loop pair. Note: You must enable the card with the command ENLX. Enabling the loops with the command ENLL does not enable the hardware. If a fault is indicated on a conference loop, replace the conference/TDS card identified. If no faults are detected on any conference loop, go to the next possible cause.
Defective card on Network shelf	One at a time, replace the following cards until the fault clears: — 3PE card — PS card If there is still a Conference problem, go to the next possible cause.
Defective telephone keys	Check the keys on any telephone with this problem. See the following Nortel Networks Publications: — <i>X11 Maintenance</i> (553-3001-511)—LD31 tests — <i>Telephone and Attendant Console: Installation</i> (553-3001-215) — <i>Meridian 1 Telephones: Description and Specifications</i> (553-3001-108)
Excessive traffic in the system	Additional conference/TDS cards may be required to handle the traffic in the system. See <i>Traffic Measurement: Formats and Output</i> (553-2001-450).

Symptom:

Problems placing calls on 2500 telephones and some trunks

Several users of 2500 telephones report trouble placing calls. Other users may report trouble dialing on certain trunks. A digitone receiver or a card that provides tone and digit switch capability may be disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Tone Detector Card: NT5K20, NT5K48
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Network/DTR card: NT8D18

Possible cause	Action
Defective digitone receiver	Check for disabled digitone receiver TNs by entering: LD 34 STAT If any are disabled, try to enable them by entering: ENLR l s c u "l s c u" represents loop, shelf, card, and unit numbers. Test the digitone receiver by entering: DTR l s c u If the digitone receiver fails the test, replace it. If the digitone receiver passes the test, go to the next possible cause.
Defective conference/TDS card	Test Tone and Digit Switch loops by entering: LD 34 TDS loop "loop" represents the loop number. If the conference loop is disabled, try to enable it by entering: ENLX loop "loop" represents the TDS/MFS loop, which is the even loop of the Conference/TDS loop pair). Note: You must enable the card with the command ENLX. Enabling the loops with the command ENLL does not enable the hardware. If a fault is indicated on a conference loop, replace the conference/TDS card identified. If no faults are detected on any conference loop, go to the next possible cause.
Excessive traffic in the system	Additional digitone receivers or conference/TDS cards may be required to handle the traffic in the system. See <i>Traffic Measurement: Formats and Output</i> (553-2001-450).

Clearing peripheral equipment faults

Contents list

The following are the topics in this section:

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- [Peripheral equipment faults 86](#)
- [Fault clearing procedures 86](#)
- [Red LED lit on Fibre Peripheral Controller card 88](#)
- [Red LED lit on Remote Carrier Interface card 90](#)
- [Red LED lit on Peripheral Controller card 92](#)
- [Red LED lit on dual loop peripheral buffer card 94](#)
- [Disabled peripheral equipment card 96](#)
- [More than one peripheral equipment card disabled 98](#)

Reference list

The following are the references in this section:

- *General Maintenance Information* (553-3001-500)
- *X11 System Messages Guide* (553-3001-411)
- *X11 Maintenance* (553-3001-511)
- *Hardware Replacement* (553-3001-520)
- *Circuit Card: Installation and Testing* (553-3001-211)
- “Final maintenance procedure” on page 139
- “How to clear faults” on page 13

Peripheral equipment faults

Peripheral equipment (PE) provides the interface between network equipment switching and terminal equipment (such as trunks, telephones, data sets, and attendant consoles). Peripheral equipment faults can disable network and terminal equipment.

Note: For fault clearing purposes, the general term “peripheral equipment” includes intelligent peripheral equipment (IPE). When there are differences, PE and IPE are specified.

CAUTION

NT6D71 fuse replacement F1 through F16.

For continued protection against risk of fire, replace the fuse only with a fuse of the same type and rating (125 V, 1.0 A).

Fault clearing procedures

Manual continuity tests can be used to isolate superloop network card and IPE faults. For a description of manual continuity tests, see *General Maintenance Information* (553-3001-500). See “LD45” in the *X11 System Messages Guide* (553-3001-411) for details on performing the tests.

Table 10 lists common peripheral equipment fault indications (many other system messages may be generated). To clear faults, select the symptom that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power or common equipment faults before you try to clear telephone faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 13 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 10
Peripheral equipment fault indicators

Indicator	Possible indications
Sample system messages	BSD301, 401, 402 ERR4062 NWS301, 401, 501 OVD001–010, 024 XMI messages
Visual indicators	Red LEDs lit on cards
Maintenance displays	NT8D01BC, NT8D01AC, or NT8D01AD Controller Card
User reports	Trouble with calls on attendant console Trouble with calls on 500/2500 telephones Trouble with calls on SL-1, M1000, or digital telephones

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:

Red LED lit on Fibre Peripheral Controller card

The red LED is lit on the controller card. Red LEDs on Peripheral (PE) Equipment cards on the same shelf may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate IPE faults. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing loopback tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Fibre Peripheral Controller card: NT1P62
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective fibre peripheral controller card	Perform the fibre controller card self-test by executing the DSXP x command for LD 32 to disable the card. Execute the XPCT x command to initiate self-test. — The maintenance display on the card shows the code for each test running (see “HEX” in the <i>X11 Maintenance</i> (553-3001-511)). If the tests complete successfully, the display continuously flashes. — If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, enable the card: ENXP x “x” represents the controller number. If the test fails, go to the next possible cause. (continued)
Defective PE card	Unseat all the cards in the shelf associated with the controller card: — If the red LED on the controller card turns off, the fault is in one of the unseated cards. — Reinsert the cards one at a time. — When the controller card LED turns on again, replace the last card you inserted. If the red LED on the controller card does not turn off when the PE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If you find a defective cable, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom:

Red LED lit on Remote Carrier Interface card

The red LED is lit on only one controller card. Red LEDs on Peripheral (PE) Equipment cards on the same shelf may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate IPE faults. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Remote Carrier Interface card: NT7R52
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective Remote Carrier Interface card	Perform the remote carrier interface card self-test by removing and reinstalling the card. Observe the self-test: — The maintenance display on the card shows the code for each test running (see “HEX” in the <i>X11 Maintenance</i> (553-3001-511)). If the tests complete successfully, the display continuously flashes. — If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, enable the card: ENLL sI “sI” represents the card number. If the test fails, go to the next possible cause.
Defective PE card	Unseat all the cards in the shelf associated with the controller card: — If the red LED on the controller card turns off, the fault is in one of the unseated cards. — Reinsert the cards one at a time. — When the controller card LED turns on again, replace the last card you inserted. If the red LED on the controller card does not turn off when the PE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If you find a defective cable, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom:

Red LED lit on Peripheral Controller card

The red LED is lit on only one controller card. Red LEDs on Peripheral (PE) Equipment cards on the same shelf may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate IPE faults. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- IPE card
- IPE card cage: NT8D3703

Possible cause	Action
Defective controller card	Remove, then, reinstall the controller card to initiate a self-test: — The maintenance display on the card shows the code for each test running (see “HEX” in the <i>X11 Maintenance</i> (553-3001-511)) — If the tests complete successfully, the display continuously flashes. — If the card continually fails a test, the code for that test is steadily displayed. If the test fails, replace the card. If the test passes but the card is still disabled, test the loop by entering: LD 30 LOOP loop “loop” represents the loop number. If the test fails, go to the next possible cause.
Defective PE card	Unseat all the cards in the shelf associated with the controller card: — If the red LED on the controller card turns off, the fault is in one of the unseated cards. — Reinsert the cards one at a time. — When the controller card LED turns on again, replace the last card you inserted. If the red LED on the controller card does not turn off when the PE cards are unseated, reinstall the cards and go to the next possible cause.
Defective cable	Test all cables to the controller card. If you find a defective cable, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom:

Red LED lit on dual loop peripheral buffer card

The red LED is lit on only one dual loop peripheral buffer card. Red LEDs on PE cards on the same shelf may be lit. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

For information on switch settings, see *Circuit Card: Installation and Testing* (553-3001-211). Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Dual loop peripheral buffer (DLB) card: QPC659 or NT5K10
- Existing Peripheral Equipment Power Supply (EPEPS): NT5K12
- Cable between the Network Superloop card and the Enhanced Dual Loop Peripheral Buffer Card
- PE card
- PE card cage NT8D1303 or NT5K1106

Possible cause	Action
Defective QPC659M DLB card	Test the shelf by entering: LD 30 LOOP I s "I s" represents loop and shelf numbers. Note: If two loops are assigned to the shelf, be sure to test both. If a defective DLB card is indicated, check the switch settings on the card. If the switch settings are correct, replace the card. If the test fails but the DLB card does not seem to be faulty, go to the next possible cause.
Defective NT5K10 DLB card	In Dual Loop Mode — Unseat 4 PE cards pertaining to the defective loop or In Single Loop Mode — Unseat 8 PE cards pertaining to the defective loop. Wait for the OVD message. If there is no OVD message, go to the defective PE card. If you receive an OVD message, remove the backplane access plate at the rear of the EEPE shelf and replace the Dual Loop Peripheral Buffer Card. Reinsert the PE cards on the shelf. Replace the backplane access plate.
Defective PE card	For the EEPE shelf only: remove the backplane access plate at the rear of the module. Unseat all the cards in the shelf associated with the DLB card: — If the red LED on the DLB card turns off, the fault is in one of the unseated cards. — Reinsert the cards one at a time. — When the DLB LED turns on again, replace the last card you inserted. If the red LED on the DLB does not turn off when the PE cards are unseated, reinstall the cards and go to the next possible cause. For the EEPE shelf only: replace the backplane access plate at the rear of the module.

Possible cause	Action
Defective cable	Test all cables to the DLB card. If you find a defective cable, replace it. If there is no problem with the cables, go to the next possible cause.
Defective backplane	Replace the card cage assembly in the module.

Symptom:

Disabled peripheral equipment card

One PE or IPE card is disabled, the red LED on a PE card is lit, or two or more units on a card are disabled. There is a system message indicating that the card or units on the card are disabled. Only one card on the shelf is affected. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate IPE faults. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- Dual loop peripheral buffer (DLB) card: QPC659 or NT5K10
- Superloop network card and network card: NT8D04, QPC414
- PE or IPE card
- PE or IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective PE card	Replace the affected card. Enable the card by entering: LD 32 ENLC I s c "I s c" represents loop, shelf, and card numbers. Test the card by entering: LD 30 SHLF I s (continued)
Defective controller card or DLB card	Replace the controller card or DLB card. Enable the PE card by entering: LD 32 ENLC I s c Test the card by entering: LD 30 SHLF I s
Defective network card	Replace the network card. Test the loop by entering: LOOP loop "loop" represents the loop number.
Defective backplane	Replace the card cage assembly in the module.

Symptom:

More than one peripheral equipment card disabled

More than one PE or IPE card, or two or more units on different cards, are disabled on the same shelf. There is a system message indicating that the cards or units on the cards are disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity tests can be used to isolate IPE faults. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Cable between network card and PE/IPE shelf
- Controller card: NT8D01BC, NT8D01AC, NT8D01AD
- Dual loop peripheral buffer (DLB) card: QPC659 or NT5K10
- Superloop network card and network card: NT8D04, QPC414
- PE or IPE card
- PE or IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective controller card or DLB card	Replace the controller card or DLB card. Enable the PE card by entering: LD 32 ENLC I s c "I s c" represents loop, shelf, and card numbers. Test the card by entering: LD 30 SHLF I s
Defective cable from network card	Disable the loop for the affected shelf by entering: DISL loop "loop" represents the loop number. Replace the cable from the network card to the PE shelf. Test the loop by entering: LOOP loop
Defective network card	Replace the network card. Test the loop by entering: LOOP loop
Defective PE card	Replace the affected card. Enable the card by entering: LD 32 ENLC I s c Test the card by entering: LD 30 SHLF I s
Defective backplane	Replace the card cage assembly in the module.

Clearing trunk faults

Content list

The following are the topics in this section:

- [Reference list 101](#)
- [Trunk faults 102](#)
- [Fault clearing procedures 103](#)
- [Trunk cannot make or receive calls \(OVD message received\) 104](#)
- [Trunk cannot make or receive calls \(no OVD message\) 107](#)

Reference list

The following are the references in this section:

- *General Maintenance Information* (553-3001-500)
- *X11 Maintenance* (553-3001-511)
- *X11 System Messages Guide* (553-3001-411)
- *Hardware Replacement* (553-3001-520)
- *Traffic Measurement: Formats and Output* (553-2001-450)
- “How to clear faults” on page 13
- “Final maintenance procedure” on page 139

Trunk faults

Trunk cards provide the interface between the peripheral equipment buffer and various trunk facilities. This chapter specifically considers two types of trunk cards:

- E&M trunk card: provides four analog trunks, each of which can be individually configured to operate as:
 - E&M signaling trunk
 - Two-wire tie trunk
 - Two-wire tie trunk Type V (BPO)
 - DC-5 trunk
 - 2280 Hz tie trunk
 - Four-wire tie trunk
 - Four-wire tie trunk type V (BPO)
 - Four-wire tie trunk type C2 Earth-off Idle
 - Paging trunk
- universal trunk card: provides eight trunks, each of which can be individually configured to operate as:
 - Central Office (CO) trunk
 - Direct Inward Dialing (DID) trunk
 - Two-way tie, Dial Repeating (2DR)
 - Two-way tie, Outgoing Automatic Incoming Dial (OAID) trunk
 - Outgoing Automatic Number Identification (OANI) trunk
 - Recorded Announcement (RAN) trunk
 - Music trunk
 - Paging trunk
- Direct Inward Dial Trunk: Provides eight trunks. The signaling supported depends on the country of operation, and can include:
 - Direct Inward Dialing (DID) trunk

- Two-way Dial Repeating (2DR)
- Outgoing Automatic Number Identification
- Music On Hold Equipment
- Central Office Trunk: Provides eight trunks. The signaling supported depends on the country of operation, and can include:
 - Ground Start
 - Loop Start
 - A-type signaling
 - Loop Start Disconnect Clearing
 - Loop Start Guarded Clearing

Trunk faults can cause problems (such as noise) on outside calls and can keep calls from coming in or going out.

Fault clearing procedures

Manual continuity tests can be used to isolate superloop network card and IPE faults. For a description of manual continuity tests, see *General Maintenance Information* (553-3001-500). See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Table 11 lists common trunk fault indications. To clear faults, select the symptom that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power or common equipment faults before you try to clear telephone faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 13 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 11
Trunk fault indicators

Indicator	Possible indications
System messages	ERR090, 220, 270 OVD003, 008, 009, 010 TRK messages
Visual indicators	Red LED lit on trunk card
User reports	Users have trouble with a specific trunk Callers report continuous ringing Trouble with calls on console and/or telephones

Figure 6

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:

Trunk cannot make or receive calls
(OVD message received)

You cannot make or receive calls over a trunk and an overload (OVD) system message is received. The message indicates that only the TN for this trunk has been disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity loopback tests can be used to isolate faults to IPE, such as E&M and universal trunk cards. See “LD45” in the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- E&M trunk card: NT8D15 NT5K19, NT5K72, NT5K83
- Universal trunk card: NT8D14, NT5K07
- Central office trunk card: NT5K18, NT5K70, NT5K71, NT5K82, NT5K90, NT5K93, NT5K99, NTAG03, NTCK16
- Direct Inward Dial trunk card: NT5K17, NT5K36, NT5K84
- Any other trunk card
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Tone Detector card: NT5K20, NT5K48
- Network/DTR card: NT8D18
- Trunk equipment (such as music source or paging equipment)
- PE or IPE card cage: NT8D1303, NT8D3703

Possible cause	Action
Defective trunk card	If the indicated card is an E&M or universal trunk card, unseat, then reinstall, the card to initiate a self-test. If the test fails, replace the card. If the test passes, follow the procedure below. Disconnect the wiring between the card and the cross-connect terminal. Enable the TN by entering: LD 32 ENLU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Wait for an OVD message. If you receive an OVD message, replace the card. If you do not receive an OVD message, reconnect the wiring and go to the next possible cause.

Possible cause	Action
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment (such as a music source or paging equipment). Enable the TN and wait for an OVD message. If you receive an OVD message, repair or replace the wiring to the PE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone. If the trunk card still will not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Defective DTR, TDS, or MFS	Use the attendant console to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter: LD 36 TRK I s c u Note: See the <i>X11 Maintenance</i> (553-3001-511) for information on using this test. If you do not hear outpulsing, the digitone receiver, tone and digit switch, or multifrequency sender may not be sending or receiving digits and the fault will affect more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.
Defective PE shelf	Unseat the affected trunk card and enable the TN. If you do not receive an OVD message, test superloop TNs by entering: LD 30 UNTT I s c u Test TNs on other loops by entering: LD 45 TEST If you receive an OVD message, replace the card cage assembly in the module.

Symptom:**Trunk cannot make or receive calls (no OVD message)**

You cannot make or receive calls over a trunk, but there is no overload (OVD) or other system message showing that the TN for this trunk is defective or has been disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Manual continuity loopback tests can be used to isolate faults to IPE, such as E&M and universal trunk cards. See “LD 45” the *X11 Maintenance* (553-3001-511) for details on performing the tests.

Note: Continually observe and look up system messages as you perform this procedure.

Replace equipment as described in *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- E&M trunk card: NT8D15, NT5K19, NT5K72, NT5K83
- Universal trunk card: NT8D14, NT5K07
- Central office trunk card: NT5K18, NT5K70, NT5K71, NT5K82, NT5K90, NT5K93, NT5K99, NTAG03, NTCK16
- Direct Inward Dial trunk card: NT5K17, NT5K36, NT5K84
- Any other trunk card
- Conference/TDS card: NT8D17
- DTR card: NT8D16
- Tone Detector card: NT5K20, NT5K48
- Network/DTR card: NT8D18
- Trunk equipment (such as music source or paging equipment)

Possible cause	Action
Defective trunk equipment	Make sure the CO equipment or other trunk equipment is not defective. If there is no problem with this equipment, go to the next possible cause.
Disabled or defective TN	Test TNs on superloops by entering: LD 30 UNTT I s c u "I s c u" represents loop, shelf, card, and unit numbers. Test TNs on other loops by entering: LD 45 TEST If the test fails, replace the indicated item and test again.
Defective trunk card	If the card is an E&M or universal trunk card, unseat, then reinstall the card to initiate a self-test. If the test fails, replace the card. If the test passes, go to the next possible cause.
Defective wiring	At the main cross-connect terminal, disconnect the wiring to the CO or other trunk equipment. Enable the TN and wait for an OVD message. If you receive an OVD message, repair or replace the wiring to the PE shelf. If there is no OVD message, repair or replace the wiring from the cross-connect terminal to the telephone. If the trunk card still will not enable or there is still a trunk problem, reconnect the wiring and go to the next possible cause.
Defective DTR, TDS, or MFS	Use the attendant console to seize trunks and audibly test for dial tone and outpulsing, or use a maintenance telephone and enter: LD 36 TRK I s c u Note: See the <i>X11 Maintenance</i> (553-3001-511) for information on using this test. If you do not hear outpulsing, the digitone receiver, tone and digit switch, or multifrequency sender may not be sending or receiving digits and the fault will affect more than one trunk. See the procedures for clearing faults on this equipment. If there is no problem with this equipment, go to the next possible cause.
Excessive traffic in the system	Additional trunk cards may be required to handle the traffic in the system. See <i>Traffic Measurement: Formats and Output</i> (553-2001-450).

Clearing attendant console faults

Content list

The following are the topics in this section:

- [Reference list 109](#)
- [Attendant console faults 110](#)
- [Fault clearing procedures 111](#)
- [Console cannot make or receive calls \(OVD message received\) 112](#)
- [Console cannot make or receive calls \(no OVD message\) 114](#)
- [Indicator or digit display not functioning properly 115](#)
- [Operator cannot hear or be heard properly 117](#)

Reference list

The following are the references in this section:

- “How to clear faults” on page 13
- “Final maintenance procedure” on page 139
- *X11 System Messages Guide* (553-3001-411)
- *Telephone and Attendant Console: Installation* (553-3001-215)
- *System Installation Procedures* (553-3001-210)
- *Hardware Replacement* (553-3001-520)
- *X11 Administration* (553-3001-311)

Attendant console faults

Attendant consoles are the operator's interface to the system and its features. Components that can cause an attendant console fault are:

- the console itself or add-on units
- the console power supply
- the building wiring
- the cross-connect from the console to the line circuit
- the unit on the peripheral line card
- the peripheral line card
- the ringing generator
- the peripheral controller card
- the peripheral module power
- the peripheral module backplane

Attendant console faults typically affect only a single attendant. However, if more than one attendant console is affected, look for the following connections, among others:

- they are on the same line card
- they are on the same module
- they are on the same loop
- they are served by the same peripheral controller
- there is a problem with ringing or tones

Use the following software programs to isolate attendant console faults:

- LD 30 to test network loops
- LD 31 to test sets and consoles
- LD 32 to test peripheral controllers
- LD 45 to perform
 - signaling tests
 - manual continuity tests

Fault clearing procedures

Table 12 lists common attendant console fault indications. To clear faults, select the symptom that most resembles the fault indications, then go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power or common equipment faults before you try to clear attendant console faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 13 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 12
Telephone fault indicators

Indicator	Possible indications
System messages	BSD501—The console (identified by loop, shelf, card, and unit) failed the signaling test. If the unit number is preceded by a minus sign, the console was disabled. There is a console fault or a fault on the peripheral equipment card indicated.
Visual indicators	Red LED lit on associated cards
User reports	Trouble with calls Trouble with equipment (such as handset, headset, or display)

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:

Console cannot make or receive calls (OVD message received)

The attendant console cannot make or receive calls. There is an OVD message indicating that a TN for the attendant console has been disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting attendant consoles. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Attendant console
- PE or IPE card associated with the console
- CE/PE, PE, or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective PE card	Software disable the TN indicated by the OVD message by entering: LD 32 DISU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Disconnect the wiring between the PE card and the cross-connect terminal. Reenable the TN by entering: ENLU I s c u and wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card. If you do not receive a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.

Possible cause	Action
Defective console	Disable the TN. Disconnect the wiring from the console to the jack. Reenable the TN and wait for an OVD message. If you do not receive an OVD message, replace the console. If you receive an OVD message, reconnect the wiring and go to the next possible cause.
Defective wiring	Disable the TN. Disconnect the wiring between the console and the cross-connect terminal. Reenable the TN and wait for an OVD message. If you do not receive an OVD message, replace or repair the wiring between the console and the cross-connect terminal. If you receive an OVD message, replace or repair the wiring between the PE shelf and the cross-connect terminal. If there is still a console problem, reconnect all wiring and go to the next possible cause.
Defective backplane	Disable the TN. Unseat the affected PE card. Reenable the TN and wait for an OVD message. If you receive an OVD message, replace the card cage assembly in the module.

Symptom:

Console cannot make or receive calls (no OVD message)

The attendant console cannot make or receive calls. There is no OVD message. There may be other system messages indicating that the TN for this console is defective or has been disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting attendant consoles. See *System Installation Procedures* (553-3001-210) for information on system cabling.

Possible cause	Action
No power to console	Check the power supply and wiring to see that the console is powered up. If there is a power supply problem, correct it. If there is no power problem, go to the next possible cause.
Defective console	Test the console by entering: LD 31 Note: See the <i>X11 System Messages Guide</i> (553-3001-411) for information on testing consoles with LD 31. If the console fails the test, replace it. If the console passes the test, go to the next possible cause.
Console connected to wrong TNs	Check the cross-connect terminal to make sure the console is connected to the correct TNs. If the console is not connected correctly, fix the wiring. If the console is connected correctly, go to the next possible cause.

Possible cause	Action
Disabled TN	Software disable, then reenable, each TN by entering: LD 32 DISU I s c u ENLU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Test TNs on superloops by entering: LD 30 UNTT I s c u Test TNs on other loops by entering: LD 45 TEST If there is still a console problem, go to the next possible cause.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the console and the cross-connect terminal. — Check the wiring between the PE/IPE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom:

Indicator or digit display not functioning properly

The attendant console operates, but some LCD indicators or digit displays are not functioning properly. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting attendant consoles.

Possible cause	Action
Disconnected or defective power supply	Make sure the required power supplies to the attendant console are connected and are not defective. If there is still a console problem, go to the next possible cause.
Disabled TN	Software disable, then reenable, each TN by entering: LD 32 DISU I s c u ENLU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Test TNs on superloops by entering: LD 30 UNTT I s c u Test TNs on other loops by entering: LD 45 TEST If there is still a console problem, go to the next possible cause.
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the <i>X11 Administration</i> (553-3001-311)). If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering: LD 31 (See the <i>X11 System Messages Guide</i> (553-3001-411) for information on testing consoles with LD 31.) If the console fails the test, replace it.

Symptom:**Operator cannot hear or be heard properly**

The attendant console operates, but the user cannot hear or be heard properly. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting attendant consoles. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520).

Possible cause	Action
Defective headset or handset	Make sure the handset or headset is plugged into the correct jack on the console. Try another handset or headset. If the test equipment works, replace the faulty handset or headset. If there is still a console problem, go to the next possible cause.
Defective console	Test the console by entering: LD 31 (Follow the procedures in the <i>X11 Maintenance</i> (553-3001-511) to test consoles with LD 31.) If the console fails the test, replace it. If the console passes the test, go to the next possible cause.

Possible cause	Action
Defective PE/IPE card	Software disable each TN by entering: LD 32 DISU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Disconnect the wiring between the PE card and the cross-connect terminal. Reenable and test each TN by entering: ENLU I s c u Wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card. If you do not receive a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective wiring to console	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the console and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Clearing telephone faults

Content list

The following are the topics in this section:

- [Reference list 119](#)
- [Telephone faults 120](#)
- [Fault clearing procedures 121](#)
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- [Defective feature 132](#)
- [Defective add-on module 133](#)
- [Cannot dial from 2500 telephone 134](#)
- [No ring on 500 and 2500 telephones 135](#)

Reference list

The following are the references in this section:

- “How to clear faults” on page 13
- “Final maintenance procedure” on page 139
- *Telephone and Attendant Console: Installation* (553-3001-215)
- *System Installation Procedures* (553-3001-210)

- *Hardware Replacement* (553-3001-520)
- *X11 Administration* (553-3001-311)
- *X11 System Messages Guide* (553-3001-411)
- *Traffic Measurement: Formats and Output* (553-2001-450)

Telephone faults

Telephones and terminals are the user's interface to the system and its features. Components that can cause a telephone fault are:

- the telephone itself or add-on units
- the telephone power supply
- the building wiring
- the cross-connect from the telephone to the line circuit
- the unit on the peripheral line card
- the peripheral line card
- the ringing generator
- the peripheral controller card
- the peripheral module power
- the peripheral module backplane

Telephones and terminal faults typically affect only a single user. However, if more than one telephone is affected, look for the following connections, among others:

- they are on the same line card
- they are on the same module
- they are on the same loop
- they are served by the same peripheral controller
- there is a problem with ringing or tones

Use the following software programs and tests to isolate telephone faults:

- LD 30 to test network loops
- LD 31 to test sets and consoles

- LD 32 to test peripheral controllers
- LD 45 to perform signaling tests
- Meridian Modular Telephone (M2006, M2008, M2016S, and M2616) self-test

Fault clearing procedures

Table 13 lists common telephone fault indications. To clear faults, select the symptom that most resembles the fault indications and go through the procedure for clearing each possible cause until the fault is fixed. Once the fault is corrected, disregard the remaining possible causes.

Note: Clear any power or common equipment faults before you try to clear telephone faults.

If the fault is not cleared after you have gone through each possible cause, check the most recent fault indications. Also check “How to clear faults” on page 13 to see if another type of fault is indicated.

After the fault is corrected, go to “Final maintenance procedure” on page 139 to completely restore normal operation.

Table 13
Telephone fault indicators

Indicator	Possible indications
System messages	BSD501 ERR500 MWL500 NWS501 OVD001–002, 004, 005 XMI messages
Visual indicators	Red LED lit on associated cards
User reports	Trouble with calls Trouble with equipment (such as handset or add-on module)

WARNING

Module covers are *not* hinged; do *not* let go of the cover. Lift the cover away from the module and set it out of your work area.

Symptom:
Telephone cannot make or receive calls (OVD message received)

The telephone cannot make or receive calls. There is an OVD message indicating that the TN for only this telephone has been disabled. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- PE or IPE card
- Telephone
- Wiring between the cross-connect terminal and the telephone
- Wiring between the PE/IPE shelf and the telephone
- CE/PE, PE, or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective PE card	Software disable the TN indicated by the OVD message by entering: LD 32 DISU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Disconnect the wiring between the PE card and the cross-connect terminal. Reenable the TN by entering: ENLU I s c u and wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card. If you do not receive a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective telephone	Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, continue this procedure. Disable the telephone TN. Disconnect the wiring from the telephone to the jack. Reenable the TN and wait for an OVD message. If you do not receive an OVD message, replace the telephone. If you receive an OVD message, reconnect the wiring and go to the next possible cause.

Possible cause	Action
Defective wiring	Disable the TN. Disconnect the wiring between the telephone and the cross-connect terminal. Reenable the TN and wait for an OVD message. If you do not receive an OVD message, replace or repair the wiring between the telephone and the cross-connect terminal. If there is still a problem with the telephone, reconnect all wiring and go to the next possible cause.
Defective backplane	Disable the TN. Unseat the affected PE card. Reenable the TN and wait for an OVD message. If you receive an OVD message, replace the card cage assembly in the module.

Symptom:

Telephone cannot make or receive calls (no OVD message)

The telephone cannot make or receive calls. There is no OVD message or other system message indicating the TN for this telephone is defective or disabled. There may or may not be dial tone when the handset is off-hook. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520).

Possible cause	Action
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Telephone connected to wrong TNs	Check the cross-connect terminal to make sure the telephone is connected to the correct TN. If the telephone is not connected correctly, fix the wiring. If the telephone is connected correctly, go to the next possible cause.
Disabled TN	Software disable, then reenable, the telephone TN by entering: LD 32 DISU I s c u ENLU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Test TNs on superloops by entering: LD 30 UNTT I s c u Test TNs on other loops by entering: LD 45 TEST If there is still a problem with the telephone, go to the next possible cause.

Possible cause	Action
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in <i>Telephone and Attendant Console: Installation</i> (553-3001-215) for self-test instructions.
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the telephone and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom:

One end cannot hear or be heard

The person at the far end can hear you but you cannot hear them or the person at the far end cannot hear you but you can hear them. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- PE or IPE card
- Telephone handset
- Telephone
- Wiring to the telephone

Possible cause	Action
Fault on other equipment	Check with the user to determine if the fault is present only on: — Certain types of calls (such as on a paging trunk or a Tie trunk). — Calls to a specific location. — Calls to a specific telephone or other piece of equipment (such as a modem or Fax machine). If the fault occurs only with certain calls, take the appropriate action. If the fault occurs on all calls, go to the next possible cause.
Defective handset	Check the receiver or transmitter in the handset. If one is defective, replace the handset or, if necessary, the telephone.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, see “Add-on modules” in <i>Telephone and Attendant Console: Installation</i> (553-3001-215) for self-test instructions.

Possible cause	Action
Defective PE card	Software disable the telephone TN by entering: LD 32 DISU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Disconnect the wiring between the PE card and the cross-connect terminal. Reenable and test the TN by entering: ENLU I s c u Wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card. If you do not receive a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.
Defective wiring to telephone	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the telephone and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it.

Symptom:

Noise or low volume on all calls

There is noise on the line on all calls or the volume is lower than usual on all calls. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- PE or IPE card
- Telephone
- Wiring to the telephone

Possible cause	Action
Defective wiring	Make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the telephone and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is no problem with the wiring, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, see “Add-on modules” in <i>Telephone and Attendant Console: Installation</i> (553-3001-215) for self-test instructions.

Possible cause	Action
Defective PE card	Software disable the telephone TN by entering: LD 32 DISU I s c u "I s c u" represents loop, shelf, card, and unit numbers. Disconnect the wiring between the PE card and the cross-connect terminal. Reenable and test the TN by entering: ENLU I s c u Wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card.

Symptom:

Defective indicator, digit display, or component

The telephone can place and receive calls, but one or more LED or LCD indicators, digit displays, or components (such as a handsfree unit) are not working. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Power supply to telephone
- PE or IPE card
- Telephone

Possible cause	Action
Telephone has incorrect software parameters	Disconnect, then reconnect, power to the telephone to force a reset and parameter download. If the fault is not cleared, go to the next possible cause.
No power to digital telephone	Check the power supply (if one is required) and make sure it is not defective. If there is a power supply problem, correct it. If there is no problem with the power supply, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in <i>Telephone and Attendant Console: Installation</i> (553-3001-215) for self-test instructions.
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the <i>X11 Administration</i> (553-3001-311)).

Symptom:
Defective feature

The telephone can make and receive calls, but one or more of its features (such as call transfer or ring again) is not working. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones.

Possible cause	Action
Feature not assigned	Make sure the feature or the indicator is assigned in software (see the <i>X11 Administration</i> (553-3001-311)). If there is still a console problem, go to the next possible cause.
Defective telephone	Disconnect the telephone from the jack. Plug in another telephone of the same type. If the replacement telephone works, replace the telephone you removed. If the replacement telephone does not work, reconnect the original telephone and go to the next possible cause. Note: If the telephone is a Meridian Modular Telephone, enter: LD 32 IDU I s c u If there is no response, replace the telephone. If there is an appropriate response, see "Add-on modules" in <i>Telephone and Attendant Console: Installation</i> (553-3001-215) for self-test instructions.

Symptom:

Defective add-on module

The telephone can make and receive calls, but an add-on module connected to it is not working. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. You may need to replace one of the following:

- Add-on module
- Data option card
- Power supply for add-on module

Possible cause	Action
Defective power supply for add-on module	If the add-on module requires a separate power supply, make sure it is properly connected and in working order. If there is still a problem with the telephone, go to the next possible cause.
Defective add-on module	Replace the add-on module.
Defective data option card	If the fault is with a data add-on module, replace the data option card.

Symptom:

Cannot dial from 2500 telephone

A user cannot dial from a 2500 telephone. The condition may exist on more than one telephone and may be intermittent. The telephone may occasionally experience a “no dial tone” condition. Calls from other types of sets are not affected. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- DTR card: NT8D16
- Tone Detector card: NT5K20, NT5K48
- Network/DTR card: NT8D18
- Telephone
- Wiring to the telephone

Possible cause	Action
Defective telephone	If only one telephone is affected, replace it. If there is still a problem with the telephone, go to the next possible cause.
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the telephone and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is still a problem with the telephone, go to the next possible cause.
Defective digitone receiver	If the condition is intermittent or more than one telephone is affected, test the digitone receivers in the system by entering: LD 34 DTR l s c u “l s c u” represents loop, shelf, card, and unit numbers of the DTR. Replace any units that fail the test. If there is still a problem with the telephone, go to the next possible cause.
Excessive Digitone traffic	Additional digitone receivers may be required to handle the traffic in the system. See <i>Traffic Measurement: Formats and Output</i> (553-2001-450).

Symptom:

No ring on 500 and 2500 telephones

Both 500 and 2500 telephones do not ring. One or several sets in the same module are experiencing the problem. Look up all system messages and maintenance display codes in the *X11 System Messages Guide* (553-3001-411) and follow the instructions given. If the fault does not clear, use this procedure.

Note: Continually observe and look up system messages as you perform this procedure.

See *Telephone and Attendant Console: Installation* (553-3001-215) for information on connecting telephones. See *System Installation Procedures* (553-3001-210) for information on system cabling. To replace other equipment, see *Hardware Replacement* (553-3001-520). You may need to replace one of the following:

- Ringing generator: NT6D42, NT8D21
- PE or IPE card
- Telephone
- Wiring to the telephone
- CE/PE, PE, or IPE card cage: NT8D1103, NT8D1303, NT8D3703

Possible cause	Action
Defective telephone	If only one telephone is affected, replace it. If there is still a problem with the telephone, go to the next possible cause.
Defective wiring	If only one telephone is affected, make sure wiring is properly connected and wires are not interchanged, crossed, or grounded: — Check the wiring between the telephone and the cross-connect terminal. — Check the wiring between the PE shelf and the cross-connect terminal. If there is a wiring problem, correct it. If there is still a problem with the telephone, go to the next possible cause.
Defective PE card	Software disable the telephone TN by entering: LD 32 DISU I s c u “I s c u” represents loop, shelf, card, and unit numbers. Disconnect wiring between the PE card and the cross-connect terminal. Reenable and test the TN by entering: ENLU I s c u Wait for an OVD message. If you receive a message indicating a problem with the card or unit, replace the card. If you do not receive a message indicating a problem with the card or unit, reconnect the wiring and go to the next possible cause.

Possible cause	Action
Defective controller card	If several sets on different cards in the same loop are affected, replace the controller card. If there is still a problem with the telephone, reinstall the original controller card and go to the next possible cause.
Defective ringing generator	If several sets on different cards in the same module are affected, replace the ringing generator for the shelf (even if the green LED on the unit is lit). If there is still a problem with the telephone, reinstall the original ringing generator and go to the next possible cause.
Defective backplane	If the green LED is lit on the ringing generator and the fault persists, replace the card cage assembly in the module.

Final maintenance procedure

Introduction

Perform the final maintenance procedure (Procedure 4) to verify that the Meridian 1 is operating properly and that there are no remaining faults.

Procedure 3

Final maintenance procedure

- 1 Make sure all cards that may have been removed are reinserted in their assigned location and enabled.
- 2 Make sure all wiring and connectors that may have been disconnected are reconnected.
- 3 Make sure all loops and shelves that should be enabled are enabled.

Note: Digital telephones on a network loop that was disabled may not be restored when the loop is enabled. Each telephone should be individually disabled and reenabled through LD 32. Service may also be restored by disconnecting and reconnecting the telephone line cord.
- 4 Make sure all circuit breakers are set to ON and any fuses (in power panels or auxiliary equipment) are inserted.

- 5 Clear fault indicators by entering:
LD 35 or (**LD 135** for Options 51C, 61C, and 81C)
To clear the maintenance display in a single CPU system, enter:
CDSP
To clear the maintenance display in a dual CPU system, clear the display on one CPU by entering:
CDSP
Test the CPU by entering:
TCPU (LD 35), or
TEST CPU (LD 135 for Options 51C, 61C, and 81C)
If the response is "OK," switch CPUs by entering:
SCPU
Clear the display on the other CPU by entering:
CDSP
To clear a major alarm indication and restore Power Fail Transfer Units (PFTUs) to normal operation, enter:
CMAJ
To clear a minor alarm indication from all attendant consoles, enter:
CMIN ALL
- 6 Set the midnight routine to run after you log out of the system with:
MIDN
End the session in LD 35 or LD 135 and log out of the system:

LOGO (The midnight routine will now run.)
- 7 Check system messages produced when the midnight routine runs.
Clear any faults indicated.

- 8** If there was a sysload (reload) while you were clearing a fault, reset the correct time and date by entering:

LD 2

STAD (day) (month) (year) (hour) (minute) (second)

Check the time and date you entered:

TTAD

End the session in LD2 and log out of the system:

LOGO

- 9** Replace any covers you removed from modules.
- 10** Tag defective equipment with a description of the fault and return it to a repair center.

List of terms

3PE card	QPC441 Three-Port Extender Card
BTU	QPC477 Bus Terminating Unit
CBT	Core Bus Terminator
CE	Common Equipment
CE/PE	Common/Peripheral Equipment
CMA card	Changeover and Memory Arbitrator Card
CMDU card	Core Multi Disk Unit Card
Conference/TDS card	NT8D17 Conference/Tone and Digit Switch Card
CNI	Core to Network Interface
CP	Call Processor
CPU	Central Processing Unit
DLB card	QPC659 Dual Loop Peripheral Buffer Card

DTR card

Digitone Receiver Card

Network/DTR card

NT8D18 Network/Digitone Receiver Card

FDI card

QPC742 Floppy Disk Interface Card

FDU

NT8D68 Floppy Disk Unit

FN card

QPC579 CPU Function Card

IF card

QPC580 CPU Interface Card

IOP

Input/Output Processor

IPE

Intelligent Peripheral Equipment

MDU

NT8D69 Multi Disk Unit

MSI card

QPC742 Mass Storage Interface Card

PE

Peripheral Equipment

PS card

QPC43 Peripheral Signaling Card

ROM cards

Read Only Memory Cards

SBE

QPC215 Segmented Bus Extender Card

SDI cards

Serial Data Interface Cards

UPS

Uninterruptible Power Supply

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Meridian 1

Fault Clearing

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