297-7001-503

DMS-100 Family

DMS VoiceMail

Trouble-locating and alarm-clearing procedures

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northern telecom

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Publication history

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Standard 02.02 is the first standard release of the SPM 02 version of this document. SPM 02 is the second software release for DMS VoiceMail.

February 1994

Standard 01.03 is the first standard release of the SPM 01 version of this document. SPM 01 is the first software release for DMS VoiceMail.

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About this document

This document provides information about the DMS VoiceMail system, its subsystems, and procedures for locating troubles and clearing alarms. The procedures are designed for first-line and secondary support maintenance personnel in an operating company.

The document is structured in the following chapters:

System redundancy discusses the principal subsystems, peripherals, and links that comprise the DMS VoiceMail system and how redundancy has been incorporated as part of the product to provide reliable service.

Maintenance principles describes the basic maintenance model used by DMS VoiceMail and the various maintenance tools and indicators that are available to monitor system performance.

Booting the system provides booting up procedures and information on what to look for if problems are encountered during the booting up sequence.

Multiserver processor node provides a summary description of the multiserver processor node and procedures for resolving troubles.

Signal processing node provides a summary description of the signal processing node and procedures for resolving troubles.

Telephony interface node provides a summary description of the telephony interface node and procedures for resolving troubles.

Disks discusses how to interpret SEERs that indicate problems with the disk drives.

Peripherals and links provides procedures for resolving problems with peripherals and links in a DMS VoiceMail system.

Cabinet and I/O connections discusses where to locate information on clearing frame supervisory panel faults, how to resolve cabling, and Meridian Mail bus troubles.

When to use this document

This document is written for all offices where DMS VoiceMail is deployed. More than one version of this document may exist. To determine whether you have the latest version of this document, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, NTP 297-1001-001.

How DMS VoiceMail documentation is organized

This document is part of DMS VoiceMail documentation that supports the Northern Telecom line of DMS VoiceMail products. DMS VoiceMail documentation is a subset of the DMS-100 Family library.

The DMS-100 Family library is structured in numbered layers, and each layer is associated with an NT product. To understand DMS VoiceMail products, you need documents from the following layers:

- DMS-100 Family basic documents in the 297-1001 layer
- DMS VoiceMail documents in the 297-7001 layer

DMS VoiceMail documents and other documents that contain related information are listed in "Finding DMS VoiceMail information" in *DMS VoiceMail Product Guide* (NTP 297-7001-010).

References in this document

The following documents are referred to in this document.

Number	Title
297-7001-010	*DMS VoiceMail Product Guide*
297-7001-300	*DMS VoiceMail System Administration Guide*
297-7001-502	*DMS VoiceMail Card Replacement Procedures*

What precautionary messages mean

Danger, warning, and caution messages in this document indicate potential risks. These messages and their meanings are listed in the following chart.

Message	Significance
DANGER	Possibility of personal injury
WARNING	Possibility of equipment damage
CAUTION	Possibility of service interruption or degradation

Examples of the precautionary messages follow.

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

WARNING
Damage to backplane connector pins
Use light thumb pressure to align the card with the connectors. Next, use the levers to seat the card into the connectors. Failure to align the card first may result in bending of the backplane connector pins.

CAUTION
Loss of service
Subscriber service will be lost if you accidentally remove a card from the active unit of the peripheral module (PM). Before continuing, confirm that you are removing the card from the inactive unit of the PM.

Regulatory notices

United States installations

The following regulatory notices pertain to installations in the United States of America:

1 The Northern Telecom service peripheral module complies with Part 68 of the FCC rules. On the inside door of the cabinet is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

2 The FCC regulation label includes the REN. This number represents the electrical load that will be applied to your telephone line once an SPM modem port is connected to the network. The telephone line serving your premises will not operate properly if the total ringer load exceeds the capability of your telephone company central office equipment. If you desire to know the total REN allowed for your telephone line, call your telephone company and they will inform you. Normally, an SPM modem port should not share the line with any other device.

   If your Northern Telecom SPM causes harm to the telephone network, the telephone company may disconnect your service temporarily. The telephone company may ask you to disconnect the equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning. It is possible they will notify you in advance, but if the advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

   Your telephone company may make changes in its facilities, equipment, operations or procedures that could affect proper operation of your equipment. If they do, you will be given advance notice so as to give you an opportunity to maintain uninterrupted service.

   If you experience trouble with your Northern Telecom SPM equipment, contact your authorized distributor or service center in the USA for repair or warranty information. If you do not know how to contact your distributor, call 1-800-NORTHERN.

Canadian installations

The following regulatory notices pertain to installations in Canada:

3 The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

DANGER
Risk of electrocution
Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

4 The load number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the sum of the LNs of all the devices does not exceed 100.

If you experience trouble with your Northern Telecom SPM equipment, contact your authorized distributor or service center in Canada for repair or warranty information. If you do not know how to contact your distributor, call 1-800-NORTHERN.

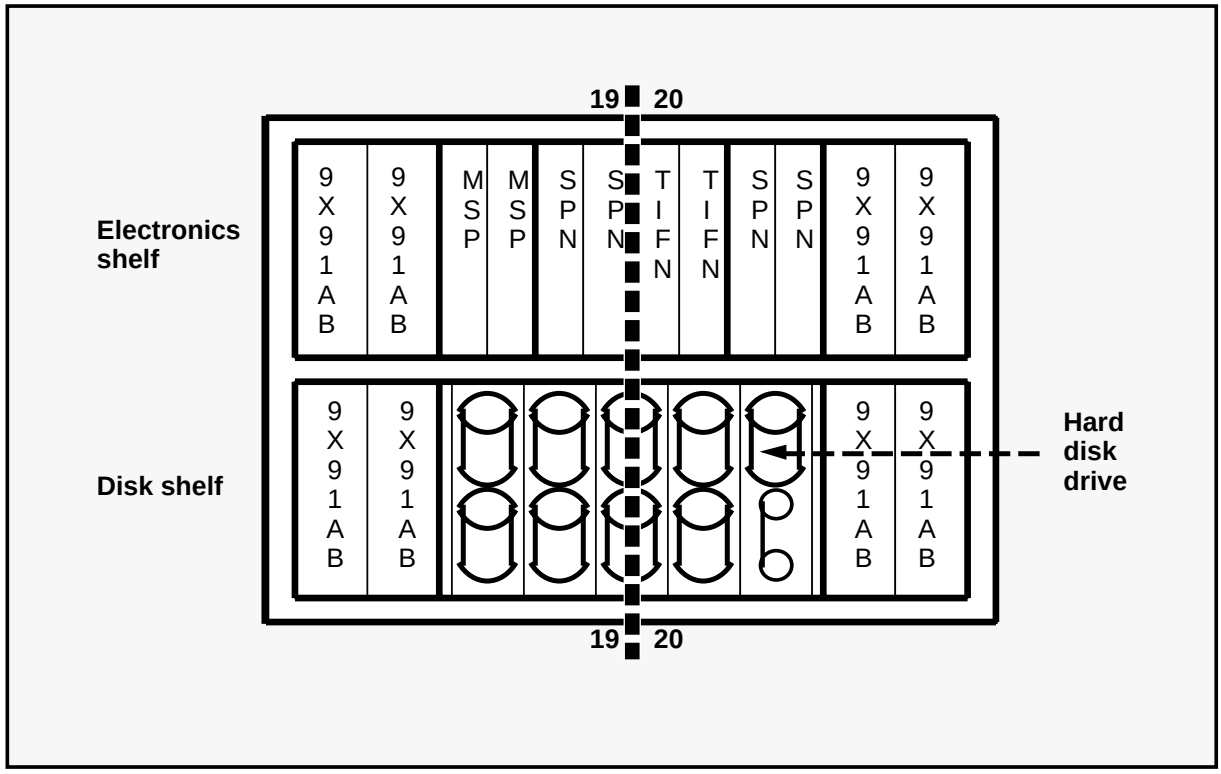
System redundancy

Power

For power distribution purposes, each shelf of the service peripheral module (SPM) is divided into two halves between card slots 19 and 20. Each half-shelf is powered by two power converters that are supplied by the A and B central office power feeds.

Figure 1-1 illustrates the division of power for an SPM shelf that occurs between card slots 19 and 20.

Figure 1-1
SPM shelf power division



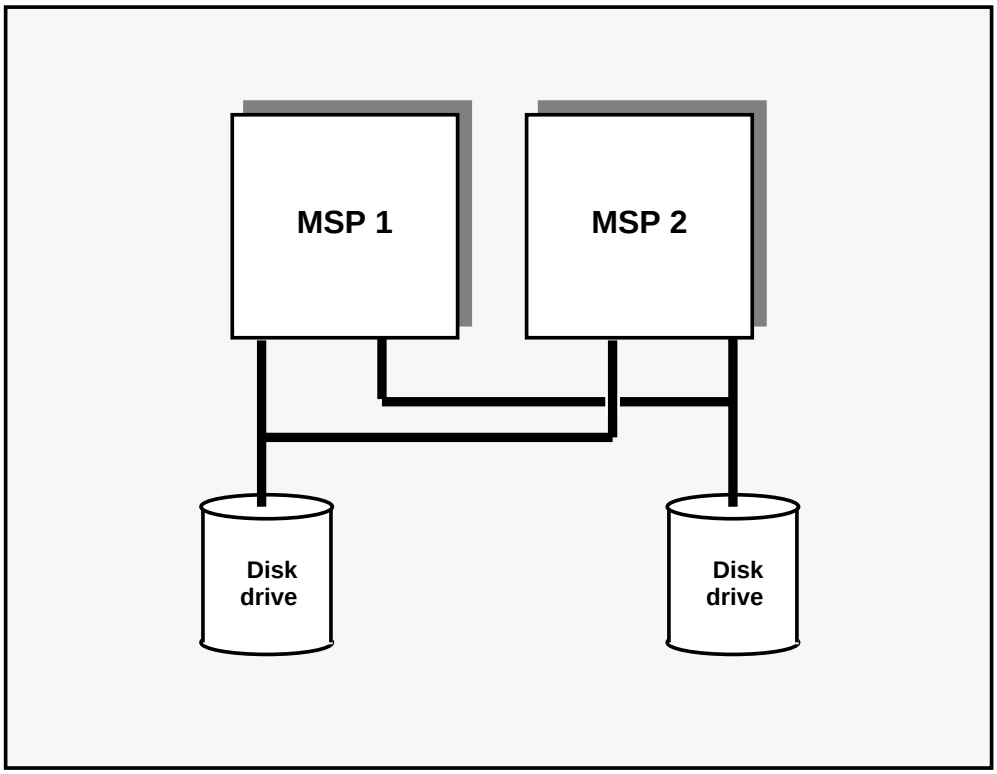
Note: Middle disk drives are powered from the left power converters.

Multiserver processor node

DMS VoiceMail uses a pair of multiserver processors (MSPs) to provide system redundancy. The primary MSP has the active bus controller. Multiserver programs are distributed to both MSPs. When the active MSP fails, bus control passes to the second MSP and the appropriate multiserver programs are restarted.

Figure 1-2 illustrates a pair of MSPs.

Figure 1-2
MSP pair



Signal processing node

A DMS VoiceMail subscriber is normally associated with one signal processing node (SPN). SPNs are configured in pairs. If one SPN fails, the overall system capacity is diminished. However, since SPNs are paired (that is SPNs 1-2, 3-4, 5-6, etc.), all subscribers on a failed SPN can still gain access to their mailboxes through the other SPN.

The SPN consists of three types of cards:

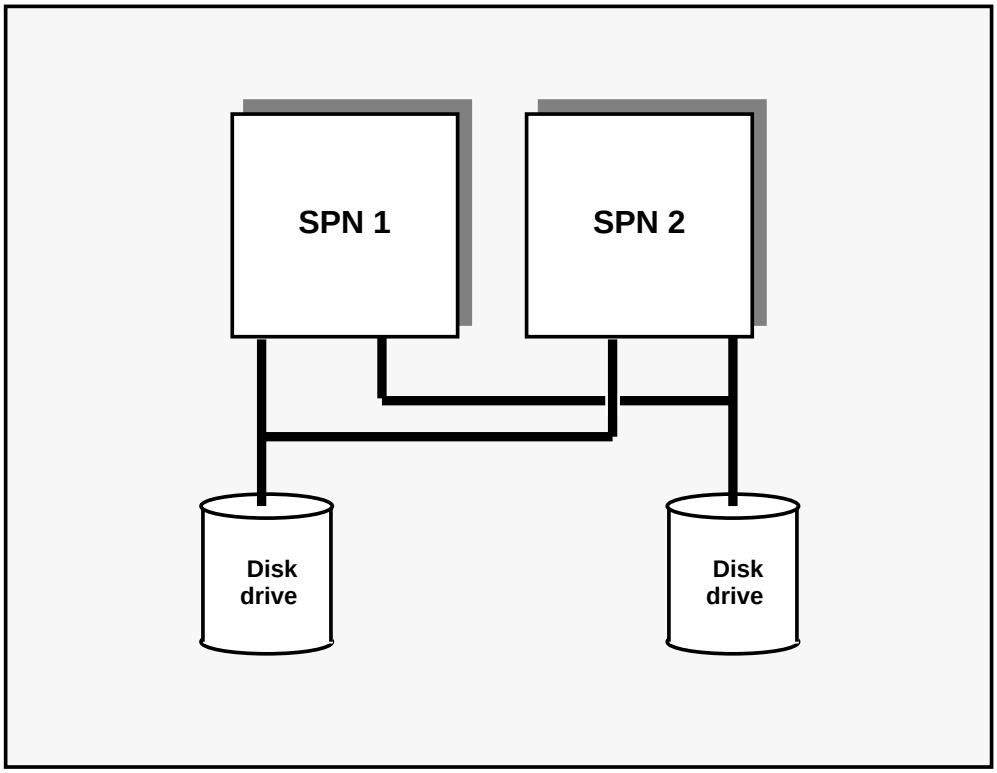
- one 68K card
- two VP12 cards
- one 68K transition module

The loss of a VP12 card in an SPN results in 12 channels being lost. However, VP12 cards can be replaced while an SPN remains in service. This allows the affected SPN to continue providing 12 channels of service until the failed VP12 card is replaced.

The loss of a 68K card in an SPN results in all 24 channels being lost.

Figure 1-3 illustrates a pair of SPNs.

Figure 1-3xxx
SPN pair

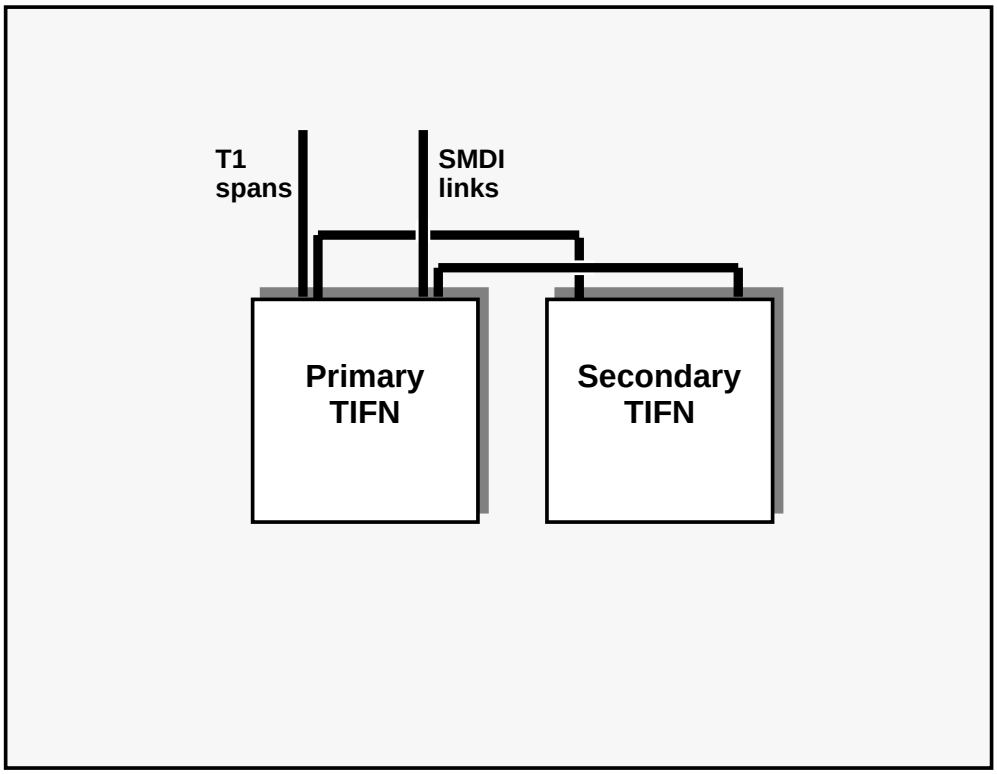


Telephony interface node

The telephony interface node (TIFN) consists of a 68K card and a T1 card. TIFNs are configured in redundant pairs. If the primary TIFN fails, the T1 spans and SMDI links that terminate on the primary TIFN are automatically shifted to the secondary TIFN.

Figure 1-4 illustrates a pair of TIFNs and the redundant T1 and SMDI links from the primary TIFN to the secondary TIFN.

Figure 1-4
TIFN pair

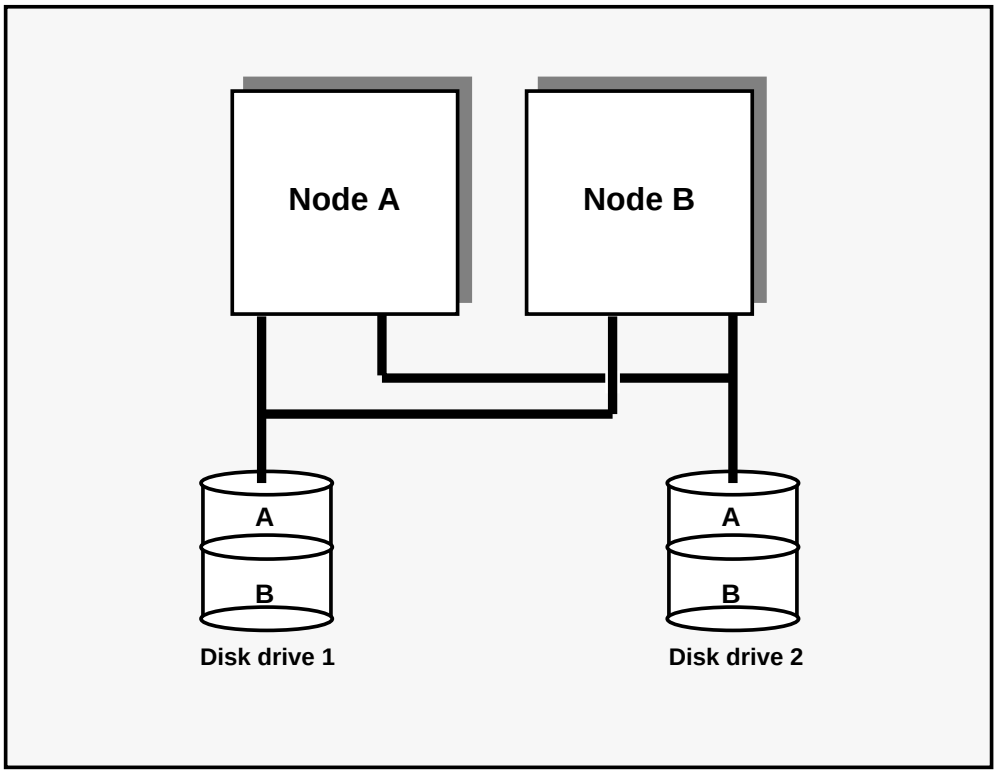


Disk drives

Each MSP and SPN node has two SCSI paths to two disk drives. Node A writes to Disk 1 and shadows Disk 2. Node B writes to Disk 2 and shadows Disk 1. If a disk drive fails, both nodes have a surviving disk. If a node fails, access to that node's stored data can be routed through the other node in the pair. By using redundant SCSI buses, a failed disk drive can be removed, replaced and re-synchronized to the inservice disk without disturbing it.

Figure 1-5 illustrates the concept of redundant disk drives and SCSI paths that are configured for nodes in the DMS VoiceMail system.

Figure 1-5
Basic disk drive configuration



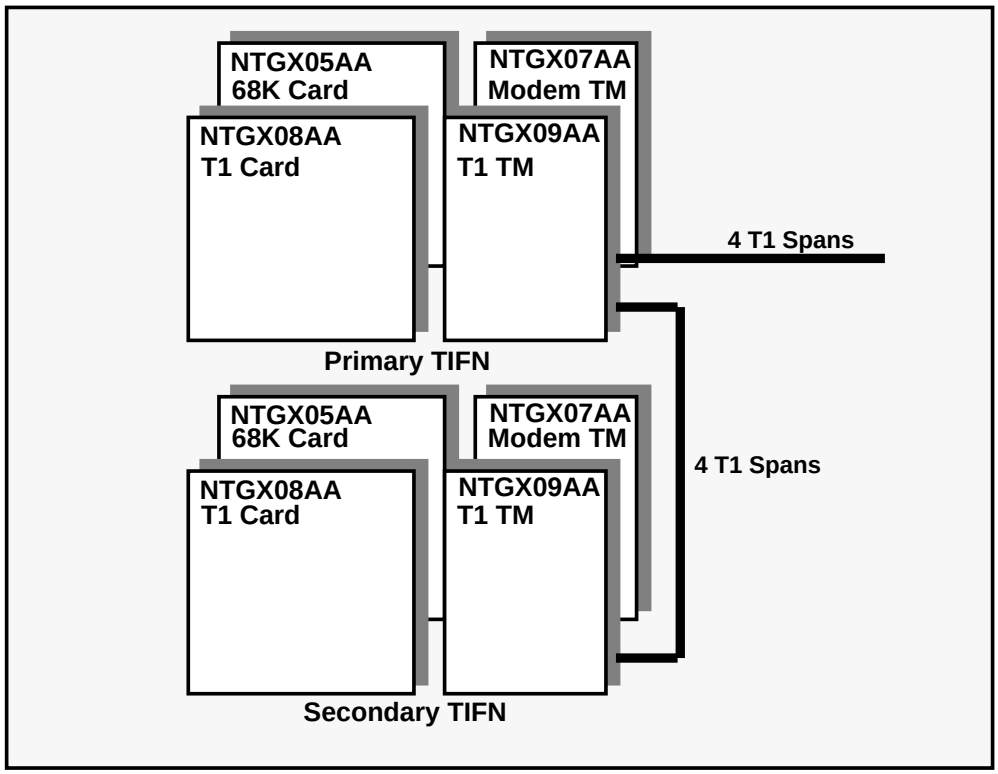
T1 spans

Each pair of telephony interface nodes (TIFNs) can terminate up to four T1 spans. Four T1 spans terminate on the primary TIFN. When an error is detected at the primary TIFN, one or more of the T1 spans are automatically switched to the redundant TIFN.

The service peripheral module (SPM) provides redundancy for its terminating hardware as the DMS-100 does not support redundant T1 spans.

Figure 1-6 illustrates how T1 spans are terminated on the primary TIFN and secondary TIFN.

Figure 1-6
T1 span termination



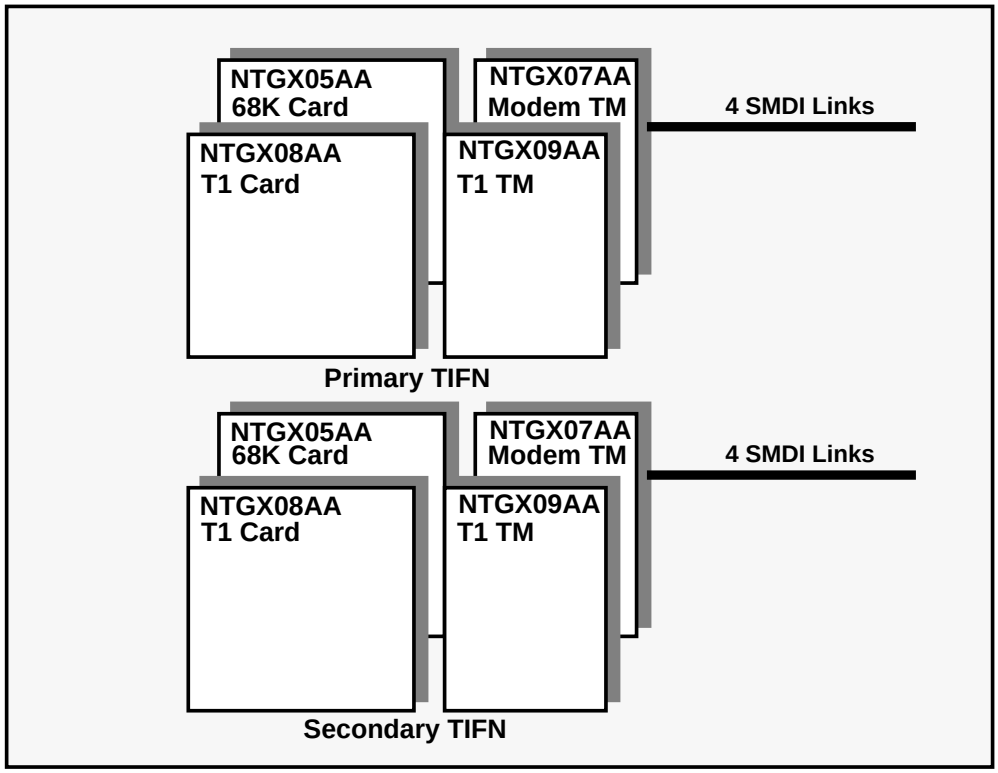
Simplified message desk interface links

Each telephony interface node (TIFN) can terminate up to four simplified message desk interface (SMDI) connections. Up to four SMDI links can terminate on a TIFN. When an error is detected at the primary TIFN, one or more of the SMDI links are automatically switched to the redundant TIFN.

The service peripheral module (SPM) provides redundancy for its terminating hardware as the DMS-100 does not support redundant SMDI links.

Figure 1-7 illustrates how SMDI links are terminated on TIFNs.

Figure 1-7
SMDI link termination



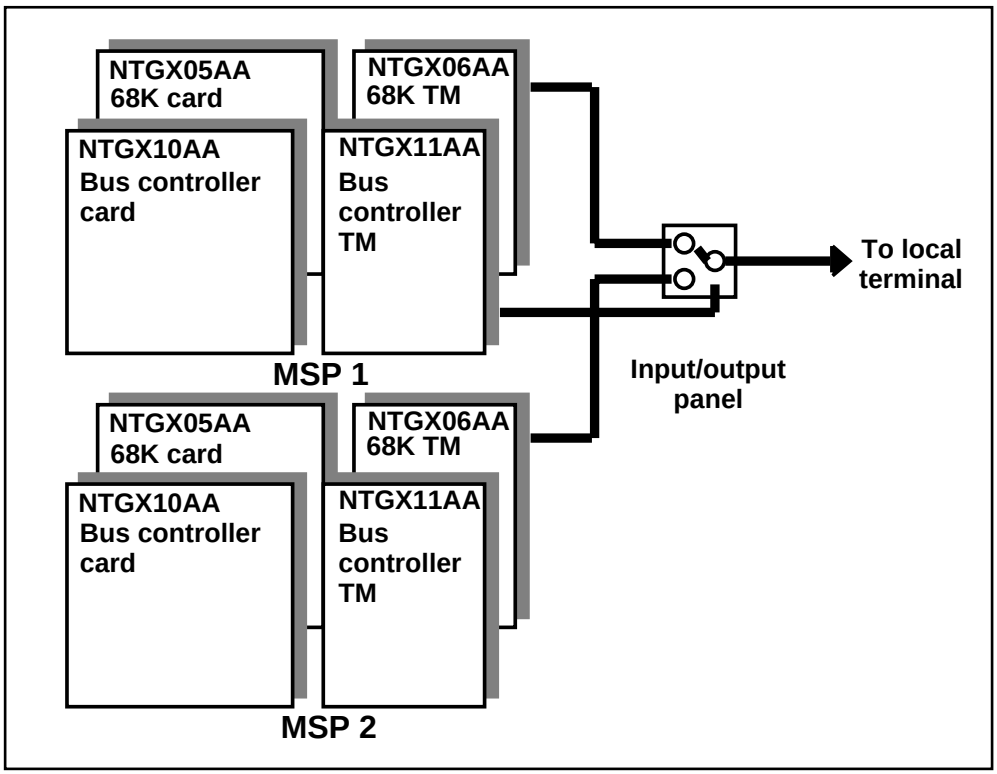
Note: To provide redundancy for SMDI links, the NTGX0105 cable is required for TIFN pairs.

Local maintenance console

Port one on each of the two MSPs is dedicated to local maintenance and administration support. A relay mounted on the input/output daughter board selects which MSP is connected to the maintenance terminal. This selection is based on an MSP active signal from MSP 1 that controls which MSP is connected to the terminal.

Figure 1-8 illustrates how local maintenance console connectivity is regulated by the relay on the input/output daughter board.

Figure 1-8
Local maintenance console connectivity



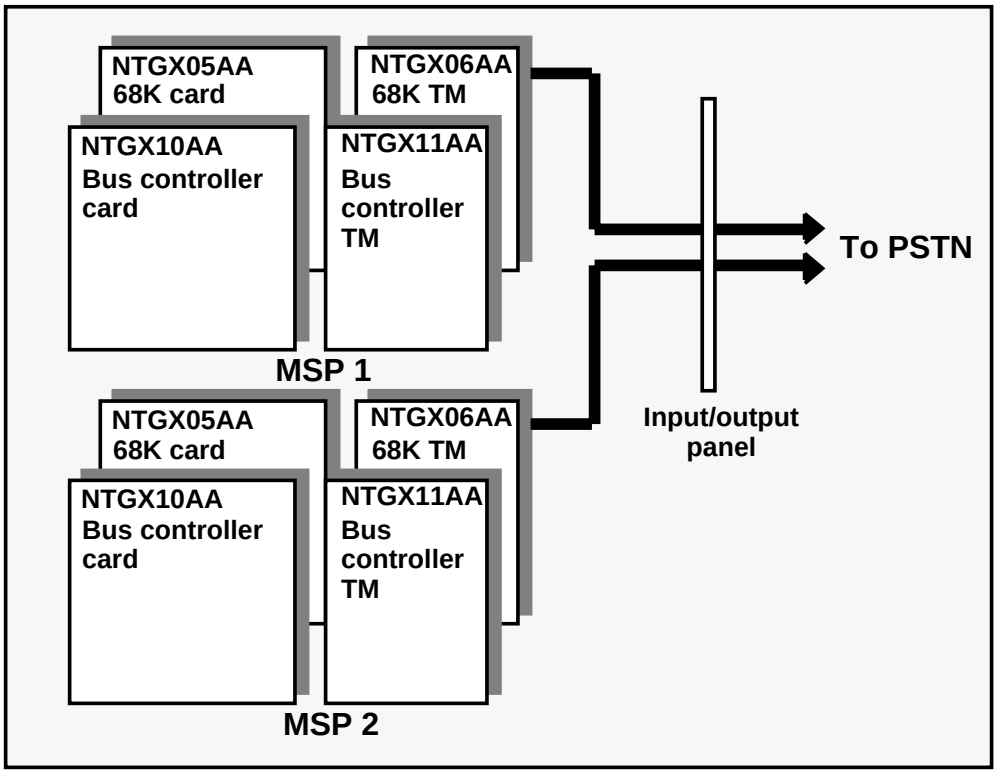
Remote access

Remote access to the SPM can be achieved by dialing a directory number that is assigned to the remote access port on the multiserver processor (MSP). Each MSP has a 2400-baud modem dedicated to its second port for this purpose.

> ***Note:*** Remote support ports must be re-enabled after any system reboot. For further information about remote access, refer to the *DMS VoiceMail System Installation and Modification Guide*, NTP 297-7001-504.

Figure 1-9 illustrates how the MSPs provide remote support access through the public switching telephone network (PSTN).

Figure 1-9
Direct dial-up to an SPM

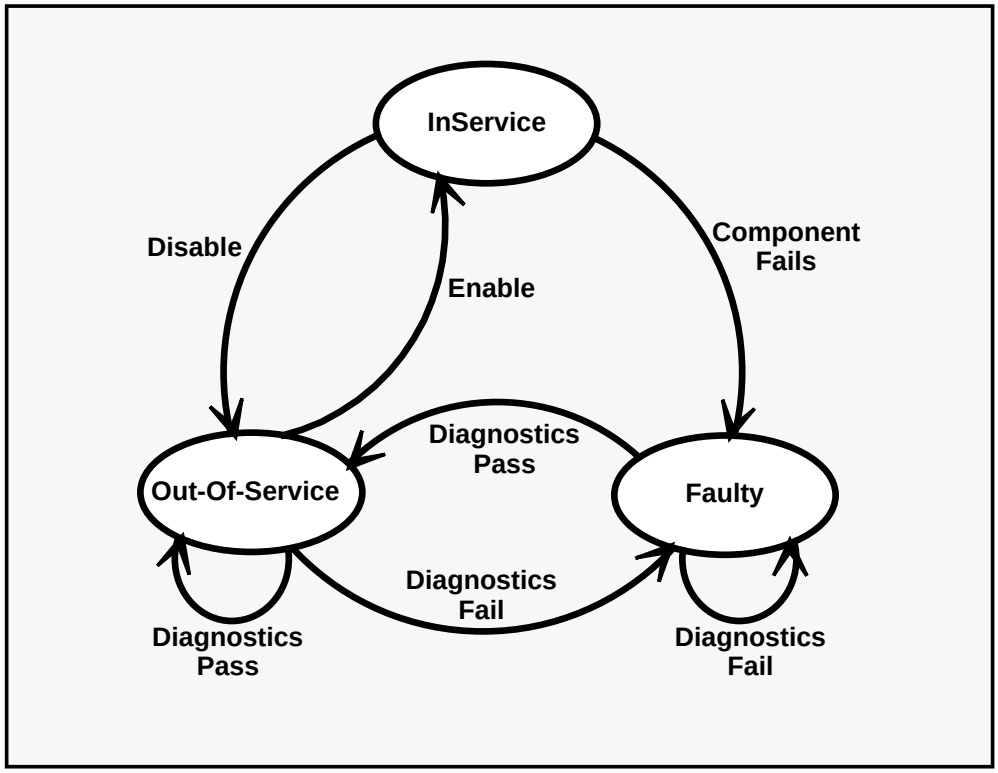


Maintenance principles

Maintenance model

Figure 2-1 illustrates the basic maintenance model that DMS VoiceMail uses. The most common maintenance states are shown (that is, inservice, out-of-service, and faulty) while transient states (such as, pending, loading, etc.) are not shown.

Figure 2-1
DMS VoiceMail maintenance model



An inservice component (such as a node, card, or connection) is put in the out-of-service state if the disable command is used. If a component fails, it is automatically put in the faulty state by the system.

An out-of-service component is brought back to the inservice state by manually using the enable command. Out-of-service diagnostics can be run against an out-of-service component. If the diagnostics pass, the component remains out-of-service. However, if the diagnostics fail, the component is put in the faulty state by the system.

To ensure the system successfully returns to service, the out-of-service diagnostics must pass before a faulty component is returned to service. If the diagnostics pass on a faulty component, it is put in the out-of-service state by the system. However, if the diagnostics fail, the component remains in the faulty state.

When a node is disabled, it is first reset, then it goes through an abbreviated boot sequence, and the operating system software is loaded. When a node is in the out-of-service state, a portion of the operating system software is loaded so that the diagnostic programs can be started and the out-of-service diagnostics run.

In most cases, maintenance action should be performed when a node is in the out-of-service state. As a result of the redundancy built into DMS VoiceMail, there is usually no resulting loss of service. However, if a 68K card for an SPN must be replaced, there is a temporary loss of 24 channels until the SPN is returned to service. Likewise, if a VP12 card is out-of-service, there is a temporary loss of 12 channels until the VP12 is returned to service.

Maintenance actions and system events

The following sections discuss the maintenance actions and the resulting sequence of events that can occur for DMS VoiceMail various components.

MSP maintenance actions

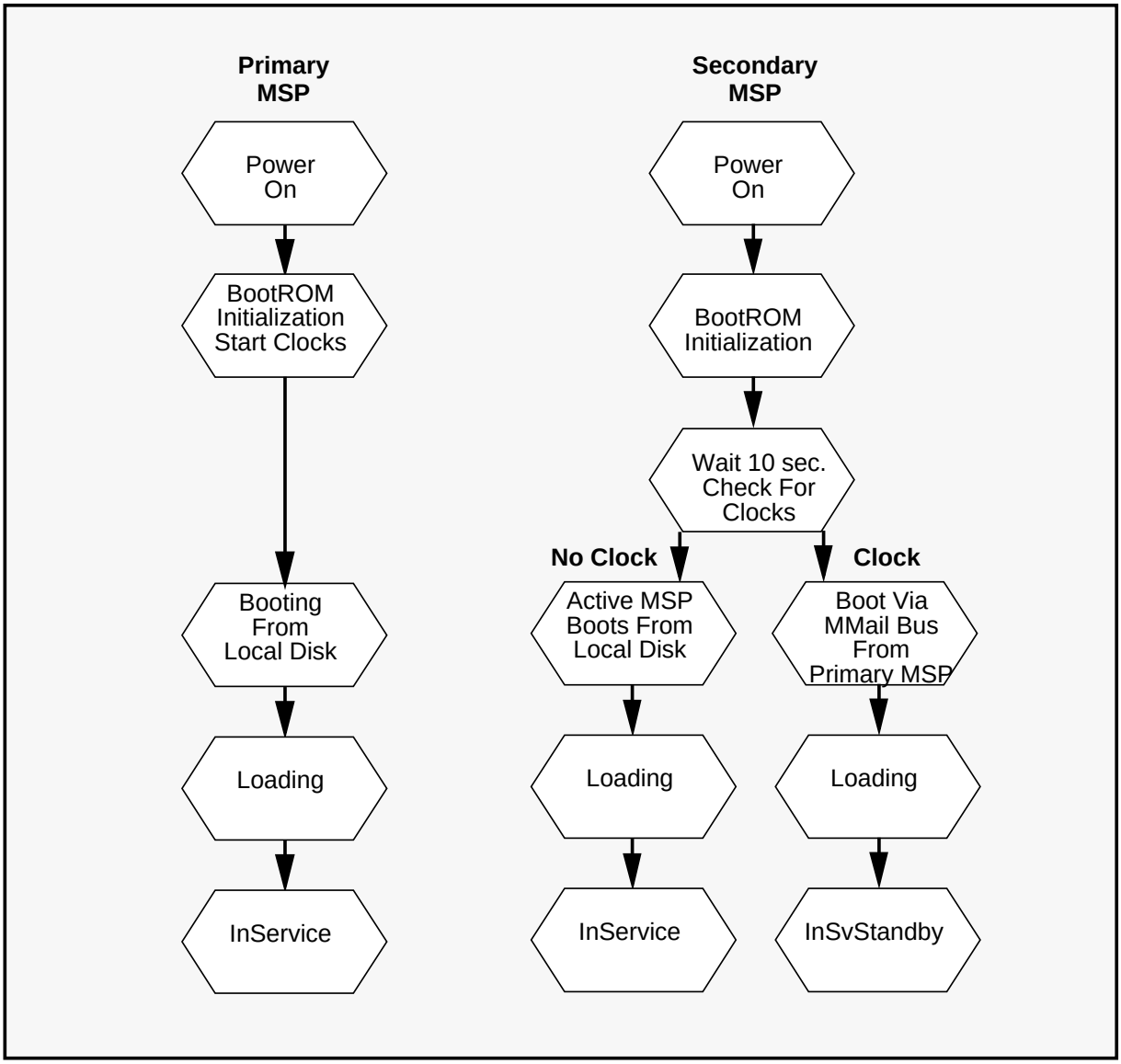
Multiserver processors (MSP) can either be enabled or disabled. Normally, a pair of MSPs operate with both the primary and secondary MSPs enabled. The primary MSP runs in the inservice state and the secondary MSP runs in the inservice standby state. DMS VoiceMail uses a default setting that has MSP1 designated as the primary node.

The only reason to disable the primary MSP is to replace a card or to run the out-of-service diagnostics because of a suspected fault. However, if there is a fault condition with the primary MSP, the system automatically initiates a switchover to the secondary MSP and puts the primary MSP in the faulty state.

Nominal boot sequence

Figure 2-2 illustrates the boot sequence for both the primary and secondary MSPs.

Figure 2-2
Boot sequence



Primary MSP boot sequence

When a primary MSP is booted, the following sequence of events occurs:

the 68K card of the MSP powers up and starts the BootROM sequence

- the 68K card reads its physical slot location to determine whether it has the primary MSP role
- the 68K card turns on the clocks of the bus controller and executes firmware-based diagnostics
- the 68K card completes the diagnostics and loads operating system software from its attached disk
- the 68K card loads application software
- application programs start
- the MSP goes to the inservice state and then initiates loading of the other nodes in the system

Secondary MSP boot sequence

When a secondary MSP is booted, the following sequence of events occurs:

- the 68K card of the MSP powers up and starts the BootROM sequence
- the 68K card reads its physical slot location to determine whether it has the primary or secondary MSP role
- the 68K card initiates the ten second counter and waits
- the 68K card checks for clocks
  - if clock signals are present the MSP waits for the boot sequence
  - if clock signals are not present, the MSP assumes the primary MSP role and follows the primary MSP boot sequence
- the 68K card boots from the operating system software that is loaded from the primary MSP through the MMail bus
- the 68K card loads application programs through the MMail bus
- the application programs start
- the MSP goes to the InSvStandby state

Disabling MSPs

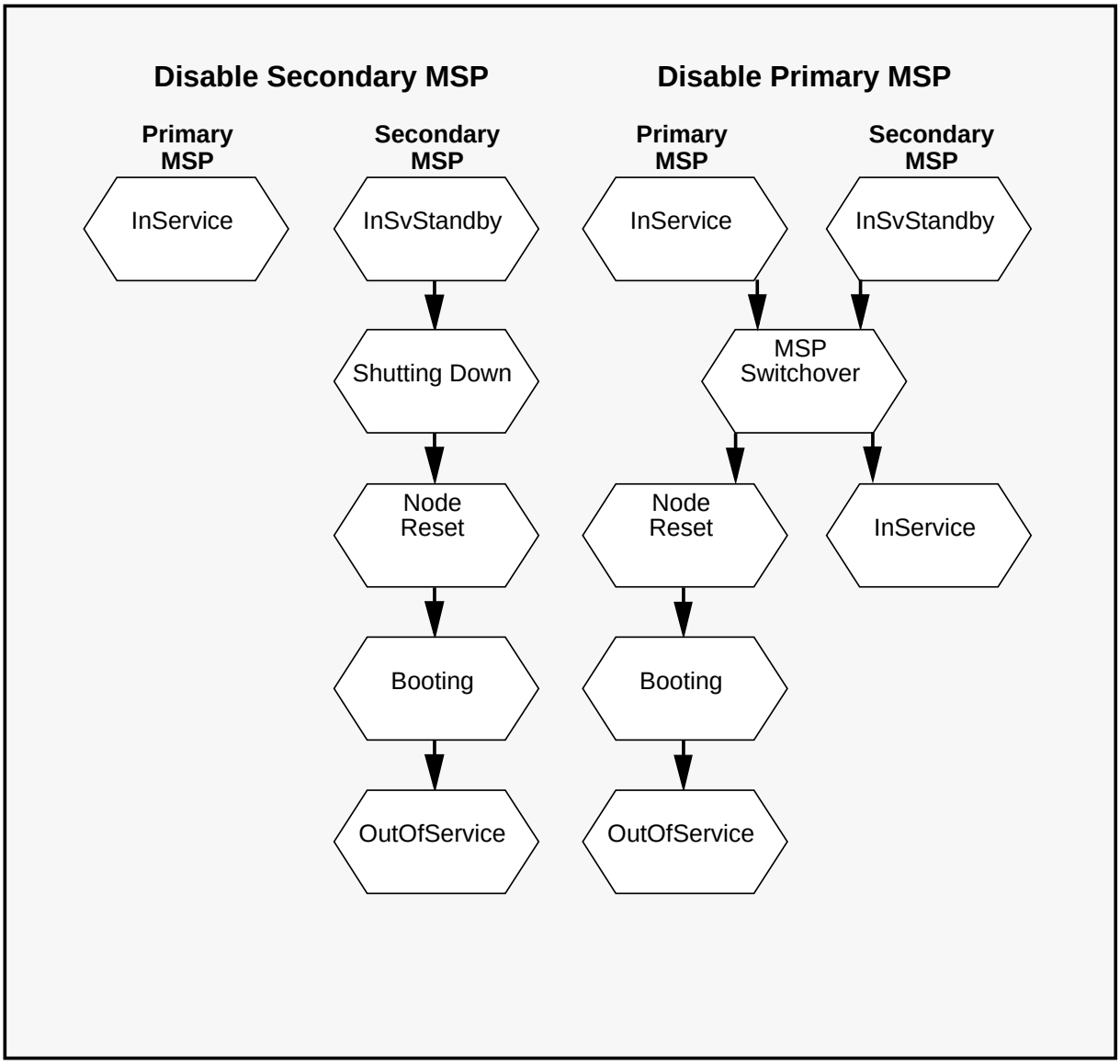
Figure 2-3 illustrates the sequence of events when the primary and secondary MSPs are disabled.

Disabling the secondary MSP Disabling the secondary MSP has no effect on the primary MSP. The primary MSP remains inservice. After entering the disable command for the secondary MSP, it goes through a

series of transitions from the inservice standby state to the out-of-service state.

Disabling the primary MSP When the primary MSP is disabled, the secondary MSP takes over from the primary MSP through an MSP switchover. This puts the secondary MSP in the inservice state and the primary MSP in the out-of-service state.

Figure 2-3xxx
Disabling MSPs



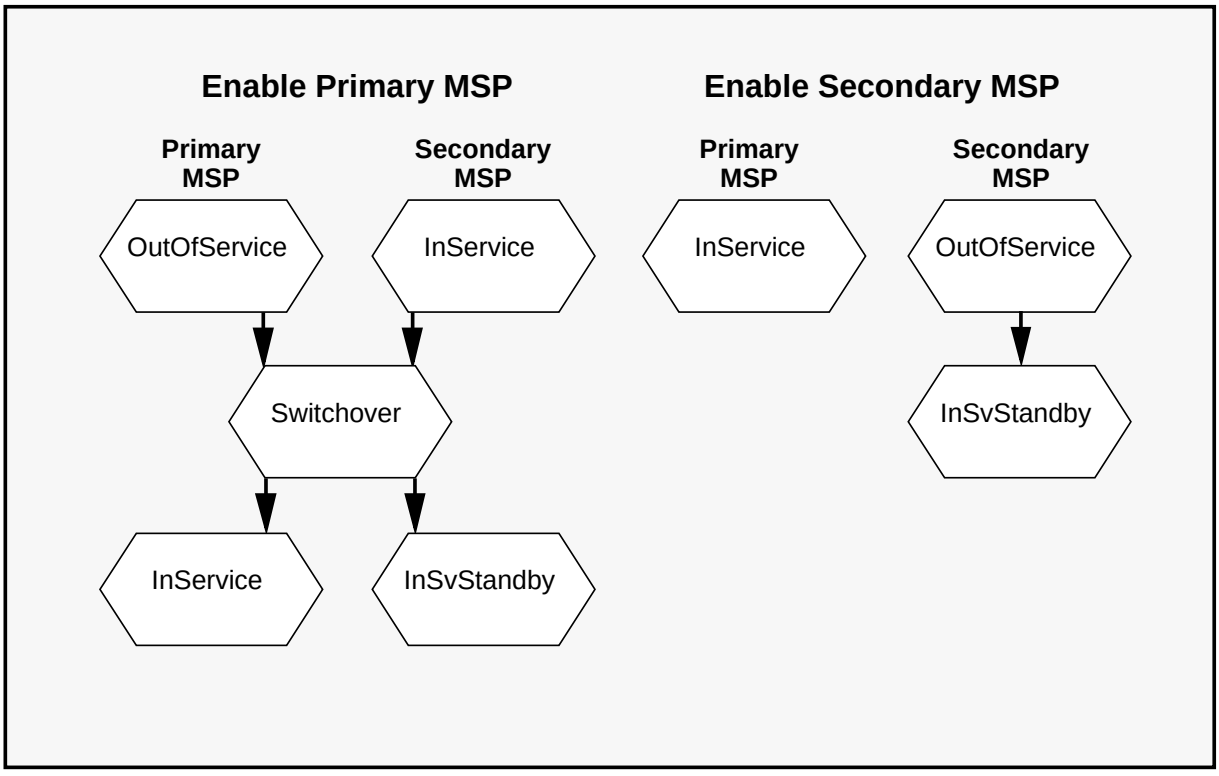
Enabling MSPs

Figure 2-4 illustrates the sequence of events when the primary and secondary MSPs are enabled.

Enabling the primary MSPs When the primary MSP is enabled, it takes system control from the secondary MSP through an MSP switchover. This put the primary MSP in the inservice state and the secondary MSP in the inservice standby state.

Enabling the secondary MSP Enabling the secondary MSP has no effect on the primary MSP. The primary MSP remains inservice. After entering the enable command for the secondary MSP, the secondary MSP goes through a transition from the out-of-service state to the inservice standby state.

Figure 2-4
Enabling MSPs



TIFN maintenance actions

Maintenance operations can be performed on the Telephony Interface Node (TIFN), the 68K card, the T1 card, T1 spans, T1 channels, and SMDI links. Normally, a maintenance action performed to a higher entity causes a ripple effect for lower entities. For example, if the T1 spans are in the inservice standby state, disabling a T1 card causes all four T1 spans to be switched to the alternate T1 card. Likewise, disabling a T1 span causes all 24 channels to be switched to the alternate T1 card. Disabling one channel causes only one channel to be disabled.

A fault in the 68K card of a TIFN can cause all four T1 spans and SMDI links to switch to the redundant TIFN. A fault to a single T1 span causes that single span to switch to the redundant TIFN.

The only reason to disable a TIFN, or one of its associated cards, is to replace the card in question or to run out-of-service diagnostics against a suspected fault.

In some cases, surviving T1 spans of a TIFN are disabled, switching the span to the redundant TIFN to allow the TIFN with a failed span to be replaced.

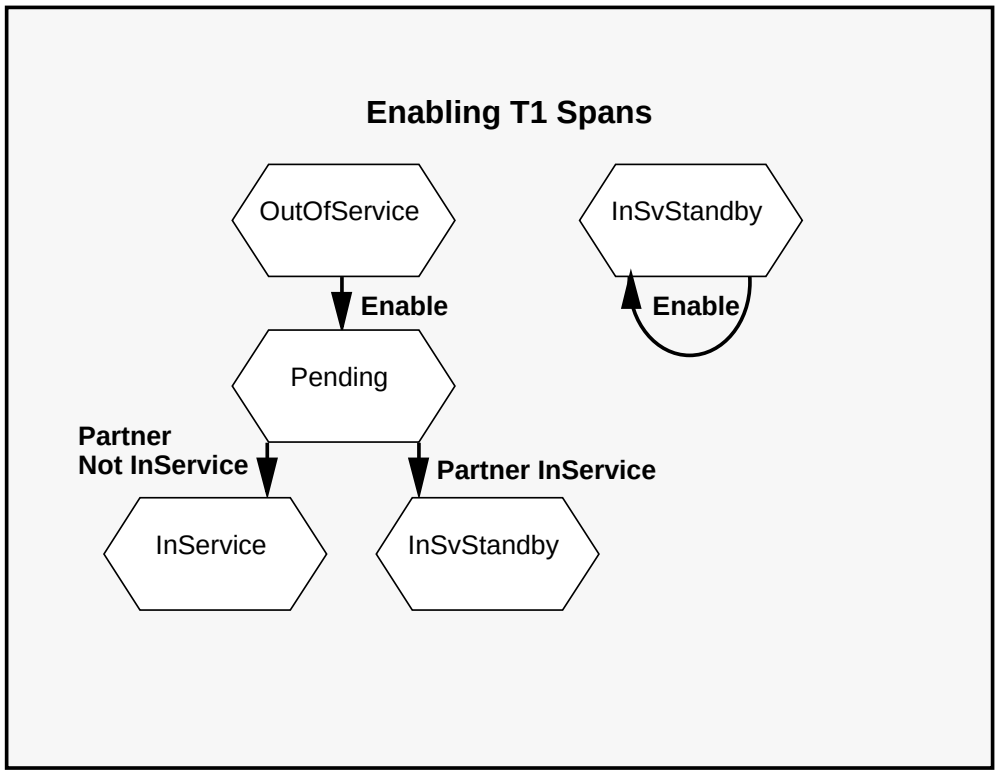
Enabling T1 spans

Figure 2-5 illustrates the sequence of events when T1 spans are enabled from the out-of-service and inservice standby states.

When an out-of-service T1 span is enabled, it goes through a transitional pending/loading state before going to either the inservice or inservice standby state. If no T1 span is currently inservice, the enabling span goes to the inservice state. However, if the primary T1 span is inservice, the enabled span goes to the inservice standby state.

Enabling an inservice standby T1 span has no effect, it remains in the inservice standby state.

Figure 2-5
Enabling T1 spans



Disabling T1 spans

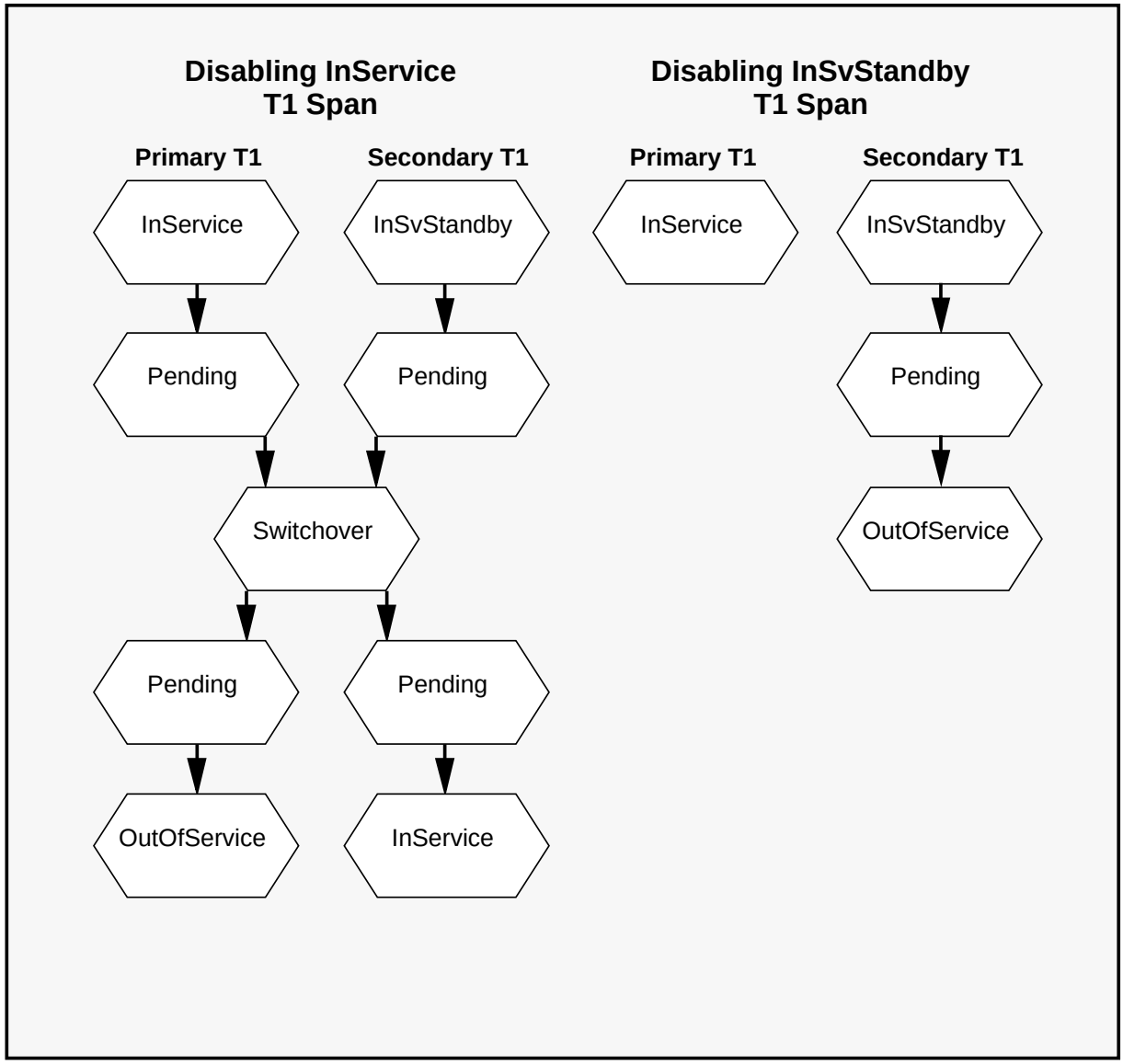
Figure 2-6 illustrates the sequence of events when T1 spans are disabled from the inservice and inservice standby states.

When an inservice T1 span is disabled, it goes through a transitional pending state as an automatic courtesy down is implemented. Automatic courtesy down waits three minutes for active calls to terminate, then the T1 span is taken down.

Switchover occurs when individual T1 spans are switched to the redundant TIFN. The primary T1 span goes to the out-of-service state and the secondary T1 span goes to the inservice state.

Disabling a T1 span in the inservice standby state causes the T1 span to go to the out-of-service state. There is no impact to the T1 span in the inservice state.

Figure 2-6xxx
Disabling T1 spans



T1 channels

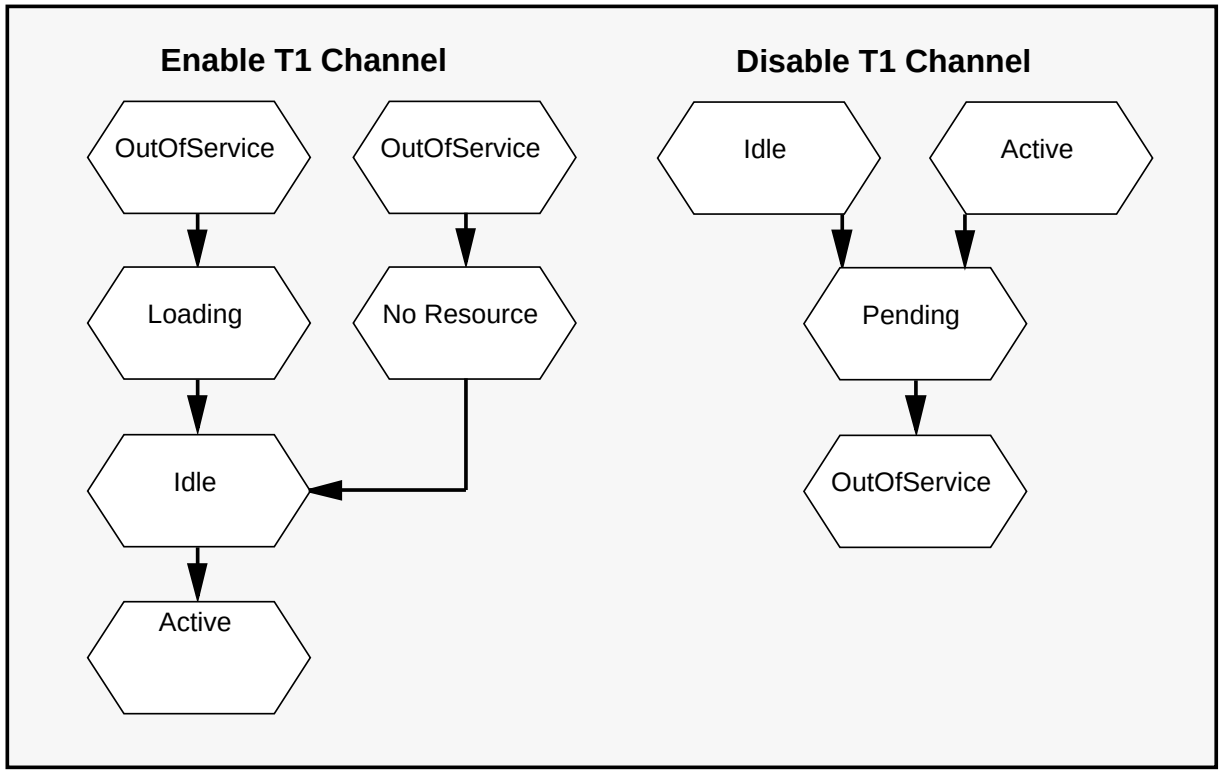
Figure 2-7 illustrates the sequence of events when T1 channels are enabled and disabled.

Enabling T1 channels When an out-of-service T1 channel is enabled, it goes through a transitional loading state that takes about one minute before going to the idle state. If a related component is not available to allow the channel to answer a call, the channel goes to the NoResource state. For example, a T1 channel cannot function if the TIFN is out-of-service or if the T1 span is not inservice.

When the related component is available, the channel goes to the idle state and it can now accept calls.

Disabling T1 channels To be disabled, T1 channels must be in either the idle or active states. When an active T1 channel is disabled using the disable command, the call in progress is terminated immediately. However, using the courtesy disable command allows the active call to complete before the T1 channel is disabled.

Figure 2-7
Enabling and disabling T1 channels



SPN maintenance actions

Maintenance operations can be performed on the Signal Processing Node (SPN) at the node, card and DSP port levels. For example, disabling a VP12 card marks its 12 channels as OutOfService. However, disabling an SPN does not put its cards out-of-service. They remain inservice.

The SPN is the only node where a card (that is, the VP12 card) can be removed and replaced while the node remains inservice. This allows a faulty VP12 card to be removed without disturbing active operations on the other 12 channels of the node.

DMS VoiceMail subscribers are associated with a home node where their subscriber information and messages are stored in user cabinets. Since SPNs are not redundant, the loss of one node removes 24 channels of call handling capacity from the system. However, SPNs are paired. If an SPN goes out-of-service, users associated with the SPN pair can still access their messages through the paired node.

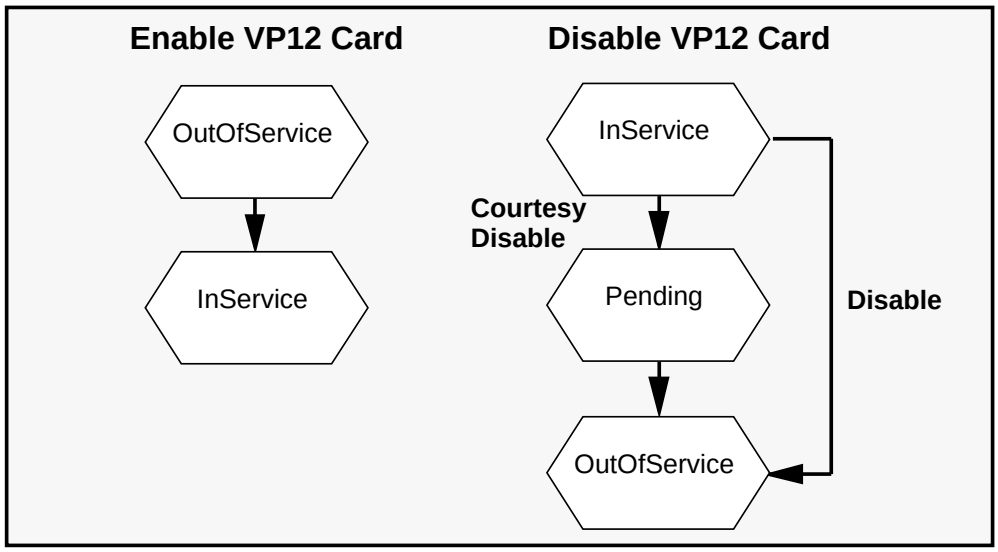
VP12 cards

Figure 2-8 illustrates the sequence of events when a VP12 card is enabled and disabled.

Enabling a VP12 Card When an out-of-service VP12 card is enabled, it goes to the inservice state.

Disabling a VP12 Card When a VP12 card is disabled using the disable command, the calls in progress are terminated immediately. However, using the courtesy disable command allows the active call to complete before the VP12 card is disabled.

Figure 2-8xxx
Enabling and disabling a VP12 card



DSP ports

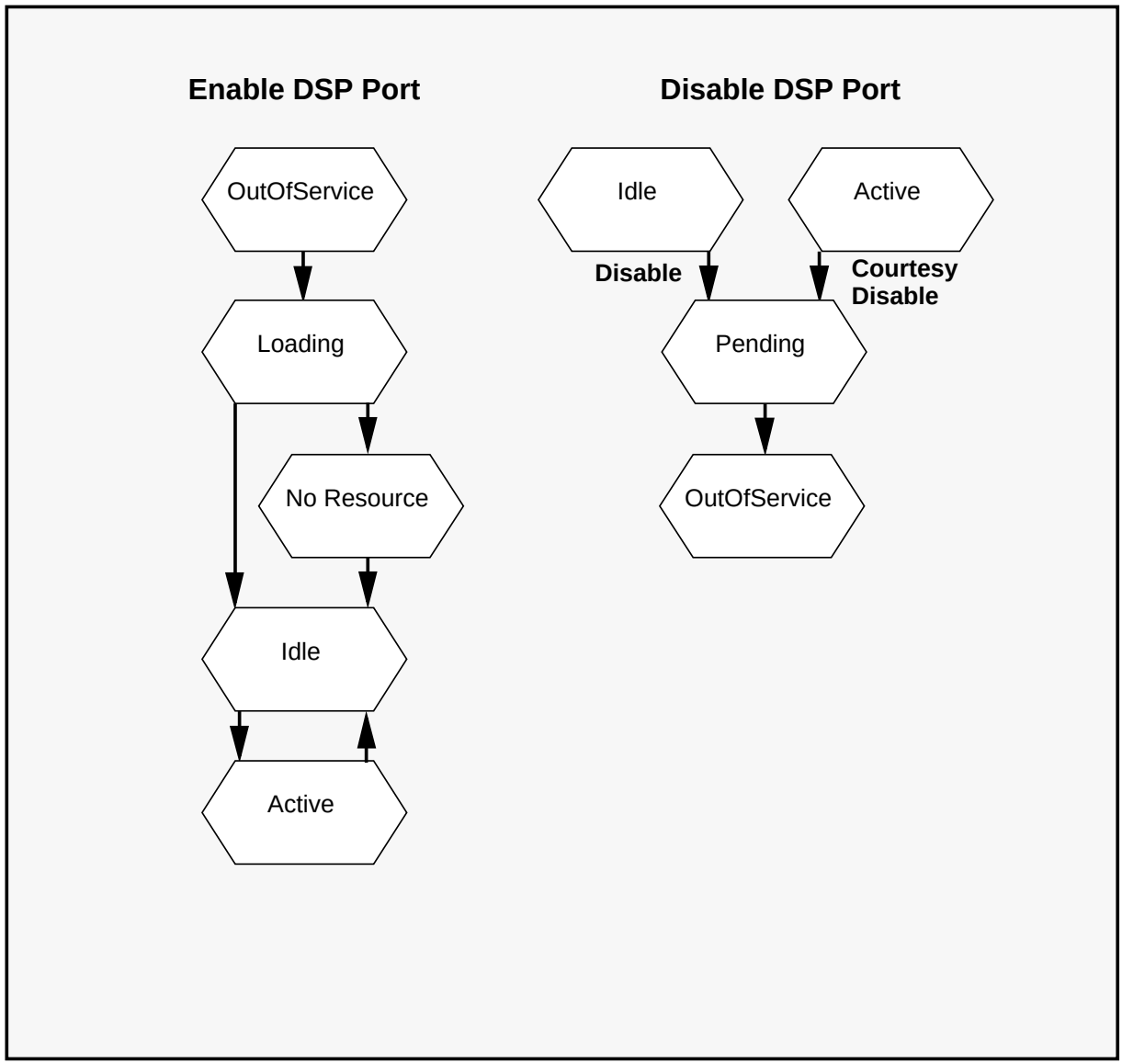
Figure 2-9 illustrates the sequence of events when DSP ports are enabled and disabled.

Enabling DSP ports When an out-of-service DSP port is enabled, it goes through a transitional loading state that takes about one minute before going to the idle state. If a related component is not available, the DSP port goes to the NoResource state.

When the related component is available, the DSP port goes to the idle state.

Disabling DSP ports To be disabled, a DSP port must be in either the idle or active states. When an active DSP port is disabled using the disable command, the port is disabled immediately. However, using the courtesy disable command allows the system to wait for the DSP port to become idle before it is disabled.

Figure 2-9xxx
Enabling and disabling a DSP port



System status and maintenance menu

The System Status and Maintenance menu is used to access screens that display the status of various types of components. It is from this menu that alarms can be silenced using the Silence Alarm softkey.

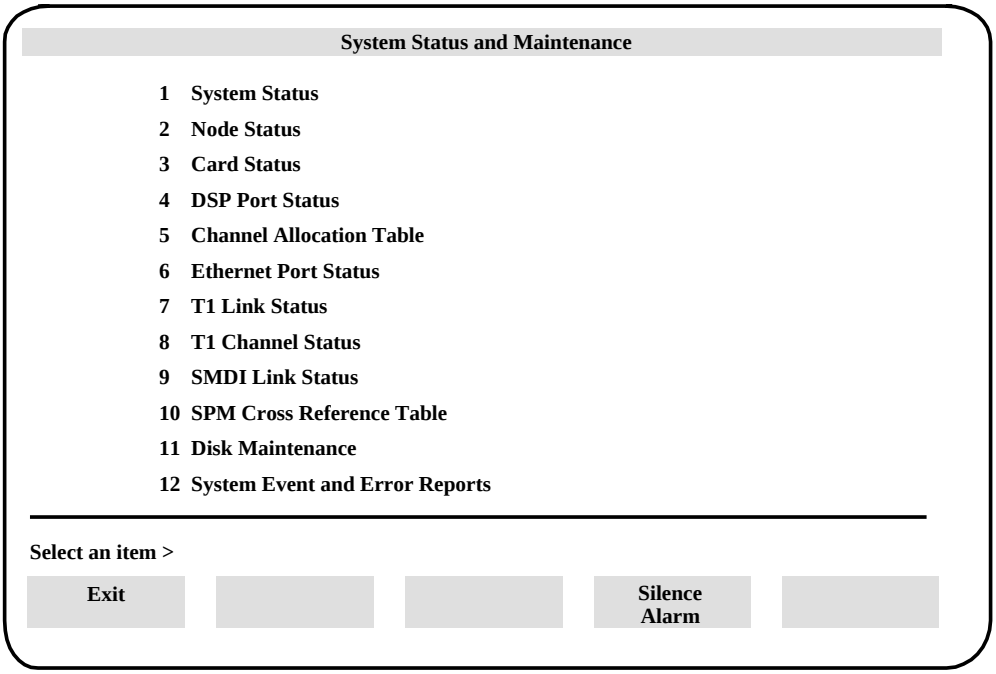
When the Silence Alarm softkey is selected, the administrator is given the option of silencing the critical, major, or minor alarms. When one of the three Silence Alarm softkeys is selected the appropriate alarm is silenced.

> ***Note:*** The condition that causes the alarm must be rectified otherwise the alarm can be reactivated by the system.

The status of the three alarms is displayed in the top right section of all System Status and Maintenance screens, except the SPM Cross Reference Table screen.

Figure 2-10 illustrates the System Status and Maintenance Menu.

Figure 2-10xxx
System Status and Maintenance menu



Node status screen

The Node Status screen displays the operational status of nodes in the system. This screen is used to identify nodes that are faulty or suspected of not operating correctly. A normally operating node is either in the inservice (InService) or inservice standby (InSvStandby) state.

If operating system software cannot be loaded on a node, the node goes to the faulty state after booting. To determine if the 68K card is functioning correctly, diagnostics are run on the corresponding 68K card of the node using the OutOfService Diagnostics softkey of the Card Status screen.

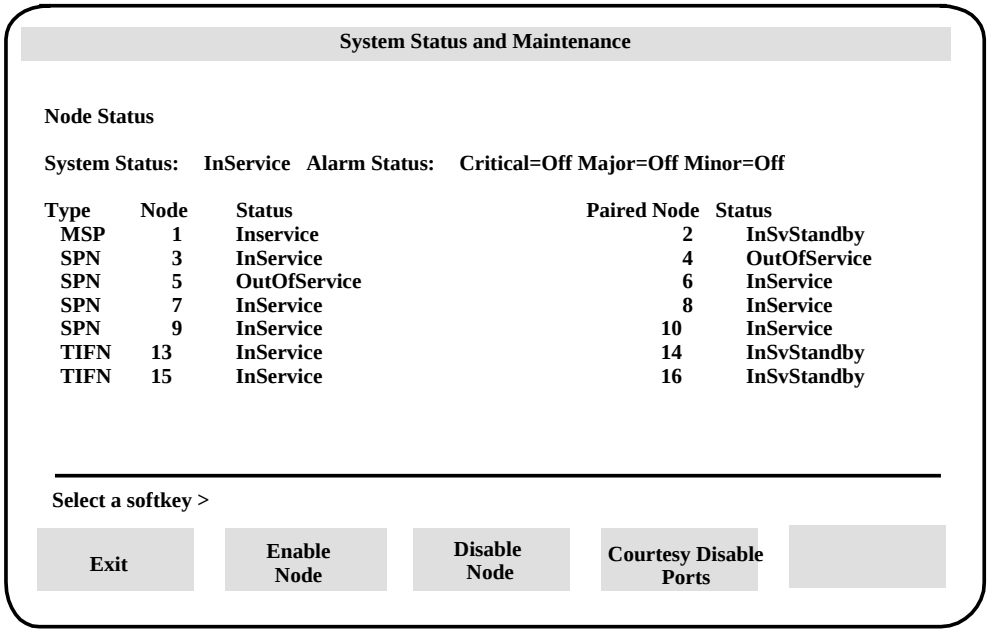
The Node Status screen is also used to determine if an MSP switchover has occurred. This is evident if node 2 is in the inservice state instead of the InSvStandby state.

If out-of-service diagnostics are required for any 68K card, the corresponding node must be disabled using the Disable Node softkey in this screen.

Prior to disabling an SPN, use the Courtesy Disable Ports softkey to disable all of the DSP ports on the node so that active calls are not affected. When the node is ready to be put back inservice, use the Enable Node softkey.

Figure 2-11 illustrates the Node Status Screen.

Figure 2-11xxx
Node Status screen



Card status screen

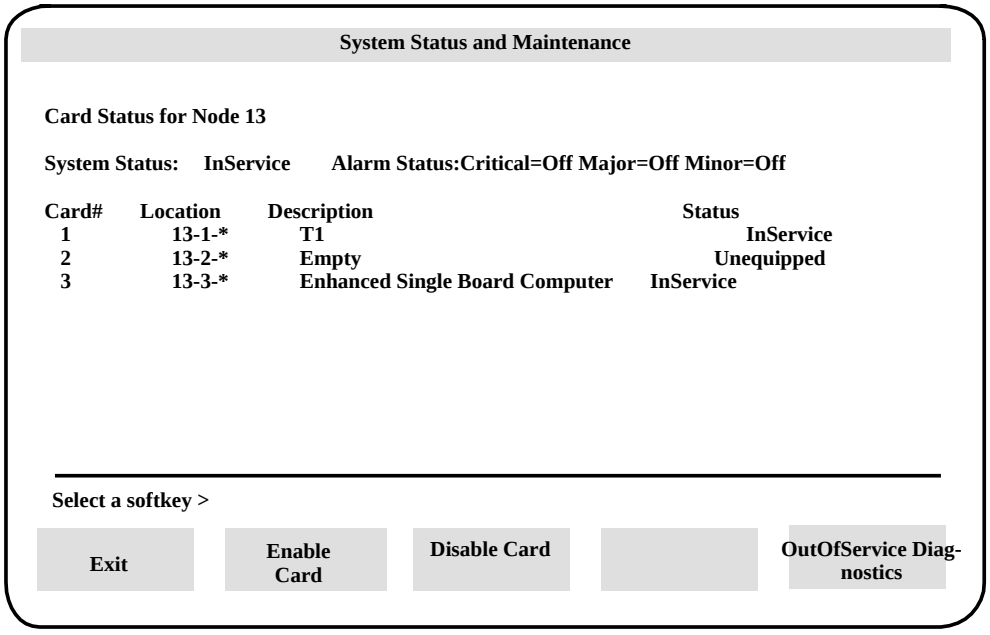
The Card Status screen displays the operational status of the cards on a particular node in the system. Before entering the screen, the administrator is prompted for the number of the node for which the card status should be displayed.

The OutOfService Diagnostics softkey is used to run diagnostics on the VP12, T1, 68K, 68KU and bus controller cards that are in the out-of-service, or faulty state. If diagnostics pass on a faulty card, the card is changed to the out-of-service state. If the diagnostics fail, the card remains or goes to the faulty state and an error message is displayed on the MMI with an error code and goes to the printer as well. This error code can be looked up in the *DMS VoiceMail Maintenance Messages (SEER) Manual (NTP 297-7001-510)*.

To enable or disable a VP12 or T1 card, the Enable Card or Disable Card softkey is used. To enable or disable a 68K, 68KU or bus controller card, the Enable Node or Disable Node softkeys in the Node Status screen are used.

Figure 2-12 illustrates the Card Status Screen.

Figure 2-12xxx
Card Status screen



T1 link status screen

The T1 Link Status screen displays the operational status of primary and redundant T1 spans in the system. A normally running T1 span is either in the InService or InSvStandby state. This screen is used to identify T1 spans that are not operating correctly.

The T1 Link Status screen is also used to determine which T1 spans have been nominated as T1 clock reference candidates. This is indicated by a Y in the Clocking Cand column. The actual T1 span that is the source of the T1 clock reference is indicated by an R in the Clocking Mode column.

If a T1 span is in the InSvYelAlarm state, it indicates the span is inservice but that either the DMS-100 host or the T1 channel bank is experiencing a T1 signaling problem to the SPM. This state usually occurs momentarily during T1 switchover.

If a T1 span is in the InSvRedAlarm state, it indicates that the span is inservice but that the T1 port has lost signaling with either the DMS-100 host or the T1 channel banks. For InSvRedAlarm, check if the T1 cable has been disconnected or if the DMS-100 or the channel banks are not functioning correctly.

If a T1 span is in the faulty state, this indicates a physical fault has occurred on the span.

To run diagnostics on the T1 span it is necessary to use the OutOfService Diagnostics softkey on the corresponding parent T1 card in the Card Status screen. If the T1 span is not faulty, it is put in the out-of-service state by the diagnostics. The T1 span can then be enabled by using the Enable Card softkey in the Card Status screen. If the diagnostics fail, the span remains in the faulty state.

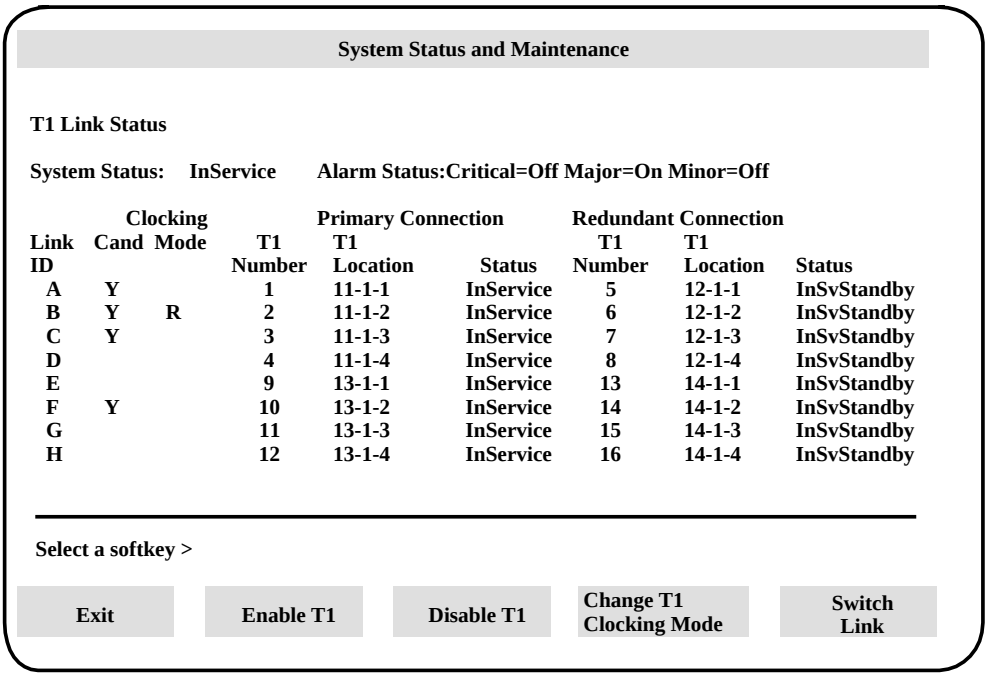
Individual T1 spans are enabled or disabled using the Enable T1 or Disable T1 softkeys respectively.

The Switch Link softkey is used to put the InSvStandby partner connection to the inservice state and to put the inservice primary connection to the InSvStandby state.

The Change T1 Clocking Mode softkey is used to select either a new span that provides the T1 clock reference or to select the free run timing mode.

Figure 2-13 illustrates the T1 Link Status Screen.

Figure 2-13xxx
T1 Link Status screen



SMDI link status screen

The SMDI Link Status screen displays the operational status of the primary and secondary SMDI connections in the system. A normally running SMDI link is either in the InService or InSvStandby state. This screen is used to identify SMDI links that are not operating correctly.

If the SMDI link is in the InSvYelAlarm state, it indicates that the link is inservice but has lost the modem connection. For InSvYelAlarm, check the physical connection between the SMDI data port and the corresponding modem.

If the SMDI link is in the InSvRedAlarm state, it indicates that the SMDI link has lost handshaking with the DMS-100 host. For InSvRedAlarm, check if the DMS-100 is operating and whether the baud rates are set correctly on the DMS-100.

> ***Note:*** Yellow and red alarms are expected when the SMDI link is coming up. These can last between 30 seconds and two minutes.

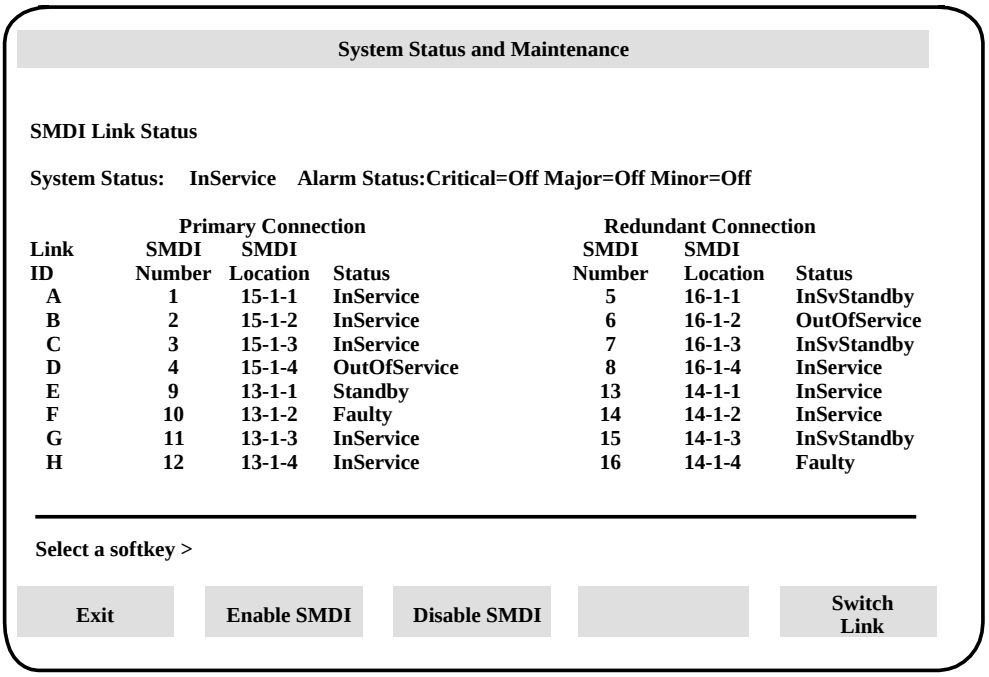
If the SMDI link is in the Faulty state, it indicates that a fault has occurred on the link. It is also possible for a SMDI link to be placed in the Faulty state by the system if the link has been in either the InSvYelAlarm or InSvRedAlarm states for more than five minutes.

To run diagnostics on an SMDI link, it is necessary to run the out-of-service diagnostics on the 68K card of the corresponding node in the Card Status screen. If the SMDI link is not faulty, it is placed in the out-of-service state by the diagnostics. The SMDI link can then be enabled using the Enable Node softkey in the Node Status screen. Individual SMDI links can be enabled or disabled using the Enable SMDI or Disable SMDI softkeys respectively.

The Switch Link softkey is used to put the InSvStandby partner connection to the inservice state and to put the inservice primary connection to the InSvStandby state.

Figure 2-14 illustrates the SMDI Link Status Screen.

Figure 2-14xxx
SMDI Link Status screen



SPM cross reference table

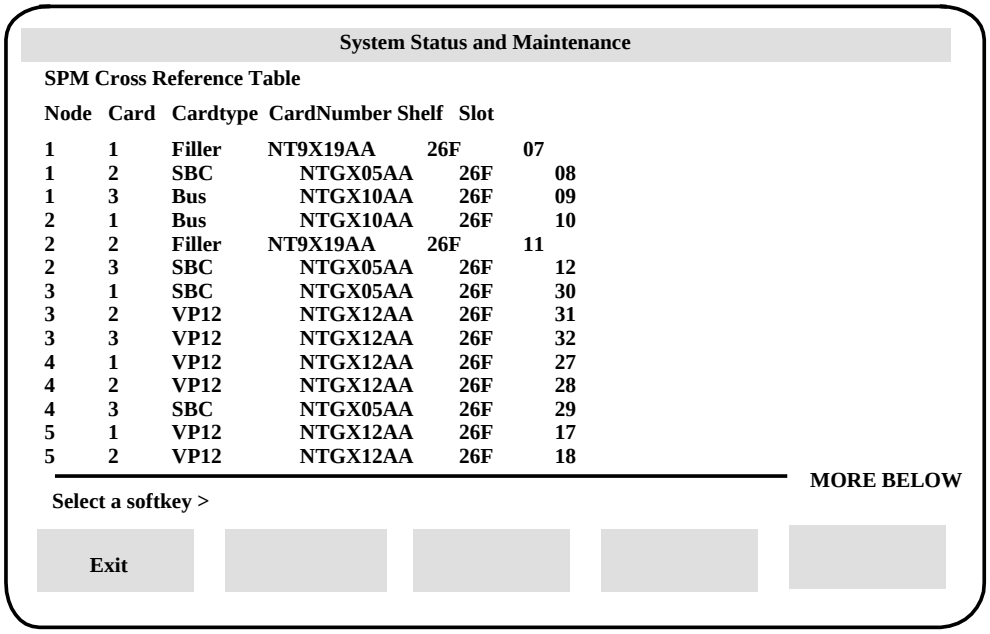
The SPM Cross Reference Table screen translates a logical location of a card (that is, node-card) to a physical location (that is, shelf-slot) on the SPM frame. It also indicates the Northern Telecom product equipment code, shown as CardNumber. This screen is used if it is necessary to identify where on the physical SPM frame a faulty card is located.

The SPM Cross Reference Table also displays information for the transition modules that are located at the rear of the SPM frame.

> ***Note:*** The SPM Cross Reference Table displays information for a 192-port DMS VoiceMail system. If your system is not provisioned to full capacity, not all cards listed will be in your system.

Figure 2-15 illustrates how the first screen of the SPM cross reference table appears.

Figure 2-15xxx
SPM Cross Reference Table screen



Disk maintenance screen

Disks are added to DMS VoiceMail in pairs. When new data is written to disk, both drives in a pair are updated at the same time with the same information. If one of the drives in a pair fails, it can be removed from service and replaced without loss of data or interruption of service.

When a disk fails due to any sort of SCSI error, the system automatically takes it out of service (puts it in "No Access" state) and generates a SEER. The shadowed disk continues to function and there is no service interruption. However, the failed disk should be replaced as soon as possible. You may also have to replace (or repair) a disk that has reported a large number of recovered errors. In the second case, you will have to take the disk out of service manually before replacing it. After a disk has been replaced or repaired, you will have to perform a disk synchronization in order to bring the paired disks in line with each other.

Figure 2-16 illustrates the Disk Maintenance screen and shows the status of each disk pair in the system. The three possible states for a disk pair are "InSync", "Synching" and "OutofSync". If a SEER has alerted you to the fact that the system has automatically taken a disk out of service, check the Disk Maintenance screen to determine which pair is out of synch.

Figure 2-16xxx
Disk Maintenance screen

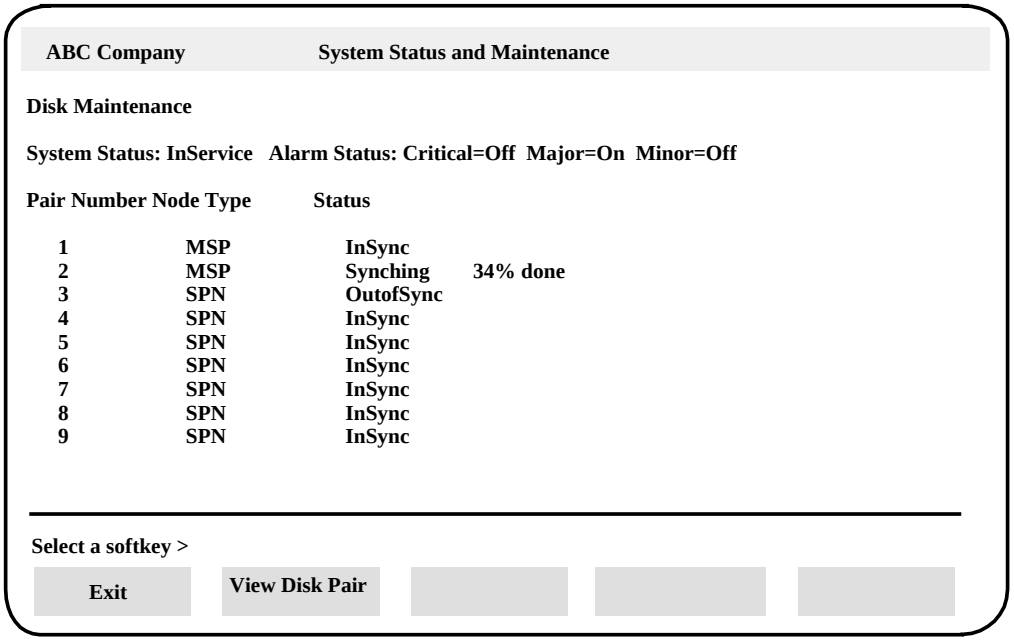
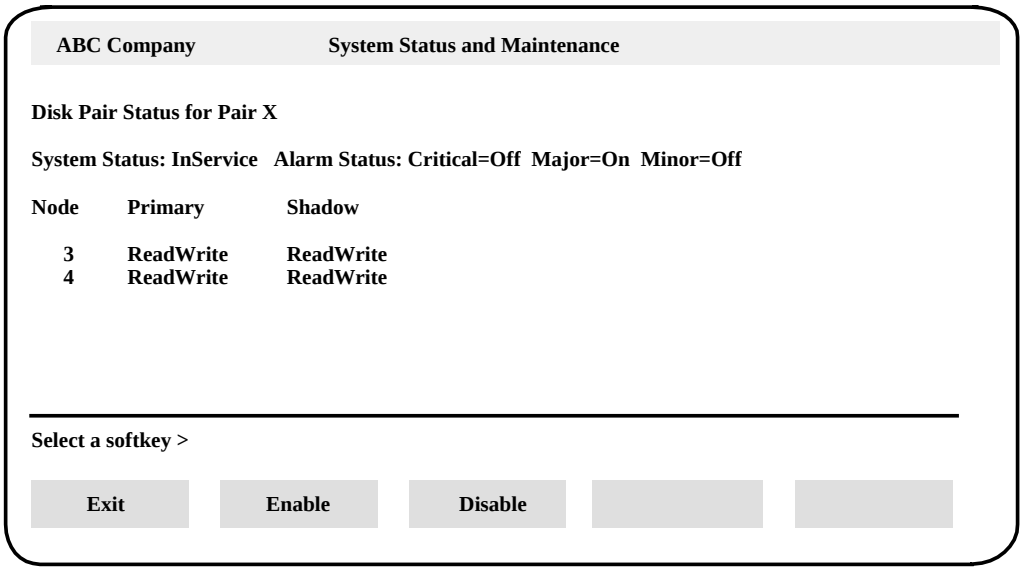


Figure 2-17 illustrates the Disk Pair Status screen.

Figure 2-17xxx
Disk Pair Status screen



Note: If required to either replace or re-synchronize disks, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).*

SEER operations

System Event and Error Reports (SEERs) collect information on every system event and error reported by the system software components.

Severity level

SEERs are classified into four severity classifications: critical, major, minor, and info.

Type

SEERs are also classified into four types: Error, Admin, System, and All.

Filtering

The SEERs form allows you to filter SEERs based on the following criteria: Class, Severity, Type, Date, and Time.

The resulting filtered SEERs can be viewed on the terminal, or printed on the printer. The SEERs are then used to help diagnose a problem that occurs in the system or indicate to the administrator that normal system events are occurring (for example, nightly audits). The SEERs should be interpreted in conjunction with the *DMS VoiceMail Maintenance Messages (SEER) Manual, 297-7001-510*.

Figure 2-18 illustrates how the System Event and Error Reports screen appears.

Figure 2-18xxx
System Event and Error Reports screen

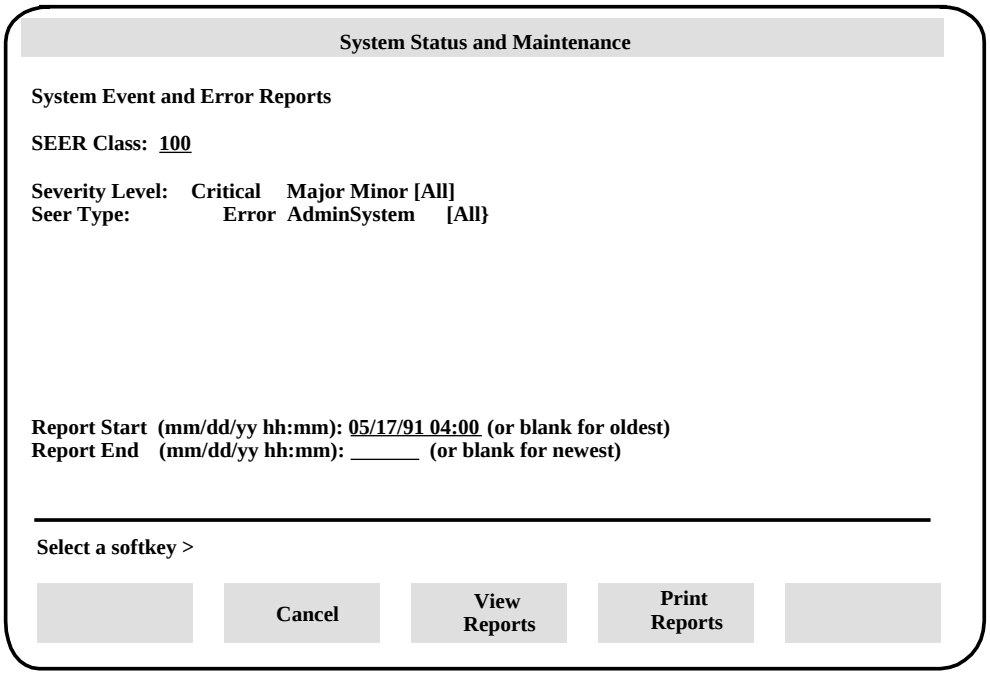
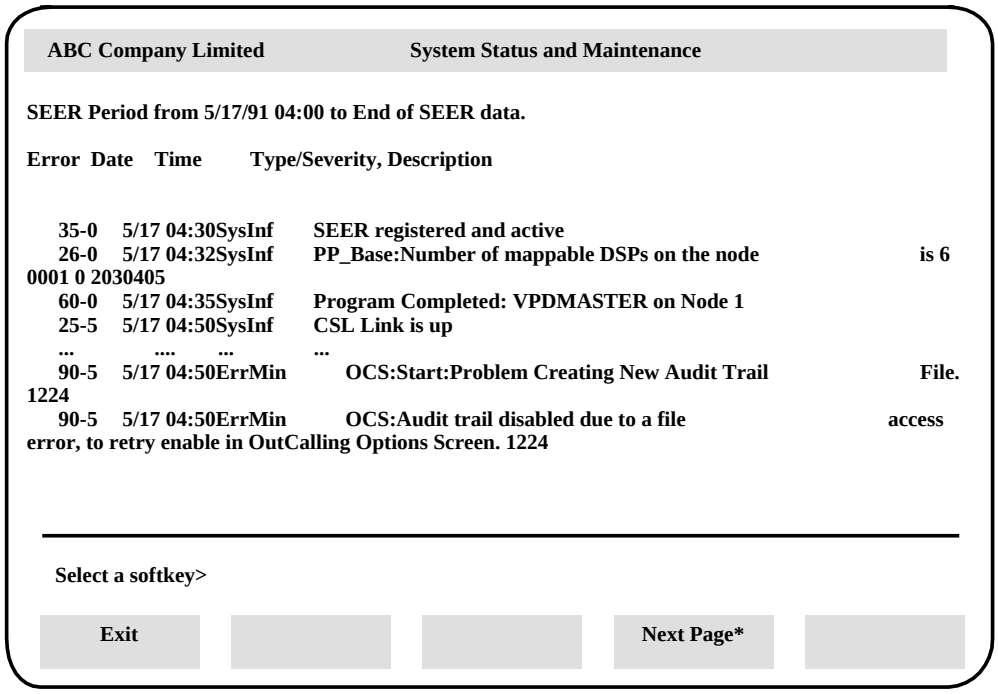


Figure 2-19 illustrates how a sample Report screen appears.

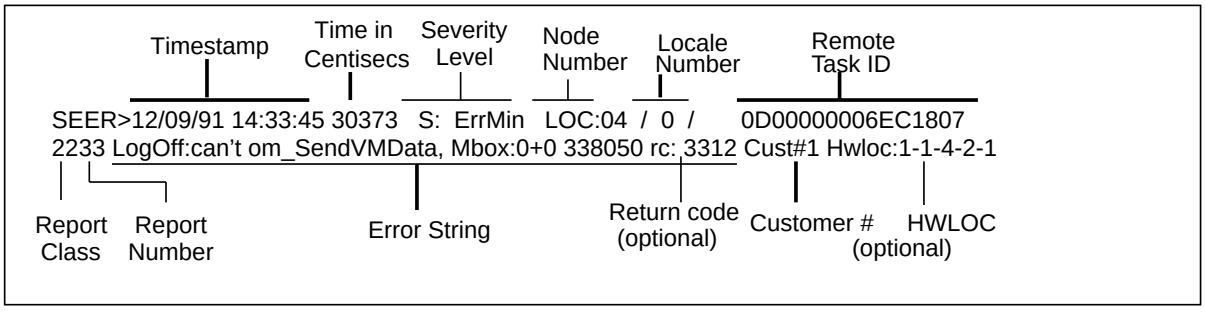
Figure 2-19xxx
Report screen



***Appears when the information fills more than one screen.**

Figure 2-20 illustrates a sample SEER and identifies the various parts of a SEER.

Figure 2-20xxx
Parts of a SEER



Troubleshooting using SEERs

To troubleshoot DMS VoiceMail problems through SEERs, use the following guidelines:

- Group SEERs by hardware location (HWLOC).
- Using the timestamp, trace the grouped SEERs back to a single root event that initiated the generation of multiple SEERs.
- Check for return codes in the SEERs. Problems can be caused by a lower level software failure that is indicated by the return code pointer to the faulty level.
- Using the severity level, trace back through the SEERs to a single root event that caused an alarm condition.

Interpreting SEERs

Example 1

The following example illustrates how a memory problem on one channel is indicated through SEERs. The system fully recovers and no maintenance action is required.

SEERs output

```
SEER > 09/26/92  13:03:03     238121  S:ErrMin  LOCN: 3/ 5/170000000AE81C0B
2712      Failed to re-open the NetDb 1000 HWLOC: 1-250-1-1-1

SEER > 09/26/92  13:03:04     238123  S:ErrMin  LOCN: 3/ 5/170000000AE81C0B
2712      Failed to open the NetDb 1000 HWLOC: 1-250-1-1-1

SEER > 09/26/92  13:03:06     238129  S:ErrMin  LOCN: 3/ 5/170000000AE81C0B
2706      Error in NewService-->2326101.  Service:0  1000 HWLOC: 1-250-1-1-1

SEER > 09/26/92  13:03:08     238132  S:ErrMin  LOCN: 3/ 5/170000000AE81C0B
2732      Failed to do maintenance (result) :  12   HWLOC: 1-250-1-1-1

SEER > 09/26/92  13:03:10     243528  S:SysInf  LOCN: 1/ 4/0100000012823A13
4167     VCM:A VSS terminated on Node 3, cause=UnexpectedUnload,
DevStatus=isOnLine, Action=Restart it.  HWLOC: 1-250-1-1-1
```

Explanation: The first SEER indicates that a Class 27 Number 12 error has occurred. The Voice Base Service Shell (Class 27) failed to open the network database due to insufficient memory (Return Code = 1000).

The next three SEERs are generated as a result of the first, or root, event that occurred.

The final SEER indicates a recovery action that has been initiated. The Voice Base Service Shell does not recover by itself and terminates.

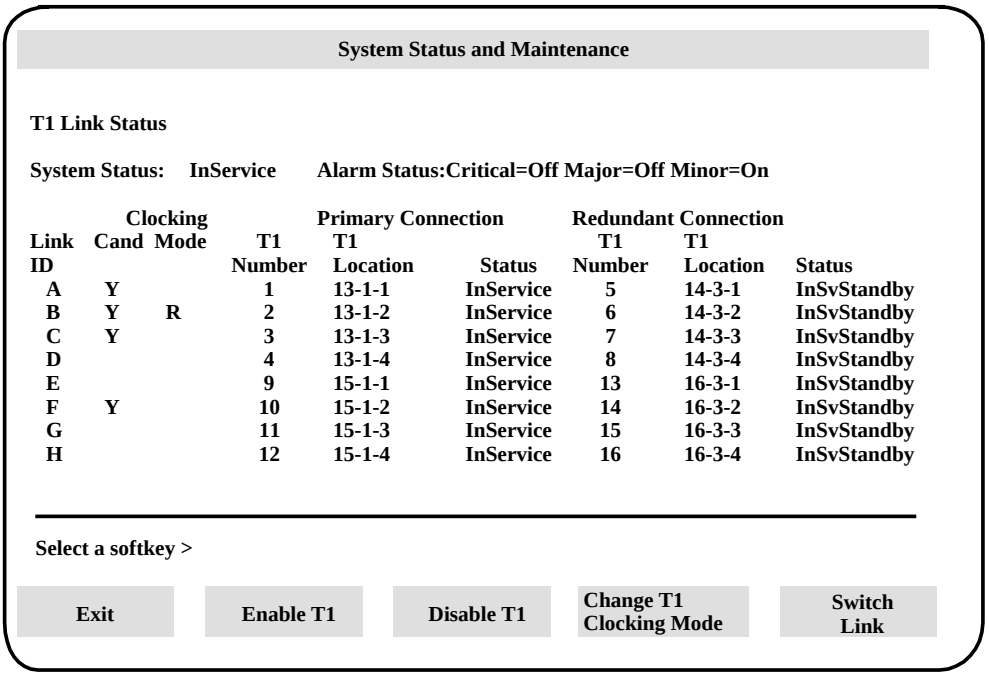
However, the Voice Channel Maintenance (VCM - Class 41) is notified of the VSS program termination and its cause by the Program Resource Manager. The VCM recovers by restarting the VSS program. During the loading sequence the channel status is set to “L”.

Example 2

Starting state

Figure 2-21 illustrates the T1 Link Status screen with all primary T1 links in the InService state and all redundant T1 links in the InSvStandby state.

Figure 2-21xxx
T1 Link Status screen



Alarm triggered

A T1 alarm is triggered that results in the following series of SEERs:

SEER>09/26/92 13:08:11 267480 S:SysInf LOCN:13/ 2/12000000066D1807 4708 [0:31] T1 Trunk OpStatus chg from 0 to1 (HWStatus:0) 0 HWLOC:1-13-1-1

SEER>09/26/92 13:08:14 267481 S:SysInf LOCN:13/ 2/12000000066D1807 4700 [0:31] T1 Link Status - Alarm Active (3) (5) 0 HWLOC:1-13-1-1

SEER>09/26/92 13:08:16 267505 S:SysInf LOCN:13/ 2/12000000066D1807 4700 [0:31] T1 Link Status - StandBy (1) (3) 0 HWLOC:1-13-1-1

SEER>09/26/92 13:08:20 268305 S:SysInf LOCN:13/ 2/12000000066D1807
4708 [0:31] T1 Trunk OpStatus chg from 1 to0 (HWStatus:0) 0 HWLOC:1-13-1-1

SEER>09/26/92 13:08:23 268729 S:SysInf LOCN:14/ 2/0D000000066EC1807
4700 [0:31] T1 Link Status - InService (0) (1) 0 HWLOC:1-14-3-1

Explanation: The first four SEERs indicate that a T1 alarm has been triggered by the primary T1 connection on link A (HWLOC: 1-13-1-1). The last SEER in the series indicates that the redundant T1 connection on link A (HWLOC: 1-14-3-1) has taken over for the primary link. Note that the alarm status Minor=On is displayed.

First recovery attempt

Figure 2-22 indicates that the system has switched the primary connection that is experiencing trouble to the redundant connection. This is the first attempt by the system to recover from the alarm condition.

Figure 2-22xxx
T1 Link Status screen

System Status and Maintenance

T1 Link Status

System Status: InService Alarm Status:Critical=Off Major=Off Minor=On

Link ID	Clocking Cand	Clocking Mode	Primary Connection T1 Number	Primary Connection T1 Location	Primary Connection Status	Redundant Connection T1 Number	Redundant Connection T1 Location	Redundant Connection Status
A	Y		1	13-1-1	InSvStandby	5	14-3-1	InService
B	Y	R	2	13-1-2	InService	6	14-3-2	InSvStandby
C	Y		3	13-1-3	InService	7	14-3-3	InSvStandby
D			4	13-1-4	InService	8	14-3-4	InSvStandby
E			9	15-1-1	InService	13	16-3-1	InSvStandby
F	Y		10	15-1-2	InService	14	16-3-2	InSvStandby
G			11	15-1-3	InService	15	16-3-3	InSvStandby
H			12	15-1-4	InService	16	16-3-4	InSvStandby

Select a softkey >

Exit | **Enable T1** | **Disable T1** | **Change T1 Clocking Mode** | **Switch Link**

Problem persists

Despite the system's initial attempt to resolve the problem, the following SEERs are generated:

SEER>09/26/92 13:08:37 270430 S:SysInf LOCN: 14/ 2/0D00000006EC1807
4708 [0:31] T1 Trunk OpStatus chg from 0 to1 (HWStatus:0) 0 HWLOC:1-14-3-1

SEER>09/26/92 13:08:39 270431 S:SysInf LOCN: 14/ 2/0D00000006EC1807 4700 [0:31] T1 Link Status - Alarm Active (3) (5) 0 HWLOC:1-14-3-1

SEER>09/26/92 13:08:41 276916 S:ErrMaj LOCN: 1 / 4/0100000012823A13 4163 VCM:fDoOneSpan: too many switches (Alarm), probable far end problem, cmd=BSwitch devStatus=isOnLine PartnerStatus=isStdBy HWLOC:1-13-1-1

SEER>09/26/92 13:08:44 277299 S:SysInf LOCN: 1/ 0/0100000003821504 6305 CO Major Alarm is Turned ON

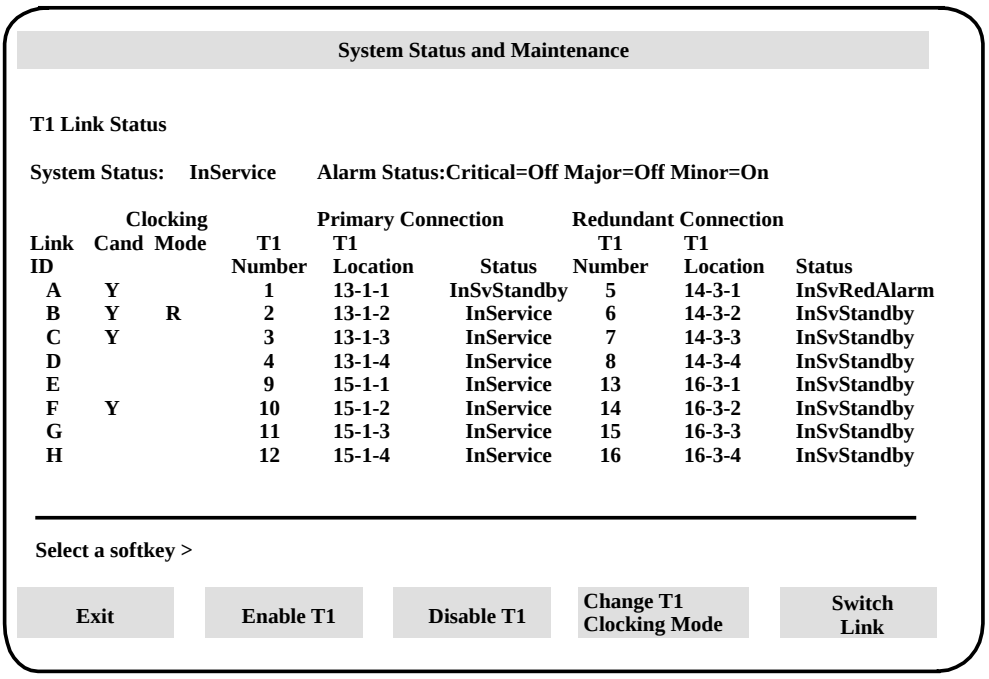
SEER>09/26/92 13:08:45 277591 S:SysInf LOCN: 2/ 0/05000000032C1504 6305 CO Major Alarm is Turned ON

Explanation: The redundant T1 connection on link A cannot detect any T1 signaling and immediately re-triggers the T1 alarm. The third SEER indicates that the T1 link has switched back and forth and that the problem exists outside the SPM. In this case, the system triggers a major alarm.

T1 red alarm

Figure 2-23 indicates an InSvRedAlarm on Link A.

Figure 2-23xxx
T1 Link Status screen



System Status and Maintenance

T1 Link Status

System Status: InService Alarm Status:Critical=Off Major=Off Minor=On

Link ID	Clocking Cand	Clocking Mode	Primary Connection T1 Number	Primary Connection T1 Location	Primary Connection Status	Redundant Connection T1 Number	Redundant Connection T1 Location	Redundant Connection Status
A	Y		1	13-1-1	InSvStandby	5	14-3-1	InSvRedAlarm
B	Y	R	2	13-1-2	InService	6	14-3-2	InSvStandby
C	Y		3	13-1-3	InService	7	14-3-3	InSvStandby
D			4	13-1-4	InService	8	14-3-4	InSvStandby
E			9	15-1-1	InService	13	16-3-1	InSvStandby
F	Y		10	15-1-2	InService	14	16-3-2	InSvStandby
G			11	15-1-3	InService	15	16-3-3	InSvStandby
H			12	15-1-4	InService	16	16-3-4	InSvStandby

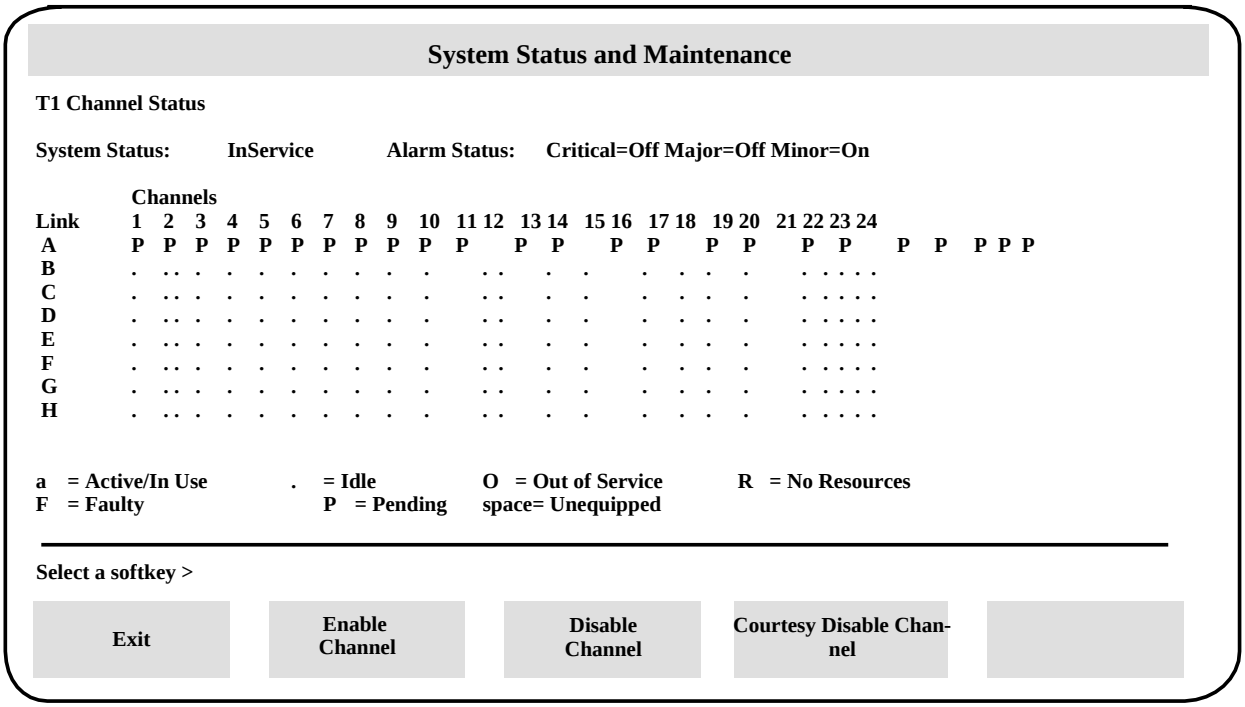
Select a softkey >

Exit | Enable T1 | Disable T1 | Change T1 Clocking Mode | Switch Link

Channels in pending state

Figure 2-24 illustrates the T1 Channel Status screen with all channels on link A in the pending (P) state.

Figure 2-24xxx
T1 Channel Status screen



External problem

Further SEERS are generated that indicate an external problem:

SEER>09/26/92 13:10:36 282362 S:SysInf LOCN: 14/ 2/0D00000006EC1807 4708 [0:31] T1 Trunk OpStatus chg from 1 to0 (HWStatus:0) 0 HWLOC:1-14-3-1

SEER>09/26/92 13:10:38 282363 S:SysInf LOCN: 14/ 2/0D00000006EC1807 4700 [0:31] T1 Link Status - AlmClr RetToServ (14) (1) 0 HWLOC:1-14-3-1

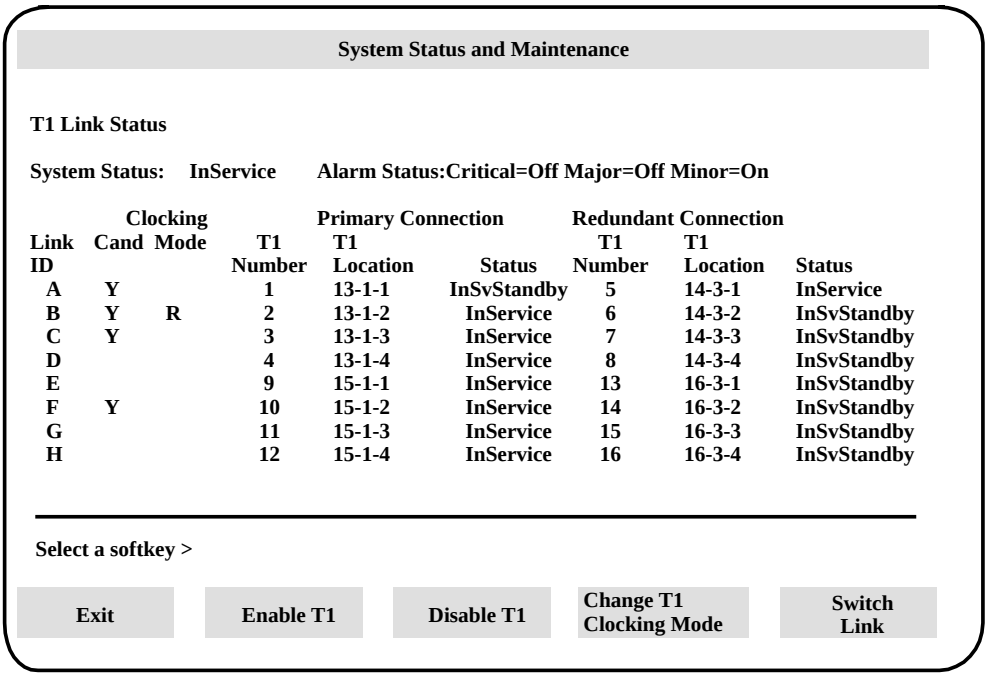
SEER>09/26/92 13:10:40 289044 S:SysInf LOCN: 1/ 1/0100000005821606 3500 SEER: 4700 being throttled

Explanation: The 47xx SEERs generated indicate that a T1 problem does exist. Both T1 spans have reported the same problem and the 4163 SEER indicates that the problem is external to the SPM. This should lead to an investigation of the channel bank and its associated cabling by on-site personnel. After re-attaching the cables, the system returns to service. The 3500 SEER is an example of SEER throttling.

Recovery

Figure 2-25 illustrates the T1 Link Status screen after recovery with the redundant link in the InService state. In this state, the system can continue to function with full redundancy. It is an acceptable practice to use the Switch Link softkey to put the primary link back to the InService state.

Figure 2-25xxx
T1 Link Status screen



Hardware database

The hardware database provides an indication of component status in the SPM and contains about 500 hardware database locations (HWLOC) entries. Each HWLOC refers to a particular hardware entity, such as a voice processor card or a an external T1 span.

Hardware database locations

The HWLOC is a five-digit code that represents the following information:

Example
Hwloc: aa-bb-cc-dd-ee
where

aa is the frame number. It is set to zero.

Note: Frame number is also referred to as SPM number and ModuleId.

bb is the node level. A fully populated SPM has 16 nodes: 2 MSPs, 4 TIFNs, and 8 SPNs. If 250 is used in this field, it indicates that the component is an external cable.

cc is the card level. This field indicates the slot address of the card.

dd is a sub-component level of the card that indicates sub-components and replaceable assemblies.

ee is a sub-component level of the card that indicates sub-components and replaceable assemblies.

The principal states that can be stored for a component include:

Term	**Means**
InService	functional and carrying traffic
InSvStandby	functional redundant component
OutOfService	functional component is maintenance busy
Faulty	faulty component
Unconfigured	hardware component(s) are not provisioned

Nodes

DMS VoiceMail supports up to 16 nodes that are numbered 1 to 16. In the hardware database, the HWLOC for node one is n-1 and for node two is n-2, where "n" is the frame number of the SPM. A node refers to one processor card and its transition module and any associated peripheral cards and their transition modules.

Frequently, SEERs indicate a TaskID or node number. Every program has a 16-digit TaskID. The first eight digits indicate which node the program runs on.

Table 2-1 specifies the node number, the location of the 68K or 68KU card in the SPM, the first eight digits of the program TaskID, and the node type.

Table 2-1xxx
HWLOC node information

Node Number	Position of 68K Card Shelf - Slot	First 8 digits of Program TaskID	Node Type
1	Lower 8	01000000	MSP
2	Lower 12	05000000	MSP
3	Lower 30	17000000	SPN
4	Lower 29	16000000	SPN
5	Lower 19	0C000000	SPN
6	Lower 16	09000000	SPN
7	Upper 30	37000000	SPN
8	Upper 29	36000000	SPN
9	Upper 19	2C000000	SPN
10	Upper 15	28000000	SPN
11	Reserved for future use		
12	Reserved for future use		
13	Lower 25	12000000	TIFN
14	Lower 22	0D000000	TIFN
15	Upper 25	32000000	TIFN
16	Upper 22	2D000000	TIFN

Telephony channels

A T1 channel can be identified in four ways. The following is an example of the four ways to identify the 22nd channel of the first T1 span:

- In the MMI, the T1 channel is identified as Link A Channel 22. The software that corresponds to the channel is a VSS that runs on node three (SPN1). All Link A VSSs run on node three.
- The primary HWLOC is reported by the primary T1 link handler that runs on node 13. The primary HWLOC is 1-13-1-1-22, which reads as frame 1, node 13, card 1, span 1, channel 22.
- The secondary HWLOC is reported by the secondary T1 link handler that runs on node 14. The secondary HWLOC is 1-14-3-1-22, which reads as frame 1, node 14, card 3, span 1, channel 22.
- The external equipment HWLOC is reported by the VSS. This is a logical HWLOC that refers to the external cable rather than an actual piece of hardware and it is denoted by putting 250 as the node number. For example, 1-250-1-1-22 reads as frame 1, 250 that means nothing, first pair of TIFNs, first span, channel 22.

The first row of Table 2-2 shows the example cited above as well as other examples for channel 22 on all eight T1 spans.

Table 2-2xxx
HWLOC channel information

MMI Link	Channel	Node	Primary HWLOC	Secondary HWLOC	External Equipment HWLOC
A	22	3	1-13-1-1-22	1-14-3-1-22	1-250-1-1-22
B	22	4	1-13-1-2-22	1-14-3-2-22	1-250-1-2-22
C	22	5	1-13-1-3-22	1-14-3-3-22	1-250-1-3-22
D	22	6	1-13-1-4-22	1-14-3-4-22	1-250-1-4-22
E	22	7	1-15-1-1-22	1-16-3-1-22	1-250-2-1-22
F	22	8	1-15-1-2-22	1-16-3-2-22	1-250-2-2-22
G	22	9	1-15-1-3-22	1-16-3-3-22	1-250-2-3-22
H	22	10	1-15-1-4-22	1-16-3-4-22	1-250-2-4-22

DSP ports

There are two ways to identify a DSP port. The MMI numbers the DSPs from 1 to 24. On each node there are two VP12 cards, each of which have 12 DSP ports. On nodes three and seven, the VP12 cards are in positions two and three. On nodes four, five, six, eight, nine and ten, the VP12 cards are in positions one and two. A SEER with an HWLOC of 1-3-2-1-1 corresponds to port one on node three in the MMI DSP Port Status screen and reads as frame 1, node 3, card 2, DSP 1, port1.

The first row of Table 2-3 shows the example cited above as well as other examples for all 24 voice channels.

Table 2-3xxx
HWLOC DSP port information

MMI Port Number	Node 3 HWLOC	Node 4 HWLOC
1	1-3-2-1-1	1-4-1-1-1
2	1-3-2-1-2	1-4-1-1-2
3	1-3-2-1-3	1-4-1-1-3
4	1-3-2-2-1	1-4-1-2-1
5	1-3-2-2-2	1-4-1-2-2
6	1-3-2-2-3	1-4-1-2-3
7	1-3-2-3-1	1-4-1-3-1
8	1-3-2-3-2	1-4-1-3-2
9	1-3-2-3-3	1-4-1-3-3
10	1-3-2-4-1	1-4-1-4-1
11	1-3-2-4-2	1-4-1-4-2
12	1-3-2-4-3	1-4-1-4-3
13	1-3-3-1-1	1-4-2-1-1
14	1-3-3-1-2	1-4-2-1-2
15	1-3-3-1-3	1-4-2-1-3
16	1-3-3-2-1	1-4-2-2-1
17	1-3-3-2-2	1-4-2-2-2
18	1-3-3-2-3	1-4-2-2-3
19	1-3-3-3-1	1-4-2-3-1

-continued-

Table 2-3xxx
HWLOC DSP port information (continued)

MMI Port Number	Node 3 HWLOC	Node 4 HWLOC
20	1-3-3-3-2	1-4-2-3-2
21	1-3-3-3-3	1-4-2-3-3
22	1-3-3-4-1	1-4-2-4-1
23	1-3-3-4-2	1-4-2-4-2
24	1-3-3-4-3	1-4-2-4-3

Alarms

Three categories of external alarms exist:

- critical
- major
- minor

In DMS VoiceMail, the two bus controllers each have three alarm relays that correspond to the three types of external alarms.

A critical alarm is triggered when any of the following conditions occur:

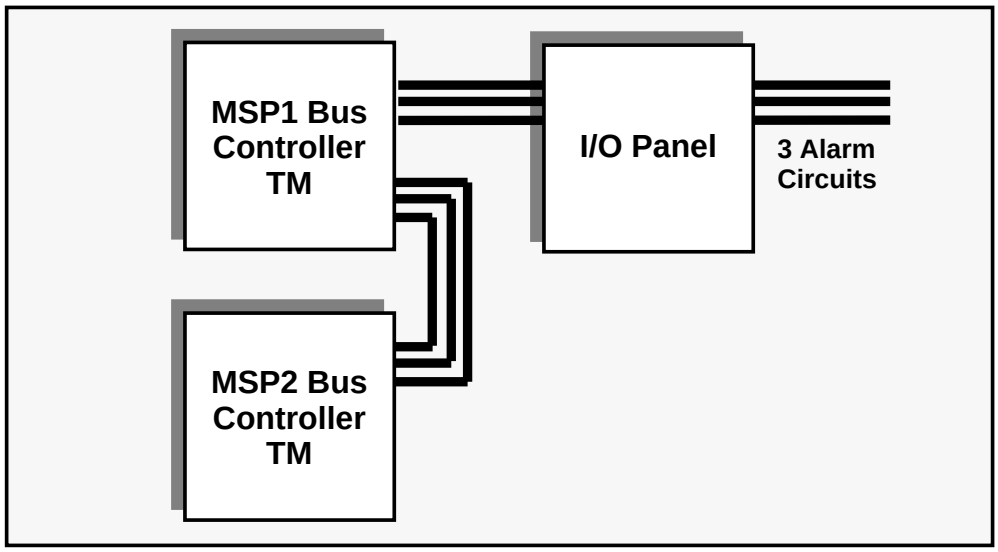
- loss of power
- watchdog timer times out
- software errors

The major and minor alarms from both bus controller transition modules are wired in parallel at the MSP1 bus controller transition module. This allows either MSP to independently set major and minor alarms.

Critical alarms from both bus controller transition modules are wired in series at the MSP1 bus controller transition module. As a result, both MSPs must set a critical alarm to generate an external notification of a critical alarm.

Figure 2-26 illustrates the logical organization of the basic alarm components.

Figure 2-26
Basic alarm components



The SEER server is the basic mechanism for setting alarms. SEERs can generate four types of reports:

- critical
- major
- minor
- no alarm (information only)

SEERs indicate the alarm severity level. One or multiple SEERs can trigger a specific alarm severity level.

When the alarm is cleared, the relays on the bus controller transition module are opened. However, if the initial problem has been cleared, a SEER from another unrelated event can trigger the alarm again.

Out-of-Service diagnostics

Out-of-service diagnostics run on a node testing a specific card and its associated transition module, if any.

68K diagnostics

The 68K diagnostics have two components - firmware and software. The firmware associated diagnostics run each time a card or node is booted. The diagnostics check the 68K card to ensure that it is operational before attempting to load software.

The principal items checked by the 68K firmware associated diagnostics include:

- 68K self-test
- bootROM checksum
- 8M memory
- dual SCSI silicon
- dual USART ports
- mail system bus tap
- MMU

After the firmware diagnostics pass, the operating system is loaded and the 68K software associated diagnostics execute a modem self-test for the modems on the associated 68K transition modules.

T1 diagnostics

The T1 diagnostics have two components - one component runs on the 68K card that controls and supports the second component that runs for each individual T1 span. Each T1 span has a dedicated 68302 microprocessor that runs the four diagnostic programs of the second component.

The following common T1 elements are checked:

- voice tap
- connection memory

The following elements are checked for each T1 span:

- 68302 shared memory
- 68302 private memory
- 68302 control and status register

The 68K card downloads firmware to each 68302 microprocessor and cooperates with the 68302 firmware to check the following for each T1 span:

- 68302 self-test
- 68K/68302 communications
- T1 line circuit
- T1 framer
- T1 data path
- T1 signaling

VP12 diagnostics

Similar to T1 diagnostics, the VP12 diagnostics consist of two components - the 68K component and the TMS320SCI (DSP) component. The 68K component checks various components and then downloads the 320SCI firmware to each of the four DSP spans. It then works with the DSP software to check the remainder of the VP12 card.

The following common VP12 elements are checked:

- voice tap
- connection memory

The following elements are checked for each DSP:

- shared memory
- private memory
- control and status register

The 68K card downloads 320SCI firmware to check the following for each DSP:

- 68K/DSP communications
- shared memory arbiter
- shared memory
- private memory
- DSP self-check
- voice tap access

Bus controller diagnostics

The bus controller has a DSP that has firmware-based programming. There is a diagnostic component to the firmware that is exercised by the 68K card.

Startup and offline diagnostics differ slightly for the bus controller. Offline diagnostics on an out-of-service bus controller occur while the system is operating so that interaction between the out-of-service bus controller and the system bus must be limited. Startup diagnostics on a bus controller assumes no active service, so that impact to the system bus can occur.

The bus controller diagnostics check the following:

- 68K communications
- real time clock
- phase-lock loop
- clock monitoring
- clock generation
- polling RAM

On-line diagnostics

The on-line diagnostics run continuously in the background of the system. The majority of fault detection is built into the basic operating system checks. If a microprocessor goes insane, then the software tasks attempting to communicate with tasks that have been killed report the failure. Failure to read or write to any location, bus exceptions, or out-of-range replies are all examples of the self-checking nature of the code.

On-line diagnostics fill the gaps left by the operational system. As an example, there is a dummy task on each node periodically reading a modem configuration register to ensure that the modem is present and has not failed. This provides a check on modem ports not in use, such as a redundant T1 node.

For both the InService yellow and red alarms, programs are unloaded and then restarted once the alarm condition is cleared.

Booting the system

WARNING
Do not change system hardware during booting up
As the system boots, do not change system hardware. Cards must not be installed or removed during booting up. Changing the system hardware during booting up can cause the system to enter an undefined state.

Booting up procedures

The SPM is intended to be operated and maintained without rebooting. However, certain installation and reconfiguration operations do require a reboot.

To power down

Starting at the top shelf, power down each shelf in sequence towards the bottom shelf. Perform this as quickly as possible.

To power down a shelf, use two fingers from each hand. Simultaneously pull down the switches on both power converters on both sides of the shelf. Then proceed quickly to the next shelf.

To power up

Starting at the bottom shelf, power up each shelf in sequence towards the top shelf.

To power up a shelf, use two fingers from each hand. Simultaneously push up the switches on both power converters on both sides of the shelf. Then proceed quickly to the next shelf. After powering up the second disk shelf, pause for 20 seconds before powering up the primary electronics shelf. Then, quickly power up the secondary electronics shelf.

Allow all diagnostics to run without manual intervention.

68K node loading

As power is applied to each node, each 68K card goes through an initialization process. Included as part of the process is a check of the physical slot address to determine whether the 68K card is the primary or secondary MSP. (Refer to *Nominal boot sequence* on page 2-3 for further information.) Any node other than an MSP places an 'I'm alive' message in the transmit buffer of its system bus tap and waits to be polled.

The primary MSP boots from its locally attached disk drive. Once up, the MSP starts polling the other nodes according to its system map. On receiving the 'I'm alive' message from a remote node, the primary MSP asks it to initiate its 68K firmware based diagnostics.

If according to its system map the primary MSP expects a node to be there, but receives no response to its poll, the node is reset and the primary MSP attempts to poll again. After three consecutive failures, the node is assumed dead and placed in a faulty state.

After executing its 68K self-test, each node places its status in its own transmit buffer. Nodes that pass the self-test proceed in the boot sequence. Nodes that fail the self-test are marked faulty. Nodes that do not provide a response are treated as faulty.

On successful completion of the diagnostics, the primary MSP loads and starts the appropriate application software.

The SPM system disks are configured to spin-up on receiving a SCSI command rather than at power-up. This allows the SPM to sequence its disk start-ups and therefore avoids a significant +12 V current surge that would occur if each disk spun-up in parallel.

Booting problems

Problems can be experienced during bootup that can cause the boot procedure to fail and leave the system in a non-operational state. Table 3-1 lists booting problems that can be experienced and refers to the applicable trouble clearing procedures in other chapters of this document.

Table 3-1xxx
Booting problems

Booting problem	Possible causes and actions	Refer to chapters
No response from 68K BootROM for an MSP.	Check terminal cabling.	4, 8
	Reset the terminal.	4, 8
	Check that the 68K card and transition module are seated properly.	4
	Check that the node is powered.	1
	Check the bus terminator transition module.	9
	Possible bad 68K card.	4
MMI does not come up.	Check SEERs for failed hardware diagnostics.	4
Node comes up in faulty state.	Check SEERs for failed hardware diagnostics.	4, 5, 6
Node comes up in loading state.	Check SEERs for programs that could not be loaded.	4, 5, 6
Node continues to reboot.	Possible hardware or software problem.	4, 5, 6
Not all voice channels come into service.	Ports can be left faulty or unconfigured due to hardware problems. Ports can be left loading, pending, or NoResources due to configuration or software problems.	5
Not all T1 channels come into service.	Faulty channels can indicate hardware problems. Channels that remain in other states can indicate configuration or software problems.	6
Disk errors on boot.	There can be hardware problems with the disk or SCSI interface.	7
Node times-out booting.	Can be caused by bus terminator problems.	9
Nodes unload while inservice.	Can be caused by bus terminator problems.	9

If the referenced trouble clearing procedures fail to resolve the problem, call your NT support organization.

Multiserver processor node

The Multiserver Processor (MSP) node is the controlling node of the Service Peripheral Module (SPM). Multiserver programs run on the MSP and are responsible for booting other nodes, program management, and voice channel allocation.

The MSP consists of four cards:

- 68K card
- bus controller card
- 68K transition module
- bus controller transition module

68K card

The 68K card, commonly referred to as the single board computer (SBC) card, provides the processing environment for common system data, such as directory and message transfer, and it also provides input/output ports.

Note: The on-screen user interface of the DMS VoiceMail system uses the term single board computer.

Bus controller card

The Bus Controller card maintains the sanity of the bus through which all nodes communicate with each other.

68K transition module

The 68K transition modules provides the input/output interface for the node.

Bus controller transition module

The bus controller transition module provides relays for alarm signals and a physical path for remote MSP alarms.

MSP configurations

A DMS VoiceMail system is configured for two MSPs. The MSPs are designated as nodes one and two. One of the nodes in an MSP-pair serves as a backup to the other.

When a problem occurs, the MSP is not immediately marked faulty. The system attempts to reboot the MSP up to three times. For each attempt, the system waits approximately three minutes before attempting to reboot the MSP again. It can take 10 minutes before the MSP is marked faulty. If the bootrom diagnostics pass, bus controller diagnostics are run (this takes approximately three minutes).

In the event that one of the MSPs in an MSP-pair is not available and a serious system problem occurs, the remaining MSP has the ability to reboot the DMS VoiceMail system to recover service.

The MSP can be configured with the following equipment:

- disk drives
- terminals
- printers
- modems

Usually there are two disk drives configured with an MSP-pair. One disk drive runs as a *shadow* backup to the other.

A terminal is provided for the entire system. When using an MSP-pair, the terminal is connected through the input/output panel to the primary MSP - output from the secondary MSP is not provided. A printer is used for System Events and Error Reports (SEER) output. Modems are used for remote access to the system.

Booting sequence

When an SPM system boots, you should see the following types of messages on the terminal:

- bootROM diagnostic messages (three to four minutes in duration)
- booting operating system messages (about 15 seconds duration)
- program resource manager output indicating
  - bus controller diagnostics (one to three minutes in duration)
  - startup diagnostics for each node (about 10 minutes in duration)
  - system programs starting
- MMI login screen

Switchover states of MSPs

Listed below are the various states that an MSP can experience during a switchover:

- InService means that the MSP is the primary one.

- InSvStandby means that the MSP is the redundant node, and is available to take over as the primary MSP.
- Disabling MSP1 causes a switchover to MSP2 as the primary one.
- Enabling MSP1 when MSP1 is in the faulty state causes MSP1 to go to the InSvStandby state. Enabling MSP1 from the InSvStandby state causes an MSP switchover that causes the MSP1 to go to the InService state and the MSP2 to go to the InSvStandby state.
- Enabling MSP1 when MSP1 is in the OutOfService state causes MSP1 to switchover, MSP1 goes to the InService state and MSP2 goes to the InSvStandby state.
- Enabling MSP2 when MSP1 is primary **does not** cause a switchover.

Note: A switchover takes about five minutes to complete. When the switchover is completed, a new MMI login screen appears on the system terminal. Following an MSP switchover, remote users must dial-in to the alternate MSP that has taken control.

Maintenance exceptions

Any time a reference is made to replacing or resetting hardware (that is, cards, terminals, etc.) any referenced maintenance procedures should be followed. Follow the appropriate card replacement procedures contained in *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Cannot complete MSP switchover

An MSP switchover can take up to five minutes to complete. When a switchover occurs, the screen clears and a message is displayed indicating that a switchover is in progress and that it can take up to five minutes. Eventually, the MMI login screen appears. All programs that had been running on the previous inservice MSP have been moved to the other MSP. If this sequence of events does not occur, the MSP switchover has failed.

If a switchover does not complete properly, it is likely that the MMI login screen will not appear. This means that some or all of the multiserver programs have not restarted on the new inservice MSP. This requires immediate attention.

Determine whether the terminal is working properly - it may simply have locked. Enter the following at the terminal keyboard:

- Press <CNTL> W.
- Press <CNTL> Q.
- Press <RETURN>.

If there is no response to this action, reset the terminal and try again.

If the Window Manager appears on the screen, then the system is partially alive.

In either case, attempt to dial-in to the system to determine whether it is alive. If you can dial-in to the system remotely, then,

- if the MMI screen is present, the system is operating.
- if no MMI screen is present, then a software problem exists. You should call your NT support personnel.

If you cannot dial-in, then the system has died. Follow standard MSP boot procedures. If this fails, call your NT support personnel.

Cannot enable node

If MSP1 is in the InService state and you are attempting to enable MSP2 in the OutOfService state, but MSP2 will not go to the InSvStandby state, then there is a software problem. Collect the SEERs that have been generated, and then call your NT support personnel.

If MSP2 is in the faulty state and it will not boot up there may be hardware problems. Refer to the section called *Recovering the InSvStandby MSP* in this chapter.

If MSP2 is inservice and you are attempting to enable MSP1, then this should cause a switchover to occur with MSP1 becoming the new inservice MSP. If the switchover starts but does not complete, then refer to the section called *Cannot complete MSP switchover* in this chapter.

If MSP1 is in the faulty state and does not boot, there may be hardware problems. Refer to the section called *Recovering the InSvStandby MSP* in this chapter.

Cannot disable node

If MSP1 is in the InService state, and you are attempting to disable MSP1, this should cause a switchover making MSP2 to be put inservice. If the switchover does not complete, then refer to the section entitled *Cannot complete MSP switchover* in this chapter.

If the switchover does not start, ensure that MSP2 is in the InSvStandby state. If it is not in this state, then enable it. Refer to the section entitled *Cannot enable node* in this chapter.

If MSP2 is in the InSvStandby state and you cannot disable MSP1, then there is a software problem. Call your NT support personnel.

If the switchover completes, but MSP1 does not go to the out-of-service state, then there may be hardware problems. Refer to the sections entitled *Recovering the InSvStandby MSP* in this chapter.

If MSP1 is in the InService state and you are attempting to disable MSP2, but the disable does not start, then there is a software problem. Call your NT support personnel. If MSP2 starts to disable but does not reboot to the OutOfService state, then there may be hardware problems. Refer to the section called *Recovering the InSvStandby MSP* in this chapter.

Out-of-service diagnostics fail on 68K card

Out-of-service diagnostics can only be run if the MSP has been disabled. Three types of diagnostics are run when the out-of-service diagnostics are requested on the 68K card:

- The 68K card is rebooted causing the bootROM diagnostics to run. If the node fails to boot at all, a SEER is output and the indicated card should be replaced. If the bootRom diagnostics fail, a SEER is output and the 68K card should be replaced. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-503)*.
- Modem diagnostics are run on all ports that have modems attached to them. If the diagnostics fail, a SEER is output, and the 68K card and the 68K transition module on which the modem is located should be replaced. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-503)*.
- Bus Controller diagnostics are run on the Bus Controller card. If the diagnostics fail, a SEER is output, the Bus Controller card should be replaced, and the node should be disabled again. This causes the 68K card to reboot. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-503)*.

If any card has been replaced, reboot the MSP by first disabling the MSP. If the MSP does not boot up to the out-of-service state, there may be another hardware problem. Refer to the section entitled *Recovering the InSvStandby MSP* in this chapter.

Out-of-service diagnostics fail on bus controller card

When OutOfService diagnostics are requested on the Bus Controller card, then only the Bus Controller card diagnostics are run. If the diagnostics fail, a SEER is output, the Bus Controller card should be replaced, and the node should be disabled again. This causes the 68K card to reboot.

System response

The following sections discuss problems that can occur with an MSP and the associated actions that should be taken to solve problems.

Lost communication through the terminal

If there is no response from the terminal, or there is no indication, determine whether the terminal is working properly. The terminal may have locked. Enter the following at the terminal keyboard:

- Press <CNTL> W.
- Press IF.
- Press <Return>.

If there is no response to this action, reset the terminal and try again.

If you get the appropriate response after resetting the terminal, then the terminal was locked.

If the Window Manager appears on the screen and nothing else seems to be responding, there is a serious problem.

Attempt to dial-in to the system to determine whether it is alive. If you can dial-in, then

- if the MMI screen is present, the system is operating. Check all of the I/O cabling to the terminal and or replace the terminal.
- if no MMI screen is present, then a software problem exists. You should call your NT support personnel.

If you cannot dial-in, then the system has died. Follow standard MSP boot procedures. Call your NT support organization.

Node stuck in faulty state

If an MSP is stuck in the faulty state, the MSP cannot be rebooted. Refer to the section entitled *Recovering the InSvStandby MSP* in this chapter.

Node stuck in loading state

If an MSP is stuck in the loading state, the MSP has failed to boot up because a program that should be running on the node could not be started. A SEER should be generated that indicates which program is at fault.

From the Node Status screen, attempt to disable and then enable the MSP. If this does not work, there is a software fault that needs to be resolved. Call your NT support personnel.

Node oscillating between InService/InSvStandby and OutOfService

If an MSP is oscillating between the InService/InSvStandby and OutOfService states, a software program is continually crashing and recovering. SEERs should be generated that indicate which program is at fault.

From the Node Status screen, attempt to disable and then enable the MSP. If this does not work, call your NT support personnel.

Node continues to reboot

If an MSP continually reboots, there may be either a software or hardware fault. Attempt to disable the MSP through the Node Status screen. This forces the MSP to be rebooted. If the MSP still continues to reboot, refer to the section entitled *Recovering the InSvStandby MSP* in this chapter.

If the MSP does not reboot and remains in the out-of-service state, then attempt to enable the MSP. If the enable attempt does not work, then there is a software problem and you should call your NT support personnel.

Node cannot boot from tape

An MSP should be booted from tape only when installing or upgrading the system. If the MSP cannot boot, there is a problem with either the tape or the hardware.

If you have an alternate or earlier version of an install tape, attempt to boot from that tape. If the boot is successful, there is a problem with the first tape and you should call your NT Support organization.

If the boot is not successful, then replace the 68K card, the Bus Controller card, the tape unit, and attempt to boot again. If the boot attempt fails, call your NT support personnel.

Node recovery

There are two situations that require emergency recovery of an MSP node:

- Both MSPs in a redundant system, or the single MSP in a non-redundant system, are lost and the entire DMS VoiceMail system is down. In this case, the system must be booted as quickly as possible.
- The redundant MSP in a two-MSP system does not recover.

Recovering the entire system

Follow the standard boot procedures. Refer to *Bootup procedures* on page 3-1 in Chapter 3 of this document.

Recovering the InSvStandby MSP

If the InSvStandby MSP does not come up, it will be in the faulty state on the Node Status screen.

Disable the backup MSP through the terminal. This forces the program resource manager to reboot the MSP. It can take up to eight minutes to complete the boot.

If the reboot is not successful, then check the following items to ensure that they are provisioned properly in the cabinet:

- 68K card
- bus controller card
- 68K transition module
- cabling

For provisioning information, refer to the *DMS VoiceMail Planning and Engineering Guide, 297-7001-100*.

Do a visual inspection to determine whether to reseat any cards that are not properly seated and then disable the redundant MSP again.

If the node indicates that it is faulty, check the Card Status screen and enable any cards that are out-of-service. Check for SEERs and refer to the *DMS VoiceMail Maintenance Messages (SEER) manual (NTP 297-7001-510)* for explanations about individual SEERs. Follow any guidelines that are given for a particular SEER.

If the MSP is still faulty after all of the cards have been replaced, check for bent pins on the front and back connectors of the backplane. If pins are bent, straighten them and then attempt to reboot the MSP.

Note: Broken or missing pins require shelf replacement.

If the problem persists, replacement of the shelf may be required. Call your NT support personnel.

Signal processing node

The Signal Processing Node (SPN) provides the voice processing for the DMS VoiceMail system. Each SPN has a maximum capacity of 24 channels. SPNs are configured in pairs. If one SPN fails, the overall system capacity is diminished. However, since SPNs are paired (that is SPNs 1-2, 3-4, 5-6, etc.), all users of a failed SPN can still gain access to their mailboxes through the other SPN.

The SPN consists of three types of cards:

- one 68K card
- two VP12 cards
- one 68K transition module

68K card

The 68K card, commonly referred to as the single board computer (SBC) card, provides per-channel processing, and relays timeslot assignments to the voice taps on the VP12 cards from the Multiserver Processor (MSP).

Note: The user interface of DMS VoiceMail system uses the term single board computer.

VP12 card

The VP12 card provides signal processing for 12 channels and communicates with the 68K card through shared memory, and control and status registers.

68K transition module

The 68K transition modules provides the SCSI and serial data port connections for the node.

Maintenance exceptions

Any time a reference is made to replacing or resetting hardware (that is, cards, terminals, etc.) any referenced maintenance procedures should be followed. Follow the appropriate card replacement procedures contained in *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Cannot enable node

Verify that power is being applied to the node

Check that the power converters for the SPN are on. If the power converters fail to remain on, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Verify that the disk shelf power is on

Check that the disk shelf power converters are on. If the power converters fail to remain on, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Verify that the disk cables are correctly connected

Check that the cables on ports four and six of the 68K transition module are secured. If the 68K transition module has been recently replaced, check that the cables have been connected to the correct ports. This can be accomplished by checking the labels on the cables.

The cables are labelled with a three-number code (for example, 26-4-30). The first number refers to the shelf. The upper electronics shelf is 39 and the lower electronics shelf is 26. The second number refers to the port on the card. The upper port is two, the middle port is four, and the lower port is six. The last number refers to the card slot on the shelf.

Verify that the disk packs are present and seated properly

If a disk pack is missing, then install it in the correct position of the node. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-7001-100)* for hardware location information.

Check that the disk pack for the node is seated properly. If not, carefully reseat the disk pack.

Verify that the cards are present and in correct positions

If any of the card, front or back, are missing, then install them in the correct positions for the node. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-700-100)* for hardware location information.

Check that the node is configured correctly, front and back. If not, then move cards to the correct positions. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-7001-100)* for hardware location information.

Check that the cards for the node are seated properly. If not, carefully reseat the card.

Check the 68K card status

If a node fails to enable, go to the Node Status screen for that node. From this screen, check the status of all the cards in that node. All cards should indicate that they are inservice.

If the 68K card indicates that it is out-of-service, then attempt to enable the card. If the card returns to service, then go to the Node Status screen of the terminal and re-attempt to enable the node. If the card fails to return to service, check for SEERs and refer to the section entitled *Cannot enable card* in this chapter.

If the 68K card indicates that it is faulty, attempt to disable the card. If the card fails to disable, check for SEERs and refer to the section entitled *Cannot disable card* in this chapter. If the card goes out-of-service, then attempt to run the out-of-service diagnostics on the card. If the out-of-service diagnostics fail, refer to the section entitled *Out-of-service diagnostics on card fail* in this chapter.

If the diagnostics pass, then attempt to enable the card. If the card returns to service, then go to the Node Status screen of the terminal and re-attempt to enable the node. If the card fails to return to service, refer to the section entitled *Cannot enable card* in this chapter.

If the diagnostics fail, check for SEERs and refer to the section entitled *Out-of-service diagnostics on card fail* in this chapter.

Cannot enable card

Verify that the card is present

If any of the cards, front or back, are missing, then install them in the correct positions for the node. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-7001-100)* for hardware location information.

Verify that the cards are in the correct positions

Check that the node is configured correctly, front and back. If not, then move cards to the correct positions. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-7001-100)* for hardware location information.

Verify that the cards are seated properly

Check that the cards for the node are seated properly. If not, carefully reseat the card.

Card is present but has a faulty status

Attempt to put the faulty card out-of-service.

If the card fails to disable, check for SEERs and refer to the section called *Cannot disable card* that appears later in this chapter.

If the card goes out-of-service, attempt to run the out-of-service diagnostics on the card. Refer to the section in Chapter 2 of this document that pertains to out-of-service diagnostics.

If diagnostics pass, attempt to enable the card. If the card fails to enable, then refer to the section entitled *Cannot enable card* in this chapter.

If diagnostics fail, check for SEERs and refer to the section entitled *Out-of-service diagnostics on card fail* in this chapter.

Cannot enable DSP channel

Verify that the node is InService

Verify that the node is inservice through the Node Status screen.

Verify that the VP12 card is InService

Verify that the VP12 card is inservice through the Card Status screen.

Run out-of-service diagnostics

If the diagnostics pass, attempt to enable the channel. If the channel fails to enable, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

If the diagnostics fail, refer to the section entitled *Out-of-service diagnostics on card fail* in this chapter.

Change channel status in hardware database

Contact your NT support personnel for assistance.

Out-of-service diagnostics on card fail

Replace the card and re-attempt the out-of-service diagnostics. For further information about card replacement, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Cannot disable node

Run the out-of-service diagnostics on the 68K card and attempt to disable the node. For further information about card replacement, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Cannot disable card

Card fails to disable from faulty state

Verify that the card and its transition module are present and in correct position. Refer to the *DMS VoiceMail Planning and Engineering Guide (NTP 297-7001-100)* for hardware location information.

Replace the card and attempt to disable it. For further information about card replacement, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. If the card fails to disable, replace the transition module and re-attempt to disable the card.

Card fails to disable from the InService state

Courtesy disable the SPN and then reseat all of the cards on the node. Enable the SPN and then attempt to disable the card. If the card fails to disable, replace the card and try again. If the card fails to disable, replace the transition module and re-attempt to disable the card.

Cannot disable channel

Verify that the node is InService

Verify that the node is inservice through the Node Status screen.

Verify that the VP12 card is InService

Verify that the VP12 card is inservice through the Card Status screen.

Run out-of-service diagnostics

If the diagnostics pass, attempt to disable the channel. If the channel fails to disable, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

If the diagnostics fail, refer to the section entitled *Out-of-service diagnostics on card fail* in this chapter.

Change channel status in hardware database

Contact your NT support personnel for assistance.

Channels do not reactivate properly after a card replacement

Verify that the node is InService

Verify that the node is inservice through the Node Status screen.

Verify that the VP12 card is InService

Verify that the VP12 card is inservice through the Card Status screen.

Run out-of-service diagnostics

If the diagnostics pass, attempt to disable the channel. If the channel fails to disable, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

If the diagnostics fail, refer to the section called *Out-of-service diagnostics on card fail* in this chapter.

Change channel status in hardware database

Contact your NT support personnel for assistance.

System response

The following sections discuss problems that can occur with an SPN and the associated actions that should be taken to solve problems.

Voice card/DSP port problems

If the voice card and or the DSP port status are faulty or out-of-service, do the following:

- Check SEERs for any driver fault messages for the DSP ports. Refer to the *DMS VoiceMail Maintenance Messages (SEER) Manual (NTP 297-7001-510)* for actions to take if SEERs are present.
- Check SEERs for excessive driver restarts for the ports. If so, disable and then re-enable the corresponding DSP ports through the terminal.
- Check for blown fuses. Replace the card if necessary. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for information on changing cards.
- Check if the card is positioned in the proper slot.
- Disable the card and run the out-of-service diagnostics.

If there is a silent channel (that is, a connection is established but there is no response), then disable the card and run the out-of-service diagnostics.

Accidental removal of the 68K transition module

If the 68K transition module is accidentally unseated or removed, do the following:

- Reseat the 68K transition module.
- Unseat and then reseat the associated 68K card.

Node stuck in loading state

Check SEERs to ensure that all programs on the SPN started. From the Node Status screen, disable the SPN. If unsuccessful, refer to *Cannot disable node* in this chapter.

From the Node Status screen, enable the SPN. If successful, then you have completed this procedure. If unsuccessful, refer to *Cannot enable node* in this chapter.

DSP port stuck in pending state

From the DSP Port Status screen, disable the DSP port. If the DSP port does not disable, go to *Cannot disable channel* in this chapter. If successful, enable the DSP port. If the DSP port does not enable, refer to *Cannot enable channel* in this chapter.

DSP stuck in loading state

From the DSP Port Status screen, disable the DSP port. If the DSP port does not disable, refer to *Cannot disable channel* in this chapter. If successful, enable the DSP port. If the DSP port does not enable, refer to *Cannot enable channel* in this chapter.

DSP port stuck in out-of-service state

From the Node Status screen, verify that the associated SPN is not out-of-service. From the Card Status screen, verify that the associated VP12 card is not out-of-service.

If either the VP12 card or the SPN are out-of-service, enable them. If unsuccessful, refer to *Cannot enable channel* in this chapter.

DSP port stuck in faulty state

From the Card Status screen, disable the VP12 card associated with the DSP port that is stuck in faulty. If unsuccessful, refer to *Cannot disable card* in this chapter.

From the Card Status screen, run the out-of-service diagnostics on the VP12 card. If unsuccessful, refer to *Out-of-service diagnostics on card fail* in this chapter.

If the out-of-service diagnostics pass, enable the card. If unsuccessful, refer to *Cannot enable card* in this chapter. If problem persists, replace the VP12 card. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

DSP port unconfigured

From the Node Status screen, disable the SPN. If unsuccessful, refer to *Cannot disable node* in this chapter.

DSP port stuck in NoResources state

From the DSP Port Status screen, disable the DSP port. If the DSP port does not disable, refer to *Cannot disable channel* in this chapter. If successful, enable the DSP port. If the DSP port does not enable, refer to *Cannot enable channel* in this chapter.

Node rebooting

Check the SEERs to determine if the SPN is continually rebooting. Replace the 68K card. If the SPN does not load successfully, replace the VP12 cards.

If the SPN does not load successfully, replace the transition modules. If the SPN does load successfully, refer to *Node recovery* in this chapter.

Noisy recorded message or noisy session

Determine the DSP ports that are causing the problem and disable them. Call your NT support personnel for assistance.

Disk failure

Replace the faulty disk pack. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Call connected but no voice

From the Card Status screen, disable the faulty VP12 card. If unsuccessful, refer to *Cannot disable card* in this chapter.

> ***Note:*** Routine system diagnostics will usually discover the source of the problem and indicate which VP12 card is faulty and or generate a SEER that indicates the card with the problem.

From the Card Status screen, run the out-of-service diagnostics on the VP12 card. If the diagnostics fail, refer to *Out-of-service diagnostics on card fail* in this chapter.

If the diagnostics pass, enable the VP12 card. If unsuccessful, refer to *Cannot enable card* in this chapter.

Incoming call OK but not outcalling

Verify that the line types are correctly datafilled for both the DMS VoiceMail system and the DMS-100. For the DMS VoiceMail system the line interface type should be T1Spandata and FXOGrdStart or 4WE&M line.

Check the hardware status of the line card in both the channel bank and the DMS-100.

If SEERs indicate a failure on “NoDialTone”, from the MAP of the DMS-100 determine if the line has been made “ManBusy” on the DMS side.

From the Card Status screen, disable the card and run the out-of-service diagnostics.

Outcalling OK but no incoming call

Check the operational measurements (OM) to determine if there have been no incoming calls. Phone the agent directly. If it answers, the problem is on the DMS-100 side. From the terminal or OAM&P workstation, post the agent and return to service.

Node recovery

When an SPN shows a faulty status, or the node does not enable, the most expedient method of resolving the problem is to completely replace the defective SPN. This is done by replacing all of the cards, front and back, associated with the node.

From the Node Status screen, disable the faulty node and replace all of the associated cards. For complete card, power converter, and disk replacement procedures, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

When the cards are installed, enable the node and check the status of the SPN.

If the SPN indicates that it is faulty, check the Card Status screen and enable any cards that are out-of-service. Check for SEERs and refer to the *DMS VoiceMail Maintenance Messages (SEER) manual (NTP 297-7001-510)* for explanations about individual SEERs. Follow any guidelines that are given for a particular SEER.

If the node is still faulty after all of the cards have been replaced, check for bent pins on the front and back connectors of the backplane. If pins are bent, straighten them and then attempt to enable the node.

Note: Broken or missing pins require shelf replacement.

If the problem persists, replacement of the shelf may be required. Call your NT support personnel.

Telephony interface node

The Telephony Interface Node (TIFN) provides the interface between T1 spans and Simplified Message Desk Interface (SMDI) links to the DMS VoiceMail system.

The TIFN consists of four cards:

- 68K card
- T1 card
- modem transition module
- T1 transition module

68K card

The 68K card, commonly referred to as the single board computer (SBC) card, provides T1 processing that includes relay call processing, T1 link maintenance, master clocking selection, and mapping of T1 to DMS VoiceMail timeslots.

Note: The on-screen user interface of DMS VoiceMail system uses the term single board computer.

T1 card

The T1 card provides termination for four T1 spans that includes line interface, bit framing, and frame buffering for each span.

Modem transition module

The modem transition module provides the physical termination for up to four SMDI links. A relay on the modem transition module can switch SMDI links individually, under software control or lack of power, to route the SMDI links to a redundant TIFN.

T1 transition module

The T1 transition module provides external physical termination for up to four T1 spans. A relay on the T1 transition module can switch T1 spans individually, under software control or lack of power, to route the T1 spans to a redundant TIFN.

Maintenance exceptions

Any time a reference is made to replacing or resetting hardware (that is, cards, terminals, etc.) any referenced maintenance procedures should be followed. Follow the appropriate card replacement procedures contained in *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

Cannot enable node

If you cannot enable a node, use procedure 6-1.

Procedure 6-1xxx
Cannot enable node

Step	Action and response
1	**Verify that the node is faulty** From the Node Status screen, check the status of the TIFN. If the TIFN is in the faulty state, go to the next step. If the TIFN is not in the faulty state, disable the node and then go to the next step. If you cannot disable the node, then go to the procedure called *Cannot disable node* in this chapter and return to this procedure once the TIFN is disabled.
2	**Run the out-of-service diagnostics** From the Card Status screen, run the offline diagnostics for the 68K card of the TIFN. If the diagnostics pass, go to the next step. If the diagnostics fail, go to the procedure called *Out-of-service diagnostics on 68K card fail* in this chapter and return to this procedure once the diagnostics have passed.
3	**Enable the node** From the Node Status screen, enable the TIFN. If the node is successfully enabled, you have completed this procedure. If the node does not enable, go to the procedure called *Node recovery* in this chapter.

Cannot enable card

If you cannot enable a card, use procedure 6-2.

Procedure 6-2xxx
Cannot enable card

Step	Action and response
1	**Verify that the card is faulty** From the Card Status screen, check the status of the card. If the card is in the faulty state, go to the next step and run the out-of-service diagnostics. If the card is not in the faulty state, go to the step called *Check the status of the node*.
2	**Run out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the faulty card. If the diagnostics pass, go to the next step. If the diagnostics do not pass, go to the appropriate procedure from the following list: - *Out-of-service diagnostics on 68K card fail* in this chapter. - *Out-of-service diagnostics on T1 card fail* in this chapter Return to this procedure once the diagnostics pass.
3	**Enable the card** From the Card Status screen, enable the card. If the card is successfully enabled, you have completed this procedure. If the card does not enable, go to the next step.
4	**Check the status of the node** From the Node Status screen, check the status of the TIFN. If the TIFN is in the inservice or inservice standby state, go to the step called Enable the node. If the node is not in the inservice or inservice standby state, go to the next step.

-continued-

Procedure 6-2xxx
Cannot enable card (continued)

Step	Action and response
5	**Disable the node** From the Node Status screen, disable the TIFN. If the TIFN is successfully disabled, go to the next step. If you cannot disable the TIFN, then go to the procedure called *Cannot disable node* in this chapter.
6	**Enable the node** From the Node Status screen, enable the TIFN. If the TIFN is successfully enabled, you have completed this procedure. If the TIFN does not enable, go to the procedure called *Cannot enable node* in this chapter.

Cannot enable T1 link

If you cannot enable a T1 link, use procedure 6-3.

Procedure 6-3xxx
Cannot enable T1 link

Step	Action and response
1	**Verify that the T1 link is faulty** From the T1 Link Status screen, check the status of the link. If the T1 link is in the faulty state, skip the next two steps and go to the step called *Disable the T1 card*. If the T1 link is not in the faulty state, go to the next step.
2	**Verify that the far-end is transmitting** Verify that the far-end office is transmitting over the T1 link. If the far-end is transmitting, go to the next step. If the far-end is not transmitting, wait for the far-end to clear the problem.
3	**Disable the T1 link** From the T1 Link Status screen, disable the T1 link. If the T1 link is successfully disabled, go to the next step. If the T1 link does not disable, go to the procedure called *Cannot disable T1 span* in this chapter and then return to this procedure and go to the next step.
4	**Enable the T1 link** From the T1 Link Status screen, enable the T1 link. If the T1 link is successfully enabled, you have completed this procedure. If the T1 link does not enable, go to the next step.
5	**Disable the T1 card** From the Card Status screen, disable the T1 card. If the T1 card is successfully disabled, go to the next step. If the T1 card does not disable, go to the procedure called *Cannot disable card* in this chapter and then return to this procedure and go to the next step.

-continued-

Procedure 6-3xxx
Cannot enable T1 link (continued)

Step	Action and response
6	**Run the out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the T1 card. If the out-of-service diagnostics pass, go to the next step. If the out-of-service diagnostics fail, go to the procedure called *Out-of-service diagnostics on T1 card fail* in this chapter and then return to this procedure and go to the next step.
7	**Enable the T1 card** From the Card Status screen, enable the T1 card. If the T1 card is successfully enabled, you have completed this procedure. If the T1 card does not enable, go to the procedure called *Cannot enable card* in this chapter.

Cannot enable T1 channel

If you cannot enable a T1 channel, use procedure 6-4.

Procedure 6-4xxx
Cannot enable T1 channel

Step	Action and response
1	**Disable the T1 channel** From the T1 Channel Status screen, disable the T1 channel. If the T1 channel is successfully disabled, go to the next step. If the T1 channel does not disable, go to the procedure called *Cannot disable T1 channel* in this chapter and then return to this procedure and go to the next step.
2	**Enable the T1 channel** From the T1 Channel Status screen, enable the T1 channel. If the T1 channel is successfully enabled, you have completed this procedure. If the T1 channel does not disable, go to the next step.
3	**Disable the T1 link** From the T1 Link Status screen, disable the T1 link. If the T1 link is successfully disabled, go to the next step. If the T1 link does not disable, go to the procedure called *Cannot disable T1 span* in this chapter and then return to this procedure and go to the next step.
4	**Disable the T1 link** From the T1 Link Status screen, disable the T1 link. If the T1 link is successfully disabled, go to the next step. If the T1 link does not disable, go to the procedure called *Cannot disable T1 span* in this chapter and then return to this procedure and go to the next step.
5	**Enable the T1 link** From the T1 Link Status screen, enable the T1 link. If the T1 link is successfully enabled, you have completed this procedure. If the T1 link does not enable, go to the procedure called *Cannot enable T1 link* in this chapter.

Cannot enable SMDI link

If you cannot enable an SMDI link, use procedure 6-5.

Procedure 6-5xxx
Cannot enable SMDI link

Step	Action and response
1	**Disable the SMDI link** From the SMDI Link Status screen, disable the SMDI link. If the SMDI link is successfully disabled, go to the next step. If the SMDI link does not disable, go to the procedure called *Cannot disable SMDI link* in this chapter and then return to this procedure and go to the next step.
2	**Enable the SMDI link** From the SMDI Link Status screen, enable the SMDI link. If the SMDI link is successfully enabled, go to the next step. If the SMDI link does not enable, check the datafill for the SMDI link by referring to the *DMS VoiceMail Translations Guide, 297-7001-310*, and then go to the next step.
3	**Disable the node** From the Node Status screen, disable the TIFN that is associated with the SMDI link. If the TIFN is successfully disabled, go to the next step. If the TIFN does not disable, go to the procedure called *Cannot disable node* in this chapter.
4	**Run the out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the 68K card of the TIFN. If the diagnostics pass, go to the next step. If the diagnostics fail, go to the procedure called *Out-of-service diagnostics on 68K card fail* in this chapter and return to this procedure once the diagnostics have passed.
5	**Enable the node** From the Node Status screen, enable the TIFN. If the TIFN is successfully enabled, you have completed this procedure. If the node does not enable, go to the procedure called *Node recovery* in this chapter.

Out-of-service diagnostics on 68K card fail

If the out-of-service diagnostics on the 68K card fail, use procedure 6-6.

Procedure 6-6xxx
Out-of-service diagnostics on 68K card fail

Step	Action and response
1	**Replace the 68K card** Go to the procedure for replacing the NTGX05AA 68K card in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.
2	**Replace the 68K transition module** If after replacing the NTGX05AA 68K card the out-of-service diagnostics fail, go to the procedure for replacing the NTGX06AA 68K transition module in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.
3	**Recover the node** If after replacing the NTGX06AA 68K transition module the out-of-service diagnostics fail, go to the procedure called *Node recovery* in this chapter.

Out-of-service diagnostics on T1 card fail

If the out-of-service diagnostics on the T1 card fail, use procedure 6-7.

Procedure 6-7xxx
Out-of-service diagnostics on T1 card fail

Step	Action and response
1	**Replace the T1 card** Go to the procedure for replacing the NTGX08AA T1 card in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.
2	**Replace the T1 transition module** If after replacing the NTGX08AA T1 card the out-of-service diagnostics fail, go to the procedure for replacing the NTGX09AA T1 transition module in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.
3	**Recover the node** If after replacing the NTGX09AA T1 transition module the out-of-service diagnostics fail, go to the procedure called *Node recovery* in this chapter.

Cannot disable node

If you cannot disable the TIFN, use procedure 6-8.

Procedure 6-8xxx
Cannot disable node

Step	Action and response
1	**Reseat the 68K card** Transfer any active traffic from the TIFN that cannot be disabled. Unseat the 68K card momentarily and then reseat the 68K card. If the TIFN reboots, go to the next step. If the TIFN does not reboot, go to the procedure for replacing the NTGX05AA 68K card in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.
2	**Check the state of the node** From the Node Status screen, check the status of the TIFN. If the TIFN is in the faulty state, you have completed this procedure. If the TIFN is in the out-of-service state, go to the next step. If the TIFN is not in the out-of-service or faulty state, disable the node and then go to the next step. If you cannot disable the node, then go to the procedure called *Node recovery* in this chapter.
3	**Run the out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the out-of-service card. If the diagnostics pass, you have completed this procedure. If the diagnostics do not pass, go to the procedure called *Out-of-service diagnostics on 68K card fail* in this chapter.

Cannot disable card

If you cannot disable the 68K card, use procedure 6-9.

Procedure 6-9xxx
Cannot disable card

Step	Action and response
1	**Disable the node** From the Node Status screen, disable the TIFN that is associated with the card that cannot be disabled. If the TIFN is successfully disabled, then the card has been disabled and you have successfully completed this procedure. If the TIFN does not disable, refer to the procedure called *Cannot disable node* in this chapter.

Cannot disable T1 span

If you cannot disable a T1 span, use procedure 6-10.

Procedure 6-10xxx
Cannot disable T1 span

Step	Action and response
1	**Disable the card** From the Card Status screen, disable the T1 card that is associated with the T1 span that cannot be disabled. If the T1 card is successfully disabled, then the span has been disabled and you have successfully completed this procedure. If the T1 card does not disable, refer to the procedure called *Cannot disable T1 card* in this chapter.

Cannot disable T1 channel

If you cannot disable a T1 channel, use procedure 6-11.

Procedure 6-11xxx
Cannot disable T1 channel

Step	Action and response
1	**Disable the T1 span** From the T1 Link Status screen, disable the T1 span that is associated with the T1 channel that cannot be disabled. If the T1 span is successfully disabled, then the T1 channel has been disabled and you have successfully completed this procedure. If the T1 span does not disable, refer to the procedure called *Cannot disable T1 span* in this chapter.

Cannot disable SMDI link

If you cannot disable an SMDI link, use procedure 6-12.

Procedure 6-12xxx
Cannot disable SMDI link

Step	Action and response
1	**Disable the node** From the Node Status screen, disable the TIFN that is associated with the SMDI link that cannot be disabled. If the TIFN is successfully disabled, then the SMDI link has been disabled and you have successfully completed this procedure. If the TIFN does not disable, refer to the procedure called *Cannot disable node* in this chapter.

Symptom response

The following sections discuss problems that can occur with a TIFN and the associated actions that should be taken to solve problems.

Node stuck in loading state

If a TIFN is stuck in the loading state, use procedure 6-13.

Procedure 6-13xxx
Node stuck in loading state

Step	Action and response
1	**Disable the node** From the Node Status screen, disable the TIFN. If the TIFN is successfully disabled, go to the next step. If you cannot disable the TIFN, then go to the procedure called *Cannot disable node* in this chapter.
2	**Enable the node** From the Node Status screen, enable the TIFN. If the TIFN is successfully enabled, you have completed this procedure. If the TIFN does not enable, go to the procedure called *Cannot enable node* in this chapter.

Channel stuck in pending state

If a T1 channel is stuck in the pending state, use procedure 6-14.

Procedure 6-14xxx
Channel stuck in pending state

Step	Action and response
1	**Disable the T1 channel** From the T1 Channel Status screen, disable the T1 channel. If the T1 channel is successfully disabled, go to the next step. If the T1 channel does not disable, go to the procedure called *Cannot disable T1 channel* in this chapter and then return to this procedure and go to the next step.
2	**Enable the T1 channel** From the T1 Channel Status screen, enable the T1 channel. If the T1 channel is successfully enabled, you have completed this procedure. If the T1 channel does not enable, go to the procedure called *Cannot enable T1 channel* in this chapter.

Channel stuck in loading state

If a T1 channel is stuck in the loading state, use procedure 6-15.

Procedure 6-15xxx
Channel stuck in loading state

Step	Action and response
1	**Check for SEERs** Check for a SEER with the following error string: Could not login to agent SLID : xxx 8001 If such an error string is present, go to the next step. If such an error string is not present, skip the next two steps and go to the step called *Disable the T1 channel*.
2	**Check the status of the SMDI link** From the SMDI Link Status screen, check the status of the SMDI link that is associated with the stuck channel. If the SMDI link is in the inservice or inservice standby state, go to the step called *Disable the T1 channel*. If the SMDI link is not in the inservice or inservice standby state, go to the next step.
3	**Enable the SMDI link** From the SMDI Link Status screen, enable the SMDI link. If the SMDI link is successfully enabled, go to the next step. If the SMDI link does not enable, go to the procedure called *Cannot enable SMDI link* in this chapter and then return to this procedure and go to the next step.
4	**Disable the T1 channel** From the T1 Channel Status screen, disable the T1 channel. If the T1 channel is successfully disabled, go to the next step. If the T1 channel does not disable, go to the procedure called *Cannot disable T1 channel* in this chapter and then return to this procedure and go to the next step.
5	**Enable the T1 channel** From the T1 Channel Status screen, enable the T1 channel. If the T1 channel is successfully enabled, you have completed this procedure. If the T1 channel does not enable, go to the procedure called *Cannot enable T1 channel* in this chapter.

Channel stuck in out-of-service state

If a T1 channel is stuck in the out-of-service state, use procedure 6-16.

Procedure 6-16xxx
Channel stuck in out-of-service state

Step	Action and response
1	**Enable the T1 channel** From the T1 Channel Status screen, enable the T1 channel. If the T1 channel is successfully enabled, you have completed this procedure. If the T1 channel does not enable, go to the procedure called *Cannot enable T1 channel* in this chapter.

Channel stuck in faulty state

If a T1 channel is stuck in the faulty state, use procedure 6-17.

Procedure 6-17xxx
Channel stuck in faulty state

Step	Action and response
1	**Disable the T1 channel** From the T1 Channel Status screen, disable the T1 channel. If the T1 channel is successfully disabled, go to the next step. If the T1 channel does not disable, go to the procedure called *Cannot disable T1 channel* in this chapter and then return to this procedure and go to the next step.
2	**Run the out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the 68K card of the TIFN. If the diagnostics pass, go to the next step. If the diagnostics fail, go to the procedure called *Out-of-service diagnostics on 68K card fail* in this chapter and return to this procedure once the diagnostics have passed.
3	**Enable the T1 channel** From the T1 Channel Status screen, enable the T1 channel. If the T1 channel is successfully enabled, you have completed this procedure. If the T1 channel does not enable, go to the procedure called *Cannot enable T1 channel* in this chapter.

Channel stuck in unconfigured state

If a channel is stuck in the unconfigured state, contact your NT support personnel for assistance.

Channel stuck in no-resource state

If a T1 channel is stuck in the no-resource state, use procedure 6-18.

Procedure 6-18xxx
Channel stuck in no-resource state

Step	Action and response
1	**Check the status of partner SPN** From the System Status screen, check the SPN channels that are associated with the TIFN that has a channel stuck in no-resource. The associated SPN channels should be inservice. If the associated SPN channels are inservice, go to the next step. If the associated SPN channels are not inservice, go to the Node Status screen and enable the SPN: - If the SPN enables, go to the next step. - If the SPN does not enable, go to the procedure called *Cannot enable node* in Chapter 5 of this document.
2	**Disable the node** From the Node Status screen, disable the TIFN. If the TIFN is successfully disabled, go to the next step. If you cannot disable the TIFN, then go to the procedure called *Cannot disable node* in this chapter.
3	**Enable the node** From the Node Status screen, enable the TIFN. If the TIFN is successfully enabled, you have completed this procedure. If the TIFN does not enable, go to the procedure called *Cannot enable node* in this chapter.

Node rebooting

If a TIFN continuously attempts to reboot, use procedure 6-19.

Procedure 6-19xxx
Node rebooting

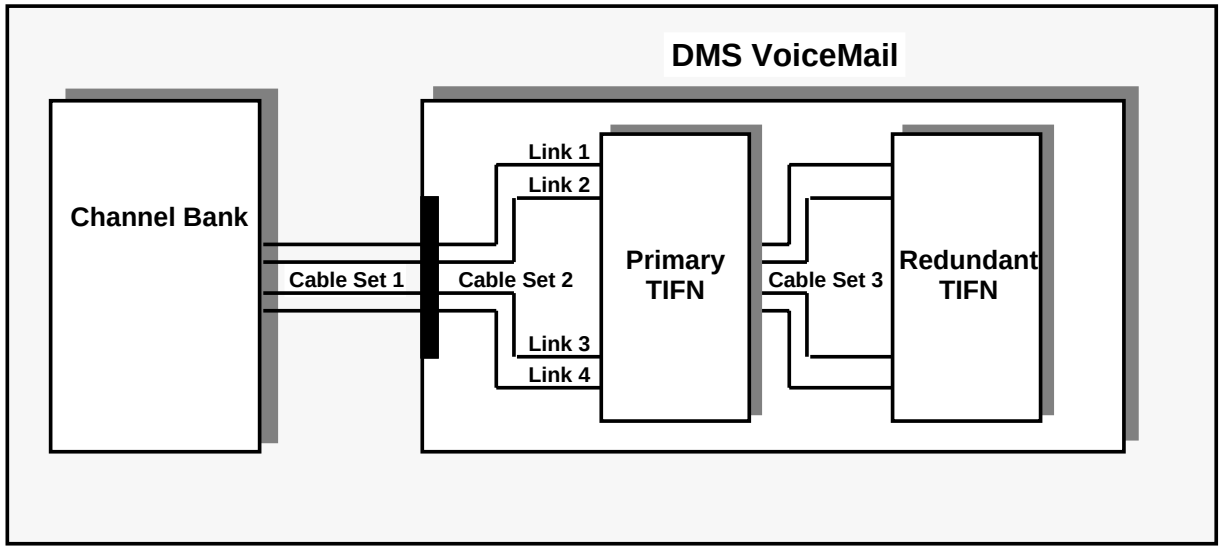
Step	Action and response
1	**Node reboots continuously** If a TIFN is continuously attempting to reboot (that is, constantly changing from the faulty state to the rebooting state and back again), then go to the next step. If a TIFN makes one attempt to reboot and it fails, go to the procedure called *Node recovery* in this chapter.
2	**Replace the 68K card** Go to the procedure for replacing the 68K card (NTGX05AA) in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. Return to this procedure once the 68K card has been replaced. If the TIFN has successfully loaded, you have completed this procedure. If the TIFN does not load successfully, go to the next step.
3	**Replace the T1 card** Go to the procedure for replacing the T1 card (NTGX08AA) in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. If the TIFN has successfully loaded, you have completed this procedure. If the TIFN does not load successfully, go to the next step.
4	**Replace the 68K transition module** Go to the procedure for replacing the 68K transition module (NTGX06AA) in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. If the TIFN has successfully loaded, you have completed this procedure. If the TIFN does not load successfully, go to the procedure called *Node recovery* in this chapter.

T1 link alarms

If T1 link alarms are encountered, use procedure 6-20 to resolve the alarm(s).

Figure 6-1 illustrates the location of the three TIFN cable sets that are referred to in the following procedure.

Figure 6-1xxx
TIFN cable sets



Procedure 6-20xxx
T1 link alarms

Step	Action and response
1	**Check the status of the links** From the T1 Link Status screen, check the status of the T1 links. If both the primary and redundant T1 links are either in the out-of-service or faulty states, skip the next step and go to the step called *Check for alarms*. If the primary and redundant T1 links are not in the out-of-service or faulty states, go to the next step.

-continued-

Procedure 6-20xxx
T1 link alarms (continued)

Step	Action and response
2	**Enable the T1 link** From the T1 Link Status screen, enable both the primary and secondary T1 links. If the T1 links are successfully enabled, go to the next step. If the T1 links do not enable, go to the procedure called *Cannot enable T1 link* in this chapter.
3	**Check for alarms** From the T1 Link Status screen, check for alarms on the T1 links. If a redundant T1 link has a status of alarm (that is, either yellow or red), go to the next step. If a primary T1 link has a status of alarm, skip the next step and go to the step called *Disable the node*.
4	**Check Cable Set 3** Refer to Figure 6-1 and check cable set 3. Make any required adjustments and then check the terminal for alarms. If after checking cable set 3 no alarm exists, you have completed this procedure. If after checking cable set 3 the alarm still exists, go to the next step.
5	**Disable the node** From the Node Status screen, disable the TIFN. If the TIFN is successfully disabled, go to the next step. If you cannot disable the TIFN, then go to the procedure called *Cannot disable node* in this chapter.
6	**Run the out-of-service diagnostics** From the Card Status screen, run the out-of-service diagnostics for the T1 card of the TIFN. If the diagnostics pass, go to the next step. If the diagnostics fail, go to the procedure called *Out-of-service diagnostics on T1 card fail* in this chapter and return to this procedure once the diagnostics have passed.

-continued-

Procedure 6-20xxx
T1 link alarms (continued)

Step	Action and response
7	**Enable the node** From the Node Status screen, enable the TIFN. If the TIFN is successfully enabled, you have completed this procedure. If the TIFN does not enable, go to the procedure called *Cannot enable node* in this chapter.
8	**Replace the T1 transition module** Go to the procedure for replacing the T1 transition module (NTGX09AA) in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. If after replacing the T1 transition module no alarm exists, you have completed this procedure. If after replacing the T1 transition module the alarm still exists, go to the next step.
9	**Check cable sets 1 and 2** Refer to Figure 6-1 and check cable sets 1 and 2. If after checking cable sets 1 and 2 and making any required adjustments no alarm exists, you have completed this procedure. If after checking cable set 3 the alarm still exists, go to the next step.

-continued-

Procedure 6-20xxx
T1 link alarms (continued)

Step	Action and response
10	**Check channel bank** Diagnose the channel bank that connects to cable set 1. Refer to the documentation supplied by the channel bank manufacturer. If after checking the channel bank and making any required adjustments no alarm exists, you have completed this procedure. If after checking the channel bank the alarm still exists, go to the next step.
11	**Replace T1 transition module of primary TIFN** Go to the procedure for replacing the T1 transition module (NTGX09AA) in the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*. If after replacing the T1 transition module in the primary TIFN no alarm exists, you have completed this procedure. If after replacing the T1 transition module of the primary TIFN the alarm still exists, contact your NT support personnel.

SMDI link alarms

Refer to the section entitled *SMDI links* in Chapter 8 for information on how to clear SMDI alarms.

Node recovery

When a TIFN appears to be faulty or the node does not enable, the most expedient method of resolving the problem is to completely replace the defective TIFN. This is done by replacing all of the cards, front and back, associated with the TIFN.

From the Node Status screen, disable the faulty node and replace all of the associated cards. For complete card, power converter, and disk replacement procedures, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)*.

When the cards are installed, enable the TIFN and check the status of the node.

If the node indicates that it is faulty, check the Card Status screen and enable any cards that are out-of-service. Check for SEERs and refer to the *DMS VoiceMail Maintenance Messages (SEER) manual (NTP 297-7001-510)* for explanations about individual SEERs. Follow any guidelines that are given for a particular SEER.

If the TIFN is still faulty after all of the cards have been replaced, check for bent pins on the front and back connectors of the backplane. If pins are bent, straighten them and then attempt to enable the node.

Note: Broken or missing pins require shelf replacement.

If the problem persists, replacement of the shelf may be required. Call your NT support personnel.

Disks and tape drives

Interpreting Class 66 disk managing SEERs

The disk manager is the operating system component that maintains disk configuration. It generates SEERs to report errors encountered during file system disk accesses and to log disk mirroring maintenance operations.

Disk manager SEERs identify disks by node number and SCSI ID.

Figure 7-1 lists node numbers and their corresponding disk and pack numbers that are used with the Class 66 SEERs

For example, a Class 66 SEER reads "... node 2> disk8 ...". Check the chart in Figure 7-1 under Node 2, Disk 8. Reading across the Pack Number column, this disk is in slot 1. Now move to the diagram at the bottom of Figure 7-1 to determine which disk shelf the pack is on and its location on the shelf. In this example, it is the pack on the bottom shelf, extreme right.

Figure 7-1xxx
Node numbers and corresponding disk and pack numbers

Node #	Disk #	Pack*
1	0	1
	8	2
2	0	2
	8	1
3	2	3
	4	3
	10	4
	12	4
4	2	4
	4	4
	10	3
	12	3
5	2	5
	4	5
	10	6
	12	6

* A pack can include one disk drive, two disk drives, or a disk drive and a tape unit.

Node #	Disk #	Pack*
6	2	6
	4	6
	10	5
	12	5
7	2	7
	4	7
	10	8
	12	8
8	2	8
	4	8
	10	7
	12	7
9	2	9
	4	9
	10	10
	12	10
10	2	10
	4	10
	10	9
	12	9

Slots numbers for disk shelves

Electronics Shelf					
Electronics Shelf					
7	8	9	10	2	Disk Shelf
3	4	5	6	1	Disk Shelf

Slot numbers for packs

Listed on the following pages of this chapter are the principal disk manager SEERs that indicate there may be a maintenance problem.

Class 6602

Error string format

6602 node n>disk a down; disk b remains

Cause

One of the disks in a mirrored disk pair has gone down.

Action

If this SEER appears during normal operation, replace the failed disk indicated by the SEER using the Disk Maintenance and Disk Pair Status screens on the terminal. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for the appropriate disk pack that is being replaced.

> ***Note:*** If this SEER appears during 68K transition module replacement, continue to follow the replacement procedure without regard to this SEER.

Class 6603

Error string format

6603 node n disk d>sense key: s error code: e [block: b]

Cause

The disk drive has reported an exception. The sense key number indicates the exception type as given below. The error code included is vendor unique, and a block number may also be shown.

Action

Listed below are the various sense key exception types and the suggested action that should be taken:

Sense Key 1 Error Recovery

A large number of recovered error SEERs for the same disk indicates the need to replace the disk pack indicated by the SEER. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for the appropriate disk pack that is being replaced.

Sense Key 2 Not Ready

The disk indicated by the SEER has not yet spun up as it is re-initializing following a reset.

Sense Key 3 Medium Error

A medium error indicates the need to replace the disk pack indicated by the SEER. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for the appropriate disk pack that is being replaced.

Sense Key 4 Hardware Error

A hardware error indicates the need to replace the disk pack indicated by the SEER. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for the appropriate disk pack that is being replaced.

Sense Key 5 Illegal Request

The disk indicated by the SEER has received an illegal request from the system. Call your NT support personnel for assistance.

Class 6604

Error string format

6604 node n disk d > drive error: e

Cause

The SCSI device reported an exception. The drive error number indicated the exception type as listed below:

Driver Error	Meaning
129	Selection Timeout
130	Unexpected Timeout
131	Bus Reset
132	Input Parity Error
255	Driver Queue Full

Action

This SEER indicates a hardware failure along the SCSI path. This includes any of the following components:

- disk pack indicated by the SEER
- 68K card resident on the node associated with this disk
- 68K transition module card resident on the node associated with this disk
- SCSI cables linking this disk pack to the associated node.

In each of the actions discussed below, use the Disk Maintenance and Disk Pair Status screens on the terminal. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* to identify the location of the 68K card and the 68K transition module card for the associated node as well as the cable locations on the 68K transition module card that is connected to the disk pack.

If components are reseated and or replaced, and the SEER does not reoccur, re-synchronize the disk using the references listed above.

If components are reseated and or replaced, and the SEER does reoccur, continue to the next step without re-synchronizing the disk.

WARNING
Avoid disabling the active SCSI connection
Although the disk drive under investigation may have already lost synchronization with its shadowed disk, exercise caution during component removal to avoid accidental disabling of the SCSI connection to the functioning disk pack.

1 Check that the associated SCSI cables are firmly connected.

2 Reseat the disk pack indicated by the SEER.

3 Reseat the 68K card associated with the failed disk pack.

4 Replace the 68K card associated with the failed disk pack.

5 Replace the disk pack indicated by the SEER.

6 Replace the 68K transition module associated with the failed disk pack. This requires re-synchronizing the remaining disk pack to the disk pack indicated by the SEER.

Class 6605

Error string format

6605 node n disk d > Warning

Cause

An attempt is being made to set up a smaller disk as a mirror to a larger capacity disk.

Action

Call your NT support personnel for assistance

Class 6606

Error string format

6606 node n disk d > Warning

Cause

An attempt is being made to declare two disks as mirrored without performing a disk synchronization.

Action

Follow the disk synchronization procedure for the disk indicated by the SEERs. Refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502)* for the appropriate disk pack that is being re-synchronized.

Replacing and resynchronizing disks

If required to either replace or resynchronize disks, refer to the *DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).*

Tape drive errors

The tape drive should be replaced when you receive repeated errors when attempting to write to tape. You should also consider replacing the tape drive if the light on the front of the tape drive is out or if you cannot hear the tape spinning.

Preventative maintenance of the tape drive involves periodic cleaning. Tape retensioning is performed automatically by the system on every backup. However, to ensure reliable tape drive performance, you should establish a regular cleaning schedule. Refer to the *DMS VoiceMail Routine Maintenance Procedures*, NTP 297-7001-501, for further information.

Peripherals and links

Local terminals

If the local terminals are having problems, do the following in sequence:

1 Check the following port setting information: baud rate, XON/XOFF, character length, and start bit. Refer to the DMS V oiceMail System Installation and Modification Guide (NTP 297-7001-504) for correct port setting information.

2 Type <CNTL> R.

3 Type <CNTL> Q.

4 Type <CNTL> W.

5 Reset the communications port and display from the setup menu.

6 Enable the terminal status display and look for clues.

7 Check for loose cable connections.

8 If a printer is attached, do the following:

   a. Turn the printer on and off.

   b. Toggle the autoprint by typing <CNTRL> PrintScreen.

   c. Ensure that the printer is not jammed and that the paper is inserted correctly.

9 Power the terminal off and then back on.

10 Disconnect the cable to the terminal, reset the terminal, clear the communications port, clear the display and re-connect the terminal.

11 Replace the terminal.

12 Go to the node that the terminal is attached to and verify that it is operational.

13 Check and replace the current loop adapter.

Multiple administration terminals

If multiple administration terminals that are connected to a telephony interface node (TIFN) experience problems, do the following:

- Verify that the TIFN is operating properly. If necessary, use the procedures in Chapter 6, Telephony Interface Node, to recover the TIFN.
- Verify that the associated signal processing node (SPN) is operating properly. If necessary, use the procedures in Chapter 5, Signal Processing Node, to recover the SPN.

The mapping of SPNs to TIFNs is listed in Table 8-1.

Table 8-1xxx
Mapping of SPNs to TIFNs

SPNs	TIFN
3 and 5	13
4 and 6	14
7 and 9	15
8 and 10	16

Remote terminals

If remote terminals are having problems, do the following:

1 Verify the dial-in DN.

2 Hold down the BREAK key.

3 Type <CNTL> R.

4 Type <CNTL> Q.

5 Type <CNTL> W.

6 Check the *DMS VoiceMail System Installation and Modification Guide, NTP 297-7001-504*, for the following port setting information: baud rate, XON/XOFF, character length, and start bit.

7 Ensure that the modem is on and that the connection is active.

8 Reset the communications port and display from the terminal setup menu.

9 Enable the terminal status display and look for clues.

10 Check for loose cable connections.

11 If the terminal was not working with existing cables, try inserting a null modem.

12 If a printer is attached, do the following:

   a. Turn the printer on and off.

   b. Toggle the autoprint by typing <CNTL> PrintScreen.

   c. Ensure that the printer is not jammed and that the paper is inserted correctly.

13 Power the terminal off and then back on.

14 Disconnect the cable to the terminal, reset the terminal, clear the communications port, clear the display and re-connect the terminal.

15 Is the phone line analog?

16 Try calling the dial-in number from the handset. The modem should answer.

17 Check the phone line connection from the DMS VoiceMail.

18 Try dialing in to the alternate maintenance DN.

19 Verify the terminal on a known working connection.

20 Replace the 68K transition module that is associated with the remote terminal.

Local printers

No printer output

Node printer port setup is incorrect

Check that the node printer port is set up as explained in the DMS VoiceMail System Installation and Modification Guide (NTP 297-7001-504).

Printer setup is incorrect

Verify that the printer setup matches the node printer port setting.

Cable connections to the printer are incorrect

Verify that the current loop cable is connected to the correct port.

Verify that the current loop pairs from the node connect to the correct pairs on the current loop interface (that is, either a current loop adapter or a current loop port). Refer to DMS VoiceMail System Installation and Modification Guide (NTP 297-7001-504) for cable and signal assignments.

Current loop adapter is defective

Replace the current loop adapter.

Transition module is defective

Replace the transition module by referring to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Printer is defective

Replace the printer.

Printer alarms

Check the printer for visible and audible alarms. The HP ThinkJet printers have a small LED to indicate alarms. The LP120 and LA120 both have an audible and visual alarm. Alarms occur for the following conditions:

Out of paper

Check the paper supply. If the printer is out of paper, then add paper. If the printer is not out of paper, then the printer requires service.

Paper jam

Check the paper supply and ensure that the paper is feeding correctly. If the paper does not advance properly, then adjust the paper feed. If the paper continues to jam, then the printer requires service.

Backup printers

No printer output

Terminal printer port setup is incorrect

Check that the terminal printer port is setup as explained in the terminal's installation manual.

Printer setup is incorrect

Verify that the printer setup matches the terminal printer port setting.

Cable connections to the printer are incorrect

Verify that the printer cable used is the correct type for the printer port of the terminal. If the terminal has a dedicated printer port, it requires an RS232 cable. If the port is DTE, then a null cable is required.

Terminal printer port is defective

Replace the terminal.

Printer is defective

Replace the printer.

Printer alarms

In all conditions in which the printer is disabled, the terminal will freeze and will not accept any input. If this occurs, check the printer status.

Check the printer for visible and audible alarms. The HP ThinkJet printers have a small LED to indicate alarms. The LP120 and LA120 both have an audible and visual alarm. Alarms occur for the following conditions:

Out of paper

Check the paper supply. If the printer is out of paper, then add paper. If the printer is not out of paper, then the printer requires service.

Paper jam

Check the paper supply and ensure that the paper is feeding correctly. If the paper does not advance properly, then adjust the paper feed. If the paper continues to jam, then the printer requires service.

SMDI links

Link bounces up and down constantly

Check the connectivity of the related SMDI cables, and verify that the external modem settings are correct. For further information on modem settings, refer to the *DMS VoiceMail Planning and Engineering Guide, 297-7001-100*.

Verify that the switch load for the SMDI link is compatible. In the case of the MPC link, the load on the IOC should be of at least MPCA33CB. If the load version is of an earlier issue, the link will bounce under idle conditions.

Disable and re-enable the SMDI link from both the DMS VoiceMail side as well as the DMS-100 switch side.

If the problem persists, disable the card that the SMDI link is on and run the out-of-service diagnostics. If the card fails the out-of-service diagnostics, replace the card. Refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502) for complete replacement information.

If the problem persists, call your NT support personnel.

Link cannot be brought up

Verify that all connections are in place and that the system is configured correctly for SMDI. Check the status of the SMDI links. If the state is OutOfService, then enable the link.

If one link appears to be InService and its partner is InSvStandby, but the link is not up, then visually check the external modem to see if the onboard modem has made a connection with the external modem. (The CD and OH lights should be on to indicate connection for a VenTel modem, a message Online on LCD for a UDS modem.)

> ***Note:*** Usually there is a small delay once the system has just been booted up for the links to make a modem-to-modem connection. However, the terminal screen can show InService before the actual connections are made from a SMDI perspective. InService at this stage does not really mean that the link is ready and should be handshaking with the DMS. InService means only that the link handler has been started. The reason this happens is because the terminal screen has a lower priority and is not updated as often when a lot of activity is taking place (that is, system just coming up). Only once the link up or link down SEER message is generated does it mean that the link is ready for the handshaking.

If the external modem is not connected, an InsrvYelAlarm is displayed. If the switch is not handshaking with the SPM and the external modem is

connected, then an InsrvRedAlarm is displayed. These alarm conditions are not the same as T1 alarms.

After waiting about five minutes, once all of the T1 channels and the system appears to be ready but the external modem is not yet connected, check the modem connections and the wiring on the DMS VoiceMail modem transition module. Powering the external modem up and down may help.

> ***Note:*** A SEER message indicating "more than ten attempts made to connect to external modem" is printed. This means that the link handler is ready but failing to establish a connection with the external modem. If this occurs, refer to the the instructions provided in the section entitled *InsrvYelAlarm*

If the problem persists, disable the card that the SMDI link is on and run the out-of-service diagnostics. If the card fails these diagnostics, replace the card. Refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502) for complete replacement information.

If the problem persists, call your NT support personnel.

If the system shows an alarm

InSvYelAlarm

Check the connectivity of the related SMDI cables.

Verify that the external modem power is on and that the modem settings are correct.

Verify that the baud rate settings for external modems are correct. If the modem is a VenTel 2400 Plus II, it will auto detect to a lower baud rate of 2400 bps. However, if a UDS 2400 modem is used, ensure that the baud rate is set correctly - it does not autobaud in leased-line mode.

Disable and then enable the SMDI link. Turn the external modem's power off and then on again.

InSvRedAlarm

Check the switch-side status of the SMDI link. If not Enabled, then RTS the link.

Check the cable connections between the modem and the switch IOC panel. Verify that the RS232 cable from the external modem to the switch is correct.

Verify that the modem is connected to the onboard modem. The CD and OH lights should be on to indicate connection for a VenTel modem, or an Online

message should appear on the LCD for a UDS modem. If not, disable and then enable the link. Return to service (RTS) the link and then RTS the card.

Attempt to make a call if there is no link up message, then check the DMS side to determine if the MPC card is enabled. Check the status of the card and link. If it is disabled, then enable it. If no fault exists, it should indicate enabled. If you get a SysB message, then there is no handshaking taking place. Check that the RS232 cable is plugged in the back of the external modem. Then disable and enable the link.

Check that the baud rates for the data port of the SMDI link on the DMS VoiceMail system and the datafill on the switch-side for the link are set at the same baud rate.

Disable and enable the SMDI link on the DMS VoiceMail side.

Disable the SMDI card on the switch-side (either an MPC or IOC card). Find the location of the card on the DMS shelf and reseat the card. Then enable the card, and for MPCs download the software to the card again, and then enable the link.

If the problem persists, disable the card that the SMDI link is on. If the card fails the out-of-service diagnostics, replace the card. Also check that the switch-side components and datafill are correct.

Faulty

If the link was in the InSrvStandby status and it detected a fault twice during the standby modem test, then the link is deemed to be faulty.

If an active link remains in an alarm conditions for more than five minutes before the InSvStandby link takes over, the active link is deemed to be faulty.

- Disable the faulty link and then enable it.
- If the fault persists, disable the card and run out-of-service diagnostics to determine if there is a hardware problem. Refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502) for complete replacement information.
- If the problem persists, call your NT support personnel.

Link up for a short time and then down

Verify that the cables are of the type recommended for SMDI links.

Check the connectivity of the related SMDI cable.

Verify that the SMDI links are datafilled correctly. Refer to the *DMS VoiceMail Translation Procedures, 297-7001-310*.

Check the status of the links on the terminal display. Then follow the described steps in the previous section for the type of condition.

Link goes down when idle

Check the connectivity of the related SMDI cable.

If the link bounces up and down when it is idle (that is, every minute), then suspend the load on the switch side of the SMDI link. Verify that if an MPC card is being used, then the load should be MPCA33CP or later.

Verify that the correct firmware is being used.

If the terminal display indicates an alarm condition, refer to the section entitled *If the system shows an alarm* in this chapter.

DMS SMDI shutdown behavior

If the switch-side SMDI links shutdown, then the InService link on the DMS VoiceMail side will get an InsrvRedAlarm after about ten seconds. If the SMDI link on the switch-side does not recover in five minutes then the InsrvRedAlarm link is deemed to be faulty.

However, if the link is either out-of-service or faulty, the link stays InsrvRedAlarm. However, if the link remains down for over ten minutes, DMS VoiceMail resets and re-initializes the onboard modem causing the modem connection to be dropped (InsrvYelAlarm) and attempts to re-establish connections.

If redundancy is available, after five minutes a switch link occurs causing the standby link to take over. Once the standby link takes over and the switch is down, the link behaves as described above. Once the link on the switch comes up, the problem should clear itself. Maintenance needs to be performed on the faulty link if redundancy was equipped.

If the problem is isolated to the SMDI link on the switch-side, disable the SMDI card on the switch-side (either an MPC or FA card). Find the location of the card on the DMS shelf and reseat the card. Then enable the card (that is, download the software to the card again) and enable the link.

T1 links

All channels are not working

Channel status remains *NoResource*

Check if the corresponding nodes are inservice. If not, enable the nodes.

Check if the corresponding T1 links are inservice. If not, enable the T1 links.

Channel status remains *Loading/Pending*

If SEERs indicate "Could not login to agent SLID: XXX8001", check the hardware database to determine if the SMDI link with the LinkID equal to 'XXX' exists. If it does, check if the link is InService or not through the SMDI Link Status screen. If the link is OutOfService, enable the link.

Disable and enable a channel to check for any sign of failing during the agent login and logout operations. If the channel fails, refer to the section below called *Agent login/logout failed.*

Channels *OutOfService*

Check that the corresponding T1 links are inservice. If the T1 links are inservice, attempt to enable each channel individually, or disable the T1 links and then enable them. If the problem persists and no agent operations fail, disable the T1 links and run the out-of-service diagnostics.

Agent login/logout failed

If SEERs indicate a failed on 'ReOrder', determine if the AgentID code is datafilled in the hardware database. In most situations, the AgentID code is the same as the ACD/UCD DN.

Check if the agent login/logout codes datafilled in the hardware database match the ones configured on the DMS switch-side.

Check if the UCD Queue has set the number of agents to the correct value.

If a number of SEERs indicate failed on 'NoDialTone,' check if the line is ManBusy on the DMS-100 switch-side.

Check if the line types datafilled for both of the DMS VoiceMail and DMS switch-side are correct. For the DMS VoiceMail side, check the line interface type of the T1SpanData. For Release 8, it should be FXOGrdStart line.

Check the settings of the channel bank.

Check the hardware status of the line card in both the channel bank and the DMS switch.

If SEERs indicate failed on ‘Voice Answer,’ check that the agent login/logout codes datafilled in the hardware database match the ones configured on the DMS switch-side.

Some channels are not working

Disable and enable the channel to see if there is any sign of failing during the Agent login/logout operations.

Check if the failed channels are configured as UCD/ACD agents on the DMS switch-side.

If a particular channel is faulty, check the line card in the channel bank.

If no call is presented to a particular channel, check if the channel is dedicated to a particular service through the Channel Allocation Table.

If there is a silent channel (that is, a connection is established but there is no response), then disable the card and run the out-of-service diagnostics.

Multiple T1 links are not working

Check the connectivity of the related T1 cables.

Check if the corresponding channel bank is functioning.

Run the out-of-service diagnostics to determine if there is any hardware problem.

If a T1 link remains in the Faulty, OutOfService, or Alarm state, disable the corresponding link and run the out-of-service diagnostics.

If a T1 link remains in the Pending state, allow about two minutes for the link to complete the current operation. If it takes more than two minutes, disable the link and wait until all of the channels are either unloaded or the redundant link has taken over completely before enabling the link. If the problem persists, disable the T1 link and run the out-of-service diagnostics on the T1 link.

If the problem persists, call your NT support personnel.

Cabinet and I/O connections

Frame supervisory panel

For information on how to clear alarms related to the frame supervisory panel of the Service Peripheral Module (SPM), refer to the BCS34, or later, issue of the *DMS-100 Lines, Trunks, and Peripherals - External Subsystems Alarm and Performance Monitoring Procedures* (NTP 297-1001-583). Refer to the procedures that relate to the *Ext FSP DPCC Cabinet*.

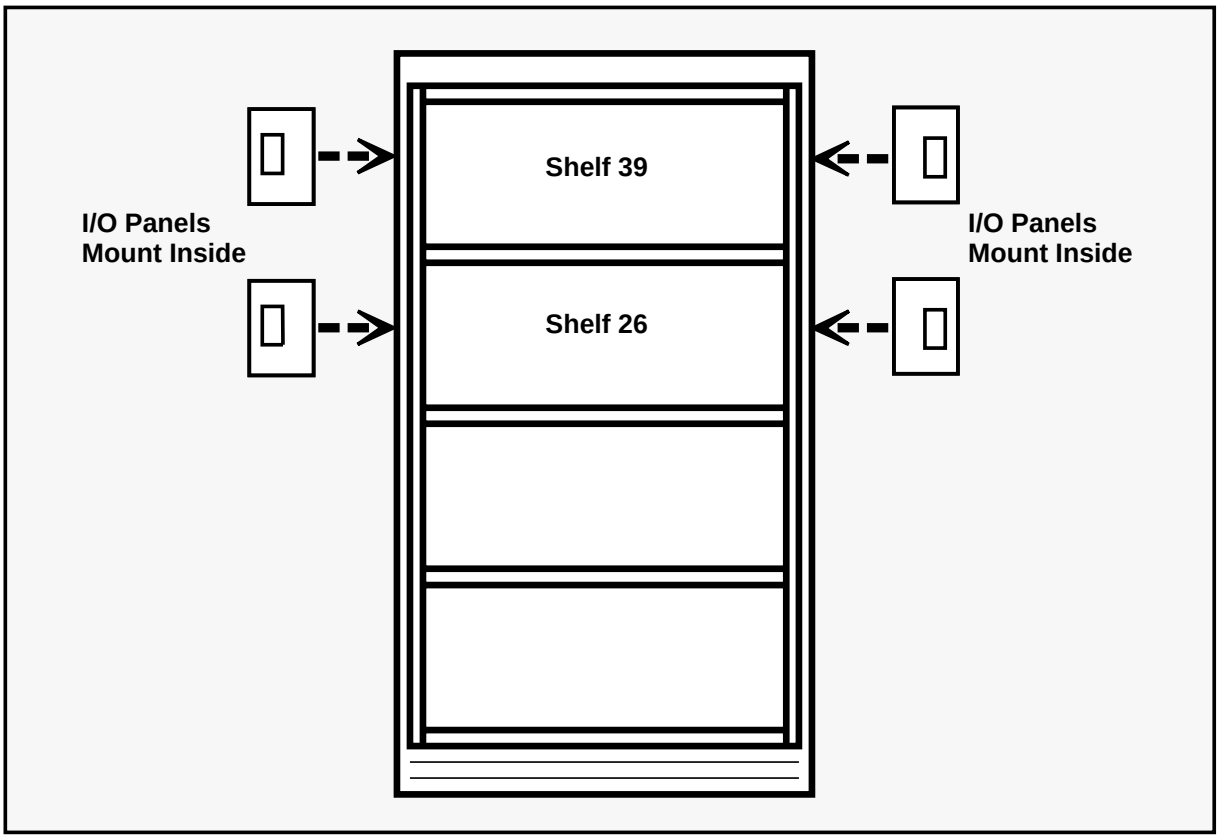
Input/output panel

Input/output panel interconnections

Each Service Peripheral Module (SPM) cabinet has four input/output panels. Two input/output panels are provided for each electronic shelf - one on the right side and the other on the left side of the bulkhead as viewed from the rear of the SPM. The daughterboard is oriented towards the rear cabinet doors for all input/output panels. This allows access to the daughterboard. The 2x20 four-walled, straight-header connectors are mounted on both sides of the panel and are keyed to prevent the reverse insertion of mating cable connectors. See Figure 9-1 for details.

Figure 9-1 illustrates the location of the input/output panels as viewed from the rear of the SPM.

Figure 9-1
Input/output panel locations - rear SPM view



I/O connectors inside of the cabinet

Connectors on the inside of the cabinet bulkhead are designated J1 through J9 as well as JX and JY on the daughterboard.

Connectors J1, J2, J3, and J6 each connect three active current loop ports and one modem port to the external cabling by tracking through the input/output panel and onboard EMI filters to the connectors on the other side of the panel. These serial ports are cabled to the input/output panel from the 68K transition module of an MSP or SPN.

Connector J4 connects four modem ports to the external cabling by tracking through the input/output panel and onboard EMI filters to the connectors on the other side of the panel. The modem ports are cabled to the input/output panel from one of the TIFNs.

Connectors J7 and J8 are not used.

Connector J9 conveys the alarms and OA&M terminal switchover signal from the Bus Controller transition module.

I/O connectors outside the cabinet

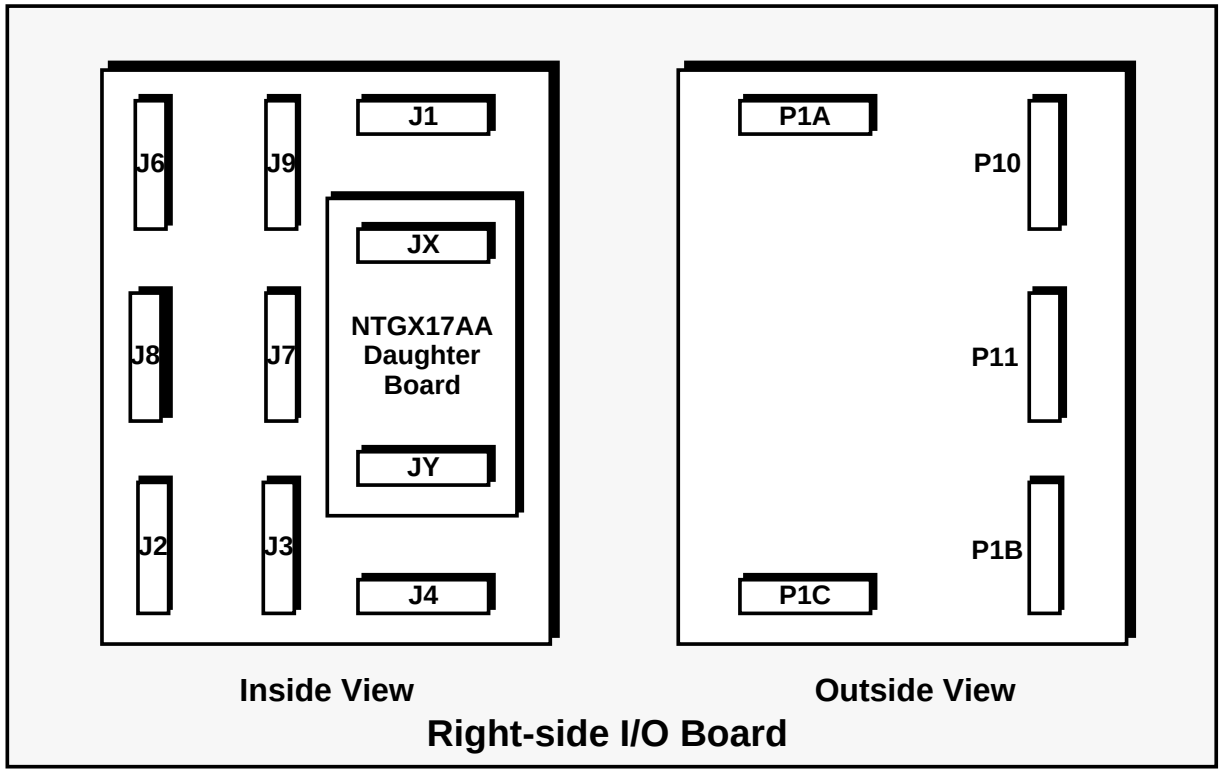
Connectors on the outside of the cabinet bulkhead are designated P1A through P1C and P10 and P11.

Connectors P1A to P1C provide cable connections for the active current loop and modem pairs to the main distribution frame.

Connectors P10 provides alarm relay connections to the main distribution frame.

Figure 9-2 illustrates the location of the input/output connectors on the input/output panel.

Figure 9-2
Input/output connectors



Input/output panel daughter board replacement

Removing the input/output panel daughterboard assembly disconnects modem links from the TIFNs and current loops from MSPs and SPNs. If these links are inservice (SMDI connections, remote terminal connections, or local terminal current loop connections), they should be taken out-of-service before the daughterboard is removed.

Table 9-1 lists the preparation actions required before removing an input/output daughter board that is located next to each of the SPM shelves.

Table 9-1xxx
Preparing to remove I/O panel daughter boards

Shelf	Node type	Action required
26 Right	MSP1 OA&M Port 3 MSP2 OA&M Port 3	Removal requires cabinet shutdown.
26 Left	SPN1 Port 1 SPN2 Port 1	Remove cables to 68K TMs for SPN1 and SPN2 before removal.
	TIFN1 Links 1-4 TIFN2 Links 1-4	Removal requires SMDI shutdown.
39 Right	SPN7 Port 1 SPN8 Port 1	Remove cables to 68K TMs for SPN1 and SPN2 before removal.
39 Left	SPN5 Port 1 SPN6 Port 1	Remove cables to 68K TMs for SPN5 and SPN6 before removal.
	TIFN3 Links 1-4 TIFN4 Links 1-4	Removal requires SMDI shutdown.

After the preparation is complete, remove the four hex nuts at the corners of the NTGX17AA daughterboard. Remove the existing daughterboard and replace with a new one. Fasten the new daughterboard and then re-enable the connections that were earlier disabled.

Input/output panel replacement

Before removing an input/output panel, it is recommended that the cabinet be taken out-of-service and powered down. After the SPM has been powered down, do the following:

1 Label and remove the internal and external cables that are connected to the input/output panel being removed.

2 Cut the tie-wraps to cables in the immediate area to allow access to the input/output panel being removed.

3 Remove the hex nuts from the input/output panel.

4 Remove the four slotted screws (two at the top and two at the bottom) from the input/output panel.

5 The input/output panel is then removed and replaced in the reverse order of the above steps.

Input/output cabling

Input/output cable identification

Figure 9-3 identifies all of the cables that are connected between the four input/output panels and the two electronics shelves of the SPM. Internal T1 cables are also shown although these are not connected to the input/output panels.

Figure 9-3xxx
Input/output cable identification

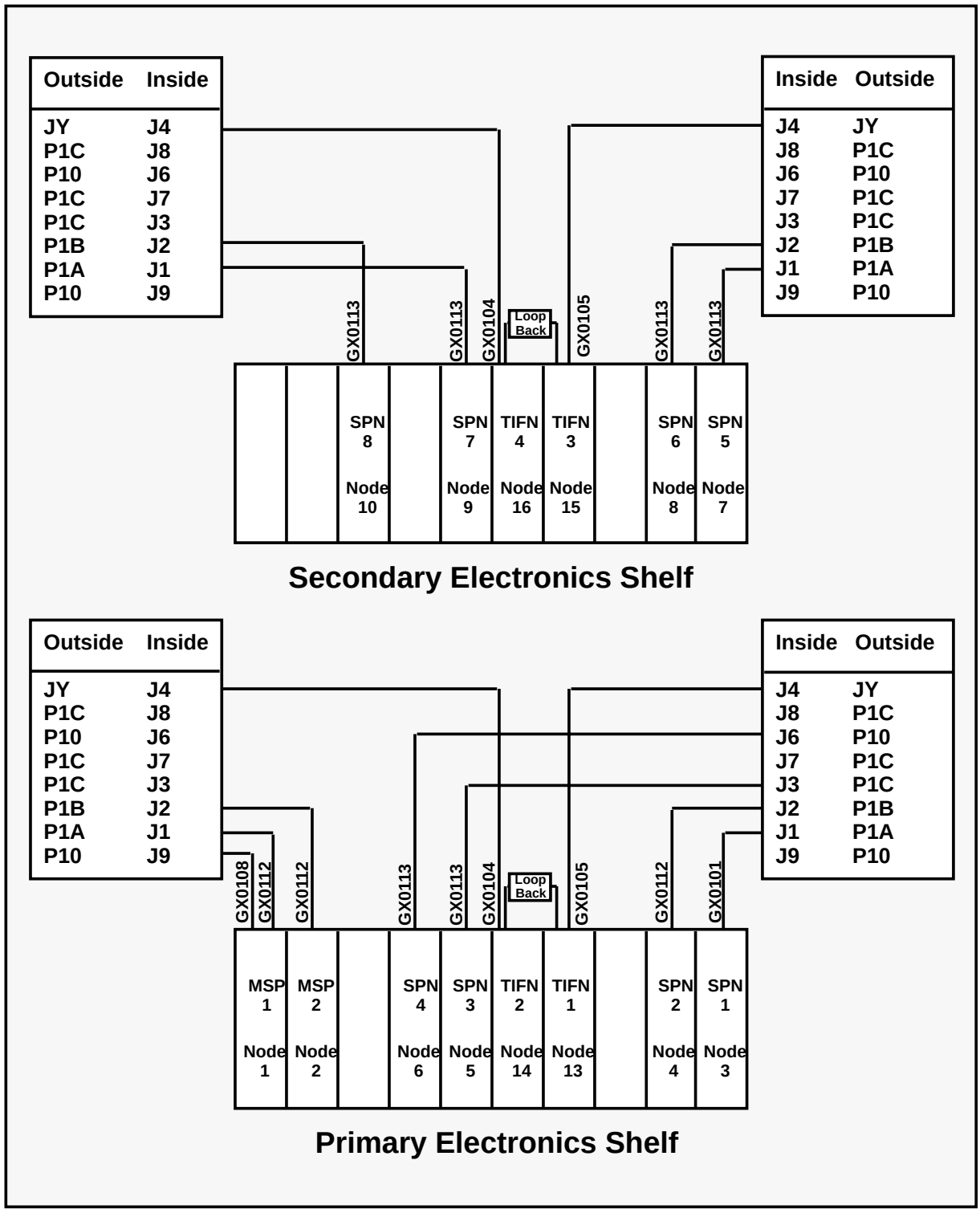


Figure9-4xxx
Internal backplane cable connections for shelf 26

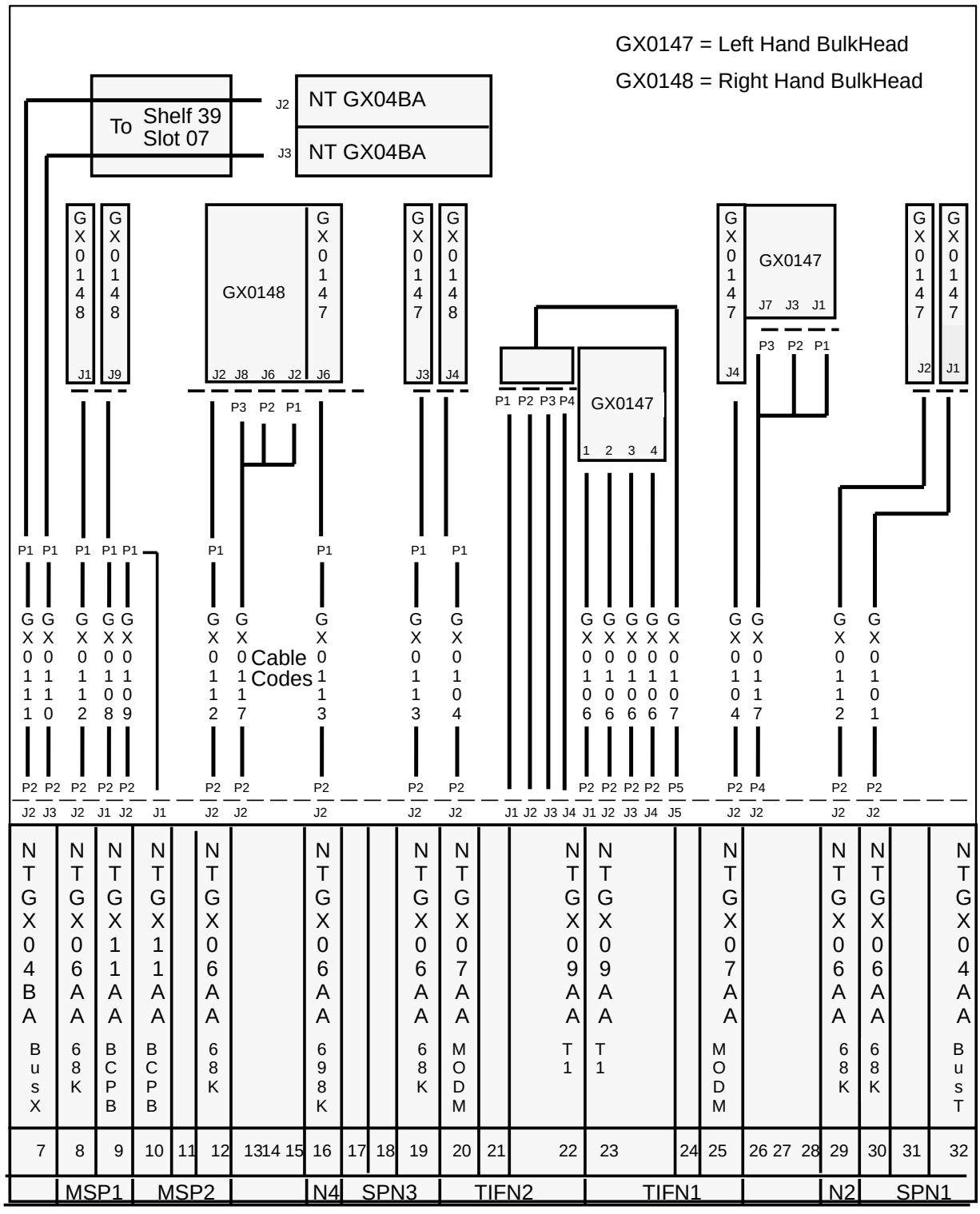


Figure 9-5xxx
Internal backplane cable connections for shelf 39

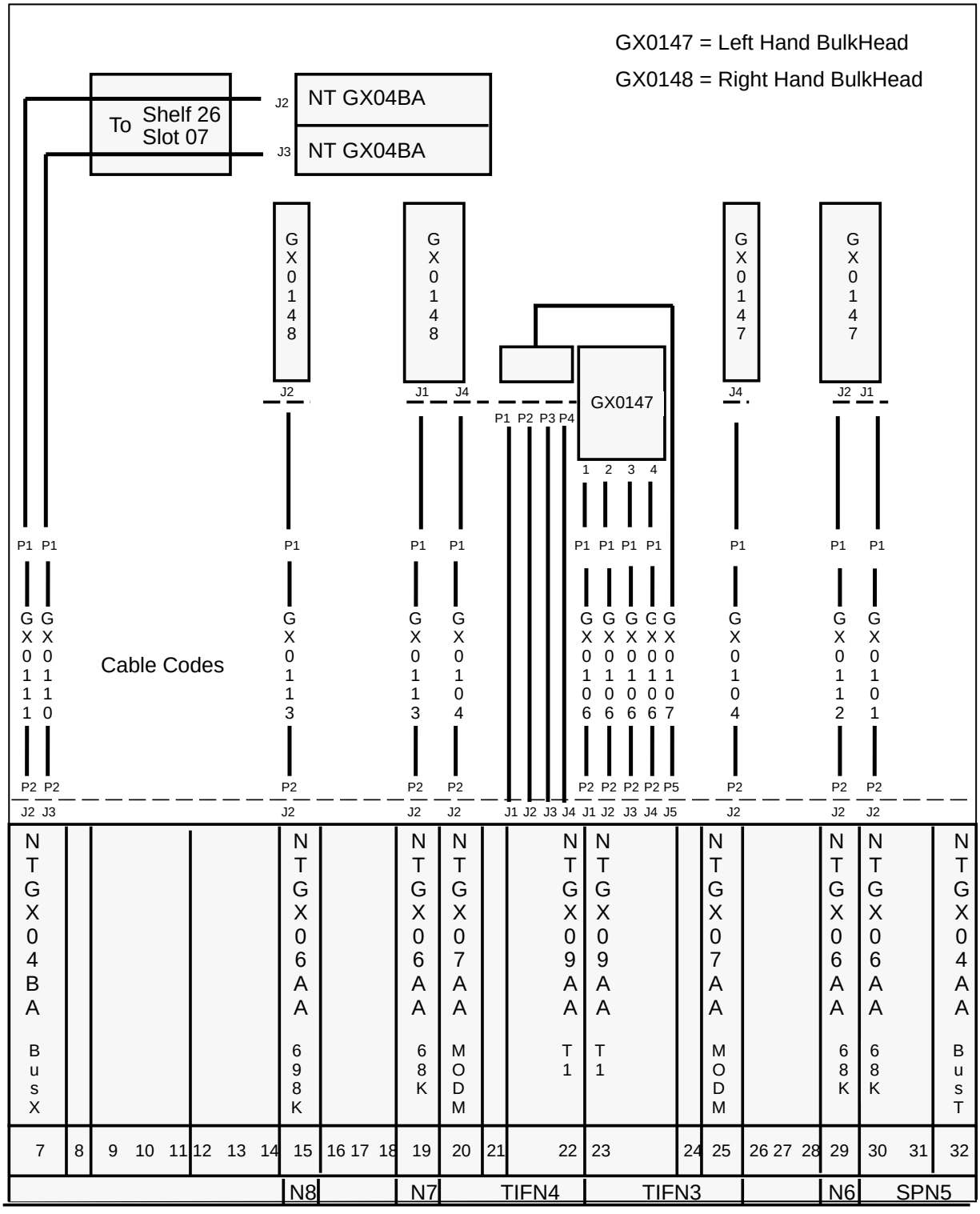


Figure 9-6xxx
Internal backplane cable connections for shelf 00

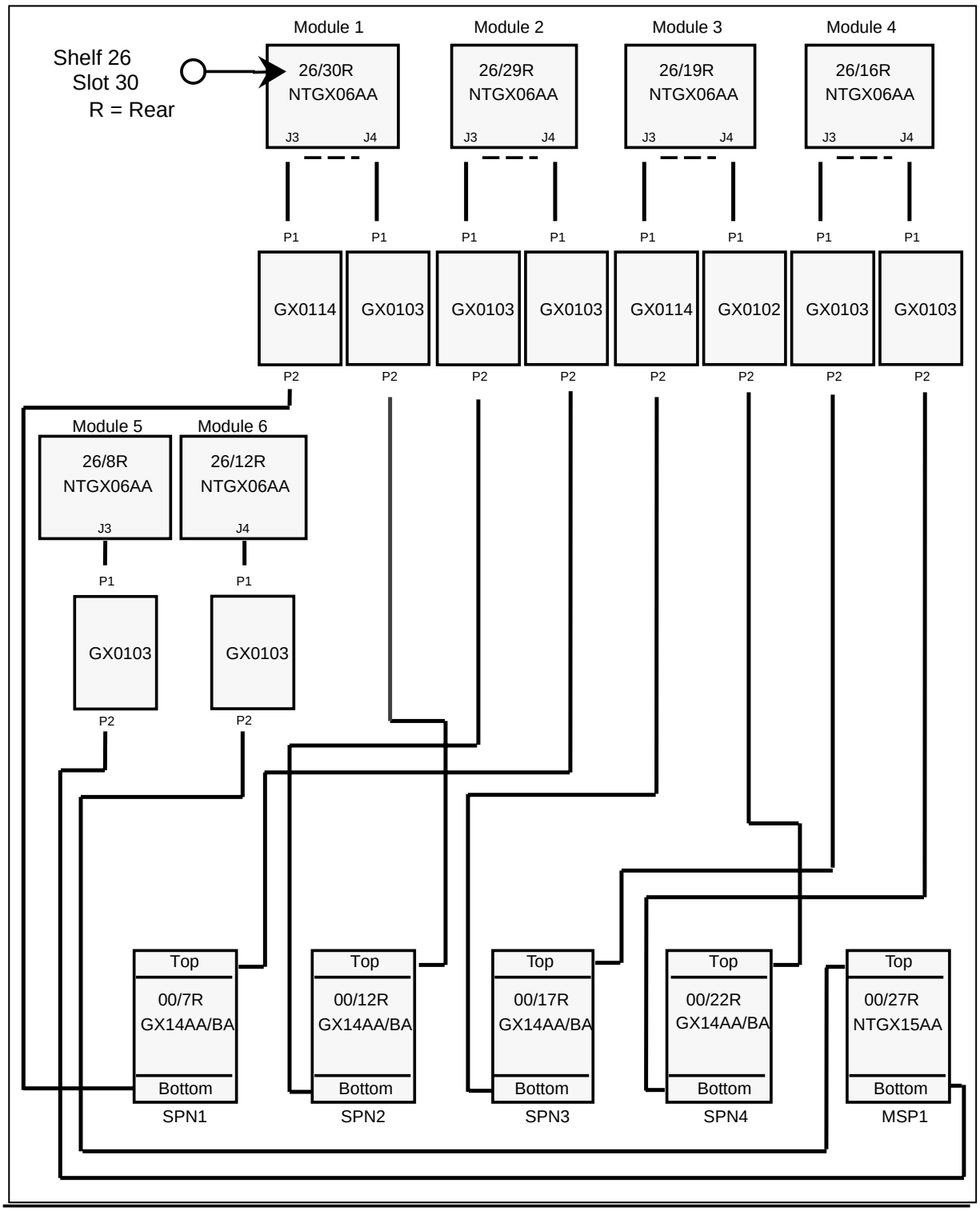
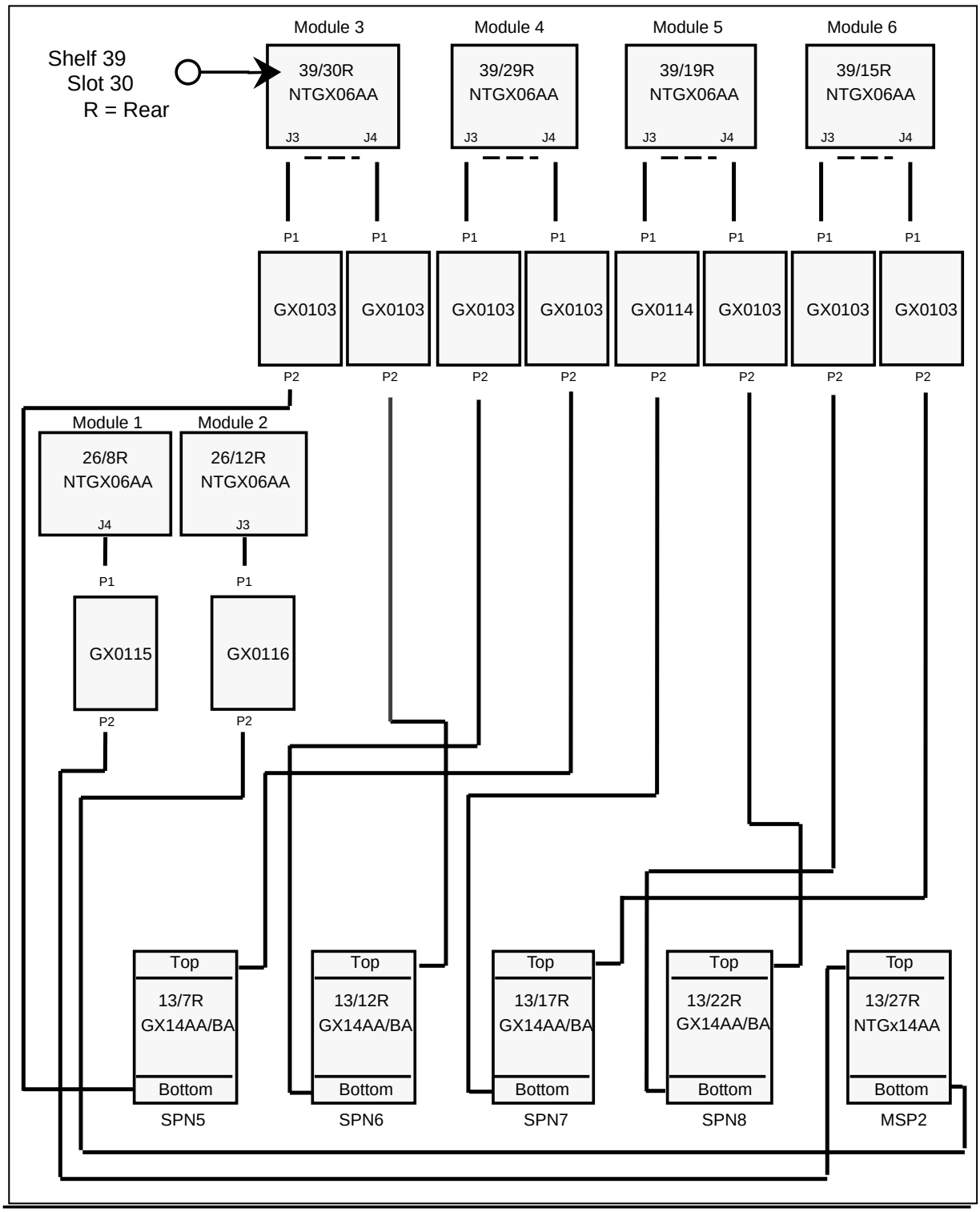


Figure 9-7xxx
Internal back plane cable connections for shelf 13



Input/output cable replacement

If the replacement of cards and transition modules fail to clear a fault condition, the cabling from the transition module of the identified node can be replaced.

If the node is fully out-of-service, the cable can be replaced without any further preparations. However, if the node is inservice, refer to the applicable procedure for transition module replacement in the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Replace the cable and continue through the procedure without actually removing the transition module to the point of restoring service.

Intracabinet cabling

Input/output cable identification

Table 9-2 identifies the input/output cable signals that are carried on the various input/output cables.

Table 9-2xxx
Input/output cable identification

Input/output panel		Connects to			
Shelf	**Connector**	**Node type**	**Node number**	**Port number**	**Function**
26 Right	P1A	MSP1	Node 1	Port 1	
		MSP2	Node 2	Port 2	Remote Access
		MSP1	Node 1	Port 3	OA&M VDU
		MSP2	Node 2	Port 1	
	P1B	MSP2	Node 2	Port 2	Remote Access
		MSP2	Node 2	Port 3	OA&M VDU
		MSP2	Node 2	Port 4	
	P1C	TIFN2	Node 14	SMDI	Link 1
		TIFN2	Node 14	SMDI	Link 2
		TIFN2	Node 14	SMDI	Link 3
		TIFN2	Node 14	SMDI	Link 4
	P10	MSP1	Node 1	Alarms	Contacts
		MSP2	Node 2	Alarms	Contacts
	P11	No Connection			
26 Left	P1A	SPN1	Node 3	Port 1	
		SPN1	Node 3	Port 2	Modem Port
		SPN1	Node 3	Port 3	
		SPN1	Node 3	Port 4	
		SPN2	Node 4	Port 1	

-continued-

Table 9-2xxx
Input/output cable identification (continued)

Shelf	Connector	Node type	Node number	Port number	Function
26 Left (Cont'd)	P1B	SPN2	Node 4	Port 2	Modem Port
		SPN2	Node 4	Port 3	
		SPN2	Node 4	Port 4	
		SPN3	Node 5	Port 1	
		SPN3	Node 5	Port 2	Modem Port
		SPN3	Node 5	Port 3	
	P1C	SPN3	Node 5	Port 4	
		TIFN1	Node 13	SMDI	Link 1
		TIFN1	Node 13	SMDI	Link 2
		TIFN1	Node 13	SMDI	Link 3
		TIFN1	Node 13	SMDI	Link 4
	P10	SPN4	Node 6	Port 1	
		SPN4	Node 6	Port 2	Modem Port
		SPN4	Node 6	Port 3	
		SPN4	Node 6	Port 4	
	P11	No Connection			
	T1-1	TIFN1	Node 13	T1	Span 1
		TIFN2	Node 14	T1	Span 1
	T1-2	TIFN1	Node 13	T1	Span 2
		TIFN2	Node 14	T1	Span 2
	T1-3	TIFN1	Node 13	T1	Span 3
		TIFN2	Node 14	T1	Span 3
	T1-4	TIFN1	Node 13	T1	Span 4
		TIFN2	Node 14	T1	Span 4
39 Right	P1A	SPN7	Node 9	Port 1	
		SPN7	Node 9	Port 2	Modem Port
		SPN7	Node 9	Port 3	
		SPN7	Node 9	Port 4	
		SPN8	Node 10	Port 1	
	P1B	SPN8	Node 10	Port 2	Modem Port
		SPN8	Node 10	Port 3	
		SPN8	Node 10	Port 4	
	P1C	TIFN4	Node 16	SMDI	Link 1
		TIFN4	Node 16	SMDI	Link 2
		TIFN4	Node 16	SMDI	Link 3
		TIFN4	Node 16	SMDI	Link 4
	P10	No Connection			
	P11	No Connection			

-continued-

Table 9-2xxx
Input/output cable identification (continued)

Shelf	Connector	Node type	Node number	Port number	Function
39 Left	P1A	SPN5	Node 7	Port 1	
		SPN5	Node 7	Port 2	Modem Port
		SPN5	Node 7	Port 3	
		SPN5	Node 7	Port 4	
		SPN6	Node 8	Port 1	
	P1B	SPN6	Node 8	Port 2	Modem Port
		SPN6	Node 8	Port 3	
		SPN6	Node 8	Port 4	
		SPN7	Node 9	Port 1	
		SPN7	Node 9	Port 2	Modem Port
		SPN7	Node 9	Port 3	
	P1C	SPN7	Node 9	Port 4	
		TIFN3	Node 15	SMDI	Link 1
		TIFN3	Node 15	SMDI	Link 2
		TIFN3	Node 15	SMDI	Link 3
		TIFN3	Node 15	SMDI	Link 4
	P10	SPN8	Node 10	Port 1	
		SPN8	Node 10	Port 2	Modem Port
		SPN8	Node 10	Port 3	
		SPN8	Node 10	Port 4	
	P11	No Connection			
	T1-1	TIFN3	Node 15	T1	Span 1
		TIFN4	Node 16	T1	Span 1
	T1-2	TIFN3	Node 15	T1	Span 2
		TIFN4	Node 16	T1	Span 2
	T1-3	TIFN3	Node 15	T1	Span 3
		TIFN4	Node 16	T1	Span 3
	T1-4	TIFN3	Node 15	T1	Span 4
		TIFN4	Node 16	T1	Span 4

Input/output cable replacement

For the specific cable to be replaced, identify the signals on the cable from the previous section and then follow the recommended procedure that is listed in Table 8-3. The actual procedures are discussed after Table 9-3.

Table 9-3xxx
Recommended I/O cable replacement procedures

Shelf	I/O connector	Recommended procedure
26 Right	P1A	Procedure B
	P1B	Procedure A
	P1C	No Connection
	P10	No Connection
	P11	No Connection
26 Left	P1A	Procedure A
	P1B	Procedure A
	P1C	Procedure A
	P10	No Connection
	P11	No Connection
	T1-1	Procedure C
	T1-2	Procedure C
	T1-3	Procedure C
	T1-4	Procedure C
39 Right	P1A	No Connection
	P1B	No Connection
	P1C	No Connection
	P10	No Connection
	P11	No Connection
39 Left	P1A	Procedure A
	P1B	Procedure A
	P1C	Procedure A
	P10	No Connection
	P11	No Connection
	T1-1	Procedure C

-continued-

Table 9-3xxx
Recommended I/O cable replacement procedures (continued)

Shelf	I/O connector	Recommended procedure
39 Left (cont'd)	T1-2	Procedure C
	T1-3	Procedure C
	T1-4	Procedure C

Procedure A

Take the associated nodes out-of-service by following the appropriate procedures contained in the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502). Listed below are the card replacement procedures to refer to in the 297-7001-502:

If the problem involves an:	Use the following procedure:
MSP	NTGX05AA for a MSP Node
SPN	NTGX05AA for a SPN Node
SMDI Link	NTGX05AA for a TIFN Node

Procedure B

Take the SPM out-of-service before replacing this cable.

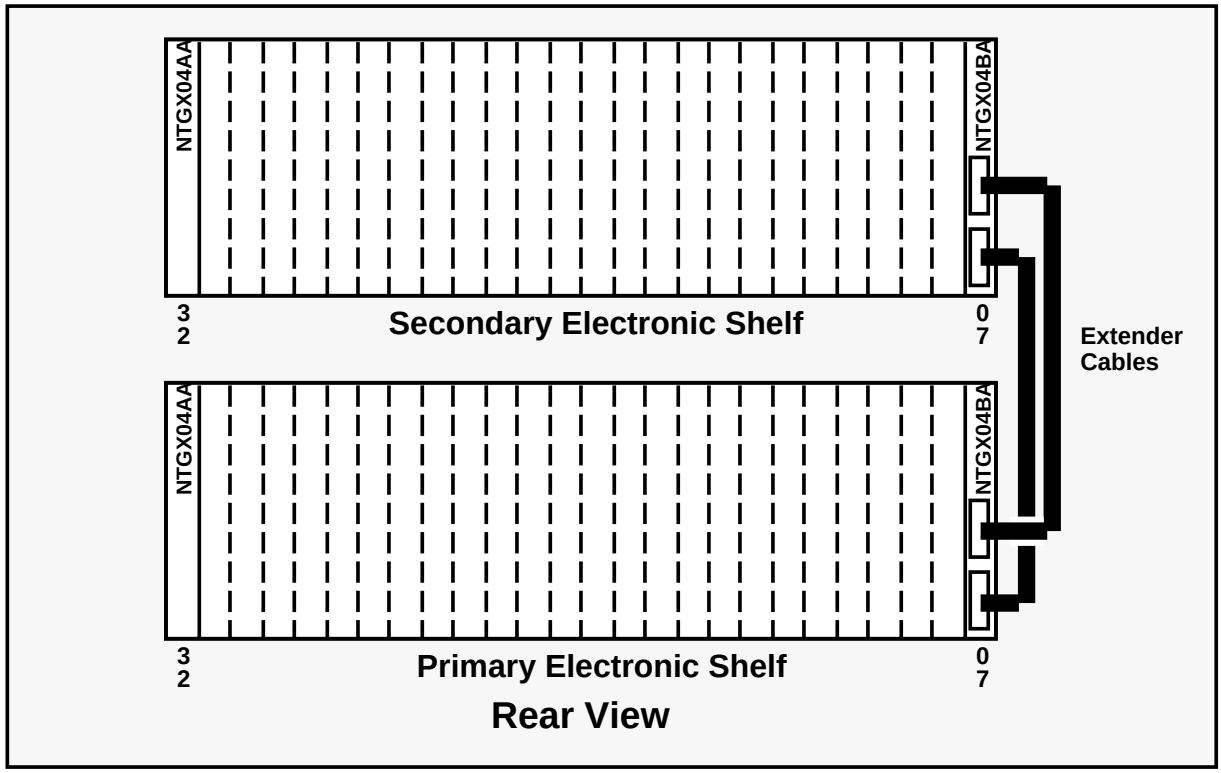
Procedure C

Take the specific T1 link out-of-service by following the appropriate procedures contained in the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

How the Meridian Mail bus is configured

Figure 9-8 illustrates how the Meridian Mail bus (MMBus) is physically configured.

Figure 9-8xxx
MMBus physical configuration



Bus extender cable replacement

To replace an extender cable between NTGX04BA bus extender transition modules, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502) for instructions on how to disable the affected transition modules.

After replacing an extender cable, monitor the reloading of all the affected nodes. Typically, the nodes on the secondary electronics shelf are affected. Refer to Figure 9-3 for an illustration of the affected nodes. For example, node 10 should have a SEER sequence as follows:

6099 OS Loaded successfully 10

Bus extender transition module replacement

To replace an NTGX04BA bus extender transition module, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

After replacing an extender cable or bus extender transition module, monitor the reloading of all the affected nodes. Typically, the nodes on the secondary electronics shelf are affected. Refer to Figure 9-3 for an illustration of the affected nodes. For example, node 10 should have a SEER sequence as follows:

6099 OS Loaded successfully 10

Bus terminator transition module replacement

To replace an NTGX04AA bus terminator transition module, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Primary shelf bus terminator symptoms

Cannot boot from a cold start

If the SPM cannot boot from a cold start, there may be a problem with the NTGX04AA bus terminator transition module on the primary electronics shelf. The shelf identification (ID) or shelf address can be corrupted by either incorrect switch settings or blown fuses on the NTGX04AA bus terminator transition module.

Remove and inspect the NTGX04AA bus terminator transition module from the primary electronics shelf. Check the switch settings and fuses. For detailed information on card removal, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Nodes unload while in service

If the nodes on the primary electronics shelf unload while in service, there may be a problem with the NTGX04AA bus terminator transition module on the primary electronics shelf.

If the nodes have unloaded, they will timeout on a diagnostics request. The following nodes can be affected: SPNs 1, 2, 3, and 4, and TIFNs 1 and 2. Refer to Figure 9-3 on page 9-6 for an illustration of all these nodes on the primary electronics shelf.

As each node is affected, the following SEER is generated for each node:

6058 PRM1 (Prime) ProgUnloaded: Lost Polling Node 4 Disappeared Error = 5

The shelf identification (ID) or shelf address can be corrupted by either incorrect switch settings or blown fuses on the NTGX04AA bus terminator transition module.

Remove and inspect the NTGX04AA bus terminator transition module from the primary electronics shelf. Check the switch settings and fuses. For detailed information on card removal, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Secondary shelf bus terminator symptoms

Nodes time-out booting

If the nodes on the secondary shelf time-out on a diagnostics request from a cold start, there may be a problem with the NTGX04AA bus terminator transition module on the secondary electronics shelf.

The following nodes can be affected: SPNs 5, 6, 7, and 8, and TIFNs 3 and 4. Refer to Figure 9-3 on page 9-6 for an illustration of all these nodes on the secondary electronics shelf.

As each node is affected, the following SEER is generated for each node:

6023 Timeout waiting for Bootrom response 10

The shelf identification (ID) or shelf address can be corrupted by either incorrect switch settings or blown fuses on the NTGX04AA bus terminator transition module.

Remove and inspect the NTGX04AA bus terminator transition module from the secondary electronics shelf. Check the switch settings and fuses. For detailed information on card removal, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Nodes unload while in service

If the nodes on the secondary electronics shelf unload while in service, there may be a problem with the NTGX04AA bus terminator transition module on the primary electronics shelf.

If the nodes have unloaded, they will timeout on a diagnostics request. The following nodes can be affected: SPNs 5, 6, 7, and 8, and TIFNs 3 and 4. Refer to Figure 9-3 on page 9-6 for an illustration of all these nodes on the primary electronics shelf.

As each node is affected, the following SEER is generated for each node:

6058 PRM1 (Prime) ProgUnloaded: Lost Polling Node 4 Disappeared Error = 5

The shelf identification (ID) or shelf address can be corrupted by either incorrect switch settings or blown fuses on the NTGX04AA bus terminator transition module.

Remove and inspect the NTGX04AA bus terminator transition module from the secondary electronics shelf. Check the switch settings and fuses. For detailed information on card removal, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502).

Other bus terminator symptoms

No SEERs

Local terminal lockup

Critical alarm

If the following symptoms are seen, there may be a problem with the NTGX04AA bus terminator transition module:

- no SEERs are generated
- local terminal locks up
- critical alarm is generated

If the problem is a power related fault, refer to the BCS34, or later, issue of the *DMS-100 Lines, Trunks, and Peripherals - External Subsystem Alarm and Performance Monitoring Procedures* (NTP 297-1001-583).

If the problem is not a power related fault, do each of the following steps in sequence:

Note: Refer to Figure 9-8 for an illustration of where the NTGX04AA bus terminator transition module is physically located.

1 Replace the NTGX04AA bus terminator transition module on the right side of the primary electronic shelf. To replace an NTGX04AA bus terminator transition module, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502). After the NTGX04AA bus terminator transition module is replaced, attempt to reboot the SPM.

2 If the secondary electronic shelf is unequipped, replace the NTGX04AA bus terminator transition module on the left side of the primary electronic shelf. To replace an NTGX04AA bus terminator transition module, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502). After the NTGX04AA bus terminator transition module is replaced, attempt to reboot the SPM.

3 If the secondary electronic shelf is equipped, replace the NTGX04AA bus terminator transition module on the right side of the secondary electronic shelf. To replace an NTGX04AA bus terminator transition module, refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502). After the NTGX04AA bus terminator transition module is replaced, attempt to reboot the SPM.

Bus extender transition module symptoms

Nodes unload on secondary shelf

If the nodes on the secondary electronics shelf unload while in service, there may be a problem with the NTGX04BA bus extender transition module on the primary electronics shelf.

If the nodes have unloaded, they will timeout on a diagnostics request. The following nodes can be affected: SPNs 5, 6, 7, and 8, and TIFNs 3 and 4. Refer to Figure 9-3 on page 9-6 for an illustration of all these nodes on the primary electronics shelf.

As each node is affected, the following SEER is generated for each node:

```
6058 PRM1 (Prime) ProgUnloaded: Lost Polling Node 8 Disappeared  Error = 5
```

Referring to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502), reseat and replace the MMBus extender components in the following order and check for clearing of the problem after each step:

1 extender cables connected to the NTGX04BA extender on both shelves.

2 extender NTGX04BA on the right-side primary shelf as per Figure 9-8.

3 extender NTGX04BA on the right-side secondary shelf as per Figure 9-8.

After replacing an extender cable, monitor the reloading of all the affected nodes. For example, node 8 should have a SEER sequence as follows:

```
6099 OS Loaded successfully 8
```

Loss of voice

Secondary electronic shelf is unequipped

If the secondary electronic shelf is unequipped, then the NTGX04BA bus extenders are not equipped. Install the NTGX04AA bus terminator transition module. Refer to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502) for the appropriate transition module procedure.

Secondary shelf is equipped and SEERs are generated

If the secondary electronic shelf is equipped, and the SEER listed below is generated:

```
6058 PRM1 (Prime) ProgUnloaded: Lost Polling Node 10 Disappeared Error = 5
```

> ***Note:*** SEERs related to the above faults typically reference all of the equipped nodes on the secondary electronics shelf under faulty extender conditions. However, some of the nodes on the primary electronics shelf may also be referenced. Refer to Figure 9-3 for node numbers.

Referring to the DMS VoiceMail Card Replacement Procedures (NTP 297-7001-502), reseat and replace the MMBus extender components in the following order and check for clearing of the problem after each step:

1 extender cables connected to the NTGX04BA extender on both shelves.

2 extender cable NTGX04BA on the right-side primary shelf as per Figure 9-8.

3 extender cable NTGX04BA on the right-side secondary shelf as per Figure 9-8.

After replacing an extender cable, monitor the reloading of all the affected nodes. For example, node 8 should have a SEER sequence as follows:

```
6099 OS Loaded successfully 8
```

If the condition remains, take the SPM out-of-service to replace the NTGX04AA terminator cards.

When the SPM is not in service, replace the NTGX04AA on the primary electronics shelf right-side and then reboot.

If the secondary electronics shelf is unequipped, replace the NTGX04AA on the primary electronics shelf left-side and then reboot.

If the secondary electronics shelf is equipped, replace the NTGX04AA on the primary electronics shelf right-side and then reboot.

Remote view bootup diagnostics

The following procedure is used by maintenance personnel for logging in to the service peripheral module (SPM) remotely and viewing the bootup diagnostics for both the signal processing node (SPN) and the multiserver processor (MSP) node. The procedures outlined in this section describe how to reconfigure the modem from a leased-line mode to a mode that will accept auto-answer and other parameters necessary for remote access to the SPN. In the first section, the port is set up and the SPN is booted so that the hardware database is updated to reflect the changes. In the second section you are shown what to do to log in to the SPN and view the diagnostics.

Note: The Telephony Interface Node (TIFN) cannot be viewed using this procedure because a reset on the TIFN 68K card causes the internal modem on the transition modules to also be reset which causes any modem setup for auto-answer to be lost on subsequent boots.

Setting up the modem

1 Change the hardware database on the SPN nodes internal modem port (Port 2) to a terminal type. This allows User Admin applications to run on that port.

2 Log in to the TOOLS administration level and configure a User Admin on the second port of the SPN.

3 Reboot the SPN by disabling the SPN from the MMI. This reboot allows the hardware database to pick up the changes made to the port type. For more information, refer to the procedures for disabling a node in the *Card Replacement Procedures* manual, NTP 297-7001-502. When the SPN reboots, the internal modem is enabled and set up for auto-answer.

4 Re-enable the SPN if it is disabled.

Dialing into the SPM

5 Dial into the SPN by using the modem command **ATDT nnnn** (where nnnn is the phone umber).

6 Once connected, the bootrom maintains the connection during the bootup sequence.

7 Reboot the node again by disabling the SPN through the the MMI. If the MMI is unavailable, or you are unable to reboot the node. Unseat the 68K card to force a reboot.

8 At this point, the user should be able to view the bootup sequence remotely.

Note: In place of steps 1 and 2, you can change the hardware database port name of the second port to UATxxxx and make it a terminal type with a window size 80x24.

Modem BIX tip and ring pairs for MSPs and SPNs

The following tables reflect the correct BIX tip and ring connections required to set up the modems for remote viewing of SPN and MSP bootrom diagnostics.

Table 10-1xxx
Modem tip and ring pairs (shelf 26 right)

I/O Panel connector	Pin number	Signal	Binder / Color
P1A (MSP1)	3 13	MR02 MT02	Blue / G2W Blue / G1W
P1B (MSP2)	1 11	MR12 MT12	Blue / BL2BK Blue / BL1BK

Table 10-2xxx
Modem tip and ring pairs (shelf 26 left)

I/O Panel connector	Pin number	Signal	Binder / Color
P1A (SPN1)	3 13	MR02 MT02	Blue / G2W Blue / G1W
P1B (SPN2)	1 11	MR12 MT12	Blue / BL2BK Blue / BL1BK
P1B (SPN3)	8 18	MR22 MT22	Orange / O2W Orange / O1W
P10 (SPN4)	6 16	MR42 MT42	N.A. R(BL) N.A. BL(R)

Table 10-3xxx
Modem tip and ring pairs (shelf 39 left)

I/O Panel connector	Pin number	Signal	Binder / Color
P1A (SPN5)	3 13	MR52 MT52	Blue / G2W Blue / G1W
P1B (SPN6)	1 11	MR12 MT12	Blue / BL2BK Blue / BL1BK

Table 10-4xxx
Modem tip and ring pairs (shelf 39 right)

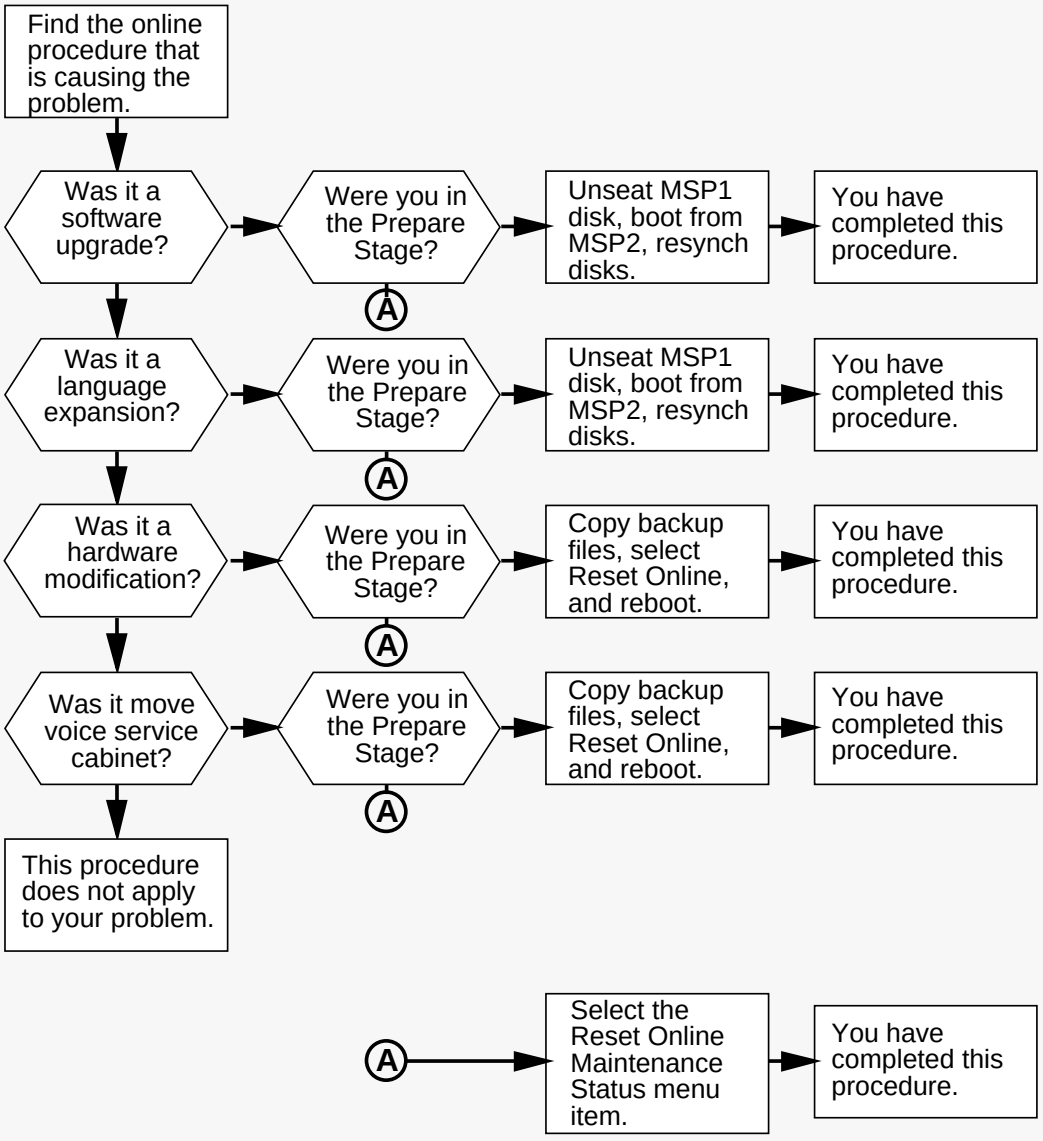
I/O Panel connector	Pin number	Signal	Binder / Color
P1A (SPN7)	3 13	MR02 MT02	Blue / G2W Blue / G1W
P1B (SPN8)	1 11	MR12 MT12	Blue / BL2BK Blue / BL1BK

Online recovery

Problems encountered during online maintenance can cause the system to abort a maintenance procedure and leave the system in an incomplete state. When problems of this type are encountered during an initial system installation or during software modifications to the system, use the following procedure to recover the system.

The following flowchart is a summary of this procedure. Use the instructions in the step-action table that follows the flowchart to perform the procedure.

Summary of Online recovery



Online recovery

Step	Action
1	Determine the online system maintenance procedure that you were using when the problem was encountered.

If you were doing	Do
Software Upgrade	Go to step 2.
Language Expansion	Go to step 5.
Hardware Modification	Go to step 8.
Move Voice Service Cabinet	Go to step 11.

Step	Action
2	**Recovering an online software upgrade** Determine which stage of the online software upgrade procedure the problem was encountered.

If you were in the	Do
Prepare stage	From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item.
Start system stage	Go to step 3.
Completion stage	Go to step 3.

Step	Action
3	Unseat the MSP1 disk and boot the system from the MSP2 disk. After rebooting, resynchronize the disks from the MMI screen.
4	You have completed this procedure.

-continued-

Online recovery (continued)

Step	Action
5	**Recovering an online language expansion** Determine which stage of the online language expansion procedure the problem was encountered.

If you were in the	Do
Prepare stage	From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item.
Start system stage	Go to step 6.
Completion stage	Go to step 6.

Step	Action
6	Unseat the MSP1 disk and boot the system from the MSP2 disk. After rebooting, resynchronize the disks from the MMI screen.
7	You have completed this procedure.
8	**Recovering an online hardware modification** Determine which stage of the online hardware modification procedure the problem was encountered.

If you were in the	Do
Prepare stage	From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item.
Start system stage	Go to step 9.
Completion stage	Go to step 9.

-continued-

Online recovery (continued)

Step	Action
9	Copy the backup StartList:RW1:PD:Startlist.back to :RW1:PD:Startlist. Copy the backup OFS/1/ofs/vm.back to /1/ofs/vm. Copy the backup Hardware Database /1/hwd.back to /1/hwd. Copy the backup System Record /1/isr1sysrec.back to /1/isr1sysrec. From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item. Reboot the system.
10	You have completed this procedure.
11	**Recovering an online move voice service cabinet** Determine which stage of the online move voice service cabinet procedure the problem was encountered.

If you were in the	Do
Prepare stage	From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item.
Start system stage	Go to step 12.
Completion stage	Go to step 12.

12	Remove the destination voice service cabinet. Copy the backup Hardware Database /1/hwd.back to /1/hwd. Copy the backup System Record /1/isr1sysrec.back to /1/isr1sysrec. From the OnLine Maintenance Menu, select the Reset On-line Maintenance Status menu item. Reboot the system.
13	You have completed this procedure.

DMS-100 Family

DMS VoiceMail

Trouble-locating and alarm-clearing procedures

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