

Lucent Technologies
Bell Labs Innovations



Data Networking Products Trunk Module Reference

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Preface

The *Data Networking Products Trunk Module Reference* provides the information needed to install, configure, and administer trunk modules common to the *Datakit® II VCS*, BNS-1000, and BNS-2000 data networking products. Procedures for routine operations, maintenance, and troubleshooting are also included.

Document Organization

The *Trunk Module Reference* explains module hardware, software, and troubleshooting in the following six chapters:

Trunk Module Overview	includes a physical description of the trunk modules and an overview of their features.
Trunk Module Installation	explains how to insert and remove an input/output (I/O) distribution board and a module.
Trunk Module Cabling	describes the cables and adapters required to connect compatible devices and equipment to trunk modules, and illustrates cabling configurations.
Trunk Module Administration	explains the implications of choosing certain module and I/O board options, and gives procedures for initial and routine administration.
Trunk Module Troubleshooting	provides the information and procedures needed to isolate and resolve trunk-related problems.
Trunk Module Commands	provides a detailed reference of the commands needed to administer, control, and maintain trunk modules. Included are command syntax, parameter options, input/output examples, report field definitions, and system responses.

In addition, the **Appendix** provides database entry forms as a guide for entering information in the configuration database.

Related Documentation

The *System Description* for your system provides a list of customer documentation for this release. Documents required for use with the *Data Networking Products Trunk Module Reference* include the

- *Node Reference* appropriate for your system
- *Planning Guide* appropriate for your system
- *Data Networking Products ISN Concentrator Reference*
- *Data Networking Products Messages Reference*
- *Data Networking Products Multipurpose Concentrator Reference*
- *Data Networking Products Session Maintenance Guide*—for systems using automatic alternate routing
- *Data Networking Products Synchronous/Asynchronous Multiplexer Reference*
- *StarKeeper II NMS Commands Reference*
- *StarKeeper II NMS Network Builder Guide*
- *StarKeeper II NMS Network Monitor Guide*
- *StarKeeper II NMS Performance Reporter*

Data Networking Products Terminology lists and defines many technical terms found in this document. Vendor documentation may be necessary for certain end devices.

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Trunk Module Overview

Trunks providing high-capacity connections for many channels interconnect nodes and ISN and Multipurpose Concentrator (BNS-2000 MPC), and Synchronous/Asynchronous Multiplexers (SAMs) that make up one or more networks. These trunks include the Standard Fiber Trunk (SFT), Standard Wire Trunk (SWT), Trunk-64 (TRK-64), Trunk-DDS (TRK-DDS), Trunk-HS (TRK-HS), Trunk-PQ (TRK-PQ), and Trunk-T1 (TRK-T1) modules.

Physical Description

The following describes the trunk module types. Specific details regarding trunk module installation, administration, and troubleshooting are provided in the appropriate chapters.

SFT Module

The SFT (MC1D085A1) module is the interface that links nodes over fiber optic cable to other nodes and to ISN concentrators and MPCs. The maximum cable length for fiber trunks is 2.91 km. The SFT module is used with the AWJ3 I/O board, which has an ST®-type fiber connector.

SWT Module

The SWT (TN2092/TN2092B) module is the standard interface for wire trunks between nodes and from nodes to ISN concentrators and MPCs. A variety of connections can be made by selecting the appropriate I/O board. Detailed hardware configuration information is provided in **Trunk Module Installation**.

- The AWJ9 I/O board provides a V.35 interface for the SWT module with or without non-return to zero inverted (NRZI) signal encoding.
- The AWJ10 I/O board provides an RS-422/449 interface for the SWT module with or without NRZI signal encoding.
- The AWJ11 I/O board provides an RS-232-C DTE connection for data terminal equipment (DTE).
- The AWJ33 I/O board provides a G.703/G.704/G.706 interface for the SWT module (TN2092B).

Trunk-64 Module

The Trunk-64 (TN2165B) is a wire interface that provides communications between nodes over a Digital Data Service (DDS) line, using one of two I/O boards:

- The AWJ9 I/O board provides two V.35 DTE ports, of which only one is used. Data service units (DSUs), such as the Lucent Technologies Model 2556 or 2656, are required.
- The AWJ11 I/O board provides two EIA RS-232-C DTE ports, of which only one is used. It is connected to a DSU that interfaces to a channel service unit (CSU).

The Trunk-64 is fully compatible with the two-board Trunk-DDS module (UN221, MC5P033A1). The Trunk-64 is supported in all applications where the Trunk-DDS is used.

Trunk-DDS Module

The Trunk-DDS module consists of two boards: a single-board processor (MC5P033A1) and an SC/DKI interface board (UN221). The SC/DKI board is on the left side of the module and contains the module switches and LEDs. The module address is taken from this board.

Trunk-HS Module

The Trunk-HS (TN1010) is a fiber interface that uses the AWJ2 I/O board to provide connections between nodes as well as connections between nodes and SAM64 modules. The counterpart for the Trunk-HS in the SAMs is the HS-Trunk module (TN1391). Refer to the *Synchronous/Asynchronous Multiplexer Reference* for a description of the HS-Trunk module.

Trunk-PQ Module

The Trunk-PQ (MC1D152A-1) is a single port wire interface that provides fair queuing and enhanced buffering for multi-protocol traffic, and enforcement of Committed Information Rate (CIR) for frame relay traffic at up to T1/E1 rates. The AWJ24 I/O board provides a V.35 DTE connection to the external device.

Trunk-T1 Module

The Trunk-T1 (TN1015) module is the interface for wire trunks that provide long-distance, high-speed point-to-point communication over a T1 digital transmission facility between nodes. The Trunk-T1 module is used with an AWJ4 I/O board that provides a V.35 or RS-422/449 interface to an external multiplexing device, such as a DSU/CSU.

Features

Trunk modules feature multiple channel high-speed interconnection capabilities for nodes and concentrators. These features are supported by maintenance diagnostic capabilities, call setup, session maintenance, and interworking. A variety of configurable options are also available.

Interconnections

Trunks provide the following transmission capabilities for interconnecting nodes and nodes to concentrators:

- The SFT operates at standard speeds up to 8.64 Mbps and supports up to 2042 virtual circuits.
- The SWT and Trunk-T1 operate at standard speeds from 9600 bps to 2.048 Mbps. The SWT supports up to 506 virtual circuits; the Trunk-T1 supports up to 2042 virtual circuits.
- Both the Trunk-64 and the Trunk-DDS operate at speeds up to 64 Kbps, and support up to 504 virtual circuits for end users. The Trunk-DDS can also operate as an interface to an analog carrier up to 9.6 Kbps, using modems, or 19.2 Kbps, using duoplexors.
- The Trunk-HS operates at 8 Mbps on optical fiber for a maximum distance of 3 km, and supports a maximum of 2042 virtual circuits for end users.
- The Trunk-PQ operates at speeds up to T1 and E1 rates, and supports fair queuing in a multi-protocol environment and the capability to support CIR for frame relay traffic throughout the network. It supports a maximum of 2038 user channels (2000 with session maintenance) when **TRAFFIC TYPE** is configured for *non-cir*, or a maximum of 502 user channels (500 with session maintenance) when **TRAFFIC TYPE** is configured for *cir* or *both*.

Diagnostics

Trunk module diagnostic software is used to isolate and segment problems that occur on trunk interconnections. In addition, alarms indicate the existence of problems, and *StarKeeper*® II NMS offers network monitoring and fault isolation analysis.

Call Setup

A variety of virtual connection capabilities are provided for endpoints at either end of a trunk. These include security screening to manage access to node resources and alternate routing to provide redundant interconnections and to minimize transmission failures.

Session Maintenance

Session maintenance provides the ability to maintain established calls or sessions despite failed trunk facilities. With session maintenance, when a trunk failure occurs, all active calls on that trunk are rerouted over standby trunks. To configure session maintenance trunks,

StarKeeper II NMS is required. See the *Session Maintenance Guide* for details.

Interworking

In keeping with the modular architecture of the network, no restrictions are imposed on connection topology—nodes can be trunked together in any configuration to support the characteristics and requirements of a given network. Except for Trunk-64–Trunk-DDS connections however, only trunks of the same module type can interwork (i.e., a trunk module from one node must be connected to the same trunk module type in another node).

Options

The following parameter options can be configured in the database with the **enter trunk** command:

- for all trunks:
 - module type
 - a set of security patterns used to check the destination address of calls at a strategic point in a network in order to permit, deny, or limit access to a certain host, node, or set of nodes for calls coming in to a trunk
- for an SWT:
 - maximum frame size combinations for the high-priority transmit queue (HPQ) and the low-priority transmit queue (LPQ) for a wire trunk
- for an SWT or Trunk-T1:
 - line speeds specifying the data transmission rate of a wire trunk connected to the module
- for SFT, SWT, Trunk-HS, and Trunk-T1:
 - enable/disable collection of trunk traffic measurement data
- for SFT, SWT, Trunk-HS, Trunk-PQ, and Trunk-T1:
 - the frequency for running trunk active (*keepalive*) tests
 - the maximum consecutive trunk active tests that can fail before the trunk is declared *dead*
- for a Trunk-PQ:
 - traffic type
 - CIR related parameters
 - optimization for low delay or high throughput

Trunk Module Installation

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Trunk Module Installation

Trunk module installation consists of inserting the I/O distribution board in the backplane slot and the module in the corresponding shelf slot.

This section provides specific information for setting switches and positioning jumpers, as well as procedures for inserting and removing I/O boards and trunk modules.

When installing a trunk module:

1. Ensure protection from electromagnetic interference (EMI, see inside front cover). Wear an electrostatic discharge (ESD) wrist strap to prevent equipment damage. See the *Node Reference* for grounding locations and related details.
2. Verify that the I/O board to be installed is appropriate for use with the type of trunk module being installed.
3. Ensure that the correct slot is designated for the module. Refer to the *Planning Guide* and the *Node Reference* for module placement in the node. See the *Data Networking Products Multipurpose Concentrator Reference* for placement of LIMs in the BNS-2000 MPC. For placement of LIMs in ISN concentrators, refer to the *Data Networking Products ISN Concentrator Reference*.
4. Where appropriate, set the switches, or position the jumpers on the I/O board, before inserting it in the backplane; see *Setting Options on Modules and I/O Boards* in this chapter.

CAUTION: To prevent damage to module circuitry, **always** insert the I/O board **before** inserting its corresponding module. **Never** remove the I/O board before removing the module.

5. Insert the appropriate I/O board(s); see Procedure 2-1.
6. Position the jumpers on the trunk modules where required; see *Setting Options on Modules and I/O Boards*.
7. Insert the trunk module(s); see Procedure 2-3.
8. Cable the I/O board ports to support external devices; see **Trunk Module Cabling**.
9. Examine the LEDs on the I/O board. If they are lit, refer to **Trunk Module Troubleshooting** for their significance.

Setting Options on Modules and I/O Boards

The I/O boards used with SFT and SWT modules have three switches: the upper switch, when used, enables or disables NRZI signal encoding for wire trunks; the lower two switches enable *magic*, a property that gives a module control over access to the backplane. The I/O boards used with Trunk-DDS modules also have switches which control various module functions.

The directions for setting these switches apply when you are holding the I/O board with the backplane connector to your left, the interface connectors to your right, and the switches facing you. A slide switch is moved in the specified direction. A rocker switch is pushed in on the specified side.

SFT Module (MC1D085A1) with AWJ3 I/O Board

The AWJ3 I/O board is used with the SFT module. The default switch position (Down) applies when the AWJ3 is used in the node. Magic is *disabled* with S1.2 and S1.3; S1.1 is not used. When the AWJ3 I/O board is used with the SFT in an MPC15, magic is *enabled*. When it is used in an MPC7, magic is *disabled*.

TABLE 2-1. Switch Settings for AWJ3 I/O Board with SFT Module (MC1D085A1)

Switch	Function	Position	
		Up	Down (default)
S1.1	Not used		
S1.2	PERENA (Permanently enabled)	Connects pin 205 to ground (magic enabled)	Open circuit (magic disabled)
S1.3	BRESET (Backplane reset)	Connects pin 106 to pin 105 (magic enabled)	Open circuit (magic disabled)

SWT Module (TN2092/TN2092B) with AWJ9, AWJ10, AWJ11, and AWJ33 I/O Boards

The AWJ9, AWJ10, AWJ11, and AWJ33 I/O boards are used with the SWT module. The default switch position (Right) for the AWJ9 and AWJ11 I/O boards, and (Left) for the AWJ10 I/O board, applies when these boards are used in the node. Magic is *disabled* with S1.2 and S1.3. When the AWJ33 is used in the node, magic must be disabled with S1.3 and S1.4. When the AWJ9, AWJ10, AWJ11, or AWJ33 I/O board is used with the SWT in an MPC15, magic is *enabled*. When it is used in an MPC7, magic is *disabled*.

TABLE 2-2. Switch Settings for AWJ9 I/O Board with SWT Module (TN2092/TN2092B)

Switch	Function	Position	
		Left	Right (default)
S1.1	NRZI	Enabled	Disabled
S1.2	PERENA (Permanently enabled)	Connects pin 205 to ground (magic enabled)	Open circuit (magic disabled)
S1.3	BRESET (Backplane reset)	Connects pin 106 to pin 105 (magic enabled)	Open circuit (magic disabled)

TABLE 2-3. Switch Settings for AWJ10 I/O Board with SWT Module (TN2092/TN2092B)

Switch	Function	Position	
		Left (default)	Right
S1.1	NRZI	Disabled	Enabled
S1.2	PERENA (Permanently enabled)	Open circuit (magic disabled)	Connects pin 205 to ground (magic enabled)
S1.3	BRESET (backplane reset)	Open circuit (magic disabled)	Connects pin 106 to pin 105 (magic enabled)

TABLE 2-4. Switch Settings for AWJ11 I/O Board with SWT Module (TN2092/TN2092B)

Switch	Function	Position	
		Left	Right (default)
S1.1	NRZI	Enabled	Disabled
S1.2	PERENA (Permanently enabled)	Connects pin 205 to ground (magic enabled)	Open circuit (magic disabled)
S1.3	BRESET (Backplane reset)	Connects pin 106 to pin 105 (magic enabled)	Open circuit (magic disabled)

TABLE 2-5. Switch Settings for AWJ33 I/O Board with SWT Module (TN2092B)

Switch	Function	Position	
		On	Off
S1.1	BER	BER 10E-6*	BER 10E-3
S1.2	Not used		
S1.3	BRESET (Backplane reset)	Magic enabled	Magic disabled*
S1.4	PERENA (Permanently enabled)	Magic enabled	Magic disabled*

* Indicates the default setting.

Jumper Settings on SWT (TN2092/TN2092B) Module

The SWT module (TN2092/TN2092B) has three jumpers to control various module functions; see Figure 2-1.

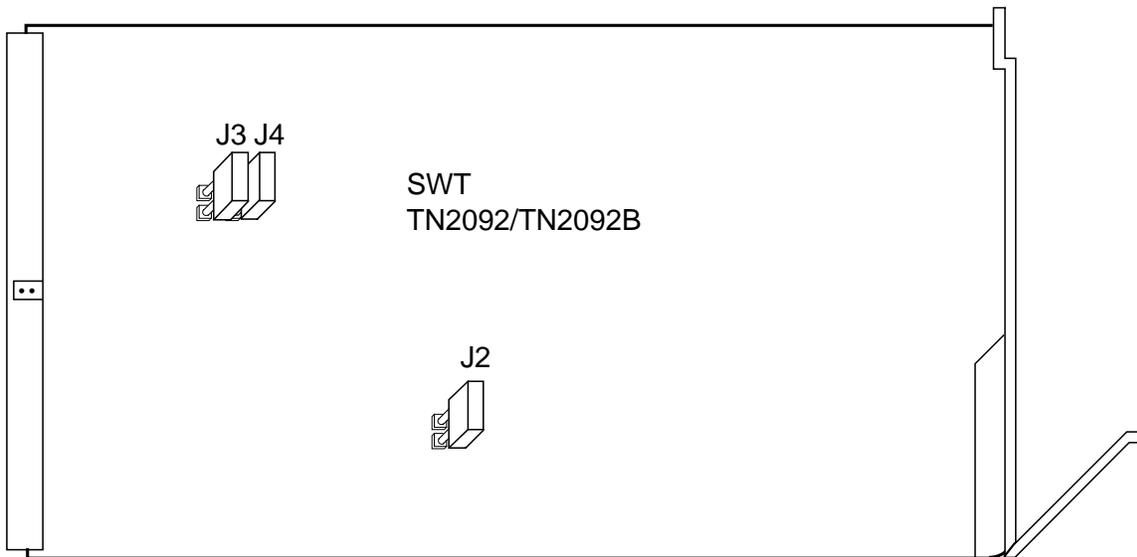


FIGURE 2-1. Jumper Locations on TN2092/TN2092B Module

Jumper J2 controls queuing. For normal operation, the jumper is installed (In) to allow the use of both low- and high-priority queues. Removing the jumper (Out) limits service to the low-priority queue. Jumpers J3 and J4 control the source of the terminal timing signal on the RS-449/422 or V.35 interface, and terminal timing for the SWT; see Table 2-6.

For the G.703/G.704/G.706 interface provided by the AWJ33, jumpers J3 and J4 should be Out for normal operation, and for all diagnostic tests.

For the SWT module using the AWJ9, AWJ10, or AWJ11 I/O board, use terminal timing whenever the cable length between the SWT module and its modem exceeds the distances shown in Table 2-9. If you enable terminal timing on the SWT module, you must also enable it on the connected modem. For loopback testing with no modem connected, set the timing type to the internal clock (11 kHz). The two terminal timing settings, shown in Table 2-6, allow increased cable length between the SWT and its modem; see Table 2-9. If the cable length is *less* than that given for a data rate, terminal timing is not required and both jumpers J3 and J4 should be removed (Out Out).

TABLE 2-6. Jumper Positions for SWT Module

J2	J3	J4	Timing Type	Usage
In				Normal position is In. Uses both low- and high-priority queues.
Out				Uses only low-priority queue.
	Out	Out	No terminal timing	Normal setting; both jumpers removed.
	In	Out	Internal clock	Used when loopback connector is installed in any I/O board except the AWJ33.
	Out	In	DCE transmit clock	Used for terminal timing if modem provides this signal in terminal timing mode. (Not applicable to the AWJ33.)
	In	In	DCE receive clock	Used for terminal timing if modem does not provide the DCE to clock signal in terminal timing mode. (Not applicable to the AWJ33.)

Jumper Positions on AWJ33 I/O Board

The AWJ33 I/O board jumper positions vary according to function and connectors used. Figure 2-2 shows the jumper locations, as well as the switch and red LED locations, and Tables 2-7 and 2-8 list the jumper positions and functions.

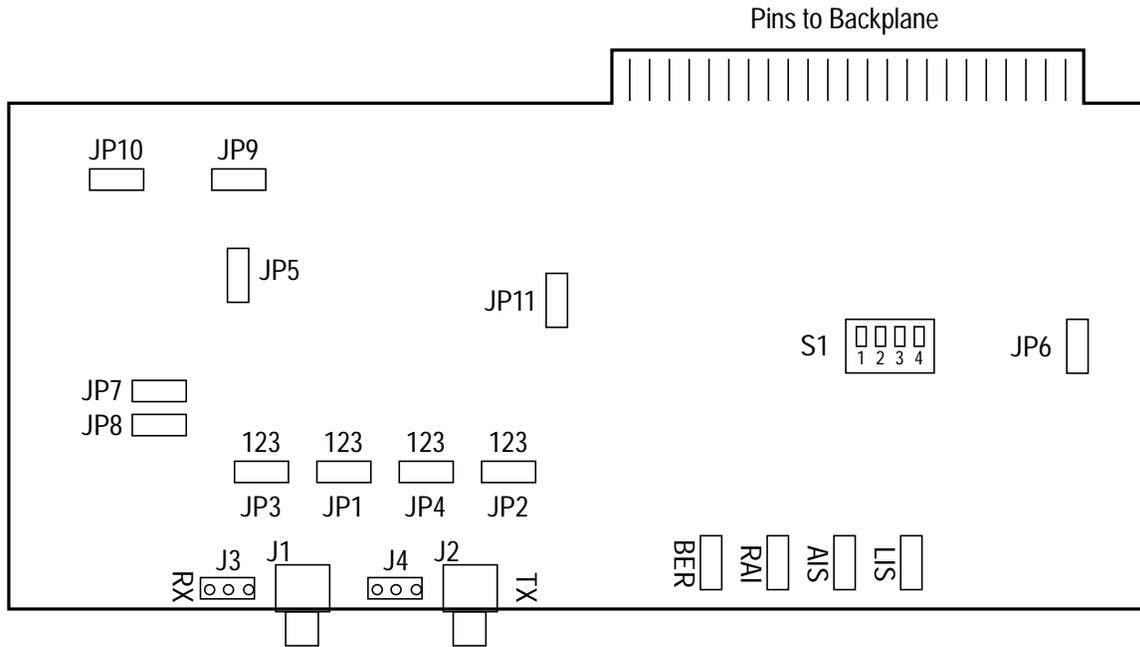


FIGURE 2-2. Jumper, Switch, and LED Locations on AWJ33 I/O Board

TABLE 2-7. Jumper Positions for AWJ33 I/O Board—75 Ω Connectors

Jumper	Pins	Function
JP1	1 and 2	Outer conductor RX connected to earth
	2 and 3*	Outer conductor RX not connected to earth
JP2	1 and 2**	Outer conductor TX connected to earth
	2 and 3	Outer conductor TX not connected to earth
JP5	2 and 3*	Set to 75 Ω operation
JP6	1 and 2	SWT signal resets I/O board.
	2 and 3*	I/O board not reset by SWT.
JP7, JP8, JP9, JP10	not numbered*	Set for 75 Ω operation

* Indicates default setting.

** Indicates default setting as imposed by CCITT Recommendation G.703.

TABLE 2-8. Jumper Positions for AWJ33 I/O Board—120 Ω Connectors

Jumper	Pins	Function
JP3	1 and 2	Shield RX connected to earth.
	2 and 3*	Shield RX not connected to earth.
JP4	1 and 2**	Shield TX connected to earth.
	2 and 3	Shield TX not connected to earth.
JP5	1 and 2	Set to 120 Ω operation.
JP6	1 and 2	SWT signal resets I/O board.
	2 and 3	I/O board not reset by SWT.
JP7, JP8, JP9, JP10	not numbered	Remove for 120 Ω operation.

* Indicates default setting.

** Indicates default setting as imposed by CCITT Recommendation G.703.

Data Rates and Cable Length Restrictions for SWT (TN2092/TN2092B) Module

The maximum cable length that can be used to connect an SWT to a modem or DSU is determined by the device. Table 2-9 shows the maximum cable lengths for connecting an SWT if terminal timing is not enabled. The terminal timing option is not applicable to an SWT module using the AWJ33 I/O board.

TABLE 2-9. Data Rates and Cable Length Restrictions for SWT Module

Interface	Data Rate	Maximum Cable Length (ft)	
		Feet	(or) Meters
RS-232-C	<=19.2 Kbps	50	
RS-449/422 or V.35	2.0 Mbps	20	
	1.5 Mbps	40	
	1.0 Mbps	60	
	500 Kbps	140	
	100 Kbps	800	
	<=56 Kbps	1600	
		Feet	(or) Meters
G.703	2.048 Mbps		
75 Ω		820	250
120 Ω		820	250
with cross-sectional area of $.5\text{mm}^2$			
120 Ω		984	300
with cross-sectional area of $.6\text{mm}^2$			

Trunk-DDS 56 Kbps (UN221, MC5P033A1) with ED-5P076-30 and ED-5P080-30 I/O Boards

The default position handles most equipment, but switches can be set to interface as necessary.

TABLE 2-10. Switch Settings for I/O Board ED-5P076-30, G1 (DDS 56 Kbps)

Switch	Function	Position	
		Left (default)	Right
S1.1	Chan A-DSR-6	Controlled by USART A-DSR signal	Permanently enabled
S1.2	Chan A-DCD-8	Permanently enabled	Controlled by USART A-DTR signal
S1.3	USART A-CTS	Controlled by Chan A-RTS-4	Permanently enabled
S1.4	USART A-DCD	Controlled by Chan A-DTR-20	Permanently enabled
S1.5	USART B-CTS	Controlled by Chan B-CTS-106	Controlled by Chan B-DSR-107

TABLE 2-11. Switch Settings for I/O Board ED-5P080-30, G1 (DDS 56 Kbps)

Switch	Function	Position	
		Left (default)	Right
S1.1	BS0	Address select BS0 (Pin 346) grounded	Open circuit
S1.2	BS1	Address select BS1 (Pin 347) grounded	Open circuit
S1.3	BS2	Address select BS2 (Pin 348) grounded	Open circuit

Trunk-DDS < 56 Kbps (UN221, MC5P033A1) with ED-5P079-30 and ED-5P080-30 I/O Boards

The default position handles most equipment, but switches can be set to interface as necessary.

TABLE 2-12. Switch Settings for I/O Board ED-5P079-30, G1 (DDS < 56 Kbps)

Switch	Function	Position	
		Left (default)	Right
S1.1	Chan A-DSR-6	Controlled by USART A-DSR signal	Permanently enabled
S1.2	Chan A-DCD-8	Permanently enabled	Controlled by USART A-DTR signal
S1.3	USART A-CTS	Controlled by Chan A-RTS-4	Permanently enabled
S1.4	USART A-DCD	Controlled by Chan A-DTR-20	Permanently enabled
S1.5	USART B-CTS	Controlled by Chan B-CTS-5	Controlled by Chan B-DSR-6

TABLE 2-13. Switch Settings for I/O Board ED-5P080-30, G1 (DDS < 56 Kbps)

Switch	Function	Position	
		Left (default)	Right
S1.1	BS0	Address select BS0 (Pin 346) grounded	Open circuit
S1.2	BS1	Address select BS1 (Pin 347) grounded	Open circuit
S1.3	BS2	Address select BS2 (Pin 348) grounded	Open circuit

Trunk-64 (MC1D105A1) with AWJ9 and AWJ11 I/O Boards

Magic is always *disabled* because the AWJ9 and AWJ11 I/O boards are used only in the node.

TABLE 2-14. Switch Settings for AWJ9 I/O Board with Trunk-64 Module

Switch	Function	Position	
		Left	Right (default)
S1.1	NRZI	Enabled	Disabled
S1.2	PERENA (Permanently enabled)	Connects pin 205 to ground (magic enabled)	Open circuit (magic disabled)
S1.3	BRESET (Backplane reset)	Connects pin 106 to pin 105 (magic enabled)	Open circuit (magic disabled)

TABLE 2-15. Switch Settings for AWJ11 I/O Board with Trunk-64 Module

Switch	Function	Position	
		Left	Right (default)
S1.1	NRZI	Enabled	Disabled
S1.2	PERENA (Permanently enabled)	Connects pin 205 to ground (magic enabled)	Open circuit (magic disabled)
S1.3	BRESET (Backplane reset)	Connects pin 106 to pin 105 (magic enabled)	Open circuit (magic disabled)

Trunk-HS Module (TN1010) with AWJ2 I/O Board

The Trunk-HS module does not require any jumper or switch settings on the module or I/O board.

Trunk-PQ Module (MC1D152A-1) with AWJ24 I/O Board

The Trunk-PQ module does not require any jumper or switch settings on the module or I/O board.

Trunk-T1 Module (TN1015) with AWJ4 or AWJ59 I/O Board

The Trunk-T1 module uses baud rates set by the software, and does not require any jumper or switch settings on the module or I/O board.

Procedures

The following procedures give the steps for inserting and removing an I/O board and for inserting and removing a trunk module.

PROCEDURE 2-1. Inserting the I/O Board

The I/O board plugs into the backplane at the rear of the shelf; it is held in place by shrouds on the backplane pinfield, and secured with two screws.

Insert the I/O board before inserting its corresponding trunk module.

1. Align the I/O board backplane connector with the backplane pinfield, and align the screw slots with the screw holes.
2. Slip the backplane connector onto the pins.
The board should seat easily. If seating is difficult, the board may be canted or some pins may be bent.
3. Insert the screws, and tighten them securely.

PROCEDURE 2-2. Removing the I/O Board

Remove the I/O board **only** for relocation, replacement, or board type confirmation.

Requirement: Module in the slot corresponding to the I/O board must be removed.

1. Disconnect all cabling to I/O board ports, labeling the cable ends if appropriate.
2. Remove the screws holding the I/O board in place.
3. Carefully rock the board as you pull it out.

PROCEDURE 2-3. Inserting the Trunk Module

Requirement: I/O board for the module must be in its corresponding slot on the backplane at the rear of the shelf.

1. Set the mode switch on the module faceplate to Disab.
2. With the module latch(es) extended, carefully push the module all the way into the slot. The backplane pins slip into the module receptacle.
3. Close the latches to lock the module into position.
4. Move the mode switch on the module faceplate to Enabl.

For the two-board module, set the mode switch on each module faceplate to Enabl.

PROCEDURE 2-4. Removing the Trunk Module

You can remove and replace a trunk module in an operating node without damaging the module itself, or without disrupting calls on other modules. Only the calls on the trunk module being removed are disrupted.

Requirement: I/O board for the module must still be in its corresponding slot on the backplane at the rear of the shelf.

1. If the mode switch is in the Enabl position, move it to Disab.
For the two-board module, set the mode switch on each module faceplate to Disab.
2. Open the latch(es) on the module faceplate.
3. Pull the module straight out of the slot.

Trunk Module Cabling

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Trunk Module Cabling

This chapter provides the following trunk module information for cabling *Datakit II VCS* nodes, BNS-2000 VCS nodes, BNS-2000 Series M1 Shelves, ISN and Multipurpose Concentrators, and SAMs in a network:

- a brief description of the trunk module types that can be installed in nodes for fiber and wire trunks
- figures illustrating the trunk module interfaces between nodes, and from nodes to concentrators and SAMs in the network
- tables indicating the specific trunk modules that are best suited, based on trunk speed requirements, for connections within the network
- detailed information (speed ranges, interface types supported, and I/O boards) for each trunk module in various connection configurations
- instructions and figures illustrating each cabling configuration in a network
- tables providing cable ordering information* for each configuration

Module Types

Fiber trunks provide the highest transmission rates but are limited to about 3 km in length. The Standard Fiber Trunk (SFT) is used to connect nodes to other nodes, and as a LIM to a concentrator. The Trunk-HS provides *Datakit II VCS* and BNS-2000 VCS connections between nodes and to SAM64 and SAM504 modules.

Wire trunks are used when the transmission distance exceeds 3 km or where installation of fiber is not practical. The Standard Wire Trunk (SWT) and Trunk-T1 are used to connect nodes; the Trunk-PQ provides priority connections between nodes. In addition, the SWT is used as a LIM to a concentrator, and the Trunk-T1 provides *Datakit II VCS* and BNS-2000 VCS connections to SAM64 modules. The Trunk-64 and Trunk-DDS provide *Datakit II VCS* and BNS-2000 VCS connections between nodes over a DDS line.

* Some cables are available with plenum sheathing. These cables have a HALAR® outer sheath that satisfies electrical code restrictions on emission of toxic fumes in a fire, and can be used in air-return plenums. For additional plenum sheathing information, refer to the *Data Networking Products Cabling Guide*.

Trunk Interfaces Between Nodes

The following figures show various trunk interfaces in a network. Figure 3-1 illustrates the interfaces between a Series M1 Shelf, and another Series M1 Shelf, a BNS-1000 node, a *Datakit II* VCS node, a BNS-2000 VCS node or a *Datakit* VCS node. Figure 3-2 illustrates trunk interfaces between a BNS-2000 VCS node and a *Datakit II* VCS node, or from a *Datakit II* VCS node or a BNS-2000 VCS node to a *Datakit* VCS node. Figure 3-3 illustrates trunk interfaces between a BNS-2000 VCS node, concentrators, and SAMs. Figure 3-4 shows the Series M1 Shelf connections to SAMs and MPCs.

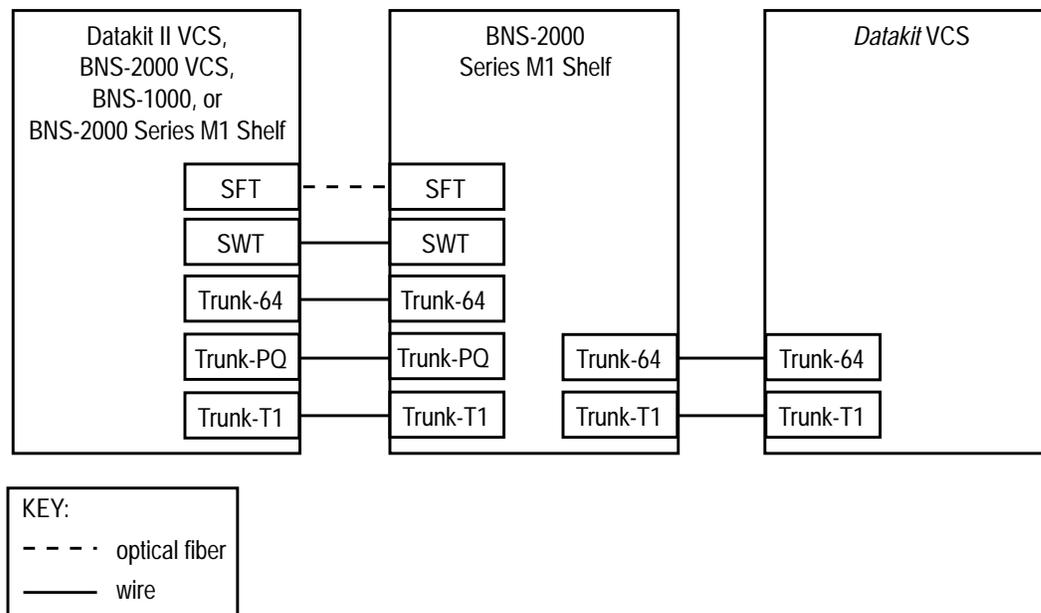


FIGURE 3-1. Series M1 Shelf to Series M1, BNS-1000, *Datakit II* VCS, BNS-2000 VCS or *Datakit* VCS

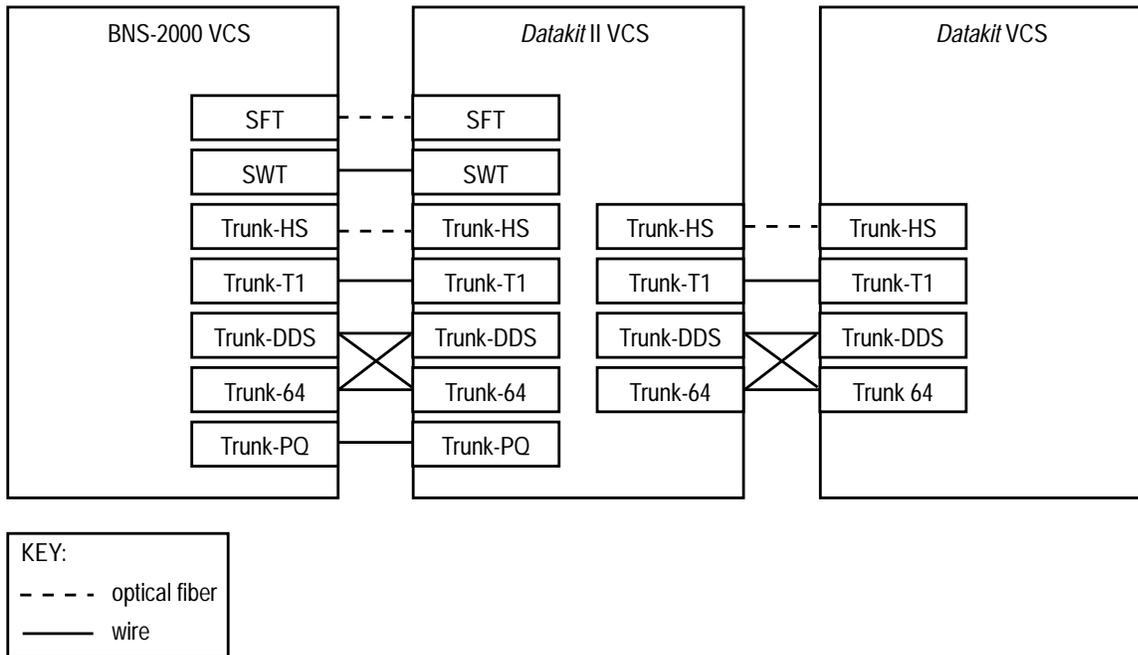


FIGURE 3-2. BNS-2000 VCS to *Datakit II VCS*, or *Datakit VCS*

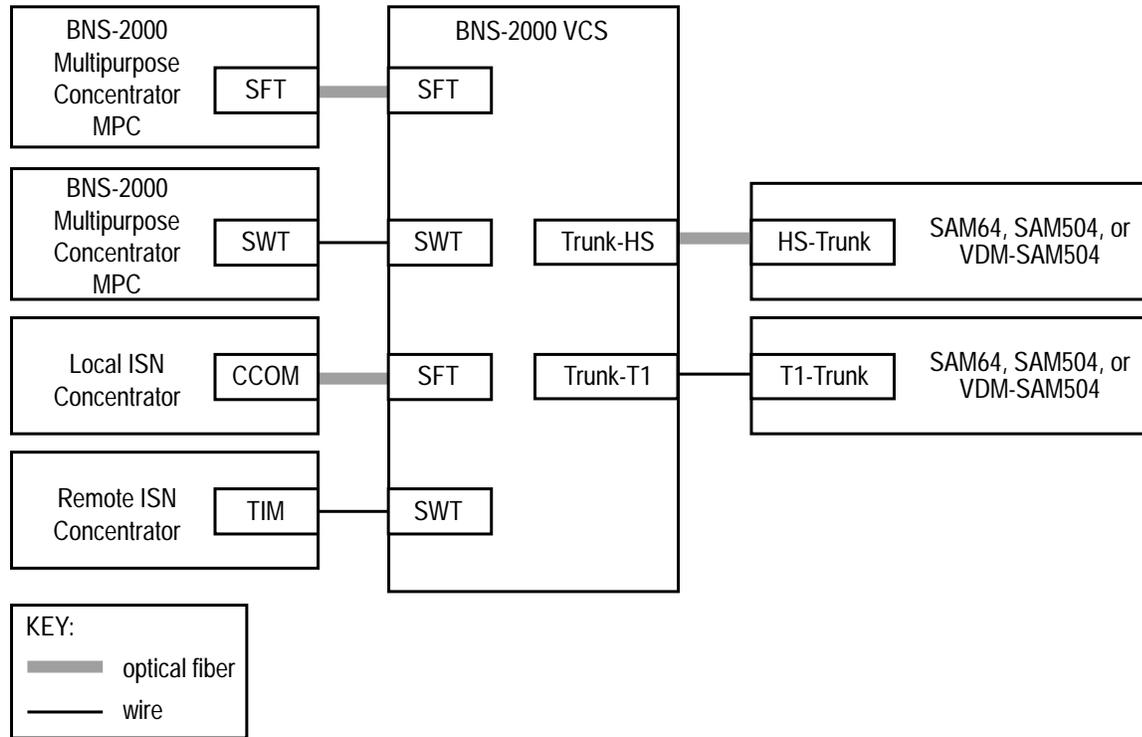


FIGURE 3-3. Trunk Interfaces Between BNS-2000 VCS Node, Concentrators, and SAMs

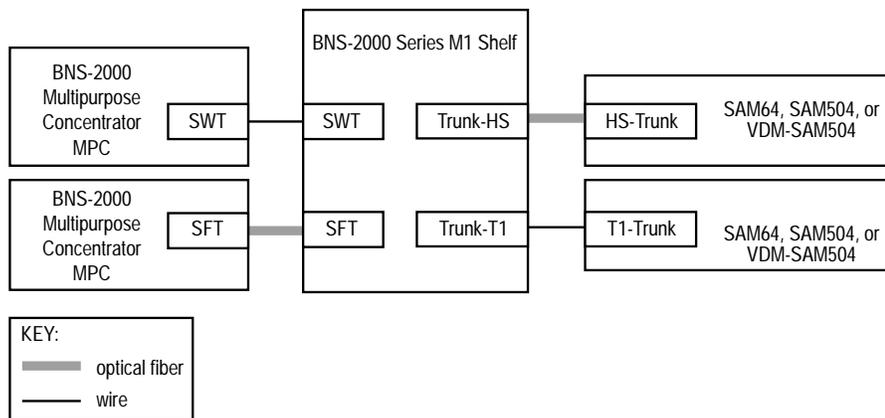


FIGURE 3-4. Series M1 Shelf to SAMs and MPCs

Recommended Trunk Selection

Certain trunks are recommended based on the traffic loads and applications indicated. For additional trunk selection information see **Design Issues** in the *Planning Guide*.

TABLE 3-1. BNS-2000 VCS Recommended Trunks

Trunking from BNS-2000 VCS Node to	Trunk Speed Requirement					
	8.64 M	2.048 M	1.544–2.048 M	56 K–1544 M	64 K	< 56 K
BNS-2000 Series M1 Shelf	SFT	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64	SWT Trunk-T1 Trunk-T1 Trunk-64
<i>Datakit</i> II VCS Node	SFT Trunk-HS	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64 Trunk-DDS	SWT Trunk-T1 Trunk-T1 Trunk-64 Trunk-DDS
BNS-2000 VCS Node	SFT Trunk-HS	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64 Trunk-DDS	SWT Trunk-T1 Trunk-T1 Trunk-64 Trunk-DDS
<i>Datakit</i> VCS Node	Trunk-HS		Trunk-T1	Trunk-T1	Trunk-T1 Trunk-64 Trunk-DDS	Trunk-T1 Trunk-64 Trunk-DDS
BNS-1000 Node	SFT Trunk-HS	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64	SWT Trunk-T1 Trunk-T1 Trunk-64
MPC7, MPC15, BNS-2000 MPC or ISN Concentrator**	SFT (LIM)	SWT (LIM) (w/AWJ33)	SWT (LIM)	SWT (LIM)	SWT (LIM)	SWT (LIM)
SAM64, SAM504	Trunk-HS	—	Trunk-T1	Trunk-T1	Trunk-T1	Trunk-T1

** SWT Module with AWJ33 I/O board connects only to MPC7 and MPC15.

TABLE 3-2. Series M1 Shelf Recommended Trunks

Trunking from Series M1 Shelf to	Trunk Speed Requirement				
	8.64 M	2.048 M	1.544–2.048 M	56 K–1544 M	56 K
BNS-2000 Series M1 Shelf	SFT	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64
<i>Datakit II</i> VCS Node	SFT	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64
BNS-2000 VCS Node	SFT	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64
<i>Datakit</i> VCS Node			Trunk-T1	Trunk-T1	Trunk-T1 Trunk-64
BNS-1000 Node	SFT	SWT (w/AWJ33)	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ	SWT Trunk-T1 Trunk-PQ Trunk-64
MPC7, MPC15, BNS-2000 MPC	SFT (LIM)	SWT (LIM) (w/AWJ33)	SWT (LIM)	SWT (LIM)	SWT (LIM)
SAM64, SAM504	Trunk-HS	—	Trunk-T1	Trunk-T1	Trunk-T1

Connecting Nodes in the Network

This section specifies the trunk modules used in various network configurations: between BNS-2000 VCS nodes or Series M1 Shelves, from a BNS-2000 VCS node or Series M1 Shelf to another node, or to a concentrator or a SAM.

TABLE 3-3. BNS-2000 VCS Connections

Connections From BNS-2000 VCS Node to	Trunk Module	Speed (bps)	Interface Type	I/O Board
<i>Datakit II VCS Node</i>	SWT	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
		2.048M	G.703/G.704/G.706	AWJ33
	SFT	8M	Fiber optic	AWJ3
	Trunk-64	1200 to 19200	RS-232-C	AWJ11
		48K, 56K, 64K	V.35	AWJ9
	Trunk-DDS	9600 to 19200	RS-232-C	ED5P080-30,G1 ED5P079-30,G1
48K, 56K, 64K		V.35	ED5P080-30,G1 ED5P076-30,G1	
Trunk-HS	8M	Fiber optic	AWJ2	
Trunk-PQ	56K to 2.048M	V.35	AWJ24	
Trunk-T1	56K to 2.048M	V.35 RS-422/449	AWJ4	
<i>BNS-2000 VCS Node</i>	SWT	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
		2.048M	G.703/G.704/G.706	AWJ33
	SFT	8M	Fiber optic	AWJ3
Trunk-64	1200 to 19200	RS-232-C	AWJ11	
	48K, 56K, 64K	V.35	AWJ9	

TABLE 3-3. BNS-2000 VCS Connections (continued)

Connections From BNS-2000 VCS Node to	Trunk Module	Speed (bps)	Interface Type	I/O Board
BNS-2000 VCS Node (continued)	Trunk-DDS	9600 to 19200	RS-232-C	ED5P080-30,G1 ED5P079-30,G1
		48K, 56K, 64K	V.35	ED5P080-30,G1 ED5P076-30,G1
	Trunk-HS	8M	Fiber optic	AWJ2
	Trunk-PQ	56K to 2.048M	V.35	AWJ24
BNS-2000 Series M1 Shelf	SWT	2400 to 19200	RS-232-C	AWJ11
			V.35	AWJ9
		2400 to 2.048M	RS-422/449	AWJ10
	SFT	8M	Fiber optic	AWJ3
	Trunk-64	1200 to 19200	RS-232-C	AWJ11
		48K, 56K, 64K	V.35	AWJ9
Trunk-PQ	56K to 2.048M	V.35	AWJ24	
Trunk-T1	56K to 2.048M	V.35 RS-422/449	AWJ4	
MPC7, MPC15, BNS-2000 MPC, or ISN Concentrator**	SWT (LIM)	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
	2.048M	G.703/G.704/G.706	AWJ33	
SFT (LIM)	8M	Fiber optic	AWJ3	

TABLE 3-3. BNS-2000 VCS Connections (continued)

Connections from BNS-2000 VCS Node to	Trunk Module	Speed (bps)	Interface Type	I/O Board
SAM64 or SAM504	Trunk-HS	8m	Fiber optic	AWJ2
	Trunk-T1	56K 64K to 2.048M	V.35 V.35 RS-422/449	AWJ4
BNS-1000 Node	SWT	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
		2.048M	G.703/G.704/G.706	AWJ33
	SFT	8M	Fiber optic	AWJ3
	Trunk-64	1200 to 19200	RS-232-C	AWJ11
		48K, 56K, 64K	V.35	AWJ9
Trunk-HS	8M	Fiber optic	AWJ2	
Trunk-PQ	56K to 2.048M	V.35	AWJ24	
Trunk-T1	56K to 2.048M	V.35 RS-422/449	AWJ4	
Datakit VCS Node	Trunk-64	1200 to 19200	RS-232-C	AWJ11
		48K, 56K, 64K	V.35	AWJ9
	Trunk-DDS	9600 to 19200	RS-232-C	ED5P080-30,G1 ED5P079-30,G1
		48K, 56K, 64K	V.35	ED5P080-30,G1 ED5P076-30,G1
	Trunk-HS	8M	Fiber optic	AWJ2
Trunk-T1	56K	V.35	AWJ4	
	64K to 2.048M	V.35 RS-422/449		

** SWT Module with AWJ33 I/O board connects only to MPC7 and MPC15.

TABLE 3-4. Series M1 Shelf Connections

Connections from Series M1 Shelf to	Trunk Module	Speed (bps)	Interface Type	I/O Board
BNS-2000 Series M1 Shelf, BNS-1000, <i>Datakit II</i> VCS Node, or BNS-2000 VCS Node	SFT	8M	Fiber optic	AWJ3
	SWT	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
		2.048M	G.703/G.704/G.706	AWJ33
	Trunk-64	1200 to 19200	RS-232-C	AWJ11
48K, 56K, 64K		V.35	AWJ9	
Trunk-PQ	56K to 2.048M	V.35	AWJ24	
Trunk-T1	56K to 2.048M	V.35 RS-422/449	AWJ4	
<i>Datakit VCS Node</i>	Trunk-T1	56K	V.35	AWJ4
		64K to 2.048M	V.35 RS-422/449	
MPC7, MPC15, or BNS-2000 MPC	SFT (LIM)	8M	Fiber optic	AWJ3
	SWT (LIM)	2400 to 19200	RS-232-C	AWJ11
		2400 to 2.048M	V.35	AWJ9
			RS-422/449	AWJ10
2.048M		G.703/G.704/G.706	AWJ33	
SAM64 or SAM504	Trunk-HS	8m	Fiber optic	AWJ2
	Trunk-T1	56K	V.35	AWJ4
64K to 2.048M		V.35 RS-422/449		

Configuration Details: Fiber Trunks

The following subsections explain cabling configurations in detail for fiber trunks, with figures illustrating the configurations, and tables listing ordering information for their cables and adapters.

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with SFT: Fiber Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node or Series M1 Shelf to another node or to a concentrator with an SFT module uses the following:

- an SFT module consisting of an MC1D085A1 main circuit pack and an AWJ3 I/O board
- FL2P-P fiber optic cables connecting the AWJ3 I/O board to the terminating device

The transmit side (T) of the I/O board is connected to the receive side (R) of the opposite end.

Several other methods that can be used for fiber cable distribution are not presented here.

Because of building distribution requirements, fiber cross-connect panels, fiber extenders, and other fiber distribution devices might be needed.

Figures 3-5 and 3-6 illustrate these configurations.

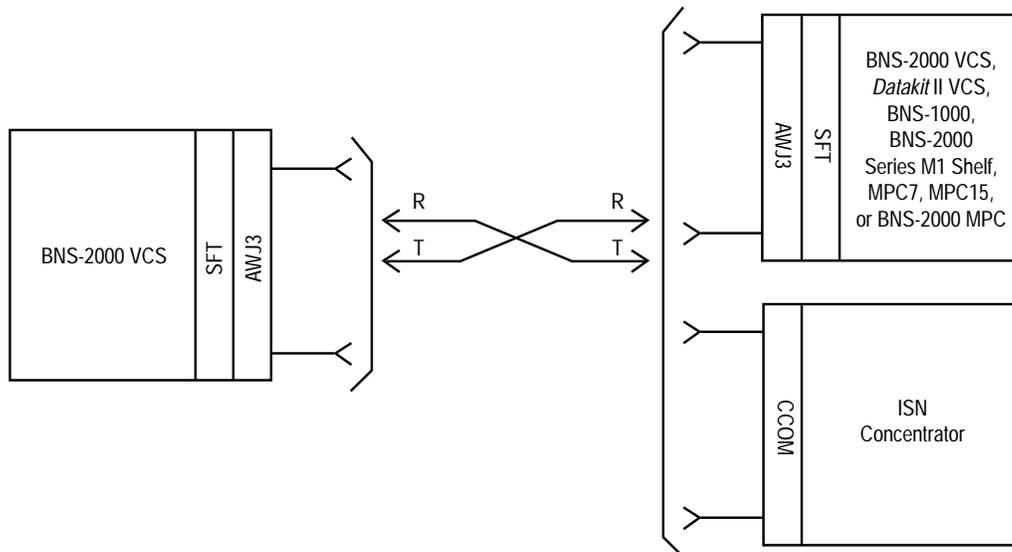


FIGURE 3-5. BNS-2000 VCS Node with SFT: Fiber Interface

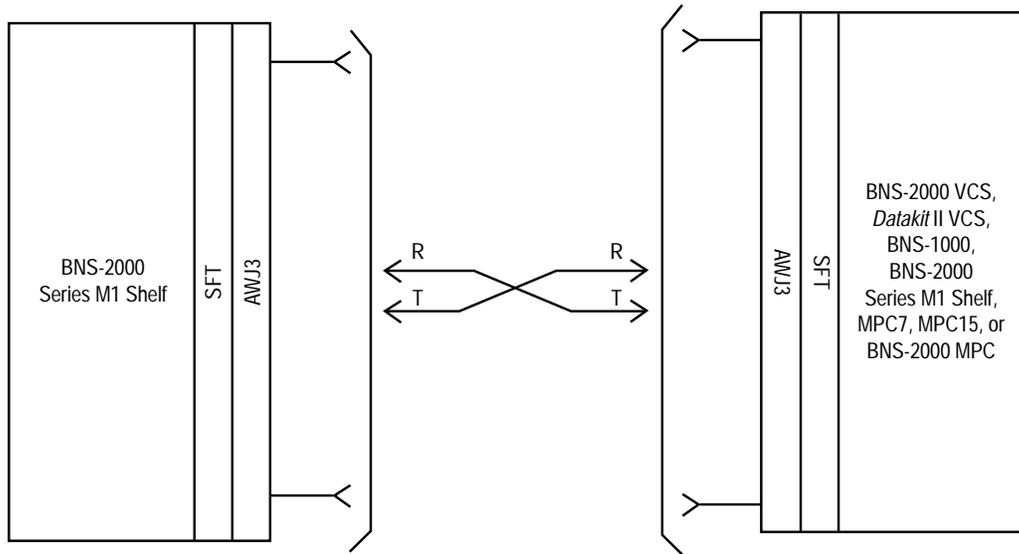


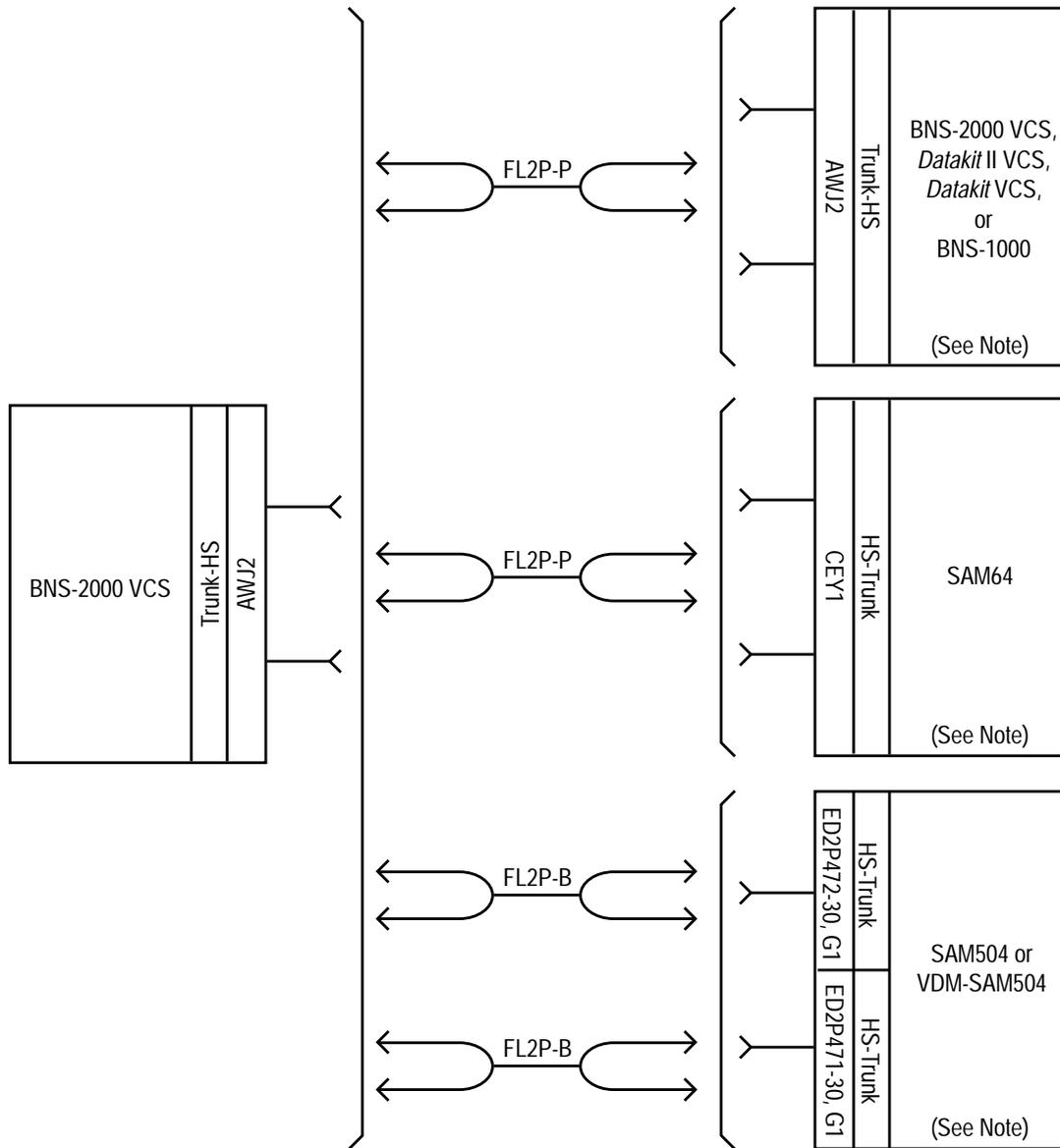
FIGURE 3-6. Series M1 Shelf with SFT: Fiber Interface

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-HS: Fiber Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node to another node or to a SAM64, SAM504, or VDM-SAM504, or cabling a Series M1 Shelf to a SAM64, SAM504, or VDM-SAM504, with a Trunk-HS uses the following:

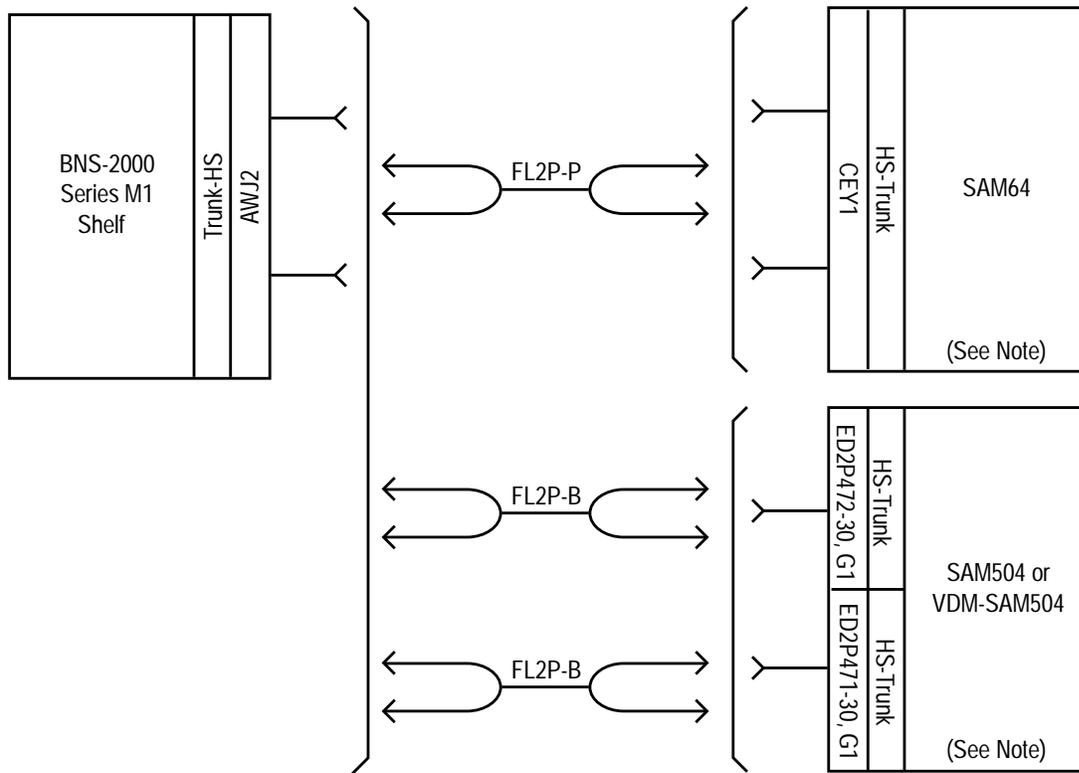
- a Trunk-HS consisting of a TN1010 main circuit pack and an AWJ2 I/O board
 - FL2P-P fiber optic cables connecting the AWJ2 I/O board to the terminating device
 - For SAM64, the FL2P-P cable connects to the CEY1 I/O board.
 - For SAM504 and VDM-SAM504, the FL2P-B cable connects to either the ED2P471-30,G-1, or the ED1P472-30,G-1.
 - The ED2P472-30,G-1 module is used for transmitting up to 1 km.
 - The ED2P472-30,G-1 module is used for transmitting from 1 km to 3 km.
- Several other methods that can be used for fiber cable distribution are not presented here. Because of building distribution requirements, fiber cross-connect panels, fiber extenders, and other fiber distribution devices might be needed.

Figures 3-7 and 3-8 illustrate these configurations.



Note: The AWJ2 and CEY1 I/O distribution boards require ST-type fiber connectors. The ED2P471-30,G1 and ED2P472-30,G1 I/O distribution boards require Biconic Data Link Connectors.

FIGURE 3-7. BNS-2000 VCS Node with Trunk-HS: Fiber Interface



Note: The CEY1 I/O distribution board requires ST-type fiber connectors.
 The ED2P471-30,G1 and ED2P472-30,G1 I/O distribution boards require Biconic Data Link Connectors.

FIGURE 3-8. Series M1 Shelf with Trunk-HS: Fiber Interface

TABLE 3-5. Ordering Information for Fiber Trunks

Trunk Type	Cable or Adapter	Description	ED5P055-31 Group Number
SFT <i>or</i> Trunk-HS	FL2P-P	ST	See Table 3-6.
Trunk-HS	FL2P-B Biconic	ST	See Table 3-6.

TABLE 3-6. Identification of Standard Length FL2P-P and FL2P-B Cables

FL2P-P Cable Length (Feet)	Comcode	FL2P-B Cable Length (Feet)	Comcode
2	104266408	2	105259204
4	104266476	4	104244959
6	104266424	8	105259220
8	104266432	10	104244967
10	104266440	15	104244975
15	104266457	20	104244983
20	104266465	25	104244991
25	104266473	30	104245006
30	104266481	35	104245014
35	104266499	40	104245022
40	104266507	50	104245030
50	104266523	75	104245048
75	104266556	100	104245055
100	104266564	125	105259238
200	104266606	150	105259253
500	104266721	175	105259261
1000	104266929	200	105259303
2000	104267323	600	104244999
3000	104267638		

Configuration Details: Wire Trunks

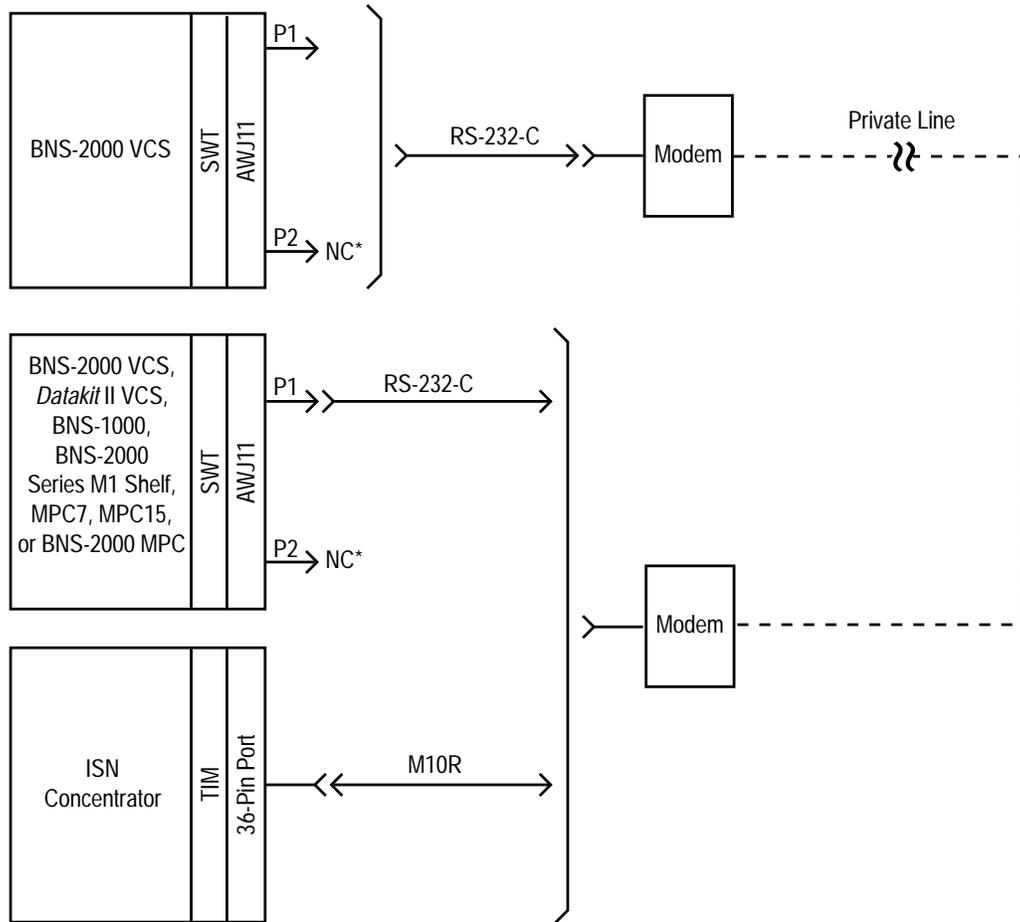
The following subsections explain cabling configurations in detail for wire trunks, with figures illustrating the configurations, and tables listing ordering information for their cables and adapters.

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with SWT: RS-232-C Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node or Series M1 Shelf to another node, or to a concentrator, with an SWT module and an RS-232-C interface uses the following:

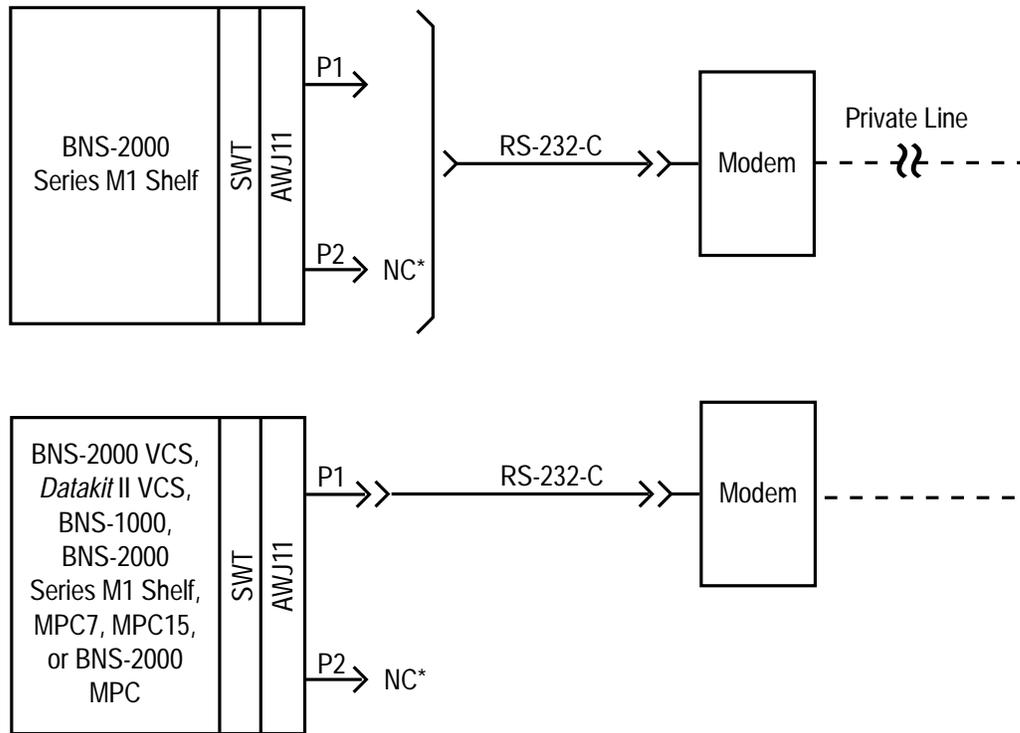
- an SWT module consisting of a TN2092 or a TN2092B circuit pack and an AWJ11 I/O board
- RS-232-C cable originating at the P1 connector of the AWJ11 I/O board and connecting to a modem or DSU
- At the remote end, the circuit is completed at an SWT module in the terminating device; the RS-232-C cable connects the AWJ11 I/O board P1 connector to the remote modem.
- If the circuit connects to a trunk interface module (TIM) in an ISN Concentrator, the remote modem connects to the 36-pin port of the TIM with an M10R cable.

Figures 3-9 and 3-10 illustrate this configuration.



*NC = no connection

FIGURE 3-9. BNS-2000 VCS Node with SWT: RS-232-C Interface



*NC = no connection

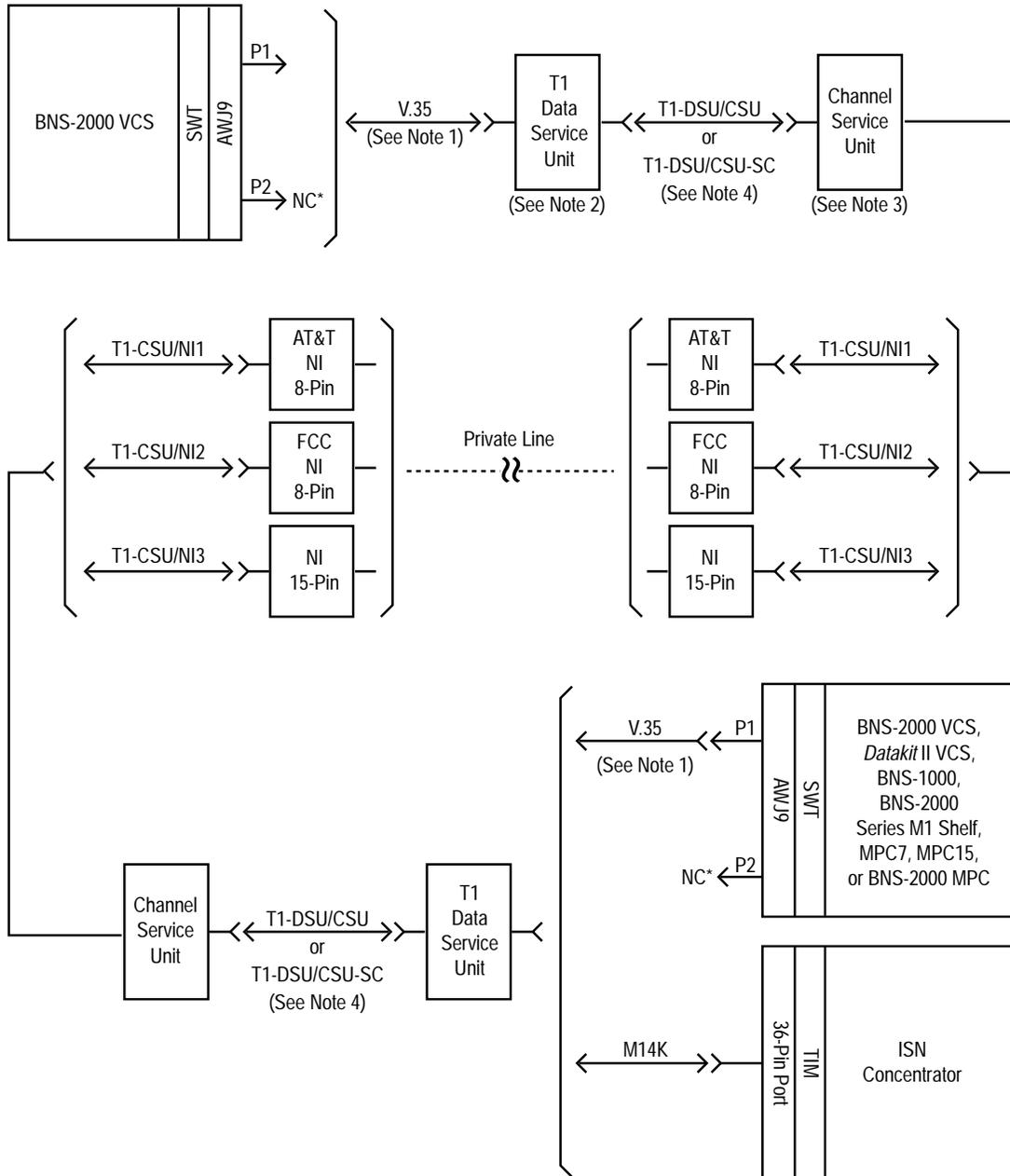
FIGURE 3-10. Series M1 Shelf with SWT: RS-232-C Interface

BNS-2000 VCS Node, *Datakit II* VCS Node, or Series M1 Shelf with SWT: V.35 Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node, or Series M1 Shelf to another node or to a concentrator with an SWT module and a V.35 interface uses the following:

- an SWT module consisting of a TN2092 or a TN2092B circuit pack and an AWJ9 I/O board
- one of three recommended DSUs: the SCITEC Saturn D4/ESF™, the Phoenix 1536, or the COASTCOM D/I MUX™
- The Kentrox T-Serv™ CSU is recommended.
NOTE: It is important to establish whether the DSU/CSU has slide-lock or screw-lock connections before ordering cables.
- V.35 cable originating at the P1 connector of the AWJ9 I/O board and connecting to the DSU
NOTE: For the COASTCOM DSU, use the V.35-C cable instead of the V.35 cable. The overall length of the cable can not exceed 30 feet at 1.344 Mbps, or 15 feet at 1.544 Mbps.
- The DSU then connects to a CSU with:
 - T1-DSU/CSU cable for a slide-lock connection
 - T1-DSU/CSU-SC cable for a screw-lock connection
- A CSU connects to a private line through one of three different network interfaces (NIs); the cable used to connect the CSU to the NI is dependent on the NI used:
 - Lucent Technologies NI (8-pin) — T1-CSU/NI1 cable
 - FCC NI (8-pin) — T1-CSU/NI2 cable
 - 15-pin NI — T1-CSU/NI3 cable
- At the remote end, the private line is connected to another NI. Select the appropriate cable (listed above) for the connection to the terminating end CSU.
 - For a slide-lock connection, T1-DSU/CSU cable connects the remote DSU and CSU.
 - For a screw-lock connection, a T1-DSU/CSU-SC cable connects the remote DSU and CSU.
- For a trunk terminating on an SWT module, a V.35 cable connects to the AWJ9 I/O board P1 port.
NOTE: For a COASTCOM DSU, use V.35-C cable instead of the V.35 cable. This cable can not exceed 25 feet.
- For a trunk terminating on an ISN Concentrator, the M14K cable connects the DSU to the TIM.

Figures 3-11 and 3-12 illustrate these configurations.



*NC = no connection

Note 1: For a COASTCOM DSU, use V.35-C cable instead of V.35 cable.

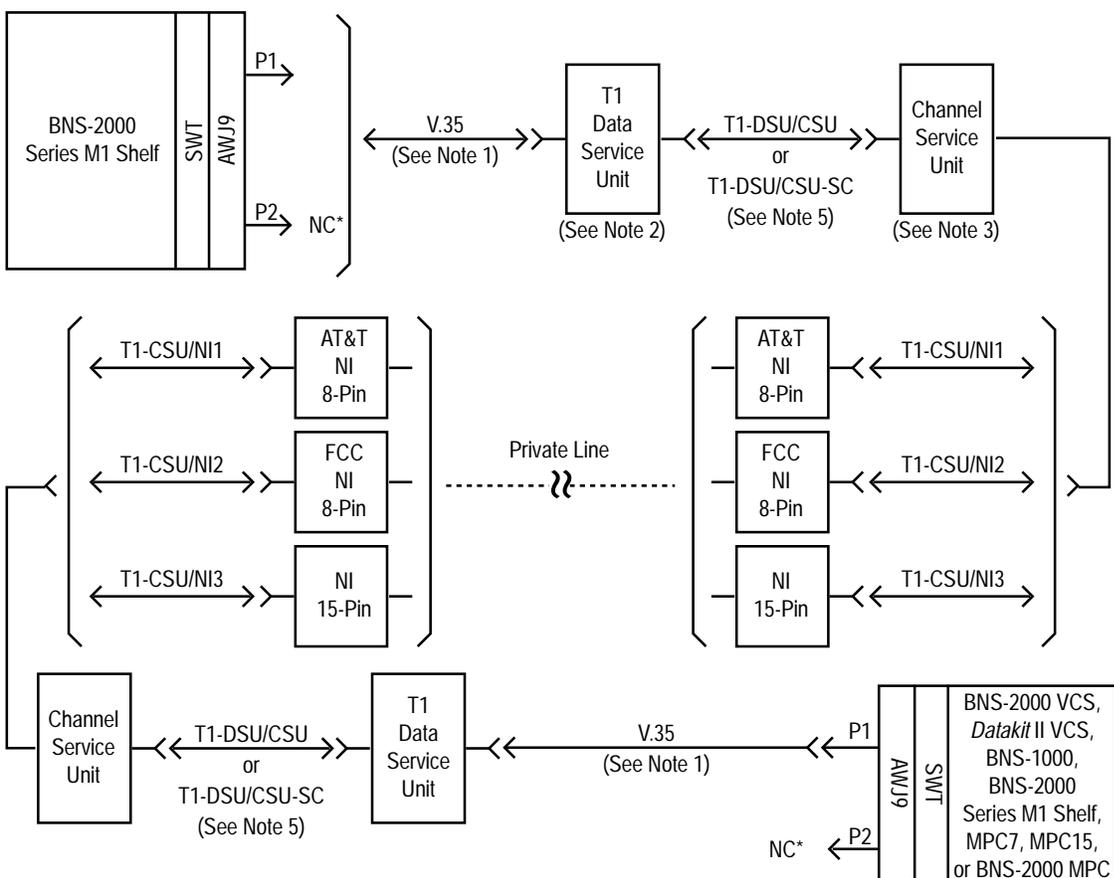
Note 2: Recommended DSUs are SCITEC Saturn D4/ESF, Phoenix 1536, and COASTCOM D/I MUX.

Note 3: Recommended CSU is Kentrox T-Serv.

Note 4: For DSU/CSU slide-lock connection use T1-DSU/CSU cable.

For DSU/CSU screw-lock connection use T1-DSU/CSU-SC cable.

FIGURE 3-11. BNS-2000 VCS Node with SWT: V.35 Interface



*NC = no connection

Note 1: For a COASTCOM DSU, use V.35-C cable instead of V.35 cable.

Note 2: Recommended DSUs are SCITEC Saturn D4/ESF, Phoenix 1536, and COASTCOM D/I MUX.

Note 3: Recommended CSU is Kentrox T-Serv.

Note 4: For DSU/CSU slide-lock connection use T1-DSU/CSU cable.

For DSU/CSU screw-lock connection use T1-DSU/CSU-SC cable.

FIGURE 3-12. Series M1 Shelf with SWT: V.35 Interface

BNS-2000 VCS Node, *Datakit II* VCS Node, or Series M1 Shelf with SWT: RS-422/449 Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node, or Series M1 Shelf to another node or to a concentrator with an SWT and RS-422/449 interface uses the following:

- an SWT module consisting of a TN2092 or TN2092B circuit pack and an AWJ10 I/O board
- high-speed modems or T1 DSU facilities for transmission to the terminating device
- RS-422/449 cable originating at the AWJ10 I/O board P1 connector, and connecting to the modem or DSU. If a COASTCOM DSU is specified, special cable (Comcode: 405575523) must be connected from the RS-422/449 cable to the DSU.
- For high-speed modems, RS-422/449 cable connects the remote modem to the terminating SWT module (Figure 3-11).
- For T1 DSUs:
 - Recommended DSUs are the SCITEC Saturn D4/ESF, Phoenix 1536, or the COASTCOM D/I MUX.
 - Kentrox T-Serv is the recommended CSU.

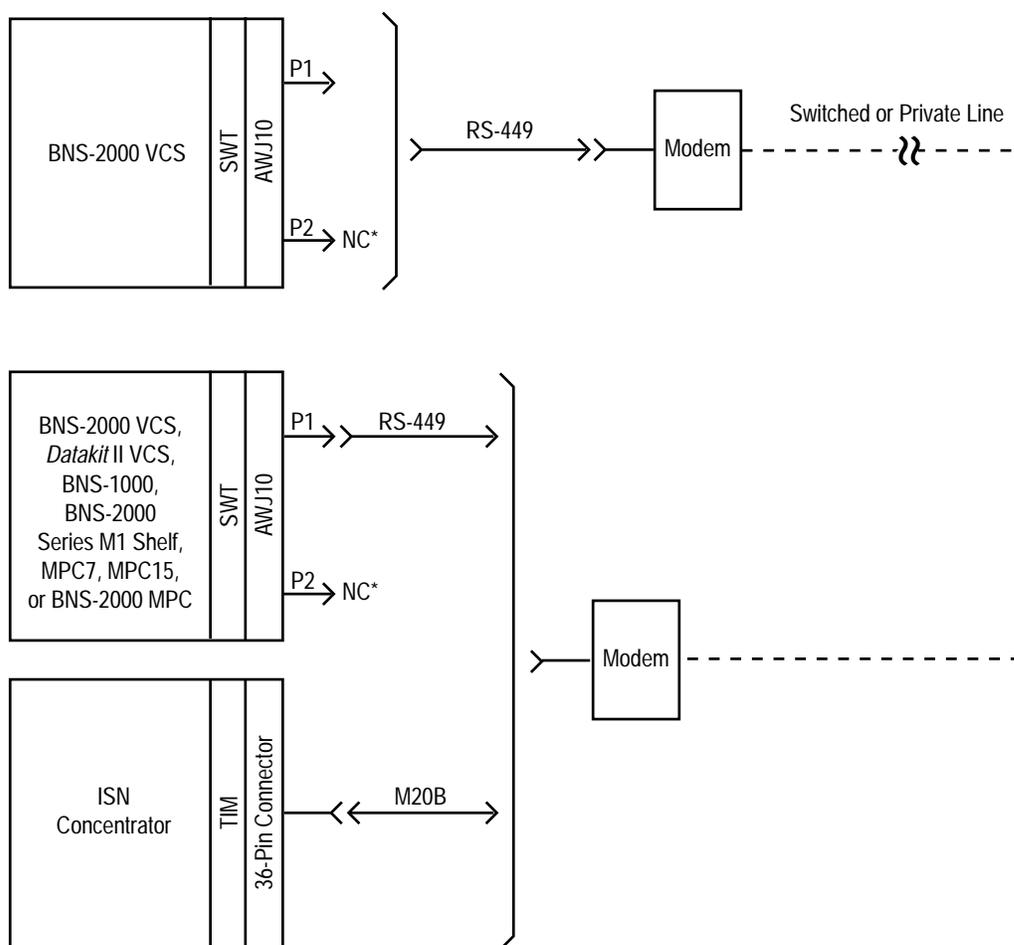
NOTE: It is important to establish whether the DSU/CSU has slide-lock or screw-lock connections before ordering cables.

- RS-422/449 cable originates at the AWJ10 I/O board P1 connector and connects to the DSU. If a COASTCOM DSU is specified, special cable (Comcode: 405575523) must be connected from the RS-422/449 cable to the DSU. This cable should not exceed 40 feet.
- The DSU then connects to a CSU with:
 - T1-DSU/CSU cable for a slide-lock connection
 - T1-DSU/CSU-SC cable for a screw-lock connection
- All high-speed T1 cabling from the CSU to the NI is dependent on the NI used:
 - Lucent Technologies NI (8-pin) — T1-CSU/NI1 cable
 - FCC NI (8-pin) — T1-CSU/NI2 cable
 - 15-pin NI — T1-CSU/NI3 cable
- At the remote NI, connections to the DSU are as described above.
 - For a slide-lock connection, T1-DSU/CSU cable connects the remote DSU to a CSU.
 - For a screw-lock connection, T1-DSU/CSU-SC cable connects the remote DSU to a CSU.

BNS-2000 VCS Node, *Datakit II* VCS Node, or Series M1 Shelf with SWT: RS-422/449 Interface (continued)

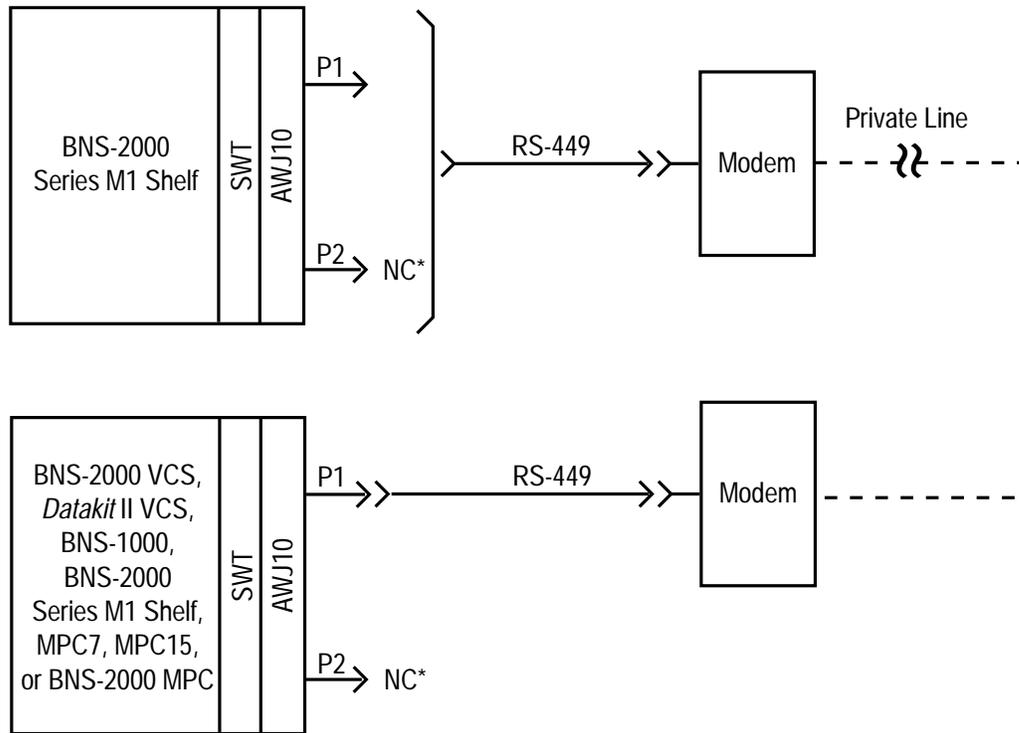
- At the remote end, RS-422/449 cable connects the DSU to the AWJ10 I/O board P1 connection. For a COASTCOM DSU, special cable (Comcode: 405575523) must be connected from the RS-422/449 cable.
- If the terminating device is an ISN Concentrator, the terminating end DSU is connected with an M20B cable. For a COASTCOM DSU, special cable (Comcode: 405575523) must be connected from the RS-422/449 cable.

Figures 3-13, 3-14, 3-15, and 3-16 illustrate these configurations.



*NC = no connection

FIGURE 3-13. BNS-2000 VCS Node with SWT via Modem: RS-422/449 Interface



*NC = no connection

FIGURE 3-14. Series M1 Shelf with SWT via Modem: RS-422/449 Interface

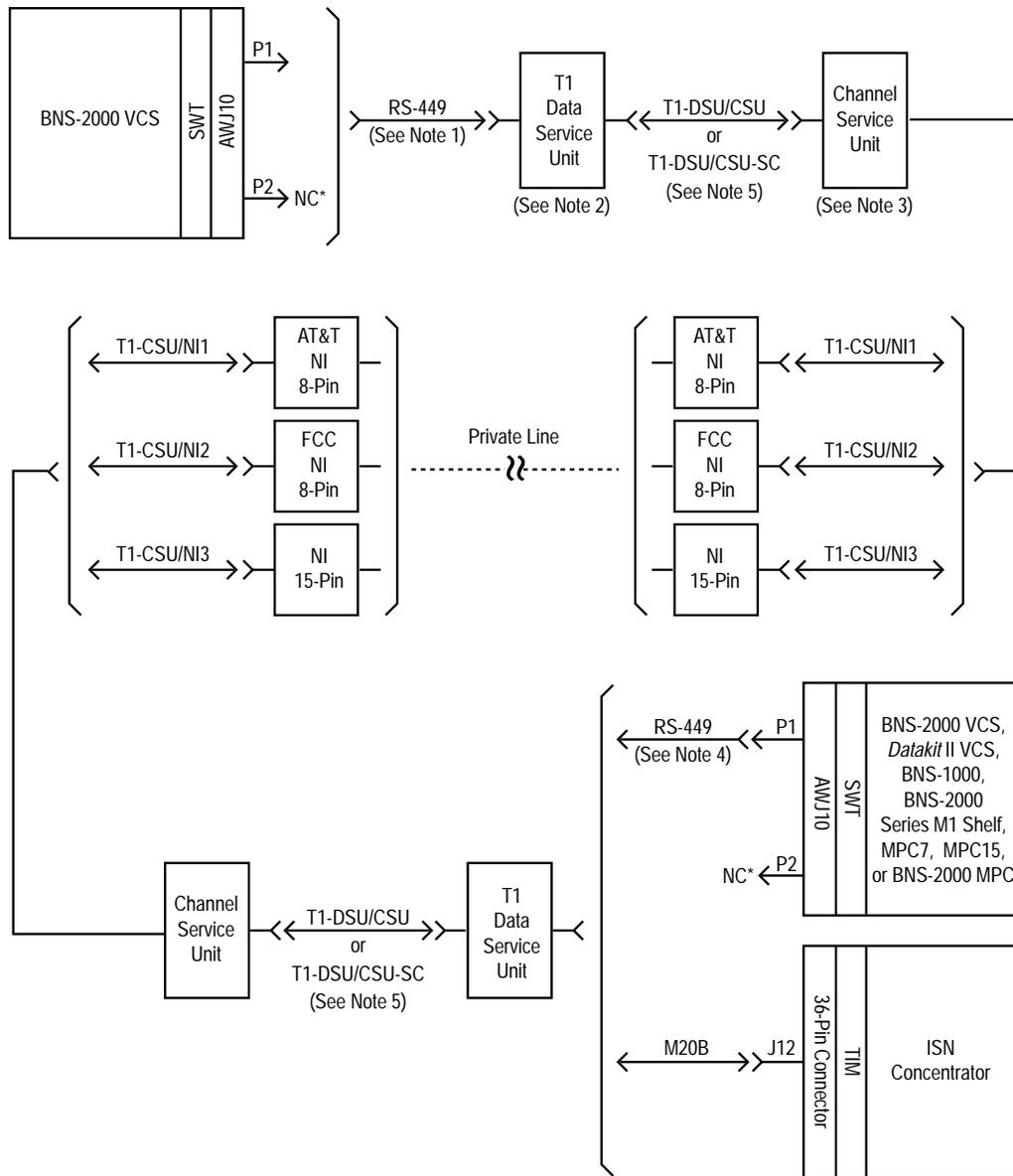
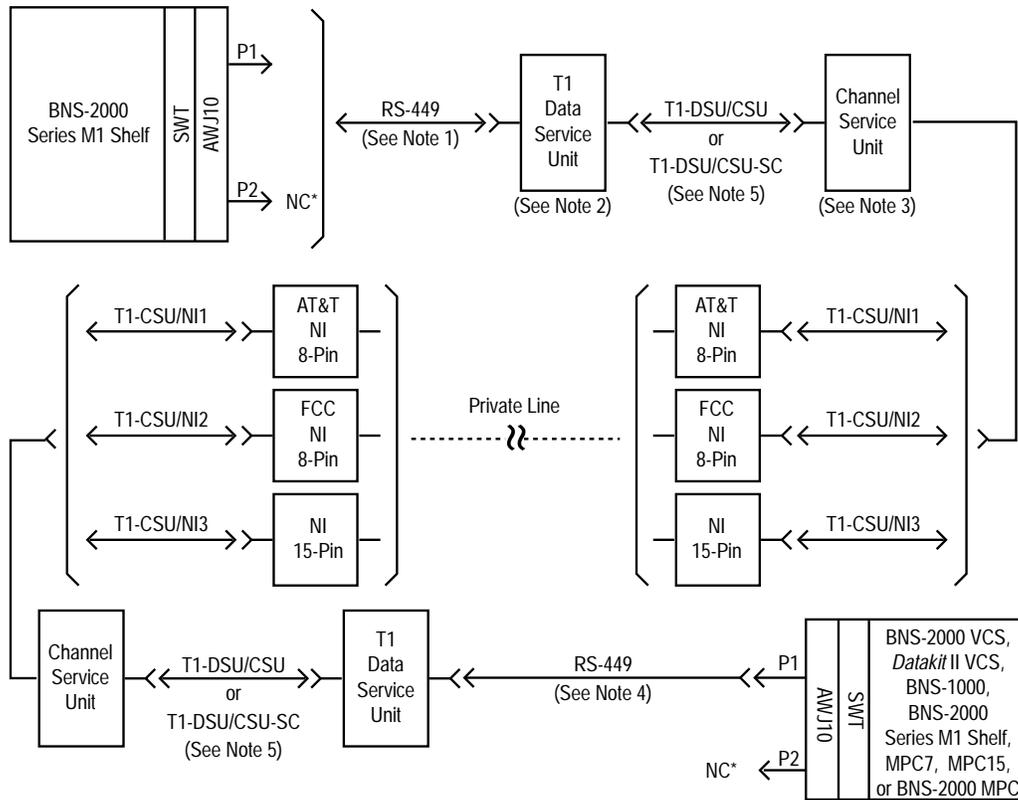


FIGURE 3-15. BNS-2000 VCS Node with SWT via DSU: RS-422/449 Interface



*NC = no connection

Note 1: For COASTCOM DSU, a special cable (Comcode: 405575523) must be connected from the RS-422/449 cable to the DSU.

Note 2: Recommended T1 DSUs are SCITEC Saturn D4/ESF, Phoenix 1536, and COASTCOM D/I MUX.

Note 3: Recommended CSU is Kentrox T-Serv.

Note 4: For COASTCOM DSU, a special cable (Comcode: 405575523) must be connected from the DSU to the RS-422/449 cable.

Note 5: For a slide-lock DSU/CSU connection, use T1-DSU/CSU cable.

For a screw-lock DSU/CSU connection, use T1-DSU/CSU-SC cable.

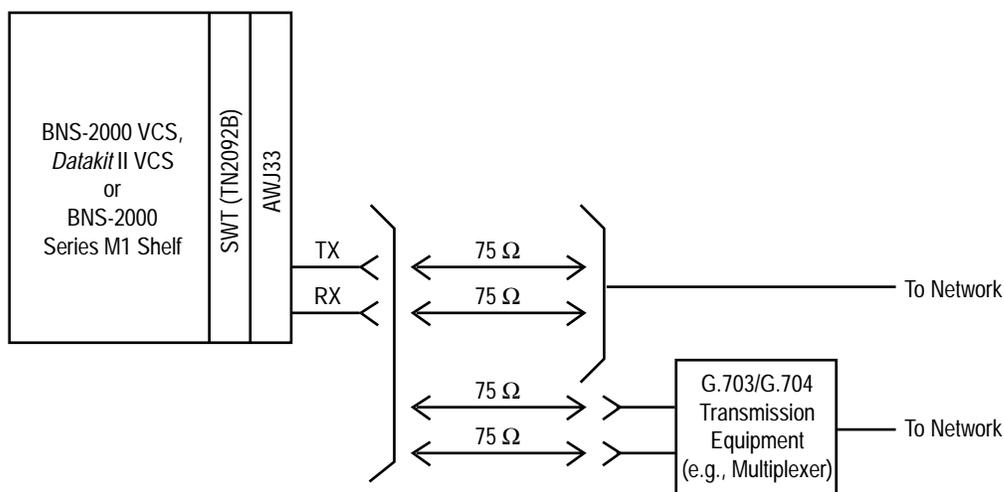
FIGURE 3-16. Series M1 Shelf with SWT via DSU: RS-422/449 Interface

BNS-2000 VCS Node or Series M1 Shelf with SWT: G.703/G.704/G.706 Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node or Series M1 Shelf to another node, or to a concentrator with an SWT module and a G.703/G.704 /G.706 interface uses the following:

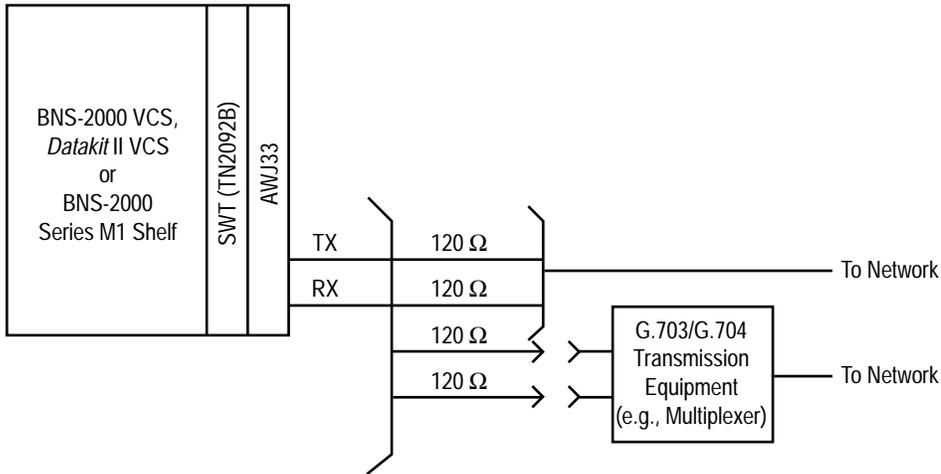
- an SWT module consisting of a TN2092B circuit pack and an AWJ33 I/O board
- either 75 Ω coaxial cables or 120 Ω twisted pair cables
 - To use 75 Ω cables, set the jumpers JP5 2–3, JP1 2–3, and JP2 1–2, JP7, JP8, JP9, and JP10. Figure 3-17 illustrates this configuration.
 - To use 120 Ω cables, set the jumpers JP5 1–2, JP3 2–3, JP4 1–2, and remove jumpers JP7, JP8, JP9, and JP10. Figure 3-18 illustrates this configuration.

To connect two trunks with no intervening transmission equipment, TX is always connected to RX and RX is always connected to TX. Figure 3-19 illustrates this configuration.



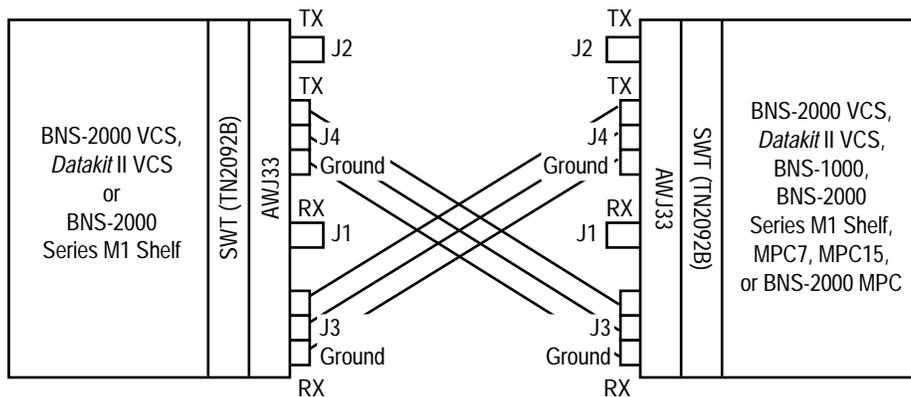
Note: The 75 Ω cables are customer provided.
 The cable connector is straight plug screw-on type, DIN 1.6/5.6 M.
 Use cable specified by connector manufacturer, or refer to the appropriate ordering information table.

FIGURE 3-17. BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with SWT: G.703/G.704/G.706 Interface using 75 Ω Cables



Note: The 120 Ω cables are customer provided. No connector is required. Use PDS 1016, PDS 1010, or compatible cable, or refer to the appropriate ordering information table.

FIGURE 3-18. BNS-2000 VCS Node, Datakit II VCS Node or Series M1 Shelf with SWT: G.703/G.704/G.706 Interface using 120 Ω Cables



Note: J3 designates the 120 Ω RX screw terminal. J4 designates the 120 Ω TX screw terminal.

FIGURE 3-19. BNS-2000 VCS Node, Datakit II VCS Node or Series M1 Shelf with SWT: G.703/G.704/G.706 Interface using 120 Ω Cables (no intervening transmission equipment)

TABLE 3-7. Ordering Information for SWT (AWJ9, AWJ10, AWJ11 I/O Board)

Cable or Adapter	Description	ED5P055-31 Group Number
RS-232-C	25-pin-F 25-pin-M	G(175), G(Q)
V.35	34-pin-M 34-pin-F	G(170), G(T)
V.35-C	36-pin-M 25-pin-M	G(184), G(Q)
T1-DSU/CSU	15-pin-M 15-pin-M	G(183), G(AN)
T1-DSU/CSU-SC	15-pin-M 15-pin-M	G(227), G(AN)
T1-CSU/NI1	8-pin mod 8-pin mod	G(182), G(AE)
T1-CSU/NI2	8-pin mod 8-pin mod	G(180), G(AE)
T1-CSU/NI3	15-pin mod 15-pin mod	G(181), G(AE)
RS-422/449	RS-422/449 M RS-422/449 F	G(171), G(T)
M10R	25-pin M 36-pin M	Comcode: 25 feet 105164701 50 feet 105164693
M14K	36-pin 90 M V.35 M	Comcode: 20 feet 105164636 40 feet 105164644
M20B	36-pin 90 M RS-422/449 M	Comcode: 20 feet 105164628 40 feet 105164610
Special cable	RS-422/449 M RS-422/449 F	Comcode: 405575523

TABLE 3-8. Ordering Information for SWT (AWJ33 I/O Board)

Cable	Pope* Code Number	Phillips Code Number	Maximum Cable Length
75 Ω	58513	0722 102 48009	250 meters
120 Ω	46050	0722 104 11001	240 meters
	46051	0722 104 12001	240 meters
120 Ω	46448	0722 651 00002	140 meters
	46449		
	46450		
	46451		

*For Pope cables, contact:

Pope Cable and Wire B.V.
Edisonstraat 9
P.O. Box 9
5900 AA Venlo
The Netherlands

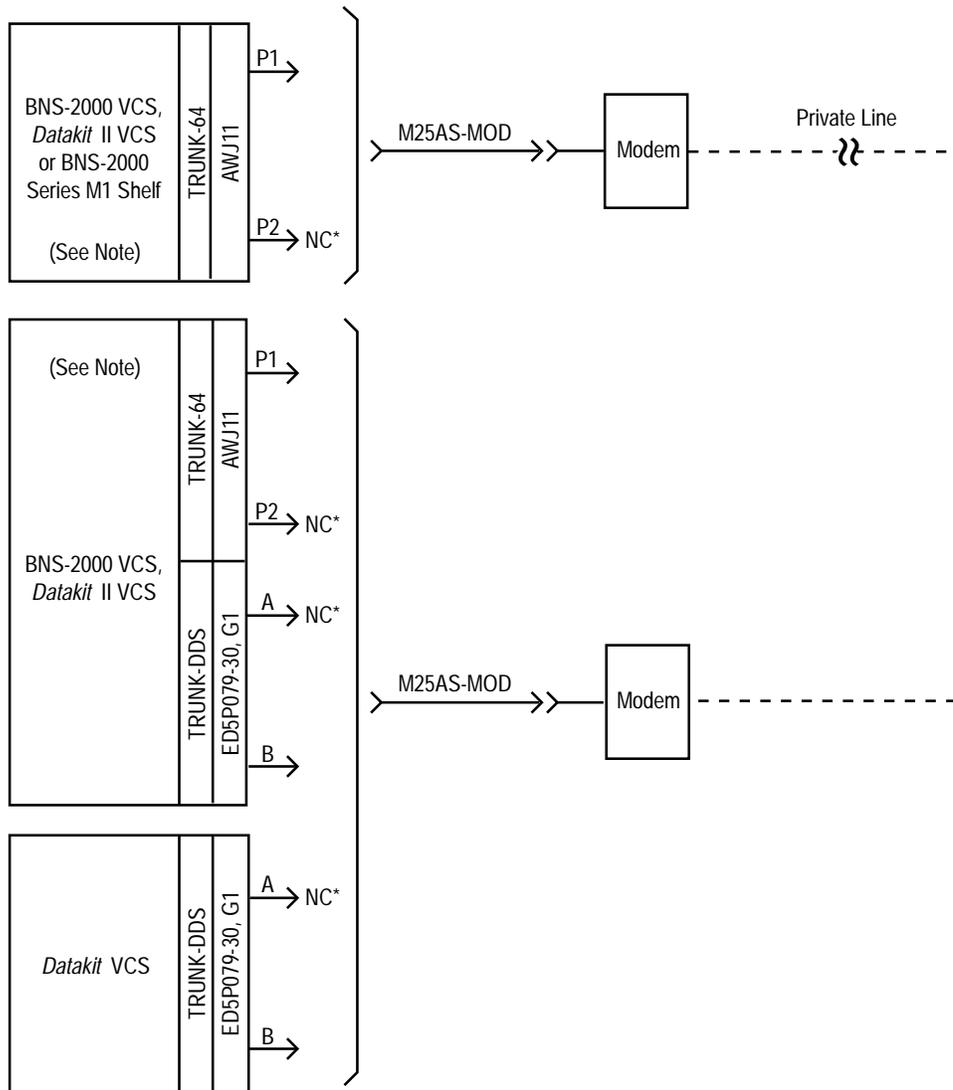
Telephone: +31 77 87 84 47
FAX: +31 77 87 84 88

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-64: RS-232-C Interface

Cabling a BNS-2000 VCS Node, *Datakit II* VCS node or Series M1 Shelf to another node with a Trunk-64 and an RS-232-C interface uses the following:

- a Trunk-64 module consisting of an MC1D105A1 circuit pack and an AWJ11 I/O board (for transmission rates of up to 19.2 Kbps)
- RS-232-C cabling originating at the I/O board
- an M25AS-MOD cable linking the RS-232-C interface to a modem or DSU
- an end point device using a Trunk-64 module or a Trunk-DDS module
- an M25AS-MOD cable at the terminating end to link the remote modem to the end point device.

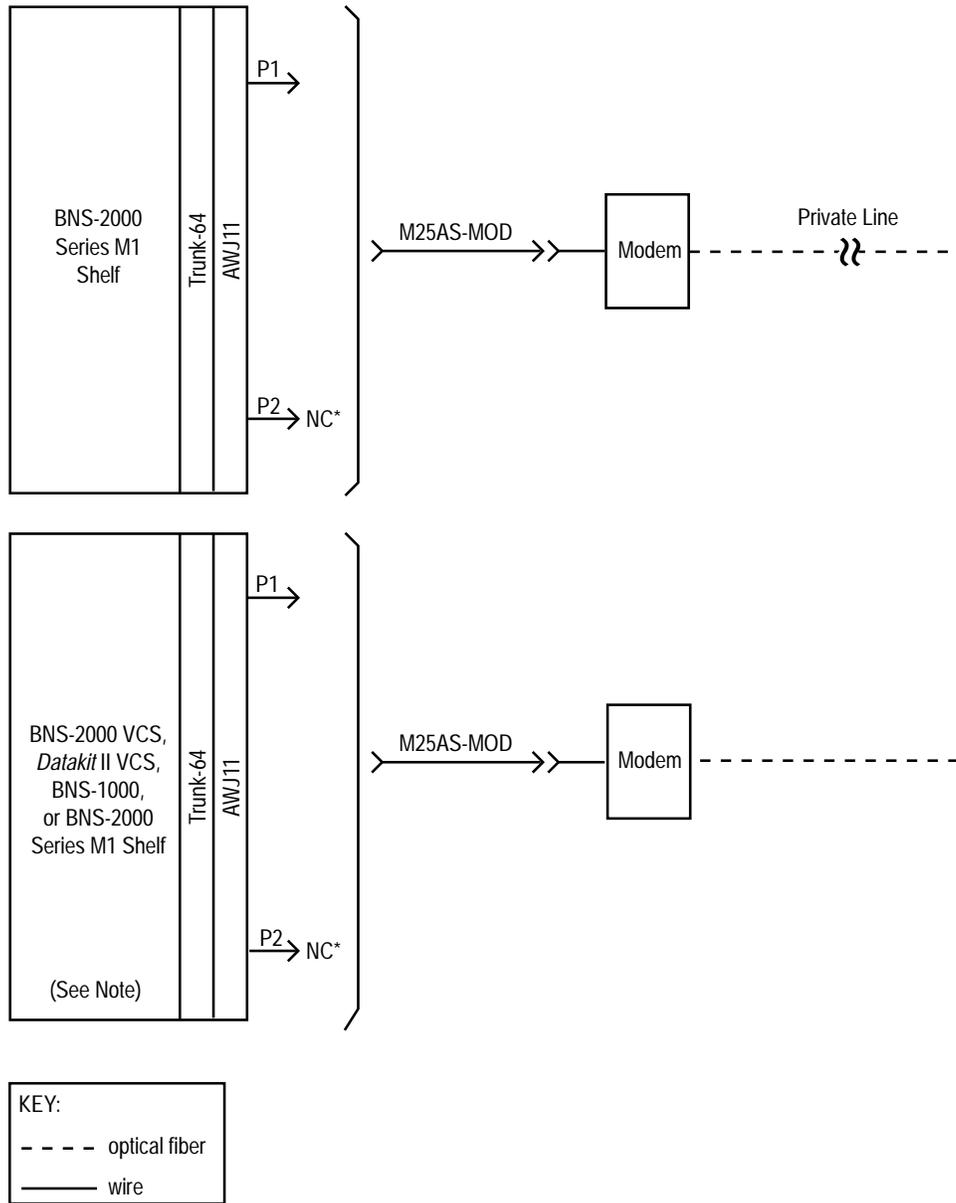
Figures 3-20 and 3-21 illustrate these configurations.



*NC = no connection

Note: The Trunk-64 module is only compatible with a Datakit II VCS software release of R2.1 or later.

FIGURE 3-20. BNS-2000 VCS Node, Datakit II VCS Node, or Series M1 Shelf with Trunk-64: RS-232-C Interface



*NC = no connection

Note: The Trunk-64 module is only compatible with a Datakit II VCS software release of R2.1 or later.

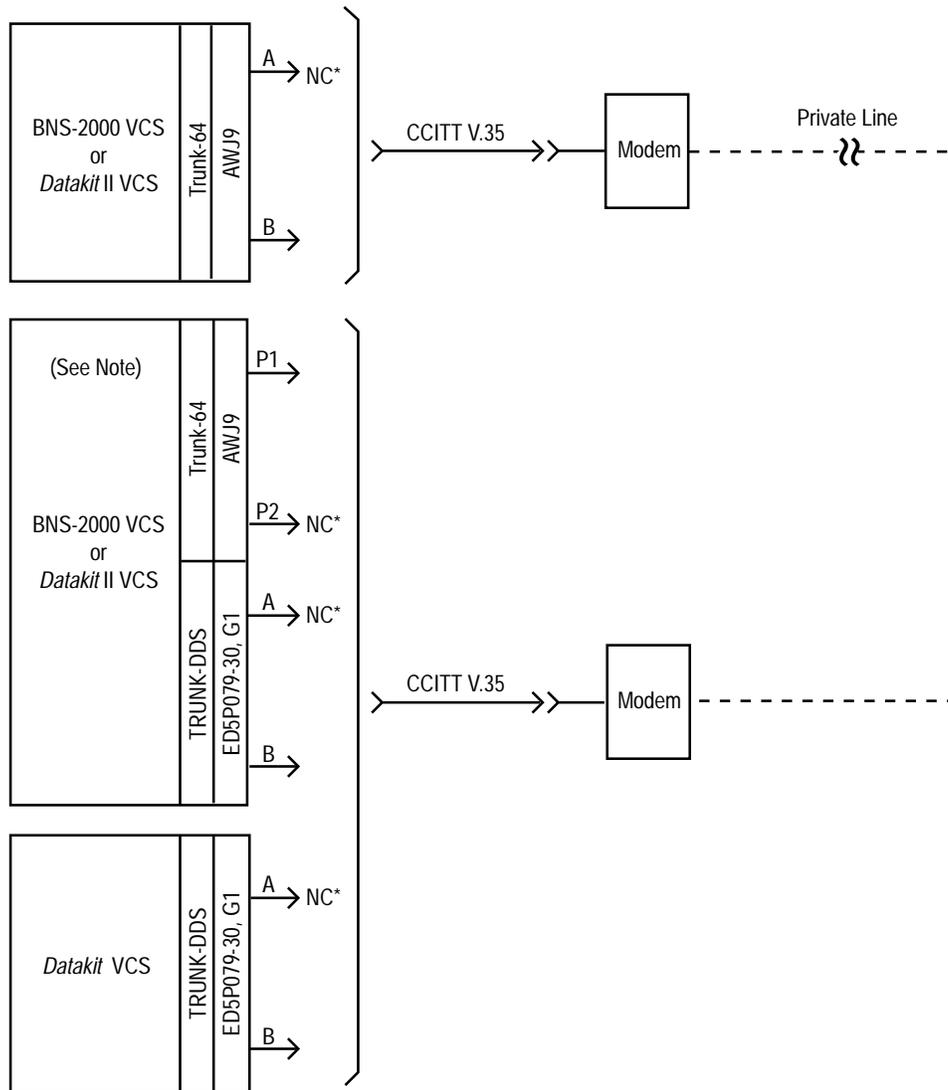
FIGURE 3-21. Series M1 Shelf with Trunk-64: RS-232-C Interface

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-64: V.35 Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node or a Series M1 Shelf to another node with a Trunk-64 and a V.35 interface uses the following:

- a Trunk-64 module consisting of an MC1D105A1 circuit pack and an AWJ9 I/O board
- V.35 cabling originating at the P1 connector on the I/O board
- a CCITT V.35 cable linking the P1 connector of the Trunk-64 to a DSU
- a CCITT V.35 cable linking the remote DSU to the terminating device
- For BNS-2000 VCS or *Datakit II* VCS this trunk circuit may terminate on a Trunk-64 module or on a Trunk-DDS module; for BNS-2000 the circuit terminates only on a Trunk-64 module.
 - When terminating on a Trunk-64 circuit, the CCITT V.35 cable connects to Port P1 of the I/O board.
 - When terminating on a Trunk-DDS circuit, the CCITT V.35 cable connects to Port B of the ED5P076-30, G-1 I/O board.

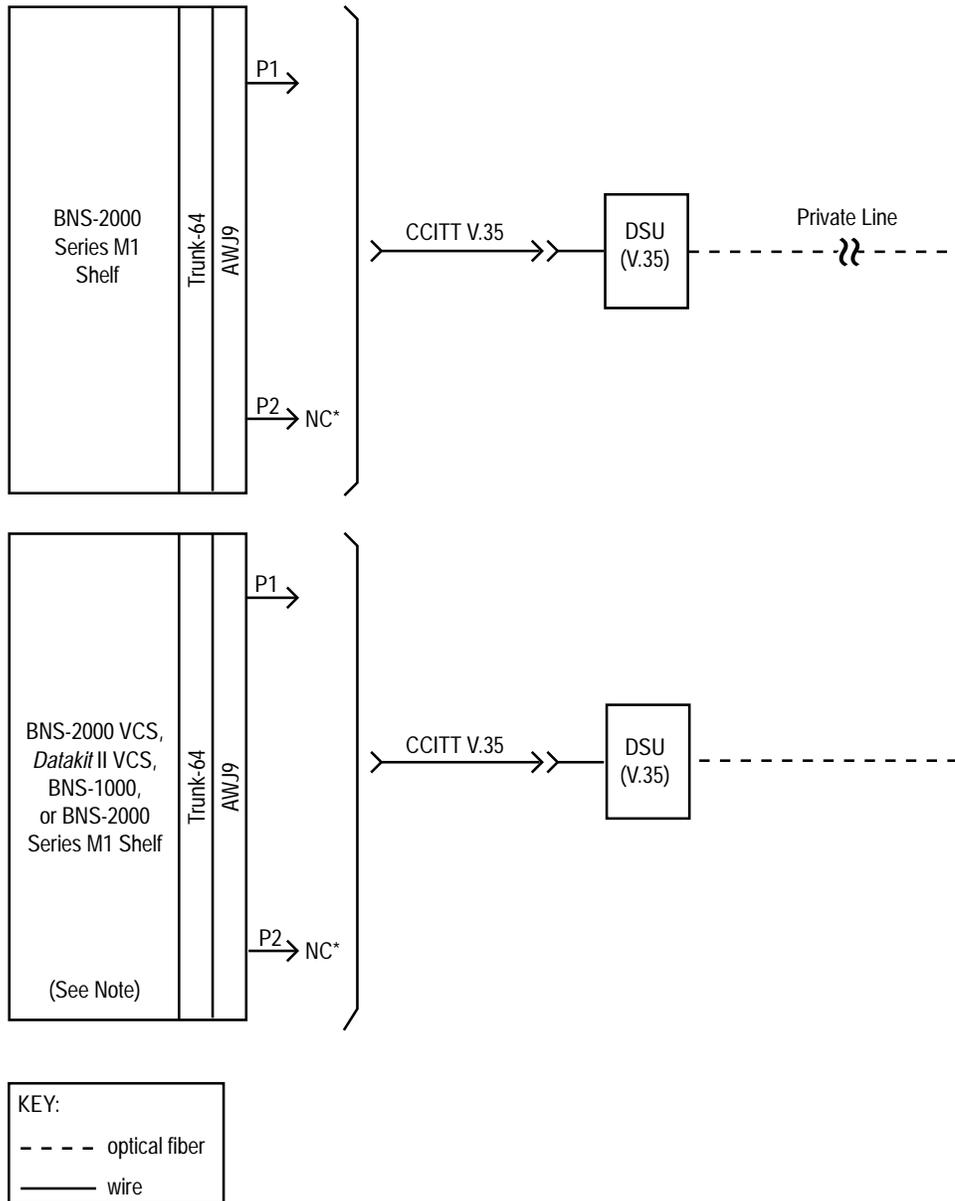
Figures 3-22 and 3-23 illustrate these configurations.



*NC = no connection

Note: The Trunk-64 module is only compatible with a Datakit II VCS software release of R2.1 or later, or BNS-2000 VCS.

FIGURE 3-22. BNS-2000 VCS Node or Datakit II VCS Node with Trunk-64: V.35 Interface



*NC = no connection

Note: The Trunk-64 module is only compatible with a Datakit II VCS software release of R2.1 or later.

FIGURE 3-23. Series M1 Shelf with Trunk-64: V.35 Interface

TABLE 3-9. Ordering Information for Trunk-64

Cable or Adapter	Description	ED5P055-31 Group Number
M25AS-MOD	25-pin-F 25-pin-M	G(178), G(L)
CCITT V.35	V.35 M V.35 F	G-121, G-Q

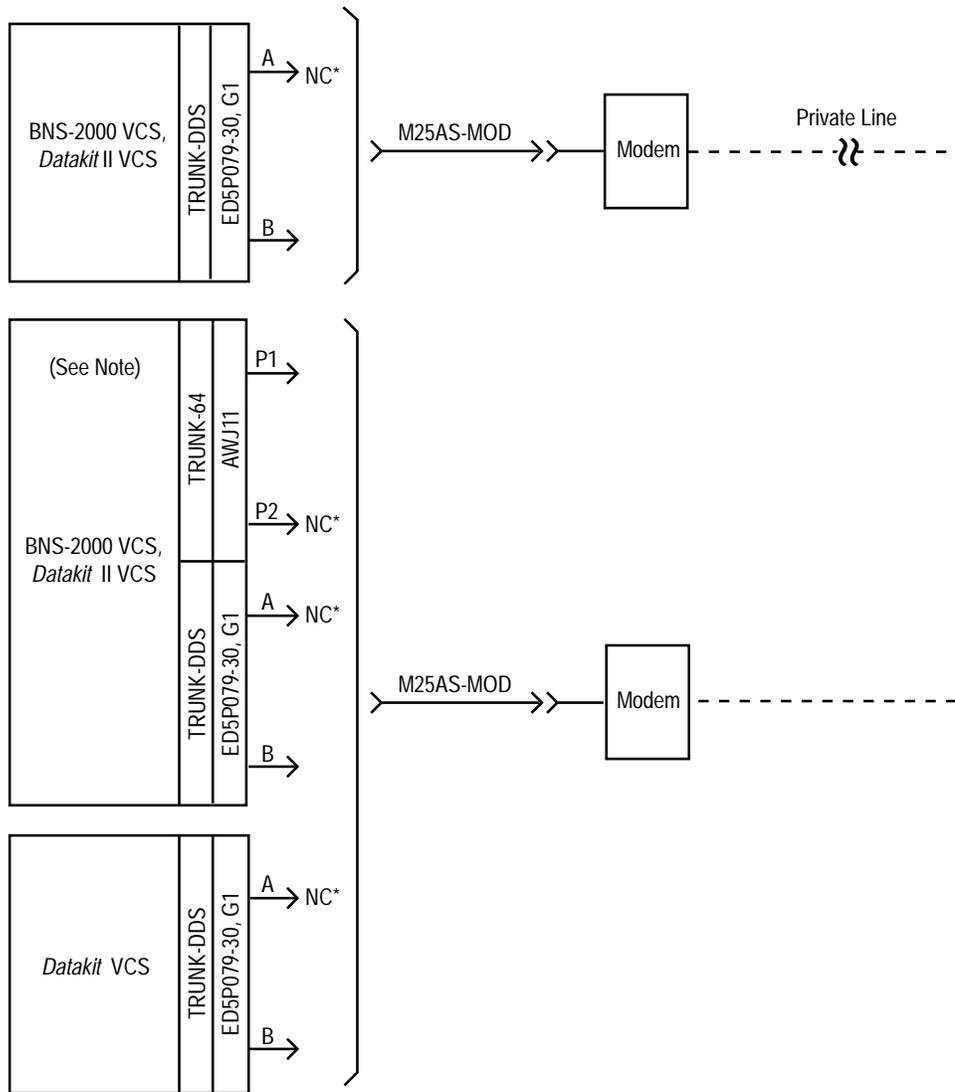
BNS-2000 VCS Node or *Datakit II* VCS Node with Trunk-DDS: RS-232-C Interface

Cabling a BNS-2000 VCS node or *Datakit II* VCS node to another node with a Trunk-DDS module and an RS-232-C interface uses the following:

- a Trunk-DDS module consisting of an MC5P033A1 circuit pack and an ED5P079-30, G1 I/O board* (for transmission rates of less than 56 Kbps)
- RS-232-C cabling originating at the ED5P079-30, G1 I/O board
- an M25AS-MOD cable linking the RS-232-C interface to a modem
- If the end point device is a *Datakit* VCS, it requires a Trunk-DDS module.
If the end point device is a BNS-2000 VCS or *Datakit II* VCS, it can have either a Trunk-DDS or Trunk-64 module.
- an M25AS-MOD cable at the terminating end linking the remote modem to the end point device

Figure 3-24 illustrates this configuration.

* Although this 56K trunk is a two-board set consisting of an additional UN221 circuit pack and an ED5P080-30, G1 I/O board, the ED5P080-30, G1 I/O board is not cabled with this application.



*NC = no connection

Note: The Trunk-64 module is only compatible with a Datakit II VCS software release of R2.1 or later.

FIGURE 3-24. BNS-2000 VCS Node or Datakit II VCS Node with Trunk-DDS: RS-232-C Interface

TABLE 3-10. Ordering Information for Trunk-DDS

Cable or Adapter	Description	ED5P055-31 Group Number
M25AS-MOD	25-pin-F 25-pin-M	G(178), G(L)

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-PQ: V.35 Interface

Cabling a BNS-2000 VCS node, *Datakit II* VCS node or Series M1 Shelf to another node with a Trunk-PQ and a V.35 interface uses the following:

- a Trunk-PQ consisting of an MC1D152A-1 main circuit pack and an AWJ24 I/O board
- an HD-V.35M cable connected to the J2 (top) V.35 port on the AWJ24 I/O board

The AWJ24 I/O board has two 50-pin connectors, labeled J2 and J6. Only the J2 connector is used for the Trunk-PQ. The HD-V.35M cable provides one V.35 port to be connected to a V.35 DSU. Figure 3-25 illustrates this configuration.

NOTE: The overall length of the HD-V.35M cable cannot exceed 10 feet.

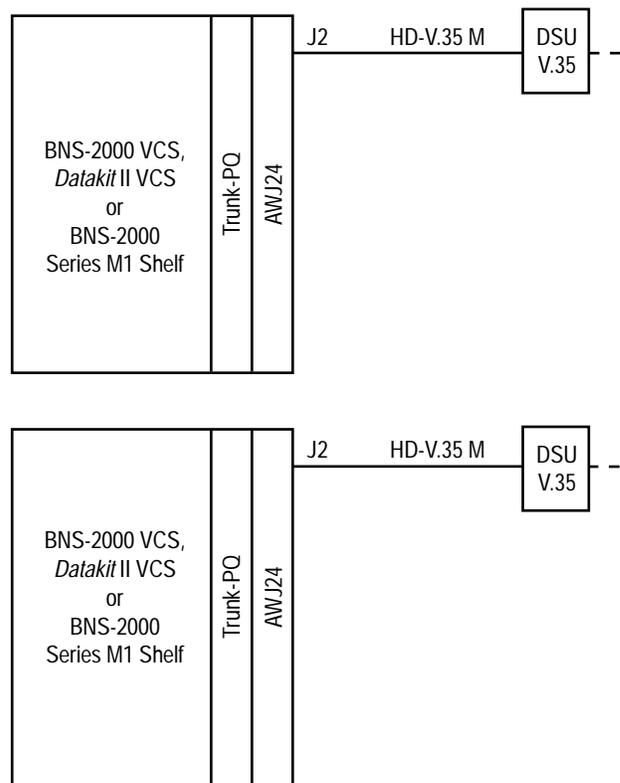


FIGURE 3-25. BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-PQ: V.35 Interface

TABLE 3-11. Ordering Information for Trunk-PQ (AWJ24 I/O Board)

Cable or Adapter	Description	ED5P055-31 Group Number
HD-V.35M	50-pin-M V.35 M	G(251)

BNS-2000 Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-T1: V.35 Interface

Cabling a node to another node or to a SAM with a Trunk-T1 module and a V.35 interface uses the following:

- a Trunk-T1 module consisting of a TN1015 circuit pack and an AWJ4 I/O board (The AWJ4 I/O board has a physical 50-pin connector and a logical V.35 or RS-422/449 interface; this section explains cabling for the V.35 interface.)
- The recommended DSUs are the SCITEC Saturn D4/ESF, the Phoenix 1536, or the COASTCOM D/I MUX.
- The recommended CSU is the Kentrox T-Serv.

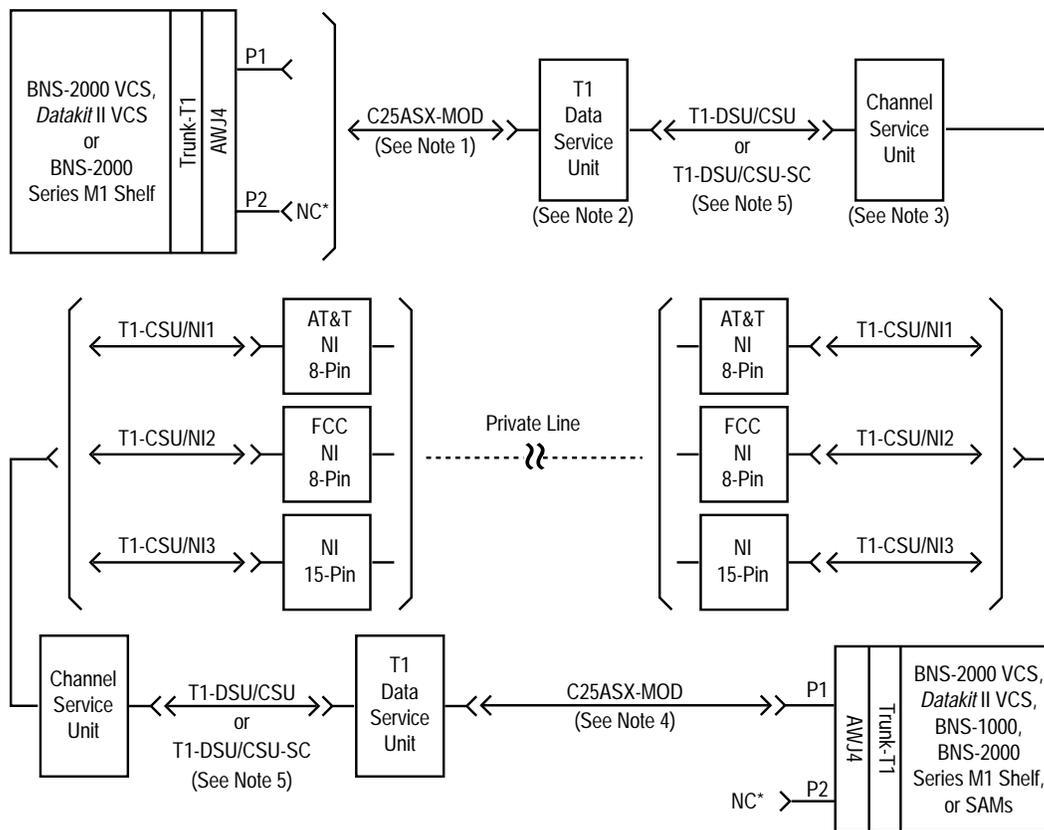
NOTE: It is important to establish whether the DSU/CSU has slide-lock or screw-lock connections before ordering cables.

- A V.35 cable originates at the AWJ4 I/O board P1 connector.
- A C25AS-MOD cable (or T1-DSU cable for the COASTCOM DSU) connects the P1 connector to the DSU.

NOTE: For the COASTCOM DSU, use the T1-DSU cable instead of the C25AS-MOD cable. The overall length of this cable can not exceed 30 feet at 1.344 Mbps, or 15 feet at 1.544 Mbps.

- The DSU then connects to a CSU with:
 - T1-DSU/CSU cable for a slide-lock connection
 - T1-DSU/CSU-SC cable for a screw-lock connection
- All high-speed T1 cabling from the CSU to the NI depends on the NI used:
 - Lucent Technologies NI (8-pin) — T1-CSU/NI1 cable
 - FCC NI (8-pin) — T1-CSU/NI2 cable
 - 15-pin NI — T1-CSU/NI3 cable
- At the remote NI, connections to the CSU are as described above.
 - For a slide-lock connection, the T1-DSU/CSU cable connects the remote DSU to a CSU.
 - For a screw-lock connection, the T1-DSU/CSU-SC cable connects the remote DSU to a CSU.
- The remote end DSU connection should be made with a C25AS-MOD cable (or T1-DSU cable for COASTCOM DSUs) to the AWJ4 I/O board P1 connector at the Trunk-T1 module.

Figure 3-26 illustrates this configuration.



*NC = no connection

Note 1: For a COASTCOM DSU, use T1-DSU cable instead of C25AS-MOD cable.

Note 2: Recommended T1 DSUs are SCITEC Saturn D4/ESF, Phoenix 1536, and COASTCOM D/I MUX.

Note 3: Recommended CSU is Kentrox T-Serv.

Note 4: For COASTCOM DSU, use a T1-DSU cable.

Note 5: For a slide-lock DSU/CSU connection, use T1-DSU/CSU cable.

For a screw-lock DSU/CSU connection, use T1-DSU/CSU-SC cable.

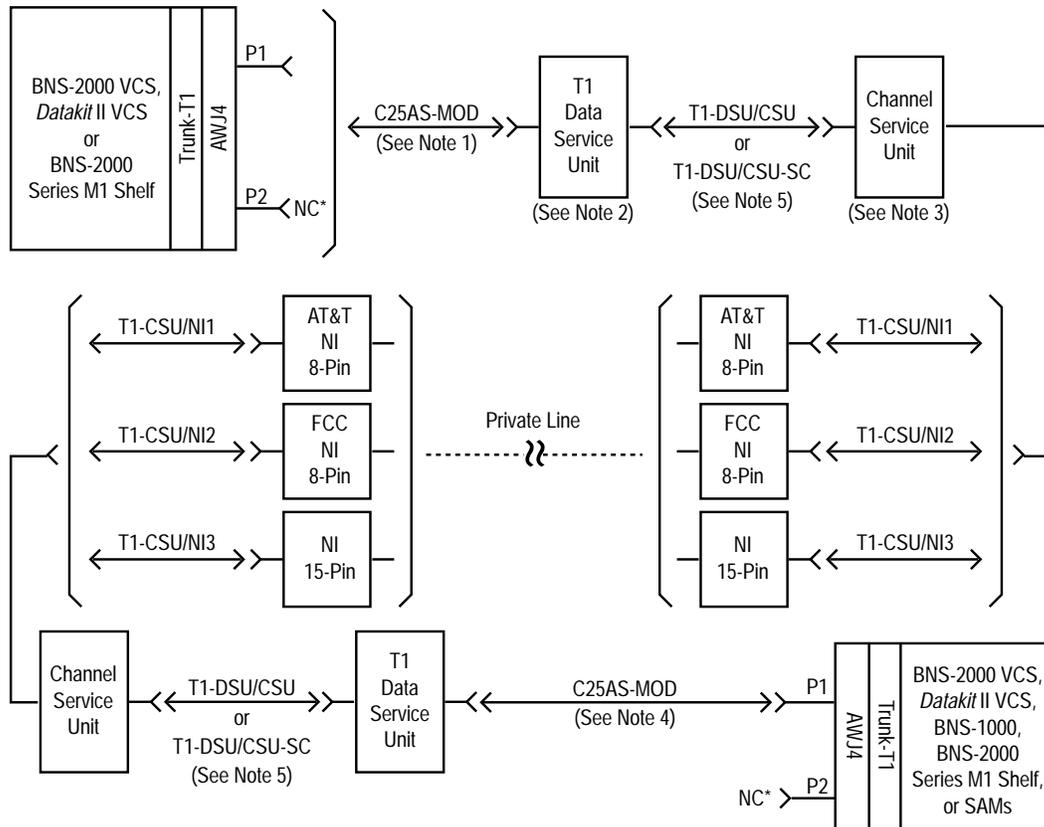
FIGURE 3-26. BNS-2000 VCS Node, Datakit II VCS Node or Series M1 Shelf with Trunk-T1: V.35 Interface

BNS-2000 VCS Node, *Datakit II* VCS Node or Series M1 Shelf with Trunk-T1: RS-422/449 Interface

Cabling a node to another node or to a SAM with a Trunk-T1 module and an RS-422/449 interface uses the following:

- a Trunk-T1 module consisting of a TN1015 circuit pack and an AWJ4 I/O board (The AWJ4 I/O board has a physical 50-pin connector and a logical V.35 or RS-422/449 interface; this section explains cabling for an RS-422/449 interface.)
- The recommended DSUs are the SCITEC Saturn D4/ESF, the Phoenix 1536, and the COASTCOM D/I MUX.
- The recommended CSU is the Kentrox T-Serv.
NOTE: It is important to establish whether the DSU/CSU has slide-lock or screw-lock connections before ordering cables.
- RS-422/449 cabling originates at the AWJ9 I/O board P1 connector.
- A C25ASX-MOD cable (or T1-DSU cable for the COASTCOM DSU) connects from the P1 connector to the DSU.
NOTE: For the COASTCOM DSU, use the T1-DSU cable instead of the C25ASX-MOD cable. This cable can not exceed 40 feet.
- The DSU then connects to a CSU with:
 - T1-DSU/CSU cable for a slide-lock connection
 - T1-DSU/CSU-SC cable for a screw-lock connection
- All high-speed T1 cabling from the CSU to the NI depends on the NI used:
 - Lucent Technologies NI (8-pin) — T1-CSU/NI1 cable
 - FCC NI (8-pin) — T1-CSU/NI2 cable
 - 15-pin NI — T1-CSU/NI3 cable
- At the remote NI, connections to the CSU are as described above:
 - For a slide-lock connection, T1-DSU/CSU cable connects the remote DSU to a CSU.
 - For a screw-lock connection, a T1-DSU/CSU-SC cable connects the remote DSU to a CSU.
- The remote end DSU connection should be made with a C25ASX-MOD cable (or T1-DSU cable for COASTCOM DSUs) to the AWJ4 I/O board P1 connector at the Trunk-T1 module.

Figure 3-27 illustrates this configuration.



*NC = no connection

Note 1: For a COASTCOM DSU, use T1-DSU cable instead of C25ASX-MOD cable.

Note 2: Recommended T1 DSUs are SCITEC Saturn D4/ESF, Phoenix 1536, and COASTCOM D/I MUX.

Note 3: Recommended CSU is Kentrox T-Serv.

Note 4: For a COASTCOM DSU, use T1-DSU cable.

Note 5: For a slide-lock DSU/CSU connection, use T1-DSU/CSU cable.

For a screw-lock DSU/CSU connection, use T1-DSU/CSU-SC cable.

FIGURE 3-27. BNS-2000 VCS Node, Datakit II VCS Node or Series M1 Shelf with Trunk-T1: RS-422/449 Interface

TABLE 3-12. Ordering Information for Trunk-T1 (AWJ4 I/O Board)

Cable or Adapter	Description	ED5P055-31 Group Number
C25AS-MOD	50-pin 180-M V.35-M RS-422/449-M	G(202), G(C)
T1-DSU/CSU	15-pin-M 15-pin-M	G(183), G(AN)
T1-CSU/NI1	8-pin mod 8-pin mod	G(182), G(AE)
T1-CSU/NI2	8-pin mod 8-pin mod	G(180), G(AE)
T1-CSU/NI3	15-pin mod 15-pin mod	G(181), G(AE)
T1-DSU	50-pin 180 M DB25 M	G(185), G(Q)
T1-DSU/CSU-SC	15-pin M 15-pin M	G(227), G(AN)

Trunk Module Administration

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Trunk Module Administration

When all appropriate group and profile information has been entered, you can complete the database entry forms provided in the **Appendix** and begin trunk administration. If these database elements have not been added to the database with the **group** and **profile** commands, refer to the *Node Reference* before continuing with the procedures in this chapter.

The *Data Networking Products Multipurpose Concentrator Reference* provides information for administering trunks used as LIMs for MPCs. For trunks used as LIMs for ISN concentrators, refer to the *Data Networking Products ISN Concentrator Reference*.

StarKeeper II NMS Administration

StarKeeper II NMS provides a variety of tools to support administration of trunks that interconnect nodes in a network. *StarKeeper II NMS Network Builder* analyzes the interconnections for the best choices for session maintenance, and makes standard trunk administration consistent. *StarKeeper II NMS Network Monitor* provides an overview of the system consistent with the current status of each node and trunk, provides a continual view of the status and integrity of the network, and provides diagnostic capability. *StarKeeper II NMS Performance Reporter* collects reports on network performance.

Trunk administration via *StarKeeper II NMS* is accomplished by using the Network Builder and the cut-through mode of *StarKeeper II NMS*. Trunk command entry and execution via *StarKeeper II NMS* is similar to command entry and execution on the direct console connection. Not all of the same abbreviations are allowed, however, nor is input information validated. Refer to the appropriate *StarKeeper II NMS* documentation for information on accessing the cut-through mode for your node.

Command Set

Information regarding the disposition of trunks with errors is initially entered into the database with the **node** commands. With the **automatically remove trunks with errors?** parameter, trunk modules can be taken out of service when a designated error threshold is reached. The response to the parameter **after how many error packets (per two minutes)** designates the error threshold. See the *Node Reference*.

Trunk module configuration information is added to the database and then manipulated and checked, using the **enter**, **change**, **delete**, and **verify trunk** commands. These commands are used frequently during trunk administration. The **enter** and **change** commands have extensive parameter prompting sequences for specifying options. These parameters can then be checked with the **verify** command, or removed from the database with the **delete** command.

Trunk module service states are controlled by the **restore** and **remove** commands. These commands affect call processing on trunks, and are often used with administration and maintenance procedures. The **verify oosmods** command lists all out-of-service modules.

The **diagnose trunk**, **dmeas trunk**, **dstat trunk**, **display traffic**, and **display connections** commands are used for trunk module maintenance and troubleshooting. The *Node Reference* documents all other command objects that are related to trunk modules. Table 4-1 lists all commands related to trunk module administration.

TABLE 4-1. Trunk Command Set

Administration	Operations	Maintenance	Related Objects	
change trunk	remove trunk	diagnose trunk	connections	oosmods
delete trunk	restore trunk	dmeas trunk	group*	profile*
enter trunk	route trunk**	dstat trunk	measurements	traffic
verify trunk			node	

* Must be entered before configuring a trunk in the database.

** Applies only to a configuration in which session maintenance has been administered through *StarKeeper II* NMS. See the *Session Maintenance Guide*.

Parameter Considerations

Parameters that require special consideration because of the hardware configuration or the application being supported are explained in this section.

The Syntax of the **enter trunk** section in **Trunk Module Commands** and the database entry forms in the **Appendix** give the correct prompting sequence for the module type being entered. In addition, the parameter definitions in the **enter trunk** section supplement the following explanations.

Trunk Module Type

The **TRUNK MODULE TYPE** parameter enables you to specify the type of trunk module to be entered. Trunks that connect two nodes must be the same hardware type; that is, the trunk module type in one node must connect to the same trunk module type at the other node. The modules do not, however, have to be installed in the same numbered slots in both nodes.

Comment

The **COMMENT** parameter enables you to enter a string of 1 to 60 characters to annotate a particular module with needed administrative information.

Number of User Channels

When configuring trunk modules, you must specify the maximum number of channels (depending on the hardware type and the application) to be used for networking.

The administered number of channels must be equal on both sides of the trunk, because the node does not negotiate between different channel ranges. When a channel mismatch occurs, calls originating from one node are completed, but calls originating from the other node may not go through.

Traffic Type

The **TRAFFIC TYPE** (*non-cir*, *cir*, or *both*) can be configured for the Trunk-PQ. The same type must be configured on both sides of the trunk. If a type mismatch occurs, calls cannot be completed properly.

CIR Information

To avoid congestion and data loss over the Trunk-PQ, the **MAXIMUM AGGREGATE CIR** and **AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS** can be configured with the **enter trunk** and **change trunk** commands.

Optimization

If **TRAFFIC TYPE** is *non-cir* or *both*, the Trunk-PQ can be optimized for either low delay or high throughput. If the **TRAFFIC TYPE** is configured for CIR only, the Trunk-PQ is optimized for high throughput.

Call Screening Profile ID

Incoming calls, entering the node through a trunk module, can be made secure with *trunk call screening*—a set of security patterns used to check the destination address of calls at strategic points in a network in order to permit, deny, or limit access to a certain host, node, or set of nodes. These security patterns are specified in a call screening profile ID with the **profile** commands. Once a call screening profile ID is administered, the same profile ID can be used for one or more trunk modules. (The same security patterns apply.) For details on trunk call screening, see the *Planning Guide* and the **profile** command in the *Node Reference*.

Procedures

A trunk module does not have to be physically installed before its database information is configured. For routine administration and operations procedures, such as removing and restoring modules to service or displaying module hardware status, module installation is required.

To enter or change trunk database information, follow Procedure 4-2 or Procedure 4-3. To transfer or duplicate trunk database information from one module address to another module address, follow Procedure 4-4 or Procedure 4-5.

NOTE: You cannot use the **move** and **copy** commands for a trunk module configured as a session maintenance trunk.

PROCEDURE 4-1. Preparing to Enter or Change Trunk Database Information

1. Check the output of the **verify node** command to determine whether the **automatically remove trunks with errors** parameter has been specified, and whether the specification is appropriate for your configuration. If necessary, use the **change node** command to make the required modifications. See the *Node Reference* for details.
2. Check the output of the **verify group** and **verify profile** commands to determine if the appropriate group name and profile ID have been entered. If they do not appear in the database as required (they have been deleted, changed, or misspelled), refer to the *Node Reference* for information to make the necessary adjustments.
3. When planning to move or copy trunk database information for a two-board (Trunk-DDS) module, make sure two contiguous slots are available.

PROCEDURE 4-2. Entering a Trunk Module in the Database

1. Refer to Procedure 4-1.
2. Have your completed database entry forms available. Use **enter trunk** to begin module administration. To specify default values, press or as shown in the prompted entry examples in **Trunk Module Commands**.
3. Use **verify trunk** to check your entries.
4. To correct errors or change parameter specifications, use **change trunk**.
5. To start over, use **delete trunk** to eliminate all database entries.
6. If the trunk module has been installed, use **restore trunk** to place the module back into service.

PROCEDURE 4-3. Changing Trunk Database Configuration

For minor database changes, such as modifications to only a few parameters, follow Method 1. For database changes involving extensive configuration adjustments, follow Method 2.

Method 1. Minor Changes

1. Use **remove trunk** to take the module out of service.
2. Use **change trunk** to make modifications.
3. Use **verify trunk** to review changes.
4. Use **restore trunk** to place the module back into service.

Method 2. Extensive Changes

1. Use **verify trunk** to display parameter options currently specified in the database. If necessary, complete or revise the database planning forms.
2. Use **remove trunk** to take the module out of service.
3. Use **delete trunk** to eliminate all database information.
4. Use **enter trunk** to re-enter all information in the database.
5. Use **verify trunk** to review changes.
6. Use **restore trunk** to place the module back into service.

PROCEDURE 4-4. Moving Database Information to Another Module Address

NOTE: The **move module** command does not duplicate ranges of numbers.

Method 1:

1. Use **remove trunk** to take the module out of service.
2. Use **verify module** to ensure that a database entry does not exist for the new module address. (If a database entry does exist for the specified module address, the **move** command fails.)
3. Use **move module** to transfer database information from one module address to another.
4. Physically move the hardware.
5. Use **restore trunk** to place the trunk module into service at the new address.

Method 2:

1. If **move module** is not appropriate for the situation, use **verify trunk** to get a report of the configuration data.
2. Use **remove trunk** to take the trunk module out of service.
3. Use **delete trunk** to eliminate all information at the existing module address.
4. Use **enter trunk** to configure the information at the new module address.
5. Use **verify module** to check information entered at the new module address.
6. Physically move the hardware.
7. Use **restore trunk** to place the module back into service.

PROCEDURE 4-5. Copying Database Information to Another Module Address

If an additional trunk module must be installed that requires exactly the same parameter specifications as a currently installed and configured trunk module, duplicate information from one module address to another with **copy module** or with a combination of **verify** and **enter**.

NOTE: The **copy module** command does not duplicate ranges of numbers.

Method 1:

1. Use **remove trunk** to take the module out of service.
2. Use **verify module** to ensure that a database entry does not exist for the new module address. (If a database entry does exist for the specified module address, the **copy** command fails.)
3. Use **copy module** to duplicate the database information from one module address to another.
4. Use **restore trunk** to place both trunk modules back into service.

Method 2:

1. If **copy module** is not appropriate for the situation, use **verify trunk** to get a report of the existing configuration data. If necessary, complete the database planning forms.
2. Use **enter trunk** to configure the information at the new module address.
3. Use **verify trunk** to check information entered at the new module address.

PROCEDURE 4-6. Enabling Measurement Reports

Two types of trunk measurement reports are available:

- on-demand measurement reports, which are initiated from the console by executing the **dmeas** command
- scheduled measurement reports, which are available from *StarKeeper II* NMS Performance Reporter

To obtain either type of measurement report:

1. Enable the collection of measurement data for all trunk modules in the node.
 - a. If you have *StarKeeper II* NMS in your network, refer to the *StarKeeper II NMS Commands Reference* for details.

Enter **yes** in response to the **NODE MONITORED BY StarKeeper II NMS** prompt of the **change node** command so that your node is aware that it is monitored by *StarKeeper II* NMS.
 - b. If you do not have *StarKeeper II* NMS in your network, enter **schedule measurements trunk** at your console.

NOTE: This procedure only enables on-demand measurements.
2. In addition to Step 1, each trunk module must have its measurements enabled.
 - a. For all trunk types except the Trunk-PQ, this is accomplished by entering *yes* in response to the **ENABLE TRUNK MEASUREMENTS** prompt of the **enter trunk** command.
 - b. For the Trunk-PQ, this is done automatically and the prompt is not displayed.

Reports

Table 4-2 explains the reports available to assist with analysis of module/network performance, system expansion, troubleshooting, and other routine tasks.

TABLE 4-2. Reports for Trunk Modules

Report Topic	Command	Description
measurements	dmeas trunk	On-demand measurement reports detailing usage level of the trunk module. Module must be installed and measurements enabled. Collection of measurements must be enabled. (See Procedure 4-6.)
	verify schedule	Informs you whether or not trunk measurement data can be collected. (See Procedure 4-6.) (Refer to the <i>Node Reference</i> for information for this command.)
module data	verify trunk	Hardware/software module data currently configured in the database. Module does not have to be installed.
	dstat trunk	Hardware/software trunk module data. Module must be installed.
out-of-service modules	verify oosmods	Lists all installed modules currently out of service.
group data	verify group	Database information for a specific trunk group.
connections	dmeas connections	Measurement reports for connections established through the node for trunk groups.
	display connections	PDD (predefined destination), PVC (permanent virtual circuit), and SVC (switched virtual circuit) information for modules or groups. Provides packet counts for <i>Datakit II VCS</i> and <i>BNS-2000 VCS</i> .
	display traffic	For BNS-2000 nodes, lists established connections for modules, groups, or hosts. Segment counts are included. See the <i>Node Reference</i> .
database size	dbaudit	Shows where database space expenditures occur. If dbresize is used, the database tables are readjusted automatically. See the <i>Node Reference</i> .

Trunk Module Troubleshooting

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Trunk Module Troubleshooting

The *Node Reference* provides general troubleshooting information and a systematic approach to problem solving. Using methods outlined there, you can determine which problems affect the entire node and isolate local problems to specific interface modules.

This chapter provides problem indicators that are trunk module-specific, a checklist of problem areas, and detailed remedial procedures, but does not explain problem indicators that are common to all modules. Refer to the *Node Reference* and other vendor documents for this information. Refer to the *Data Networking Products Multipurpose Concentrator Reference* for resolving problems related to trunks configured as LIMs for MPCs. For trunks configured as LIMs for ISN concentrators, refer to the *Data Networking Products ISN Concentrator Reference*.

StarKeeper II NMS provides continual monitoring of the nodes that make up a network. Alarms from both ends of any facility are correlated, and a network map is available to spot any pending problems. (See the *StarKeeper II NMS Network Monitor Guide*.) By combining these tools you can quickly identify trouble areas and then follow the diagnostics and other procedures documented in this chapter to further isolate and resolve problems.

Problem Indicators

Module faceplate and I/O board LEDs, and the output of certain commands can indicate trunk problems.

Faceplate LEDs

The LEDs on the module faceplates are green, yellow, and red. They indicate on-line, off-line, and fault states. When the module circuitry detects an on-board fault, the red LED (fault) is lit. When the Reset button is pressed, the module buffers and registers are cleared, and the module application program is restarted. The module is taken out of service, and all connections are terminated. For the Trunk-PQ, the module is then redownloaded, and returned to service.

I/O Board LEDs

The AWJ3 I/O board for the SFT has two red LEDs. When the upper red LED (DS2 loopback) is lit, it indicates that diagnostics are being run; when the lower red LED (DS1 mute) is lit, it indicates that no connection exists. When neither LED is lit, the module is in service.

The AWJ33 I/O board for the SWT has four red LEDs. If any of these LEDs are lit, it indicates the presence of a failure condition and generation of the appropriate alarm. When the failure condition is corrected, a clearing alarm is issued and the LED(s) should no longer be lit.

Command Output

The output of certain operations commands—such as **diagnose trunk** and others listed in Table 5-1—can indicate an existing or potential problem.

TABLE 5-1. Command Output

Command	Description	Reference
diagnose trunk	Enables module hardware tests to be run, or loopback tests that isolate problems in a transmission path to another device.	Trunk Diagnostics procedures Trunk Module Commands Appropriate vendor documentation
display traffic	For BNS-2000 nodes, shows established connections for modules, groups, or hosts. Segment counts are included.	Procedure 5-4. Correcting Network Congestion on Trunks
display connections	PDD, PVC, and SVC information for modules or groups. Provides packet counts for <i>Datakit II</i> VCS or BNS-2000 VCS.	Procedure 5-4. Correcting Network Congestion on Trunks
dmeas connections	Displays measurements reports for connections established through the node, giving a breakdown of connection failures, and optionally, of security failures.	Procedure 5-4. Correcting Network Congestion on Trunks
dstat trunk	Displays fields showing numerical values that are counts of status packets indicating an error. Also gives module service state, and hardware alarm information.	Procedure 5-3. Obtaining Trunk Status Procedure 5-4. Correcting Network Congestion on Trunks Procedure 5-5. Responding to Alarm Messages
verify trunk	Shows all parameter options configured for a particular trunk module. Useful for determining current channel allocations.	Procedure 5-4. Correcting Network Congestion on Trunks

Problem Areas

Table 5-2 lists trunk module problem areas and troubleshooting information sources.

TABLE 5-2. Module Problems Checklist

√ Symptoms/Indicators	Possible Causes	Actions
<ul style="list-style-type: none"> _____ No transmission in progress or able to be made _____ Red LED lit on trunk module _____ LEDs lit on AWJ3 or AWJ33 I/O board _____ Report alarm message _____ dstat trunk output indicates problems 	<ul style="list-style-type: none"> _____ Bad cabling connection _____ Faulty module _____ Blown or missing slot fuse _____ Module not in service _____ Trunk at capacity _____ Incorrect routing _____ Addresses are out of service _____ Service address or trunk problems at remote end _____ I/O board in loopback mode _____ Carrier failure _____ Facilities noise 	<ul style="list-style-type: none"> _____ See Procedure 5-1. Solving Trunk Module Problems. _____ See Procedure 5-2. Solving I/O Board Problems. _____ See Procedure 5-5. Responding to Alarm Messages. _____ See the <i>Node Reference</i> for slot fuse information. _____ See Trunk Diagnostics procedures.
<ul style="list-style-type: none"> _____ End users on trunks report lost or garbled data. _____ End users connected through a common trunk report slow responses. _____ dmeas trunk output indicates potential problem 	<ul style="list-style-type: none"> _____ Trunk at capacity _____ Channel allocation mismatch between nodes _____ Facilities outage _____ Facilities noise _____ Facilities interface (for example, modem) failure _____ Problem with remote end 	<ul style="list-style-type: none"> _____ See Procedure 5-4. Correcting Network Congestion on Trunks. _____ See troubleshooting procedures in the <i>Node Reference</i> for connected devices and end user problems. _____ Contact the provider of your transmission facilities for service.
<ul style="list-style-type: none"> _____ diagnose trunk output indicates problems 	<ul style="list-style-type: none"> _____ Faulty module _____ Faulty connections _____ Problem with remote end device. 	<ul style="list-style-type: none"> _____ See Trunk Diagnostics procedures. _____ See troubleshooting procedures in the <i>Node Reference</i> for connected devices and end user problems. _____ See appropriate vendor documentation. _____ See Procedure 5-22. Correcting Diagnostic Failure.

Procedures

This section explains the considerations to take into account and the procedures to follow when troubleshooting a trunk module.

- Procedure 5-1. Solving Trunk Module Problems discusses common trunk problems and their resolutions.
- Procedure 5-2. Solving I/O Board Problems explains the significance of the LEDs on the AWJ3 and AWJ33 I/O boards.
- Procedure 5-3. Obtaining Trunk Status explains how to use the **dstat trunk** command to get status displays for the trunk indicating a problem.
- Procedure 5-4. Correcting Network Congestion on Trunks lists steps to follow to eliminate overloading.
- Procedure 5-5. Responding to Alarm Messages provides instructions for correcting conditions causing the alarm.

For **trunk** command details, refer to **Trunk Module Commands**. For additional information on trunk features, refer to the **Trunk Module Overview**.

The Trunk Diagnostics section contains procedures for running loopback tests.

PROCEDURE 5-1. Solving Trunk Module Problems

For all trunks:

1. Take the following actions for any of these problems: lost or garbled data reported; red LED on the trunk module lit; green LED not lit; an error message on the console or printer; slow responses reported by end users connected through a common trunk,
 - a. Make sure all connections are secure. For the SWT module, if you receive the following message: **REPORT ALARM: stat: per channel counter overflow for low priority queue**, a problem may exist with the cable connection to the SWT I/O board. Check the cable connection. If no cable is connected, remove the module from service and ignore the message.
 - b. Check all modems or DSUs.
 - c. Check the fiber cable and extender (SFT module only).
 - d. Enter **verify trunk < mod addr >** to determine whether the trunk is properly entered in the database, and **display connections** to see if the trunk is in service on both ends.
 - e. Verify the switch settings on the I/O board. Refer to **Trunk Module Installation** for switch setting details.
 - f. Check all cable connections. Refer to **Trunk Module Cabling** for detailed information.
 - g. If this does not solve the problem, run the trunk diagnostics to further isolate the problem.

PROCEDURE 5-1. Solving Trunk Module Problems (continued)

2. When running loopback diagnostics, take the device out of loopback mode and rerun the test to confirm a failure. This proves that the previous looped data, which passed, was actually looped back at that test point.
3. Check the **dstat trunk** report to determine whether the problem is facility-related. Bad frames indicate the existence of facility problems. See Procedure 5-3.

PROCEDURE 5-2. Solving I/O Board Problems

Check the following on the AWJ3 I/O board:

1. If the upper red LED (DS2 loopback) is lit, the I/O board is in loopback mode. Toggle the SW1 switch to the lower position.
2. If the lower red LED (DS1 mute) is lit, a module fault has occurred. The transmit and receive fibers could be reversed or the local or remote trunk could be in a fault state. If the transmit/receive fibers are reversed, manually uncross the cables. If necessary, replace the I/O board.
3. If both LEDs are lit, determine if the board is in loopback mode. If the SW1 switch is in the upper position, move it to the lower position to take the board out of loopback mode. If the DS1 LED stays lit, the transmit/receive fiber optic cables could be reversed or broken. Check the cables. If they are reversed, manually uncross them; if they are broken, replace them. If the DS1 LED is still lit, the remote trunk or the I/O board could be faulty. Replace hardware as necessary.

Check the following on the AWJ33 I/O Board:

1. If the BER LED is lit, excessive CRC errors have occurred.
2. If the RAI LED is lit, the remote digital transmission facility (DTF) equipment has lost its incoming signal.
3. If the AIS LED is lit, a transmission fault is located either at the transmitting DTF equipment or upstream of the transmitting DTF equipment.
4. If the LIS LED is lit, a loss of incoming signal failure condition exists.

When any of these LEDs are lit, an alarm message is generated. Refer to the *Data Networking Products Messages Reference* for the appropriate alarm information. (A clearing alarm is displayed when the indicated failure condition no longer exists.)

PROCEDURE 5-3. Obtaining Trunk Status

Enter **dstat trunk < mod addr >** to display a status report for the indicated trunk module.

- Report fields indicating the reception of bad frames include **SYNC ER** and **TRANSMSN ERROR**.
- Report fields indicating module or capacity problems include **FM NODE OVERFLO**, **TO NODE OVERFLO**, **PER CHNL OVERFLO**, **LPQ CONGEST**, and **MODULE RESET**.

PROCEDURE 5-4. Correcting Network Congestion on Trunks

For all trunks:

1. Check the routing on each node to be sure that no possible loops exist.
2. Allocate more channels on the trunk, if possible, or change the routing so fewer calls are placed on the trunk.
3. For all I/O boards except the AWJ33, check the cable length between the module and the DSU.
4. For the AWJ33 I/O board, check the cable length to any transmission device that may be present, or, if no device exists between the trunks, check the cable length to the remote I/O board.

For Trunk-PQ:

1. Enter **dmeas trunk < mod addr >**
 - a. If **FRAME ERRORS** or **ERRORED SECONDS** exceeds the number of times the remote trunk was removed or restored, run diagnostics on the trunk or DSU(s). (One *frame error* is normal for each time the remote trunk module is removed and restored.)
 - b. If a non-zero value is displayed for **BYTES DROPPED** in the transmit or receive directions, the trunk is overloaded. Refer to the *Planning Guide* to re-engineer the network and redirect some of the traffic.
 - c. If no number is displayed for **BYTES DROPPED**, but the **AVERAGE MAIN UTIL** is greater than 90%, the trunk is fully utilized. Additional traffic (over the trunk) could cause the trunk to become overloaded and performance to be degraded.
2. Enter **dstat trunk < mod addr > high** for the indicated trunk. If a non-zero value is displayed for **FM NODE OVERFLOW**, the trunk is overloaded. Refer to the *Planning Guide* to re-engineer the network and redirect some of the traffic.
3. For FRM or TSM-T1 traffic over the Trunk-PQ, enter **dmeas frm dlci** or **dmeas tsmt1 port** for the endpoints. If non-zero values are displayed for **REJ RECD** or **REJ SENT**, the trunk could be overloaded. Use **dmeas trunk** and **dstat trunk high** as described above to determine whether the trunk is overloaded.

PROCEDURE 5-5. Responding to Alarm Messages

1. Refer to the *Data Networking Products Messages Reference* for information for the alarm indicated.
2. Check the activity prior to the alarm message, using the **dmeas** and **dstat** commands.
3. Check the LEDs on the module faceplate.
4. Check the switch settings on the I/O board.
5. Check the cabling.
6. Reseat or replace trunk modules or I/O boards that have failed diagnostics.

PROCEDURE 5-5. Responding to Alarm Messages (continued)

7. Enter **verify node** to ensure that a node entry exists for the slot corresponding to the physical position in the Control Computer.

Trunk Diagnostics

Trunk module diagnostics are off-line tests run on the module hardware, and on-line loopback tests that isolate problems in a transmission path, such as an improper connection to a replaceable unit. Trunk diagnostic tests be run for several repetitions, and in the designated sequence to determine whether a problem actually exists with the trunks, or if it exists with the facility. If the node remote test indicates a problem, subsequent tests are run sequentially to locate where, in the path, the fault lies.

TABLE 5-3. Trunk Diagnostic Tests

Sequence	TRK-64	TRK-DDS	TRK-HS	TRK-PQ	TRK-T1	SFT	SWT
node_remote	√	√	√	√	√	√	√
remote_trk	√	√	√	√	√	√	
far_dsu*	√	√		√	√		√
near_dsu*	√	√		√	√		√
external_trk			√		√	√	√
local_trk	√	√	√	√	√	√	√
reverse_trk			√	√	√	√	
no_loop			√	√	√	√	
hardware				√			

* Not applicable to SWTs with AWJ33 I/O board.

This section is supplemented by information contained in **Trunk Module Commands**, which explains the diagnostic prompting sequence and the meaning of each parameter and its options, and includes system responses.

Trunk module diagnostics can be used

- when the module is first defined in the database and is physically installed
- when configuration changes are made
- when module integrity is in question

The *reverse_trk* and *no_loop* tests are run with the *remote_trk* test. The *external_trk* test checks I/O board integrity.

NOTE: When running diagnostic tests, the trunk module downloads only at the beginning of the testing sequence. It does not repeat the download once a test has been completed, and additional tests are selected by responding *yes* to the **CONTINUE TESTING?** prompt.

Loopback Connectors

Loopback connectors are used with the **diagnose trunk** command to perform incremental loopback tests of the data circuit between the trunk module and the connected end device. Table 5-5 lists the loopback tests and the appropriate loopback connectors.

TABLE 5-4. Loopback Connectors

Module Type	Connector Hardware Description	Connector Identifying Code
SFT	Fiber Optic Cable	FL2P-P-02 C2000A-3
SWT	RS-232-C RS-449/422 V.35 G.703 75 Ω Coaxial Loopcable	ED5P055-31,G174 ED5P055-31,G173 ED5P055-31,G172 932010*
Trunk-HS	Fiber Optic Cable	FL1P-P-02 C2000A-3
Trunk-T1	V.35	ED5P055-31,G202

* To order G.703 75 Ω Coaxial Loopcable, contact:
 VDH Corporation Telephone: +32 -16 60 79 32
 Industrieweg 7 FAX: +32 -16 60 79 28
 B-3190 Boortmeerbeek
 Belgium

PROCEDURE 5-6. Starting Loopback Tests

Requirement: Trunk module is out of service (except for the *node_remote* test).

1. Before running diagnostics, put any modems in loopback mode. Attach appropriate loopback connectors and cables. Ensure that all loopback connectors and cables are installed properly. Improperly installed connectors and cables can produce diagnostic errors. See **Trunk Module Installation** for installation procedures.
2. Put DSUs in the loopback mode before beginning the *near_dsu* or *far_dsu* diagnostic. Verify the service state of the trunk module: **verify trunk < mod addr >**

Diagnostic Tests for All Trunks Except Trunk-PQ

PROCEDURE 5-7. Running the Node Remote Test

Tests the health of the entire trunk and all connections up to and including the remote node.

Requirements: Both local and remote trunk modules are in service; *trunkloop* and *trunkcsc* channels are active.

NOTE: Wait a few minutes after restoring the trunk module to service before running this test. If you run the test too soon after restoring the trunk to service and before the channels become active, a message is displayed indicating that the trunk is inoperable.

1. Enter **display connections** to ensure that channels 3 (*trunkloop*) and 5 (*trunkcsc*) are active.
2. Enter **diagnose trunk < mod addr > node_remote**
 - a. If the test passes, the trunk facility was most likely temporarily impaired.
 - b. Enter **dstat trunk < mod addr >** to get an indication of the nature of the problem. Note the problem in the system record log along with a description.
3. If the test fails, check each piece of equipment and the trunk facility between the local and remote modules. Replace faulty equipment and repeat the test.

PROCEDURE 5-8. Running the Remote Trunk Test on SFT, Trunk-HS, Trunk-T1

Tests the remote trunk module and its connections from the local trunk module.

Requirement: Remote trunk module is in loopback mode.

1. Ask the remote administrator to put the remote trunk module in loopback mode by entering **diagnose trunk < mod addr > reverse_trk**
2. Enter **diagnose trunk < mod addr > remote_trk**
 - a. If the test passes, the trunk facility was most likely temporarily impaired. Check all connections.
 - b. If the test fails, the remote I/O board is probably faulty. Check the switch settings or replace the board, and repeat the test.
3. When the test is complete, ask the remote node administrator to restore the remote trunk module to service by entering **diagnose trunk < mod addr > no_loop**

PROCEDURE 5-9. Running the Far DSU* Test on SWT (TN2092) or Trunk-T1

This test extends through the local trunk module, the near DSU, to the far DSU. It does not apply to the SWT module used with an AWJ33 I/O board.

Requirement: Remote DSU provides timing and is in loopback mode.

NOTE: See DSU documentation for information. If a connected modem is not put into loopback mode, the test loops back through the entire trunk.

1. Make sure that the remote DSU is in loopback mode and that the timing straps are set correctly.
2. Enter **diagnose trunk < mod addr > far_dsu**
 - a. If the test passes, the trunk facility was most likely temporarily impaired.
 - b. If the test fails, the trunk facility is probably faulty. Replace the faulty component and repeat the test.
3. Repeat steps 1 and 2 from the remote end.
4. When testing is complete, reset the timing straps.

PROCEDURE 5-10. Running the Near DSU* Test on SWT (TN2092) or Trunk-T1

This test extends through the local trunk module to the near DSU. It does not apply to the SWT used with an AWJ33 I/O board.

Requirement: Local DSU provides timing and is in loopback mode.

NOTE: See DSU documentation for information. If a connected modem is not put into loopback mode, the test loops back through the entire trunk.

1. Ensure that the local DSU is in loopback mode and that the trunk module timing straps are set correctly.
2. Enter **diagnose trunk < mod addr > near_dsu**
 - a. If the test passes, the trunk facility was most likely temporarily impaired.
 - b. If the test fails, the I/O board, cable, or local DSU is probably at fault. Replace the faulty component and repeat the test.
3. When testing is complete, reset the timing straps.

* The *far_dsu* and *near_dsu* tests are not applicable to the SWT module using an AWJ33 I/O board.

PROCEDURE 5-11. Running the Local Trunk Test on the SFT, SWT, Trunk-HS, or Trunk-T1

Tests the local trunk module.

1. Enter **diagnose trunk < mod addr > local_trk**
2. If the test fails, replace the module and repeat the test.
3. If you receive the **TRUNK MODULE FAILED OPTIONS TEST** message, the trunk module type may not be appropriate for your node configuration.
4. If other parts of this test fail, the trunk module is most likely faulty. Replace the module and repeat the test.

PROCEDURE 5-12. Running the External Trunk Test on Trunk-HS, Trunk-T1, or SFT

This test checks the trunk module and the I/O board.

Requirement: Test is repeated several times, as indicated.

1. Connect the appropriate loopback connector to the back of the I/O board.
2. Enter **diagnose trunk < mod addr > external_trk**
 - a. If the test passes, continue with step 3.
 - b. If the test fails, check the I/O board switch settings, or replace the I/O board, and repeat the test.
3. Test the cable segments between these two points by moving the loopback connector to each end and repeating the test.
4. If the test fails, replace the last component tested and repeat the test.

PROCEDURE 5-13. Running the External Trunk Test on SWT with an AWJ9, AWJ10, or AWJ11 I/O Board

This test checks the trunk module and the I/O board.

Requirement: Test is repeated several times, as indicated.

NOTE: Where applicable, instructions for jumper placement of SWT module timing straps are provided. The timing straps are in the upper left-hand corner of the module. For additional information on timing straps, see **Trunk Module Installation**.

1. Connect the appropriate loopback connector to the back of the I/O board.
2. Place the jumper on the SWT timing strap to: internal clock, In for J3 and Out (no jumper) for J4.
3. Enter **diagnose trunk < mod addr > external_trk**
 - a. If the test passes, continue with Step 4.
 - b. If the test fails, check the I/O board switch settings, or replace the I/O board, and repeat the test.

PROCEDURE 5-13. Running the External Trunk Test on SWT with an AWJ9, AWJ10, or AWJ11 I/O Board (continued)

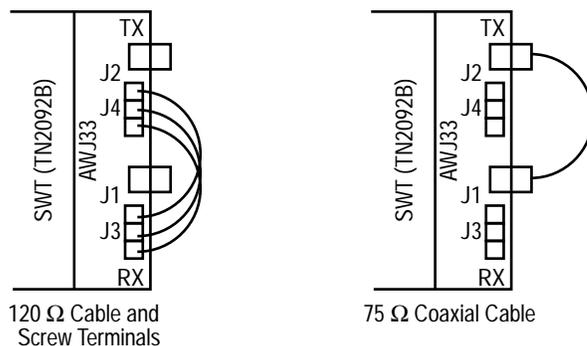
4. Connect the loopback connector to the end of the cable that attaches to the DSU.
5. Place the jumper on the SWT timing strap to: internal clock, In for J3, and Out (no jumper) for J4 and repeat the test.
6. Test the cable segments between these two points by moving the loopback connector to each end and repeating the test.
7. If the test still fails, replace the last component tested and repeat the test.

PROCEDURE 5-14. Running the External Trunk Test on SWT with an AWJ33 I/O Board

This test checks the trunk module and the I/O board.

Requirement: Test is repeated several times, as indicated.

1. Connect the appropriate loopback connector to the back of the I/O board.
 - a. with 75 Ω connectors, connect one end of the coaxial cable to the (J1) TX connector and the other end to the (J2) RX connector as illustrated in Figure 5-1.
 - b. with 120 Ω connectors, use 120 Ω cables and the screw terminals illustrated in Figure 5-1 to establish a loopback connection between the (J4) TX and (J3) RX connectors.
2. Enter **diagnose trunk < mod addr > external_trk**
 - a. If the test passes, continue with Step 3.
 - b. If the test fails, check the I/O board switch settings, or replace the I/O board, and repeat the test.
3. To test the cables, use the cables to form the loopback connection.
4. If the tests pass, refer to your vendor documentation for running diagnostics on any transmission devices that may be connected to the AWJ33.
5. If the test fails, replace the last component tested and repeat the test.



Note: Each of the three wires of the 120 Ω cable originating from one socket of the J3 screw terminal must be connected to the corresponding socket in the J4 screw terminal (e.g., the top sockets of J4 and J3 must be connected by one wire; the middle sockets of J4 and J3 must be connected by another wire; and the bottom sockets [ground] of J4 and J3 must be connected by the ground wire).

FIGURE 5-1. Loopback Connectors for External Trunk Test: SWT with AWJ33 I/O Board

Diagnostic Tests for the Trunk-PQ

PROCEDURE 5-15. Running the Node Remote Test on Trunk-PQ

This test sends data from the local trunk module out through the facility and remote trunk to the remote switch where it is looped back along the same path to the local trunk.

Requirements: Both the local and remote trunk modules must be in service and the *trunkloop* and *trunkcsc* channels must be active.

NOTE: After restoring the trunk module to service, wait a few minutes for the *trunkloop* and *trunkcsc* channels to become active before running the *node_remote* test. Otherwise, the diagnostic will not even be attempted but will terminate with an error message.

1. Enter **display connections** to see whether channels 7 and 8 (*trunkloop*) and 9 (*trunkcsc*) are active.
2. Enter **diagnose trunk < mod addr > node_remote**
 - a. If the test passes, the trunk facility was most likely temporarily impaired.
Enter **dstat trunk < mod addr >** and note any error conditions displayed in the report. Record this in a system record log along with a description of the error.
 - b. If the test fails, the problem could be with any component in the path between the local and remote trunk modules and the remote switch modules inclusively.
To determine the possible location of the problem, go to Procedure 5-17. Running the Remote Trunk Test on Trunk-PQ.

PROCEDURE 5-16. Running the Remote Trunk Test on Trunk-PQ

This test sends data from the local trunk module out through the facility and remote I/O board to the USART on the remote trunk module, where the data is looped back along the same path to the local trunk module.

Requirements: Both local and remote trunk modules must be out of service. The remote trunk must be in reverse or loopback mode.

1. Have the network administrator at the remote node put the remote trunk into reverse mode by entering **diagnose trunk < mod addr > reverse_trk**
2. Enter **diagnose trunk < mod addr > remote_trk**

After the test has finished, have the network administrator at the remote node take the remote trunk out of reverse mode by entering **diagnose trunk < mod addr > no_loop** This must be done before any diagnostic test can be run from the remote trunk or before the remote trunk can be restored to service.

 - a. If the remote trunk test passes and the node remote test had failed, the problem may lie in the remote switch module. Replace the Switch module and go to Procedure 5-16. Running the Node Remote Test on the Trunk-PQ to run the node remote test again.

PROCEDURE 5-16. Running the Remote Trunk Test on Trunk-PQ (continued)

- b. If this test fails, the problem may lie with any component in the path between the local trunk and remote trunk modules inclusively. Go to Procedure 5-18. Running the Far DSU Test.

PROCEDURE 5-17. Running the Far DSU Test on Trunk-PQ

This test sends data from the local trunk module out through the facility to the far DSU where the data is looped back along the same path to the local trunk module.

Requirements: Both the local and remote trunk modules must be out of service. The far DSU must provide timing and be in loopback mode.

NOTE: See your vendor documentation for instructions to put the DSU into loopback mode. If the far DSU is not put into loopback mode, the test data will pass through the DSU to the remote trunk and will not be looped back, violating the integrity of this test.

Enter **diagnose trunk < mod addr > far_dsu**

1. If this test passes and the remote trunk test had failed, the problem may lie with the remote I/O board, the remote trunk or with the cabling between the far DSU and the remote I/O board.
 - a. Locate the faulty components by having the remote network administrator go to Procedure 5-19. Running the Near DSU Test on Trunk-PQ, Procedure 5-20. Running the Local Trunk Test on Trunk-PQ, and Procedure 5-21. Running the Hardware Test on Trunk-PQ and run diagnostics from the remote trunk.
 - b. Replace the faulty components and repeat the test.
2. If this test fails, the problem may lie with any component in the path between the local trunk and the far DSU inclusively. Go to Procedure 5-19. Running the Near DSU Test on the Trunk-PQ.

PROCEDURE 5-18. Running the Near DSU Test on Trunk-PQ

This test sends data from the local trunk module out through the facility to the near DSU where the data is looped back along the same path back to the local trunk module.

Requirements: Both local and remote trunk modules must be out of service. The near DSU must provide timing and be in loopback mode.

NOTE: See your vendor documentation for how to put the DSU into loopback mode. If the near DSU is not put into loopback mode, the test data will pass through the DSU and will not be looped back, violating the integrity of this test.

Enter **diagnose trunk < mod addr > near_dsu**

1. If this test passes and the *far_dsu* test had failed, the problem may lie with the remote DSU or the cabling between the near DSU and the remote DSU.

PROCEDURE 5-18. Running the Near DSU Test on Trunk-PQ (continued)

Replace faulty components and repeat the test.

2. If this test fails, the problem may lie with any component in the path between the local trunk and the near DSU inclusively. Go to Procedure 5-20. Running the Local Trunk Test on the Trunk-PQ.

PROCEDURE 5-19. Running the Local Trunk Test on Trunk-PQ

This test sends data through the USART on the local trunk module where it is looped back. This test only tests the local trunk module because test data does not extend out to the I/O board.

Requirements: Both local and remote trunk modules must be out of service.

Enter **diagnose trunk < mod addr > local_trk**

1. If this test passes and the *near_dsu* test had failed, the problem may lie with the near DSU or the cabling between the near DSU and the I/O board, or the local trunk module.

Replace these components and repeat the test.

2. If this test fails, a hardware problem exists in the trunk module.

Go to Procedure 5-21. Running the Hardware Test on the Trunk-PQ.

PROCEDURE 5-20. Running the Hardware Test on Trunk-PQ

This test includes boot, extended RAM, instruction set, timer, backplane interface (DKI), inter-processor communication, and the port. Once hardware diagnostics for the Trunk-PQ are initiated, they run consecutively and automatically. Test results are displayed as each test is completed. If a test fails, testing stops.

During testing, the following messages indicate the specific part of the test in progress:

Boot test in progress . . .

Extended RAM test in progress . . .

Diagnostic download in progress . . .

A dot is appended to each message every thirty seconds until the test is complete.

Requirements: Both local and remote trunk modules must be out of service.

1. Enter **verify trunk** to check that the module to be tested is entered in the database and that it is out of service.
2. If the module is in service, enter **remove trunk < mod addr >**
3. Enter **diagnose trunk < mod addr > hardware**
4. If this test passes and the local trunk test had failed, a problem exists with the USART on the local trunk module.

Replace the local trunk module and repeat the test.

PROCEDURE 5-20. Running the Hardware Test on Trunk-PQ (continued)

5. If this test fails, either a hardware problem exists in the area indicated by the diagnostic output, or the slot itself may be bad.

Move the module to another slot and repeat the hardware diagnostic test, and/or replace the local trunk module and repeat the test.

PROCEDURE 5-21. Correcting Diagnostic Failure

1. Replace the failed module.
2. If this does not correct the problem, replace the appropriate I/O board.
3. Check the slot voltage and fuse. Refer to the *Node Reference* for detailed instructions.

PROCEDURE 5-22. Completing Trunk Tests

1. Restore the module to service: **restore trunk < mod addr >**
2. Verify that the module has been restored to service: **verify trunk < mod addr >**

Trunk Module Commands

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Trunk Module Commands

This chapter describes the commands related to the administration, operation, and maintenance of a trunk module. Commands appear in alphabetical order by verb. System responses for all trunk commands conclude this chapter.

The **enter trunk** command, used for initial trunk module administration, gives the full prompting sequence and contains a list of parameter definitions. The database entry forms provided in the **Appendix** also follow the prompting sequence for entering each module type. Additional parameter information for **enter trunk** and **change trunk** is provided in **Trunk Module Administration**. Procedures for running diagnostic commands are found in **Trunk Module Troubleshooting**.

The *Data Networking Products Multipurpose Concentrator Reference* and the *Data Networking Products ISN Concentrator Reference* provide information for configuring trunks used as LIMs to MPCs and ISN concentrators.

Other command objects that are related to the administration, operation, and maintenance of trunk modules are documented in the *Node Reference*.

change trunk

Depending on the service state of the trunk module, the **change trunk** command enables you to modify certain trunk module parameters that are currently administered in the database. The following restrictions apply:

- The **TRUNK MODULE TYPE** , and **MODULE ADDRESS** parameters cannot be changed with **change trunk**. To change these parameters, trunk module information must be deleted and re-entered using **delete trunk** and **enter trunk**. You can use the **move module** command to change the **MODULE ADDRESS** parameter. **Trunk Module Administration** provides information for this procedure.
- When the trunk module is in service, only the following parameters can be changed

CALL SCREENING PROFILE ID

COMMENT

ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK

Syntax

You can use **change trunk** in prompted entry only. The command syntax for **enter trunk** and **change trunk** are similar for out-of-service trunks. The defaults for **change trunk** are those values, conditions, or states that currently exist in the database. They are displayed within parentheses in the parameter prompt.

Parameters

Refer to the parameter definitions supplied in the **enter trunk** section.

Prompted Entry: Changing Information for an Out-of-Service SWT

```
CC0> change
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 18
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted, none:
+("swt in 18")]:
+
GROUP [up to 8 chars: +(gr703)]: +
NUMBER OF USER CHANNELS [1-504: +(248)]: 248
LINE SPEED [9600, 19200, 48k, 56k, 64k: +(56k)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(callscr1)]: +
MODULE ADDRESS: <DEL>
CC0>
```

Prompted Entry: Changing Information for an In-service SWT

```
CC0> change
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 62
COMMENT [up to 60 chars double quoted, none:
+("swt in 62")]:
+
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(yes)]: +
CALL SCREENING PROFILE ID [up to 8 chars, none: +(callscr3)]: callscr2
MODULE ADDRESS: <DEL>
CC0>
```

Prompted Entry: Changing Information for an In-service Trunk-PQ

```
CC0> change
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 110
COMMENT [up to 60 chars double quoted:
+("pq in 110")]:
+
CALL SCREENING PROFILE ID [up to 8 chars, none: +(callscr1)]: callscr3
MODULE ADDRESS: <DEL>
CC0>
```

change trunk

Prompted Entry: Changing Information for an In-service Trunk-T1

```
CC0> change
OBJECTS [..., trunk, ...]: trunk
MODULE ADDRESS: 42
COMMENT [up to 60 chars double quoted:
+"t1 in 42"]:
+
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(yes)]: +
CALL SCREENING PROFILE ID [up to 8 chars, none: +(callscr1)]: callscr4
MODULE ADDRESS: <DEL>
CC0>
```

* For all configurations, a *no* response is required. Session maintenance configurations should be administered through *StarKeeper II NMS*. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

delete trunk

The **delete trunk** command enables you to eliminate trunk module information from the database. Before you can delete any information, the trunk module must be out of service.

Syntax

You can use **delete trunk** in prompted entry or one-line entry.

```
CC0> delete
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
```

Parameters

Refer to the parameter definitions supplied in the **enter trunk** section.

Prompted Entry: Deleting Trunk Information

```
CC0> delete
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 55
CC0>
```

One-line Entry: Deleting Trunk Information

```
CC0> delete trunk 55
```

diagnose trunk

The **diagnose trunk** command initiates loopback tests for a trunk module and enables you to isolate network problems. This section is supplemented by Trunk Diagnostics in **Trunk Module Troubleshooting**.

Syntax

You can use **diagnose trunk** in prompted entry or one-line entry.

The **diagnose trunk** command includes extensive prompts, informational messages, and system responses. This Syntax section provides significant portions of this information; System Responses supplements it.

```
CC0> diagnose
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
```

For an SFT:

```
TEST TYPE [local_trk, external_trk, remote_trk,
node_remote, reverse_trk, no_loop: +(local_trk)]:
```

If TEST TYPE is local_trk, remote_trk, external_trk, node_remote:

```
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
```

If TEST TYPE is local_trk or remote_trk:

```
IT IS RECOMMENDED THAT THE node_remote TEST BE RUN FIRST
```

If TEST TYPE is local_trk and the remote module is in service:

```
HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER yes TO CONTINUE
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>
RUN THE remote_trk LOOP TEST NEXT.
```

If TEST TYPE is remote_trk:

```
THIS TEST WILL FAIL IF THE REMOTE MODULE ISN'T IN REVERSE LOOPING MODE.
IF IT ISN'T, ASK THE REMOTE ADMINISTRATOR TO DO THIS.
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN COMMAND AGAIN AND ANSWER yes TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>

TELL THE REMOTE ADMINISTRATOR TO RUN THE diag trk COMMAND WITH no_loop.
BE SURE THE REMOTE no_loop COMMAND IS DONE BEFORE YOU RESTORE LOCAL SERVICE.
RUN THE local_trk LOOP TEST ON THE REMOTE NODE BEFORE YOU RESTORE LOCAL SERVICE.
```

If TEST TYPE is external_trk and the remote module is in service:

```
HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER yes TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:
INFO: Replace the fiber optic link connection on the I/O board with
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>
```

Syntax (continued)

IF THIS IS THE LOCAL NODE, RUN THE `external_trk` LOOP ON THE REMOTE NODE.
 IF THIS IS THE REMOTE NODE, CHECK THE FIBER OPTIC LINK.
 BE SURE TO REPLACE THE LOOPBACK FIBER/DEVICE.

If TEST TYPE is node_remote and the module is out of service:

DIAGNOSTIC REQUIRES THAT THE MODULE BE IN SERVICE.
 USE THE `restore` COMMAND TO PUT THE MODULE BACK IN SERVICE.
 THEN BEGIN THIS COMMAND.

If TEST TYPE is node_remote and the module is in service:

<See System Responses>

If TEST TYPE is node_remote and remote module is out of service:

The `remote_trunk` must also be in service for
 the "node_remote" test or it will fail.

If TEST TYPE is reverse_trk and the module is out of service:

<See System Responses>
 TELL THE ADMINISTRATOR AT THE OTHER NODE TO CONTINUE WITH
 THE 'diagnose trunk' COMMAND WITH A LOOP TYPE OF 'remote_trk'

If TEST TYPE is not node_remote and the module is in service:

DIAGNOSTIC REQUIRES SERVICE INTERRUPTION TO MODULE.
 USE THE `remove` COMMAND TO TAKE THE MODULE OUT OF SERVICE
 THEN BEGIN THIS COMMAND AGAIN.

If TEST TYPE is no_loop and the module is out of service:

TRUNK MODULE IS RESTORED TO NON-LOOPING MODE

For an SWT:

INFO: `near_dsu` and `far_dsu` tests do not apply to SWTs used with
 G.703/G.704/G.706 I/O boards.

TEST TYPE [`local_trk`, `external_trk`, `near_dsu`,
`far_dsu`, `node_remote`]: `+(local_trk)`:

If TEST TYPE is not reverse_trk or no_loop:

REPETITIONS [1-1000; 'c' for continuous: `+(1)`]:

If TEST TYPE is local_trk or external_trk:

IT IS RECOMMENDED THAT THE `node_remote` TEST BE RUN FIRST

If TEST TYPE is local_trk or near_dsu and the remote module is in service:

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE
 AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
 THEN BEGIN THIS COMMAND AGAIN AND ANSWER `yes` TO CONTINUE.
 CONTINUE TESTING [`yes`, `no`]: `+(yes)`:

If TEST TYPE is near_dsu only:

INFO: Place near digital service unit in loop-around mode.

CONTINUE TESTING [`yes`, `no`]: `+(yes)`:

<See System Responses>

RUN THE `far_dsu` LOOP TEST NEXT.

Syntax (continued)

If TEST TYPE is far_dsu and the remote module is in service:

HAVE THE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER **yes** TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:
INFO: Place far digital service unit in loop-around mode.
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>

CHECK THE REMOTE I/O DISTRIBUTION BOARD, THE REMOTE
DIGITAL SERVICE UNIT, AND THE CABLE AND CONNECTIONS
BETWEEN THEM.

If TEST TYPE is reverse_trk and the module is out of service:

TELL THE ADMINISTRATOR AT THE OTHER NODE TO CONTINUE WITH
THE 'diagnose trunk' COMMAND WITH A LOOP TYPE OF 'remote_trk'

If TEST TYPE is no_loop and the module is out of service:

<See System Responses>

If TEST TYPE is external_trk and the module is out of service:

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER **yes** TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:

The cable connected to the I/O board must be replaced with a loop-around
connector. If any I/O board other than the AWJ33 I/O board is being used,
the terminal timing straps must be set to internal clock mode.
If this has not been done yet, type 'no' and start the command again after
making the changes.

CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>

If TEST TYPE is node_remote and the module is out of service:

DIAGNOSTIC REQUIRES THAT THE MODULE BE IN SERVICE.
USE THE **restore** COMMAND TO PUT THE MODULE BACK IN SERVICE.
THEN BEGIN THIS COMMAND.

The remote trunk must also be in service for
the "node_remote" test or it will fail.

If TEST TYPE is node_remote and the module is in service:

<See System Responses>

If TEST TYPE is node_remote and the remote module is out of service:

The remote trunk must also be in service for
the "node_remote" test or it will fail.

Syntax (continued)**For a Trunk-64 or a Trunk-DDS:**

```
TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
node_remote, reverse_trk, no_loop: +(local_trk)]:
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
```

If TEST TYPE is near_dsu or far_dsu and the module is out of service:

INFO: Place near digital service unit in loop-around mode.

- or -

INFO: Place far digital service unit in loop-around mode.

CONTINUE TESTING: [yes, no: +(yes)]:

<See System Responses>

If TEST TYPE is near_dsu or far_dsu and the module is in service:

DIAGNOSTIC REQUIRES SERVICE INTERRUPTION TO MODULE.

USE THE remove COMMAND TO TAKE THE MODULE OUT OF SERVICE
THEN BEGIN THIS COMMAND AGAIN.

If TEST TYPE is node_remote and the module is out of service:

DIAGNOSTIC REQUIRES THAT THE MODULE BE IN SERVICE.

USE THE restore COMMAND TO PUT THE MODULE BACK IN SERVICE.
THEN BEGIN THIS COMMAND AGAIN.

The remote trunk must also be in service for
the "node_remote" test or it will fail.

If TEST TYPE is local_trk or remote_trk:

<See System Responses>

For a Trunk-HS:

```
TEST TYPE [local_trk, external_trk, remote_trk,
node_remote, reverse_trk, no_loop: +(local_trk)]:
```

If TEST TYPE is not reverse_trk or no_loop:

```
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
```

If TEST TYPE is local_trk or remote_trk:

IT IS RECOMMENDED THAT THE node_remote TEST BE RUN FIRST

If TEST TYPE is local_trk and the remote module is in service:

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.

AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.

THEN BEGIN THIS COMMAND AGAIN AND ANSWER yes TO CONTINUE.

CONTINUE TESTING [yes, no: +(yes)]:

<See System Responses>

RUN THE remote_trk LOOP TEST NEXT.

If TEST TYPE is remote_trk:

THIS TEST WILL FAIL IF THE REMOTE MODULE ISN'T IN REVERSE LOOPING MODE.

IF IT ISN'T, ASK THE REMOTE ADMINISTRATOR TO DO THIS.

AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.

THEN BEGIN COMMAND AGAIN AND ANSWER yes TO CONTINUE.

CONTINUE TESTING [yes, no: +(yes)]:

<See System Responses>

TELL THE REMOTE ADMINISTRATOR TO RUN THE diag trk COMMAND WITH no_loop.

BE SURE THE REMOTE no_loop COMMAND IS DONE BEFORE YOU RESTORE LOCAL SERVICE.

Syntax (continued)

RUN THE `local_trk` LOOP TEST ON THE REMOTE NODE BEFORE YOU RESTORE LOCAL SERVICE.

If TEST TYPE is `external_trk` and the remote module is in service:

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER `yes` TO
CONTINUE TESTING [`yes`, `no`: `+(yes)`]:

INFO: Replace the fiber optic link connection on the I/O board with
the loop-around connector.

CONTINUE TESTING [`yes`, `no`: `+(yes)`]:

<See System Responses>

IF THIS IS THE LOCAL NODE, RUN THE `external_trk` LOOP ON THE REMOTE NODE.
IF THIS IS THE REMOTE NODE, CHECK THE FIBER OPTIC LINK.
BE SURE TO REPLACE THE LOOPBACK FIBER/DEVICE.

If TEST TYPE is `node_remote` and the local and/or remote module is out of service:

DIAGNOSTIC REQUIRES THAT THE MODULE BE IN SERVICE.
USE THE `restore` COMMAND TO PUT THE MODULE BACK IN SERVICE.
THEN BEGIN THIS COMMAND.

The remote trunk must also be in service for
the "`node_remote`" test or it will fail.

If TEST TYPE is `reverse_trk` and the module is out of service:

TELL THE ADMINISTRATOR AT THE OTHER NODE TO CONTINUE WITH
THE '`diagnose trunk`' COMMAND WITH A LOOP TYPE OF '`remote_trk`'

If TEST TYPE is not `node_remote` and the module is in service:

DIAGNOSTIC REQUIRES SERVICE INTERRUPTION TO MODULE.
USE THE `remove` COMMAND TO TAKE THE MODULE OUT OF SERVICE
THEN BEGIN THIS COMMAND AGAIN.

If TEST TYPE is `no_loop` and the module is out of service:

TRUNK MODULE IS RESTORED TO NON-LOOPING MODE

For a Trunk-T1:

TEST TYPE [`local_trk`, `near_dsu`, `far_dsu`, `remote_trk`,
`node_remote`, `reverse_trk`, `no_loop`: `+(local_trk)`]:

If TEST TYPE is not `reverse_trk` or `no_loop`:

REPETITIONS [`1-1000`; '`c`' for continuous: `+(1)`]:
IT IS RECOMMENDED THAT THE `node_remote` TEST BE RUN FIRST

If TEST TYPE is `local_trk` and the module is out of service:

WARNING: This test depends on the local Digital Service Unit for timing.

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER `yes` TO CONTINUE.
CONTINUE TESTING [`yes`, `no`: `+(yes)`]:

<See System Responses>

RUN THE `remote_trk` LOOP TEST NEXT.

Syntax (continued)

If TEST TYPE is remote_trk:

THIS TEST WILL FAIL IF THE REMOTE MODULE ISN'T IN REVERSE LOOPING MODE.
IF IT ISN'T, ASK THE REMOTE ADMINISTRATOR TO DO THIS.
AT LEAST 3 USER CHANNELS ARE NEEDED TO RUN DIAGNOSTICS.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER **yes** TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>

TELL THE REMOTE ADMINISTRATOR TO RUN THE **diag trk** COMMAND WITH **no_loop**
BE SURE THE REMOTE **no_loop** COMMAND IS DONE BEFORE YOU RESTORE LOCAL SERVICE.

If TEST TYPE is near_dsu or far_dsu and the remote module is in service:

HAVE THE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER **yes** TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]:

INFO: Place near digital service unit in loop-around mode.

- or -

INFO: Place far digital service unit in loop-around mode.
CONTINUE TESTING [yes, no: +(yes)]:
<See System Responses>

CHECK THE REMOTE I/O DISTRIBUTION BOARD, THE REMOTE
DIGITAL SERVICE UNIT, AND THE CABLE AND CONNECTIONS BETWEEN THEM.

If TEST TYPE is reverse_trk and the module is out of service:

<See System Responses>

TELL THE ADMINISTRATOR AT THE OTHER NODE TO CONTINUE WITH
THE 'diagnose trunk' COMMAND WITH A LOOP TYPE OF 'remote_trk'

If TEST TYPE is no_loop and the module is out of service:

<See System Responses>

If TEST TYPE is node_remote and the module is out of service:

DIAGNOSTIC REQUIRES THAT THE MODULE BE IN SERVICE.
USE THE **restore** COMMAND TO PUT THE MODULE BACK IN SERVICE.
THEN BEGIN THIS COMMAND.

The remote trunk must also be in service for
the "node_remote" test or it will fail.

If TEST TYPE is node_remote and the module in service:

<See System Responses>

If TEST TYPE is node_remote and the remote module is out of service:

The remote trunk must also be in service for
the "node_remote" test or it will fail.

Syntax (continued)

For a Trunk-PQ:

If module is out of service:

```
TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,  
reverse_trk, no_loop: +(local_trk)]:
```

If TEST TYPE is remote_trk:

```
INFO: Before continuing with this test, place the remote trunk in  
reverse looping mode by executing the "diagnose trunk" command  
with a TEST TYPE of "reverse_trk" at the remote node.
```

If TEST TYPE is near_dsu, or far_dsu:

```
INFO: Remove the remote trunk from service.  
Place the near or far DSU in loop-around mode.
```

If TEST TYPE is near_dsu, far_dsu or remote_trk:

```
CONTINUE TESTING [yes, no: +(yes)]:
```

If CONTINUE TESTING is yes and TEST TYPE is near_dsu, far_dsu or remote_trk:

```
TEST DURATION [1-300 seconds, continuous: +(continuous)]:  
TEST PATTERN [ascii, b8zs-test: +(ascii)]:
```

If TEST DURATION is continuous:

```
INFO: Enter <DEL> to terminate the test.
```

If CONTINUE TESTING is yes and TEST TYPE is remote_trk:

```
INFO: Before restoring the remote trunk to service, take the remote trunk  
out of reverse looping mode by executing the "diagnose trunk" command  
with a TEST TYPE of "no_loop" at the remote node.
```

If TEST TYPE is reverse_trk:

```
INFO: Continue the test at the remote node by executing the  
"diagnose trunk" command with a TEST TYPE of "remote_trk".
```

If trunk is in reverse (or loopback mode) and TEST TYPE is other than no-loop:

```
Module <addr> is in loop state, use the "no loop" command.  
Diagnostic exits.
```

If TEST TYPE was not hardware:

```
TEST TYPE [local_trk, remote_trk, near_dsu, far_dsu,  
reverse_trk, no_loop: +(local_trk)]:
```

If module is in service:

```
TEST TYPE [node_remote: +(node_remote)]:  
INFO: For loopback and hardware tests, remove the trunk from service and enter  
the "diagnose trunk" command again.
```

If TEST TYPE is node_remote and the remote trunk is out of service:

```
INFO: Both the local and remote trunks must be in service.
```

```
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
```

If REPETITIONS is continuous:

```
INFO: Enter <DEL> to terminate the test.
```

Parameters

This section explains parameters used in the **diagnose trunk** prompting sequence that differ from those used in **enter trunk**. Refer to the Syntax section for the prompting sequence, system defaults, and parameter options.

CONTINUE TESTING

Specifies whether (*yes* or *no*) diagnostic testing should be continued.

MODULE ADDRESS

A single number identifying the node slot that the trunk module occupies. Only a single module address can be entered.

REPETITIONS

Specifies whether a particular test is to be run *1* to *1000* times (inclusive) or if continuous testing (*c*) should occur. You can stop continuous testing by pressing to stop continuous testing.

TEST DURATION

For the Trunk-PQ tests, *near_dsus*, *far_dsus*, and *remote_trk*, specifies the length of time (from *1* to *300* seconds) that the test is to run. The trunk continuously sends a test frame, waits to receive a frame back, and validates the frame. If the frame received does not match the frame sent, an error occurs. If 10 errors are detected, the test terminates before completion of the time interval specified..

For a longer test, use the *continuous* option. Partial results are printed approximately every 30 seconds during continuous tests. These result counts are cumulative. Press to stop continuous testing.

TEST PATTERN

For the Trunk-PQ tests, *near_dsus*, *far_dsus* and *remote_trk*, specifies the data pattern for the test. If *ascii* is specified, a 125-byte pattern of ASCII characters is repeatedly sent for the time interval specified. If *b8zs-test* is specified, a 1000-bit pattern of zeros is repeatedly sent to detect facility equipment not configured for bipolar eight zero substitution (B8ZS).

TEST TYPE

Specifies the type of test to be run. With each loopback test, data originates at the trunk module and is looped to the particular test point. If the remote end device (the *far end*) can interpret the facility (or data link [DL] commands, the module automatically puts the remote device into loopback mode for the testing and returns it to operating mode after the test. If the remote end device cannot interpret DL commands, the *manu_lp* test—which requires that the remote device be put into loopback mode manually—can be run.

If a test is a total failure, the problem area is indicated. Refer to Test Results.

- *hardware*

For the Trunk-PQ, this test checks various parts of the module hardware. It includes tests for booting and verifying memory. The software diagnostic is downloaded to the trunk and tests the integrity of the instruction set, the timer, the backplane interface (DKI), inter-processor communication (IPC), and the port.

Parameters (continued)

- *near_dsu*
For a Trunk-64, Trunk-DDS, Trunk-T1, Trunk-PQ, or SWT, this test extends through the local trunk module to the near DSU. This test does not apply to SWT modules used with AWJ33 (G.703/G.704/G.706) I/O boards.
- *far_dsu*
For a Trunk-64, Trunk-DDS, Trunk-T1, Trunk-PQ, or SWT, this test extends through the local trunk module, the near DSU, to the far DSU. This test does not apply to SWT modules used with AWJ33 (G.703/G.704/G.706) I/O boards.
- *node_remote*
Verifies the health of the entire trunk, up to and including the remote node; test results indicate any node fault. (Both the local and remote trunk modules must be in service when this test is run.)
- *no_loop*
Takes the trunk module out of loopback mode. After running *reverse_trk* to perform the *remote_trk* test from the other node, run *no_loop* to return the trunk module to non-looping mode. For the trunk module previously put into reverse looping mode, *no_loop* must be executed before the module can be restored.
- *external_trk*
For Trunk-HS, SFT, or SWT, extends through the local trunk module to a loopback connector on the I/O board. See **Trunk Module Installation** for procedures to install the wire (for an *swt*) or fiber (for an *hs* or *sft*) loopback connector.
- *local_trk*
Tests the local trunk module for all trunks.
- *remote_trk*
For Trunk-64, Trunk-DDS, Trunk-HS, Trunk-PQ, or SFT, extends from the local trunk module to the remote trunk module. (For all modules except the Trunk-64 and Trunk-DDS, *reverse_trk* must be specified on the remote node before running this test.)
- *reverse_trk*
For Trunk-64, Trunk-DDS, Trunk-HS, Trunk-PQ, Trunk-T1, and SFT, an option that puts the trunk module into loopback mode to echo incoming (external) data back to its source. It must be specified on the remote node before running *remote_trk* on the local node. In addition, for an SFT, Trunk-HS, Trunk-PQ, or Trunk-T1, the remote module must be taken out of loopback mode with the *no_loop* option before restoring the trunk to service.

Prompted Entry: Running SFT Tests

```
CC0> diagnose
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 55
TEST TYPE [local_trk, external_trk, remote_trk,
           node_remote, reverse_trk, no_loop: +(local_trk)]: +
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
<diagnostic output>
CONTINUE TESTING [yes, no: +(yes)]: +
<diagnostic output>
```

Prompted Entry: Running SWT Tests

```
CC0> diagnose
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 62
TEST TYPE [local_trk, external_trk, near_dsu,
           far_dsu, node_remote: +(local_trk)]: +
REPETITIONS [1-1000; 'c' for continuous: +(1)]:
<diagnostic output>
CONTINUE TESTING [yes, no: +(yes)]: +
<diagnostic output>
```

Prompted Entry: Running Trunk-HS Tests

```
CC0> diagnose
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 78
TEST TYPE [local_trk, external_trk, remote_trk,
          node_remote, reverse_trk, no_loop: +(local_trk)]: external_trk
REPETITIONS [1-1000; 'c' for continuous: +(1) ]: 2

IT IS RECOMMENDED THAT THE node_remote TEST BE RUN FIRST

HAVE THE REMOTE ADMINISTRATOR REMOVE THE REMOTE MODULE FROM SERVICE.
THEN BEGIN THIS COMMAND AGAIN AND ANSWER yes TO CONTINUE.
CONTINUE TESTING [yes, no: +(yes)]: +

INFO: Replace the fiber optic link connection on the I/O board with
      the loop-around connector.

CONTINUE TESTING [yes, no: +(yes)]: +

  94-12-31 10:05:52 NODE=<node name>
M diagnose trunk 78 external_trk 2
  0 Errors in 1000 Transmissions
  LOOP-AROUND DIAGNOSTIC SUCCEEDED

  94-12-31 10:06:02 NODE=<node name>
M diagnose trunk 78 external_trk 2
  0 Errors in 1000 Transmissions
  LOOP-AROUND DIAGNOSTIC SUCCEEDED

IF THIS IS THE LOCAL NODE, RUN THE external_trk
LOOP ON THE REMOTE NODE.
IF THIS IS THE REMOTE NODE, CHECK THE FIBER OPTIC LINK.
BE SURE TO REPLACE THE LOOPBACK FIBER/DEVICE.

TEST TYPE [local_trk, external_trk, remote_trk,
          node_remote, reverse_trk, no_loop: +(local_trk)]: <DEL>
CC0>
```

Prompted Entry: Running Trunk-T1 Tests

```
CC0> diagnose
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 42
TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
          node_remote, reverse_trk, no_loop: +(local_trk)]: +
CONTINUE TESTING [yes, no: +(yes)]: +
REPETITIONS [1-1000; 'c' for continuous: +(1)]: +
<diagnostic output>
```

Prompted Entry: Running Node Remote Test on an In-service Trunk-PQ—Local Node

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 50

INFO: For loopback and hardware tests, remove the trunk from service and enter
      the "diagnose trunk" command again.

TEST TYPE [node_remote: +(node_remote)]: node_remote
REPETITIONS [1-1000; 'c' for continuous: +(1)]: 1

  94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 node_remote 1
  0 Errors in 1000 Transmissions
  LOOP-AROUND DIAGNOSTIC SUCCEEDED

TEST TYPE [node_remote: +(node_remote)]: <DEL>
CC0>
```

Prompted Entry: Running Reverse Trunk Test on an Out-of-service Trunk-PQ—Remote Node

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 51
TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,
          reverse_trk, no_loop: +(local_trk)]: reverse_trk

  94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 reverse_trk 1

  Diagnostic download in progress -

INFO: Trunk is now in reverse-looping mode.
INFO: Continue the test at the remote node by executing the
      "diagnose trunk" command with a test type of "remote_trk".
TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
          reverse_trk, no_loop: +(local_trk)]: <DEL>
CC0>
```

Prompted Entry: Running Remote Trunk Test on an Out-of-service Trunk-PQ—Local Node

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 50
TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,
           reverse_trk, no_loop: +(local_trk)]: remote_trk

   94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 remote_trk 1

   Diagnostic download in progress -

INFO: Before continuing with this test, place the remote trunk in
      reverse looping mode by executing the "diagnose trunk" command
      with a TEST TYPE of "reverse_trk" at the remote node.

CONTINUE TESTING [yes, no: +(yes)]: yes
TEST DURATION [1-300 seconds, continuous: +(continuous)]: 2
TEST PATTERN [ascii, b8zs-test: +(ascii)]: b8zs-test

   Loopback test in progress -

   94-06-09 14:54:25 NODE=<node name>
M diagnose trunk 50 remote_trk 1

   Diagnose completed - test passed.
   0 data errors, 0 message timeouts in 1065 transmissions

INFO: Before restoring the remote trunk to service, take the remote trunk
      out of reverse looping mode by executing the "diagnose trunk" command
      with a TEST TYPE of "no_loop" at the remote node.

TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
           reverse_trk, no_loop: +(local_trk)]: <DEL>
CC0>
```

Prompted Entry: Running No Loop Test on an Out-of-service Trunk-PQ—Remote Node

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 51
TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
           reverse_trk, no_loop: +(local_trk)]: no_loop

INFO: Trunk is no longer in reverse-looping mode.

CC0>
```

Prompted Entry: Running Far DSU Test on an Out-of-service Trunk-PQ—Local Node

```
TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,
reverse_trk, no_loop: +(local_trk)]: far_dsu

94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 far_dsu 1

Diagnostic download in progress -

INFO: Remove the remote trunk from service.
Place the near or far DSU in loop-around mode.

CONTINUE TESTING [yes, no: +(yes)]: yes
TEST DURATION [1-300 seconds, continuous: +(continuous)]: continuous
TEST PATTERN [ascii, b8zs-test: +(ascii)]: b8zs-test

INFO: Enter <DEL> to terminate the test.

Loopback test in progress -

94-06-09 14:54:25 NODE=<node name>
M diagnose trunk 50 far_dsu 1

Partial results at 14:55:54:
0 data errors, 0 message timeouts in 15934 transmissions

94-06-09 14:54:25 NODE=<node name>
M diagnose trunk 50 far_dsu 1

Partial results at 14:56:24:
0 data errors, 0 message timeouts in 31874 transmissions

<DEL>

94-06-09 14:54:25 NODE=<node name>
M diagnose trunk 50 far_dsu 1

Diagnose completed - test passed.
0 data errors, 0 message timeouts in 38419 transmissions

TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
reverse_trk, no_loop: +(local_trk)]:<DEL>

94-06-09 14:54:25 NODE=<node name>
M diagnose trunk 50 far_dsu 1

DIAGNOSTIC EXITS

CC0>
```

Prompted Entry: Running Near DSU and Local Trunk Tests on an Out-of-service Trunk-PQ—Local Node

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 50

    94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50

    Diagnostic download in progress -

TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,
           node_remote, reverse_trk, no_loop: +(local_trk)]: near_dsu

INFO: Remove the remote trunk from service.
      Place the near or far DSU in loop-around mode.

CONTINUE TESTING [yes, no: +(yes)]: yes
TEST DURATION [1-300 seconds, continuous: +(continuous)]: 2
TEST PATTERN [ascii, b8zs-test: +(ascii)]: ascii

    Loopback test in progress -

    94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 near_dsu 1

    Diagnose completed - test passed.
    0 data errors, 0 message timeouts in 1065 transmissions

TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
           node_remote, reverse_trk, no_loop: +(local_trk)]: local_trk

    94-12-31 05:55:38 NODE=<node name>
M diagnose trunk 50 local_trk 1

    Diagnose completed - test passed.

TEST TYPE [local_trk, near_dsu, far_dsu, remote_trk,
           node_remote, reverse_trk, no_loop: +(local_trk)]: <DEL>
CC0>
```

Prompted Entry: Running Hardware Tests on an Out-of-service Trunk-PQ

```
CC0> diagnose
OBJECTS [ ... trunk ... ]: trunk
MODULE ADDRESS: 50
TEST TYPE [hardware, local_trk, near_dsu, far_dsu, remote_trk,
reverse_trk, no_loop: +(local_trk)]: hardware

    94-06-03 21:03:55 NODE=<node name>
M diagnose trunk 50 hardware

    Boot tests in progress - . .

    94-06-03 21:03:55 NODE=<node name>

    Offline diagnostic boot test: PASS

    Extended RAM test in progress -

    94-06-03 21:03:55 NODE=<node name>

    Offline diagnostic memory test: PASS

    Diagnostic download in progress - .

    94-06-03 21:03:55 NODE=<node name>

    Offline diagnostic downloaded test:
    Aux. boot: PASS
    Inst. set: PASS
    Timer test: PASS
    DKI test: PASS
    IPC test: PASS
    Port: PASS

    DIAGNOSTIC EXITS

CC0>
```

Test Results

Test results for a trunk module can be a total success, a total failure, or a partial failure. If a test is a total success, appropriate system responses are output. If the key is pressed, the diagnostic exits and the `CC0>` prompt reappears.

If a test fails completely, a message such as the following appears:

```
xxx_xxx Diagnostic failed -  
  Cannot put far end device into loopback mode.
```

Refer to System Responses for a complete list of these messages and their explanations.

dmeas trunk

The **dmeas trunk** command enables you to request measurement reports detailing the efficiency level of a particular trunk module. The same data can be gathered through scheduled measurement reports.

NOTE: For Trunk-PQ the scheduled report is displayed by *StarKeeper II* NMS only. Furthermore, scheduled measurements must be activated (Procedure 4-6), otherwise the fields in the **dmeas** report are not cleared at the end of each measurement interval. If measurements are not scheduled, the fields show counts accumulated from the time the module was restored, and at high speeds, certain counts can roll over, nullifying parts of the report.

To activate measurements for any type of trunk, the trunk module must be restored to service. For all trunks except Trunk-PQ, measurements must be enabled using the **enter** or **change trunk** commands. For these trunks, on-demand reports contain information accumulated since the last automatically generated report.

NOTE: With the exception of the Trunk-PQ, when measurements have been scheduled using **schedule measurements**, it takes 10 minutes before data can be accumulated and displayed via the **dmeas trunk** command.

Syntax

You can use **dmeas trunk** in prompted entry or one-line entry.

```
CC0> dmeas
OBJECT [...trunk...]: trunk
MODULE ADDRESS:

If TRUNK MODULE TYPE is "pq":
INTERVAL [current, previous: +(current)]:
```

Parameters

This section explains a parameter used in the **dmeas trunk** prompting sequence that differs from those used in **enter trunk**. Refer to the Syntax section for the prompting sequence, system defaults, and parameter options.

MODULE ADDRESS

A number identifying the shelf slot that the module occupies. Only a single address can be entered. To request measurement reports for the second board of a two-board module, you must enter the higher number of the two contiguous slots in which the Trunk-DDS module resides.

Parameters (continued)

INTERVAL

If **TRUNK MODULE TYPE** is *pq*, specifies if the on-demand report is to be printed for the *current* or *previous* reporting interval. The current interval includes those measurements accumulated since the previous scheduled report was generated; or if a report was not scheduled, those measurements accumulated since the module counters were last reset. If measurements are scheduled, the counters are reset hourly on the hour. The previous interval includes those measurements accumulated in the hour prior to the current interval.

Prompted Entry: Displaying Trunk Measurements

```
CC0> dmeas
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 18
<report output>
```

NOTE: The following trunk measurement reports show *samples* of on-demand reports. Because they are *samples*, some reports show error measurements; other reports do not.

One-line Entry/Output: Displaying Trunk-64 Measurements

```
CC0> dmeas trunk 18
94-12-31 02:11:52 NODE=<node name>
M dmeas trunk 18
TRUNK MEASUREMENTS - 64          94-12-31 02:04 ----> 94-12-31 02:11

GROUP: trknj          MODULE: 18      SPEED: 56k          AVG. UTIL: 0%
AVG. DELAYS QUEUE 1: 16ms QUEUE 2: 16ms  PEAK UTIL: 0% 02:06 <<

ENVELOPES  PACKETS  FRAMES  ENVELOPES  PACKETS  FRAMES  OVERHEAD
FM NODE    FM NODE    TO LINE  TO NODE    TO NODE  FROM LINE  BYTES
 373111    39286     23084    358306     37576    21376     28%

          TO          FRM  RCV  BUS          STK
RCVR     RCVR  BUS  BAD  FRM  XMTR  BUS  BUF  PAR  UNEX  RAM  STK  SW-GEN
ABT  CRC  OVRN  OVF  FRM  OVF  UNDR  OVF  OVF  ERR  INT  ERR  XMTR  INT
  3   0   0   0   0   0   0   0   0   0   0   0   0   0

CC0>
```

One-line Entry/Output: Displaying Trunk-DDS Measurements

```

CC0> dmeas trunk 12
  94-12-31 02:11:52 NODE=<node name>
M dmeas trunk 12
TRUNK MEASUREMENTS - DDS                      94-12-31 02:04 ----> 94-12-31 02:11

GROUP: trknj                MODULE: 12        SPEED: 56k          AVG. UTIL: 12%
AVG. DELAYS QUEUE 1: 16ms  QUEUE 2: 16ms      PEAK UTIL: 15%    02:07 <<

ENVELOPES  PACKETS  FRAMES  ENVELOPES  PACKETS  FRAMES  OVERHEAD
FM NODE    FM BUS    TO LINE  TO NODE    TO NODE  FROM LINE  BYTES
 373111    39286    23084   358306    37576   21376     28%

RCVR      TO          FRM  RCV  BUS          STK
ABT  CRC  OVRN  OVF  FRM  OVF  UNDR  OVF  OVF  ERR  INT  ERR  XMTR  INT
  3   0   0   0   0   0   0   0   0   0   0   0   0   0

CC0>

```

One-line Entry/Output: Displaying Trunk-HS Measurements

```

CC0> dmeas trunk 78
  94-12-31 08:06:10 NODE=<node name>
M dmeas trunk 78
TRUNK MEASUREMENTS - HS                      94-02-21 11:54 ----> 94-02-21 12:55

GROUP: hs2hub                MODULE: 78        SPEED: 8.0 Mb/s

----- PEAK DATA -----
FM NODE    FM NODE    FM NODE PEAK    TO NODE    TO NODE    TO NODE PEAK
SEGMENTS  UTIL      START - STOP  SEGMENTS  UTIL      START - STOP
257        0%        12:50 - 12:55  4575      0%        11:54 - 12:50

----- TOTALS -----
FM NODE    FM NODE    TO NODE    TO NODE
SEGMENTS  UTIL      SEGMENTS  UTIL
370        0%        4928      0%

--- No error measurements ---

CC0>

```

One-line Entry/Output: Displaying SFT Measurements

```

CC0> dmeas trunk 55
  94-12-31 08:06:10 NODE=<node name>
M dmeas trunk 55
  TRUNK MEASUREMENTS - SFT          94-02-21 12:52 ----> 94-02-21 12:55
  GROUP: t3sgrp                     MODULE: 55             SPEED: 8.0 Mb/s

----- PEAK DATA -----
FM NODE   FM NODE   FM NODE PEAK      TO NODE   TO NODE   TO NODE PEAK
SEGMENTS  UTIL      START - STOP  SEGMENTS  UTIL      START - STOP
0         0%       N/A - N/A    0         0%       N/A - N/A

----- TOTALS -----
FM NODE   FM NODE           TO NODE   TO NODE
SEGMENTS  UTIL              SEGMENTS  UTIL
0         0%                0         0%

----- ERRORS -----
  PARITY   FROM BUS   TO BUS   TRANSMN   LOCAL   REMOTE
  ERROR   OVERFLOW  OVERFLOW  ERROR    SYNC    SYNC
0         0         0         0         129    129

CC0>

```

One-line Entry/Output: Displaying SWT Measurements

```

CC0> dmeas trunk 62
  94-12-31 08:04:10 NODE=<node name>
M dmeas trunk 62
  TRUNK MEASUREMENTS - SWT          94-12-31 08:01 ----> 94-12-31 08:14
  GROUP: gr703                      MODULE: 62             SPEED: 56 Kb/s

----- PEAK DATA -----
PACKETS   PACKETS   PCT      PEAK INTERVAL
TO BUS    FROM BUS  UTIL     START - STOP
58722    48688    26%     08:02 - 08:08

----- TOTALS -----
PACKETS   PACKETS   PCT
TO BUS    FROM BUS  UTIL
288446    241497   26%

--- No error measurements ---

CC0>

```

One-line Entry/Output: Displaying Trunk-PQ Measurements

```

CC0> dmeas trk 110 current
94-06-21 12:45:00 NODE=<node name>
M dmeas trk 110 current
TRUNK MEASUREMENTS - PQ

MODULE ADDRESS: 110          94-11-25    12:01 -----> 12:05

FROM NODE   TO NODE   AVERAGE  PEAK  CURRENT
PACKETS     PACKETS  MAIN     MAIN  MAIN
14566      14801    4%       4%    4%
GROUP: pq2_2          SPEED: 1.536M

-----PEAK DATA-----
<--RECEIVED FROM LINE ----> <-TRANSMITTED TO LINE ----->
AGGR CIR
ALLOCATED   UTIL  BYTES          UTIL  BYTES
0           0%   16015          0%   16015

-----TOTALS-----
<--RECEIVED FROM LINE ----> <-TRANSMITTED TO LINE ----->
          UTIL  BYTES          UTIL  BYTES          NON-CIR
          0%   175029          0%   175029          175029

<--RECEIVED FROM LINE -----><-TRANSMITTED TO LINE -->
          NON-CIR
CARRIER   RCVR   BYTES   ERRORED FRAME   BYTES   BYTES
COUNT    OVRN   DROPPED  SECONDS  ERRORS  DROPPED  DROPPED
0          0      0        0         0        0         0

CC0>

```

NOTE: No scheduled measurements report is displayed on the console for the Trunk-PQ because the measurements data is sent to *StarKeeper II* NMS.

One-line Entry/Output: Displaying Trunk-T1 Measurements

```

CC0> dmeas trunk 42
  94-12-31 08:06:10 NODE=<node name>
M  dmeas trunk 42
  TRUNK MEASUREMENTS - T1          94-12-31 07:30 ----> 94-12-31 07:40
  GROUP: trknj                     MODULE: 42           SPEED: 1.536 Mb/s
  ----- PEAK DATA -----
  PACKETS      PACKETS      PCT      PEAK INTERVAL
  TO BUS      FROM BUS      UTIL     START - STOP
  1527621    1672773      71%     07:35 - 07:40
  ----- TOTALS -----
  PACKETS      PACKETS      PCT
  TO BUS      FROM BUS      UTIL
  2014398    2780403      71%
  --- No error measurements ---
CC0>

```

Report Fields

AGGR CIR ALLOCATED

For Trunk-PQ, the peak Committed Information Rate (CIR) allocated during the measurement interval. This is represented in bits per second (bps). Refer to the **MAXIMUM AGGREGATE INFORMATION RATE** parameter definition in the **enter trunk** command description for more information.

AVERAGE MAIN UTIL

For Trunk-PQ, the percentage of the measurements interval in which the main module processors were being utilized. This percentage can help determine if the module is being used to its capacity.

AVG. DELAYS QUEUE 1/QUEUE 2

For Trunk-64 and Trunk-DDS, the average delay in milliseconds on the FIFO queue and circular queue. The FIFO queue, or queue 1, handles short transfers. The circular queue, or queue 2, handles long transfers.

AVG. UTIL

For Trunk-64 and Trunk-DDS, the average utilization by percentage in the transmit direction—the traffic over the trunk in relation to the maximum trunk capacity. (Utilization is based on the data capacity of the link, not the module.)

BAD FRM

For Trunk-DDS and Trunk-64, a bad frame format or frame size error. These errors are typically caused by modem/facility problems.

Report Fields (continued)**BUS PAR ERR**

For Trunk-64 and Trunk-DDS, parity errors on the envelope received from the node. These errors are caused by faulty node hardware or by inserting modules in the node backplane.

BYTES

For Trunk-PQ, the number of bytes the module received from, or output to the line. This number represents the total for the interval or the total for a five-minute period within the interval in which the most data was processed, or "peak" data. Peak and total data are distinguished by the header.

BYTES DROPPED

For Trunk-PQ, the number of bytes that the module dropped. Data that is received from the backplane and dropped is displayed under the **TRANSMITTED TO LINE** heading; and data that is received from the line and dropped is displayed under the **RECEIVED FROM LINE** heading. Data to be transmitted to or data that was received from the line. Bytes are dropped in a congestion situation. To determine the number of CIR bytes dropped, subtract the number of **NON-CIR BYTES DROPPED** from the value in this field.

CARRIER COUNT

For Trunk-PQ, the number of times the data carrier detect (DCD) or clear to send (CTS) signal was lost and regained over the trunk facility. If this value is high, it could indicate a facility problem.

CHANNEL OVERFLOW

For an SWT module, error measurements that indicate the counter for a channel on the low-priority queue (LPQ) has overflowed. This overflow is caused by more traffic on the SWT channel than the trunk speed can handle.

CRC

For Trunk-DDS and Trunk-64, indicates cyclic redundancy check (CRC) errors, which are typically caused by modem/facility problems.

CURRENT MAIN UTIL

For Trunk-PQ, the main module processor utilization level for the current five-minute interval. Unlike the **AVERAGE MAIN UTIL**, which is computed over the entire measurement interval, the **CURRENT MAIN UTIL** is reset each five minutes to provide a more current measure of the module utilization. This percentage can help determine if the module is being used to its capacity.

ENCODING

Indicates encode errors for all Trunk-HS modules.

ENVELOPES FM NODE

For a Trunk-64 and Trunk-DDS, the number of envelopes sent from the node.

ENVELOPES TO NODE

For a Trunk-64 and Trunk-DDS, the number of envelopes sent to the node.

Report Fields (continued)

ERRORED SECONDS

For Trunk-PQ, the number of seconds during which frame errors were detected.

FAIL-CARRIER

The failed carrier count for all Trunk-T1 modules.

FRAME ERRORS

For Trunk-PQ, the number of frames received from the line that had CRC errors, aborts or other errors.

FRAMES FROM LINE

The number of frames received from the Trunk-64 or Trunk-DDS line.

FRAMES TO LINE

The number of frames sent to the Trunk-64 or Trunk-DDS line.

FRM BUS OVF

For Trunk-64 and Trunk-DDS, overflow errors that occurred while data was transmitted from the bus. These overflow errors result in data loss.

FRM OVF

For Trunk-64 and Trunk-DDS, frame buffer overflow errors that occurred while receiving data from the line. A nonzero value indicates that the trunk load is too great.

FROM BUS OVERFLOW

Overflow errors that occurred while data was being transmitted from the node backplane. These overflow errors result in data loss.

FROM NODE PACKETS

For Trunk-PQ, the total number of packets sent to the module from the node backplane for the reporting interval. When used in conjunction with a backplane utilization report, this field helps to determine the data flow direction. The backplane utilization report indicates total packets on the backplane for all modules. A backplane utilization report can be obtained via *StarKeeper II NMS*; consult the *StarKeeper II NMS Performance Reporter Guide*.

GROUP

The name of the group associated with the trunk module.

LOCAL SYNC

For SFT, an error measurement that indicates the SFT local receiver lost synchronization with the remote transmitter.

MINUTES

For all *failed* trunks except Trunk-64 and Trunk-DDS, the number of minutes in which measurements were being collected during the interval. This field only appears if the trunk fails.

Report Fields (continued)**MODULE ADDRESS**

The node slot number (module address) occupied by the trunk module.

NON-CIR BYTES

For Trunk-PQ, the number of bytes transmitted to the line for calls that do not have CIR allocated. Refer to the **enter trunk** description for the **AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS** and the **MAXIMUM AGGREGATE INFORMATION RATE** parameters for more information.

NON-CIR BYTES DROPPED

For Trunk-PQ, the number of bytes that were to be transmitted to the line from non-CIR calls that the module dropped because of congestion. If this value is high, use **change trunk** to increase the **AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS** parameter.

OVERFLOW

Indicates overflow errors.

OVERHEAD BYTES the percentage of overhead (non-data) bytes in relation to the total number of frame bytes transmitted.

PACKETS FROM BUS

For Trunk-64, Trunk-DDS, Trunk-HS, Trunk-T1, SFT or SWT, the number of packets transmitted from the node.

PACKETS TO BUS

For Trunk-64, Trunk-DDS, Trunk-HS, Trunk-T1, SFT or SWT, the number of packets sent to the node.

PARITY ERROR

For SFT, an error measurement that indicates parity errors.

PCT UTIL

For Trunk-HS, Trunk-T1, SFT or SWT, the percentage of trunk utilization in the transmit direction—the traffic over the trunk in relation to the maximum trunk capacity. (Utilization is based on the data capacity of the link, not the module.)

PEAK DATA

For SFT, SWT, Trunk-T1, Trunk-HS, indicates the peak traffic data accumulated in a 5-minute sampling interval.

PEAK INTERVAL START - STOP

The clock time interval during which the peak traffic occurred.

PEAK MAIN UTIL

For Trunk-PQ, the utilization level for the five minutes in which the main module processors were being most utilized. This number can help determine if the module is being used to its capacity.

Report Fields (continued)

PEAK UTIL

For Trunk-64 and Trunk-DDS, the peak trunk utilization; the percentage of traffic that occurred over the trunk in relation to its capacity, based on a one-minute sampling interval.

QUEUE CONGESTED

For SWT, error measurements that indicate congestion on the module's low-priority queue caused a packet to be discarded. See **OVERFLOW**.

RAM ERR

For a Trunk-64 and a Trunk-DDS, a Random Access Memory (RAM) background diagnostic failure error. Replace the module.

RCV BUF OVF

For a Trunk-64 and a Trunk-DDS, buffer overflow errors occurred on queue 1 and 2 while receiving data from the node. Data is discarded.

RCVR ABT

For a Trunk-64 and a Trunk-DDS, an abort was received from the line by the Universal Synchronous/Asynchronous Receiver/Transmitter (USART).

RCVR OVRN

For a Trunk-64, Trunk-DDS, and a Trunk-PQ, indicates receiver overrun; either the trunk board is too slow to handle data coming from line into board or a problem exists with the DSU/modem.

REMOTE SYNC

For SFT, the remote transmitter lost synchronization with the SFT local receiver.

SPEED

The configured data rate of the trunk.

STK SW-GEN INT

For Trunk-64 and Trunk-DDS, the timer set (stuck software—generated interrupt errors) in the software failed.

STK XMTR

For Trunk-64 and Trunk-DDS, the hardware (stuck transmitter) did not transmit data from the trunk board. The result is added delay.

SYNC ERRS

Indicates FIFO synchronization errors (a hardware problem).

TO BUS OVERFLOW

For SFT or SWT, overflow errors that occurred while data was transmitted to the node.

TO BUS OVF

For Trunk-64 or Trunk-DDS, overflow errors that occurred during transmission of data to the node.

Report Fields (continued)**TO NODE PACKETS**

For Trunk-PQ, the total number of packets sent to the node backplane from the module for the reporting interval. When used in conjunction with a backplane utilization report, this field helps to determine the data flow direction. The backplane utilization report indicates total packets on the backplane for all modules. A backplane utilization report can be obtained via *StarKeeper II NMS*; consult the *StarKeeper II NMS Performance Reporter Guide*.

TOTALS

The total traffic data accumulated since the last automatic report.

TRANSMN ERROR

For SFT and SWT, an error measurement that indicates transmission errors (CRC or parity) or Manchester code violations caused by facility noise or a hardware problem.

UNEX INT

For Trunk-64 and Trunk-DDS, the unexpected interrupts that occurred to the on-board processor.

UTIL

For Trunk-PQ, the total bytes received or transmitted on the line divided by the speed of the line (or, the bandwidth used) in either direction over the measurements interval. Transmitted and received data are distinguished by the header. Peak and total data are also distinguished by the header.

XMTR UNDR

For Trunk-64 and Trunk-DDS, the number of transmitter underruns, or the trunk board is not fast enough to transmit characters to the line because the trunk load is too great, or a problem exists with the DSU/modem.

dstat trunk

The **dstat trunk** command enables you to display the status of trunk modules. You can use this command to evaluate problems that may or may not be detected by the alarm system.

All hardware module data output for **dstat module** is displayed as well as on-board software information. Hardware module data is obtained from status packet information; port data is obtained from module software while the module is in service.

Syntax

You can input **dstat trunk** in prompted or one-line entry.

```
CC0> dstat
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
DETAIL [low, high: (+low)]:
```

Parameters

This section explains a parameter used in the **dstat trunk** prompting sequence that differs from those used in **enter trunk**. Refer to the Syntax section for the prompting sequence, system defaults, and parameter options.

DETAIL

Specifies if the command output is to show a limited amount of information (*low* detail) or more information (*high* detail).

Prompted Entry: Displaying High-Detail Trunk Status

```
CC0> dstat
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 44
DETAIL [low, high: (+low)]: high
<report output>
```

One-line Entry/Output: Displaying High-Detail SFT Status

```

CC0> dstat trunk 55 high
    94-12-31 22:30:14 NODE=<node name>
M dstat trunk 55 high
***** MODULE 55 *****
MODULE TYPE      SERVICE STATE  HARDWARE ERROR COUNT  SERIAL NUMBER
sft              in service   1                195
LAST HARDWARE ALARM
none
ONLINE  ENABLED  AVAIL  SELFTST  DIAGNOS_MODE
yes     yes     yes    no info  inactive
----- HIGH DETAIL -----
OPERATE LOOPBAK ENHANCD CNTRLER GROUP  CONT  FLOCTRL PROTOCOL
STATE  MODE      PROTOCL LESS MD  CONT  STRAP  REQUEST MISMATCH
active no        yes    no   on    in    0      0
MODULE FIFO  FM NODE FM NODE TO NODE TRNSMSN LOCAL  REMOTE
RESET  RESET  PARITY OVERFLO OVERFLO ERROR  SYNC ER SYNC ER
0      0      0      0      0      1      0      0
EXPECT FULL  EMPTY  ACTUAL  ACTUAL  ACTUAL  EXPECT  EXPECT  EXPECT
TYPE  PACKETS PACKETS STAT1  STAT2  STAT3  STAT1  STAT2  STAT3
sft   1750  0      1      20    30    1      20    30
RANGE  BAD
ERRORS PACKETS
0      0
CC0>

```

One-line Entry/Output: Displaying High-Detail SWT Status

```

CC0> dstat trunk 62 high
    94-12-31 22:30:14 NODE=<node name>
M dstat trunk 62 high
***** MODULE 62 *****
MODULE TYPE      SERVICE STATE  HARDWARE ERROR COUNT  SERIAL NUMBER
swt              in service    117                  3690
LAST HARDWARE ALARM
Remote frame alarm (Yellow/RAI alarm) cleared.  94-10-06 08:33
ONLINE  ENABLED  AVAIL
yes     yes     yes
----- HIGH DETAIL -----
OPERATE LOOPBAK LPQ      HPQ      LPQ      HPQ
STATE  MODE      OCCUPIED OCCUPIED EMPTY    EMPTY
active no        0/8      0/8      yes     yes
MODULE FIFO  FM NODE FM NODE TO NODE RCV      PER CHNL LPQ
RESET  RESET  PARITY  OVERFLO OVERFLO ERROR    OVERFLO  CONGEST
0      0      0       0       0       1       0       0
LIS    AIS    RAI     BER
27     0     31     0
TTIMING LPQ      HPQ
SOURCE  LENGTH  LENGTH
dce trn 256    64
EXPECT  FULL    EMPTY  WRONG  TRANS
TYPE    PACKETS PACKETS PORT    ENAB
swt     1796    0      0      yes
ACTUAL  ACTUAL  ACTUAL  ACTUAL  EXPECT  EXPECT  EXPECT  EXPECT
STAT1   STAT2   STAT3   STAT4   STAT1   STAT2   STAT3   STAT4
1       0       0       300    1       0       0       0
RANGE  BAD
ERRORS PACKETS
0      0
CC0>

```

One-line Entry/Output: Displaying High-Detail Trunk-HS Status

```

CC0> dstat trunk 19 high
    94-12-31 22:30:14 NODE=<node name>
M dstat trunk 19 high
***** MODULE 42 *****
MODULE TYPE      SERVICE STATE  HARDWARE ERROR COUNT  SERIAL NUMBER
trkhs           in service    0                4510
LAST HARDWARE ALARM
none
ONLINE  ENABLED CARRIER DSR      AVAIL
yes     yes    up      up      yes
----- HIGH DETAIL -----
MODULE  TO NODE FM NODE TO NODE FM NODE
RESET  PARITY  PARITY  OVERFLO OVERFLO
0      0      0      0      0
SYNCHRO CARRIER CRC      ENCODE  LOOPBAK  DISTRIBU
PROBLEM COUNT  ERROR  ERROR  MODE     BOARD
0      0      0      0      no      fiber
EXPECT  FULL  EMPTY  ACTUAL  ACTUAL  EXPECT  EXPECT
TYPE  PACKETS PACKETS STAT1  STAT2  STAT1  STAT2
trkhs 128873 0      1      1      1      1
RANGE  BAD
ERRORS PACKETS
0      0
CC0>

```

One-line Entry/Output: Displaying High-Detail Trunk-T1 Status

```
CC0> dstat trunk 42 high
    94-12-31 22:30:14 NODE=<node name>
M dstat trunk 42 high
***** MODULE 42 *****
MODULE TYPE      SERVICE STATE  HARDWARE ERROR COUNT  SERIAL NUMBER
trkt1           in service    0                939
LAST HARDWARE ALARM
none
ONLINE  ENABLED CARRIER DSR      AVAIL
yes     yes    up      up      yes
----- HIGH DETAIL -----
MODULE  TO NODE FM NODE TO NODE FM NODE
RESET  PARITY  PARITY  OVERFLO OVERFLO
0      0      0      0      0
SYNCHRO CARRIER CRC      DSR      LOOPBAK
PROBLEM COUNT  ERROR  COUNT  MODE
0      0      0      0      no
EXPECT  FULL    EMPTY  ACTUAL  ACTUAL  EXPECT  EXPECT
TYPE  PACKETS PACKETS STAT1  STAT2  STAT1  STAT2
trkt1 1791    0      1      0      1      0
RANGE  BAD
ERRORS PACKETS
0      0
CC0>
```

One-line Entry/Output: Displaying High Detail Trunk-PQ Status

```

CC0> dstat trunk 110 high
94-12-31 11:59:59 NODE=Redqueen
M dstat trunk 110 high
***** MODULE 110 *****
MODULE TYPE      SERVICE STATE  HARDWARE ERROR COUNT  SERIAL NUMBER
trkqp           in service    2                62

LAST HARDWARE ALARM
Module was reset 94-01-04 12:27

LAST SOFTWARE ALARM
Link has come up 94-01-04 16:46

                LOOPBACK
ONLINE  ENABLED  MODE
yes     yes     no

----- HIGH DETAIL -----
MODULE  FIFO    FM NODE FM NODE SANITY  SOFTWARE
RESET  RESET   PARITY  OVERFLO ERROR  ALARMS
0       0       0       0      0      3

EXPECT  FULL    EMPTY  ACTUAL  ACTUAL  EXPECT  EXPECT
TYPE   PACKETS PACKETS STAT1   STAT2   STAT1   STAT2
trkqp  70914  0      1      0      1      0

RANGE  BAD
ERRORS PACKETS
0      104

***** MODULE 110 PORT LEVEL *****
EXPECT          ACTUAL          OPERATING
SRVC STATE     SRVC STATE     STATE
in service     in service     up

DCD            DTR            RTS            CTS            DSR
on             on             on             on             on

CURRENT
AGGR CIR      I/O
ALLOCATED    RESETS
0             0

CC0>

```

Report Fields

References to alarms in the following paragraphs refer to alarm messages cited in the *Messages Reference*.

ACTUAL SRVC STATE

The actual current service state of the port.

ACTUAL STAT1

The actual value of the first hardware status byte of the most recently received status packet for the specified module. In some cases, the actual and expected values of **STAT1** differ.

ACTUAL STAT2

The actual value of the second software status byte of the most recently received status packet for the specified module. In some cases, the actual and expected values of **STAT2** differ.

ACTUAL STAT3

The actual value of the third hardware status byte of the most recently received status packet for the specified module. In some cases, the actual and expected values of **STAT3** differ.

ACTUAL STAT4

The actual value of the fourth hardware status byte of the most recently received status packet for the specified module. In some cases, the actual and expected values of **STAT4** differ.

AVAIL

Shows whether (*yes* or *no*) the module is on-line and administered, the trunk cable is connected to the proper module, and the protocol has been established.

AIS

For an SWT with a G.703/G.704/G.706 interface, indicates that an alarm indication signal (AIS) is being received. Refer to the *Data Networking Products Messages Reference Report Alarm 7412* for alarm information and recommended actions.

BAD PACKETS

The count of packets with envelope parity errors transmitted by the module and detected by the Eswitch. To determine if the module is defective, run diagnostics.

BER

Indicates that excessive cyclic redundancy check (CRC) errors are being detected by the module. Refer to the *Data Networking Products Messages Reference Report Alarm 7416* for alarm information and recommended actions.

CARRIER

For Trunk-T1 or Trunk-DDS indicates if the module perceives the incoming carrier lead from the modem as being asserted (*up*) or not asserted (*down*). See **HOST NOT CONNECTED** alarm.

Report Fields (continued)**CARRIER COUNT**

For Trunk-T1, or Trunk-DDS, the number of times that the carrier failed on the trunk. (The carrier lead between the modem and modem paddleboard went into the unasserted state.) See **LOST CARRIER** alarm.

CURRENT AGGR CIR ALLOCATED

For the Trunk-PQ, the total Committed Information Rate (CIR) commitment for channels with calls currently set up. This parameter is presented in bits per second (bps). Refer to the **MAXIMUM AGGREGATE INFORMATION RATE** parameter definition in the **enter trunk** command description for more information.

CNTRLR LESS MD

For SFT, indicates whether the controllerless mode features are enabled. When enabled, the SFT operates with the enhanced fiber protocol and supports the extended addressing mode.

CONT STRAP

For SFT, indicates if the hardware strap used in conjunction with group contention is in place. When the strap is in place and the group contention option is on, the SFT can contend for the backplane 100% of the time (allowing the SFT to be an 8Mbps link). Otherwise, the SFT can handle 4Mbps of traffic.

CRC ERROR

For Trunk-T1, shows problems with corrupted data arriving at the module from the wire or fiber link. CRC errors are usually caused by transmission errors over the network.

CTS

For Trunk-DDS and Trunk-PQ, indicates whether the module perceives the incoming clear-to-send lead as asserted (*up*) or unasserted (*down*).

CTS COUNT

For Trunk-DDS, the number of times the clear-to-send lead from the modem dropped. See **LOST CTS** alarm.

DIAGNOS_MODE

For SFT, indicates whether the module is in the self-test mode: if *active*, it is in the self-test mode; if *inactive*, it is not.

DCD

For Trunk-PQ, indicates if the data carrier detect signal is *on* or *off*.

DISTRIBU BOARD

For Trunk-HS, shows the status of *fiber* if the I/O board is compatible with a fiber trunk; shows the status of *metallic* if the I/O board is compatible with a metallic trunk.

Report Fields (continued)

DSR

For Trunk-PQ and Trunk-T1, indicates if the module perceives the incoming data-set-ready lead from the modem as asserted (*up*) or not asserted (*down*).

DSR COUNT

For Trunk-T1, the number of times the data-set-ready lead from the modem dropped. See **LOST DSR** alarm.

DTR

For Trunk-PQ indicates if the data terminal ready signal is *on* or *off*.

ENCODE ERROR

For Trunk-HS, encoding violations the module detected coming in from the fiber link. The transmission scheme uses delay modulation encoding. Faulty hardware, a faulty fiber, or an improperly attached fiber link might cause encoding violations. See **DELAY MODULATION ENCODING VIOLATION** alarm.

ENHANCED PROTOCOL

For SFT, indicates if the module is using the extended address mode with the enhanced fiber protocol. This field does not appear if the SFT is connected to a fiber bridging (*isn*) concentrator that does not support this mode.

EMPTY PACKETS

The number of empty status packets received. Empty packets are received when a module is not physically present in the specified shelf slot. See **EMPTY SLOT** alarm. If the number is high and continues to increase, it could indicate a module hardware problem.

ENABLED

Indicates whether or not (*yes* or *no*) the module mode switch is enabled (Enabl). The value of this field is determined only from status information. See **MODE SWITCH NOT ENABLED** alarm.

EXPECT SRVC STATE

The expected current service state of the port.

EXPECT STAT1

The expected status of the first hardware status byte for the module.

EXPECT STAT2

The expected status of the second software status byte for the module.

EXPECT STAT3

The expected status of the third hardware status byte for the module.

EXPECT STAT4

The expected status of the fourth hardware status byte for the module.

Report Fields (continued)**EXPECT TYPE**

The expected hardware type of the module in the shelf slot. For in-service modules, the value of this field is dependent only on information the administrator supplies. For out-of-service modules, this field is determined by status information.

FIFO RESET

For SFT, SWT, and Trunk-PQ, indicates the number of first-in, first-out (FIFO) synchronization problems (hardware problems) on the module. It is normal for this count to be at approximately 3 after the module has downloaded. See **FIFO RESET** alarm.

FLOCTRL REQUEST

For SFT, the number of status packets received, which indicates that at least one request for transmitter flow control occurred since the last status packet report.

FM NODE OVERFLO

The measure of any imbalance between the rate at which information arrives at a module and the rate at which the subscriber processes that information. Overflow errors occur during typical operation and do not necessarily indicate a problem. If a high rate is reported, check the main, I/O, and port utilization and traffic count statistics to determine where the overload is occurring. See **FROM BUS OVERFLOW** alarm.

FM NODE PARITY

The number of status packets received, which indicates parity errors detected for packets.

FULL PACKETS

The number of status packets containing data that the Control Computer has received. Full packets are received only when a module is physically present in the specified shelf slot.

GROUP CONT

For SFT, shows if the group contention arbitration is enabled.

HARDWARE ERROR COUNT

An approximate number summarizing module errors detected since the last module reboot (that is, error counts in other fields). A count of 3 or 4 indicates a normal level of error. Higher counts usually indicate a problem.

HPQ EMPTY

For SWT, indicates whether the high-priority queue was empty when sampled during the status polling cycle.

HPQ LENGTH

For SWT, indicates the setting of the frame termination length for the high-priority queue to be 16 or 64 bytes.

HPQ OCCUPIED

For SWT, indicates the amount of data in the high-priority queue.

Report Fields (continued)

I/O RESETS

Indicates any sanity errors or exceptions that occurred on the I/O processor serving the Trunk-PQ link since the last time the module was downloaded.

LAST HARDWARE ALARM

The most recent alarm issued for the module hardware. This information, which is based on status packet data, is not stored across Control Computer reboots.

LAST SOFTWARE ALARM

The most recent alarm issued by the module against its software. This information is not stored across module or Control Computer reboots. See **MODULE WAS RESET** alarm.

LIS

Indicates loss of incoming signal (LIS) failure condition for the indicated SWT. Refer to the *Messages Reference* for **Report Alarm 7410** for additional information.

LOCAL SYNC ER

For SFT, the number of times the module lost synchronization with the remote transmitter. This type of error might indicate hardware problems or a damaged fiber link.

LOOPBAK MODE

Indicates whether (*yes* or *no*) the module port is in loopback mode or whether this information is unavailable (*UA*). The module should be in loopback mode only during diagnostic tests.

LPQ CONGEST

For SWT, the number of status packets received, which indicates that a packet coming from the Control Computer was discarded because of congestion on the SWT low-priority queue.

LPQ EMPTY

For SWT, indicates whether (*yes* or *no*) the low-priority queue was empty when sampled during the status polling cycle.

LPQ LENGTH

For SWT, the setting of the frame termination length for the low-priority queue is *16*, *64*, or *256* bytes.

LPQ OCCUPIED

For SWT, indicates the amount of data in the low-priority queue.

MODULE RESET

The number of module resets since the last module reboot. For some modules, resets occur during normal operation.

MODULE TYPE

Indicates the module type that is physically present. This field is determined from status packet information only and is independent of information supplied via **enter** and **delete**. This field is initialized to empty.

Report Fields (continued)**ONLINE**

Indicates whether (*yes* or *no*) the module is on-line. A status of *yes* is shown only if the green LED on the module is lit. This field is determined from status information only.

OPERATE STATE

For SFT and SWT, indicates the current state of the circuit pack to be *active*, *reboot*, *disconn*, or *restart*.

OPERATING STATE

For a Trunk-PQ, indicates the current state of operation of the link. The valid states are:

- *down*
No data transfer can take place.
- *up*
Data transfer can take place.
- *UA*
The operating state is unavailable.

OPTICAL SIGNAL

For Trunk-HS, shows a status of *yes* if the module is receiving a valid optical signal; shows a status of *no* if the module is receiving an out-of-specification signal. A defective fiber optic cable, an unattached cable, or a defective transmitter on the other side of the fiber could cause an out-of-specification signal. See **OPTICAL SIGNAL ERROR** alarm.

PER CHNL OVERFLO

For SWT, the status packet count received, which indicates that a per-channel counter for the low-priority queue channel overflowed since the last status packet report.

PROTOCOL MISMATCH

For SFT, the number of module status packets received indicating at least one fiber protocol compatibility error since the last status packet report.

RAI

Indicates that a remote frame alarm (RFA/RAI) is being received from the remote digital transmission facility (DTF) equipment. Refer to the *Data Networking Products Messages Reference* for **Report Alarm 7414** for alarm information and recommended actions.

RANGE ERRORS

The count of segments with envelope parity errors transmitted by the module and detected by the Switch. The count of packets transmitted by the module on a channel that is beyond the limit for which the module is configured. Bad packet counts might be attributed to a defective module that is corrupting the address field of the packet or to a channel configuration mismatch on the two sides of the trunks. To determine if the module is defective, run module diagnostics; to determine if a configuration mismatch has occurred, review the module configuration.

Report Fields (continued)

RECV LOS

Trunk-DDS how much data was lost in the receive direction. The receive direction is defined from the line to the Trunk-DDS to the node backplane. For Trunk-DDS, this loss can occur because of receiver overrun (when the CPU is overloaded), a bad CRC, a frame abort, lack of data buffers, a bad framing format, or a FIFO overflow. Use trunk measurement reports to determine which error(s) occurred.

RCV ERROR

For SWT, the number of status packets received indicating that an error occurred on the remote receiver.

REMOTE SYNC ER

For SFT, the number of status packets received from the module indicating that the remote receiver lost synchronization with the module transmitter. This type of error might indicate hardware problems or a damaged fiber link.

RTS

Indicates whether request to send is *on* or *off*.

SANITY ERROR

A status packet flag has indicated that the module sanity timer went off. See **MODULE MALFUNCTION** and **WRONG MODULE TYPE** alarms.

SELFTST/SELFTST

For an SFT, the result of the on-board hardware diagnostics test. For an SFT, this information is only available when the board is in the arm-reboot state. (This field shows *no info* in other states.) When diagnostics are running, this field reads *waiting*; when diagnostics are completed, this field shows *passed* or *failed*.

SELF-TEST FAIL REASON

When **SELFTST** indicates *failed*, this field shows the reason.

SERIAL NUMBER

The unique factory-encoded number for all modules accessing the backplane. Maintaining records with these numbers can help track circuit pack versions.

SERVICE STATE

Shows the current service state of the module to be *in service* (via **restore**), *oos*, *manual* (out of service via **remove**), *oos*, *fault*, *auto* (out of service via the alarm system), *rfs* (ready-for-service), or *downloading*. In addition, configurations with session maintenance show trunk modules to be *oos*, *rerouted*, or *rerouted*; where: *oos*, *rerouted* indicates that the module is out of service and connections on the trunk have been rerouted, and *rerouted* indicates that the module is in service, but the trunk has been rerouted.

SOFTWARE ALARMS

Indicates the number of alarms reported for the module since last reboot.

Report Fields (continued)**SYNCHRO PROBLEM**

For Trunk-T1, or Trunk-HS, shows any synchronization problems the module is having with incoming data. If synchronization is lost, the module automatically starts hunting for synchronization again (phase lock loop). See **PHASE LOCK SYNCHRONIZATION** alarm.

TO NODE OVERFLO

For Trunk-T1, or Trunk-HS, the number of characters that arrived from the trunk line and were dropped because the hardware FIFO buffer was full. (The Trunk-HS can transmit information at slightly greater than node backplane speeds; but, the node only accepts information from any given module every other packet frame.) See **TO BUS OVERFLOW** alarm.

TO NODE PARITY

For Trunk-T1, and Trunk-HS, the number of packets coming into the module with no parity error, but that had a parity error introduced and then detected by the module. This field indicates a faulty module.

TRANSMI LOSS

For Trunk-DDS, how much data was lost in the transmit direction due to transmitter underrun. Transmitter underrun occurs when the module is overloaded. The transmit direction is defined from the node backplane to the module and then to the line. See **EXCESSIVE XMT DATA LOSS** alarm.

TRANS ENAB

For SWT, indicates whether (*yes* or *no*) trunk transmission is enabled.

TRNSMSN ERROR

For SFT, the number of module status packets received indicating at least one CRC/parity error or Manchester code violation since the last status packet report.

TTIMING SOURCE

For SWT, the selected source for the terminal timing signal. The source can be the DCE transmit clock (*dce trn*), the DCE receive clock (*dce rec*), the DTE 500 kHz clock (*dte*), or *ground*. If the terminal timing signal has been selected from any of the three clocks, a low logic is sent to the I/O board to indicate the terminal timing signal has been enabled. If a ground is placed on the terminal timing signal, a logic high is sent to the I/O board to indicate the terminal timing signal is disabled.

WRONG PORT

For SWT, the number of unexpected errors received on port A or port B since the last system reboot.

enter trunk

enter trunk

The **enter trunk** command enables you to add trunk module information to the database.

Syntax

You can use **enter trunk** in prompted entry only. The sequence of prompts depends on your response to the **TRUNK MODULE TYPE** prompt.

```
CC0> enter
OBJECT [...trunk...]: trunk
TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]:
MODULE ADDRESS:

If TRUNK MODULE TYPE is "pq":
  DOWNLOAD SERVER [(controller)]:
If DOWNLOAD SERVER is "controller":
  SOFTWARE VERSION [(standard)]:
If DOWNLOAD SERVER is not "controller":
  SOFTWARE VERSION:
If TRUNK MODULE TYPE is "t3i":
  SOFTWARE VERSION [special, standard:+(standard)]:
If SOFTWARE VERSION is "special":
  EGRESS DOWNLOAD SERVER [(controller)]:
  EGRESS SOFTWARE VERSION [(standard)]:
If EGRESS DOWNLOAD SERVER is not "controller":
  EGRESS SOFTWARE VERSION:
  INGRESS DOWNLOAD SERVER [(controller)]:
  INGRESS SOFTWARE VERSION [(standard)]:
If INGRESS DOWNLOAD SERVER is not "controller":
  INGRESS SOFTWARE VERSION:
  UPLOAD SERVER [(none)]:
If UPLOAD SERVER is not "none":
  UPLOAD ALWAYS BEFORE DOWNLOAD [yes, no: +(no)]:
If UPLOAD ALWAYS BEFORE DOWNLOAD is "no":
  UPLOAD ONLY AFTER FAULT [yes, no: +(no)]:

*SESSION MAINTENANCE TRUNK [yes, no: +(no)]:

For all TRUNK MODULE TYPEs:
  COMMENT [up to 60 chars double-quoted]:
  GROUP [up to 8 chars]:

If TRUNK MODULE TYPE is "pq":
  TRAFFIC TYPE [cir, non-cir, both: +(both)]:

If TRUNK MODULE TYPE is "64" or "dds":
  NUMBER OF USER CHANNELS [1-504: +(24)]:
If TRUNK MODULE TYPE is "hs" or "t1":
  NUMBER OF USER CHANNELS [1-2042: +(26)]:
```

* For all configurations, a *no* response is required. Session maintenance configurations should be administered through *StarKeeper II NMS*. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

Syntax (continued)

If *TRUNK MODULE TYPE* is "pq" and *TRAFFIC TYPE* is non-cir:

NUMBER OF USER CHANNELS [1-2038: +(26)]:

If *TRUNK MODULE TYPE* is "pq" and *TRAFFIC TYPE* is cir or both:

NUMBER OF USER CHANNELS [1-502: +(26)]:

If *TRUNK MODULE TYPE* is "sft" or "swt":

ISN NODE ON FAR END OF THIS TRUNK [yes, no: +(no)]:

If *TRUNK MODULE TYPE* is "sft" or "swt" with ISN node at far end:

NUMBER OF USER CHANNELS [1-506: +(32)]:

If *TRUNK MODULE TYPE* is "swt":

FRAME TERMINATION LENGTH HPQ/LPQ [16/16, 16/64, 64/64, 64/256: +(64/256)]:

If *TRUNK MODULE TYPE* is "64" or "dds":

LINE SPEED [9600, 19200, 48k, 56k, 64k: +(56k)]:

If *TRUNK MODULE TYPE* is "swt":

LINE SPEED [2400, 4800, 9600, 19200, 48k, 56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M, 1.408M, 1.472M, 1.536M, 1.544M, 2.048M: +(56k)]:

If *TRUNK MODULE TYPE* is "tl" or "pq":

LINE SPEED [56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M, 1.408M, 1.472M, 1.536M, 1.544M, 2.048M: +(1.544M)]:

If *TRAFFIC TYPE* is "non-cir" or "both":

OPTIMIZATION [low_delay, high_throughput: +(low_delay)]:

If *TRAFFIC TYPE* is "cir":

MAXIMUM AGGREGATE CIR

[percentage of line speed, 1%-400%; a value in bps, 1200-X: +(100%)]:

If *TRAFFIC TYPE* is "both":

AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS

[percentage of line speed, 10%-100%; a value in bps, 1200-X: +(10%)]:

MAXIMUM AGGREGATE CIR

[percentage of line speed, 1%-Y%; a value in bps, 1200-X: +(Z%)]:

If *TOTAL NUMBER OF ACTIVE CHANNEL SETS* is less than Y:

TOTAL NUMBER OF STANDBY CHANNELS SETS [0-Z: +(S)]:

If *SESSION MAINTENANCE TRUNK* is "no":

NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]:

MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]:

If *TRUNK MODULE TYPE* is not "pq":

ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]:

For all *TRUNK MODULE TYPES*:

CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]:

Command loops to *TRUNK MODULE TYPE* prompt.

enter trunk

Parameters

This section contains explanations of parameters used in the **enter trunk** prompting sequence. Refer to the Syntax section for the prompting sequence, system defaults, and parameter options.

AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS

If **TRAFFIC TYPE** is *both*, specifies the service quantum to be shared among all non-CIR calls. This value is configured as a portion of the **LINE SPEED**. As long as the committed traffic from CIR calls is less than the remaining line speed, the configured value for non-CIR traffic is the least that can be expected. In the worst case, the available bandwidth is one-fourth of the aggregate information rate. (If **TRAFFIC TYPE** is *non-cir* this prompt is not displayed; 100% of the line speed is available for non-cir connections.) This parameter need not be administered with the same value for both ends of the Trunk-PQ.

CALL SCREENING PROFILE ID

A string of 1 to 8 alphanumeric characters that specifies the profile ID to be assigned to the trunk to screen incoming calls; or the word *none*, if a profile ID is not to be assigned to the trunk module. See **profile** in the *Node Reference*.

COMMENT

An optional string of 1 to 60 characters, enclosed in double quotation marks, containing needed administrative information.

DOWNLOAD SERVER

If **TRUNK MODULE TYPE** is *pq* specifies software source to be downloaded to the module. It must be a valid service address or the local *controller*.

ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK

For all trunks except *pq*, specifies whether (*yes* or *no*) measurements data is to be collected and reported for the specified trunk.

FRAME TERMINATION LENGTH HPQ/LPQ

If **TRUNK MODULE TYPE** is *swt*, specifies the maximum frame size combination for the high-priority transmit queue (HPQ) and the low-priority transmit queue (LPQ) to be *16/16*, *16/64*, *64/64*, or *64/256* bytes.

GROUP

A string of 1 to 8 alphanumeric characters specifying the name of an existing trunk group to be associated with the module.

ISN NODE ON FAR END OF THIS TRUNK

For SWT and SFT, specifies whether (*yes* or *no*) an ISN node is connected to the module.

LINE SPEED

If **TRUNK MODULE TYPE** is *64*, *dds*, *hs*, *swt* or *t1*, specifies the data transmission rate of the trunk connected to the module. See the Syntax section for specific speeds.

Parameters (continued)**MAXIMUM AGGREGATE CIR**

Specifies the maximum CIR bandwidth that a Trunk-PQ can accept from Frame Relay Modules (FRMs). See **enter frm**; in the prompt,

$$Y = 400\% - (\text{AGGREGATE INFORMATION RATE [in \%]})$$

$$X = 4 * (\text{LINE SPEED}) - (\text{AGGREGATE INFORMATION RATE [in bps]})$$

$$Z = 100\% - (\text{AGGREGATE INFORMATION RATE [in \%]})$$

A Trunk-PQ may be "over engineered" by setting the maximum aggregate CIR, either as an absolute value or as a percentage, to a value greater than the **LINE SPEED**. Once calls are set up over a trunk with a combined CIR equal to this value, subsequent calls are rejected until a CIR call comes down and the total is reduced. This parameter need not be administered with the same value for both ends of the Trunk-PQ.

NOTE: The combined **MAXIMUM AGGREGATE CIR** and **AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS** can be no more than 400% of the line speed. Although the **MAXIMUM AGGREGATE CIR** can be greater than 100%, the instantaneous traffic from CIR calls should not exceed 100%—(**AGGREGATE INFORMATION RATE [%]**) of the **LINE SPEED**. Traffic from CIR and non-CIR calls greater than the line speed for a significant period of time can result in congestion and data loss.

MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES

A number from 2 to 10 specifying the maximum consecutive trunk active tests that can fail before the module is declared *dead*. An active trunk failure is the loss of one *keepalive* message.

MODULE ADDRESS

A number identifying the shelf slot that the module occupies. Only a single address entry is allowed. If **TRUNK MODULE TYPE** is *dds*, which consists of two boards, its address is the slot occupied by the SCSI/DKI interface board. When entering a *dds*, the next highest numbered slot must be unconfigured to leave room for the second board.

NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS

Specifies the frequency (from 5 to 256 seconds) at which the Control Computer should run trunk active (*keepalive*) tests.

NUMBER OF USER CHANNELS

Specifies the maximum number of active user channels for the module. The number of user channels affects the total channels that can be specified. The range and default vary according to module type; see the Syntax section. The number of channels defined on each end of a trunk must be equal. For example: if node 1 has 51 channels defined on its trunk to node 2, then node 2 must have 51 channels defined on its trunk to node 1.

enter trunk

Parameters (continued)

OPTIMIZATION

The Trunk-PQ optimizes for either low delay or high throughput. Low delay is necessary for echoplex traffic to prevent detectable delays. This hinders high throughput by transmitting frequent small frames for echoplex traffic. High throughput may result in detectable delays by queuing echoplex traffic behind several large frames of data. If the traffic type is restricted to CIR only then the trunk is optimized for high throughput.

SESSION MAINTENANCE TRUNK

Specifies whether (*yes* or *no*) the trunk is to be identified as a session maintenance trunk. For all configurations, a *no* response is required. Session maintenance configurations should be administered through *StarKeeper II NMS*. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

SOFTWARE VERSION

If **TRUNK MODULE TYPE** is *pq*, a string of 1 to 14 characters specifying the software version filename to be downloaded to the module. If **DOWNLOAD SERVER** is *controller*, enter *standard* as the software version filename. If **DOWNLOAD SERVER** is not *controller*, enter a valid software release number or the name of the file to be downloaded from the server.

TRAFFIC TYPE

If **TRUNK MODULE TYPE** is *pq*, indicates the type of traffic (*cir*, *non-cir* or *both*) that is permitted on this trunk. CIR traffic consists of frame relay connections for which a CIR has been administered. Non-CIR traffic consists of connections from any other type of module as well as frame relay connections for which CIR has not been administered.

TRUNK MODULE TYPE

Specifies the type of trunk module to be entered as *64*, *dds*, *hs*, *pq*, *sft*, *swt*, or *t1*.

UPLOAD ALWAYS BEFORE DOWNLOAD

If **TRUNK MODULE TYPE** is *pq*, and **UPLOAD SERVER** is configured as other than *none*, specifies whether (*yes* or *no*) a memory dump should be sent to the upload server before the Control Computer initiates a download.

UPLOAD ONLY AFTER FAULT

If **TRUNK MODULE TYPE** is *pq*, and **UPLOAD SERVER** is configured as other than *none*, and **UPLOAD ALWAYS BEFORE DOWNLOAD** is *no*, specifies whether (*yes* or *no*) an upload dump should be sent to the upload server after a module fault is detected.

UPLOAD SERVER

If **TRUNK MODULE TYPE** is *pq*, specifies the service address of the host that is to receive the module memory dump prior to the Control Computer initiating a download, or after a fault.

Prompted Entry: Entering Trunk Information

```

CCO>enter
OBJECTS [..., trunk, ...]: trunk
TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: 64
MODULE ADDRESS: 18
SESSION MAINTENANCE TRUNK [yes, no: +(no)]: + *
COMMENT [up to 60 chars double quoted]:
"64 in 18"
GROUP [up to 8 chars]: trknj
NUMBER OF USER CHANNELS [1-504: +(24)]: 248
LINE SPEED [9600, 19200, 48k, 56k, 64k: +(56k)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: +
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr1

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: dds
MODULE ADDRESS: 12
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"dblbrd in 12"
GROUP [up to 8 chars]: trknj
NUMBER OF USER CHANNELS [1-504: +(24)]: 248
LINE SPEED [9600, 19200, 48k, 56k, 64k: +(56k)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr1

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: t1
MODULE ADDRESS: 42
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"t1 in 42"
GROUP [up to 8 chars]: trknj
NUMBER OF USER CHANNELS [1-2042: +(26)]: +
LINE SPEED [56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k,
704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M,
1.408M, 1.472M, 1.536M, 1.544M, 2.048M: +(1.544M)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr1

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: <DEL>
CCO>

```

enter trunk

Prompted Entry: Entering Trunk Information (continued)

```
TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: pq
MODULE ADDRESS: 110
DOWNLOAD SERVER [(controller)]: +
SOFTWARE VERSION [(standard)]: +
UPLOAD SERVER [(none)]: +
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"pq in 110"
GROUP [up to 8 chars]: pq2_2
TRAFFIC TYPE [cir, non-cir, both: +(non-cir)]: both
NUMBER OF USER CHANNELS [1-502: +(26)]: +
LINE SPEED [56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k,
704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M,
1.408M, 1.472M, 1.536M, 1.544M, 2.048M: +(1.544M)]: 1.536M
OPTIMIZATION [low_delay, high_throughput: +(low_delay)]: +
AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS
 [percentage of line speed, 10%-100%; a value in bps, 1200-1544000: +(10%)]: +
MAXIMUM AGGREGATE CIR
 [percentage of line speed, 1%-390%; a value in bps, 1200-6021600, +(90%)]: 150%
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr1

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: sft
MODULE ADDRESS: 55
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"sft in 55"
GROUP [up to 8 chars]: trknj
ISN NODE ON FAR END OF THIS TRUNK [yes, no: +(no)]: +
NUMBER OF USER CHANNELS [1-2042: +(32)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr2

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: swt
MODULE ADDRESS: 62
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"swt in 62"
GROUP [up to 8 chars]: gr703
ISN NODE ON FAR END OF THIS TRUNK [yes, no: +(no)]: yes
NUMBER OF USER CHANNELS [1-506: +(32)]: +
FRAME TERMINATION LENGTH HPQ/LPQ [16/16, 16/64, 64/64, 64/256: +(64/256)]: +
LINE SPEED [2400,4800,9600,19200,48k,56k,64k,128k,192k,256k,320k,
384k,448k,512k,576k,640k,704k,768k,832k,896k,960k,1.024M,1.088M,
1.152M,1.216M,1.280M,1.344M,1.408M,1.472M,1.536M,1.544M,2.048M: +(56k)]:+
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr3

TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: <DEL>
CC0>
```

Prompted Entry: Entering Trunk Information (continued)

```
TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: hs
MODULE ADDRESS: 78
* SESSION MAINTENANCE TRUNK [yes, no: +(no)]: +
COMMENT [up to 60 chars double quoted]:
"hs in 78"
GROUP [up to 8 chars]: trknj
NUMBER OF USER CHANNELS [1-2042: +(26)]: +
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256: +(180)]: +
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10: +(3)]: +
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no: +(no)]: yes
CALL SCREENING PROFILE ID [up to 8 chars, none: +(none)]: callscr1
TRUNK MODULE TYPE [64, dds, hs, pq, sft, swt, t1]: <DEL>
CC0>
```

* For all configurations, a *no* response is required. Session maintenance configurations should be administered through *StarKeeper II* NMS. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

remove trunk

The **remove trunk** command enables you to take a trunk module out of service. This command interrupts any calls in progress. If **remove trunk** is executed for a session maintenance trunk while call rerouting is in progress, the command fails.

Syntax

You can use **remove trunk** in prompted entry or one-line entry.

```
CC0> remove
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
```

Parameters

Refer to the parameter definitions in the **enter trunk** section.

Prompted Entry: Removing a Trunk Module from Service

```
CC0> remove
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 55
CC0>
```

One-line Entry: Removing a Trunk Module from Service

```
cc0> remove trunk 55
```

restore trunk

The **restore trunk** command enables you to place a trunk module into service initially, or to put it back into service, after it has been automatically or manually removed from service.

Syntax

You can use **restore trunk** in prompted entry or one-line entry.

```
CC0> restore
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
```

Parameters

Refer to the parameter definitions supplied in the **enter trunk** section.

Prompted Entry: Restoring a Trunk to Service

```
CC0> restore
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 55
CC0>
```

One-line Entry: Restoring a Trunk to Service

```
CC0> restore trunk 55
CC0>
```

route trunk

For session maintenance* trunks only, the **route trunk** command enables you to specify the module address and direction of a trunk reroute. Refer to the *Session Maintenance Guide* for additional information.

Syntax

You can use **route trunk** in prompted or one-line entry.

```
CCO> route
OBJECT [...trunk...]: trunk
MODULE ADDRESS:
ROUTE DIRECTION [alternate, normal: +(normal)]:
```

If *ROUTE DIRECTION* is "alternate" and trunk is carrying rerouted calls:

```
WARNING: Trunk <addr> is carrying rerouted traffic; rerouted calls will be dropped.
```

If *ROUTE DIRECTION* is "normal" and recovery declaration criteria is not met:

```
WARNING: Trunk <addr> is not fully functional; calls may be dropped.
```

```
CONTINUE [yes, no: +(no)]:
```

Parameters

This section contains explanations of parameters used in the **route trunk** prompting sequence. Refer to the Syntax section for the prompting sequence, system defaults, and parameter options.

CONTINUE

Specifies whether (*yes* or *no*) call rerouting is to continue despite the possibility that calls might be dropped. Calls can be dropped when the specified trunk is already carrying rerouted traffic or recovery declaration criteria has not been met on the original trunk.

MODULE ADDRESS

A single number identifying the shelf slot of the session maintenance trunk that is to be routed.

ROUTE DIRECTION

Specifies the direction of the reroute to be *alternate* or *normal*; where: *alternate* initiates a trunk reroute to standby channel sets and *normal* returns rerouted channel sets to the original trunk.

* Session maintenance configurations should be administered through *StarKeeper II* NMS. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

Prompted Entry: Routing Calls to Alternate Trunk

```
CC0> route
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 7
ROUTE DIRECTION [alternate, normal: +(normal)]: alternate
CC0>
```

Prompted Entry: Routing Calls to Alternate Trunk Carrying Rerouted Traffic

```
CC0> route
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 14
ROUTE DIRECTION [alternate, normal: +(normal)]: alternate
WARNING: Trunk 14 is carrying rerouted traffic; rerouted calls will be dropped.
CONTINUE [yes, no: +(no)]: +
CC0>
```

Prompted Entry: Routing Calls to Original Trunk

```
CC0> route
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 7
ROUTE DIRECTION [alternate, normal: +(normal)]: +
CC0>
```

Prompted Entry: Routing Calls to Original Trunk (Recovery Declaration Criterion Not Met)

```
CC0> route
OBJECT [...trunk...]: trunk
MODULE ADDRESS: 7
ROUTE DIRECTION [alternate, normal: +(normal)]: +
WARNING: Trunk 7 not fully functional; calls may be dropped.
CONTINUE [yes, no: +(no)]: +
CC0>
```

route trunk

One-line Entry/Output: Routing Calls to Alternate Trunk

```
CC0> route trunk 7 alternate
```

One-line Entry/Output: Routing Calls to Alternate Trunk Carrying Rerouted Traffic

```
CC0> route trunk 14 alternate
WARNING: Trunk 14 is carrying rerouted traffic; rerouted calls will be dropped.
CONTINUE [yes, no: +(no)]: +
CC0>
```

One-line Entry/Output: Routing Calls to Original Trunk

```
CC0> route trunk 7 +
```

One-line Entry/Output: Routing Calls to Original Trunk (Recovery Declaration Criterion not Met)

```
CC0> route trunk 7 +
WARNING: Trunk 7 not fully functional; calls may be dropped.
CONTINUE [yes, no: +(no)]: +
CC0>
```

verify trunk

The output of the **verify trunk** command enables you to check the information entered in the database for a specified trunk module or for all trunk modules.

Syntax

You can use **verify trunk** in prompted entry or one-line entry.

```
CC0> verify
OBJECT [...trunk...]: trunk
MODULE ADDRESS [+(all)]:
```

Parameters

Except for being able to specify the word *all*, meaning every trunk module, the **MODULE ADDRESS** parameter definition for **verify trunk** is the same as that for **enter trunk**.

Prompted Entry: Verifying Trunk Information

```
CC0> verify
OBJECT [...trunk...]: trunk
MODULE ADDRESS [+(all)]: +
<report output>
```

One-line Entry/Output: Verifying Trunk Information

```
CC0> verify trunk +
94-12-31 15:02:23 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 12
MODULE TYPE: trkdds                NCHLS: 248
SERVICE STATE: out (manual)
LINE SPEED: 56k
ENABLE LINK MEASUREMENT: yes
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 5
CALL SCREENING PROFILE ID: callscr1
COMMENT: dblbrd in 12
GROUP      CHNLS  CHNL RANGE
trknj      248    8-255
```

One-line Entry/Output: Verifying Trunk Information (continued)

```
CC0> verify trunk +
  94-12-31 15:02:23 NODE=<node name>
M verify trunk all
  MODULE ADDRESS: 18
  MODULE TYPE: trk64                NCHLS: 248
  SERVICE STATE: out (manual)
  LINE SPEED: 56k
  ENABLE LINK MEASUREMENTS: yes
  ACTIVE TEST INTERVAL: 180
  ACTIVE TEST LIMIT: 3
  CALL SCREENING PROFILE ID: callscr1
  COMMENT: 64 in 18

  GROUP      CHNLS  CHNL RANGE
  trknj      248   8-255

  94-12-31 15:02:23 NODE=<node name>
M verify trunk all
  MODULE ADDRESS: 42
  MODULE TYPE: trkt1                NCHLS: 26
  SERVICE STATE: out (manual)
  LINE SPEED: 1.544m
  ENABLE LINK MEASUREMENT: yes
  ACTIVE TEST INTERVAL: 180
  ACTIVE TEST LIMIT: 3
  CALL SCREENING PROFILE ID: callscr1
  COMMENT: t1 in 42

  GROUP      CHNLS  CHNL RANGE
  trknj      26    6-31

  94-12-31 15:02:23 NODE=<node name>
M verify trunk all
  MODULE ADDRESS: 78
  MODULE TYPE: trkhs                NCHLS: 26
  SERVICE STATE: out (manual)
  ENABLE LINK MEASUREMENT: yes
  ACTIVE TEST INTERVAL: 180
  ACTIVE TEST LIMIT: 3
  CALL SCREENING PROFILE ID: callscr1
  COMMENT: hs in 78

  GROUP      CHNLS  CHNL RANGE
  trknj      26    6-31
```

One-line Entry/Output: Verifying Trunk Information (continued)

```
94-12-31 15:02:24 NODE=<node name>
M verify trunk all

MODULE ADDRESS: 55
MODULE TYPE: sft                NCHLS: 64
SERVICE STATE: out (manual)
ENABLE LINK MEASUREMENT: yes
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 3
COMMENT: sft in 55
CALL SCREENING PROFILE ID: callscr2

GROUP   CHNLS  CHNL RANGE
trknj   32    6-37

94-12-31 15:02:24 NODE=<node name>
M verify trunk all

MODULE ADDRESS: 62
MODULE TYPE: swt                NCHLS: 32
SERVICE STATE: out (manual)
LINE SPEED: 1.544M
FRAME TERMINATION LENGTH: 64/256
ENABLE LINK MEASUREMENT: yes
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 3
CALL SCREENING PROFILE ID: callscr3
COMMENT: swt in 62

GROUP   CHNLS  CHNL RANGE
trknj   32    6-37

94-12-31 15:02:25 NODE=<node name>
M verify trunk all

MODULE ADDRESS: 72
MODULE TYPE: trkt1             NCHLS: 26
SERVICE STATE: out (manual)
LINE SPEED: 1.544M
ENABLE LINK MEASUREMENT: yes
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 3
CALL SCREENING PROFILE ID: callscr1
COMMENT: t1 in 72

GROUP   CHNLS  CHNL RANGE
trknj   26    6-31
```

One-line Entry/Output: Verifying Trunk Information (continued)

```
94-12-31 13:47:26 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 103
MODULE TYPE: trkpq                NCHLS: 26
SERVICE STATE: in
DOWNLOAD SERVER: controller
VERSION: standard
UPLOAD SERVER: none
UPLOAD ALWAYS BEFORE DOWNLOAD: no
UPLOAD ONLY AFTER FAULT: no
TRAFFIC TYPE: cir
LINE SPEED: 1.544M
MAXIMUM AGGREGATE CIR (%): 200%
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 3
CALL SCREENING PROFILE ID: callscr1
COMMENT: pq in 103

GROUP      CHNLS  CHNL RANGE
trknj      26    10-35

94-12-31 15:02:23 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 110
MODULE TYPE: trkpq                NCHLS: 26
SERVICE STATE: in
DOWNLOAD SERVER: controller
VERSION: standard
UPLOAD SERVER: none
UPLOAD ALWAYS BEFORE DOWNLOAD: no
UPLOAD ONLY AFTER FAULT: no
TRAFFIC TYPE: both
OPTIMIZATION: high_throughput
LINE SPEED: 1.544M
MAXIMUM AGGREGATE CIR (%): 150%
AGGREGATE INFORMATION RATE FOR NON-CIR TRAFFIC (%): 10%
ACTIVE TEST INTERVAL: 180
ACTIVE TEST LIMIT: 3
CALL SCREENING PROFILE ID: callscr1
COMMENT: pq in 110

GROUP      CHNLS  CHNL RANGE
trknj      26    10-35
CC0>
```

One-line Entry/Output: Verifying Trunk Information (continued)

```
CC0> verify trunk all
  94-12-31 15:02:23 NODE=<node name>
M verify trunk all
  MODULE ADDRESS: 111
  MODULE TYPE: trkpq                NCHLS: 26
  SERVICE STATE: in
  DOWNLOAD SERVER: controller
  VERSION: standard
  UPLOAD SERVER: none
  UPLOAD ALWAYS BEFORE DOWNLOAD: no
  UPLOAD ONLY AFTER FAULT: no
  TRAFFIC TYPE: both
  OPTIMIZATION: low_delay
  LINE SPEED: 1.544M
  MAXIMUM AGGREGATE CIR (bps): 1.2M
  AGGREGATE INFORMATION RATE FOR NON-CIR TRAFFIC (bps): 560k
  ACTIVE TEST INTERVAL: 180
  ACTIVE TEST LIMIT: 3
  CALL SCREENING PROFILE ID: callscr1
  COMMENT: pq in 111

  GROUP      CHNLS  CHNL RANGE
  trknj      26    10-35

CC0>
```

One-line Entry/Output: Verifying Session Maintenance Trunk Information*

```

CC0> verify trunk all
  94-12-31 15:49:44 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 18
MODULE TYPE: trk64                NCHLS: 134
SERVICE STATE: out (manual)
LINE SPEED: 56k
ENABLE LINK MEASUREMENT: yes
CALL SCREENING PROFILE ID: callscr1
COMMENT: <node name>/<node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 5.6k    EXPECTED BANDWIDTH (%): 10.0
*   ACTIVE CHANNEL SETS: 1            STANDBY CHANNEL SETS: 3
*   BANDWIDTH/ACTIVE CS (bps): 5.6k   STANDBY BANDWIDTH (bps): 50.4k
*   FAILURE THRESHOLD (secs): 4       RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1

  94-12-31 15:49:44 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 19
MODULE TYPE: trkdds                NCHLS: 134
SERVICE STATE: out (manual)
LINE SPEED: 56k
ENABLE LINK MEASUREMENT: no
CALL SCREENING PROFILE ID: callscr1
COMMENT: <node name>/<node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 11.2k   EXPECTED BANDWIDTH (%): 20.0
*   ACTIVE CHANNEL SETS: 1            STANDBY CHANNEL SETS: 3
*   BANDWIDTH/ACTIVE CS (bps): 11.2k  STANDBY BANDWIDTH (bps): 44.8k
*   FAILURE THRESHOLD (secs): 4       RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1

```

* Output occurs on a node on which session maintenance is administered through *StarKeeper II* NMS. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

One-line Entry/Output: Verifying Session Maintenance Trunk Information* (continued)

```

94-12-31 15:49:44 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 42
MODULE TYPE: trkhs                NCHLS: 134
SERVICE STATE: out (manual)
ENABLE LINK MEASUREMENT: yes
CALL SCREENING PROFILE ID: callscr2
COMMENT: <node name>/<node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 1058.8k EXPECTED BANDWIDTH (%): 25.0
*   ACTIVE CHANNEL SETS: 1           STANDBY CHANNEL SETS: 15
*   BANDWIDTH/ACTIVE CS (bps): 1058.8k STANDBY BANDWIDTH (bps): 3176.4k
*   FAILURE THRESHOLD (secs): 4      RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1

94-12-31 15:49:44 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 55
MODULE TYPE: sft                  NCHLS: 134
SERVICE STATE: out (manual)
ENABLE LINK MEASUREMENT: yes
CALL SCREENING PROFILE ID: callscr2
COMMENT: <node name/node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 800.0k  EXPECTED BANDWIDTH (%): 10.0
*   ACTIVE CHANNEL SETS: 1           STANDBY CHANNEL SETS: 15
*   BANDWIDTH/ACTIVE CS (bps): 800.0k STANDBY BANDWIDTH (bps): 7199.9k
*   FAILURE THRESHOLD (secs): 4      RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1

```

* Output occurs on a node on which session maintenance is administered through *StarKeeper II* NMS. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

One-line Entry/Output: Verifying Session Maintenance Trunk Information* (continued)

```

94-12-31 15:49:44 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 62
MODULE TYPE: swt                      NCHLS: 134
SERVICE STATE: out (manual)
LINE SPEED: 56k
FRAME TERMINATION LENGTH: 64/256
ENABLE LINK MEASUREMENT: yes
CALL SCREENING PROFILE ID: callscr3
COMMENT: <node name/node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 8.4k    EXPECTED BANDWIDTH (%): 15.0
*   ACTIVE CHANNEL SETS: 1            STANDBY CHANNEL SETS: 3
*   BANDWIDTH/ACTIVE CS (bps): 8.4k   STANDBY BANDWIDTH (bps): 47.6k
*   FAILURE THRESHOLD (secs): 4       RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1

94-12-31 15:49:48 NODE=<node name>
M verify trunk all
MODULE ADDRESS: 78
MODULE TYPE: trkt1                    NCHLS: 134
SERVICE STATE: out (manual)
LINE SPEED: 1.544M
ENABLE LINK MEASUREMENT: yes
CALL SCREENING PROFILE ID: callscr2
COMMENT: <node name>/<node name> pair

* SESSION MAINTENANCE DATA:
*   REMOTE NODE: <node name>          PRIMARY NODE: <node name>
*   EXPECTED BANDWIDTH (bps): 185.3k  EXPECTED BANDWIDTH (%): 12.0
*   ACTIVE CHANNEL SETS: 1            STANDBY CHANNEL SETS: 15
*   BANDWIDTH/ACTIVE CS (bps): 185.3k STANDBY BANDWIDTH (bps): 1358.7k
*   FAILURE THRESHOLD (secs): 4       RECOVERY THRESHOLD (secs): 120

GROUP   CHLS/CS  CHNL RANGE  CHNL SET
trknj   126     8-133      1
CC0>

```

* Output occurs on a node on which session maintenance is administered through *StarKeeper II* NMS. Consult the *Session Maintenance Guide* and *StarKeeper II NMS Network Builder*.

Report Fields

This table correlates each report field heading shown in the output of **verify trunk** to the parameter for which you are prompted in **enter trunk** or **change trunk**. The information beneath each report field heading reflects the parameter option specified in either command. An *N/A* indicates that the parameter is *not applicable* or *not used*.

Report Field Name	Corresponding Parameter Name
ACTIVE TEST INTERVAL	NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS
ACTIVE TEST LIMIT	MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES
CALL SCREENING PROFILE ID	CALL SCREENING PROFILE ID
CHNL RANGE	None: range of channel numbers for this trunk
CHNLS	NUMBER OF USER CHANNELS
COMMENT	COMMENT
DOWNLOAD SERVER	DOWNLOAD SERVER
DQDB BUS INDICATION	DQDB BUS INDICATION
ENABLE LINK MEASUREMENT	ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK
FRAME TERMINATION LENGTH	FRAME TERMINATION LENGTH HPQ/LPQ
GROUP	GROUP
LINE SPEED	LINE SPEED
MODULE ADDRESS	MODULE ADDRESS
MODULE TYPE	TRUNK MODULE TYPE
NCHLS	None: number of user overhead plus overhead channels for call processing
SERVICE STATE	None: module service state
SESSION MAINTENANCE DATA*	None: refer to the <i>Session Maintenance Guide</i> .
VERSION	SOFTWARE VERSION
THRESHOLD PROFILE ID	THRESHOLD PROFILE ID
TRUNK WEIGHT	TRUNK WEIGHT

* Output occurs on a node that has had session maintenance administered through *StarKeeper II* NMS.

System Responses

The following sections contain applicable system responses for the **trunk** commands. These sections are organized by the key phrases that preface each response. Refer to the *Node Reference* for a detailed explanation of each key phrase.

COMMAND FAILED:

Cannot remove trunk <addr>; reroute attempt in progress.

If **remove trunk** is executed for a session maintenance trunk while call rerouting is in progress, the command fails.

Command manually terminated.

The command exited because the key was pressed at the system console.

Module is not a trunk.

The specified module address contains a module other than a trunk.

Module is not in service.

Measurements cannot be obtained while the module is out of service.

No measurement report displayed for trunk <addr>.

The measurement report requested for the indicated trunk module was not output to the system console or printer.

Requested measurement report timed-out.

The requested report could not be generated within the amount of time allocated. Wait and re-enter the command.

Route to <alternate/normal> path already in progress on trunk <addr>.

An attempt was made to route the calls on the trunk to a normal or alternate path with **route trunk**; however, the reroute to that path was already in progress.

Scheduled report is being processed. Try again.

The requested report could not be generated because the system was generating a regularly scheduled report at the time of the request.

Trunk <addr> already routed to <alternate/normal> path.

An attempt was made to reroute the calls on the indicated trunk with **route trunk** but they have already been rerouted to the alternate or normal path.

Trunk <addr> of type <type> is not fully functional.

An attempt was made to route a session maintenance trunk to its normal path before the trunk module cleared the failure.

Unexpected message type received -- [MSG-TYP-VALUE].

Contact your support group.

Use StarKeeper II NMS to schedule the measurement reports.

If your node is monitored by *StarKeeper II NMS*, you must execute the **measurements** commands from a *StarKeeper II NMS* console.

INPUT ERROR:

All is not an allowed value.

The word *all* cannot be used to name a call screening profile ID.

Call screening profile id <id> is not entered.

The indicated call screening profile ID is not configured. See the **profile** command in the *Node Reference*.

Cannot <enter/change/delete/verify/remove/restore/diagnose> second board of a trunk module.

Only the first board (the lower slot number) of the Trunk-DDS can be configured, controlled, and maintained with operations commands.

Cannot <change/delete> <type> module <addr> while <in service/downloading>.

You cannot change or delete information for the indicated module while it is in service or while it is downloading software. See **remove trunk**.

Cannot get measurements for second board of trunk module.

Measurements data is not available for the second board of a Trunk-DDS.

Cannot route trunk alternate while Session Maintenance is not in service.

The **route trunk** command cannot be executed until session maintenance is in service.

Group <name> is not a trunk group, as required.

The name of the group specified is a local receiving, originating, or two-way group. You must specify the name of a trunk group.

Measurements are not being collected for trunk <addr>.

Measurements are not being gathered for the indicated trunk module.

Module address is empty, trunk is expected.

The specified module address is not administered in the database.

Module address <addr> contains module type <type> - trunk module expected.

The indicated module address contains a module type other than a trunk.

Module <addr> is already configured.

Module <addr> is already entered.

The indicated module has already been configured.

Module <addr> is downloading.

The module cannot be removed from service or restored to service while it is downloading software.

Module <addr> is not a Session Maintenance trunk.

The indicated module is not a trunk configured for session maintenance.

INPUT ERROR

Module <addr> is not configured.

The indicated module address is not administered in the database.

Module <addr> is not a trunk.

The indicated module address contains a module other than a trunk module.

Module <addr> is not configured. Command did not execute.

The indicated module is not entered in the database.

Not an allowed value.

The local node name does not exist.

Not unique enough.

The string input does not contain the required number of characters for uniqueness.

Parameter out of Range.

Physical slot does not exist.

Slot is reserved: <addr>

The module address indicated is reserved for another module type.

Threshold profile does not exist.

The specified threshold profile ID is not entered into the database.

Threshold profile does not match trunk type.

The specified profile ID is not the appropriate type for the particular trunk module.

Trunk may only be routed from its primary node.

An attempt was made to route a trunk from its secondary node. Retry the command from a node on the opposite end of the trunk.

Trunk may only be routed while in service.

Out-of-service (*oos*) trunk modules cannot have their calls rerouted.

Trunk module <addr> is downloading.

Information for the indicated trunk cannot be changed while the module is downloading software.

Trunk module <addr> is not currently defined in the database.

The indicated trunk module is not administered in the database; therefore, information cannot be deleted.

Trunk module <addr> is not entered.

Trunk <addr> is not entered.

The indicated trunk module is not administered in the database.

REMOVE/RESTORE FAILED:

cannot get text file for module <addr>.

could not send message to config.

The command processor could not send a message to the configuration process. Contact your support group.

download failed for module <addr>.

NOTE: Wait for messages that explain the failure. The *Data Networking Products Messages Reference Appendix* provides additional information for download failure messages.

inconsistent database entry for module <addr>.

Delete and re-enter.

The information in the database does not agree with that entered for the module address indicated.

module address <addr> contains a <type> module (<type> expected).

The indicated module address contains a different module than that type specified on the command line.

module address <addr> contains no module (<trunk type> trunk expected).

The indicated address is not administered for any interface module.

module <addr> is beyond CLOCK.

The specified module address is not allowed. Refer to Volume 1 of the *Node Reference* for slot numbering restrictions.

module <addr> is in loop-around mode.

The command processor cannot execute the command because the module is in the loop-around mode as a result of diagnostic testing.

no switch memory available. Module <addr> cannot be restored.

The Control Computer cannot allocate the amount of switch memory the module requires. This situation occurs if all switch memory was allocated or fragmented by removing and restoring several modules. Reboot the system so memory space can be reallocated in a contiguous block.

software inconsistency (module <addr>).

system too busy to process module <addr>. Try again later.

The system is too burdened processing other tasks. Re-enter the command later.

unrecognized error code for module <addr>.

Re-enter the command. If the message recurs, contact your support group.

DIAGNOSTICS:

ANOTHER DIAGNOSTIC PROCESS RUNNING

Both Control Computer ports are configured as console ports and another **diagnose** command is currently running on the other console port. Only one diagnostic process can run at any time. Wait a while before re-entering the command.

Cannot communicate with remote trunk.

The trunk is most likely out of service or the *trunkcsc* channel is not active.

Cannot diagnose the second board of a two-board module.

You must specify the slot address of the primary (lower numbered) board of a two-board module set when running diagnostics.

Cannot Make Maintenance Process Special.

Both Control Computer ports are configured as console ports and another **diagnose** command is currently running on the other console port. Only one diagnostic process can run at any time. Wait a while before re-entering the command.

Diagnose completed - test passed/failed.

For the Trunk-PQ, the requested test has completed and it passed or failed.

Diagnostic download in progress

The diagnostic load module is being downloaded to the trunk so that the complete set of hardware tests or any loopback tests can be run.

Diagnostic not completed -

Command cannot be sent to module <addr>.
Control computer did not respond. Try again later.
DIAGNOSTIC EXIT DUE TO DELETE.
Download file not found.
Module <addr> did not respond to command. Try again later.
Module <addr> has no resource to process command.
Module <addr> is being downloaded.
Module <addr> is too busy to process command. Try again later.
Module <addr> must be out-of-service for diagnostics.
Module <addr> task did not respond.
System too busy to process command. Try again later.
Unexpected error code from config.

The diagnostic did not complete for one of the reasons listed.

Error communicating with config.

Because of possible errors in the database, a missing board, Control Computer errors, or a bad disk, the configuration process could not associate diagnostic text with the port being diagnosed. Make sure the trunk module board and I/O board are installed properly. Use **verify trunk** and **dstat trunk** to verify module and database integrity.

If problems are not found, re-enter the command on another module. If the command executes successfully, replace the trunk module board and re-enter the command. If the command does not execute, the text for the diagnostic might be missing from the disk.

Far-end loopback has been taken down.

INFO: Trunk is now in reverse-looping mode

For the Trunk-PQ, the trunk will now transmit any data it receives from the line back out onto the line. A Trunk-PQ that is in reverse-looping mode cannot be restored to service until it is taken out of loop mode. After diagnostics are completed **diagnose trunk** with a **TEST TYPE** of *no_loop* must be run before the Trunk-PQ can be restored to service.

INFO: Trunk is no longer in reverse-looping mode.

For the Trunk-PQ, data received from the line will no longer be transmitted back onto the line. This is the normal operational mode of the trunk.

INFO: Place far-end device in loop-around mode.

LOOP-AROUND DIAGNOSTIC FAILED ON ALL TESTED CHANNELS.

MODULE FAILED OPTIONS TEST.

CHECK THE I/O DISTRIBUTION BOARD AND CABLES.

The diagnostic failed on all tested channels. Check the appropriate hardware.

Line LINK-REVERSE has been set up.

LINK-REVERSE has been taken down.

LOOP-AROUND DIAGNOSTIC FAILED:

ERROR FROM TRUNK CONTROLLER PROCESS

ERROR IN LOOP-AROUND SIGNAL

NO RESPONSE FROM TRUNK CONTROLLER PROCESS

SYSTEM ERROR

The previous response indicates why the loopback diagnostic failed. When an error is detected in a loopback signal, the communications path is faulty. The other error/no response messages indicate a Control Computer software error. For these errors, repeat the command and log recurring similar messages.

LOOP AROUND DIAGNOSTIC SUCCEEDED

This message appears for all loop types except *reverse_trk* and *no_loop*. Since the loopback process measures the quality of transmission over an interval of time, a message is sent repeatedly (up to 1000 times) and the received data is compared to the transmitted data. An error count is incremented if one or more errors occur in that transmission. The test continues until 10 errors are found or 1000 transmissions have been sent. When the test stops upon receiving 10 errors, the message reports the exact number of transmissions.

If one or more errors occur, the message **LOOP AROUND DIAGNOSTIC FAILED: ...** appears. It is typical to see a few errors on some trunks; but this does not indicate that the trunk module needs to be replaced or cannot be used. Although the module does not detect errors and retransmissions, data integrity is verified at other levels using end-to-end protocols. If errors are numerous and consistent, investigate the trunk service.

LOOP-AROUND DIAGNOSTIC SUCCEEDED ON ALL TESTED CHANNELS.

The test has successfully completed. A message is displayed instructing you which diagnostic to run next.

Loopback test in progress

For the Trunk-PQ, indicates the loopback test has started.

Module <addr> is in loop state, use the 'no-loop' command.

The trunk is in reverse-looping mode. Before any diagnostic test can be run, the module must be taken out of the loop state with the *no-loop* command.

MODULE FAILED OPTIONS TEST

Only the module portion of the diagnostic failed the options test.

MODULE MAY STILL BE IN LOOP-AROUND MODE.

The trunk module might still be in the loopback mode; if so, it will not function properly. Use **dstat trunk < addr > < high >** to determine if it is still in loopback mode; use *no_loop* to restore the module to normal mode.

NO RESPONSE FROM PORT PROCESS

The diagnostic process was unable to communicate with the port process.

Partial results at HH:MM:SS

For the Trunk-PQ, undergoing continuous loopback tests or loopback tests of a specified time duration, indicates the results accumulated as of the hour (HH), minutes (MM), and seconds (SS). The partial results are cumulative and are printed approximately every 30 seconds. They contain the number of frames that contained an error (*data errors*), the number of frames that were never returned (*message timeouts*), and the number of frame transmissions (*transmissions*) since the loopback test began.

PORT PROCESS ABORTED BY CONFIG

Hardware complications caused the configuration process to terminate. The complications can include a manual reset (a switch on the board placed in the Diag or Disab position) rather than the Enabl position. Check the physical integrity of the module. If it appears normal, enter **dstat trunk < addr > < high >** to determine its status. If the status is normal, rerun the test. If the message recurs, replace the trunk module.

SFT MODULE FAILED SELF TEST

The SFT module has failed its self-test.

THE REMOTE TRUNK MODULE MUST ALSO BE IN SERVICE FOR THE node_remote TEST OR IT WILL FAIL.

TRUNK MODULE IS IN REQUESTED TRK_REVERSE LOOPING MODE.

The trunk module has been put into the reverse loopback mode.

UNABLE TO PLACE TRUNK INTO REQUESTED LOOPING MODE.

REPLACE TRUNK BOARD AND TRY AGAIN.

The trunk module cannot be put into the loopback mode. Replace the board and re-enter the command.

WAS THE REMOTE TRUNK MODULE IN TRUNK REVERSE LOOPING MODE?

IF SO, RUN THE near_dsu LOOP TEST NEXT, BUT FIRST, &...

If the remote trunk is in reverse loopback mode (when running the *remote_trk* test), run the *near_dsu* test next. Further self-explanatory instructions are given.

XXX_XX diagnostic failed -

Cannot put far end device into loopback mode.

Cannot put far end DSU/CSU into loopback mode.

Cannot put local DSU/CSU into loopback mode.

The far end device is not in loopback mode.

The diagnostic did not complete for one of the reasons listed.

Diagnostic FAILED**Cannot configure diagnostics**

Indicates a module hardware fault.

Cannot detect far-end loopback

An attempt to determine the loopback state of the far-end device or module has failed.

Cannot put far-end into loopback mode

An attempt to set the far-end device or module into a loopback state has failed.

Far-end stuck in loopback mode

An attempt to clear the far-end device or module loopback state has failed.

Incorrect I/O board in the slot**Ingress FROM-LINK queue overflow**

Could indicate a module hardware fault.

I/O board not present**I/O board failed diagnostic****Premature failure**

Indicates a module hardware fault.

Pre-existing far-end loopback

The far-end device or module has a loopback path already in place.

Receiver timed-out

If this message occurs after the *local_lp* test, a module or I/O board hardware fault is indicated. If it occurs following *manu_lp*, or *line_farend*, it could indicate that the loopback path is not set up correctly.

Remote DSU/CSU not using C-Bit frame format

The far-end device is using an incompatible frame format and cannot respond to module loopback commands.

Segment data mismatch

The data received differs from that transmitted. This could indicate a module hardware fault or transmission line problem.

WARNING:

Cannot detect far-end loopback

The far-end device or module is not in a loopback state (*manu_lp*).

Check network Node Reroute Tables for consistency.

This warning indicates that the module for which information is to be changed or deleted, or the module which is to be removed from service, is a session maintenance trunk.

Could not send a message to trunksig.

The remove/restore operation could not continue because it could not send a message to the Control Computer process.

Comment entry failed.

comment file too large.

unable to access comment file.

The total comment storage space needed is greater than the allocated space on the disk. Use the **dbresize** command to resize the database, or eliminate unnecessary comments.

File system corruption could be preventing access to the comment file. Check the integrity of the disk system using the file system check command **fsck**. The *Node Reference* provides information for this procedure.

Download server <addr> is not a valid service address.

The download server address must be a valid service address or the local *controller*.

Measurements will not be turned on/off for trunk <addr> until module is removed and restored.

The module must be removed and restored to service before the system can begin to collect measurements information.

Trunk <addr> not fully functional; calls may be dropped.

An attempt was made to route calls to the original (normal) trunk with **route trunk**, but the trunk is not yet operational. Calls might be dropped.

Trunk <addr> is carrying rerouted traffic; rerouted calls will be dropped.

An attempt was made to route calls to the alternate trunk with **route trunk**, but the trunk is already carrying rerouted calls. Calls might be dropped.

Trunk <addr> is rerouted; rerouted calls will be dropped.

An attempt was made to route calls to the alternate trunk with **route trunk**, but the trunk is already carrying rerouted calls. Calls might be dropped.

No Key Phrase

Cannot abort; <remove/restore> in progress.

You pressed the key when the command process could not be terminated.

DATABASE BEING MODIFIED - TRY AGAIN LATER

The command process cannot continue because the database is being changed. Wait and re-enter the command.

Module <addr> is already <in/out> of service.

The module specified is already in the requested service state.

Module <addr> state unknown -- system did not respond.

The command might have executed successfully; but the system did not respond with status information. Use **dstat module** or **verify module** to determine the actual service state of the module. This error message would most likely appear during very heavy use.

SERIOUS DATABASE TRANSACTION PROBLEM - UPDATE NOT ACCEPTED

The command process cannot continue because of a critical problem in the database. Contact your support group.

Appendix.

Trunk Module Database Entry Forms

This section contains sample database entry forms to use when initially entering trunks into the database, or when making any extensive changes. They should be used with similar forms, provided in the *Node Reference* for addresses and groups. After configuration information is entered in the database, save these forms for use in troubleshooting.

The sample database entry forms in the **Appendix** are

- A-1. Entering an SFT Module**
- A-2. Entering an SWT Module**
- A-3. Entering a Trunk-64 Module**
- A-4. Entering a Trunk-DDS Module**
- A-5. Entering a Trunk-HS Module**
- A-6. Entering a Trunk-PQ Module**
- A-7. Entering a Trunk-T1 Module**

The forms list prompts that appear when **enter** commands are used, and the values (or range of values) that can be entered in response to the prompts. Default values are shown in *italics*. Information contained in this section is supplemented by explanations in **Trunk Module Administration** and **Trunk Module Commands**.

FORM A-1. Entering an SFT Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	sft	sft	sft	sft
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-2042, 32]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-2. Entering an SWT Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	swt	swt	swt	swt
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-506, 32]				
FRAME TERMINATION LENGTH HPQ/LPQ [16/16, 16/64, 64/64, 64/256]				
LINE SPEED [2400, 4800, 9600, 19200, 48k, 56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M, 1.408M, 1.472M, 1.536M, 1.544M, 2.048M]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE TRUNK ACTIVE FAILURES [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-3. Entering a Trunk-64 Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	64	64	64	64
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-504, 24]				
LINE SPEED [9600, 19200, 48k, 56k, 64k]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE FAILED ACTIVE TESTS [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-4. Entering a Trunk-DDS Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	dds	dds	dds	dds
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-504, 24]				
LINE SPEED [9600, 19200, 48k, 56k, 64k]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE FAILED ACTIVE TESTS [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-5. Entering a Trunk-HS Module

TRUNK MODULE TYPE [e3, e3s, hs, sft, swt, pq, t1, t3, t3i, t3s]	hs	hs	hs	hs
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-2042, 26]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE FAILED ACTIVE TESTS [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-6. Entering a Trunk-PQ Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	pq	pq	pq	pq
MODULE ADDRESS				
DOWNLOAD SERVER [controller]				
If <i>DOWNLOAD SERVER</i> is "controller" SOFTWARE VERSION [standard]				
If <i>DOWNLOAD SERVER</i> is not "controller" SOFTWARE VERSION: UPLOAD SERVER [none]				
If <i>UPLOAD SERVER</i> is other than "none" UPLOAD ALWAYS BEFORE DOWNLOAD [yes, no]				
If <i>UPLOAD ALWAYS BEFORE DOWNLOAD</i> is "no" UPLOAD ONLY AFTER FAULT [yes, no]				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
TRAFFIC TYPE [cir, non-cir, both]				
NUMBER OF USER CHANNELS [1-2038, 26]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

FORM A-6. Entering a Trunk-PQ Module (continued)

<p>LINE SPEED [56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M, 1.408M, 1.472M, 1.536M, 1.544M, 2.048M]</p>				
<p><i>If TRAFFIC TYPE is "non-cir" or "both"</i> OPTIMIZATION [low_delay, high_throughput]</p>				
<p><i>If TRAFFIC TYPE is "cir"</i> MAXIMUM AGGREGATE CIR [percentage of line speed, 1%–400%, a value in bps, 1200–X, 100%]</p>				
<p><i>If TRAFFIC TYPE is "both"</i> AGGREGATE INFORMATION RATE FOR NON-CIR CHANNELS [percentage of line speed, 10%–100%, a value in bps, 1200–X, 10%]</p>				
<p><i>If TRAFFIC TYPE is "both"</i> MAXIMUM AGGREGATE CIR [percentage of line speed, 1%–Y%, a value in bps, 1200–X, Z%]</p>				
<p>NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]</p>				
<p>MAXIMUM CONSECUTIVE FAILED ACTIVE TESTS [2-10, 3]</p>				
<p>CALL SCREENING PROFILE ID [up to 8 chars, none]</p>				

FORM A-7. Entering a Trunk-T1 Module

TRUNK MODULE TYPE [sft, swt, 64, dds, hs, pq, t1]	t1	t1	t1	t1
MODULE ADDRESS				
SESSION MAINTENANCE TRUNK* [yes, no]	no	no	no	no
COMMENT [up to 60 chars double-quoted, none]				
GROUP [up to 8 chars]				
NUMBER OF USER CHANNELS [1-2042, 26]				
LINE SPEED [56k, 64k, 128k, 192k, 256k, 320k, 384k, 448k, 512k, 576k, 640k, 704k, 768k, 832k, 896k, 960k, 1.024M, 1.088M, 1.152M, 1.216M, 1.280M, 1.344M, 1.408M, 1.472M, 1.536M, 1.544M, 2.048M]				
NUMBER OF SECONDS BETWEEN TRUNK ACTIVE TESTS [5-256, 180]				
MAXIMUM CONSECUTIVE FAILED ACTIVE TESTS [2-10, 3]				
ENABLE TRUNK MEASUREMENTS FOR THIS TRUNK [yes, no]				
CALL SCREENING PROFILE ID [up to 8 chars, none]				

* Session maintenance configurations are administered through *StarKeeper II* NMS.

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