GDC 058R529-000
Issue 4, July 1996

Installation and Operation

SNMP 553SD-1/IFP
SNMP 553SD-3/IFP
SNMP Managed Fractional T1
Data Service Unit

General DataComm, Inc.

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to CISPR 22, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. The user is cautioned that any changes or modifications not expressly approved by General DataComm void the user's authority to operate the equipment.

This digital apparatus does not exceed Class A limits for radio noise emissions from digital apparatus described in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Warranty

General DataComm warrants that its equipment is free from defects in materials and workmanship. The warranty period is one year from the date of shipment. GDC's sole obligation under its warranty is limited to the repair or replacement of the defective equipment provided it is returned to GDC, transportation prepaid, within a reasonable period. This warranty will not extend to equipment subjected to accident, misuse, or alterations or repair not made by GDC or authorized by GDC in writing. *The foregoing warranty is exclusive and in lieu of all other warranties, express or implied, including but not limited to, warranties of merchantability and fitness for purpose.*

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Errata Sheet
for
SNMP 553SD-1/IFP
SNMP 553SD-3/IFP
SNMP Managed Fractional T1
Data Service Unit
Installation and Operation Manual
058R529-000, Issue 4

Purpose

This addendum covers two topics:

- How to connect a station clock to the DSU for use when that is the selected source of Transmit Timing.
- Conditions that must be met in order to perform a preoperational check on an SNMP 553SD-3 DSU

Station Clock/Cascade Port Connection

Each housing that can hold the SNMP 553SD DSU has an RJ45 jack on its back panel that can serve either of two mutually exclusive functions for the DSU:

- Cascade Port when the DSU is equipped with the optional Cascade Interface card
- Input port for a Station Clock signal when that is the selected method of Transmit Timing for the DSU.

The pin assignments for the cascade/station clock jacks, shown below, are the same for all housings.

Function	Direction	Pin No.
Cascade Receive Data (Ring)	To DSU	4
Cascade Receive Data (Tip)	To DSU	5
Cascade Send Data (Ring)	From DSU	1
Cascade Send Data (Tip)	From DSU	2
Station Clock B	To DSU	3
Station Clock A	To DSU	6
Shield (Frame Ground)	N/A	7
Unused	N/A	8

Preoperational Check

Instructions for testing the unit as a preoperational check appear on page 2-2. The instructions as they appear in the manual are sufficient for the SNMP 553SD-1/IFP model of the DSU.

There is, however, one additional condition to be met when performing the preoperational check on the SNMP 553SD-3/IFP model DSU. Each of the unit's three channels must be configured to use at least one DS0. The test will report failure if there is a channel that does not have assigned bandwidth.

Table of Contents

3 Operation

4 Configuration

5 Tests

Preface

Scope

This manual describes how to install, configure, and operate a General DataComm SNMP 553SD/IFP SNMP Managed Fractional T1 Data Service Unit. It is written for installers, service technicians, and users. It assumes a working knowledge of DTE interfaces, DS-1 and DSX-1 digital telephone interfaces, and the Simple Network Management Protocol (SNMP).

Revision History

This is Issue 4 of the manual. It covers enhancements to the terminal interface, including alarm configuration and new status displays.

Issue 1 covered the basic functionality of the DSU. The initial model supported management communications via PPP/SLIP.

Issue 2 covered the addition of models that support Ethernet or Token Ring LAN connection for SNMP communications, and the addition of down line loading capability in all models.

Issue 3 covered the addition of 3-channel models.

Organization

This manual has five chapters and four appendices. The information is arranged as follows:

- *Chapter 1 - Introduction* describes the product and its features. The chapter includes the Equipment List table.
- *Chapter 2 - Installation* presents directions for connecting the DSU to the T1 digital circuit and to data terminal equipment (DTE). It also describes the standalone and rackmount enclosures that can house the DSU.
- *Chapter 3 - Operation* describes the three ways in which the DSU can be controlled: Intelligent Front Panel (IFP), terminal interface which can be used with the Telnet protocol, and SNMP. The chapter provides instructions for the use of the IFP and the terminal interface. The terminal interface includes the down line loading feature.
- *Chapter 4 - Configuration* describes the DSU operating characteristics that can be set for compatibility with DTE and Telco equipment.
- *Chapter 5- Tests* describes diagnostic features of the DSU that can be commanded by means of the IFP or front panel push-button switches.
- *Appendix A - Technical Characteristics*
- *Appendix B - DTE Interface Signals*

- *Appendix C - Timing Options* describes a variety of transmit timing configurations that can be used with the DSU.
- *Appendix D - Alarm Definitions* lists and defines alarms that the DSU can generate in response to operating conditions.

Document Conventions

Level 1 paragraph headers introduce major topics.

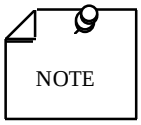
Level 2 paragraph headers introduce subsections of major topics.

Level 3 paragraph headers introduce subsections of secondary topics.

`This typewriter font shows output that is displayed on the screen.`

`This bold font shows specific input that you type at the keyboard.`

`This bold italicized font shows variable input that you type at the keyboard.`



Notes present special instructions, helpful hints or general rules..

Related Publications

The following document has additional information that may be helpful when using this product:

- TEAM 553 Network Manager Operation and Installation GDC 032R101-V110

GDC publication numbers (e.g., *GDC 032R163-000*) are used to track and order technical manuals. Publication numbers use the following format:

GDC NNNRnnn-000 or GDC NNNRnnn-Vnnn

NNN identifies the product family (e.g. APEX)

R	denotes a technical publication
nnn	a number assigned by Technical Publications
000	identifies a hardware product and does not change

Vnnn the software version associated with a product may be updated periodically

The Issue Number on the title page only changes when a hardware manual is revised or when a manual is reprinted for some other reason; it does not automatically change when the software is updated. A new Software Version is always Issue 1. Other specialized publications such as Release Notes or Addenda may be available depending on the product.

Service and Support

General DataComm is committed to providing the service and support needed to install, manage, and maintain your equipment. For information about service programs or for assistance with your support requirements, contact your local Sales Representative or call General DataComm Service at the 24-hour toll free number listed below.

- in the U.S. dial 1-800-243-1030
- outside the U.S. dial 1-203-598-7526

Be ready with the site name and phone number, and a description of the problem. The next available support representative will promptly return your call.

Hands-on training courses are provided by GDC Educational Services. Courses range from basic data communications, modems and multiplexers, to complex network and ATM systems and are taught in Connecticut or at a customer location. To discuss educational services or receive a course schedule, call 1-800-243-1030 and follow the menu instructions.

Safety Instructions

Antistatic Precautions

Electrostatic discharge (ESD) results from the buildup of static electricity and can cause computer components to fail. ESD occurs when a person whose body contains a static buildup touches a computer component.

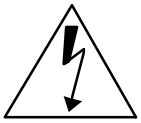
The equipment may contain static-sensitive devices that are easily damaged, so proper handling and grounding are essential. Use ESD precautionary measures when installing parts or cards, and keep the parts and cards in antistatic packaging when not in use. If possible, use antistatic floor pads and workbench pads.

When handling components or setting switch options always use an antistatic wrist strap connected to a grounded equipment frame or chassis. *If a wrist strap is not available, periodically touch an unpainted metal surface on the equipment.* Never use a conductive tool, such as a screwdriver or a paper clip, to set switches.

Safety Guidelines

The following symbols are used in this manual to draw your attention to potential hazards. A Caution indicates a hazard to equipment or data. A warning indicates a hazard to personnel.

Caution statements identify conditions or practices that can result in damage to the equipment or in loss of data.



Warning statements identify conditions or practices that can result in personal injury or loss of life.

Always use caution and common sense. *To reduce the risk of electrical shock, do not operate any equipment with the cover removed.* Repairs must be performed by qualified service personnel only.

- Never install telephone jacks in a wet location unless the jack is designed for that location.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing telephone lines, and never install telephone wiring during an electrical storm.

Regulatory Notices

FCC Part 68 Compliance

Connection of data communications equipment to the public telephone network is regulated by FCC Rules and Regulations. This equipment complies with Part 68 of these regulations which require all of the following:

All connections to the telephone network must be made using standard plugs and telephone company provided jacks or equivalent. Connection of this equipment to party lines and coin telephones is prohibited. A label on the back of the front panel of data communications equipment and on the underside or rear panel of other equipment provides the FCC Registration number and the Ringer Equivalence Number (REN) for the unit. If requested, give this information to the telephone company.

To connect the SNMP 553SD/IFP DSU to the Public Telephone Network you are required to give the following information to the Telephone Company:

FCC Registration Number:	AG6USA-20702-DE-N
FIC (Facility Interface Code):	04DU9-DN, 04DU9-BN, 04DU9-1KN, 04DU9-1SN
SOC (Service Order Code):	6.0Y
Telephone Company jack type:	RJ48C

The telephone company may discontinue your service temporarily if the unit causes harm to the telephone network. If possible, you will be notified of such an action in advance. If advance notice is not practical, you will be notified as soon as possible and will be advised of your right to file a complaint with the FCC. The telephone company may change its communication facilities, equipment, operations and procedures where reasonably required for operation. If so, the telephone company will notify you in writing. You must notify the telephone company before disconnecting equipment from 1.544 Mbit/s digital service. All repairs or modifications to the equipment must be performed by General DataComm. Any other repair or modification by a user voids the FCC registration and the warranty.

Canada DOC Notification

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

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

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

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas. *Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.*

Bundesrepublik Deutschland

Installieren Sie nie die Telefonleitungen wahrend eines Gewitters. Installieren Sie nie die Telefonbuchsen in einem feuchten Raum es sei denn die Buchs ist spezielle für Feuchträume vorgeshen. Berühren sie nie unisoliete Telefonleitungen oder Einrichtungen es sei denn die Leitungen sind vom Telefonnetz getrennt. Vorsicht bei der Installierung oder Änderung von Telefonleitungen. *Achtung*: Es sind keine durch denn Anwender zu wartende Teils im Gerät. Warting darf nur durch qualifizietes Personal erfolgen. Vor Wartung vom Stromnetz trennen.

1 Introduction

Description

General DataComm's SNMP 553SD/IFP SNMP Managed Fractional T1 Data Service Unit (DSU) is a highly efficient means of transmitting and receiving digital data. It provides interface between customer equipment and a digital carrier facility, either T1 or Fractional T1 (FT1), provided by a Telco or other carrier. The SNMP 553SD DSU performs both Data Service Unit (DSU) and Channel Service Unit (CSU) functions. As a DSU it converts one to three channels of customer data to bipolar format for transmission over the T1 network. As a CSU it is responsible for network interfacing and protection.

The SNMP 553SD/IFP DSU provides three means of performing control, configuration, diagnostic and maintenance functions, and of monitoring alarms and status conditions:

- Simple Network Management Protocol (SNMP), communicating with an SNMP network manager through the back panel management channel port. Models available to support local SNMP via PPP/SLIP, Ethernet LAN, or Token Ring LAN. All models support remote SNMP (using a GDC V.34 modem) via PPP/SLIP.
- Intelligent Front Panel (IFP), which provides local control and monitoring by means of a front panel LED display and push buttons
- Terminal Interface, accessible through a front panel jack using a VT100-compatible terminal or through a back panel connector using a computer and the Telnet protocol.

The DSU is available in two models:

- SNMP 553SD-3/IFP DSU with three user data channels
- SNMP 553SD-1/IFP DSU with a single user data channel

The DSU is also available in standalone or rack mount versions. The rack mount unit features GDC’s unique DataComm packaging concept, which allows a variety of data communications products to be mounted in the same high-density shelf. Each 16-slot shelf can hold up to eight two-card devices, such as the SNMP 553SD/IFP DSU, or a mix of single- and two-card devices. In its rackmount version the DSU requires two card slots in order to accommodate its factory-installed Intelligent Front Panel.

The SNMP 553SD/IFP DSU base card is a 10.5-inch by 10.75-inch (267 mm by 273 mm) printed circuit (pc) card. It can operate in a DataComm ac-powered standalone enclosure; in a DS-1, DS-5, or DS-6 Shelf; or in a Universal System Shelf.

The SNMP 553SD/IFP DSU may have one or more daughter cards to support specific functionality. The models that provide an Ethernet LAN or Token Ring LAN interface for SNMP have daughter boards to support those interfaces. Optional EIA-530 interface daughter cards are available to provide that interface in place of the standard ITU-T V.35. An optional cascade interface card can be installed, enabling the DSU to interface a DSX-1 signal from on-site equipment onto the network.

Features

The SNMP 553SD/IFP DSU provides the following features:

- Supports one to three high-speed serial data ports for customer equipment:

  ITU-T V.35-compatible interface is standard

  EIA-530-compatible channel interface card is available as an option (Channel A on the 553SD-1, Channels B and C on the 553SD-3)

- Provides interface to Fractional T1 (FT1) services, giving you the flexibility to utilize only the bandwidth you need, from 56 kbit/s up to the full T1 rate of 1.536 Mbit/s
- Is fully compatible with Simple Network Management Protocol (SNMP), which provides complete software control for centralized configuration and diagnostic testing capabilities
- Operates in conjunction with the GDC TEAM 553 SNMP controller to provide comprehensive, non-interfering network management.
- Supports SNMP commands and responses through the back panel management channel port connector — available in three configurations, to support the following communication modes for SNMP: Point to Point Protocol (PPP), Ethernet LAN, or Token Ring
- Accepts configuration of address(es) and mask(s) appropriate to the supported SNMP communication mode(s):
  - For PPP/SLIP model: two sets of IP addresses and subnet masks; one each for local communications and for remote communications by means of a GDC V.34 modem.
  - For Ethernet LAN model: local IP address and subnet mask, router IP address, and Ethernet type (10Base2, 10BaseT) for the LAN; IP address and subnet mask for remote PPP/SLIP.
  - For Token Ring LAN model: local IP address and subnet mask, router IP address, and Token Ring type (Unshielded Twisted Pair 4 or 16 MHz, Shielded Twisted Pair 4 or 16 MHz) for the LAN; IP address and subnet mask for remote PPP/SLIP.
- Includes Intelligent Front Panel (IFP) that permits convenient local access to configuration and diagnostic functions.
- Provides limited management capabilities through a terminal interface accessible in two ways:

  through the front panel NMC jack, using a VT100-compatible terminal, or

  through the back panel management channel port connector, using a computer running the Telnet protocol and the same local or remote IP address access that supports SNMP

- Permits configuration of network transmitter timing from a variety of sources:

  Slave timing, recovered from received network data

  Cascade timing, recovered from the signal at the Cascade port

  Station timing, provided by a station clock

  Channel (DTE) timing

  Internal clock

- Provides configurable Auto Framing option that automatically adapts the DSU to Extended Superframe Format (ESF) or D4 Superframe Format on the network side
- Supports an optional T1 Cascade Port that provides a DSX-1 interface for a channelized T1-rate signal.
- Allows the linking of FT1 services with traditional Dataphone Digital Service (DDS) and generic digital services
- Supports both Alternate Mark Inversion (AMI) and Bipolar with 8 Zero Substitution (B8ZS) line codes, and allows a variety of options for ones density in the data stream.
- Supports both AT&T TR-54016 and Bellcore TR-TSY-000194 (ANSI) procedures for collection and monitoring of network TABS Maintenance Messages or Performance Report Messages provided by the Central Office, with time-stamped 24-Hour Performance Report statistics stored in non-volatile memory.
- Provides independent user and network register sets for TABS performance data — the user set is unaffected when the Central Office clears the network set.
- Provides T1-, DS0-, and channel-level diagnostics for extensive diagnostic capabilities.

Fractional T1 Capabilities

The DS1 signal on a T1 line consists of 24 DS0 channels. The SNMP 553SD/IFP DSU can map user data into either consecutive or alternate DS0s to provide rates from 56 kbit/s (1 DS0) to 1.536 Mbit/s (24 DS0s at 64 Kbps each). Rates that use less than the full 1.536 Mbit/s are referred to as Fractional T1 (FT1).

The output rates available from the DSU are multiples of 56 and 64 Kbps because each of the 24 DS0s that make up the T1 line provides a data rate of 56 or 64 kbit/s depending on the form of line coding being used. The DSU can start a group of DS0s on any DS0 in the T1 line.

The full T1 bandwidth is available when consecutive DS0s are used, but restrictions on ones density may limit the actual usable bandwidth. Use of consecutive DS0s for N x 64 kbit/s requires either B8ZS coding on the network line or provisioning in the DTE to guarantee mark density requirements.

The user of alternate DS0s reduces the T1 bandwidth available for user data by one-half, but eliminates restrictions on the content of user data. The DSU maintains minimum ones density at 50% by filling the unused DS0s with ones when it is configured to use alternate DS0s.

DTE Interface

The SNMP 553SD-1/IFP DSU provides one DTE interface port for connection to synchronous serial customer equipment, Channel A. The SNMP 553SD-3/IFP DSU provides two additional DTE interface ports, Channels B and C. Examples of customer equipment are Front End Processors (FEPs), Local Area Network (LAN) bridges, video codecs, CAD/CAM workstations, and Group 4 facsimile equipment.

The standard interface for the DTE port of the SNMP 553SD/IFP DSU is IUT-T V.35 compatible. Optional EIA-530 compatible interface cards are available to replace the

standard V.35 channel interfaces (Channel A on the 553SD-1 and Channels B and C on the 553SD-3).

Cascade Interface

The SNMP 553SD/IFP DSU can be equipped with an optional DSX-1 cascade interface. The cascade interface enables the DSU to accept a T1 signal as input.

Diagnostics

The SNMP 553SD/IFP DSU provides loopback tests for checking the operation of the DSU and the link between DSUs. Loopbacks can be run with or without self test. Self test, when employed, activates the built-in test pattern generator/checker in the DSU. When self test is not used, loopback testing requires an external test signal, supplied by either DTE or test equipment. Loopbacks can be commanded by SNMP, the IFP, or the Telnet terminal interface.

The DSU supports a variety of alarms to notify the operator of conditions that occur in the unit or in the network. Individual alarms can be masked by means of SNMP. Some alarms can be assigned threshold values that must be met or exceeded before the alarm occurs.

Network Management

The SNMP 553SD/IFP DSU supports configuration, diagnostics, alarm monitoring, statistics, and maintenance functions performed by means of the Intelligent Front Panel, SNMP MIBs, or a terminal interface. The terminal interface is accessible through the back panel management channel port using a computer that runs the Telnet application or through the front panel jack using a VT100-compatible terminal. *Chapter 3, Operation*, describes the IFP and terminal interface screens.

The SNMP 553SD/IFP DSU supports the industry standard MIBs RFC 1213 (MIB II), RFC 1155, and RFC 1406; as well as the GDC proprietary MIBs SNMP553-MIB, GDC DSX1-MIB, GDC DSU-MIB, and GDC CMN-MIB.

Table 1-1 Equipment List

Description	GDC Part No.
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A139-401
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface	058A139-411
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A139-402
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface, with cascade port	058A139-412
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface	058M139-401
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, EIA-530 channel interface	058M139-411
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface, with cascade port	058M139-402
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, EIA-530 channel interface, with cascade port	058M139-412
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface (replaces 058A139-401)	058A139-701
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface (replaces 058A139-411)	058A139-711
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port (replaces 058A139-402)	058A139-702
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface, with cascade port (replaces 058A139-412)	058A139-712
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface (replaces 058M139-401)	058M139-701
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, EIA-530 channel interface (replaces 058M139-411)	058M139-711
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface, with cascade port (replaces 058M139-402)	058M139-702
GDC SNMP 553SD-1/IFP DSU with all management via PPP/SLIP port, rackmount pc card, EIA-530 channel interface, with cascade port (replaces 058M139-412)	058M139-712
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A139-501
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface	058A139-511
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A139-502
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface, with cascade port	058A139-512

(Continued on next page)

Table 1-1 Equipment List (Continued)

Description	GDC Part No.
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, rackmount pc card, V.35 channel interface	058M139-501
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, rackmount pc card, EIA-530 channel interface	058M139-511
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, rackmount pc card, V.35 channel interface, with cascade port	058M139-502
GDC SNMP 553SD-1/IFP DSU with local management via Ethernet LAN, rackmount pc card, EIA-530 channel interface, with cascade port	058M139-512
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A139-601
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface	058A139-611
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A139-602
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, EIA-530 channel interface, with cascade port	058A139-612
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, rackmount pc card, V.35 channel interface	058M139-601
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, rackmount pc card, EIA-530 channel interface	058M139-611
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, rackmount pc card, V.35 channel interface, with cascade port	058M139-602
GDC SNMP 553SD-1/IFP DSU with local management via Token Ring LAN, rackmount pc card, EIA-530 channel interface, with cascade port	058M139-612
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A140-401
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces	058A140-421
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A140-402
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces, with cascade port	058A140-422
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface	058M140-401
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, rackmount pc card, two EIA-530 channel interfaces	058M140-421
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, rackmount pc card, V.35 channel interface, with cascade port	058M140-402
GDC SNMP 553SD-3/IFP DSU with all management via PPP/SLIP port, rackmount pc card, two EIA-530 channel interfaces, with cascade port	058M140-422

(Continued on next page)

Table 1-1 Equipment List (Continued)

Description	GDC Part No.
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A140-501
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces	058A140-521
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A140-502
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces, with cascade port	058A140-522
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, rackmount pc card, V.35 channel interface	058M140-501
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, rackmount pc card, two EIA-530 channel interfaces	058M140-521
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, rackmount pc card, V.35 channel interface, with cascade port	058M140-502
GDC SNMP 553SD-3/IFP DSU with local management via Ethernet LAN, rackmount pc card, two EIA-530 channel interfaces, with cascade port	058M140-522
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface	058A140-601
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces	058A140-621
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, V.35 channel interface, with cascade port	058A140-602
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, standalone enclosure (model DE-7 base), 117 V ac, two EIA-530 channel interfaces, with cascade port	058A140-622
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, rackmount pc card, V.35 channel interface	058M140-601
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, rackmount pc card, two EIA-530 channel interfaces	058M140-621
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, rackmount pc card, V.35 channel interface, with cascade port	058M140-602
GDC SNMP 553SD-3/IFP DSU with local management via Token Ring LAN, rackmount pc card, two EIA-530 channel interfaces, with cascade port	058M140-622
Optional Mounting Enclosures and Shelves	
DataComm FourPak Enclosure model DFP-11, standalone, 117 V ac	010B115-001
DataComm Shelf, rackmount, Model DS-1, 117 V ac	010B015-001
DataComm Shelf, rackmount, Model DS-5R, dc-powered with redundant power supplies	010M011-001
DataComm Shelf, rackmount, Model DS-5R, dc-powered with redundant power supplies	010M011-001
DataComm Shelf, rackmount, Model DS-5NR, dc-powered with non-redundant power supply	010M011-002
DataComm Shelf, rackmount, Model DS-6R, dc-powered with redundant power supplies, with Telco, VF and DTE cables	010M047-001

(Continued on next page)

Table 1-1 Equipment List (Continued)

Description	GDC Part No.
Optional Mounting Enclosures and Shelves (Continued)	
DataComm Shelf, rackmount, Model DS-6NR, dc-powered with non-redundant power supplies, with Telco, VF and DTE cables	010M047-002
DataComm Shelf, rackmount, Model DS-6R-1, dc-powered with redundant power supplies, with Telco and VF cables only	010M047-003
DataComm Shelf, rackmount, Model DS-6NR-1, dc-powered with non-redundant power supplies, with Telco and DTE cables only	010M047-004
Universal System Shelf, rackmount, Model USS-1D, 117 V ac	010B080-001
Universal System Shelf, rackmount, Model USS-1-DC/R, dc-powered with redundant power supplies	010M040-002
Universal System Shelf, rackmount, Model USS-1-DC/NR, dc-powered with non-redundant power supply	010M040-001
Domestic DataComm Backplane (for Universal System Shelf installation)	048B015-001
Optional Equipment	
Supervisory terminal (customer-provided)	N/A
GDC V. F 28.8 Modem for DDC (DataComm version)	060M014-001
Cables	
Interface cable, ITU-T V.35 34-pin male-to-male (DSU channel port to customer equipment) (5- to 50-foot lengths)	027H570-XXX
Adapter cable, 34-pin female to 25-pin female (use with cable P/N 027H570-XXX for an ITU-T V.35 channel port in any housing except a DataComm Enclosure; included with models with a V.35 interface)	027H598-001
Adapter cable, 34-pin female to 25-pin male (DSU channel port C to customer equipment with a female connector), 6-inch length	027H599-X06
Interface cable, EIA-232-D/EIA-530 male to 25-pin male (DSU channel port to customer equipment with a female connector) (6-, 26- and 43-inch, and 2- to 100-foot lengths)	028H502-XXX*
Interface cable, EIA-232-D/EIA-530 25-pin female to 25-pin male (DSU channel port to customer equipment with a male connector) (26- and 43-inch, and 2- to 100-foot lengths)	027H511-XXX*
Interface cable, EIA-449 37-pin male to 37-pin male (use with adapter P/N 027H501-001 and optional EIA-530 interface) (1- to 50-foot lengths)	027H603-XXX*
Adapter cable, EIA 449 37-pin female to 25-pin male (use with cable P/N 027H603 and optional EIA-530 interface)	027H501-001
Interface cable, EIA-449 37-pin male to 25-pin male (use with optional EIA-530 interface) (1- to 50-foot lengths)	023H603-XXX*
Interface cable, 25-pin male to 25-pin male (EIA 422 multiplexer aggregate to optional EIA-530 interface) (1- to 50-foot lengths)	027H531-XXX*
Grounding jumper for customer equipment cables (required for a DataComm shelf housing only; one included with each rackmount SNMP 553SD-1 pc card)	024H005-X03
Interface cable, RJ48C plug-to-plug (DSU network port to the T1 line for any housing except a DataComm Shelf) (10- to 50-foot lengths; 10-foot length included with standalone enclosure models)	022H024-XXX*

(Continued on next page)

Table 1-1 Equipment List (Continued)

Description	GDC Part No.
Cables (Continued)	
Interface cable, RJ48C plug-to-15-pin male (DSU network port to the T1 line: a — any housing except a DataComm Shelf, b — Canadian installation only; or optional cascade port to DTE) (10- to 50-foot lengths)	022H022-XXX*
Interface cable, RJ48C plug to 15-pin female (DSU network port to the T1 line, for Canadian installation only) (10- to 125-foot lengths)	022H020-XXX*
Interface cable, RJ48C plug-to-plug (DSU network port to T1 network interface or cascade to DTE — for DataComm Shelf housing only) (10- to 50-foot lengths)	022H026-XXX*
Interface cable, RJ48C plug-to-terminal lugs (DSU network port to the T1 line for a DataComm Shelf housing only) (10- to 50-foot lengths)	022H025-XXX*
Adapter, RJ48C plug-to-jack (DSU network port to T1 network interface — for DataComm Shelf housing only)	029H203-001
Interface cable, RJ48C plug to 25-pin male (optional Cascade port to multiplexer/DTE, any housing except a DataComm Shelf) (10- to 50-foot lengths)	027H218-XXX*
Interface cable, EIA-530 25-pin male to 25-pin male (DCE-to-DCE crossover cable)	027H527-XXX*
Interface cable, V.35 34-pin male to 34-pin male (DCE-to-DCE crossover cable)	027H571-XXX*
Adapter, local DTE 25-pin female connector to 8-pin modular jack	209-036-011
Adapter, V.34 modem 25-pin male connector to 8-pin modular jack	029H210-001
Local PPP/SLIP Adapter, 25-pin female connector to dual 8-pin modular jacks	209-036-012
Local Ethernet 10BT Adapter, 25-pin female connector to dual 8-pin modular jacks	209-036-016
Local Ethernet 10B2 Adapter, 25-pin female connector to 1 coax and 1 8-pin modular jack	058P159-001
Local Token Ring UTP Adapter, 25-pin female connector to dual 8-pin modular jacks	209-036-017
Local Token Ring STP Adapter, 25-pin female connector to dual 8-pin modular jacks	209-036-018
Token Ring STP Cable, 25-pin male to 8-pin modular plug, shielded	027H262-X04
Token Ring STP Cable, 9-pin female to 8-pin modular plug, shielded	027H265-X04
Adapter, local DCE 25-pin male connector to 8-pin modular jack	209-036-010
Adapter, local DTE 25-pin male connector to 8-pin modular jack	209-036-014
Front panel access test jack patch cable (male-to-male) (24- and 60-inch lengths)	830-005-XXX*
Front panel access test jack patch cable Bantam-to-WECO 310 (4 feet)	830-021-S001
Bantam-to-WECO 310 Adapter Plug	209-026-S001
X-bus cable for Universal System Shelf	065H001-001A
Applicable Instruction Manuals	
Instruction Manual for 10-1/2 Inch DataComm Shelf (Model DS-1)	010R310-000
Instruction Manual for DataComm 10 1/2-Inch DC-to-DC Shelf Model DS-5	010R340-000
Instruction Manual for DataComm 10 1/2-Inch DC-to-DC Shelf Model DS-6	010R341-000
Instruction Manual for Universal System Shelf Models USS-1D, -1E, -1J, -1U, -1H	010R380-000
Instruction Manual for Universal System Shelf DC-to-DC Models USS-1-DC/NR, -DC/R	010R385-000
TEAM 553 Network Manager	058R696-V111
* XXX represents three digits which indicate cable length in the actual part number.	

2 Installation

Overview

This chapter describes the installation of the SNMP 553SD/IFP DSU.

The SNMP 553SD/IFP DSU is shipped pre-assembled, tested, and ready to use. The normal procedure after unpacking the unit is to insert it in its intended shelf slot or enclosure (or connect it to ac power in the case of the DE-7 standalone) and perform the Preoperational Check described in this chapter. When the test is successfully completed, disconnect the DSU from power and proceed to make cable connections.

The SNMP 553SD/IFP DSU should be installed in a ventilated area where the ambient temperature does not exceed 122^{o} F (50^{o} C). Maximum ambient temperature for the DSU when equipped with the optional EIA-530 interface is 104^{o} F (40^{o} C). Do not install the DSU above other equipment that generates large amounts of heat (e.g., power supplies).

You can mount the SNMP 553SD/IFP DSU in a variety of housings. The following pages contain brief descriptions and specific instructions for installing the SNMP 553SD/IFP DSU in the different housings. For general installation instructions concerning the housings themselves, refer to the appropriate instruction manual for the specific housing.

Unpacking and Handling

The SNMP 553SD/IFP DSU is shipped in packing material that is enclosed in a corrugated box. Inspect the SNMP 553SD/IFP DSU when you receive it. If you observe any damage, notify the shipper immediately.

Do not discard the box and packing material. Save them for use if it is ever necessary to reship the SNMP 553SD/IFP DSU.

Primary Power

The outlet that provides ac power, where applicable, should not be under switch control. The SNMP 553SD/IFP DSU should be powered by the same ac source as the customer equipment connected to it. Use of the same ac source prevents the possibility of large circulating currents caused by differences in ground potential. If you cannot be sure that the customer equipment is powered by the same ac source as the DSU, verify that the potential difference between the grounding circuits of their respective outlets is less than 0.25 V rms.

*This unit incorporates an internal fusible link, FL1, on the base pc card (*illustrated in Figure 2-1). *The fusible link may be opened if the ground potential between the unit and peripheral equipment exceeds 0.25 V rms. Do not apply power to the unit until all connections to the peripheral equipment have been made. If the fusible link is opened, return the unit for repair.*

You should initially connect the DSU to power (see instructions below for your specific housing) and perform the preoperational check as described below. Once that is completed, disconnect the unit from power while you make the DTE, network, and management channel connections.

Preoperational Check

You should perform a preoperational check on the SNMP 553SD/IFP DSU before you connect it to the network or customer equipment, and *before you change any factory-set options*. Use the Internal Self Test procedure that appears below to verify normal operation. Make sure that the options are set as shown in *Figure 2-1*, then perform the test before you connect the SNMP 553SD/IFP DSU to anything other than ac power.

The DSU should complete this test with no errors detected. Any other result constitutes unacceptable performance. If the SNMP 553SD/IFP DSU does not check out properly, replace it with a spare, if available, and repeat the test. Do not attempt to repair the SNMP 553SD/IFP DSU. For assistance, contact General DataComm Service (refer to *Service and Support* in the *Preface*).

If the SNMP 553SD/IFP DSU passes the test, but subsequently fails to perform in data communications operation, it may not be at fault; some error may have been made in the installation or option selection, or there may be other faulty devices or connections. Recheck the connections and option selections, and if necessary perform the *Fault Isolation Procedure* in *Chapter 5* to isolate the fault. Also verify that the customer equipment and remote DSU are compatible (that is, operating at the same rate).

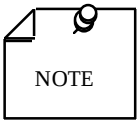
Preoperational check procedure:

1. Connect the DSU to power if it is housed in an enclosure, or insert in its slot if it is rack mounted. Wait until the IFP screen displays the product name.
2. Press the SEL key once, and the NXT key twice. The IFP displays `DIAGNOSTICS`.
3. Press the SEL key. The IFP displays `DIAGNOSTICS: INT SELF TEST`.
4, Press the SEL key. The IFP displays `TEST LENGTH: 30 SECONDS`.
5. Press the SEL key. The IFP displays `TEST TYPE: UNIT`.
6. Press the SEL key. The IFP displays `DATA PATTERN: 511`.
7. Press the SEL key. The IFP screen briefly displays `INITIATING TEST`. It then displays `SELFTEST TIME LEFT:` and a countdown timer until the test times out.
8. The `TEST RESULTS:` screen displays results at the end of the Test Length interval (normally, the screen displays `NO ERRORS`).
9. Press the SEL key three times so that the IFP again displays the product name.
10. Disconnect power and, if the DSU has performed the test successfully, proceed with the installation.

Chapter 5, Tests, describes the Internal Self Test in greater detail.

Option Selection

Most options on the SNMP 553SD/IFP DSU are soft options controlled through the IFP, an SNMP controller, or the terminal interface. Options adapt the DSU to a variety of configurations, as well as enabling and disabling certain features and tests. The DSU stores option selections in non-volatile memory. *Chapter 4, Configuration*, lists and describes the soft-configurable options in the DSU. Consult it before you select any options, to determine which options should be selected for your application.



If the firmware is ever changed on the SNMP 553SD IFP DSU, the EEPROM that contains the configuration for the unit is automatically erased and the unit has to be reconfigured.

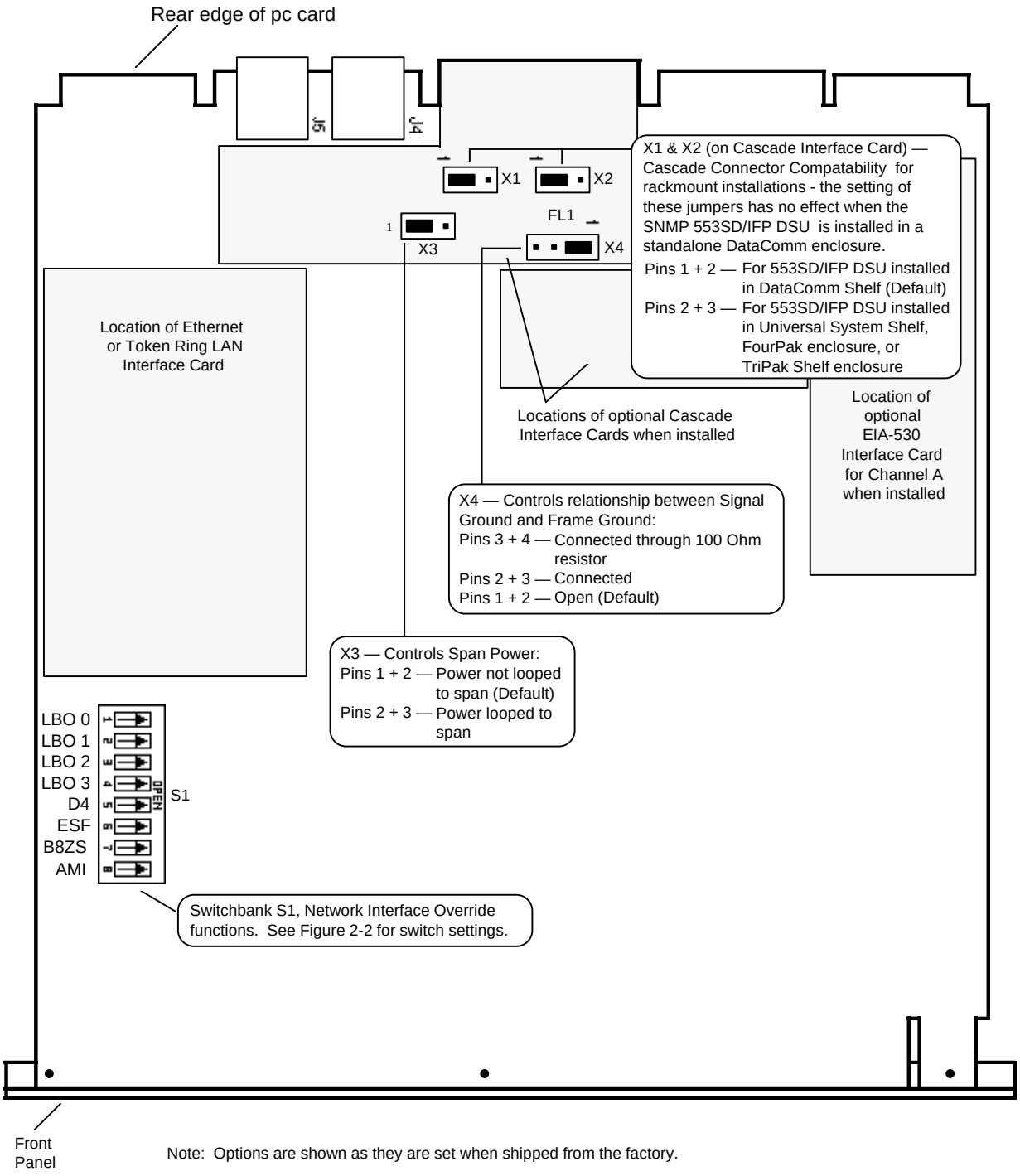


Figure 2-1 SNMP 553SD/IFP Base PC Card, with Option Settings

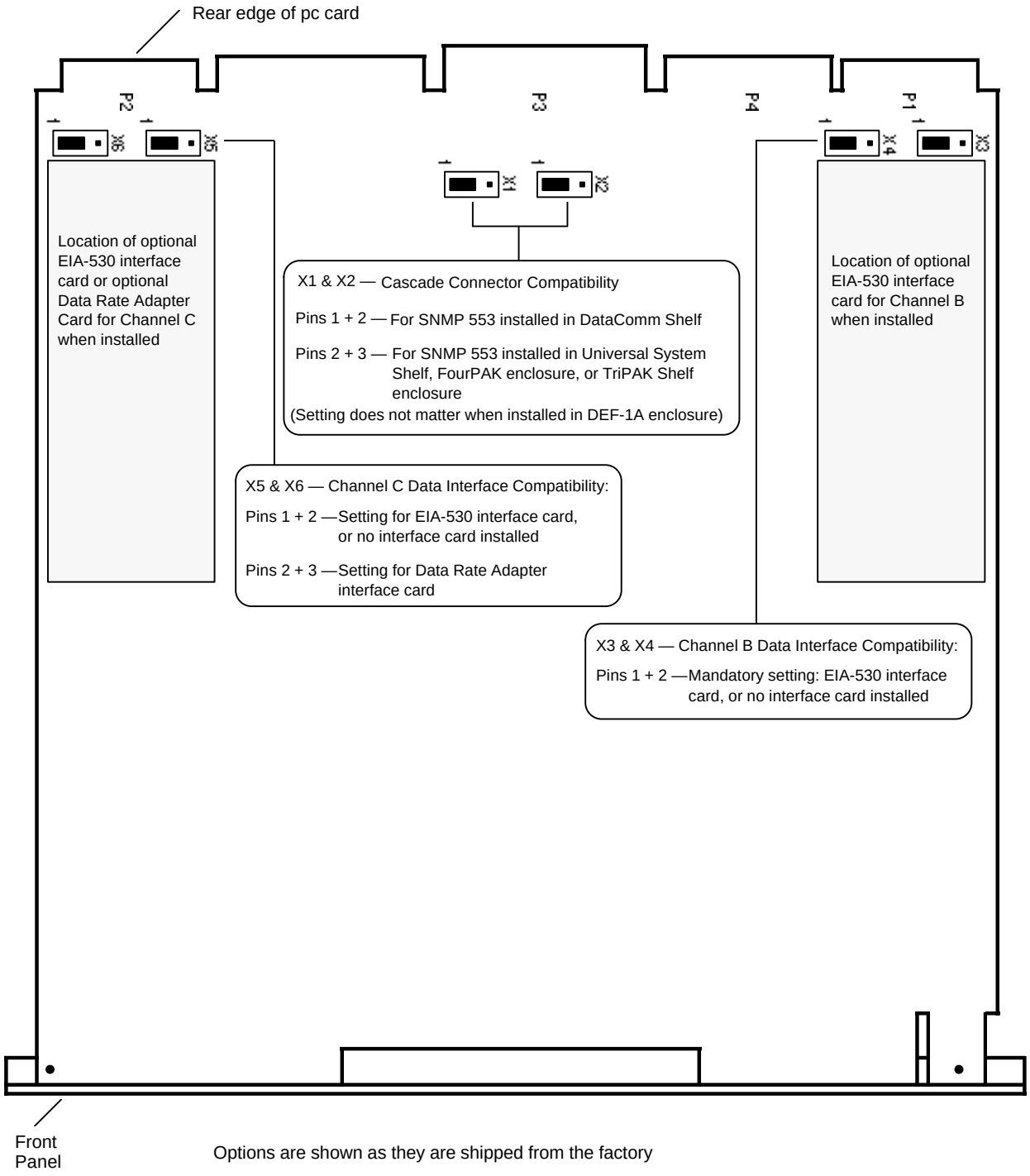


Figure 2-2 SNMP 553SD-3/IFP 2-channel Interface Extender PC Card, with Option Settings

Network Interface Override

In some instances previous network interface configuration (or factory defaults) of a remote unit may prevent synchronization. You can overcome that situation by using the Network Interface Override (S1) switch bank on the DSU base card to option the network interface. *Figure 2-3* includes the option settings for switch bank S1. S1 settings override the non-volatile memory in the DSU, which stores soft-configured option settings.

Network Interface Override optioning with switch bank S1 is a temporary measure to enable initial communication. Once the DSU is synchronized to the network and central site-to-remote site communications are established, the S1 DIP switches should all be turned Off.

*During normal operation the Network Interface Override options **must** be OFF. Any enabled option may disrupt service and diagnostic communication. The S1 options override the internal non-volatile memory for as long as they are enabled.*

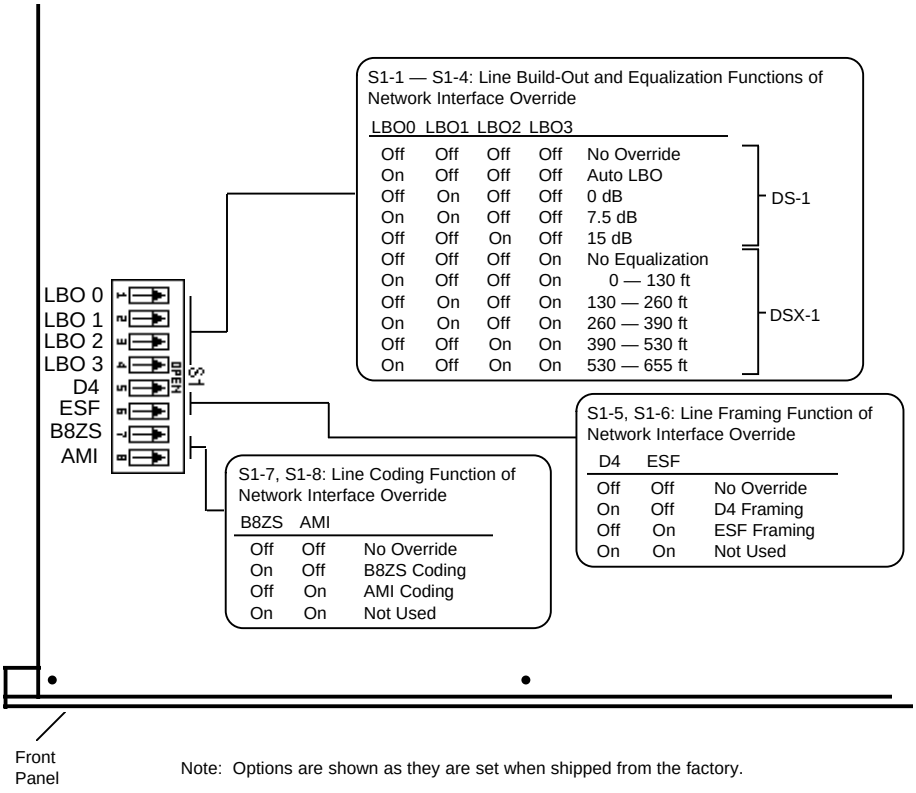


Figure 2-3 Network Interface Override Switch Settings, Switch Bank S1

Channel Port Connection

The SNMP 553SD-1/IFP DSU provides one data channel port; the SNMP 553SD-3/IFP DSU provides three. In the standard configuration, the ports are compatible with IUT-T V.35. An EIA-530 compatible port is available as an option. The EIA-530 interface, through the use of adapter cables, can also support connection of EIA-422 or EIA-449 data terminal equipment.

Channel port options are provided on small pc cards that are mounted on the principle pc cards of the DSU. The option cards are not present unless the DSU was ordered with the optional interface. An optional interface, when present, can be deselected (restoring the port to V.35 operation) by repositioning the option card.

NOTE

A. On the base pc card, the optional EIA-530 interface card for Channel A attaches to connectors XA3P2 and XA3P3. On the 2-channel extender pc card of an SNMP 553D-3/IFP DSU, the optional EIA-530 interface card for Channel B attaches to connectors XA7P2 and XA7P3, and the optional EIA-530 interface card or Data Rate Adapter card for Channel C attaches to connectors XA8P2 and XA8P3.

B. Figure 2-4 *illustrates enable and disable positions for the optional cards, using an EIA-530 card as the example. When there is no optional card, shorting jumpers (PN 208-011-716) must be installed on the connectors as described in the figure.*

C. The channel port option card for Channel A is physically inaccessible on an SNMP 553D-3/IFP DSU. Therefore Channel A of the three-channel DSU cannot be field-converted from EIA-530 to V.35 operation.

Unless otherwise noted, the channel port interface is a 25-pin female subminiature D (DB25S) connector located on the rear panel. Refer to *Table 1-1* and *Figure 2-5* for the appropriate interface cable. Refer to *Appendix B* for interface pin/signal assignments.

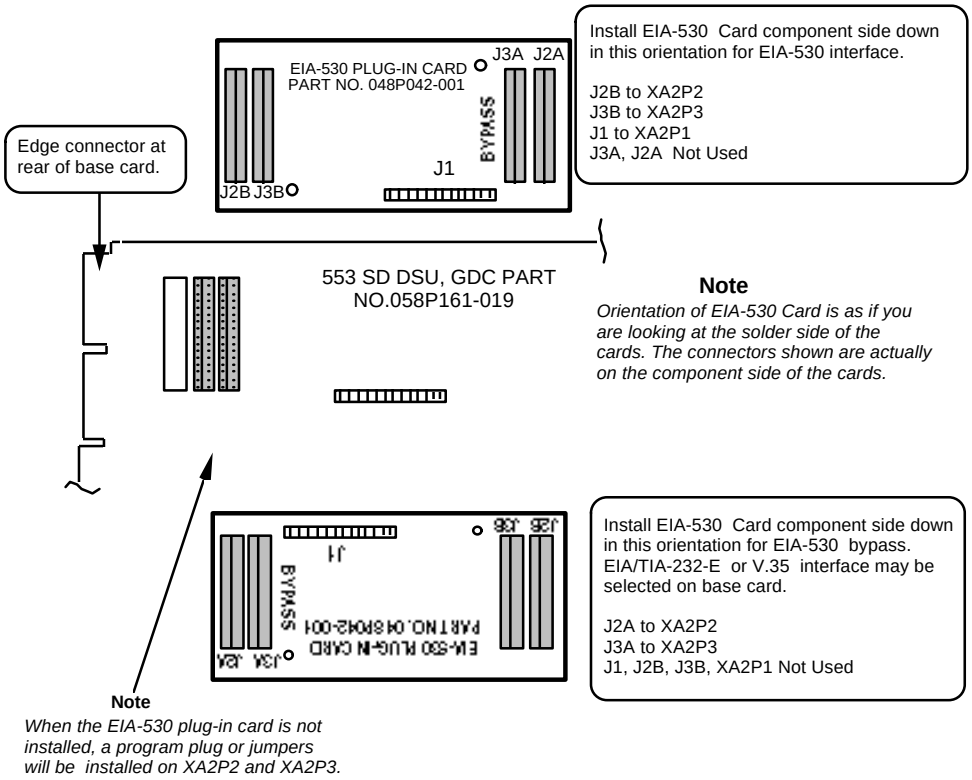
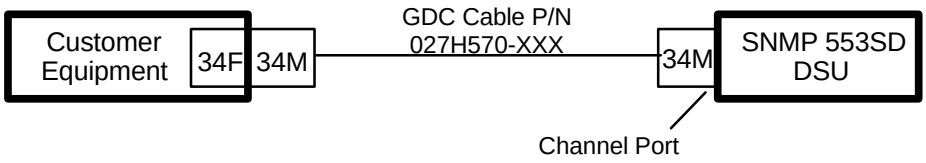
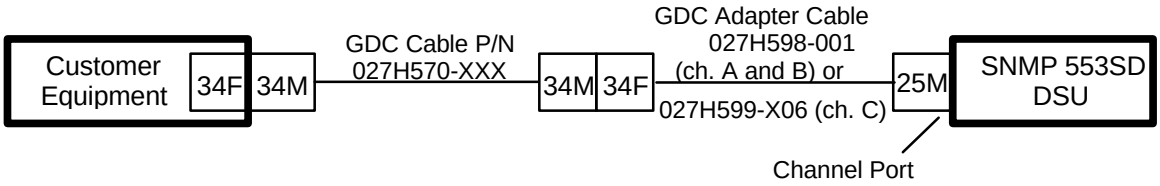


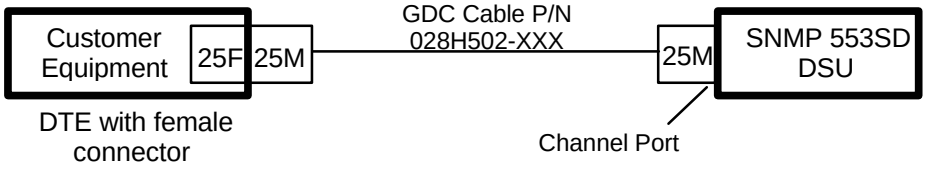
Figure 2-4 Channel Port Option Card Installation

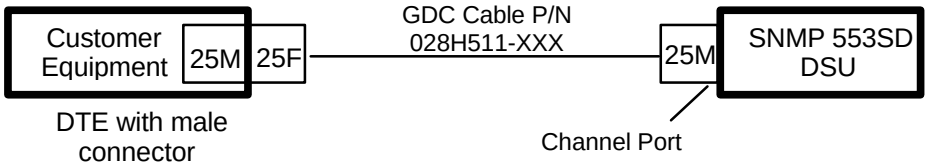


A. DataComm Enclosure Model DE-7 with IUT-T V.35 Interface

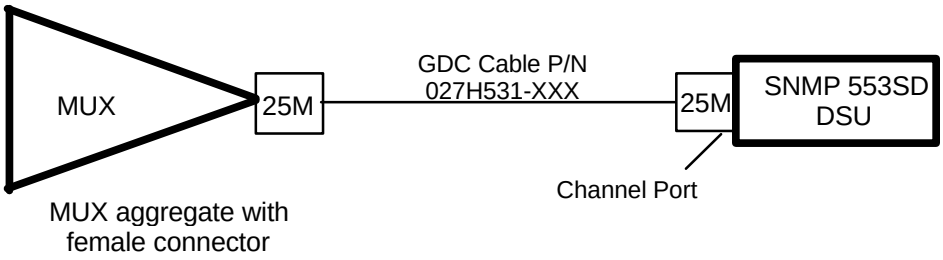


B. All other housings with IUT-T V.35 Interface

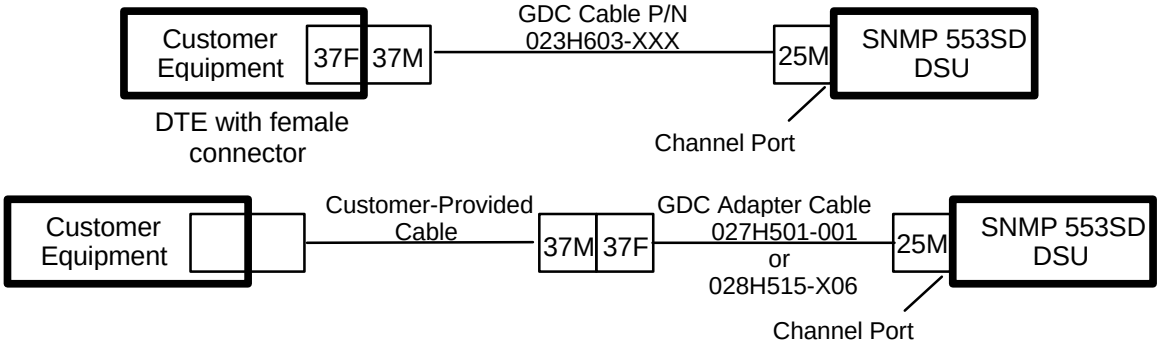




C. DTE and DSU both with EIA-530 Interface (all housings)



D. DTE with EIA-422 Interface to DSU with EIA-530 Interface (all housings)



E. DTE with EIA-449 Interface to DSU with EIA-530 Interface (all housings)

Figure 2-5 Channel Port Cables

Network Cables

Unless otherwise noted, the network port interface through which the SNMP 553SD/IFP DSU connects to the T1 line is an RJ48C jack located on the rear panel. Refer to *Table 1-1* for cable descriptions and part numbers. *Figure 2-6* illustrates the appropriate interface cables.

NOTE

The Telco may continuously monitor the T1 link and the equipment connected to it. Notify the Telco before connecting the SNMP 553SD/IFP DSU to the network, or disconnecting it.

Pin-outs for the network end of the network interface cables are listed below:

Function	Direction	027H242-X04 022H024-XXX Pin No.	022H025-XXX 022H021-XXX Wire color
Receive Data (Ring)	To DSU	1	ORN/WHT
Receive Data (Tip)	To DSU	2	WHT/ORN
Send Data (Ring)	From DSU	4	BLU/WHT
Send Data (Tip)	From DSU	5	WHT/BLU
Shield (Frame Gnd.)	N/A	7	Drain

Note: The remaining leads are not used.

A. *If the Auto Framing option is to be used, enable it at only one of the two DSUs that make up a link.*

B. *If you connect two DSUs back-to-back (direct cable connection) and automatic Line Build-Out is to be used, enable it in only one of the DSUs.*

NOTE

A. *This installation procedure must be followed for compliance with FCC Part 15, Subpart J, Class A requirements.*

B. *For Canadian installations only, a special cable is required for the network port connection. Use GDC cable P/N 022H020-XXX (RJ48C plug to 15-pin female) to connect the network port to the T1 line.*

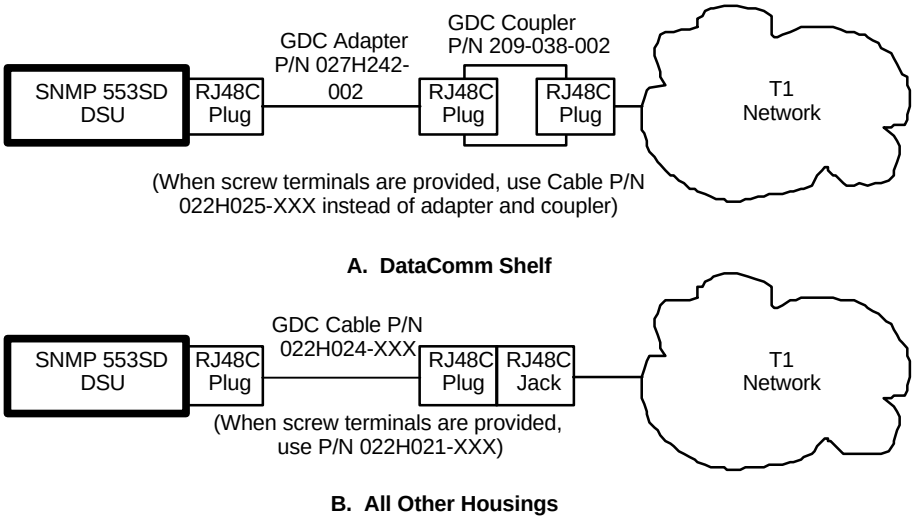


Figure 2-6 Network Cables

Cascade Port (DSX-1) Connections

When the optional DSX-1 cascade port is present its interface is an RJ45 jack located on the rear panel.

NOTE

A. You can cascade a maximum of three SNMP 553SD/IFP DSUs.

B. The maximum line length supported by the cascade port is 655 feet. The Pre-Equalization option matches the SNMP 553SD/IFP DSU to the cascade port line length.

C. You must disable Inband Loopback Code Detection in each SNMP 553SD/IFP DSU that is connected to the cascade port off another SNMP 553SD/IFP DSU.

Standalone Enclosure Cover Removal

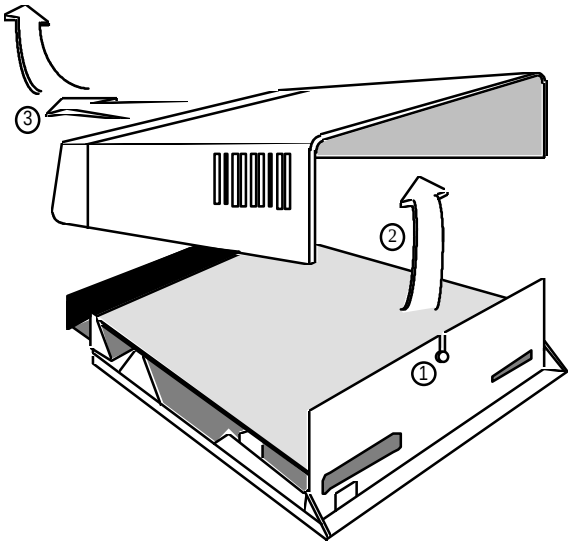
The following instructions apply for both the DataComm enclosure and the FourPak enclosure:

1. Disconnect ac power by pulling the plug from the wall receptacle.
2. Disconnect telephone line connections.

Disconnect power supply (or cable) and communications line (T1 line) connections before removing the enclosure's cover.

3. Remove the cover, as shown in *Figure 2-7*.
4. Disconnect the power supply connector from J7, which is mounted at the rear center of the card.

When reinstalling the pc cards, reinstall the power supply connector at J7 before you replace the plug in the wall receptacle.



Caution:
Disconnect power cable and phone connections before removing cover.

① With front of unit facing left, turn screw to release cover.

② Lift right end of cover upward. (for dual-card products, spread out the sides of the cover to clear the upper card.)

③ Slide cover to left with an upward motion.

When reinstalling cover, top edge of rear panel must sit between the two ridges on underside of cover.

Figure 2-7 DataComm Enclosure Cover Removal Procedure

Standalone DataComm Enclosure (Models DE-7 and DEF-1A)

A standalone DataComm Enclosure can house one SNMP 553SD/IFP DSU. Enclosure Model DE-7 is used for the SNMP 553SD-1/IFP DSU and enclosure Model DEF-1A is used for the SNMP 553SD-3/IFP DSU. The back panels of the enclosures are shown in *Figures 2-8 and 2-9*.

Channel Port Connection

Connect the customer equipment to Channel A of the SNMP 553SD/IFP DSU by means of the connector labeled Business Equip, as shown in *Figure 2-8*. The channel port interface on DataComm Enclosure Model DE-7 is a 34-pin, female V.35 connector or a 25-pin female, subminiature D connector (for the optional EIA-530 interface), depending on port configuration.

Connect customer equipment to Channel A of the SNP 553SD-3/IFP DSU by means of the connector labeled Business Equip J3, as shown in *Figure 2-10*. Connect Channel B to `Business Equip J5`, and connect Channel C to `Bus Equip/Aux J6`. The channel port interfaces on DataComm Enclosure Model DEF-1A can be a mix of 34-pin, female V.35 connectors and 25-pin female, subminiature-D connectors (for the optional EIA-530 interface), depending on port configuration.

Network Connection

Connect the network to the SNMP 553SD/IFP DSU by means of the jack labeled **J1**, as shown in *Figure 2-8*. Use either GDC cable P/N 022H024-XXX (RJ48C plug-to-plug) or 022H021-XXX (RJ48C plug-to-terminal lugs). The plug-to-plug cable is labeled NETWORK and DSU to indicate where each end is used.

Management Channel Connection

Connect the management channel to the SNMP 553SD/IFP DSU by means of the 25-pin, female, subminiature-D connector labeled Auxiliary, as shown in *Figure 2-8*.

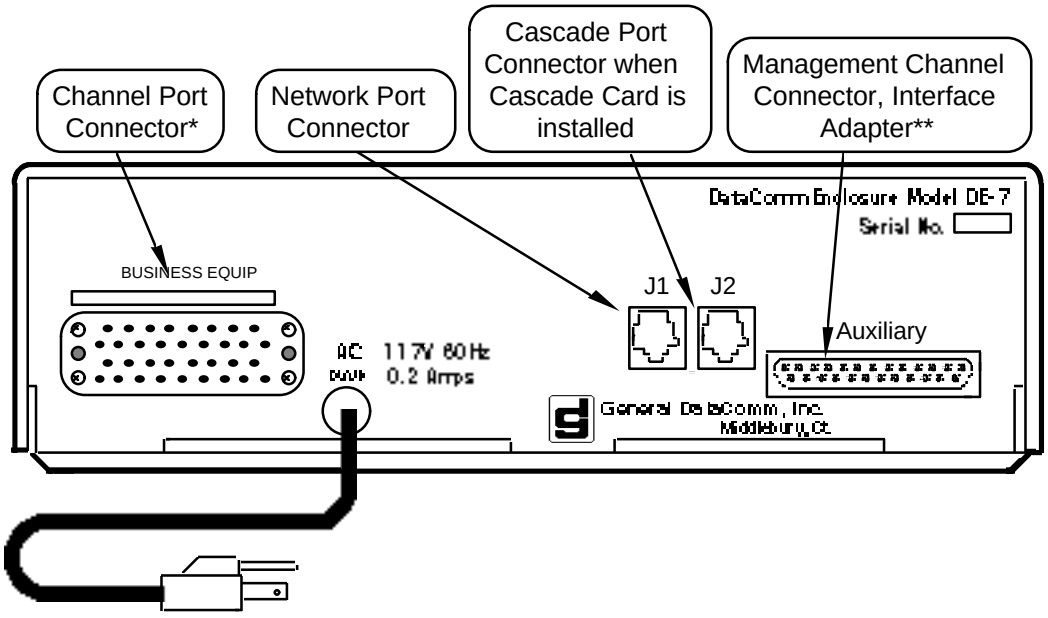
The cables and adapters for making this connection are described below, under the heading Management Channel Cables and Adapters.

DSX-1 Cascade Port Connection

If the optional cascade port is installed, connect the customer cascade equipment to the jack labeled J2. See *Figure 2-8*.

Power Connection

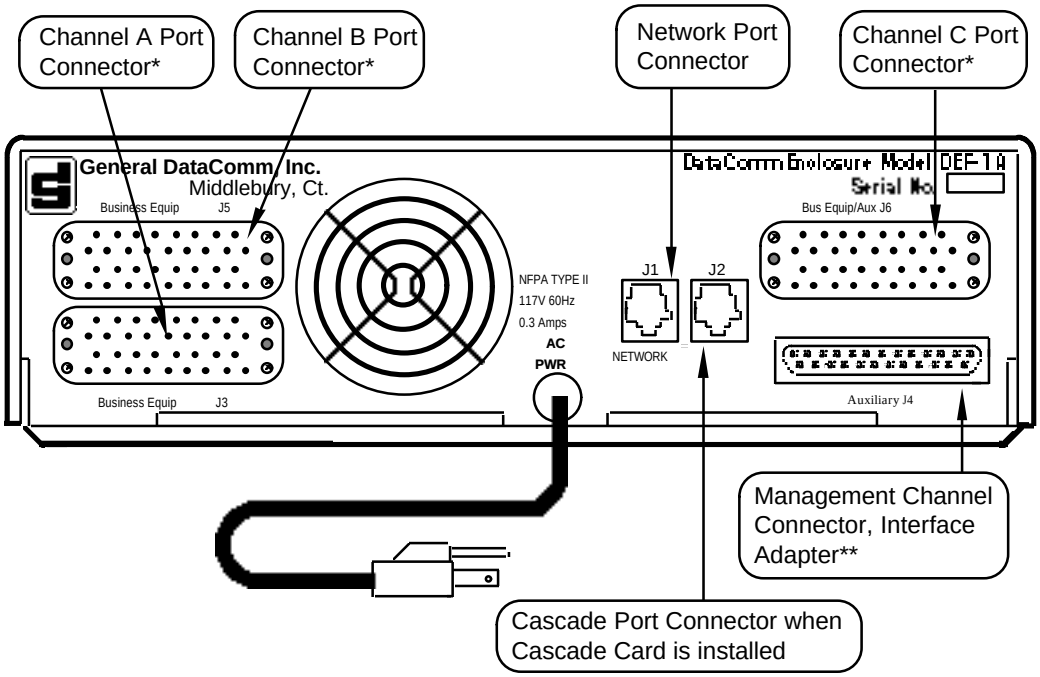
The DataComm Enclosure is equipped with a captive ac power cord terminated in a molded three-prong plug. Plug the cord into a polarized outlet that provides the required ac power.



* Shown with 34-pin IUT-T V.35 channel interface; also available with 25-pin EIA 530 channel interface.

** See Figures 2-15 and 2-16 for descriptions of adapters.

Figure 2-8 Back Panel — Standalone DataComm Enclosure, Model DE-7, for SNMP 553SD-1/IFP DSU



*Shown with 34-pin IUT-T V.35 channel interface, also available with 25-pin EIA 530 channel interface.

**See Figures 2-15 and 2-16 for descriptions of adapters.

Figure 2-9 Back Panel — Standalone DataComm Enclosure, Model DEF-1A, for SNMP 553SD-3/IFP DSU

DataComm FourPak Enclosure (Model DFP-11)

A standalone DataComm FourPak Enclosure can house up to two SNMP 553SD/IFP DSUs. The back panel of the enclosure is shown in *Figure 2-10*. The procedure for accessing pc cards in the FourPak enclosure is the same as that for the DataComm Enclosure, described above.

The DSU can also share the enclosure with other plug-in devices such as other SNMP 553SD/IFP DSUs and V.F 28.8 modems.

Channel Port Connection

The back panel of the FourPak enclosure has four 25-pin, female, subminiature-D connectors labeled BUSINESS EQUIP and numbered to correspond with the slot numbers. Connect customer equipment to Channel A through the Business Equipment connector of the card slot that contains the DSU base card.

When installing an SNMP 553SD-3/IFP DSU, connect to Channel B through the `Business Equipment` connector of the card slot that contains the DSU upper card. Connect to Channel C through the upper card slot `Auxiliary` connector. The connection at the Auxiliary connector requires the use of a crossover cable — Part No. 027H599-X06 for V.35 applications, or Part No. 028H515-X06 for EIA-530 applications.

Figure 2-10 shows one example of the channel port interface connection to a FourPak back panel. The same 25-pin connector is used for either an EIA-530 interface or a V.35 interface. *Appendix B* lists the connector pin/signal assignments for each interface.

Network Connection

The back panel of the FourPak enclosure has four jacks for network connection. As shown in *Figure 2-10*, the jacks are labeled NET 1 through NET 4, corresponding to the four card slots in the enclosure. Connect the network to the SNMP 553SD/IFP DSU by means of the jack for the slot that contains the DSU base card.

Use either GDC cable P/N 022H024-XXX (RJ48C plug-to-plug) or 022H021-XXX (RJ48C plug-to-terminal lugs). The plug-to-plug cable is labeled NETWORK and DSU to indicate where each end is used.

When you install an SNMP 553SD/IFP DSU in either slot three or four (the lower two slots), you must install the rear panel option jumper in the T1 position.

Management Channel Connection

The back panel of the FourPak enclosure has four 25-pin, female, subminiature-D connectors for management channel connection. The connectors are labeled AUXILIARY 1 through AUXILIARY 4, corresponding to the four card slots supported by the backplane, as shown in *Figure 2-10*. Make the management channel connection to the connector for the slot that contains the DSU base card.

The cables and adapters for making this connection are described below, under the heading Management Channel Cables and Adapters.

DSX-1 Cascade Port Connection

If the optional cascade port card is installed, connect the customer cascade equipment to the NET connector that corresponds to the upper of the two slots occupied by the DSU:

DSU in	Cascade connector
Slots 1 and 2	NET 1
Slots 2 and 3	NET 2
Slots 3 and 4	NET 3

See Figure 2-10.

Power Connection

The DataComm FourPak Enclosure is equipped with a captive ac power cord terminated in a molded three-prong plug. Plug the cord into a polarized outlet that provides the required ac power.

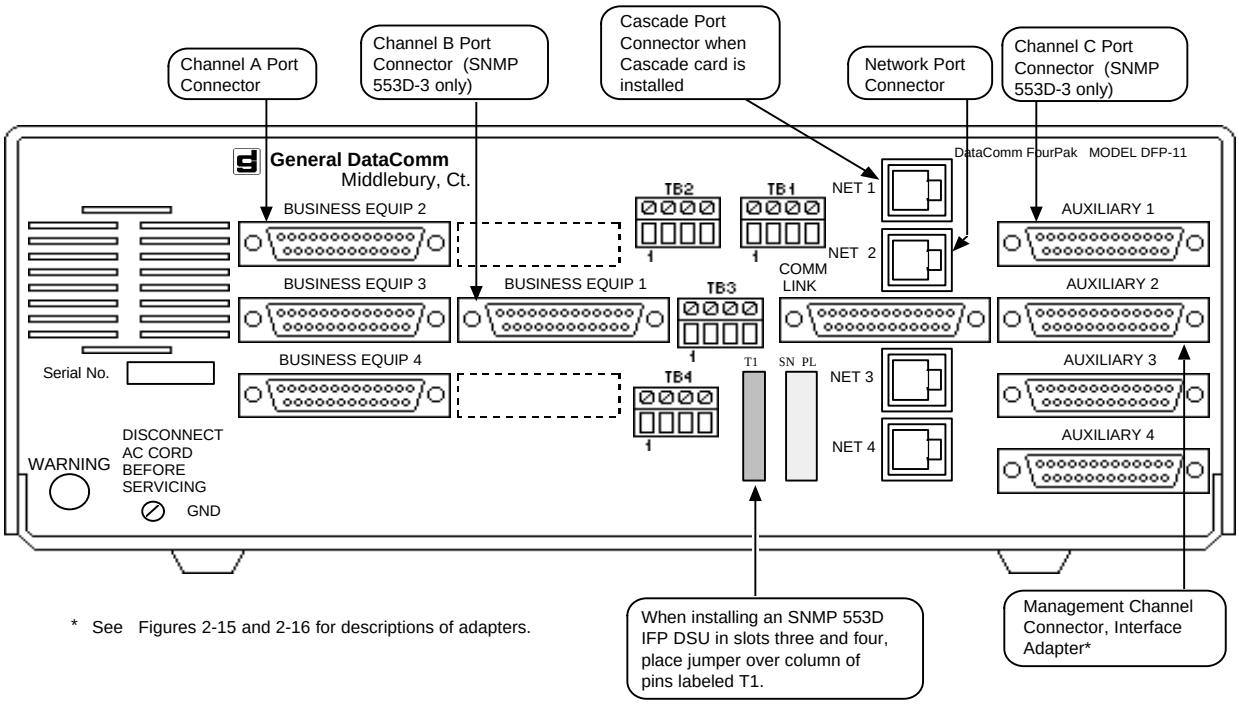


Figure 2-10 FourPak Enclosure Back Panel (Connector Assignments Shown for DSU Installed in Slots 1 and 2)

DataComm Shelf (Models DS-1, DS-5R, DS-5NR, DS-6R/-1, DS-6NR/-1)

A rack-mountable DataComm Shelf can house up to eight SNMP 553SD/IFP DSUs or a combination of DSUs and other plug-ins. The shelf back panel is shown in *Figure 2-12*.

The SNMP 553SD/IFP DSU can occupy any pair of adjacent slots. An adapter cable and coupler (P/Ns 027H242-X04 and 209-038-002) are required to connect each SNMP 553SD/IFP DSU to the T1 line.

The shelf fits into 19- and 23-inch wide equipment racks.

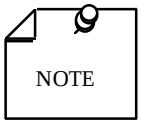
Channel Port Connection

The back panel of the DataComm Shelf has 16 25-pin, female, subminiature-D connectors for the connection of customer equipment. The connectors are labeled BUSINESS EQUIP 1 through BUSINESS EQUIP 16, corresponding to the 16 card slots in the enclosure. Connect customer equipment to the SNMP 553SD/IFP DSU by means of the connector for the slot containing its base card, as shown in *Figure 2-12*.

When installing an SNMP 553SD-3/IFP, connect to Channel B through the `Business Equipment` connector of the card slot that contains the DSU top card. Connect to Channel C through the `Telephone` connector of the slot that contains the top card. The connection

at the Telephone connector requires the use of a crossover cable — Part No. 027H599-X06 for V.35 applications, or Part No. 028H515-X06 for EIA-530 applications.

The same 25-pin connector is used for either an EIA-530 interface or a V.35 interface. *Appendix B* lists the connector pin/signal assignments for each interface.



For compliance with FCC Part 15, Subpart J, Class A requirements you must ground the customer equipment cables when you install a DSU in a DataComm Shelf,.

DataComm Shelf Grounding Jumpers

In order to meet FCC radio frequency (RF) suppression requirements when you install an SNMP 553SD/IFP DSU in a DataComm Shelf, you must install grounding jumpers on the shielded customer equipment cables connected to the DTE port connectors. One grounding jumper, GDC P/N 024H005-X03, is required for each DSU.

The grounding jumper consists of two pieces of wire — a short wire (2” long) and a long wire (3 1/2” long) — connected together at one end and terminated in a lug. The other ends are separate and each is terminated in a lug. Each jumper grounds two customer equipment cables.

Procedure to install a grounding jumper:

1. Securely attach the common end of the jumper to the closest shelf screw, as shown in *Figure 2-11*. You can attach two jumpers to each shelf screw, grounding four cables.
2. Securely attach the other end of each wire to a customer equipment cable, using the cable mounting screw. When one channel is not used, connect both wires to the same cable.

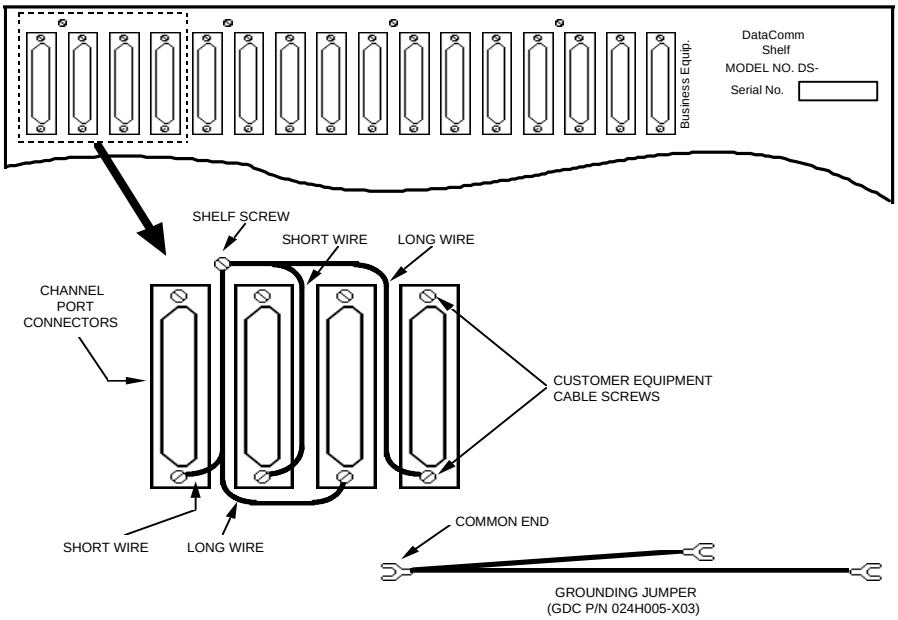


Figure 2-11 Grounding DataComm Shelf Cables

Network Connection

The back panel of the DataComm Shelf has 16 jacks for network connection. The jacks are labeled **J1** through **J16**, corresponding to the 16 card slots in the shelf, as shown in *Figure 2-10*. Connect the network to the SNMP 553SD/IFP DSU by means of the jack for the slot that contains the DSU base card.

The pin-outs of the RJ48C network jack on the back panel of the DataComm Shelf are different from those for all other housings for the SNMP 553SD/IFP DSU. Because of that:

A. You must either use GDC cable P/N 027H242-X04 (RJ48C plug-to-plug) and coupler P/N 209-038-002, or use GDC cable P/N 022H025-XXX (RJ48C plug-to-terminal lugs) for connecting the SNMP 553SD/IFP DSU to the network. Using any other cable can cause damage to the DSU or the network. The pin-outs for the network end of the cables are listed above.

B. If you are connecting the network interface of an SNMP 553SD/IFP DSU in a DataComm Shelf to the cascade port of a DSU (such as an SNMP 553SD IFP DSU in a DataComm Enclosure) you must use GDC cable P/N 027H235-XXX. Using any other cable can cause damage to the units.

Management Channel Connection

The back panel of the DataComm Shelf has four 25-pin, female, subminiature-D connectors for management channel connection. The connectors are labeled Telephone 1 through Telephone 4, corresponding to the four card slots supported by the backplane, as shown in *Figure 2-11*. Make the management channel connection to the connector for the slot that contains the DSU base card.

The cables and adapters for making this connection are described below, under the heading Management Channel Cables and Adapters.

DSX-1 Cascade Port Connection

If the optional cascade port card is installed, connect the customer cascade equipment to the **J** connector — J1, J2, J3, etc. — that corresponds to the slot containing the upper pc card of the DSU.

See Figure 2-12.

Power Connection

The DataComm Shelf is available with a variety of power supply arrangements. Refer to its instruction manual for details concerning power connection.

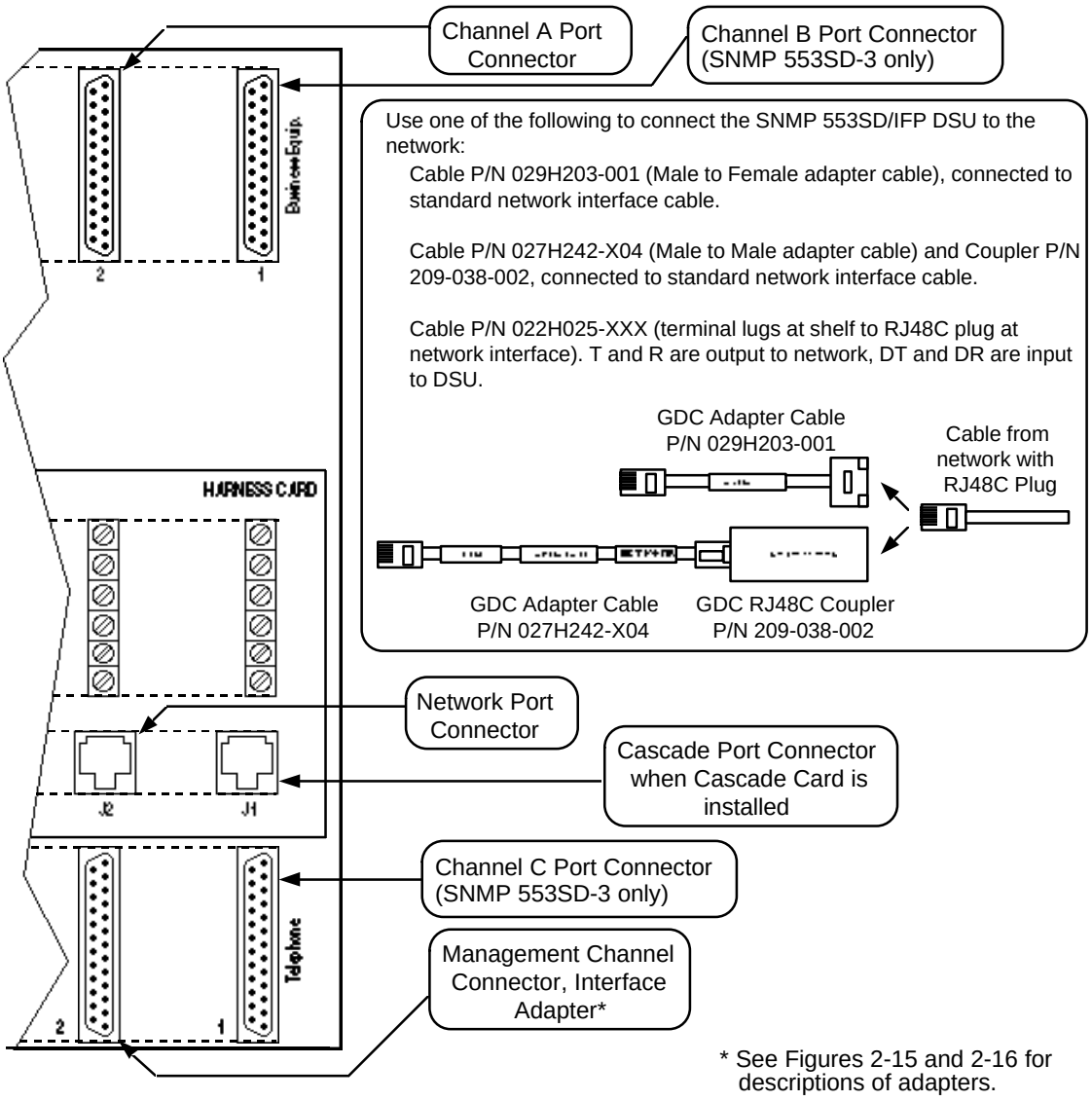


Figure 2-12 DataComm Shelf Back Panel

Universal System Shelf (Models USS-1D, USS-1-DC/R, USS-1-DC/NR)

A rack-mountable Universal System Shelf can house up to eight SNMP 553SD/IFP DSUs or a combination of DSUs and other plug-ins. For each group of four shelf slots (two DSUs), you must install one Domestic DataComm Backplane (P/N 048B015-001).

The backplane, which occupies four slots (one quadrant) in the shelf, provides the connectors required to support operation of the DSU. It is shown in *Figure 2-11*.

Channel Port Connection

Each Universal System Shelf Domestic DataComm Backplane has four 25-pin, female, subminiature-D connectors for the connection of customer equipment. The connectors are labeled BUSINESS EQUIP 1 through BUSINESS EQUIP 4, corresponding to the four card slots supported by the backplane. Connect customer equipment to Channel A through the Business Equipment connector of the card slot that contains the DSU base card, as shown in *Figure 2-13*.

When installing an SNMP 553SD-3/IFP, connect to Channel B through the `Business Equipment` connector of the card slot that contains the DSU top card. Connect to Channel C through the `Auxiliary` connector of the slot that contains the top card. The connection at the `Auxiliary` connector requires the use of a crossover cable — Part No. 027H599-X06 for V.35 applications, or Part No. 028H515-X06 for EIA-530 applications.

The same 25-pin connector is used for either an EIA-530 interface or a V.35 interface. *Appendix B* lists the connector pin/signal assignments for each interface.

Network Connection

Each Universal System Shelf Domestic DataComm Backplane has four jacks for network connection. The jacks are labeled NET 1 through NET 4, corresponding to the four card slots supported by the backplane, as shown in *Figure 2-13*. Connect the network to the SNMP 553SD/IFP DSU by means of the jack for the slot that contains the DSU base card.

Use either GDC cable P/N 022H024-XXX (RJ48C plug-to-plug) or 022H021-XXX (RJ48C plug-to-terminal lugs). The plug-to-plug cable is labeled NETWORK and DSU to indicate where each end is used.

When you install an SNMP 553SD/IFP DSU in slot three or four (the rightmost two slots) of a quadrant, you must install the rear panel option jumper in the T1 position.

Management Channel Connection

Each Universal System Shelf Domestic DataComm Backplane has four 25-pin, female, subminiature-D connectors for management channel connection. The connectors are labeled AUXILIARY 1 through AUXILIARY 4, corresponding to the four card slots supported by the backplane, as shown in *Figure 2-13*. Make the management channel connection to the connector for the slot that contains the DSU base card.

The cables and adapters for making this connection are described below, under the heading Management Channel Cables and Adapters.

DSX-1 Cascade Port Connection

If the optional cascade port card is installed, connect the customer cascade equipment to the NET connector that corresponds to slot containing the upper pc card of the DSU:

DSU in	Cascade connector
Slots 1 and 2	NET 1
Slots 2 and 3	NET 2
Slots 3 and 4	NET 3

See Figure 2-13.

Power Connection

The Universal System Shelf is available with a variety of power supply arrangements. Refer to its instruction manual for details concerning power connection.

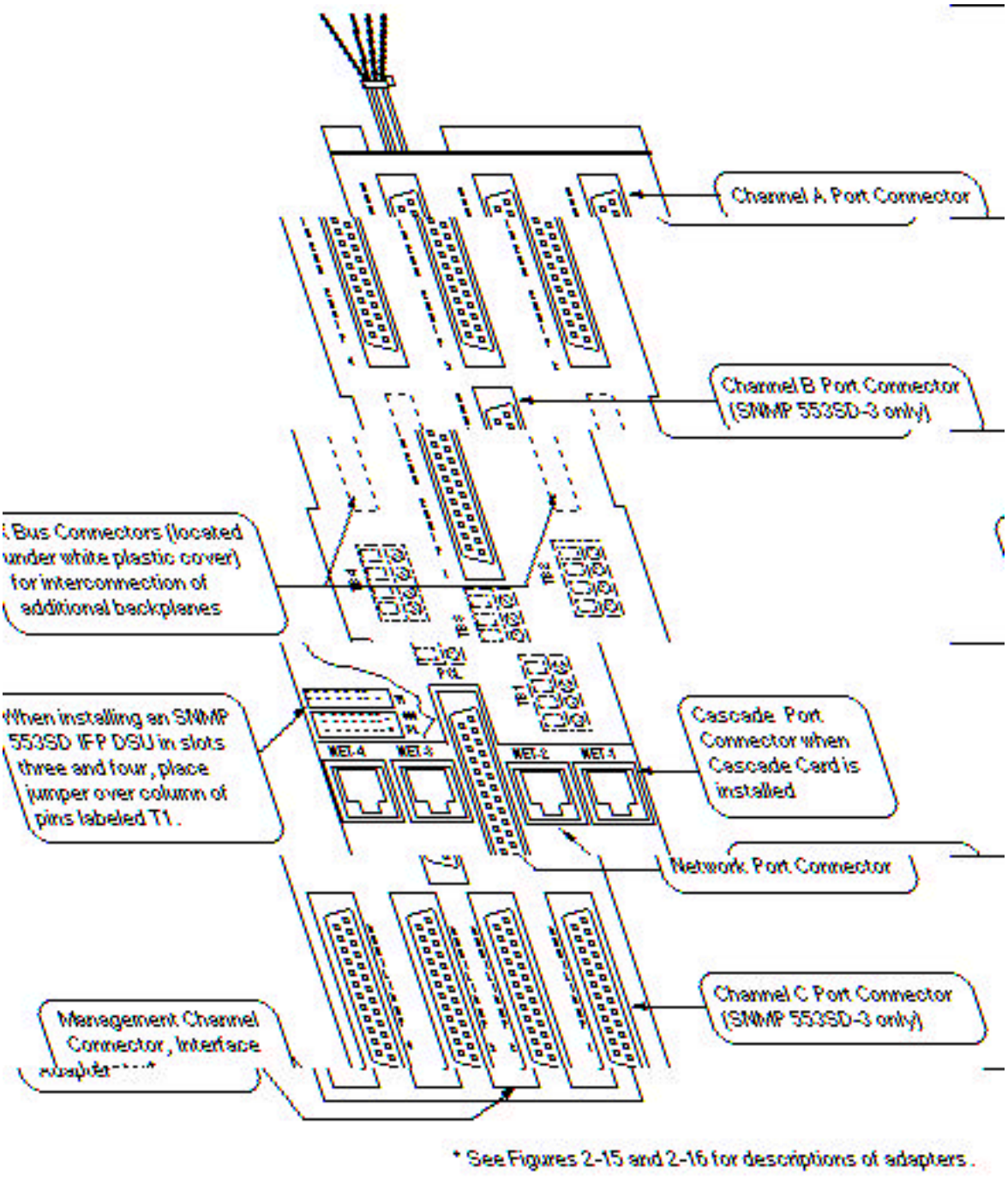


Figure 2-13 Universal System Shelf Back Panel (Connector Assignments Shown for DSU Installed in Slots 1 and 2)

GDC TriPak Shelf (Models TPS-1, TPS-2)

A rack-mountable GDC TriPak Shelf can house one SNMP 553SD/IFP DSU with space remaining for a second, one-card plug-in. The back panel of the shelf is shown in *Figure 2-14*.

The shelf fits into 19- and 23-inch wide equipment racks.

Channel Port Connection

The back panel of the TriPak shelf has three 25-pin, female, subminiature-D connectors for the connection of customer equipment. The connectors are labeled BUSINESS EQUIP A through BUSINESS EQUIP C, corresponding to Slots 1 through 3 in the enclosure. Connect customer equipment to Channel A through the Business Equipment connector of the card slot that contains the DSU base card, as shown in *Figure 2-14*.

When installing an SNMP 553SD-3 DSU, connect to Channel B through the `Business Equipment` connector of the card slot that contains the DSU's upper card. Connect to Channel C through the upper card slot's `Aux` connector. The connection at the `Aux` connector requires the use of a crossover cable — Part No. 027H599-X06 for V.35 applications, or Part No. 028H515-X06 for EIA-530 applications.

The same 25-pin connector is used for either an EIA-530 interface or a V.35 interface. *Appendix B* lists the connector pin/signal assignments for each interface.

Network Connection

The back panel of the TriPak shelf has three jacks for network connection. The jacks are labeled J1 through J3, corresponding to the three card slots of the enclosure, as shown in *Figure 2-14*. Connect the network to the SNMP 553SD/IFP DSU by means of the jack for the slot that contains the DSU base card.

Use either GDC cable P/N 022H024-XXX (RJ48C plug-to-plug) or 022H021-XXX (RJ48C plug-to-terminal lugs). The plug-to-plug cable is labeled NETWORK and DSU to indicate where each end is used.

You must also install the appropriate rear panel option jumper in the T1.5 position.

Management Channel Connection

The back panel of the TriPak shelf has three 25-pin, female, subminiature-D connectors labeled AUX-A through AUX-C, corresponding to Slots 1 through 3 in the enclosure. Make the management channel connection to the AUX-B connector when the DSU occupies slots 1 and 2; to the AUX-C connector when it occupies slots 2 and 3.

The cables and adapters for making this connection are described below, under the heading Management Channel Cables and Adapters.

DSX-1 Cascade Port Connection

If the optional cascade port card is installed, connect the customer cascade equipment to the NET connector that corresponds to slot containing the upper pc card of the DSU:

DSU in	Cascade connector
Slots 1 and 2	J1
Slots 2 and 3	J2

See Figure 2-14.

Power Connection

The TriPak shelf is available with a variety of power supply arrangements. Refer to its instruction manual for details concerning power connection.

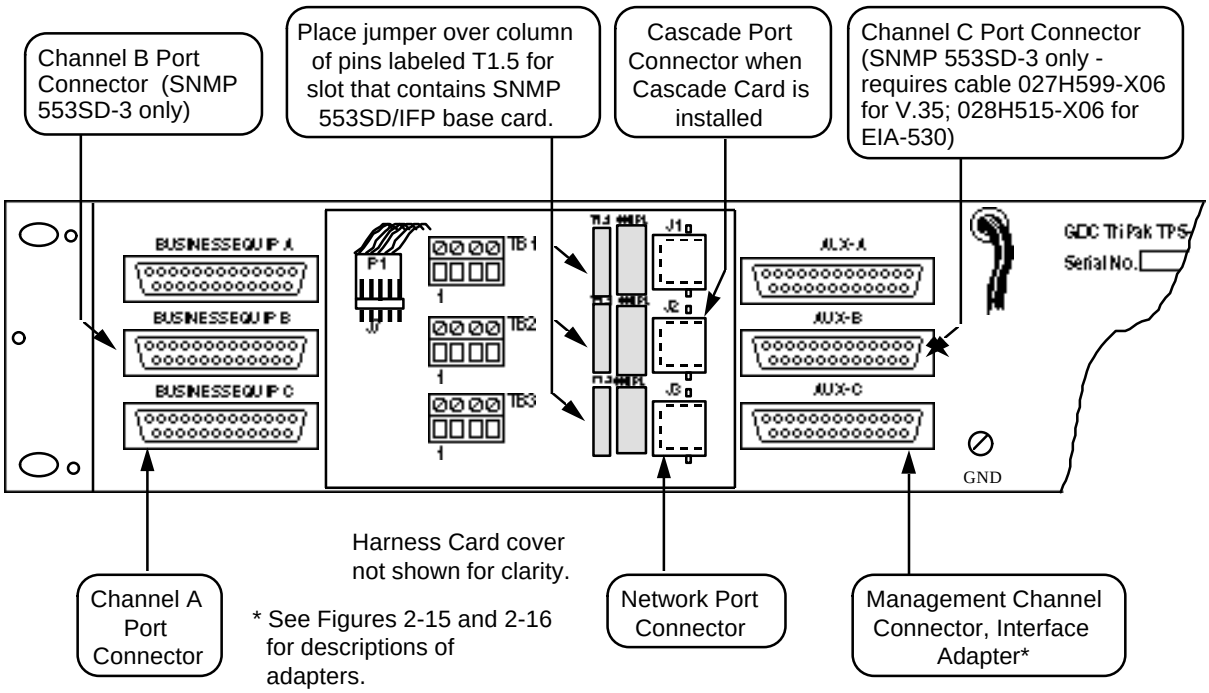


Figure 2-14 TriPak Shelf Back Panel (Connector Assignments Shown for DSU Installed in Slots 2 and 3)

Management Channel Cables and Adapters

The Management Channel Port provides the interface for management communications. It can be used for both SNMP and terminal interface (Telnet) management of the DSU. The SNMP 553SD/IFP DSU is available in models that support local management communications via PPP or SLIP, Ethernet LAN, or Token Ring LAN. All models support remote (modem) management communications via PPP or SLIP. In all PPP/SLIP communications, the SNMP 553SD/IFP DSU detects which protocol is being used to control data transfer through the Management Channel Port — Point-to-Point Protocol (PPP) or Serial Line Internet Protocol (SLIP) — and adapts automatically.

The Management Channel Port is implemented through an adapter and a DB-25 connector on the back panel of the enclosure or shelf that holds the DSU. There are five specialized adapters for this purpose:

PPP and SLIP (Part No. 209-036-012)

Ethernet 10Base2 (Part No. 058P159-001)

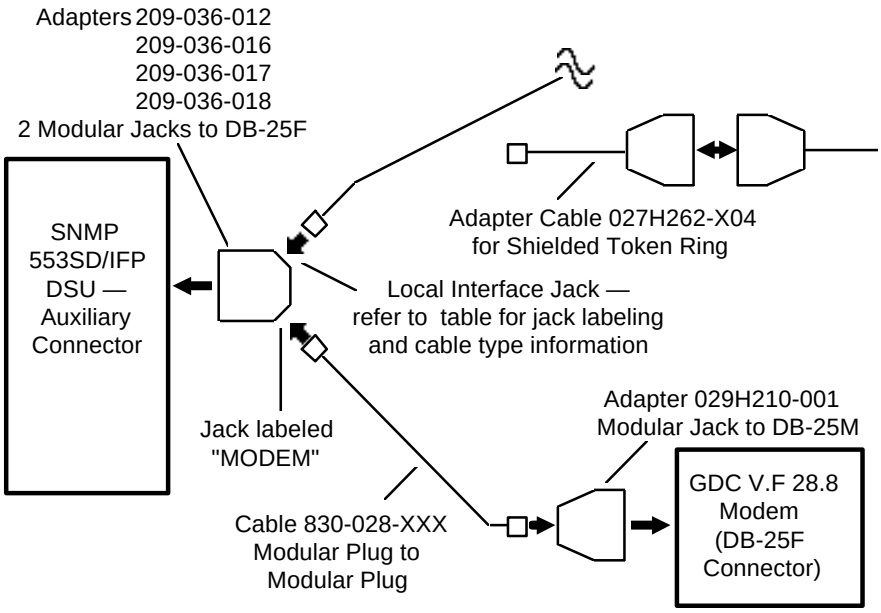
Ethernet 10BaseT (Part No. 209-036-016)

Token Ring, Unshielded Twisted Pair (Part No. 209-036-017)

Token Ring, Shielded Twisted Pair (Part No. 209-036-018)

Figure 2-15 illustrates the adapter connections for the Management Channel Port. It also identifies cables and additional adapters required for some types of connection.

A local PPP or SLIP connection also requires the use of a specific cable and one of three adapters at the management device. *Figure 2-16* illustrates that cable and the adapters.



Application	Adapter	Interface Jack Label	Connects to
PPP/SLIP	209-036-012	LOCAL	Cable 830-028-XXX* (modular plug to modular plug). See Figure 2-16 for far end adapter applications.
10Base2 Ethernet	058P159-001	none	10Base2 Co-axial Ethernet cable
10BaseT Ethernet	209-036-016	10BT	10BaseT Unshielded Twisted Pair Ethernet cable
Token Ring, Unshielded	209-036-017	UTP	Unshielded Twisted Pair Token Ring cable
Token Ring, Shielded	209-036-018	STP	4-inch modular plug to DB Adapter Cable - 027H262-X04 (DB-25) or 027H265-X04 (DB-9) - to standard Shielded Twisted Pair Token Ring cable with DB connector
Remote PPP/SLIP	All	MODEM (none on 058P159)	Cable 830-028-XXX* (modular plug to modular plug) to Adapter 029H210-001 for connection to a GDC V.F 28.8 Modem.
* XXX stands for three-digit length identifier that appears in the actual part number.			

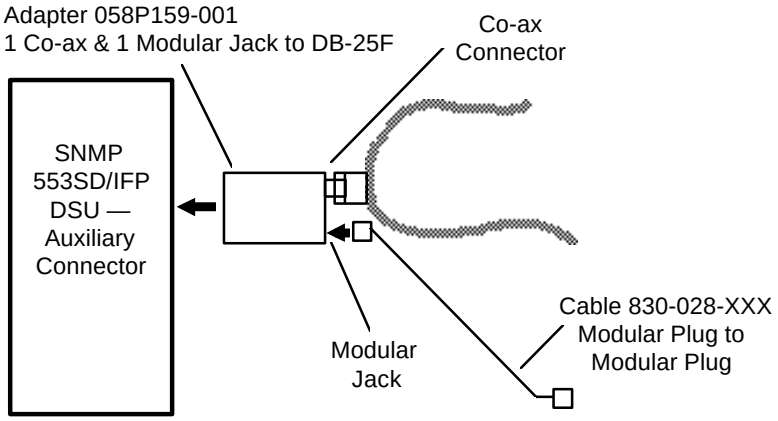


Figure 2-15 Cable and Adapter Connections for Management

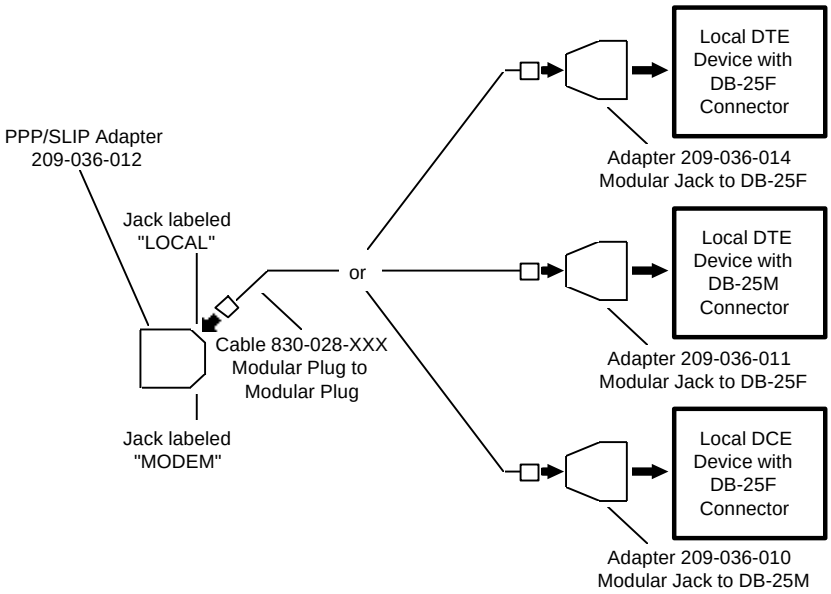


Figure 2-16 Cable Adapters for Local PPP/SLIP Management

Adapter Pins/Signals

The DB25-to-modular jack adapters for use at the management device (or modem) employ the following pin/signal assignments on their DB25 portions:

DCE interface (Part No. 209-036-011 and. 209-036-014)

Pin:	Name:	Direction:
2	TD	to DSU
3	RD	from DSU
4	RTS	to DSU
5	CTS	from DSU
6	DSR	from DSU
7	Gnd	
8	DCD	from DSU

DTE interface (Part No. 209-036-010 and. 029H210-001)

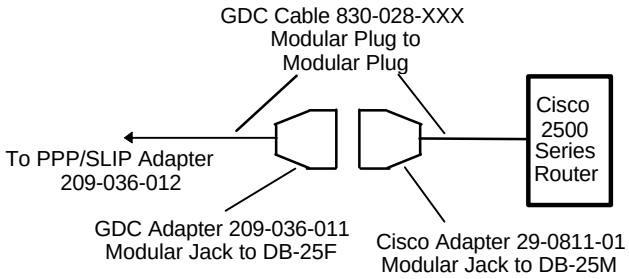
Pin:	Name:	Direction:
2	TD	from DSU
3	RD	to DSU
4	RTS	from DSU
5*	CTS	to DSU
7	Gnd	
8	DCD	to DSU

* not present in 029H210-001

NOTE

Some manufacturers implement management ports through RJ jacks. They do not necessarily employ the same pin/signal assignments as the GDC adapters, so you cannot make a straight-through connection from such a port to the GDC interface adapter. Instead, you must use the manufacturer's modular-to-DB25 adapter and connect the appropriate GDC adapter to that DB25 interface.

Cisco 2500 series routers, for example, require the use of a Cisco modular-to-male DB25 adapter (Cisco Part No. 29-0811-01) at the far end of a modular plug-to-modular plug cable. Connect that adapter to the GDC modular-to-female DB25 adapter (GDC Part No. 209-036-011).



Modem Installation

A pair of modems can provide an link to a controller over a switched telephone line connection. The communications protocol on the link can be either PPP or SLIP. The link can be the normal means of communication between the DSU and its controller, or the modems may be provided to facilitate system restoral or trouble shooting from off-site. The link must always be initiated from the controller site.

A remote controller link requires the following items:

- Dual 8-pin jack adapter 209-036-012
- GDC V.34 Modem
- RJ45-to-RJ45 cable 830-028-XXX
- RJ45-to-DB25M adapter 029H210-001.

Make the following connections:

- Dual jack adapter to the management port of the DSU
- One end of the RJ45-to-RJ45 cable to the jack labeled M on the dual jack adapter
- Remaining end of the cable to RJ45 port on the RJ45-to-DB25M adapter
- DB25 side of the RJ45-to-DB25M adapter to the modem's business equipment interface
- Modem to a switched telephone line and to power

As soon as the DSU detects CTS (output constantly by the V.34 Modem) at the management port interface it outputs a string of AT commands that automatically configure the modem. The configuration the DSU furnishes to the modem configures it for auto-answer.

3 Operation

Overview

The SNMP 553SD/IFP DSU accepts three forms of control: SNMP, IFP, or terminal interface. The terminal interface is accessible by means of a VT100-compatible terminal through the front panel or by means of a computer using the Telnet protocol through the back panel management channel port. This chapter of the manual is concerned principally with the IFP and terminal interface modes of control.

IP Addressing

You can program the DSU, by means of the IFP or the terminal interface (front panel jack only), with Internet Protocol (IP) addresses for management data communications. The IP addresses are used for both SNMP and Telnet control. The DSU distinguishes between SNMP and Telnet control data by recognizing the protocols. There are three addresses that you can specify

- Local IP Address, for local management data communications through the back panel management port
- Modem IP Address, for remote management data communications received through a GDC V.F 28.8 modem connected to the back panel management channel port
- Router IP Address, for Ethernet LAN or Token Ring LAN management data communications in which the controller and the DSU reside on different subnets (not applicable to PPP/SLIP models).

When you use a PPP or SLIP connection for local management the local IP address identifies communications received through the local management port interface (labeled L on the adapter). When an Ethernet or Token Ring port is installed, the local IP address applies to that port.

The Modem IP address identifies management data communications received through the remote management port interface (labeled M on the adapter). Each IP address has a corresponding IP mask that can be set to identify the network portion of the address.

If only one of the data paths is to be used for control, the DSU can be configured with only the IP address/mask for that path. If addresses and masks are configured for both paths, the presumption is that local traffic is the primary form of control, with modem communications available for backup use. When a PPP or SLIP session is established at the modem interface the DSU transfers from primary (local) control to backup (modem) control.

SNMP Control

Simple Network Management Protocol (SNMP) is performed by means of read and write operations that involve Management Information Base (MIB) tables in the DSU operating

firmware. The communications required for SNMP control can take place through either the local or the modem management port interface. Specific details of SNMP operating functions vary depending on the SNMP controller being used, so this manual cannot describe just how they are to be carried out.

SNMP-accessible configuration options are identified and described in *Chapter 4, Configuration* (as are the options that can be set by IFP and terminal interface). *Chapter 5, Tests*, identifies the test procedures that can be commanded by means of SNMP.

Controls, Indicators, and Connectors

Figures 3-1 and 3-2 illustrate the SNMP 553SD/IFP DSU front panel and explain the function of each control and indicator. *Figure 3-3* explains the function of the front panel jacks.

The initial IFP screen display, which is shown at all times when the IFP is not in use, varies by model. *Figures 3-1 through 3-3* show the display for the model that supports PPP/SLIP for local management. *Figure 3-4* illustrates and identifies the other initial displays.

Figure 2-3 in *Chapter 2* illustrates the standalone enclosure rear panel connectors for 117 V ac voltage bases.

Rack-Mount Shelf Controls and Indicators

The front panel controls, indicators, and fuses of each rack-mount shelf are described in the manual supplied with the shelf. Refer to it if you have a rack-mount shelf.

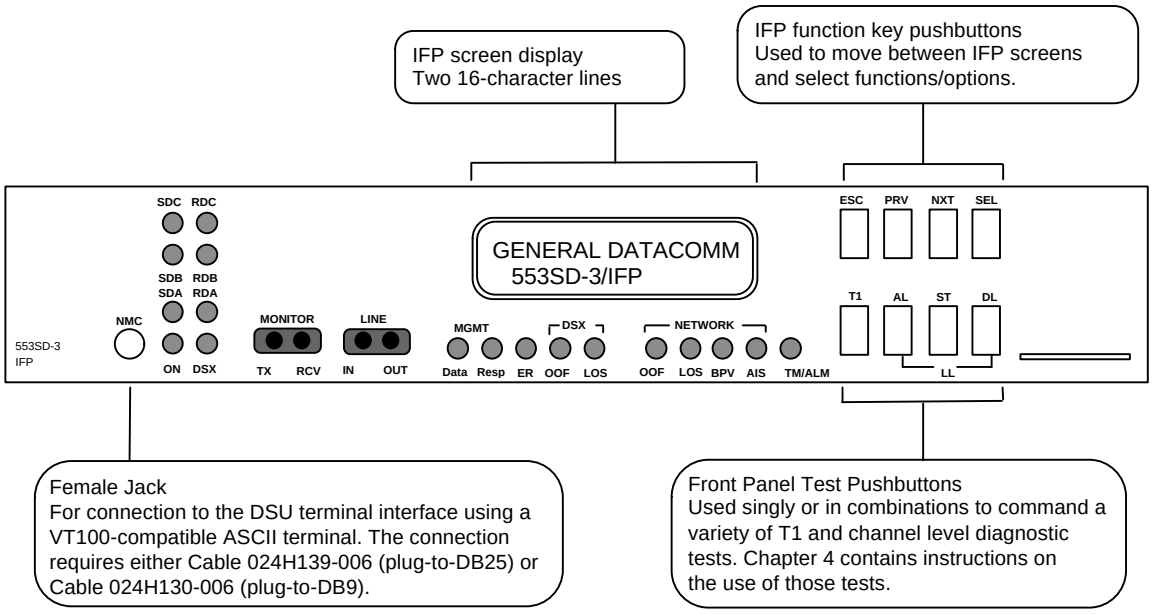


Figure 3-1 SNMP 553SD/IFP Front Panel Controls

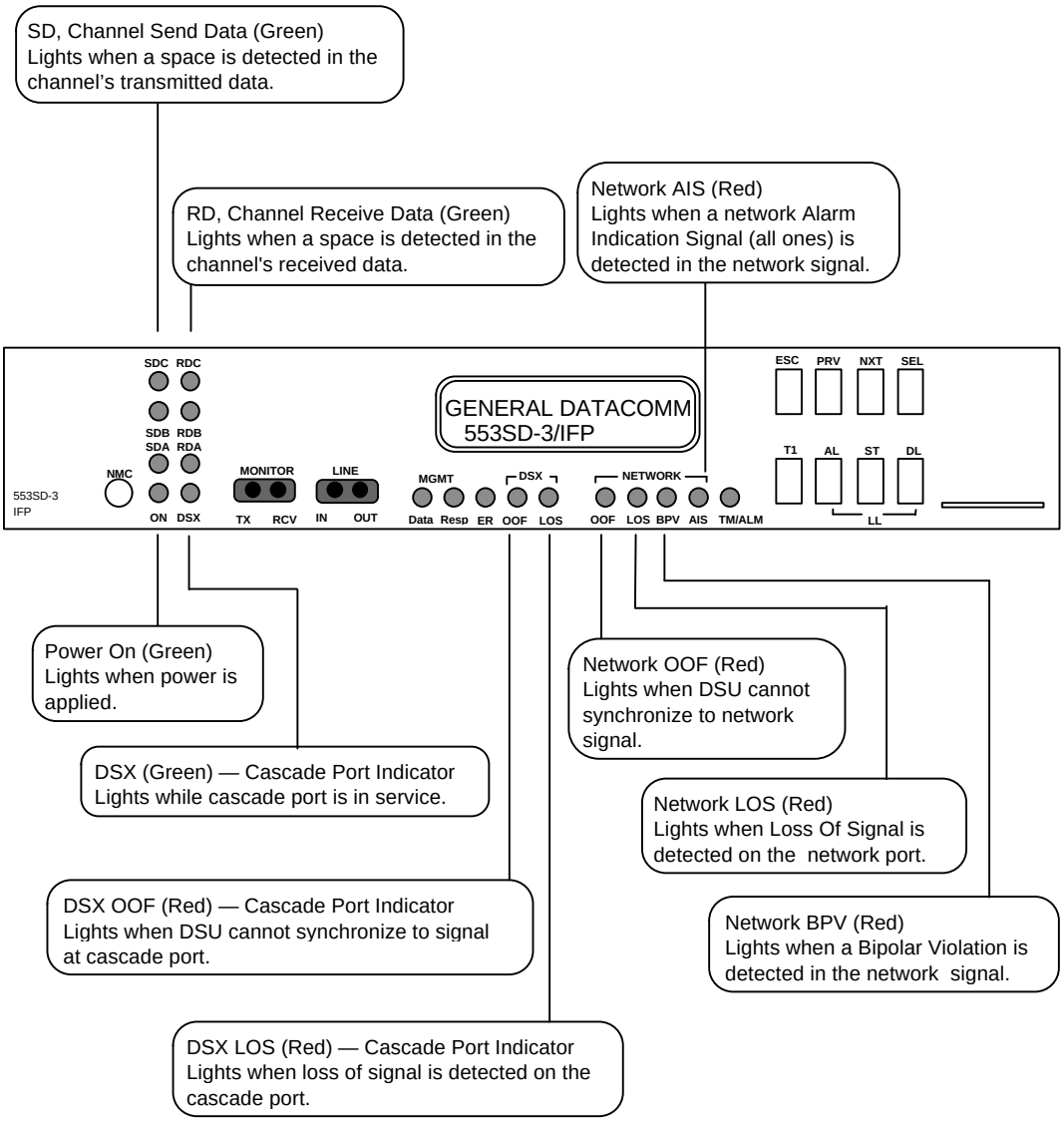


Figure 3-2 SNMP 553SD/IFP Front Panel Indicators (1 of 2)

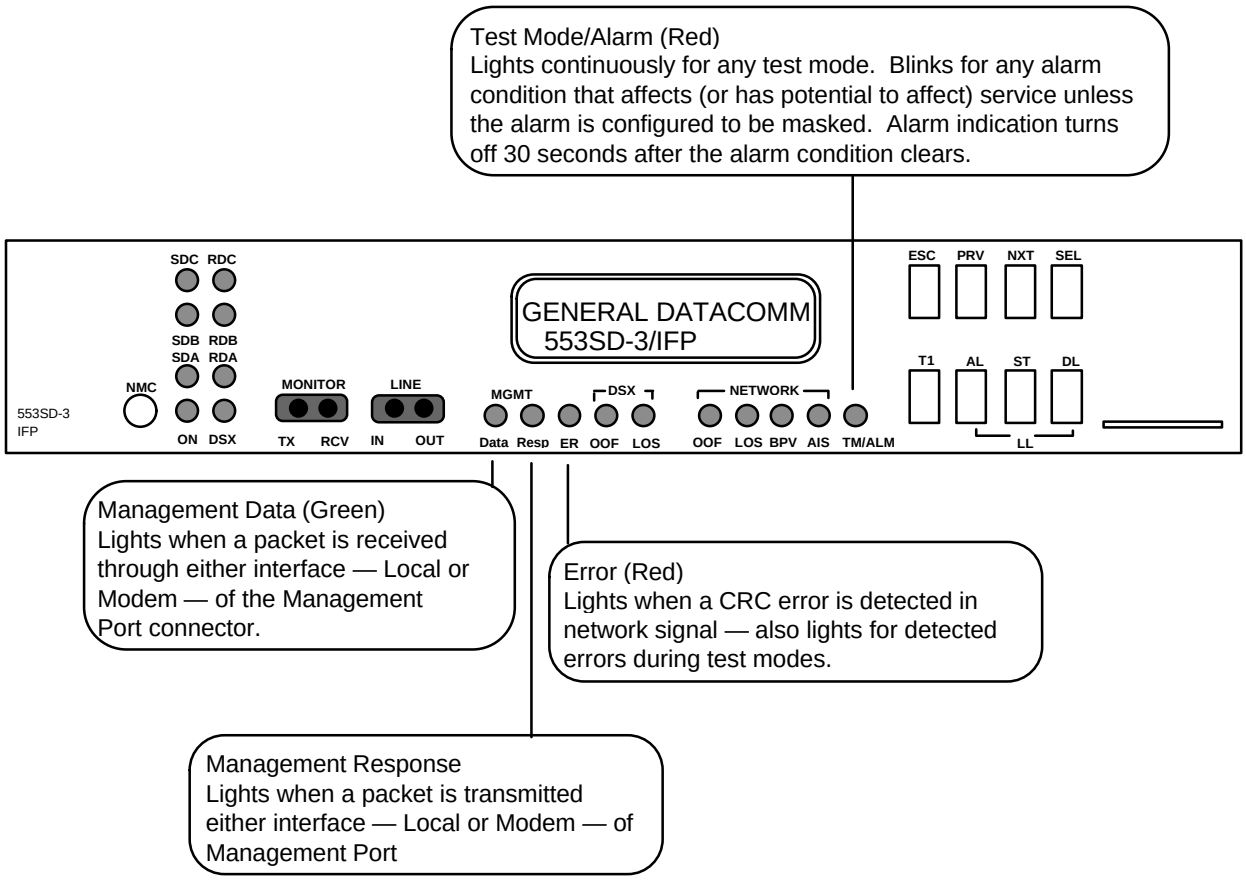


Figure 3-2 SNMP 553SD/IFP Front Panel Indicators (2 of 2)

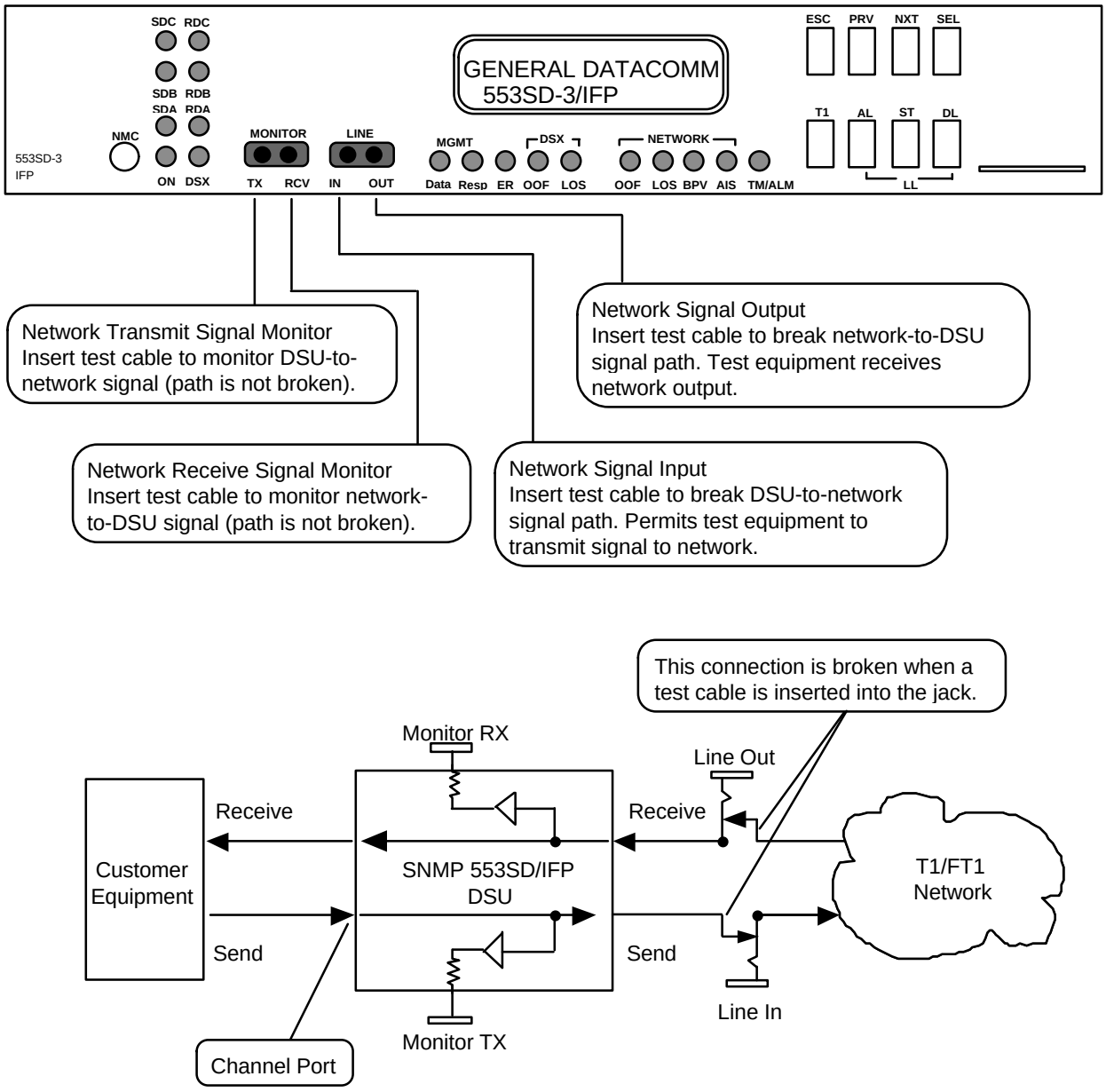


Figure 3-3 SNMP 553SD/IFP Front Panel Test Jacks

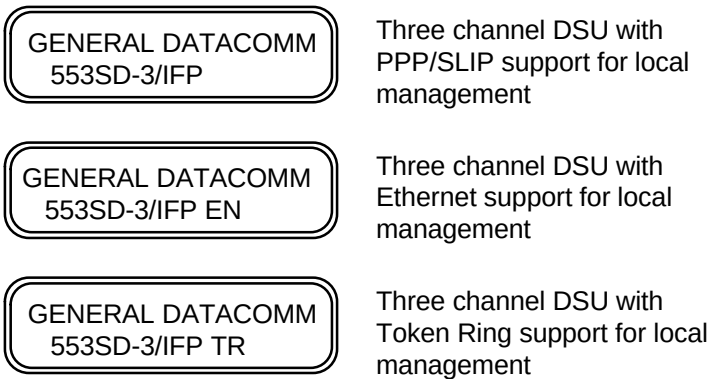
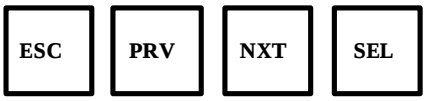


Figure 3-4 Initial IFP Displays for Variant Models of the SNMP 553SD-3/IFP DSU

IFP Keypad Operation

Intelligent Front Panel (IFP) commands are generated from routines that you select by means of four keys:



ESC (escape)	Returns the display to the level above the current one when pressed and released. When pressed and held for at least one second, returns the display to the product (top) level.
SEL (select)	Functions in the way that an Enter key on a keyboard does. Depending on what screen is being displayed, pressing SEL can cause the display to step vertically downward into the next — more specific — screen level, or it can cause the IFP to take an action such as choosing an option.
PRV (previous)	Causes the display to scroll through choices within the current level.
NXT (next)	Causes the display to scroll through choices within the current level.

The IFP screen displays short English-language menu prompts to request the input you have to specify for each IFP routine.

Log On to the IFP

In its idle state the IFP displays the product level screen, with `GENERAL DATACOMM` on the top line and the appropriate model identification on the second line. To connect the IFP to an SNMP 553SD/IFP DSU:

1. With the product level screen on the display, press SEL.

   If password protection is disabled, no further log on procedure is required; the IFP screen immediately displays the first group level function screen.

If password protection is enabled, the IFP screen displays the following two lines:

SET MODIFY MODE?

YES

2. If you intend to use Display mode — either to check configuration or monitor status — press NXT or PRV so that the second line displays NO, and press SEL. No further log on procedure is required, and the IFP screen immediately displays the first group level function screen.

   If you intend to perform configuration or run diagnostic tests you must set the IFP in Modify mode. Press SEL while the second line displays YES. The following two lines are displayed.

   ENTER PASSWORD:

   ********** END**

3. Input the configured IFP password, which consists of up to eight characters:

   A. The NXT and PRV keys move the on-screen underline through its nine possible positions: the eight character positions and the E in END.

   B. While the underline is on a character position, press the SEL key to cycle through the values A – Z, a – z, 1 – 0, and *space* until the correct value is displayed. If the configured password contains fewer than eight characters put a space in the position following the last character.

   C. When all the characters of the password are in place, position the underline on the E in END and press the SEL key. If you have entered the correct password the IFP briefly displays

      PASSWORD OK

      MODIFY MODE SET

      If the password was not correct the IFP will briefly display

      PASSWORD FAILED

      DISPLAY MODE SET

   In either case the screen sequence proceeds with the connection process and displays the first group level function screen. If the password you entered was incorrect and you still wish to use Modify mode, press the ESC key to return to the product level screen and start over.

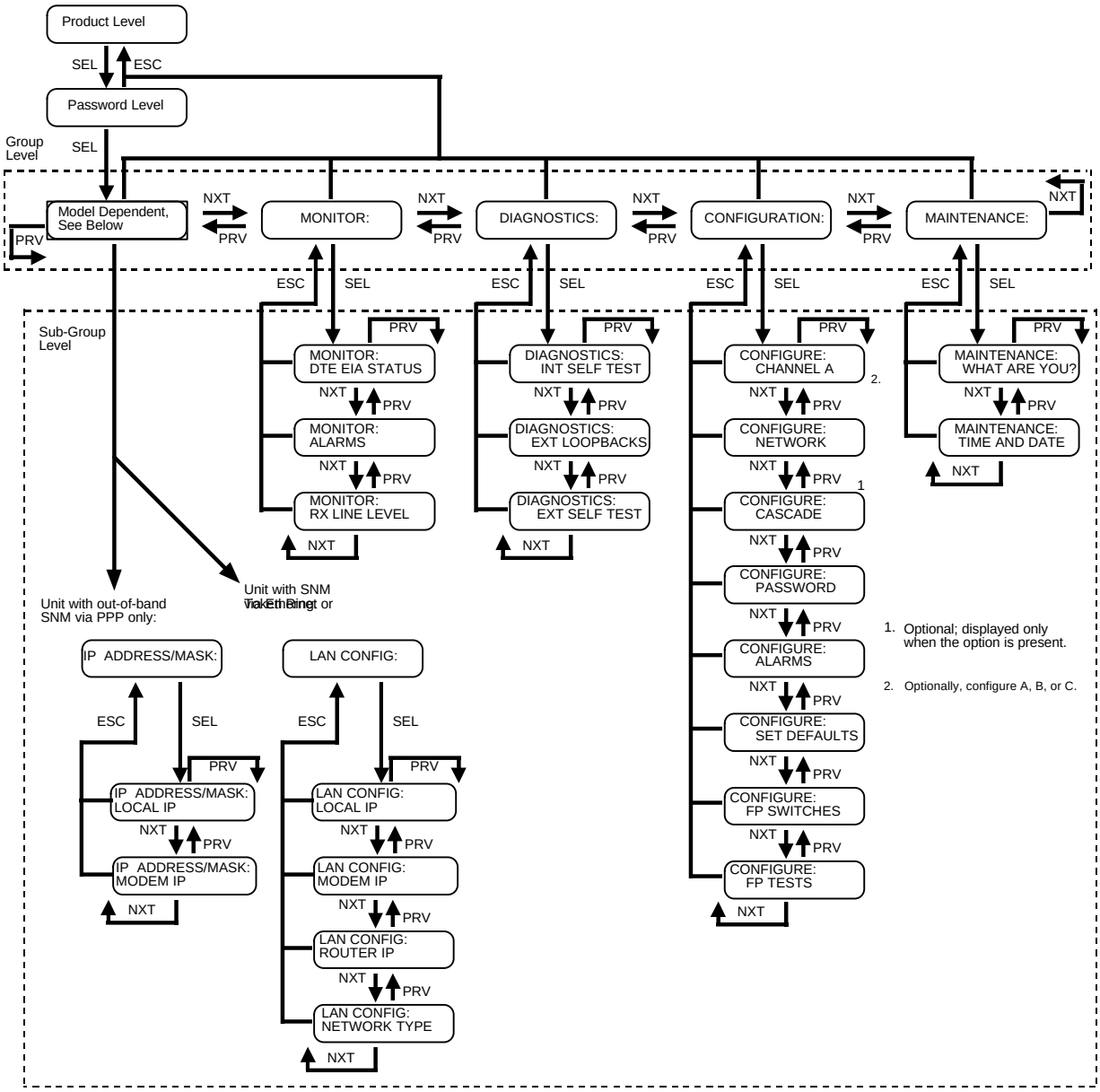


Figure 3-5 SNMP 553SD/IFP Screen Structure — Group and Sub-Group Levels

Selecting at the Group Level

After logging on to the IFP you must select the functional group of screens in which you intend to work. There are five group level screens:

IP ADDRESS/MASK: (PPP/SLIP model) or
LAN CONFIG: (Ethernet and Token Ring models)

MONITOR:

DIAGNOSTICS:

CONFIGURATION:

MAINTENANCE:

When you log on in Modify mode the first group level screen to be displayed is either `IP ADDRESS/MASK:` or `LAN CONFIG:` depending on the model you are working with. In Display mode those functions are not available, and `MONITOR:` is the first group level screen displayed. You can move through the screens in order by pressing the NXT key, or move through them in reverse order by pressing the PRV key.

When the screen displays the function you intend to perform, press the SEL key to enter the sub-group screens for that function.

Pressing the ESC key while a group level screen is displayed terminates the IFP session and returns the product level screen to the display.

IP Address/Mask / LAN Configuration

The IP Address/Mask (PPP/SLIP model) and LAN Configuration (Ethernet and Token Ring models) functions of the IFP configure the address(es) and mask(s) that the DSU requires for management functions. LAN Configuration also enables you to configure the DSU for compatibility with the physical LAN type to which it is connected.

In a DSU that performs all management by means of PPP or SLIP connections you can configure two IP addresses, each with a subnet mask. *Figure 3-6* illustrates the IFP screen structure for the PPP/SLIP DSU. The two addresses, designated Local and Modem, correspond to the interfaces on the Management Port of the DSU.

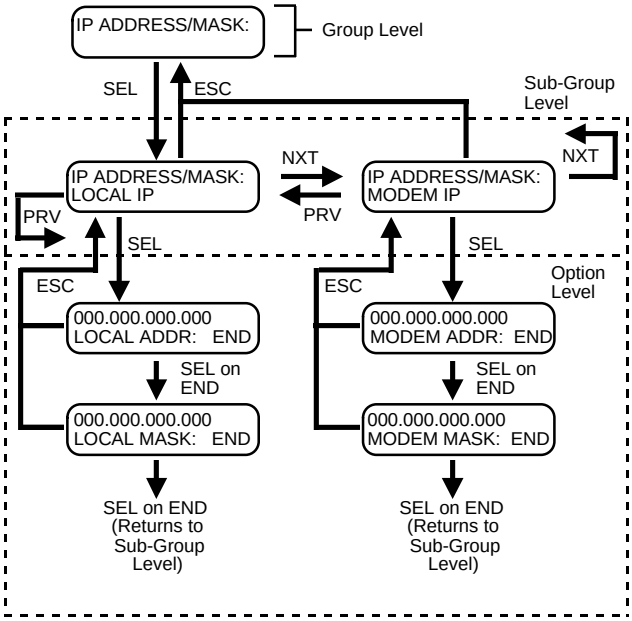


Figure 3-6 IP Address/Mask Screens

In a DSU that performs local management by means of an Ethernet or Token Ring LAN connection you can configure two IP addresses, each with a subnet mask, a router IP address, and the type of LAN network to which the DSU is connected. *Figure 3-7* illustrates the IFP screen structures for the Ethernet and Token Ring DSUs. The two sets of addresses and subnet masks, designated Local and Modem, correspond to the two interfaces on the Management Port of the DSU. The Local interface is the LAN connection; the Modem interface supports a PPP or SLIP connection for remote management via a modem.

You need to configure the Router IP address when the local network controller is located on a different LAN segment than the DSU.

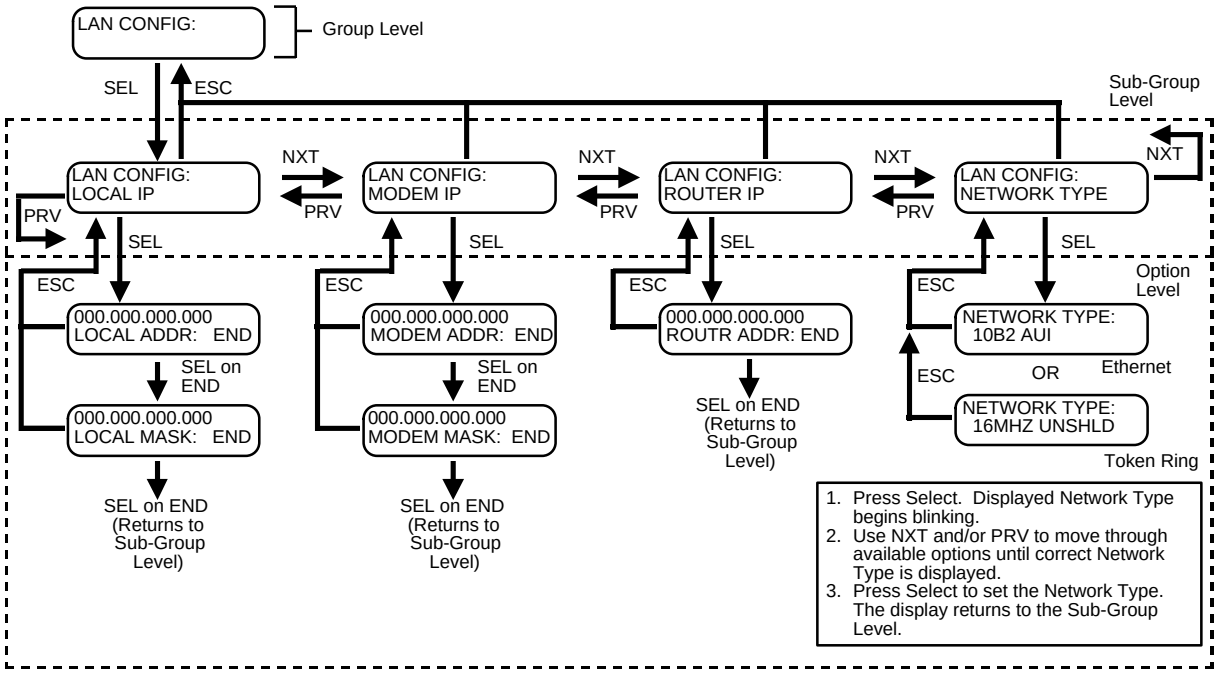


Figure 3-7 LAN Configuration Screens

NOTE

The unit stores the Router IP Address you configure via the IFP in non-volatile memory and uses it as its power-up default route. The unit inserts this default address into its IP routing table if its power is cycled. The IP routing table can be modified by an SNMP controller, but changes made in that way do not appear on IFP or terminal interface displays and do not alter the power-up default.

The option you configure for Network Type enables the DSU to conform its LAN communications to the physical characteristics of the LAN to which it is connected.

IP Configuration Procedure

The following instructions describe the procedure for setting an IP address and mask. The procedure applies to Local, Modem, and Router addresses and takes into account the fact that a Router address does not have a corresponding mask. Until you save changes you can press the ESC key at any point in the procedure to end the process without changing the previous address and mask values.

1. With the IP Address/Mask or LAN Configuration screen displayed, press the SEL key. The second line of the screen displays:

   `LOCAL IP`

   The NXT and PRV keys switch the second line of the display — back and forth between Local IP and Modem IP in the IP Address/Mask function; through Local IP, Modem IP, Router IP, and Network Type in the LAN Configuration function.

2. When the display identifies the IP address you intend to configure press SEL (Local is used here as an example), The screen displays:

   nnn.nnn.nnn.nnn
   LOCAL ADDR: END

   Each three-digit group within the address can have any value from 000 to 255.

3. To change the value of any digit in the address, use the NXT (right) and PRV (left) keys to position the underline cursor, then press the SEL key to increment the digit value. The value wraps around at the highest value permitted for each digit and begins again with 0.

4. When all digits of the IP address are properly set, position the underline cursor on the E in End, then press the SEL key.

   When you are setting a Router address the IFP saves the new address and mask, and returns to the display shown in Step 1. Router IP address configuration is complete at this point.

   When you are setting a Local or Modem address the screen displays

   nnn.nnn.nnn.nnn
   LOCAL MASK: END

5. Set the subnet mask, using Steps 2 and 3.

6. When all digits of the mask are properly set, position the underline cursor on the E in End, then press the SEL key. The IFP saves the new address and mask, and returns to the display shown in Step 1.

LAN Type Configuration

Figure 3-7 describes the procedure for setting the Network Type.

The options available for an Ethernet DSU are 10B2 AUI for connection to a coaxial cable, or 10BT TWIST PAIR for connection to a twisted wire pair.

The options available for a Token Ring DSU are 16 MHZ UNSHLD or 4 MHZ UNSHLD for connection to an unshielded twisted wire pair, and 16 MHZ SHLD or 4 MHZ SHLD for connection to a shielded twisted wire pair.

Monitor

The Monitor function enables you to view information about how the DSU is operating. There are three MONITOR: screens at the sub-group level:

DTE EIA STATUS:
ALARMS:
RX LINE LEVEL:

DTE EIA Status displays the state of signals in the DTE interface. Alarms presents a list of currently active alarms. Rx Line Level displays, in dB, the strength of the signal being received by the DSU.

To access a Monitor function:

1. Press the SEL key while `MONITOR:` is displayed on the screen. The IFP responds by displaying

   `MONITOR:`
   `DTE EIA STATUS.`

2. Press the NXT key to move through the screens in order by or press the PRV key to move through them in reverse order.

3. Press the SEL key when the screen displays the `MONITOR:` function you intend to view. The IFP responds by displaying the first sub-group level screen for the function.

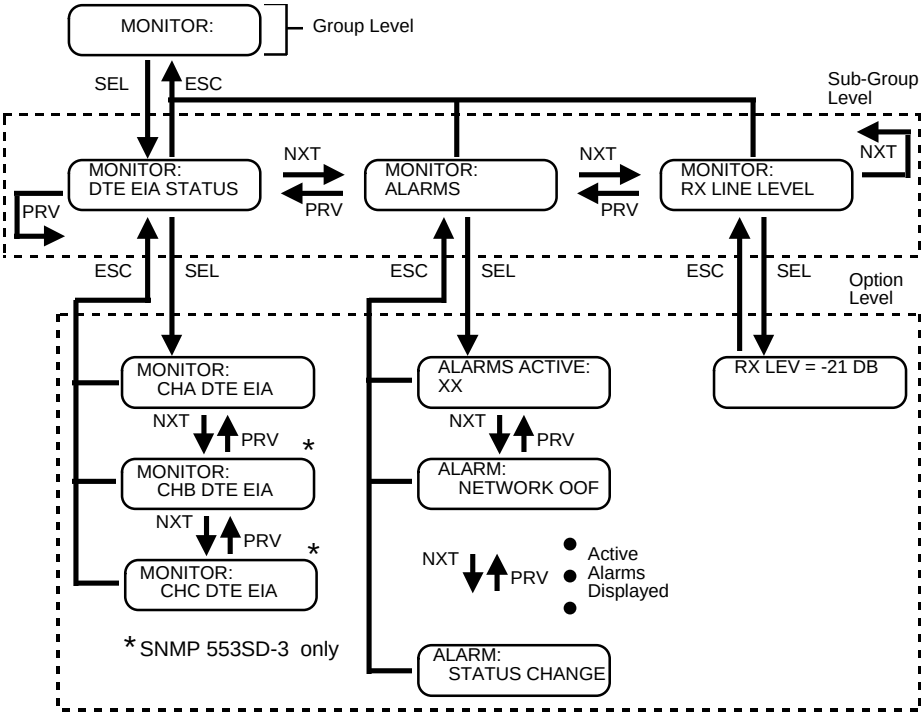


Figure 3-8 Monitor Screens

DTE EIA Status

When you select `MONITOR: DTE EIA STATUS` the screen displays `MONITOR: CHA DTE EIA` (Monitor Channel A EIA Status). Channel A is the only channel available to monitor on an SNMP 553SD-1/IFP DSU, whereas Channels A, B, and C are all available to monitor on an SNMP 553SD-3/IFP DSU. Press the SEL key. The screen briefly displays `RETRIEVING EIA STATUS...` and then presents a status display that resembles the following:

`MR ↑ TR ↑ RS ↓ CS ↓`
`CO ↑ SD – RD ↕`

The EIA status display employs the following abbreviations and symbols:

MR	Modem Ready (output)
TR	Terminal Ready (input)
RS	Request to Send (input)
CS	Clear to Send (output)
CO	Carrier On (output)
SD	Send Data (input)
RD	Receive Data (output)
↑	signal high
↓	signal low
↕	signal transitions
—	no transitions

The display is a "snapshot" of interface signal status, rather than a dynamic display. Pressing the SEL key updates the display with new information from the DSU.

Pressing the ESC key while the status screen is on the display returns the IFP to the channel selection screen. Pressing the ESC key while the channel selection screen is on the display returns the IFP to the sub-group screen, `MONITOR: DTE EIA STATUS`.

Alarms

When you select `MONITOR: ALARMS` the screen briefly displays

```
SCANNING ALARMS
PLEASE WAIT...
```

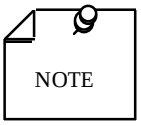
and then displays

```
ALARMS ACTIVE:
xx
```

where *xx* is the number of alarms that are currently active at the DSU connected to the IFP.

When the screen indicates that there are active alarms, you can display them, one per screen, by pressing the NXT or PRV key. Only the screens for alarms that are currently active appear. A new alarm screen is displayed each time you press the key.

The IFP retrieves its initial list of active alarms from the DSU when you press SEL at the `MONITOR: ALARMS` screen. You can update the list while in the alarm viewing function by pressing the SEL key. When you do so, the display returns to the `ALARMS ACTIVE:` screen.



The IFP does not display alarms that have been masked by means of an SNMP controller. Alarm masking can be removed by means of the Configure: Alarms function of the IFP.

Pressing the ESC key while any alarm viewing screen is displayed will return the IFP to the `MONITOR: ALARMS` screen.

The IFP can display the following alarms:

NETWORK OOF (Out of Frame)
NETWORK LOS (Loss of Signal)
NETWORK USS (Unavailable Signal State)
NETWORK AIS (Alarm Indication Signal)
NETWORK BPVS (Bipolar Violations)
NETWORK CRCS (Cyclic Redundancy Checksum)
NETWORK XS0 (Excessive Zeros)
NETWORK YEL (Received Yellow Alarm)
NETWORK LAD (Low Average Density)
NETWORK CFS (Controlled Frame Slips)
NETWORK TIM LOS (Loss of Transmit Timing)
CASCADE OOF (Out of Frame)
CASCADE LOS (Loss of Signal)
CASCADE USS (Unavailable Signal State)
CASCADE AIS (Alarm Indication Signal)
CASCADE BPVS (Bipolar Violations)
CASCADE CRCS (Cyclic Redundancy Checksum)
CASCADE YEL (Received Yellow Alarm)
UNIT FAILURE
UNSOL TEST (Unsolicited Test Mode)
POWER CYCLED
CONFIG ERROR
STATUS CHANGE

Appendix D, Alarm Definitions, contains descriptions of the alarm conditions that can be reported by the SNMP 553SD/IFP DSU.

Receive Level

When you select MONITOR: RX LINE LEVEL the screen briefly displays RETRIEVING RX LEVEL before presenting one of three possible screen displays. The standard display is

RX LEVEL = -xx DB

where *xx* is the numeric value of the signal being received from the network.

If the DSU is not receiving a signal from the network the screen displays

NO SIGNAL

The level display is only valid when the DSU is configured for a DS-1 network interface. If that is not the case, the screen displays

NETWORK IS DSX-1

When a receive level value is being displayed, the display is a "snapshot," rather than a dynamic value. Pressing the SEL key updates the display with new information from the DSU.

Pressing the ESC key while the receive level value screen is on the display returns the IFP to the MONITOR: RX LINE LEVEL screen.

Diagnostics

The Diagnostics function enables you to run a variety of tests involving selected portions of the DSU and its network. *Chapter 5, Tests*, describes each of the tests in detail and provides operating instructions for the Diagnostics function.

There are three types of test available at the sub-group level:

- Internal Self Tests
- External Loopbacks
- External Self Tests

The Internal Self Tests direct a test pattern generated by the DSU through a selected loopback within the DSU back to its test pattern checker. There are three types of loopback available as Internal Self Tests: Unit, Channel, and T1.

External Loopbacks are provided to be used in conjunction with external test equipment that performs the pattern generation and error checking functions.

The External Self Tests transmit a test pattern generated by the local DSU to the remote DSU. At the remote DSU, the test pattern can either be checked for errors (end-to-end test) or looped back to be checked at the local DSU. In either case an operator at the remote DSU must take the appropriate action to enable the test. The External Self Tests function does not exert any control over the remote DSU. There are three External Self Tests available: DS0, Channel, and T1.

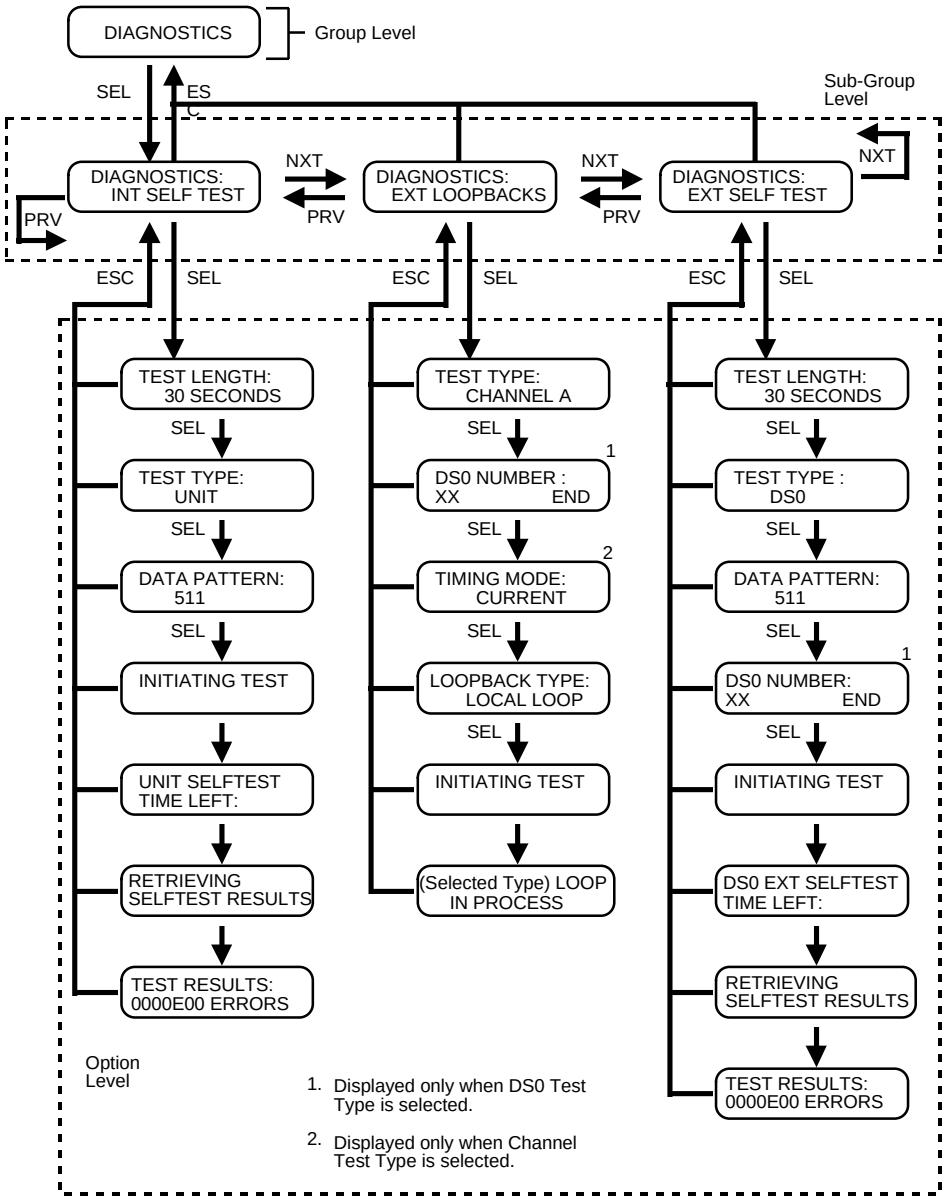


Figure 3-9 Diagnostics Screens

Configuration

The Configuration function of the IFP enables you to modify the options that control operation of the SNMP 553SD DSU. When the IFP is operating in Display mode you can view, but not change, configuration. The number of sub-group level screens for this function varies depending on the features of the DSU:

CHANNEL A
CHANNEL B (SNMP 553SD-3/IFP only)
CHANNEL C (SNMP 553SD-3/IFP only)
NETWORK
CASCADE (if installed)
PASSWORD
ALARMS
SET DEFAULTS
FP SWITCHES
FP TESTS

Chapter 4, Configuration, describes the individual configuration options and their potential settings. Consult that chapter for guidance when performing the following Configuration procedure.

Procedure for selecting a Configuration sub-group and modifying configuration:

1. Use the NXT and PRV keys to scroll through the sub-group name screens until the screen displays the name of the sub-group in which you intend to work.

2. Press the SEL key to enter the option level screens for the sub-group.

   Three of the Configuration sub-groups — Alarms, Set Defaults, and FP Switches — have only one option level screen.

3. To set any of the single-option sub-groups, use the NXT and PRV keys to change between the settings available for the option. When the correct setting is displayed, press the SEL key to make the selection. You may then use the ESC key to return to the sub-group screen.

4. To change a setting in a sub-group that contains multiple options, use the NXT and PRV keys to scroll through the individual option screens for the selected sub-group until the screen displays the option you intend to modify.

5. Press the SEL key. The option setting begins to blink, indicating that it may now be changed.

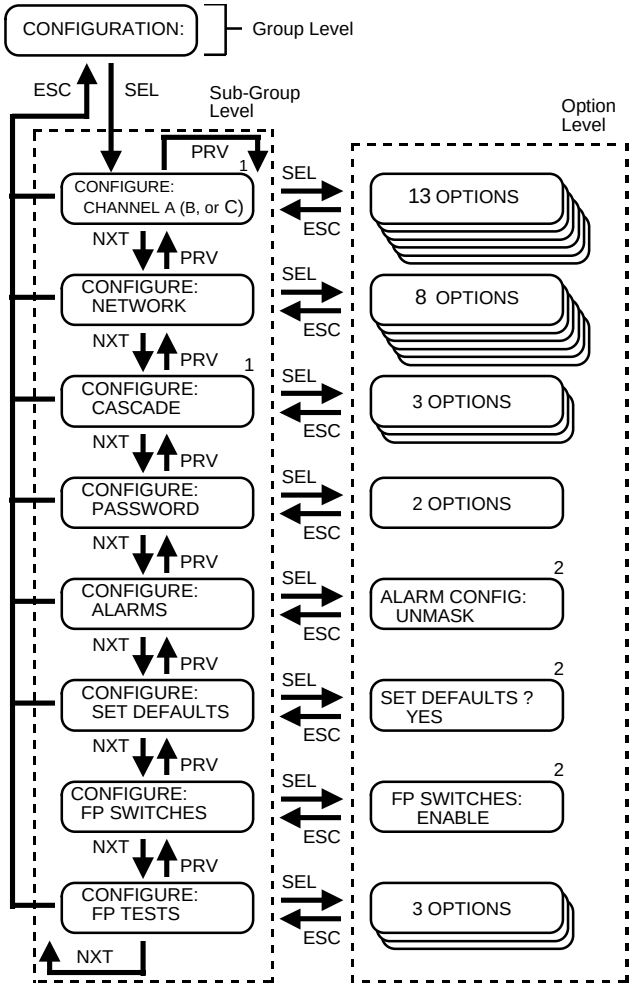
6. Use the NXT and PRV keys to scroll through the potential settings for the option until the screen displays the setting you intend to configure. The displayed setting changes each time you press either key.

NOTE

Two options, PASSWORD:MODIFY in the PASSWORD subgroup and T1 PROG (programmable) PATTERN in the FP TESTS sub-group, require you to specify input in the manner described earlier for the PASSWORD function.

The PASSWORD:MODIFY option accepts up to eight characters. The characters available for you to use are the 26 upper case letters, the 26 lower case letters, and the digits 0 — 9. When you specify a password that has fewer than eight characters you must enter a space to indicate the end of the password. The space does not become part of the password.

The T1 PROG PATTERN option requires you to specify four hexadecimal digits (1 — 9, A — F).



1. Optional; displayed only when the option is present.
2. Use NXT and PRV keys to change setting on second line. Press SEL when desired setting is displayed.

Figure 3-10 Configuration Screen Structure

7. When the correct setting is displayed, press the SEL key to make the selection. The option setting stops blinking.

8. If you intend to modify other options in the same sub-group, return to Step 4.

9. Repeat Steps 4 — 8 until you have modified all the options that you need to in the current sub-group.

10. Press ESC to return to the sub-group name screen. If you need to modify options in another sub-group, repeat Steps 1 — 10.

11. When you are done modifying Configuration options in all subgroups, press the ESC key while a sub-group name screen is displayed. *Figure 3-9* illustrates the procedure that is then required to return to the Configuration group level screen.

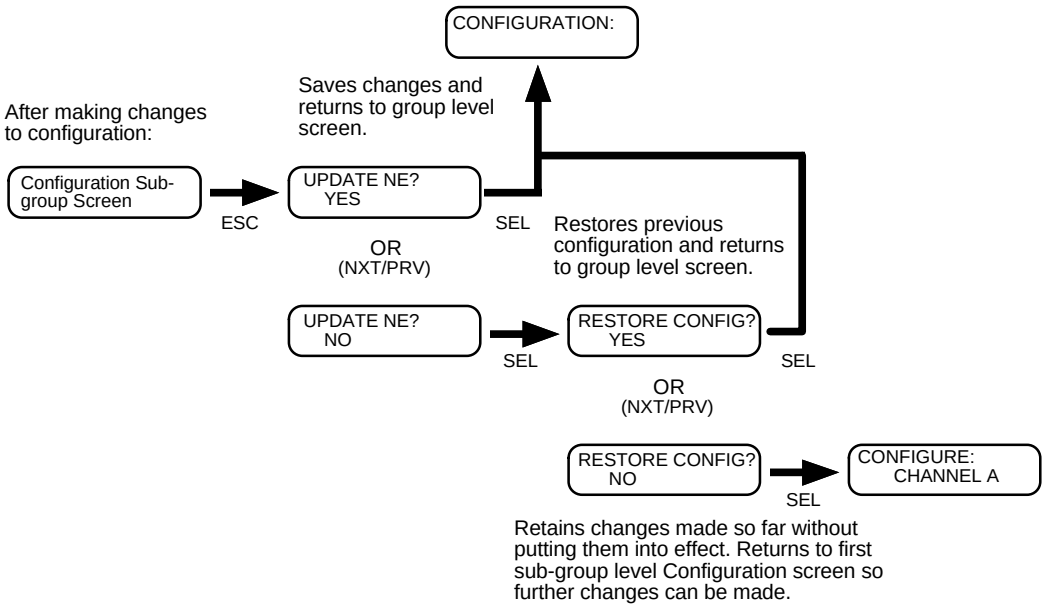


Figure 3-11 Returning to Configuration Group Level Screen After Making Changes

Maintenance

The Maintenance function provides access to two sub-group level screens that relate to control of the DSU and its network. Each Maintenance subgroup function requires a different operating procedure. Instructions for their use are provided separately below.

What Are You?

The What Are You? option level screens display the following information about the SNMP 553SD/IFP DSU:

- unit type
- whether or not the DSU has a cascade port installed
- channel type — either the standard V.35 or the optional EIA-530
- firmware revision level
- IP addresses and masks for management communications
- Media Access Code (MAC) address

- serial number of the DSU
- whether or not the DSU is connected to a modem for management communications.

Procedure for displaying What Are You? information:

1. Press the SEL key while the WHAT ARE YOU? sub-group level screen is displayed.
2. Use the NXT and PRV keys to scroll through the option level screens as needed.
3. Pressing the ESC key at any of the option level screens returns the display to the sub-group level WHAT ARE YOU? screen.

Time and Date

The Time and Date option level screens permit you to set the time and date that the DSU uses when recording alarms.

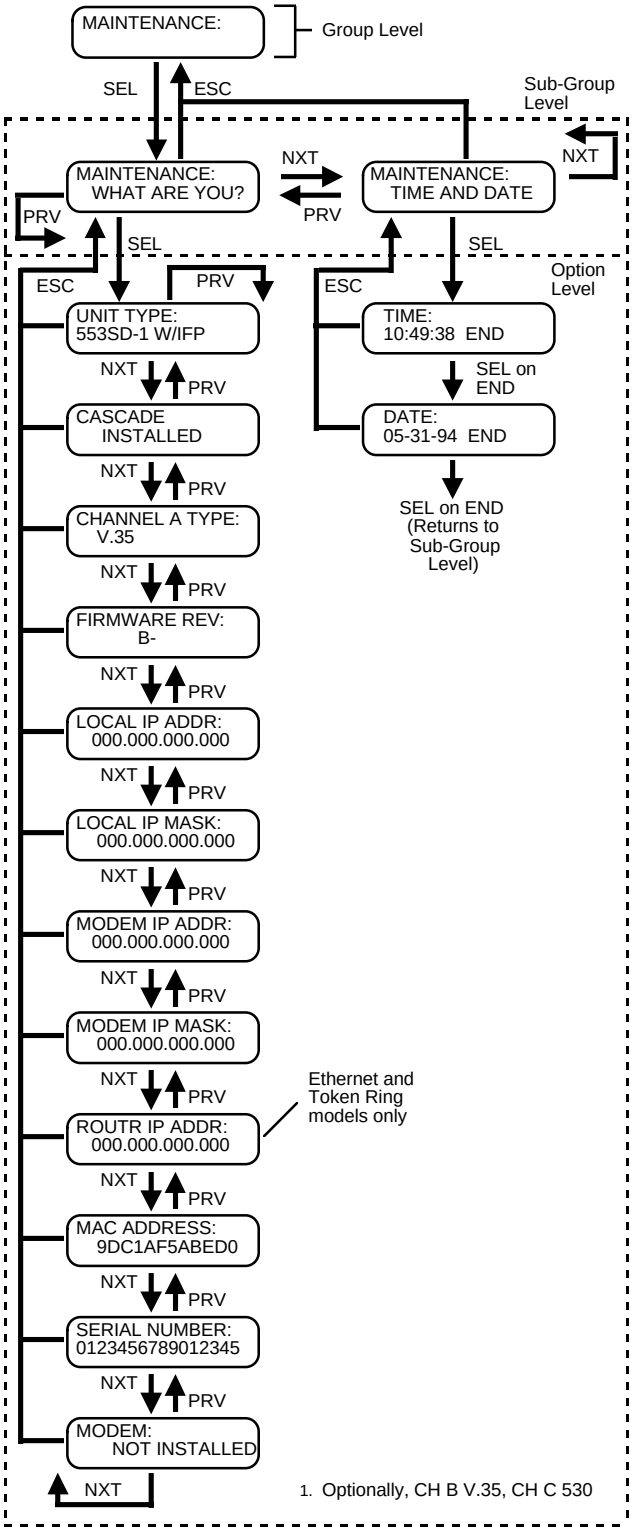


Figure 3-12 Maintenance Screens

Procedure for setting time and/or date:

1. Press the SEL key while the TIME AND DATE sub-group level screen is displayed. The TIME: screen appears, with the current time (read from the DSU to which the IFP is attached) displayed as six digits — two each for hours, minutes, and seconds. The display is in 24-hour time. If you need to set the Date but not the Time, go directly to Step 5.
2. Use the NXT and PRV keys to position the underline on a digit that you need to change.
3. Press the SEL key to cycle through the possible values for the digit until the correct value is displayed.
4. Repeat Steps 2 and 3 until all digits are set to their correct values.
5. Use the NXT or PRV key to position the underline on the E in END and press the SEL key. The DATE: screen appears with the current date displayed as six digits in month-day-year format.
6. Use the NXT and PRV keys to position the underline on a digit that you need to change.
7. Press the SEL key to cycle through the possible values for the digit until the correct value is displayed.
8. Repeat Steps 6 and 7 until all digits are set to their correct values.
9. Use the NXT or PRV key to position the underline on the E in END and press the SEL key. The screen confirms that the time and date are being set and then displays the TIME AND DATE sub-group level screen.

   Pressing the ESC key at any time while the TIME: or DATE: screen is displayed returns the display to the TIME AND DATE sub-group level screen without changing the previous time and date settings.

Terminal Interface

The SNMP 553SD/IFP DSU also provides a terminal interface for configuration and control functions by means of a VT100-compatible terminal or a computer running the Telnet protocol. You can access the terminal interface through two interfaces:

- management channel port, located on the back panel — supports terminal interface functions for a computer running the Telnet protocol. The computer has to initiate the Telnet session using the IP address assigned to the DSU. The DSU disables the front panel NMC jack during a Telnet session.
- NMC jack, located on the front panel — supports terminal interface functions for a VT100-compatible terminal. There are two cables available for connection to this port:

  PN 024H139-06, which has a DB25 connector for attachment to the DTE

  PN 024H130-06, which has a DB9 connector.

Both interfaces support serial, asynchronous communication at 9600 bit/s using the 8/N/2 character format (8 data bits, no parity, 2 stop bits).

To access the terminal interface use the following procedure:

1. Connect the terminal or computer to the appropriate port.
2. Power on the terminal or computer.
3. Initiate a Telnet session if you are using a computer.
4. Press the Enter key. The DSU responds with

```
553SD-1 with IFP Login:
```

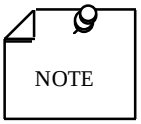
Type in the password that has been assigned to the DSU and press Enter. The DSU will respond

```
553SD-1 with IFP Auxiliary Control
[0]  Exit-Quit
[1]  CONFIGURATION
[2]  STATUS
[3]  DIAGNOSTICS
[4]  MAINTENANCE
[5]  DOWN LINE LOADING

Next Selection:
```

The figures on the following pages provide graphical representations of the terminal interface menu structure. When you access configuration menus, each is preceded by a display of the current settings for the options in the menu. The displays of current settings are not shown in the following illustrations.

The terminal interface follows each list of menu options with the "Next Selection:" prompt. Type the number of the option you are selecting and press the enter key.



A. The DSU is delivered with the default password GDCGDC. The password can be changed by means of the Intelligent Front Panel (IFP).

B. The current setting display that accompanies a configuration menu does not react dynamically to display any changes (such as line type) that are initiated during the terminal interface session by the service provider. It will display the changes in subsequent sessions.

Terminal interface menus vary in some details according to how the DSU is equipped and how the terminal interface is being accessed.

The menus shown in the following figures are those for a DSU with the optional Cascade Interface card installed. Terminal interface menus for a DSU without a Cascade Interface card do not display the items that relate to it, and the numbering of other menu items is adjusted accordingly.

The menus shown include Modify IP Address/Mask as part of the Maintenance menu. That selection only appears in the Maintenance menu during a VT-100-compatible connection through the front panel NMC jack, it cannot be accessed by a Telnet connection.

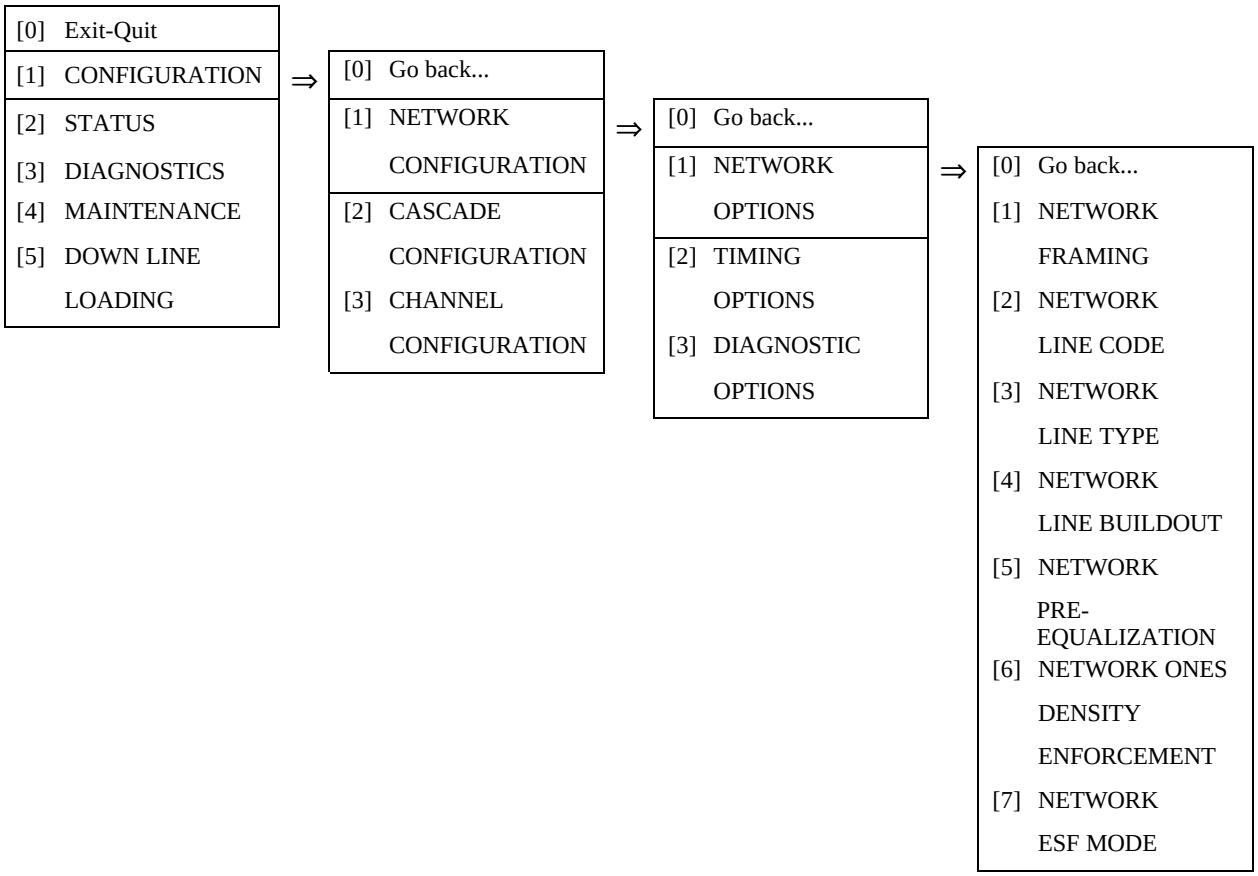


Figure 3-13 Terminal Interface: Network Configuration, Network Options

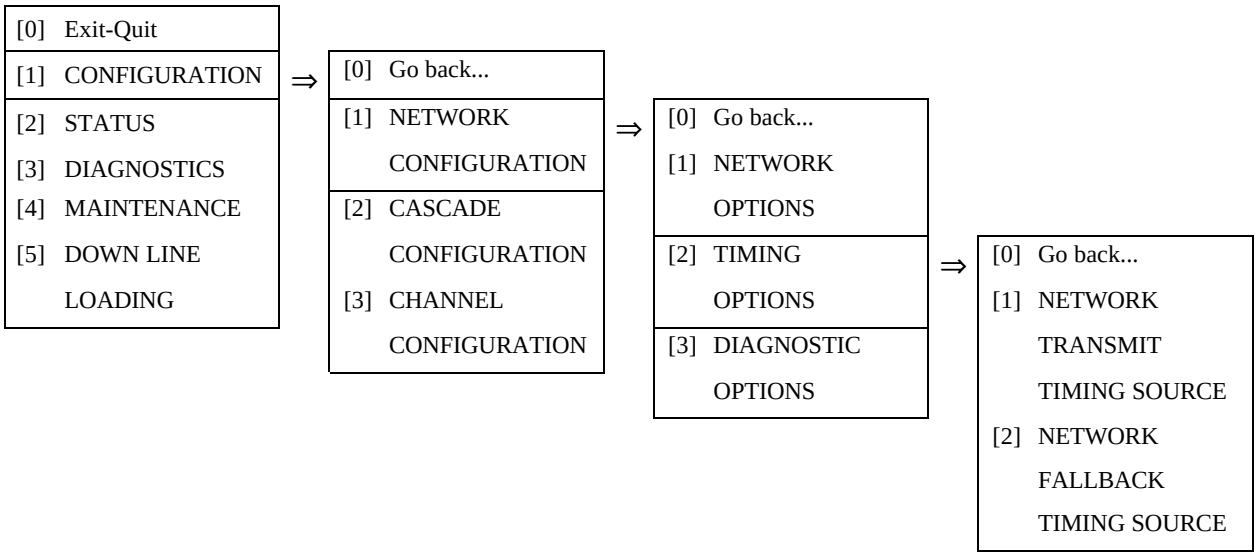


Figure 3-14 Terminal Interface: Network Configuration, Timing Options

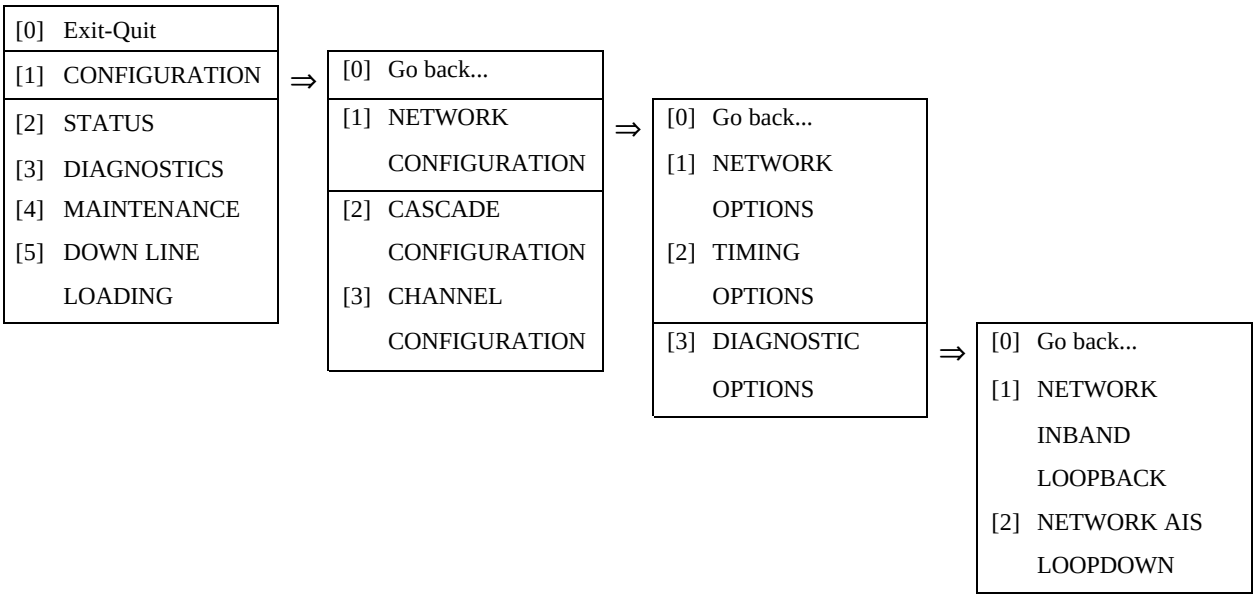


Figure 3-15 Terminal Interface: Network Configuration, Diagnostic Options

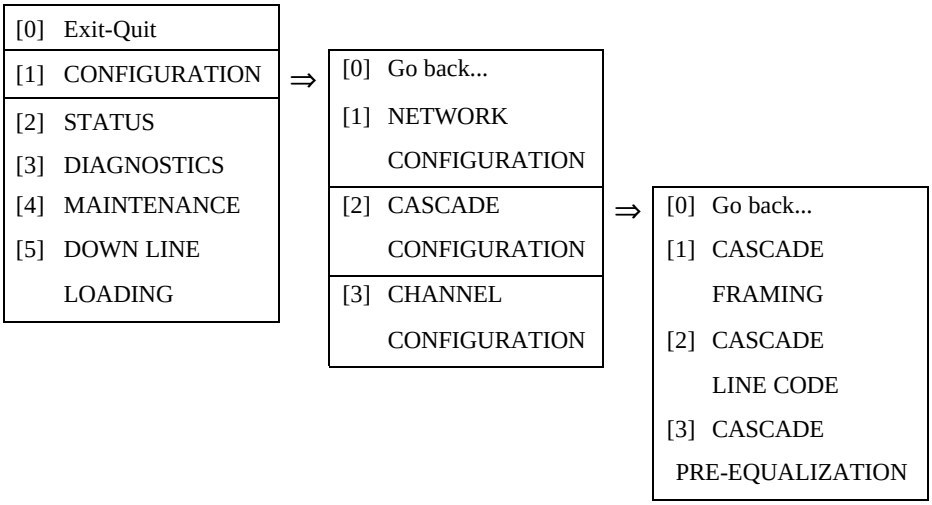


Figure 3-16 Terminal Interface: Cascade Configuration

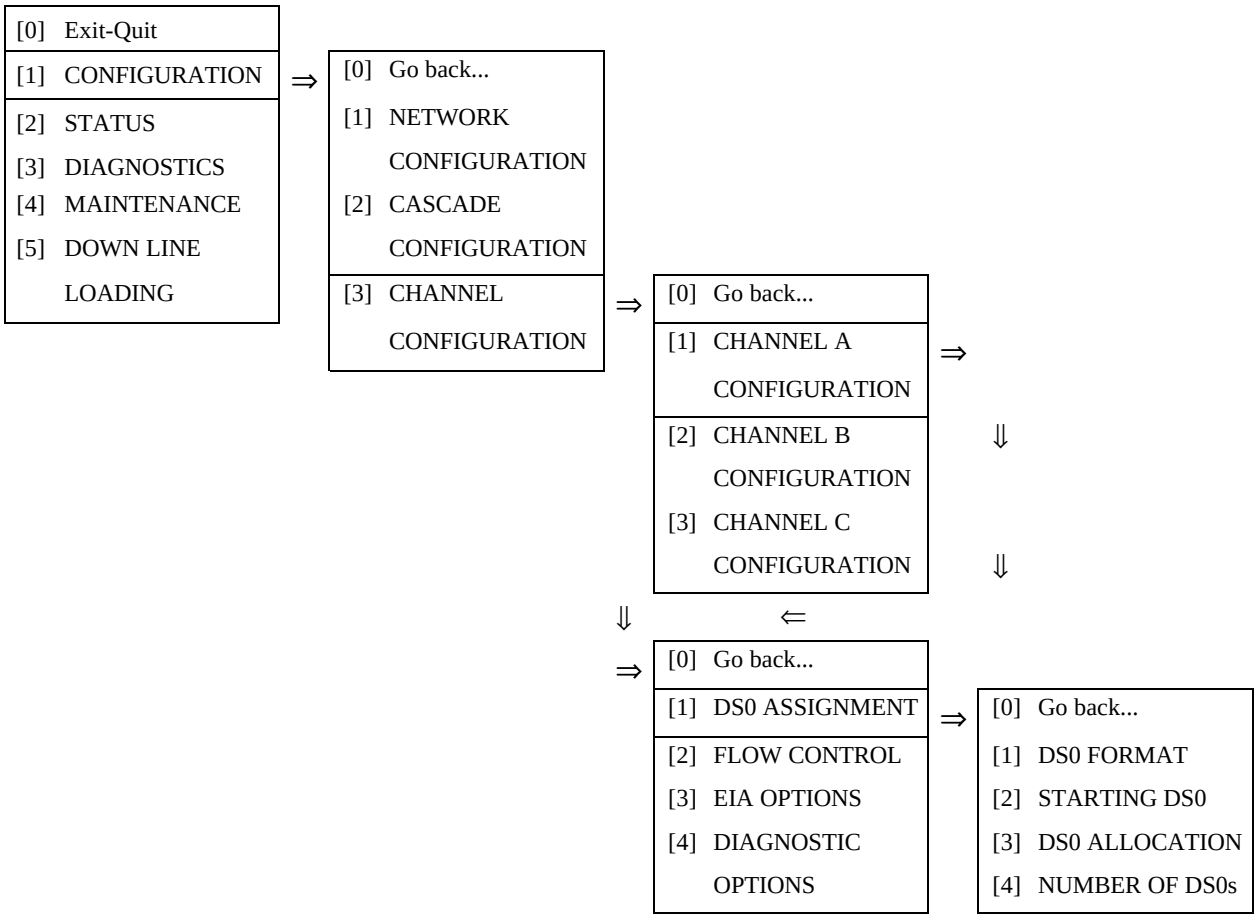


Figure 3-17 Terminal Interface: Channel Configuration, DS0 Assignment

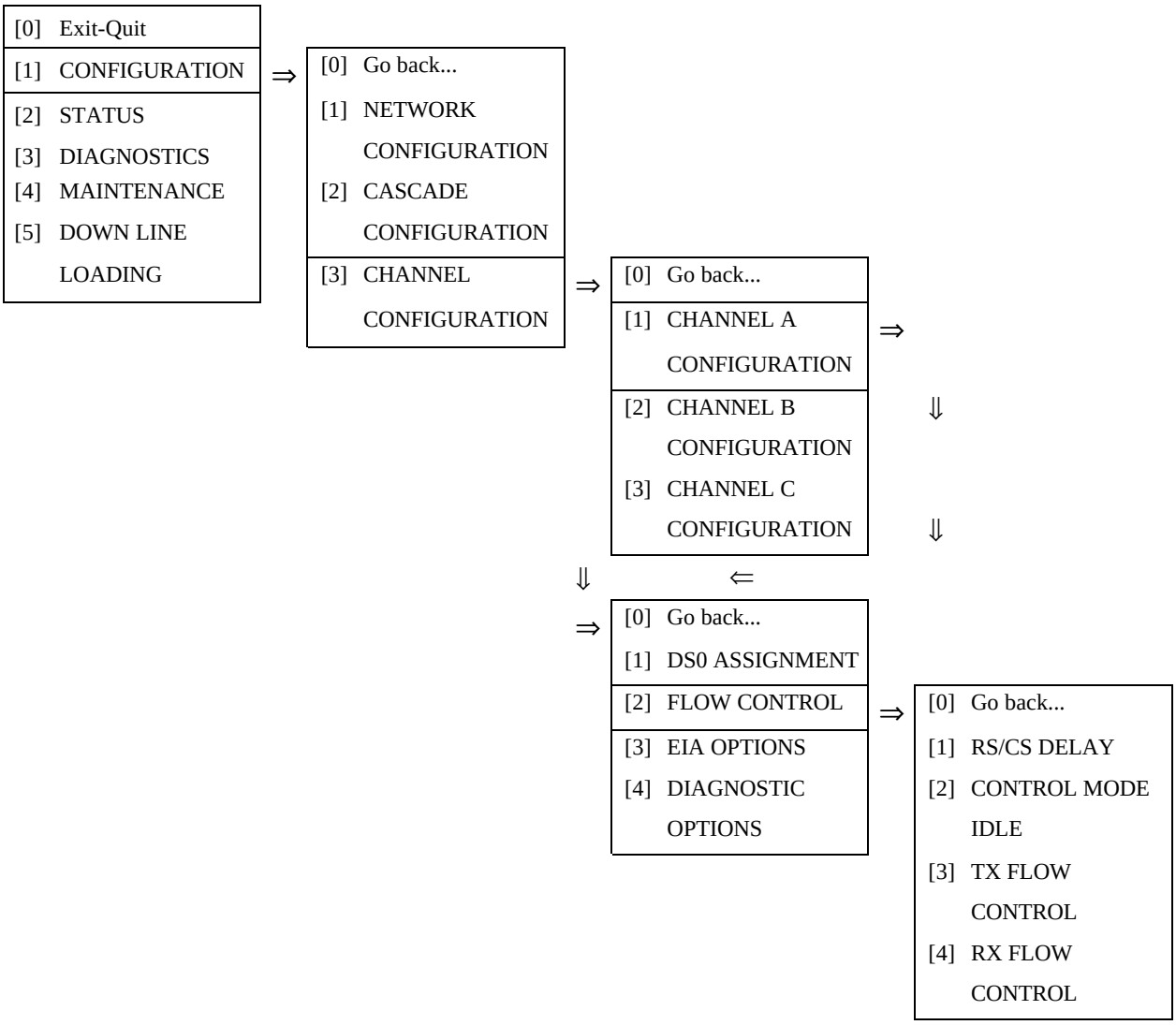


Figure 3-18 Terminal Interface: Channel Configuration, Flow Control

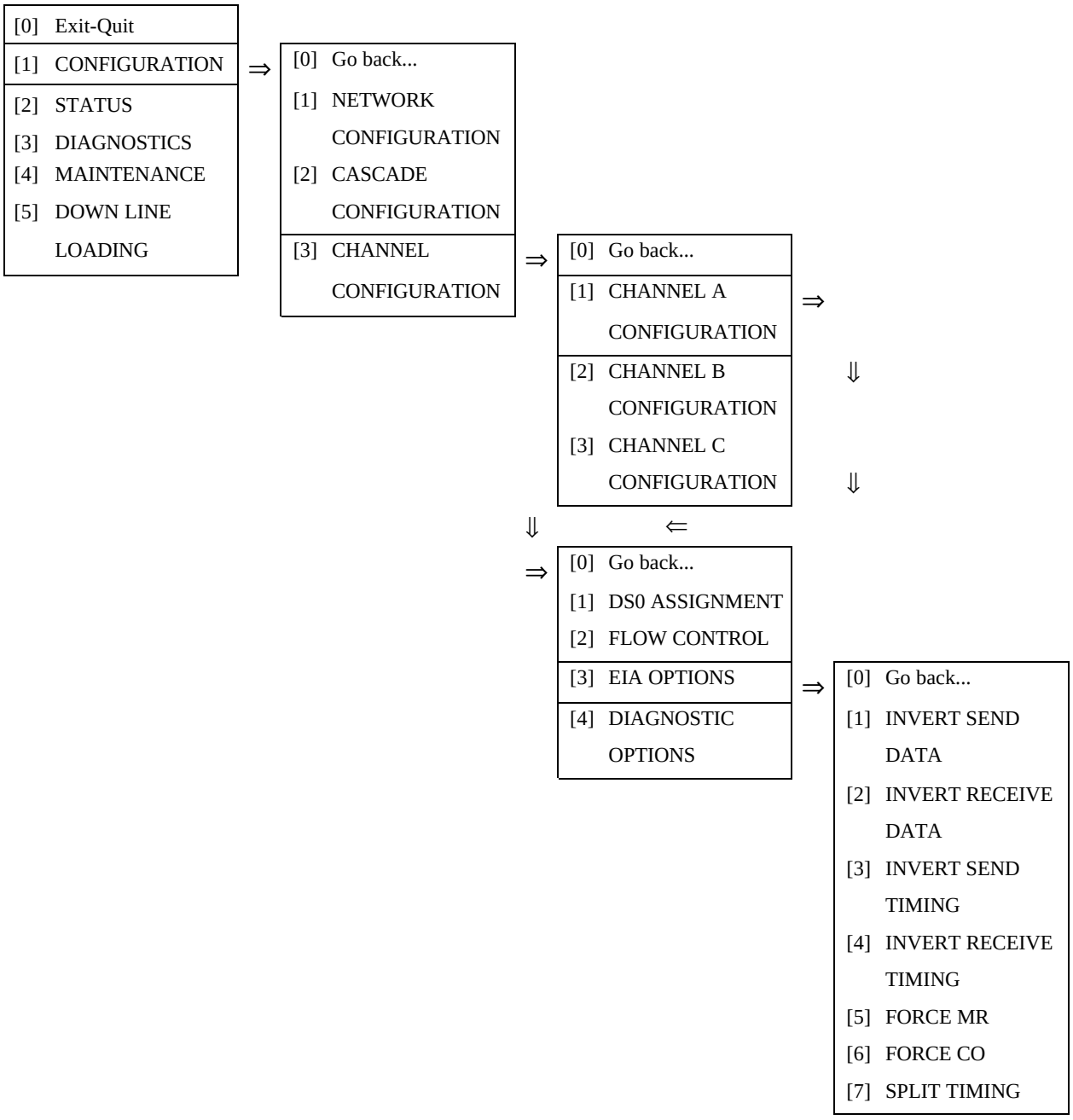


Figure 3-19 Terminal Interface: Channel Configuration, EIA Options

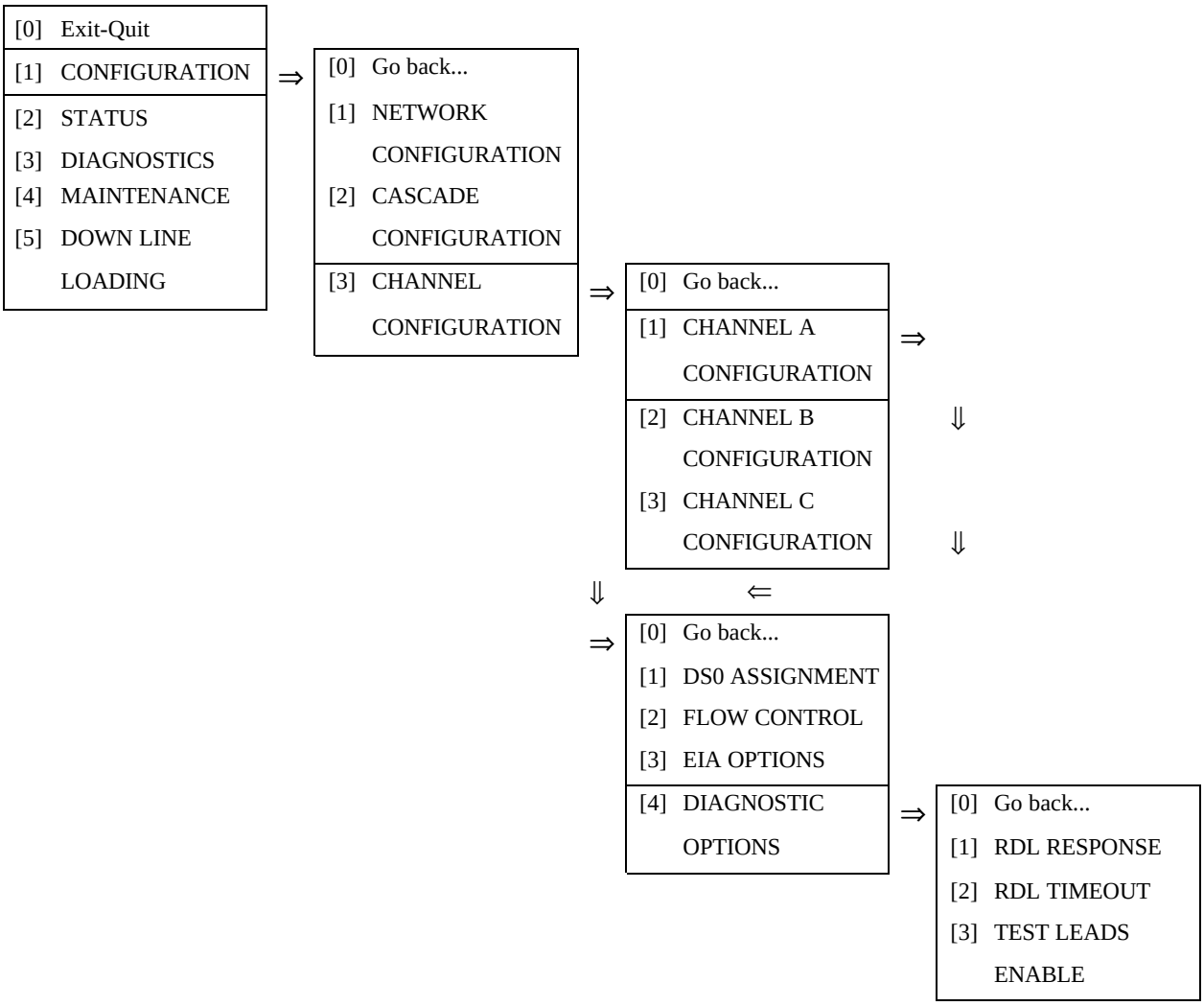


Figure 3-20 Terminal Interface: Channel Configuration, Diagnostic Options

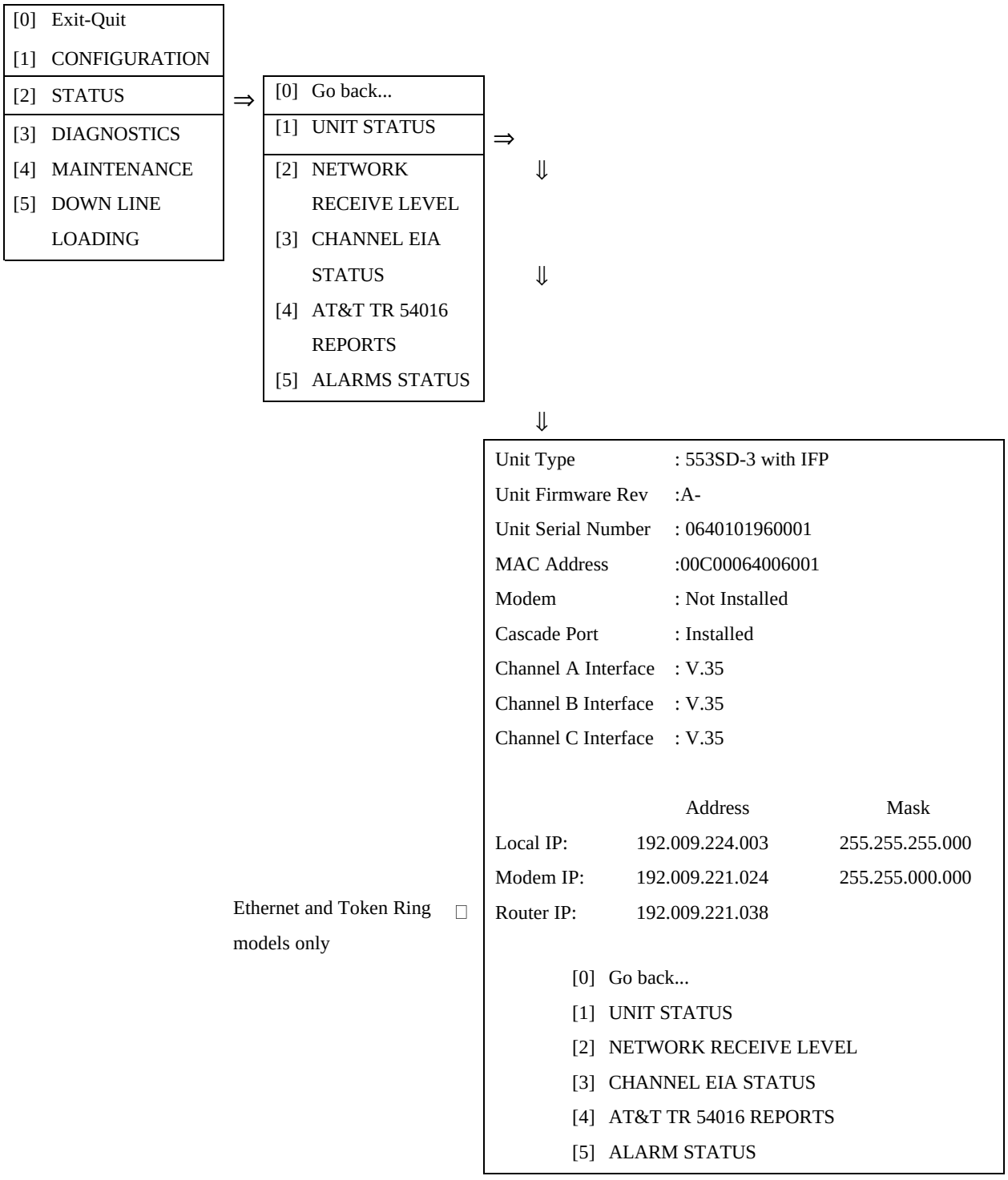


Figure 3-21 Terminal Interface: Status, Unit Status

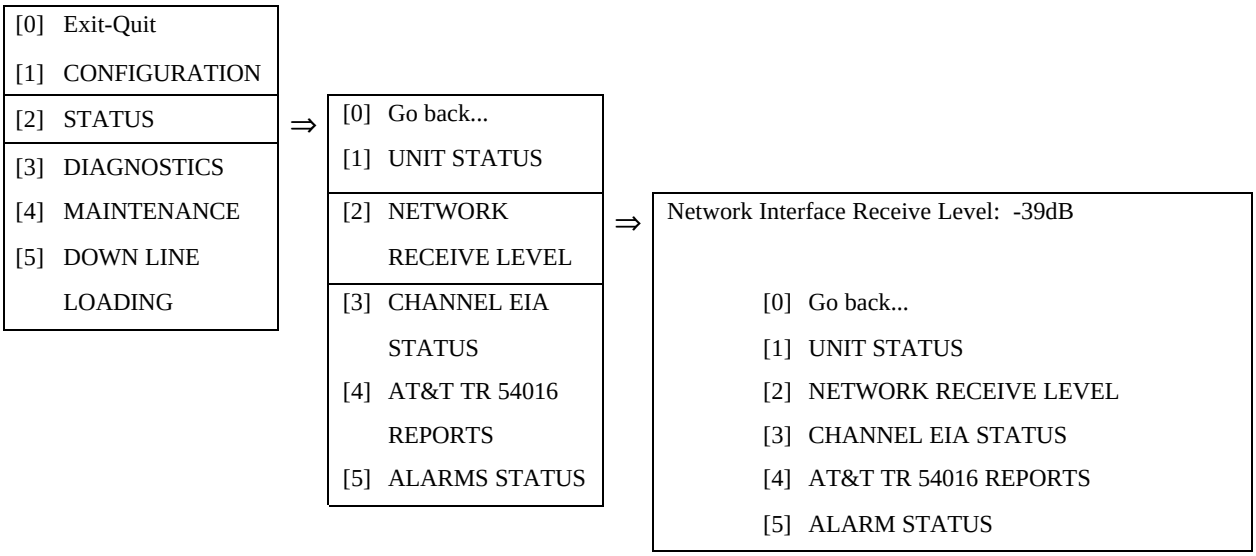


Figure 3-22 Terminal Interface: Status, Network Receive Level

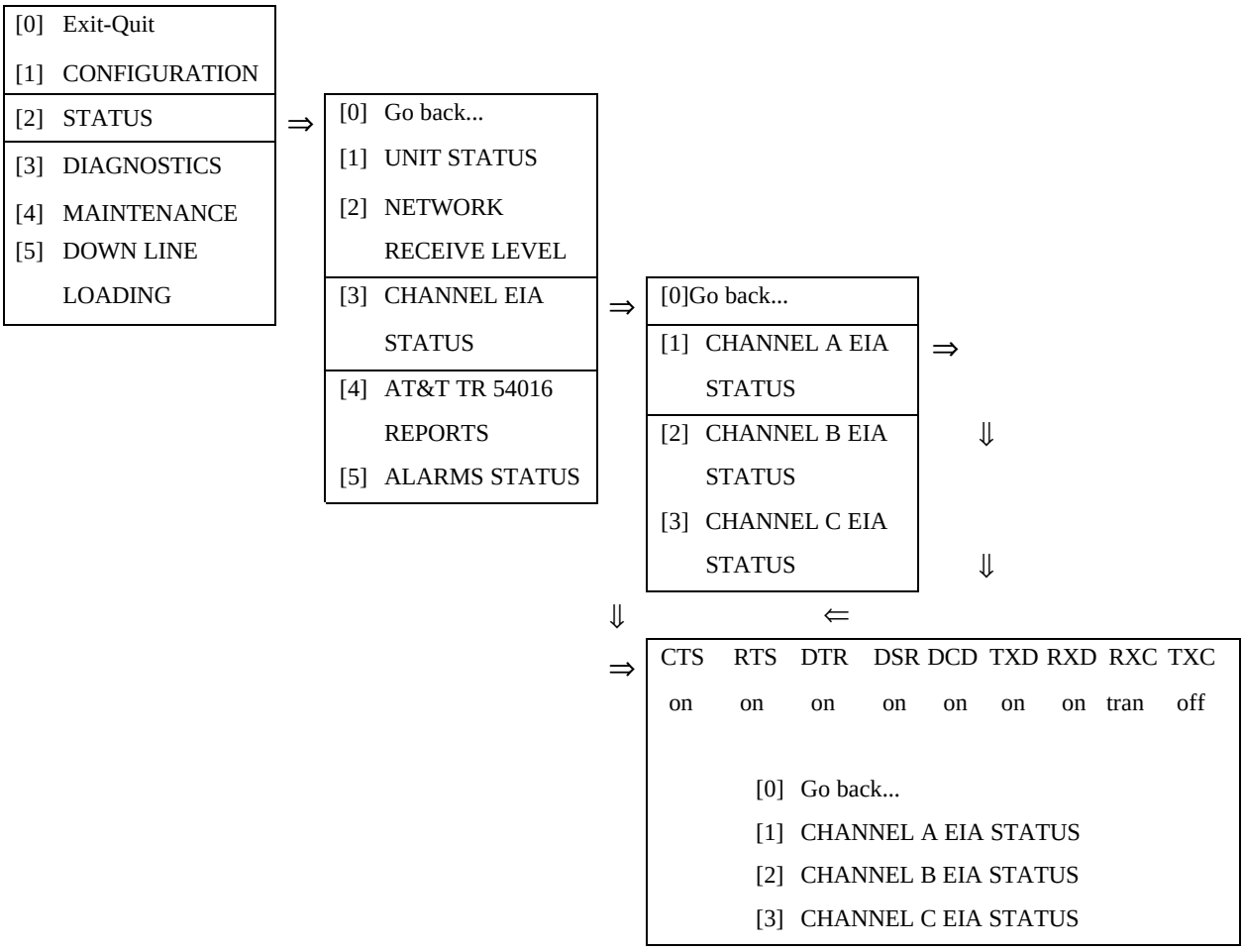


Figure 3-23 Terminal Interface: Status, DTE Signals

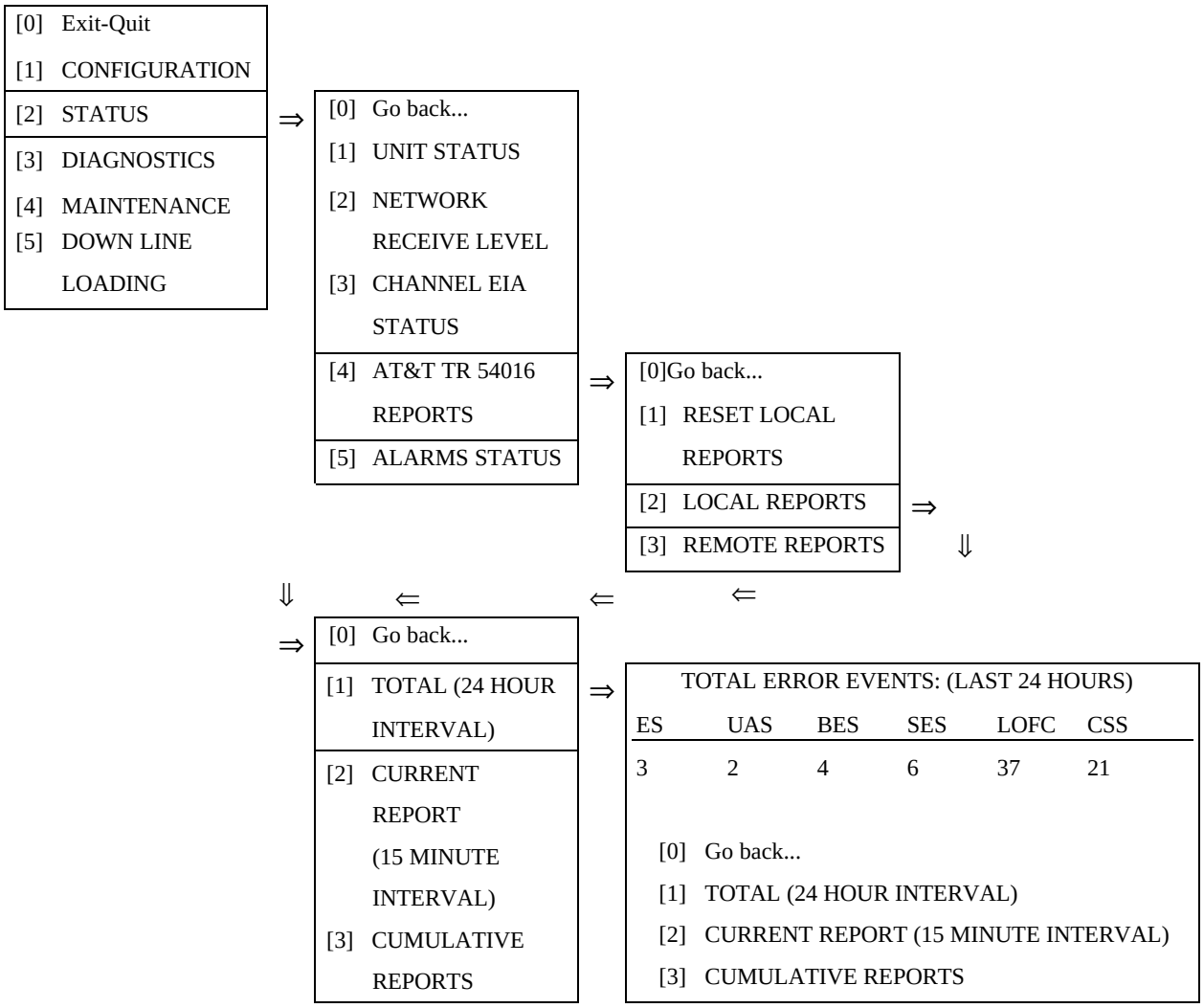
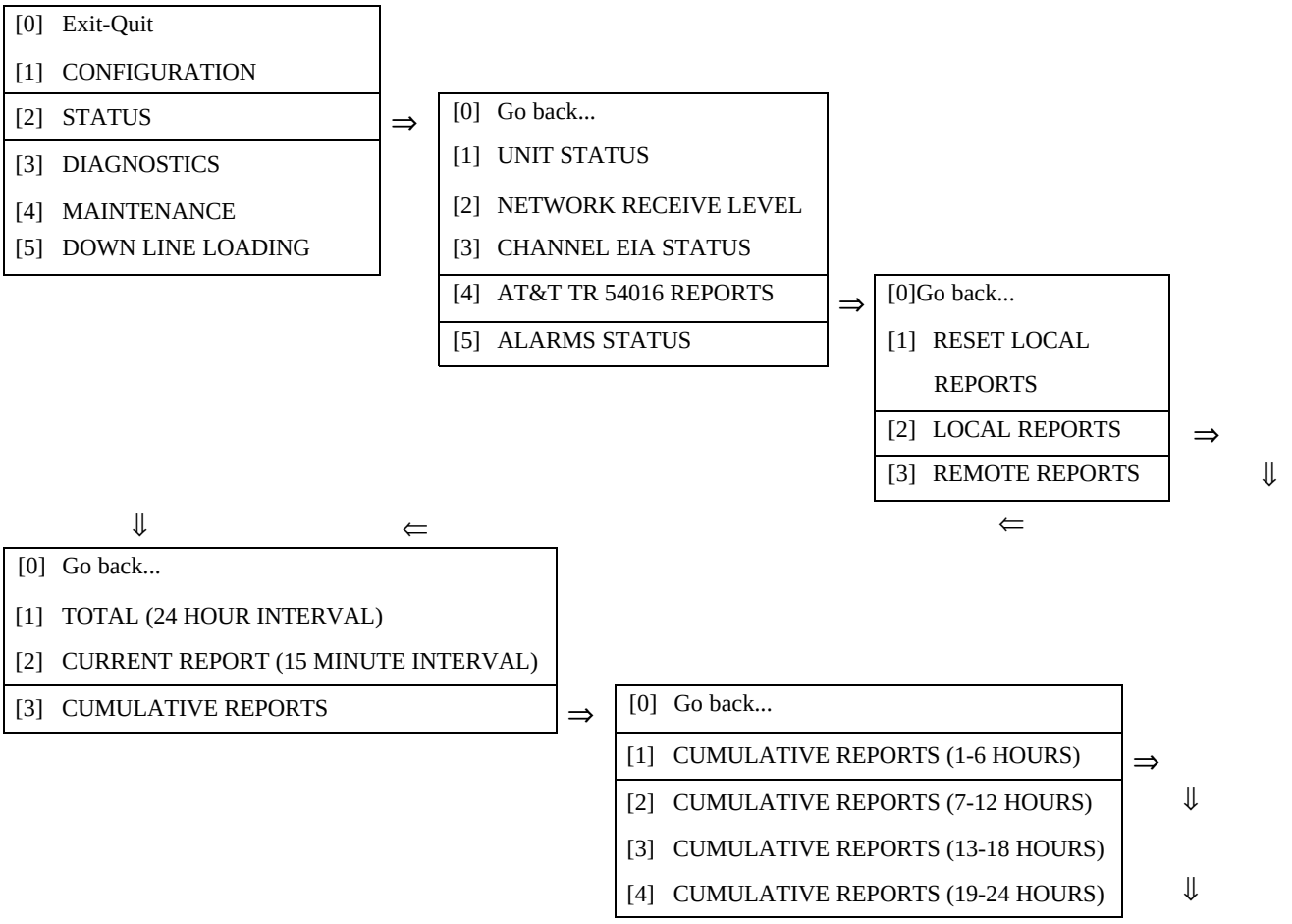


Figure 3-24 Terminal Interface: Status, AT&T Reports - Total ([2] Current Report provides the same display for a single 15-minute interval)



CUMULATIVE ERROR EVENTS: (1 to 6 HOURS -- 15 MINUTE INTERVALS)

	ES	UAS	BES	SES	LOFC	CSS		ES	UAS	BES	SES	LOFC	CSS
01	3	2	4	6	37	21	02	3	2	4	6	37	21
03	3	2	4	6	37	21	04	3	2	4	6	37	21
05	3	2	4	6	37	21	06	3	2	4	6	37	21
07	3	2	4	6	37	21	08	3	2	4	6	37	21
09	3	2	4	6	37	21	10	3	2	4	6	37	21
11	3	2	4	6	37	21	12	3	2	4	6	37	21
13	3	2	4	6	37	21	14	3	2	4	6	37	21
15	3	2	4	6	37	21	16	3	2	4	6	37	21
17	3	2	4	6	37	21	18	3	2	4	6	37	21
19	3	2	4	6	37	21	20	3	2	4	6	37	21
21	3	2	4	6	37	21	22	3	2	4	6	37	21
23	3	2	4	6	37	21	24	3	2	4	6	37	21

[0] Go back...

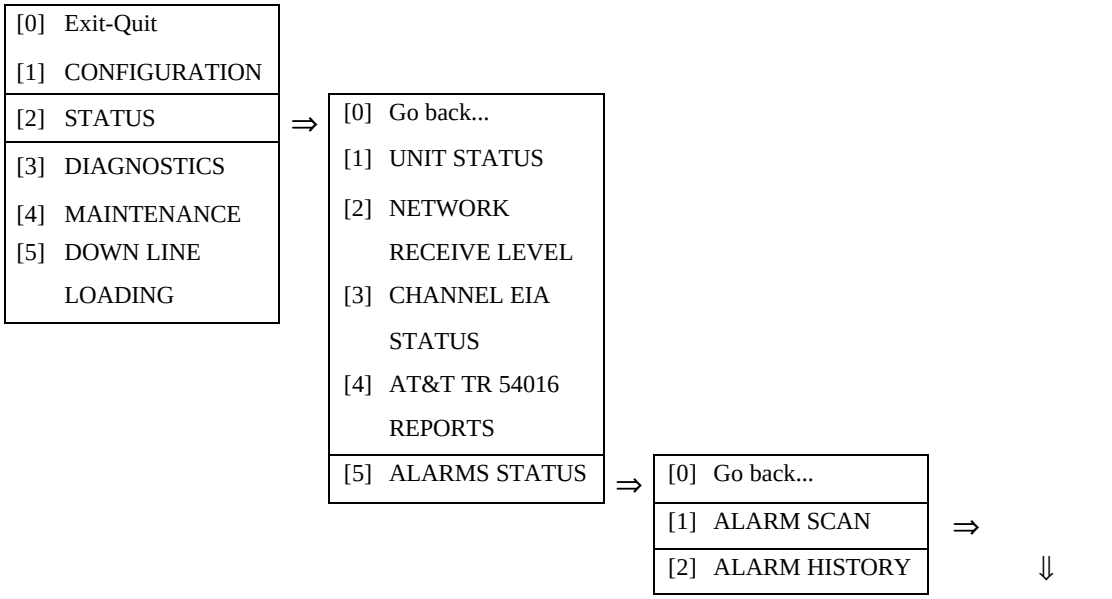
[1] CUMULATIVE REPORTS (1-6 HOURS)

[2] CUMULATIVE REPORTS (7-12 HOURS)

[3] CUMULATIVE REPORTS (13-18 HOURS)

[4] CUMULATIVE REPORTS (19-24 HOURS)

Figure 3-25 Terminal Interface: Status, AT&T Reports - Cumulative



NETWORK ALARMS	STATUS
LOSS OF SIGNAL	INACTIVE
OUT OF FRAME	INACTIVE
ALARM INDICATION SIGNAL	INACTIVE
UNAVAILABLE SIGNAL STATE	INACTIVE
RECEIVED YELLOW	INACTIVE
BIPOLAR VIOLATIONS	INACTIVE
CYCLIC REDUNDANCY CHECK	INACTIVE
EXCESSIVE ZEROS	INACTIVE
LOW AVERAGE DENSITY	INACTIVE
CONTROLLED SLIPS	INACTIVE

EQUIPMENT/CASCADE ALARMS	STATUS
LOSS OF SIGNAL	INACTIVE
OUT OF FRAME	INACTIVE
ALARM INDICATION SIGNAL	INACTIVE
UNAVAILABLE SIGNAL STATE	INACTIVE
RECEIVED YELLOW	INACTIVE
BIPOLAR VIOLATIONS	INACTIVE
CYCLIC REDUNDANCY CHECK	INACTIVE

UNIT ALARMS	STATUS
STATUS CHANGE	INACTIVE
UNSOLICITED TEST	INACTIVE
TIMING LOSS	INACTIVE
UNIT FAILURE	INACTIVE
NVRAM CHECKSUM CORRUPT	INACTIVE
POWER-UP ALARM	INACTIVE

[0] Go back…
[1] REFRESH

Figure 3-27 Terminal Interface: Status, Alarm Scan

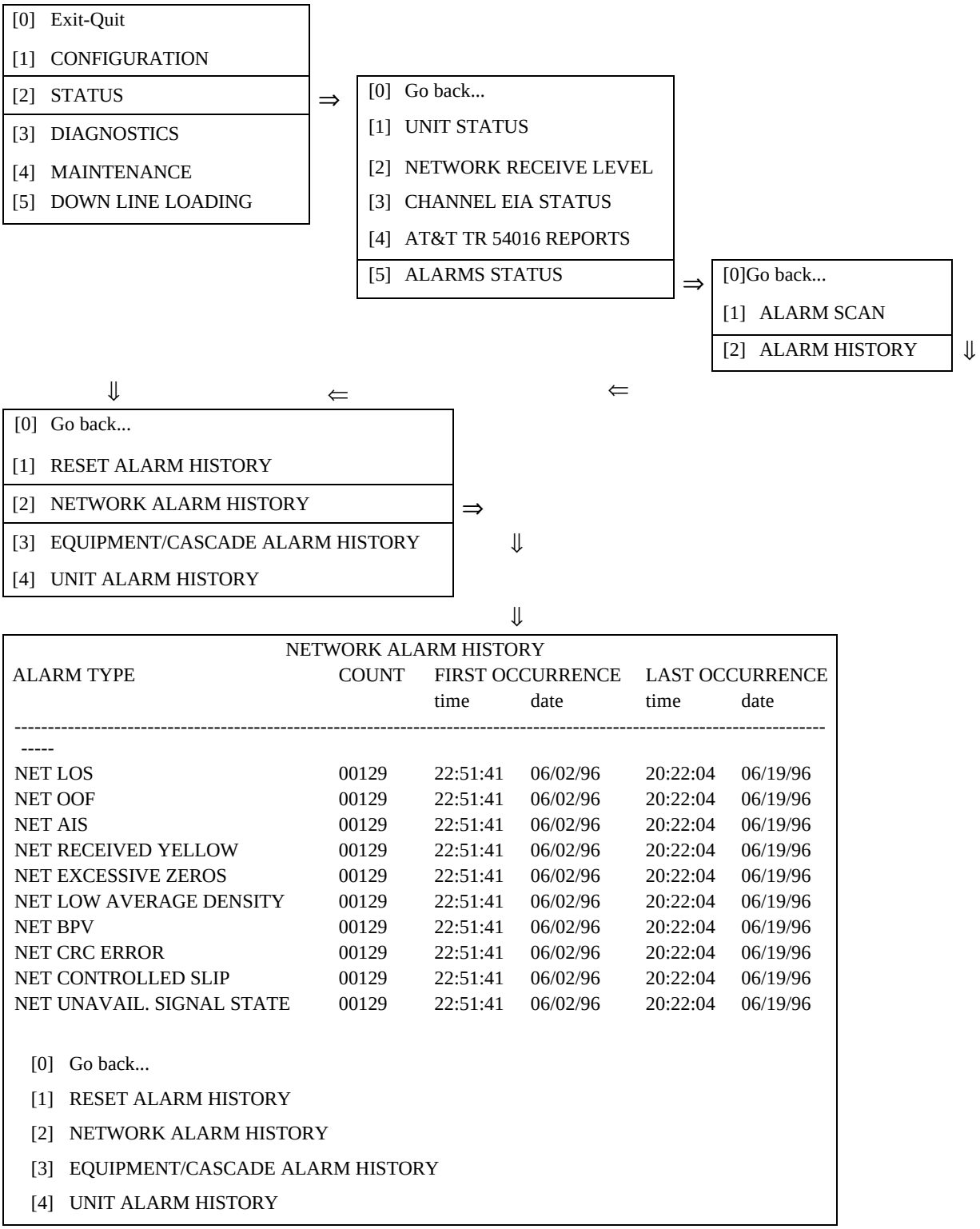


Figure 3-28 Terminal Interface: Status, Alarm Status, Alarm History - Network (Equipment/Cascade and Unit Alarm Histories employ the same format)

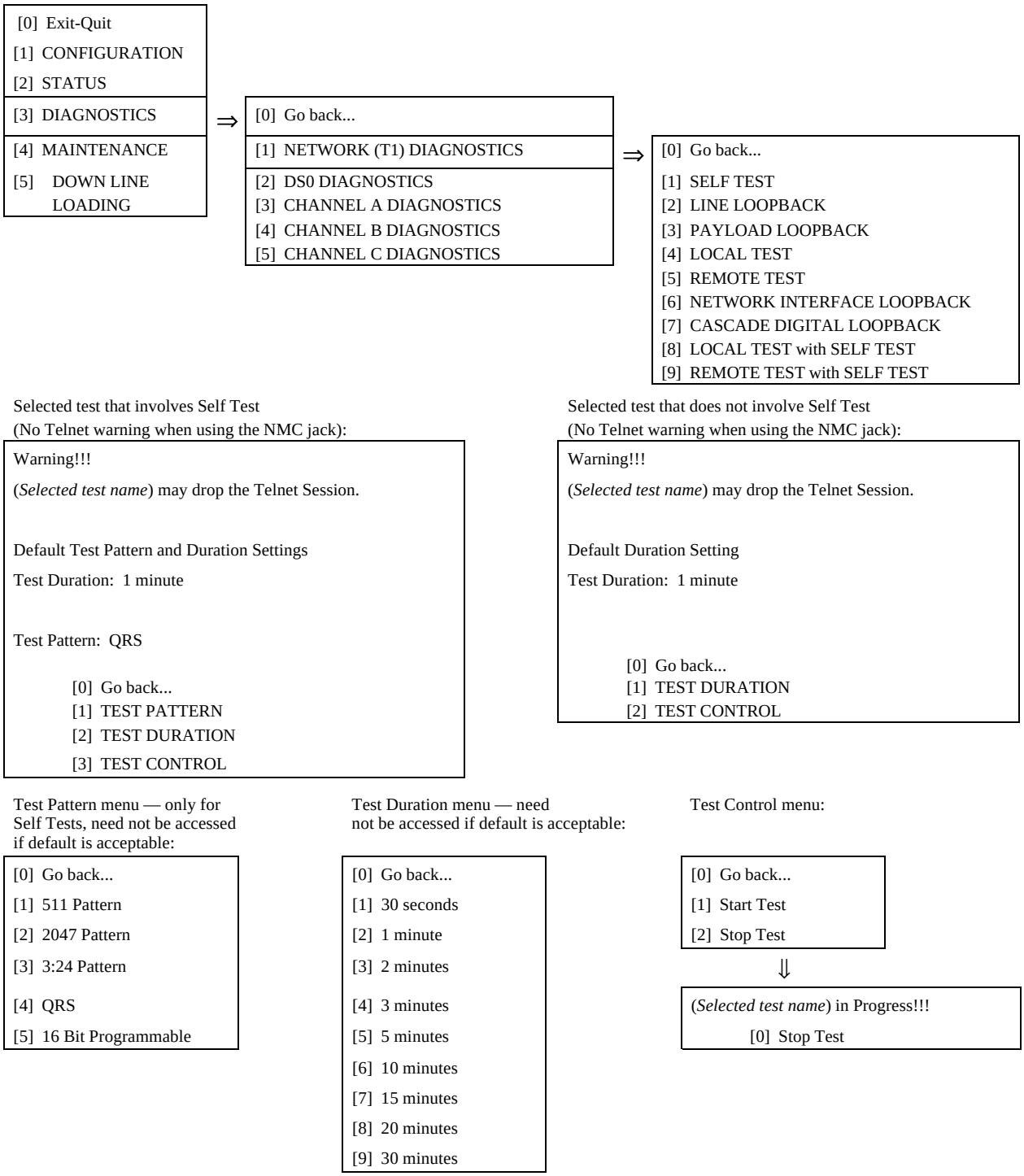


Figure 3-29 Terminal Interface: Diagnostics, Network (T1) Diagnostics

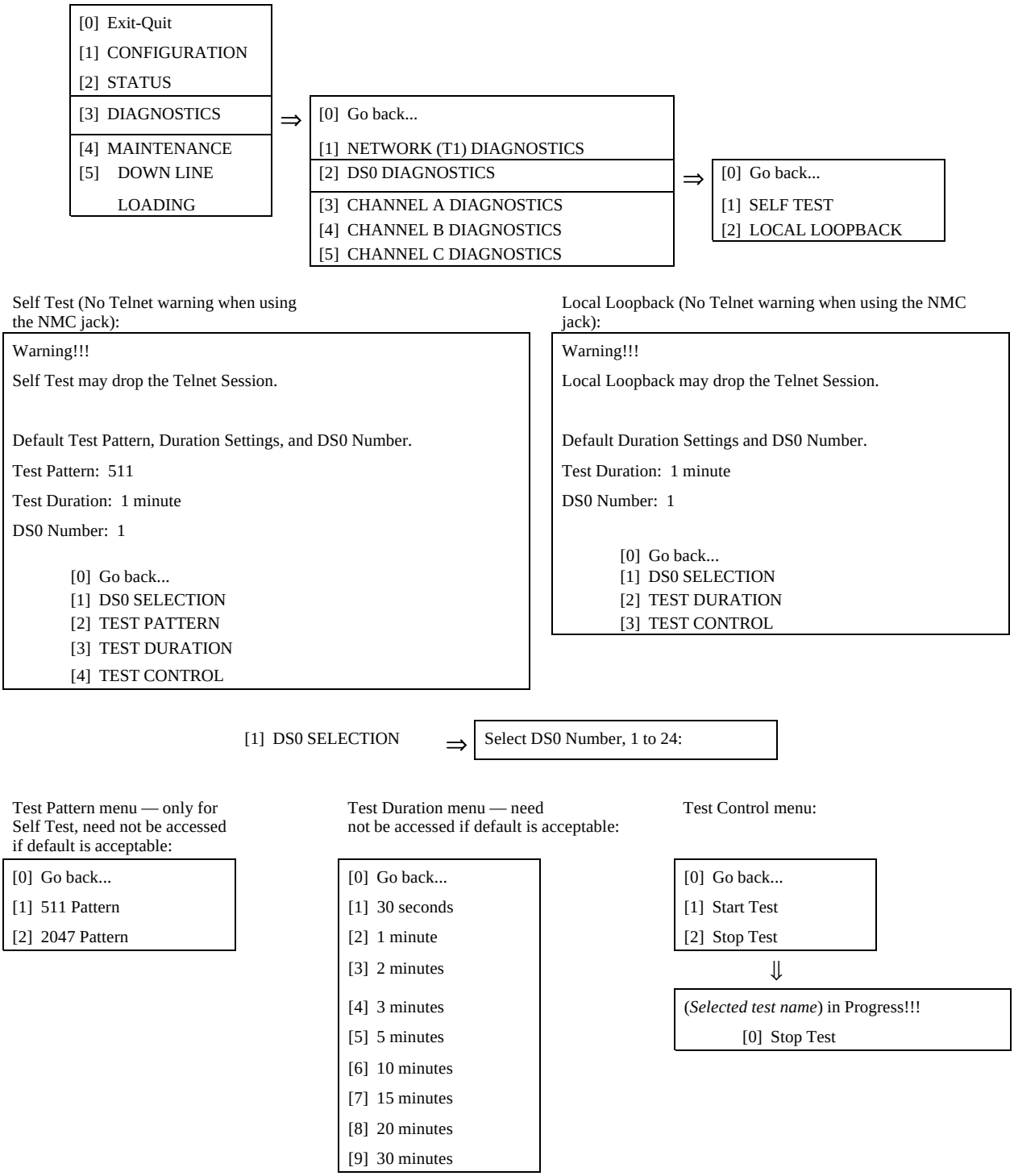


Figure 3-30 Terminal Interface: Diagnostics, DS0 Diagnostics

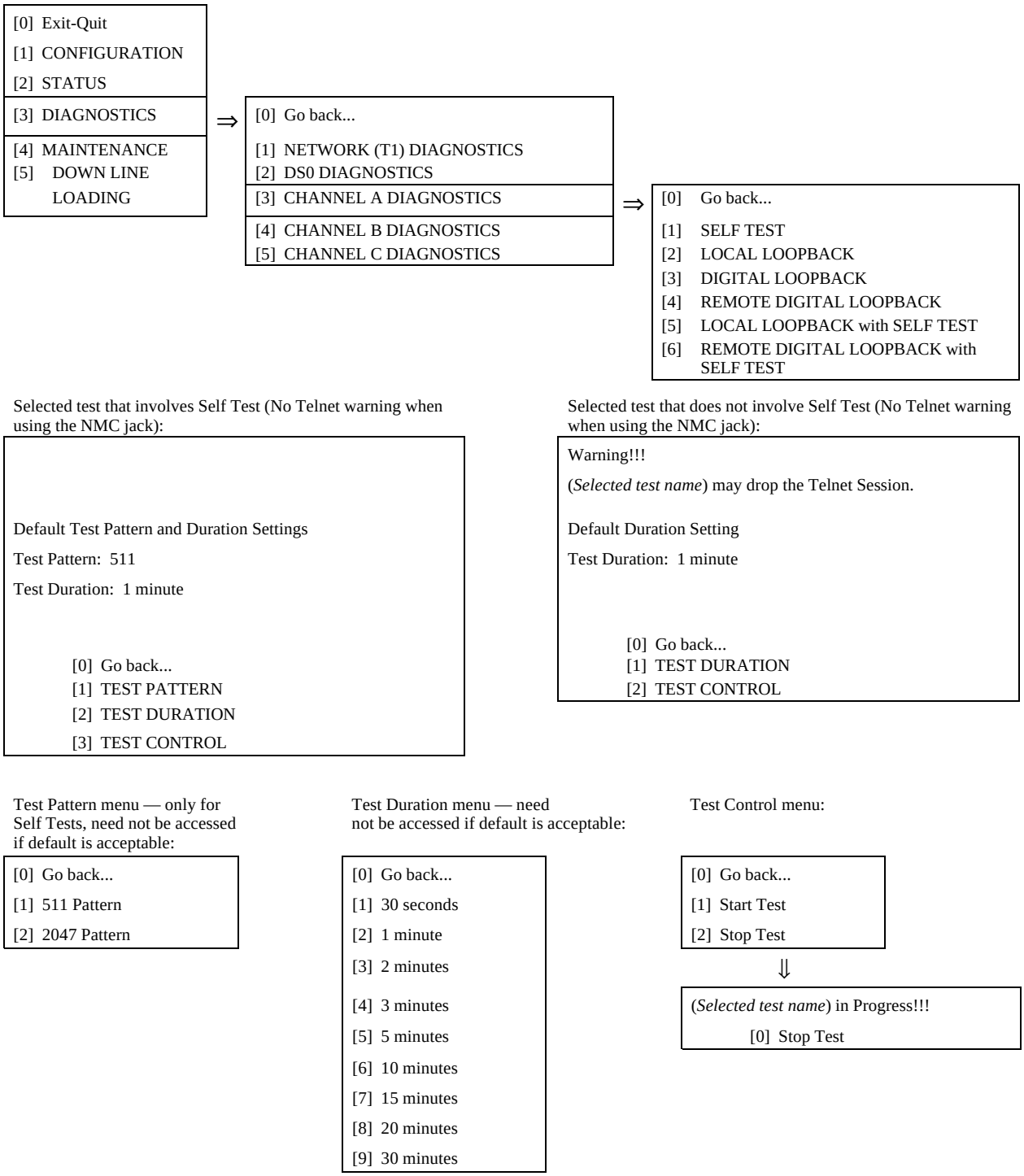


Figure 3-31 Terminal Interface: Diagnostics, Channel Diagnostics

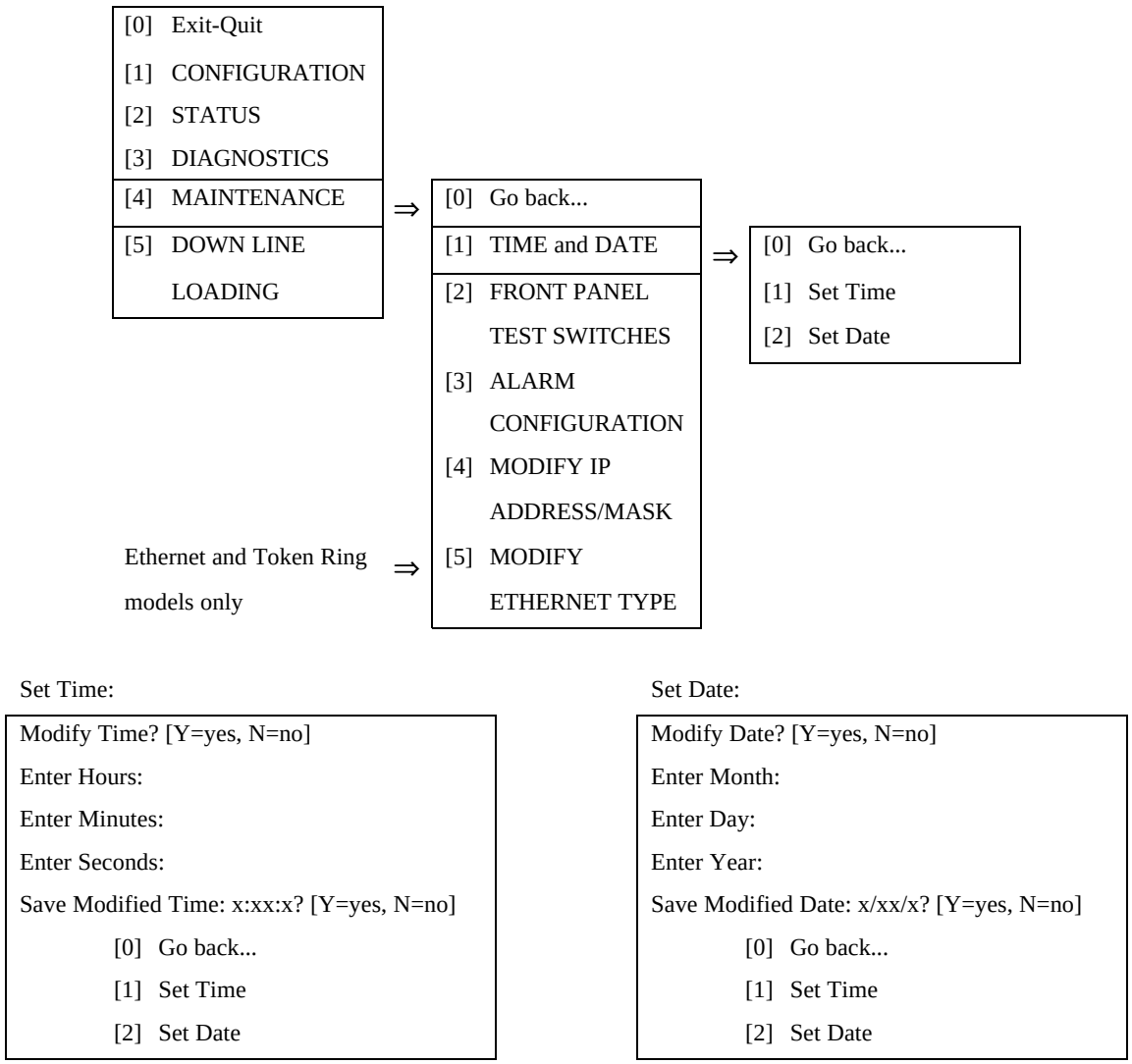


Figure 3-32 Terminal Interface: Maintenance, Set Time and Date

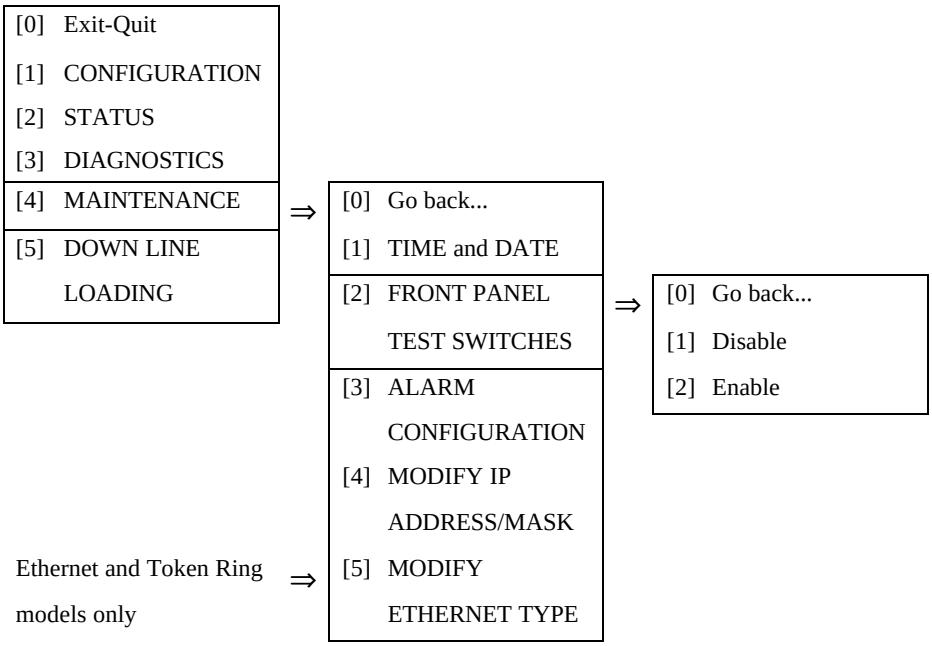
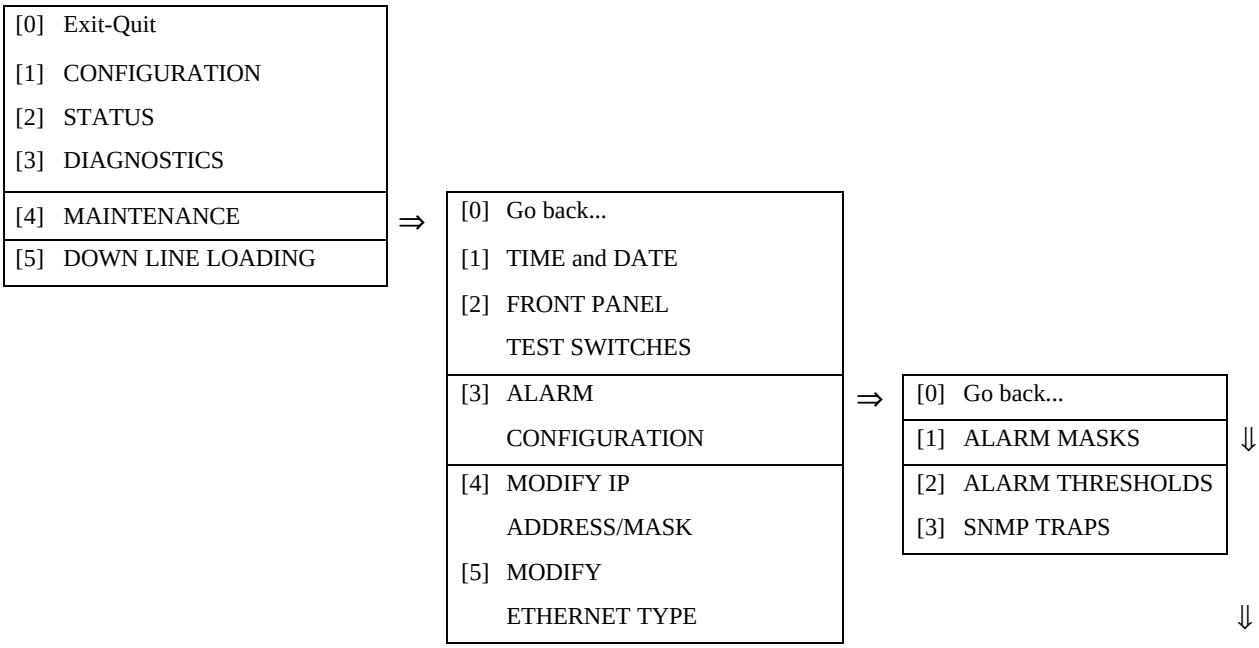


Figure 3-33 Terminal Interface: Maintenance, Front Panel Test Switches



ALARM MASK CONFIGURATION

NETWORK ALARMS	MASKING	EQUIPMENT/CASCADE ALARMS	MASKING
[a] LOSS OF SIGNAL	UNMASK	[k] LOSS OF SIGNAL	UNMASK
[b] OUT OF FRAME	UNMASK	[l] OUT OF FRAME	UNMASK
[c] ALARM INDICATION SIGNAL	UNMASK	[m] ALARM INDICATION SIGNAL	UNMASK
[d] UNAVAILABLE SIGNAL STATE	UNMASK	[n] UNAVAILABLE SIGNAL STATE	UNMASK
[e] RECEIVED YELLOW	UNMASK	[o] RECEIVED YELLOW	UNMASK
[f] BIPOLAR VIOLATIONS	UNMASK	[p] BIPOLAR VIOLATIONS	UNMASK
[g] CYCLIC REDUNDANCY CHECK	UNMASK	[q] CYCLIC REDUNDANCY CHECK	UNMASK
[h] EXCESSIVE ZEROS	UNMASK		
[i] LOW AVERAGE DENSITY	UNMASK	UNIT ALARMS	MASKING
[j] CONTROLLED SLIPS	UNMASK		
		[r] STATUS CHANGE	UNMASK
NOTE: POWER UP, CONFIG ERROR, AND UNIT FAILURE ARE NON-MASKABLE.		[s] UNSOLICITED TEST	UNMASK
		[t] TIMING LOSS	UNMASK

[0] Go back…
[1] UNMASK
[2] MASK
[3] UNMASK ALL
[4] MASK ALL

Figure 3-34 Terminal Interface: Maintenance, Alarm Configuration, Alarm Masks

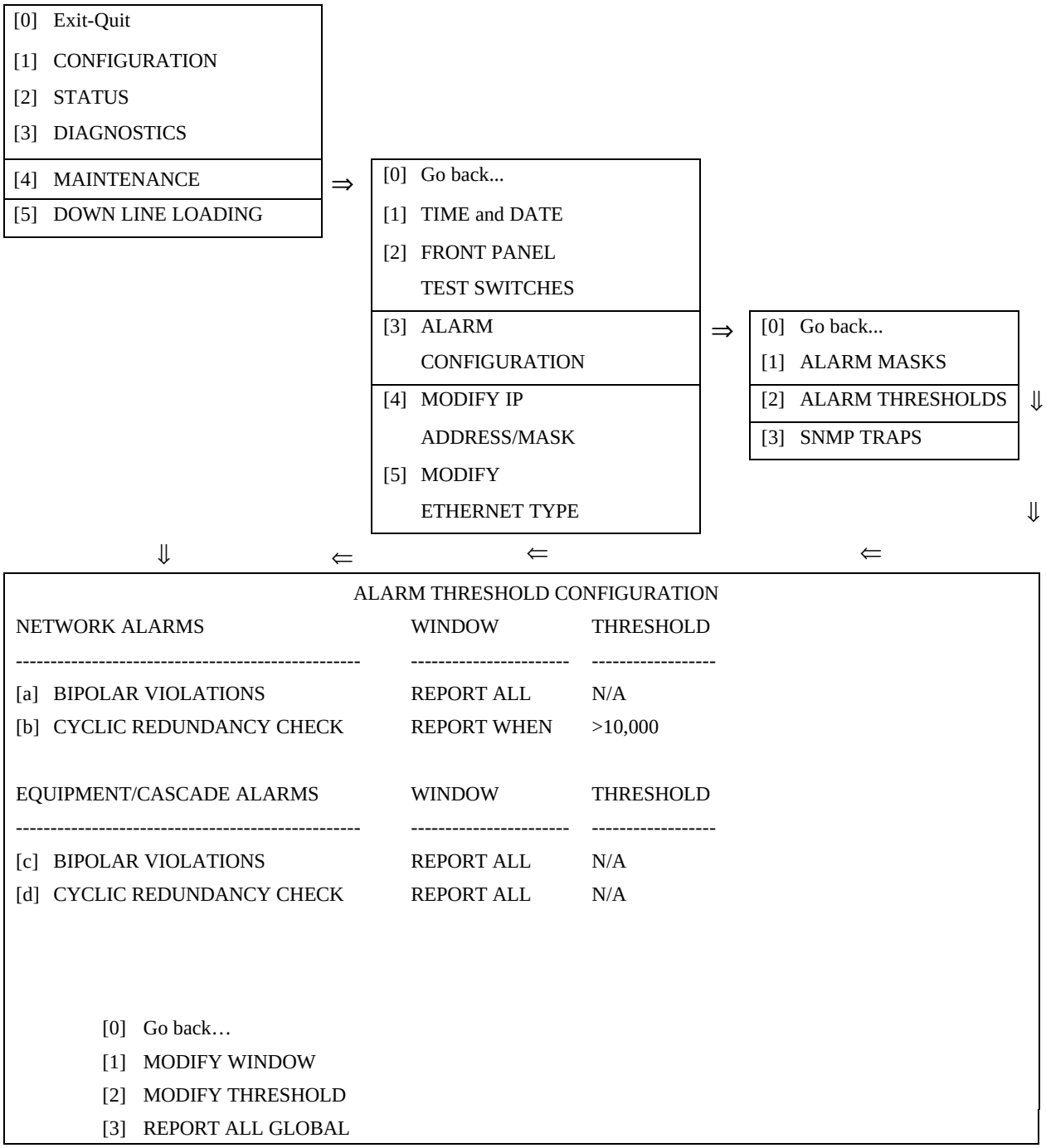


Figure 3-35 Terminal Interface: Maintenance, Alarm Configuration, Thresholds

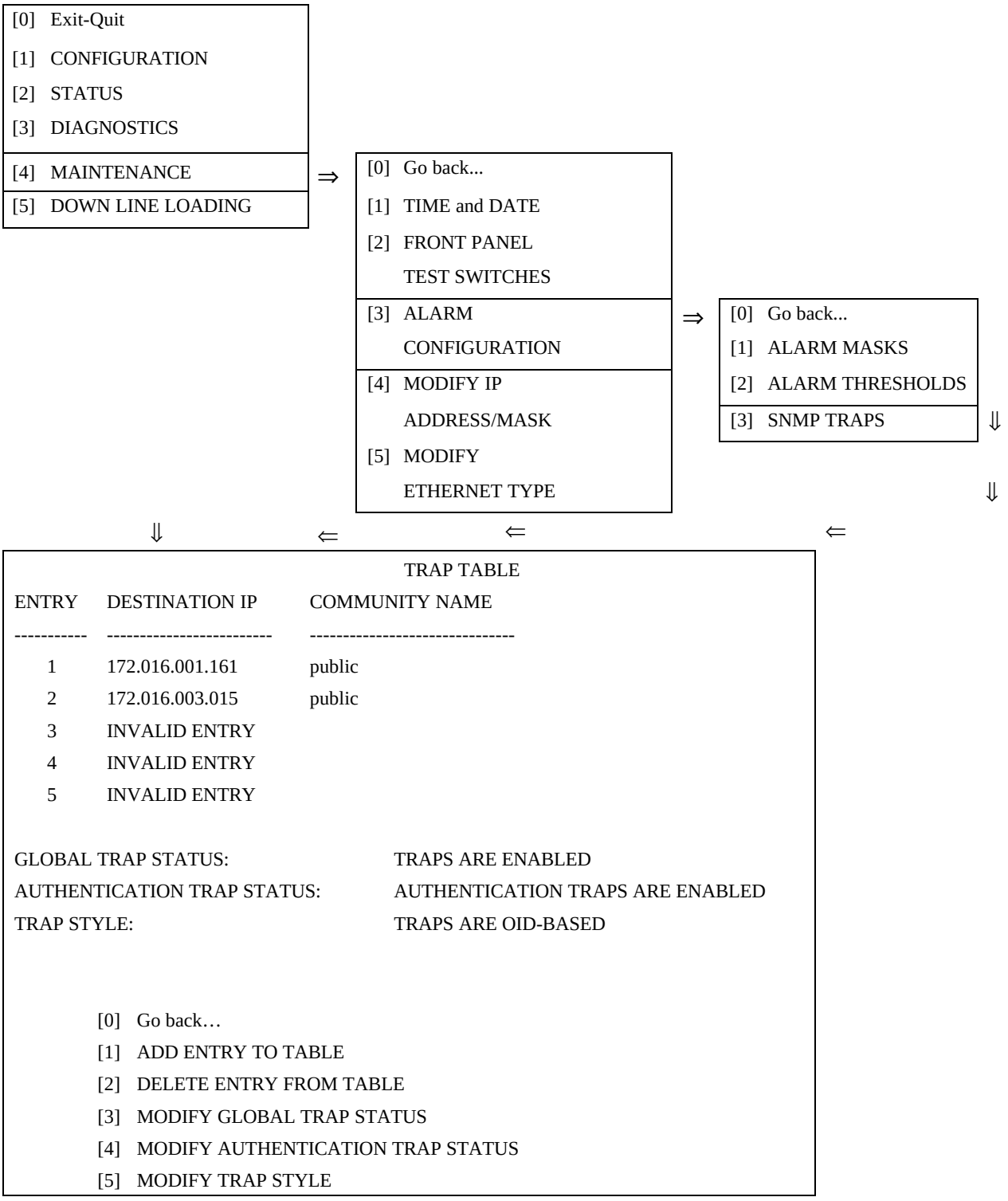


Figure 3-36 Terminal Interface: Maintenance, Alarm Configuration, SNMP Traps

NOTE

Changes to the Trap Table are saved in the unit immediately as they are made.

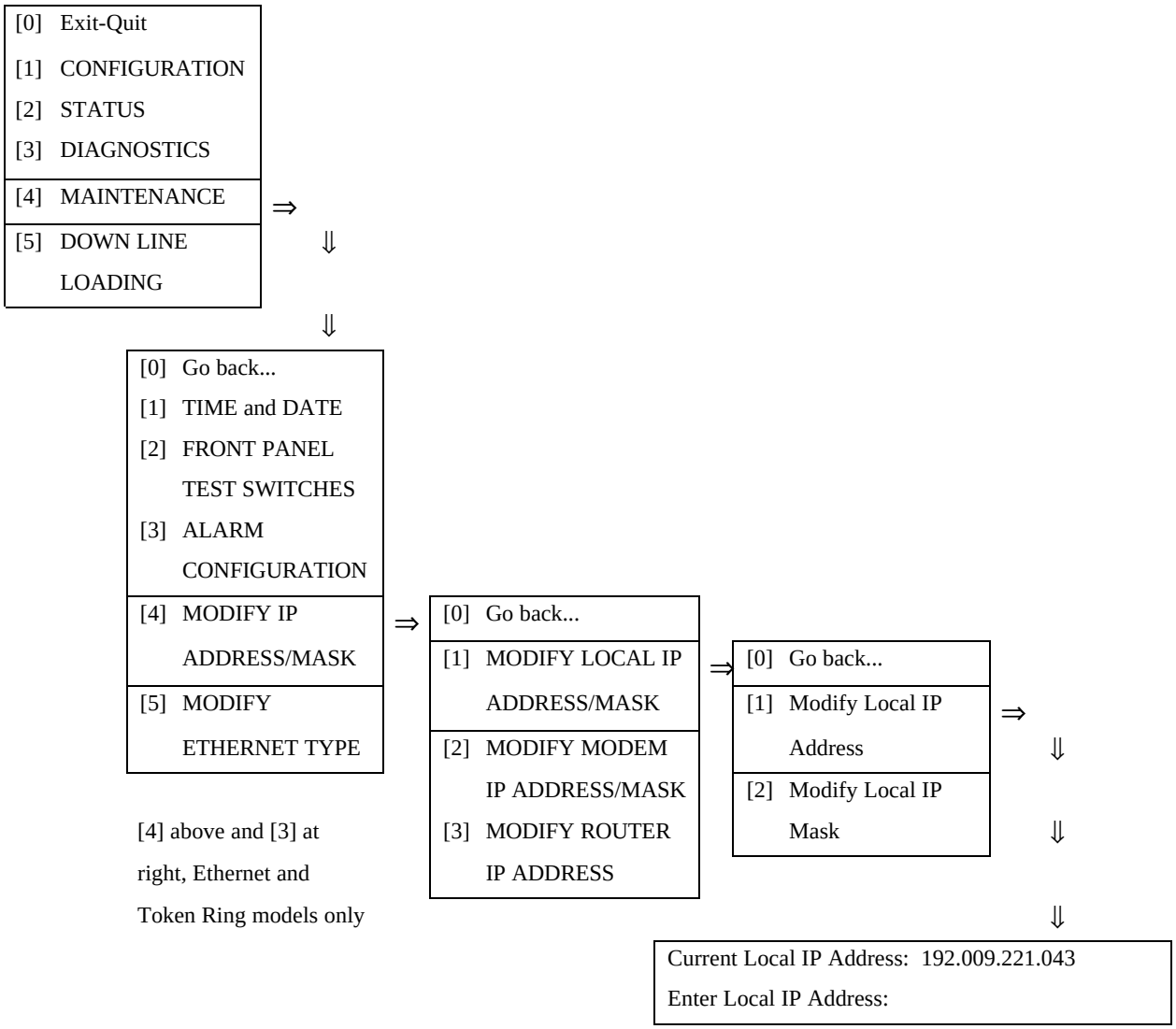


Figure 3-37 Terminal Interface: Maintenance, Modify IP Address/Mask

NOTE

A. The Modify IP Address/Mask function appears in the Maintenance menu only during a VT-100-compatible connection through the front panel NMC jack.

B. Follow the same procedure shown in Figure 3-37 *when modifying the Modem IP Address and Mask or the Router IP Address.*

C. Changes to the IP addresses and masks are saved in the unit immediately as they are made.

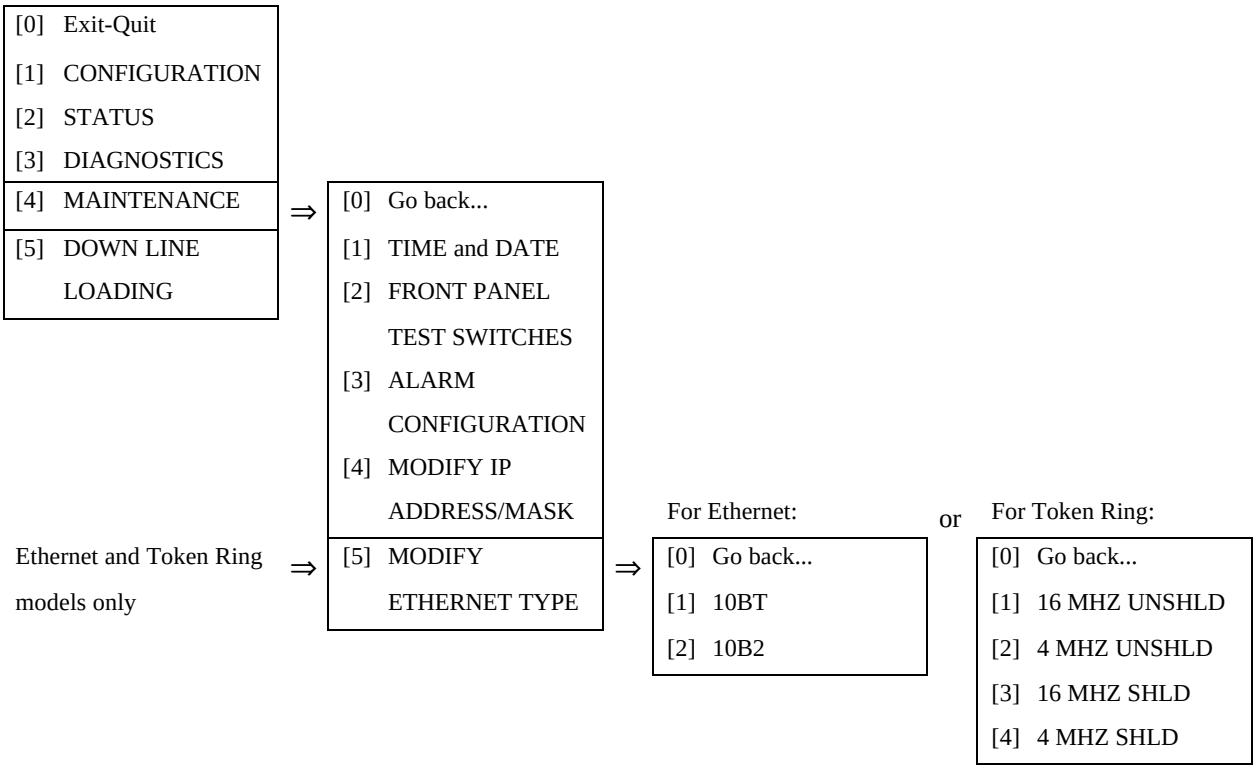


Figure 3-38 Maintenance, Modify Ethernet Type

NOTE

Ethernet Type modifications are saved in the unit immediately as they are made.

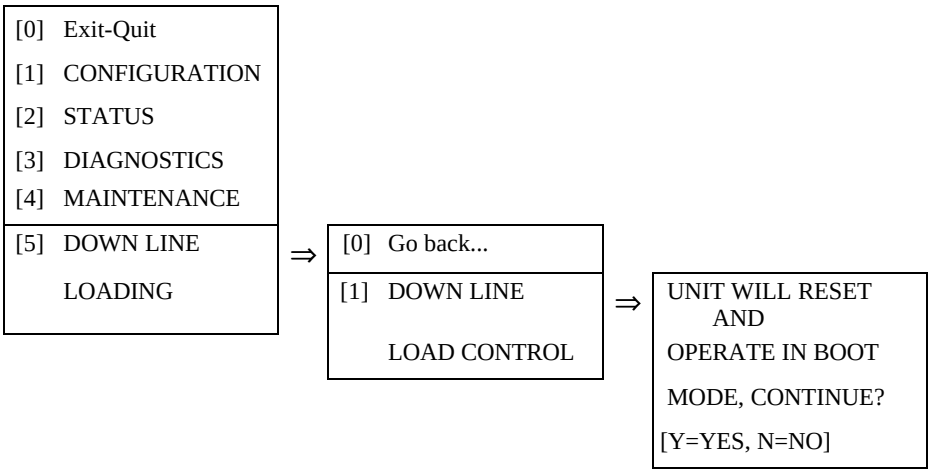


Figure 3-39 Terminal Interface: Down Line Loading

Down Line Loading

The terminal interface Down Line Loading function enables you to upload new operating firmware into the DSU through the management channel port interface. Uploading of firmware is typically required when GDC makes changes to improve performance or to include new features.

The function uses the Trivial File Transfer Protocol (TFTP) method of communication.

Do not invoke the Down Line Load Control function unless it is absolutely necessary to do so. Do not confuse this function with normal configuration optioning.

Requirements for Down Line Loading

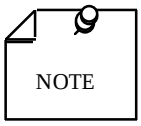
Before beginning either down line loading process you should

- Make sure you have a working version of TFTP available on a host that can "ping" the SNMP 553D/IFP DSU.
- Stop all SNMP management functions involving the DSU that is to receive the down load.
- Reduce data traffic through the DSU to an absolute minimum. The DSU can continue to pass user data while the downline loading process is under way, but its efficiency is reduced. If possible, schedule the procedure to take place during off hours.

If you are uploading new operating firmware into the DSU, make sure you have the software program file that is to be loaded. It should be named SNMP553.V*xxx* (*xxx* here represents the numeric identifier that appears in the actual file name; the format of the identifier varies depending on the type of host you use to perform the upload).

Down Line Loading Procedure

1. Establish a local Telnet connection to the SNMP 553D/IFP DSU and log in. Down Line Loading cannot be performed through the modem port.



The Down Line Loading functions can be invoked from a VT100-compatible terminal connected to the NMC jack on the front panel, but the actual upload or download TFTP procedure requires a computer. For that reason these functions should only be used during a Telnet session.

2. Select `[5] Down Line Loading`. The resulting menu offers the choices `[0] Go back...` and `[1] Down Line Load Control`.
3. Select `[1] Down Line Load Control`. The Boot Mode confirmation screen is displayed.
2. Enter `Y`. The DSU performs a reset and enters Boot Mode. The word "boot" is displayed in the lower right hand corner of the IFP screen.
3. Open a TFTP session to the DSU and select the binary file transfer mode.
4. Do a Put of the file SNMP553.V*xxx* in octet mode. When the transfer is complete, the DSU automatically performs a reset and returns to normal operating mode, using the newly loaded firmware.

4 Configuration

Overview

This chapter describes the SNMP 553SD/IFP DSU operating parameters you can configure by means of the Intelligent Front Panel, an SNMP controller, or the terminal interface. The parameters are arranged according to how they are accessed from the IFP and identified by their IFP designations. Some options or individual option selections may not be available to be configured as the result of their relationship to other options configured previously. The descriptions that follow identify the options and option selections for which that can be the case.

Default Configuration

Table 4-1 lists the default configuration settings for the DSU. You can restore the DSU to default settings at any time by means of the IFP configuration function Set Defaults.

Table 4-1 Default Configuration Settings

Option	Default
Channel Configuration	
DSO Format	64K
Start DS0	1 (Channel A) 2 (Channel B) 3 (Channel C)
Alternate DS0s	Disable
Rate	64 Kbps, 1 DS0
RS-CS Delay	RS On
Control Mode Idle (option available only if 56 Kbps and an RS-CS delay are configured)	Disabled
Transmit Flow Control (option available only if 56 Kbps, an RS-CS delay, and CMI enabled are configured)	RS
Receive Flow Control (option available only if 56 Kbps, an RS-CS delay, and CMI enabled are configured)	CO
Remote Digital Loop Response	Yes
Remote Digital Loop Timeout	Inhibit
Invert Data	True Send and Receive Data (not inverted)

(Continued on next page)

Table 4-1 Default Configuration Settings (Continued)

Option	Default
Channel Configuration (Continued)	
Invert Timing	True Send and Receive Timing (not inverted)
Force Modem Ready	Yes
Force Carrier On	Yes
Split Timing	Disabled
Test Leads	Disabled
Network Configuration	
Framing	Manual ESF
Line Code	B8ZS
Line Type	DS1
Line Build Out	0 dB
Equalization (option available only if Line Type is DSX-1)	None
Transmit Timing	Receive
Fallback Timing	Internal
ESF Mode	None
Inband Loopback	Inhibit
Ones Density Enforcement	Inhibit
AIS Loopdown (option only available if Inband Loopback is not Inhibit)	Inhibit
Cascade Configuration	
Framing	ESF
Line Code	B8ZS
Pre-Equalization	None
Other Configuration	
Password	Disable
Password Name	GDCGDC
Alarm Config	Unmask
Front Panel Switches	Enable
Front Panel Tests	Channel Pattern: 511
	T1 Pattern: 511
	T1 Prog Pattern: FFFF

Channel Configuration

Channel Rate

DS0 FORMAT

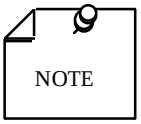
Options: 64K
56K

Selects the throughput rate for each individual DS0, 64 kbit/s or 56 kbit/s.

START DS0#

Options: None
1 — 24

Selects one of the 24 DS0s that make up the T1 line to be first in the group that carries the DTE channel data traffic. Selecting None disables the channel.



Evaluate the value you select for START DS0 in conjunction with DS0 FORMAT, ALT DS0, and RATE for the same channel, and in conjunction with the configuration of any other channel(s). Of particular importance:

- *a group of DS0s cannot "wrap around" (extend past DS0 24 to resume with DS0 1)*
- *there cannot be "overlap" between channels — each DS0 can only be assigned to one channel*

ALT DS0

Options: Disable
Enable

Enabling ALT (alternate) DS0 (for example, 1, 3, 5 — N) limits the bandwidth available for user data to no more than half the full bandwidth of the T1 line but eliminates the need to enforce minimum zero constraints.

Disabling ALT DS0 (for example, 1, 2, 3, 4 — N) permits use of the full T1 line bandwidth for user data. The user is responsible for enforcing minimum zero constraints through line coding.

RATE

Options: 0 — 1344 Kbps
0 — 1536 Kbps

The operating rate you configure here is a multiple of the rate selected for each DS0 (56 Kbps or 64 Kbps).

Passing a Control Signal

RS-CS DELAY

Options: RS On
10 MS Delay
Standard Delay

This option determines whether the DTE channel has a delay between RS from the DTE and CS from the DSU. Configuring RS On in the DSU results in a constant CS to the DTE. If a delay is needed, you can select either 10 milliseconds or the Standard Delay, which varies in duration depending on the configured channel speed.

CMI

Options: Disabled
Enabled

You must enable this option, Control Mode Idle, in order for the DSU to transmit a control signal to the far-end DSU.

This screen does not appear on the IFP if RS On is selected for RS-CS Delay. You cannot enable this option when 64K is selected for the DS0 Format.

TX FLW CTL

Option: RS
TR

This option selects between RS and TR as the interface signal from the DTE that causes the DSU to transmit a control signal to the far end of the communication link. Before you can option the DSU to pass a DTE interface control signal across the link, you must select 56K as the DS0 Format, specify an RS-CS delay, and enable CMI.

This screen appears on the IFP only when an RS-CS Delay is selected and CMI is enabled. This option is not available when 64K is selected for the DS0 Format.

RX FLW CTL

Options: CO
MR

This option selects between CO and MR as the interface signal the DSU outputs to the DTE in response to a control signal received from the far end of the communication link. Before you can option the DSU to receive a DTE interface control signal across the link, you must select 56K as the DS0 Format, specify an RS-CS delay, and enable CMI.

This screen appears on the IFP only when an RS-CS Delay is selected and CMI is enabled. This option is not available when 64K is selected for the DS0 Format.

Diagnostics Parameters

RDL RESP

Options: Yes
No

When you set this option to Yes the DSU accepts inband polynomial commands to initiate and end digital loopbacks.

RDL TMOUT

Options: Inhibit
10 Minutes

When RDL Response is set to Yes, this option permits you to specify whether or not the DSU ends loopbacks automatically. If you select 10 Minutes, the DSU automatically limits the duration of a Remote Digital Loopback to 10 minutes. If you select Inhibit, Remote Digital Loopbacks remain in effect until ended manually.

EIA Options

INV DATA

Options:

SD: True	RD: True
SD: True	RD: Inv
SD: Inv	RD: True
SD: Inv	RD: Inv

This option can cause the DSU to invert Transmit Data (SD) and/or Receive Data (RD). True indicates data not inverted.

INV TIMING

Options:

ST: True	RT: True
ST: True	RT: Inv
ST: Inv	RT: True
ST: Inv	RT: Inv

This option can cause the DSU to invert Transmit Timing (ST) and/or Receive Timing (RT). True indicates timing not inverted.

FORCE MR

Options: Yes
No

This option can cause the DSU to maintain MR in a constant on condition.

FORCE CO

Options: Yes
No

This option can cause the DSU to maintain CO in a constant on condition.

SPLIT TIMING

Options: Disabled
Enabled

When this option is enabled the DSU uses the channel External Clock signal to time Transmit Data at the DTE interface, independent of the timing it uses to transmit on the T1 line. Network Transmit Timing (NET TX TMG) selects the timing source for transmission on the T1 line. When this Split Timing option is disabled the DSU applies the timing source selected by Network Transmit Timing to both channel and network data.

TEST LEADS

Options: Disable
Enable

When this option is enabled DTE interface leads can initiate Remote Digital Loopback (RDL) and Channel Local Loopback (AL).

Network Configuration

Network Parameters

NET FRAMING

Options: Manual ESF
Auto
Manual D4

Network Framing selects the framing format for the DS1 signal at the network interface. The choices are Manual Extended Superframe Format, Manual D4 Superframe Format, or Auto Framing. In Auto Framing the DSU conforms to the frame format of the signal it receives.

The on-screen selection for Auto displays the current frame format in parentheses. If the DSU has the optional cascade interface, selecting Auto here also forces Auto framing for the cascade.

NET LINE CODE

Options: B8ZS
AMI

Network Line Code selects the line code the DSU receives and transmits. The choices are Alternate Mark Inversion (AMI) and Bipolar with 8 Zero Substitution.

NET LINE TYPE

Options: DS1
DSX-1

Network Line Type selects the type of signal the DSU transmits and receives through its network interface.

Select DS1 when the DSU is to be connected to a network.

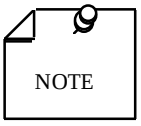
Select DSX-1 when the DSU is to be connected to the cascade port of another DSU.

NET LBO

Options: 0 DB
-7.5 DB
-15 DB
Auto

Network Line Buildout adjusts attenuation on the line between the DSU and the line interface supplied by the service provider when DS1 is selected as the Network Line Type.

Selecting Auto permits the DSU to adjust its build-out automatically based on the signal it receives. The on-screen selection for Auto displays the current LBO value in parentheses.



In a wire-line application (two DSUs connected directly back-to-back, rather than through a Telco network) only one DSU should be set for Auto LBO.

This selection is not available when the Network Line Type is DSX-1.

NET EQUALZN

Options: None
0-130ft
130-260ft
260-390ft
390-530ft
530-655ft

This Network Equalization option is only available when DSX-1 is selected as the Network Line Type. It should be set to match the line length between the DSU and the interface to which the DSU is connected.

Set this option to the lowest value that is equal to or greater than the actual line length.

NET 1'S DEN

Options: Inhibit
Max 15 Zeros
Max 39 Zeros
8X(N+1)
Min 1 in 8

The Network Ones Density option selects how the DSU enforces the ones density requirement at its network interface. This option applies only when AMI is selected as the Network Line Code; it is not available when the Network Line Code is B8ZS.

Inhibit disables the density enforcement function. Max 15 Zeros and Max 39 Zeros each cause the DSU to insert a one in the data stream when the specified number of zeros occur in transmit data. The 8X(N+1) option enables an algorithm that guarantees a minimum ones density of 12%. Min 1 in 8 monitors each DS0 and inserts a one in the bit 7 position of each detected all-zero byte.

Timing

NET TX TMG

Options: Internal
Station
Ext Ch A
Cascade
Receive

Network Transmit Timing selects the timing source the DSU uses for transmissions on the T1 line:

- Internal selects timing by the DSU internal clock.
- Station selects timing derived from an RS422 signal at the DSU cascade port.
- External Channel A selects timing at the application data rate input to the DSU through the V.35 or EIA-530 interface.
- Cascade selects timing derived from the signal at the DSU cascade port.
- Receive selects timing derived from the incoming T1 signal.

NET FB TMG

Options: Internal
Receive

Network Fallback Timing selects a fallback timing source for the DSU to use if the configured timing source becomes unavailable.

Internal selects timing by the DSU internal clock. Receive selects timing derived from the incoming T1 signal at the network interface.

NET ESF MODE

Options: None
ANSI T1.403
TR 54016

Network ESF Mode selects the type of Facilities Data Link (FDL) maintenance messages the DSU provides when ESF framing is selected. Set the option for the type of FDL maintenance messages the service provider supports.

The ANSI T1.403 selection supports Scheduled Performance Report Messages (PRMs) and Unscheduled Messages.

The TR 54016 setting supports the Telemetry Asynchronous Block Serial (TABS) protocol.

NET INBAND LBK

Options: Inhibit
PLB-Unframed
PLB-Framed
LLB-Unframed
LLB-Framed

Network Inband Loopback determines whether or not the DSU accepts an in-band loopback code, how the code must be formatted (framed or unframed), and what function the code commands: Payload Loopback (PLB) or Line Loopback (LLB).

NET AIS LPDWN

Options: Inhibit
5 Secs — 60 Secs

Network AIS Loopdown determines how many seconds of continuous Alarm Indication Signal (AIS) are required to make the DSU end a remotely-initiated loopback. AIS has no effect on loopbacks when Inhibit is selected.

This screen does not appear when Inhibit is selected for Network Inband Loopback.

Cascade Configuration

This Configuration sub-group is only present when the optional cascade port is installed in the DSU.

CAS FRAMING

Options: Manual ESF
Manual D4
Auto

Cascade Framing selects the framing format for the cascade port signal. The choices are Manual Extended Superframe Format, Manual D4 Superframe Format, or Auto Framing in which the DSU conforms to the frame format of the signal it is receiving.

The on-screen selection for Auto displays the current frame format in parentheses. Selecting Auto here also forces Auto framing for the network interface.

CAS LINE CODE

Options: AMI
B8ZS

Cascade Line Code selects the line code the DSU receives and transmits through the cascade port. The choices are Alternate Mark Inversion (AMI) and Bipolar with 8 Zero Substitution.

CAS EQUALZN

Options: NONE
130 — 260
260 — 390
390 — 530
530 — 655

Cascade Equalization should be set to match the line length between the DSU and the device that supplies the signal to the cascade port. Set this option to the lowest value that is equal to or greater than the actual line length.

Password Configuration

PASSWORD

Options: Disable
Enable

When Password is enabled the user has to enter a password in order to enter Modify mode. The Password: Modify option determines the password to be entered.

PASSWORD: MODIFY

When the Password option is enabled Password: Modify specifies the password that the DSU requires. Consult *Chapter 3, Operation*, for instructions on how to input the password.

The password can be any alphanumeric string up to eight characters long. Both upper and lower case letters are available, and password recognition is case sensitive (that is, "a" and "A" are considered to be different letters). When a password contains fewer characters than the one it is replacing, you must enter a space after the final character. The space does not become part of the password.

The default password is GDCGDC.

Alarms Configuration

ALARM CONFIG

Options: Mask
Unmask

When you set Alarm Configuration to Mask the IFP masks all maskable alarms. At the same time it removes any alarm thresholds that have been set on the DSU by an SNMP controller.

When you select Unmask the IFP removes alarm masking (whether imposed by itself or an SNMP controller) and removes alarm thresholds set by an SNMP controller.

The IFP does not display alarms that have been masked, and masked alarms do not light the front panel Alarm/TM indicator. The IFP does not provide indication of whether or not alarms have been masked or had thresholds established.

Set Defaults Configuration

SET DEFAULTS?

Options: Yes
No

Selecting Yes for Set Defaults? restores the DSU to its factory default configuration settings. The IFP then returns to the top level screen.

Front Panel Switches Configuration

FP SWITCHES

Options: Enable
Disable

When Front Panel Switches is set to Enable, you can command tests on the DSU connected to the IFP by means of its front panel test switches (T1, RL, ST, DL). The front panel test switches cannot be used when the option is set to Disable.

Front Panel Tests Configuration

CHANNEL PATTERN

Options: 511
2047

Channel Pattern selects the test pattern that the DSU uses for channel self tests controlled by the front panel switches.

T1 PATTERN

Options: 511
2047
Programmable
QRS

T1 Pattern selects the test pattern that the DSU uses for T1 self tests controlled by the front panel switches. The Programmable setting causes the DSU to use a pattern defined by four hex digits. The default Programmable setting is hex FFFF. See the T1 Prog Pattern option to change that setting.

T1 PROG PATTERN

T1 Programmable Pattern, when selected, displays four digits and the word End. Use the NXT and PRV keys to position the highlight on a digit position. Then press the SEL key to cycle the digit through its possible values (0 — 9, A, B, C, D, E, F) until the desired value is displayed. When all four digits are set to the desired values, position the highlight on the E in End and press the SEL key.

5 Tests

Overview

This chapter describes the SNMP 553SD/IFP DSU tests that you can perform using the IFP Diagnostics function. The SNMP 553SD/IFP DSU supports the following tests:

- Internal Self Test: Unit, Channel, and T1
- External Self Test: DS0, Channel, and T1
- External Loopbacks: Channel, T1, and DS0

The chapter also briefly describes tests that you can perform using front panel switches or Telnet screens instead of the IFP.

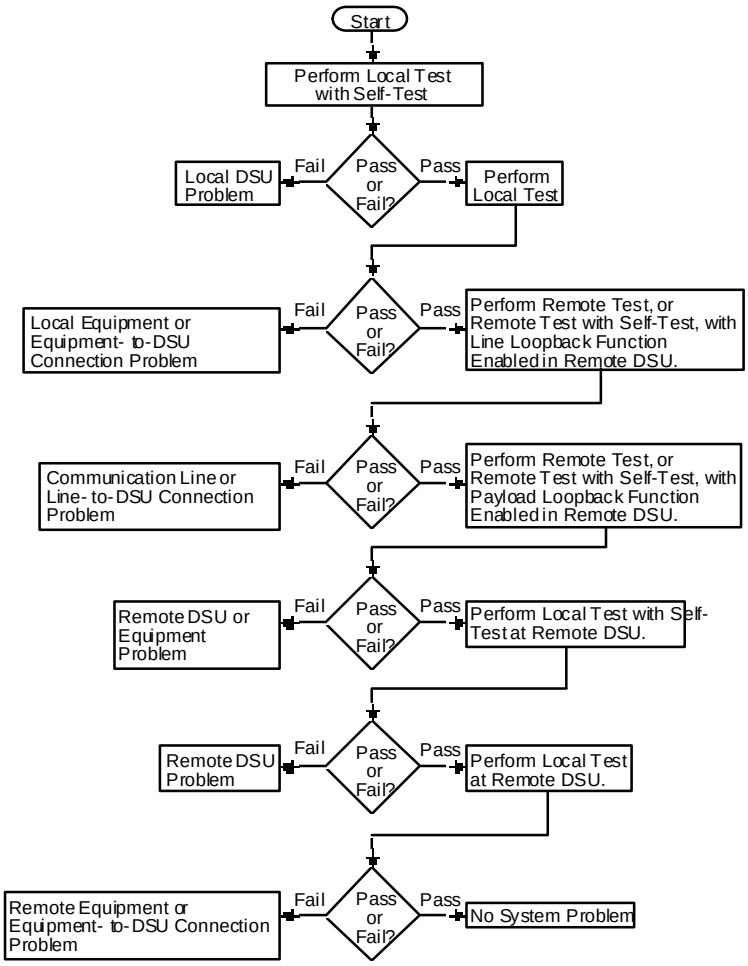


Figure 5-1 Fault Isolation Flowchart

Internal Self Tests

This portion of the chapter describes the Internal Self Tests that you can perform with an SNMP 553SD/IFP DSU whenever its operation must be checked after installation. There are three types of Internal Self Tests:

- Unit
- Channel (A only on SNMP 553SD-1/IFP; A, B, and C on SNMP 553SD-3/IFP)
- T1

Each of these tests activates a Test Pattern Generator (TPG) and Test Pattern Checker (TPC), and establishes a loopback within the local DSU. The loopback directs the transmit signal from the TPG back to the TPC as a receive signal. The same operating procedure applies for all Internal Self Tests.

Internal Self Test procedure:

1. With the `DIAGNOSTICS` group level screen displayed on the IFP, press the SEL key.
2. Use the NXT and PRV keys to scroll through the sub-group level screens until `DIAGNOSTICS: INT SELF TEST` is displayed, then press the SEL key.

3. On the resulting TEST LENGTH screen use the NXT and PRV keys to scroll through the available choices: 30 seconds, 1 — 10 minutes (in one-minute increments), and 15 — 30 minutes (in five-minute increments). When the screen displays the desired test length, press the SEL key.

4. On the resulting TEST TYPE screen use the NXT and PRV keys to scroll through the available choices: Unit, Channel A, B, or C, or T1. When the screen displays the desired test type, press the SEL key.

5. On the resulting DATA PATTERN screen use the NXT and PRV keys to scroll through the available choices. The choices available for a unit or channel test are 511-bit and 2047-bit patterns. The choices available for a T1 test are 511-bit, 2047-bit, QRS, 16-bit programmable, or 3:24. When the screen displays the desired pattern, press the SEL key. If the selected pattern is anything except 16-bit programmable go to Step 7.

6. When you select the 16-bit programmable pattern, the IFP displays a screen with PROG PATTERN: on the first line, and four hex digits and the word End on the second line. Use the NXT and PRV keys to position the highlight on a digit position. Then press the SEL key to cycle the digit through its possible values (0 — 9, A, B, C, D, E, F) until the desired value is displayed. When all four digits are set to the desired values, position the highlight on the E in End and press the SEL key.

7. The IFP screen will briefly display INITIATING TEST. It will then display SELFTEST TIME LEFT: and a countdown timer until the test times out. You can end the test before completion of the selected interval by pressing the ESC key. No results are displayed if you end the test before completion.

8. The TEST RESULTS: screen displays results at the end of the Test Length interval. From that screen, press the ESC key to return to the sub-group level INTERNAL SELF TEST screen.

The following pages describe each type of Internal Self Test in detail.

Unit Internal Self Test

Unit Internal Self Test, illustrated in *Figure 5-2*, activates the Channel Test Pattern Generator (CTPG) and Channel Test Pattern Checker (CTPC) of the local DSU with a Local Test (LT) loopback. It tests the DSU internal circuits isolated from both the T1 link and the DTE. The DSU transmits an Alarm Indication Signal (AIS) to the T1 link during the test.

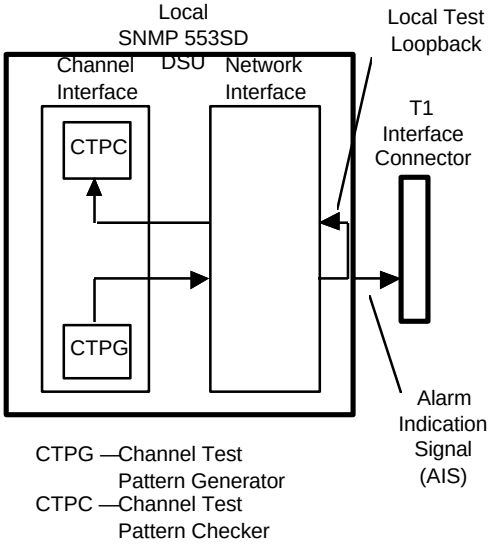


Figure 5-2 Unit Internal Self Test

T1 Internal Self Test

The T1 Internal Self Test, illustrated in *Figure 5-3*, activates the Test Pattern Generator (TPG) and Test Pattern Checker (TPC) of the local DSU along with a Local Test (LT) loopback. It tests the Network Interface circuits of the DSU isolated from both the T1 link and the channel interface(s). The DSU transmits an Alarm Indication Signal (AIS) to the T1 link during the test.

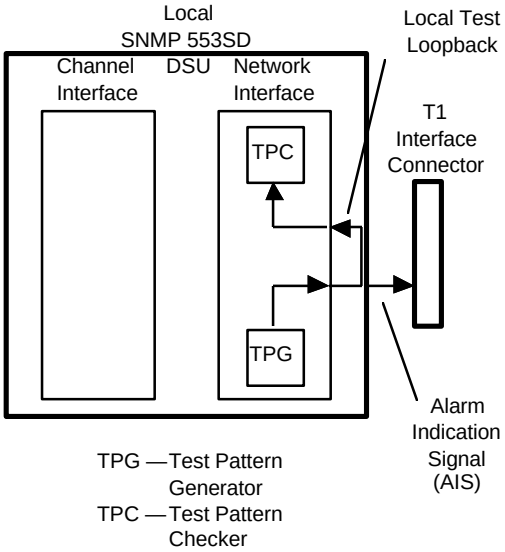


Figure 5-3 T1 Internal Self Test

Channel Internal Self Test

The Channel Internal Self Test, illustrated in *Figure 5-4*, activates the Channel Test Pattern Generator (CTPG) and Channel Test Pattern Checker (CTPC) of the local DSU along with a Local Loopback (LL). It tests the channel interface of the DSU isolated from both the Network Interface and the DTE. Channel data transmitted to the T1 link is clamped during the test.

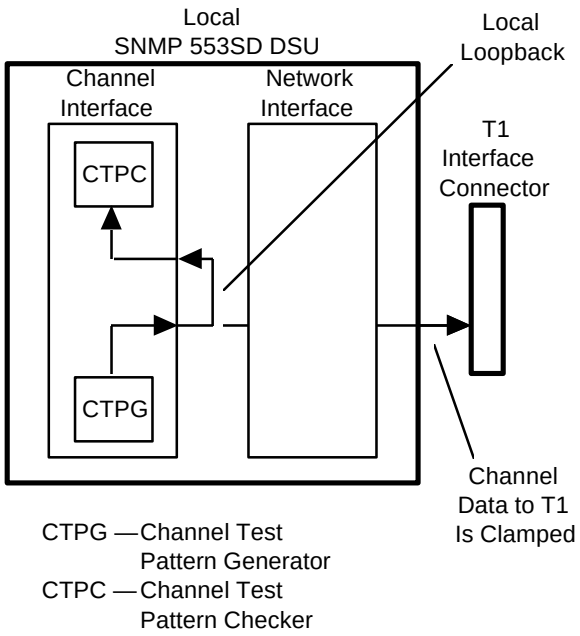


Figure 5-4 Channel Internal Self Test

External Self Tests

This chapter describes the External Self Tests you can perform using the SNMP 553SD/IFP DSU. These tests require operator intervention at both the local and remote DSU sites.

An External Self Test activates a Test Pattern Generator and Test Pattern Checker in the DSU and directs the test pattern out through the network interface to the remote DSU. The operator at the remote DSU can either activate External Self Test at that unit, directed back to the local DSU, or enable a loopback to return the test pattern to the local DSU. In either case the local DSU checks the test pattern it receives through its network interface for errors. There are three types of External Self Tests:

- DS0
- Channel A, B, or C
- T1

The following pages describe each type of External Self Test in detail and present instructions for performing them.

DS0 External Self Test

The DS0 External Self Test is illustrated in *Figure 5-5*. A DS0 External Self Test tests the network interface circuitry of both DSUs and the T1 link. It does not affect or interrupt the operation of the other DS0s.

DS0 External Self Test procedure:

1. Make arrangements for the test with the operator at the remote DSU.
2. With the `DIAGNOSTICS` group level screen displayed on the IFP, press the SEL key.
3. Use the NXT and PRV keys to scroll through the sub-group level screens until `DIAGNOSTICS: EXT SELF TEST` is displayed, then press the SEL key.
4. On the resulting `TEST LENGTH` screen use the NXT and PRV keys to scroll through the available choices: 30 seconds, 1 — 10 minutes (in one-minute increments), and 15 — 30 minutes (in five-minute increments). When the screen displays the desired test length, press the SEL key.
5. On the resulting `TEST TYPE` screen use the NXT and PRV keys to scroll through the available choices. When the screen displays DS0, press the SEL key.
6. On the resulting `DATA PATTERN` screen use the NXT and PRV keys to switch between the two choices: 511 or 2047. When the screen displays the desired pattern, press the SEL key.
7. The resulting screen displays `DS0 NUMBER:` on the first line, and 01 and the word `END` on the second line. The NXT and PRV keys move the highlight. Pressing the SEL key while the highlight is on a digit increments the digit value. When the two digits display the number of the selected DS0, position the highlight on the `E` in the word `END` and press the SEL key.
8. The IFP screen briefly displays `INITIATING TEST`. It then displays `DS0 EXT SELFTEST TIME LEFT:` and a countdown timer until the test times out. You can end the test before completion of the selected interval by pressing the ESC key. No results are displayed if you end the test before completion.
9. At the end of the Test Length interval the `TEST RESULTS:` screen displays the results of error checking at the local DSU. From that screen, press the ESC key to return to the sub-group level `DIAGNOSTICS: EXT SELF TEST` screen.

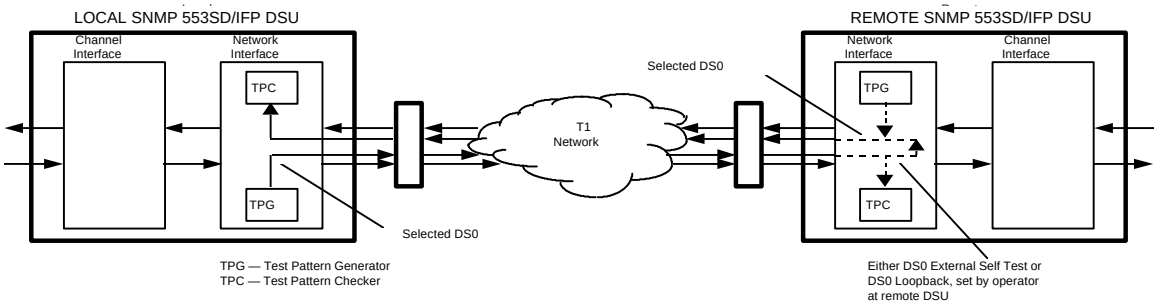


Figure 5-5 DS0 External Self Test

Channel External Self Test

Figure 5-6 illustrates a Channel External Self Test. This test employs the Channel Test Pattern Generator (CTPG) and Channel Test Pattern Checker (CTPC) of the DSU. It tests the T1 link, and both DSUs' network interface circuitry and channel interfaces.

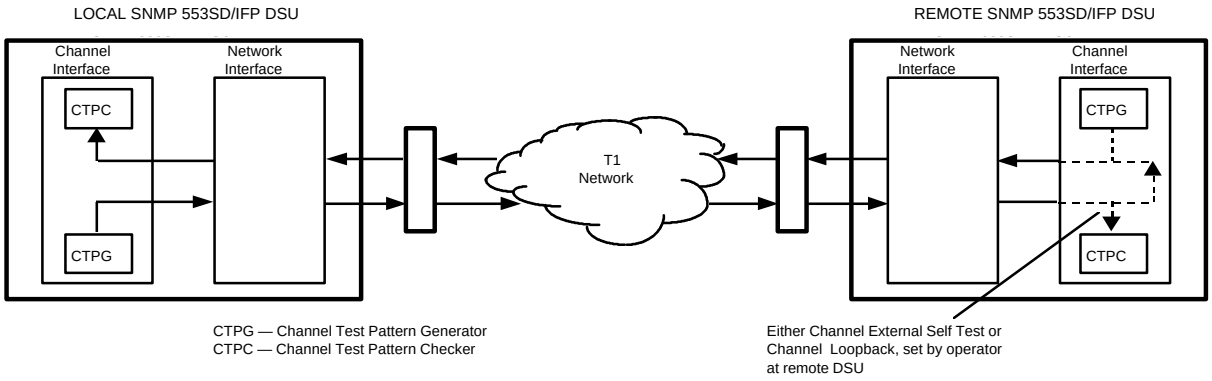


Figure 5-6 Channel External Self Test

Channel External Self Test procedure:

1. Make arrangements for the test with the operator at the remote DSU.
2. With the `DIAGNOSTICS` group level screen displayed on the IFP, press the SEL key.
3. Use the NXT and PRV keys to scroll through the sub-group level screens until `DIAGNOSTICS: EXT SELF TEST` is displayed, then press the SEL key.
4. On the resulting `TEST LENGTH` screen use the NXT and PRV keys to scroll through the available choices: 30 seconds, 1 — 10 minutes (in one-minute increments), and 15 — 30 minutes (in five-minute increments). When the screen displays the desired test length, press the SEL key.
5. On the resulting `TEST TYPE` screen use the NXT and PRV keys to scroll through the available choices. Scroll through `A`, `B`, and `C`. When the screen displays the desired channel, press the SEL key.
6. On the resulting `DATA PATTERN` screen use the NXT and PRV keys to switch between the two choices: 511 or 2047. When the screen displays the desired pattern, press the SEL key.
7. The IFP screen briefly displays `INITIATING TEST`. It then displays `CH EXT SELFTEST TIME LEFT:` and a countdown timer until the test times out. You can end the test before completion of the selected interval by pressing the ESC key. No results are displayed if you end the test before completion.
8. At the end of the Test Length interval the `TEST RESULTS:` screen displays the results of error checking at the local DSU. From that screen, press the ESC key to return to the sub-group level `DIAGNOSTICS: EXT SELF TEST` screen.

T1 External Self Test

Figure 5-7 illustrates the T1 External Self Test. This test employs the Test Pattern Generator (TPG) and Test Pattern Checker (TPC) of the DSU. It tests network interface circuitry of both DSUs and the T1 link.

T1 External Self Test procedure:

1. Make arrangements for the test with the operator at the remote DSU.
2. With the `DIAGNOSTICS` group level screen displayed on the IFP, press the SEL key.
3. Use the NXT and PRV keys to scroll through the sub-group level screens until `DIAGNOSTICS: EXT SELF TEST` is displayed, then press the SEL key.
4. On the resulting `TEST LENGTH` screen use the NXT and PRV keys to scroll through the available choices: 30 seconds, 1 — 10 minutes (in one-minute increments), and 15 — 30 minutes (in five-minute increments). When the screen displays the desired test length, press the SEL key.
5. On the resulting `TEST TYPE` screen use the NXT and PRV keys to scroll through the available choices. When the screen displays `T1`, press the SEL key.
6. On the resulting `DATA PATTERN` screen use the NXT and PRV keys to scroll through the available choices: 511-bit, 2047-bit, QRS, 16-bit programmable, and 3:24. When the screen displays the desired pattern, press the SEL key. If the selected pattern is not 16-bit programmable, go to Step 8.
7. When you select the 16-bit programmable pattern, the IFP displays a screen with `PROG PATTERN:` on the first line, and four hex digits and the word End on the second line. Use the NXT and PRV keys to position the highlight on a digit position. Then press the SEL key to cycle the digit through its possible values (`0` — `9`, `A`, `B`, `C`, `D`, `E`, `F`) until the desired value is displayed. When all four digits are set to the desired values, position the highlight on the `E` in `End` and press the SEL key.
8. The IFP screen briefly displays `INITIATING TEST`. It then display a `T1 EXT SELFTEST TIME LEFT:` and a countdown timer until the test times out. You can end the test before completion of the selected interval by pressing the ESC key. No results are displayed if you end the test before completion.
9. At the end of the Test Length interval the `TEST RESULTS:` screen displays the results of error checking at the local DSU. From that screen, press the ESC key to return to the sub-group level `DIAGNOSTICS: EXT SELF TEST` screen.

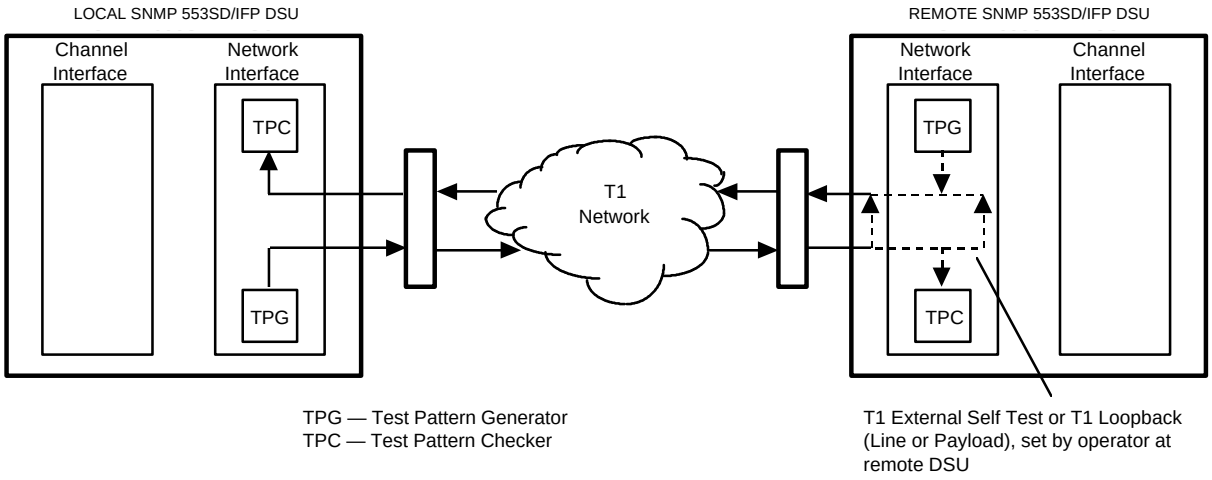


Figure 5-7 T1 External Self Test

External Loopbacks

This portion of the chapter describes the External Loopbacks that you can perform with an SNMP 553SD/IFP DSU after installation, whenever its operation must be checked. There are three types of External Loopbacks:

- Channel A, B, or C
- T1
- DS0

Each External Loopback establishes a loopback for use in tests that are performed with external test equipment. The operating procedure for a DS0 loopback differs from that used for channel and T1 loopbacks.

Procedure for Channel and T1 External Loopbacks

1. With the `DIAGNOSTICS` group level screen displayed on the IFP, press the SEL key.
2. Use the NXT and PRV keys to scroll through the sub-group level screens until `DIAGNOSTICS: EXT LOOPBACKS` is displayed, then press the SEL key.
3. On the resulting `TEST TYPE` screen use the NXT and PRV keys to scroll through the available choices: `Channel A`, `B`, or `C`, `T1`, or `DS0` (DS0 loopback instructions appear separately below). When the screen displays the desired test type, press the SEL key.
4. On the resulting `TIMING MODE` screen use the NXT and PRV keys to scroll between the choices: `CURRENT` or `INTERNAL`. Use Internal if the loopback you plan to use will isolate the DSU from its configured timing source. When the screen displays the desired mode, press the SEL key.
5. On the resulting `LOOPBACK TYPE` screen use the NXT and PRV keys to scroll through the available choices. The choices will vary depending on whether the selected Test Type is a channel loopback or a T1 loopback. The choices available for channel loopbacks are `LOCAL LOOP`, `DIGITAL LOOP`, and `REM DIG LOOP`. The

following choices are available for T1 loopbacks: LOCAL TEST, REMOTE TEST, LINE LOOP, PAYLOAD LOOP, and NI LOOP (network interface). CASC DIG LOOP is available as a T1 loopback when the optional cascade interface is installed.

When the screen displays the desired loopback type, press the SEL key.

6. The IFP screen briefly displays INITIATING TEST. It then displays the name of the loopback on its first line and HIT ESC TO EXIT on its second line.

7. The loopback remains in effect until you terminate it by pressing the ESC key.

The following pages describe the channel and T1 loopbacks in detail.

Procedure for DS0 External Loopback

1. With the DIAGNOSTICS group level screen displayed on the IFP, press the SEL key.

2. Use the NXT and PRV keys to scroll through the sub-group level screens until DIAGNOSTICS: EXT LOOPBACKS is displayed, then press the SEL key.

3. On the resulting TEST TYPE screen use the NXT and PRV keys to scroll through the available choices until DS0 is displayed, then press the SEL key.

4. The resulting screen displays DS0 NUMBER: on the first line, and 01 and the word END on the second line. The NXT and PRV keys move the highlight. Pressing the SEL key while the highlight is on a digit increments the digit value.

5. When the two digits display the number of the DS0 you intend to loop, position the highlight on the E in the word END and press the SEL key.

6. The IFP screen briefly displays INITIATING TEST. It then displays DS0 LOOPBACK on its first line and HIT ESC TO EXIT on its second line.

7. The loopback remains in effect until you terminate it by pressing the ESC key.

The DS0 loopback is described in the following pages.

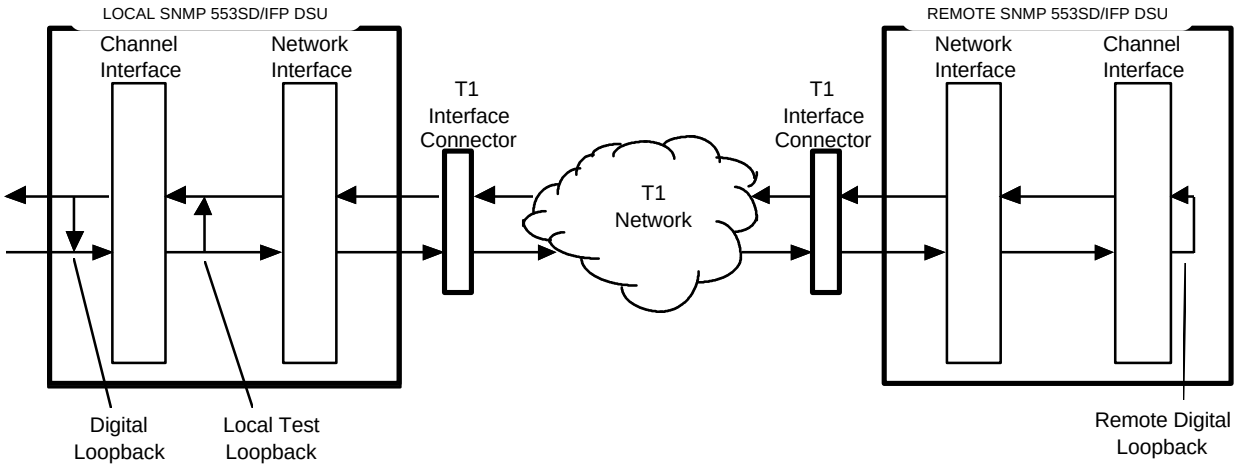


Figure 5-8 Channel Loopbacks

Channel Loopback

A Channel loopback loops data through the channel interface of the DSU back to its source. There are three types of Channel loopbacks available:

- Digital Loopback (DL)
- Local Loopback (LL)
- Remote Digital Loopback (RDL)

DL and LL establish loopbacks at the local DSU. RDL causes the local DSU to transmit an in-band code that commands a loopback at the remote DSU. *Figure 5-8* illustrates all three loopbacks.

Digital Loopback (DL) loops the channel data the local DSU receives from the network back toward the network at the channel interface.

Local Loopback (LL) loops channel data the local DSU receives from its DTE back toward the DTE at the channel interface. LL tests everything up to the channel interface. During this test the DSU clamps channel data transmitted to the T1 link.

Remote Digital Loopback (RDL) causes the local DSU to transmit an in-band code that commands a Digital loopback at the remote DSU. In order for a DSU to have its DL controlled by in-band codes it must have Respond to RDL enabled in its Channel Configuration screen.

T1 Loopback

A T1 loopback loops a T1 line signal back to its source. There are six types of T1 loopbacks available:

- Line Loopback (LL)
- Payload Loopback (PL)
- Local Test (LT)
- Remote Test (RT)
- Network Interface Loopback (NIL)

- Cascade Digital Loopback

LL, PL, LT, and Cascade Digital Loopback establish loopbacks at the local DSU. RT and NIL cause the local DSU to transmit an in-band code that commands a remote loopback. *Figure 5-9* illustrates the following loopbacks.

Line Loopback (LL) loops the T1 signal the local DSU receives from the network through a minimum of the DSU circuitry and transmits it back toward the network. LL utilizes only the critical DSU circuitry — the line build-out and timing regeneration circuits — and tests everything on the network side up to the critical circuitry of the DSU. It leaves bipolar violations uncorrected.

Payload Loopback (PL) loops the T1 signal the local DSU receives from the network through as much as is practical of the DSU circuitry and transmits it back toward the network. PL tests everything on the network side up to and including the DSU. It regenerates Framing and corrects Bipolar Violations.

Local Test (LT) loops the T1 transmit signal of the local DSU back through the receive path. LT tests all of the local DSU up to the network interface. The DSU transmits an Alarm Indication Signal (AIS) to the T1 link while the LT loopback is in effect.

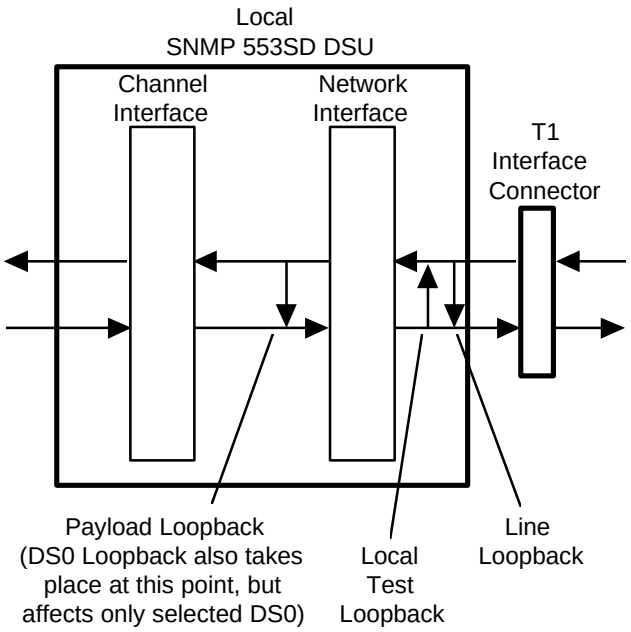


Figure 5-9 Local DSU T1 and DS0 Loopbacks

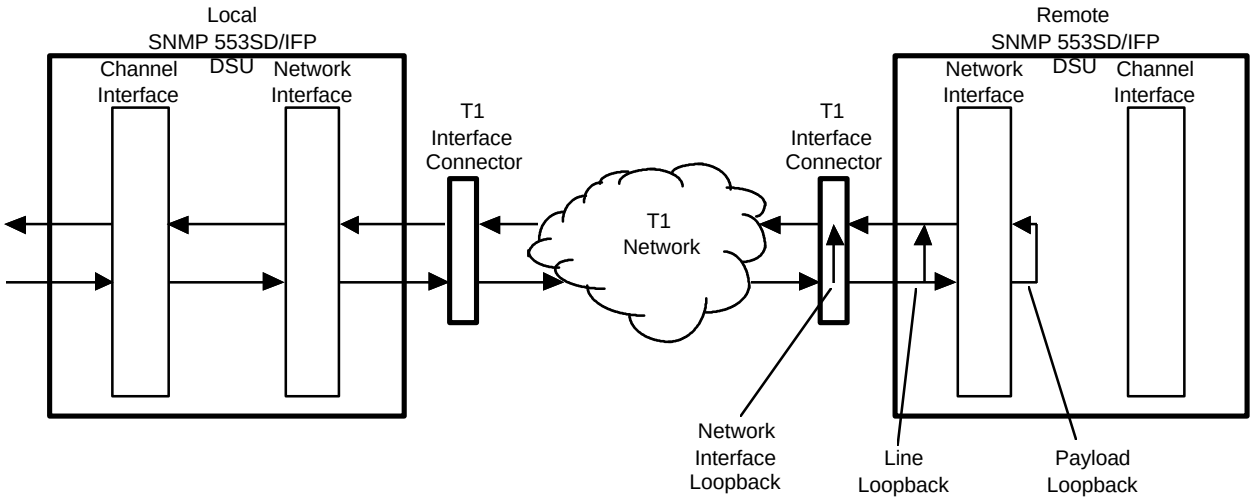


Figure 5-10 Remote DSU T1 Loopbacks

Remote Test (RT), illustrated in *Figure 5-10*, instructs the local DSU to transmit in-band codes to activate and deactivate a loopback at the remote DSU. The `Inband Loop — Framed/Unframed` selection in the `CSU Configuration` screen of the local DSU determines whether the transmitted loopback codes are framed or unframed.

The selection made for the `Loopback Configuration` option in the `CSU Configuration` screen determines how the remote DSU responds to an inband loopback code. The possible selections are `Line Loopback`, `Payload Loopback`, or `Inhibit` (no loopback in response to inband code).

Network Interface Loopback (NIL), illustrated in *Figure 5-10*, instructs the local DSU to transmit in-band codes to activate and deactivate a loopback at the T1 Interface Connector of the remote DSU. The `Inband Loop — Framed/Unframed` selection in the `CSU Configuration` screen of the local DSU determines whether the transmitted loopback codes are framed or unframed. NIL tests the T1 link isolated from the remote DSU.

Cascade Digital Loopback, illustrated in *Figure 5-11*, loops the incoming T1 signal back toward the network at the DSU cascade port.

DS0 Loopback

A DS0 loopback loops the selected DS0 back toward the network as indicated in Figure 5-9. A DS0 loopback does not affect or interrupt the operation of the other DS0s. It does affect data if the looped DS0 is one of those configured to carry channel data.

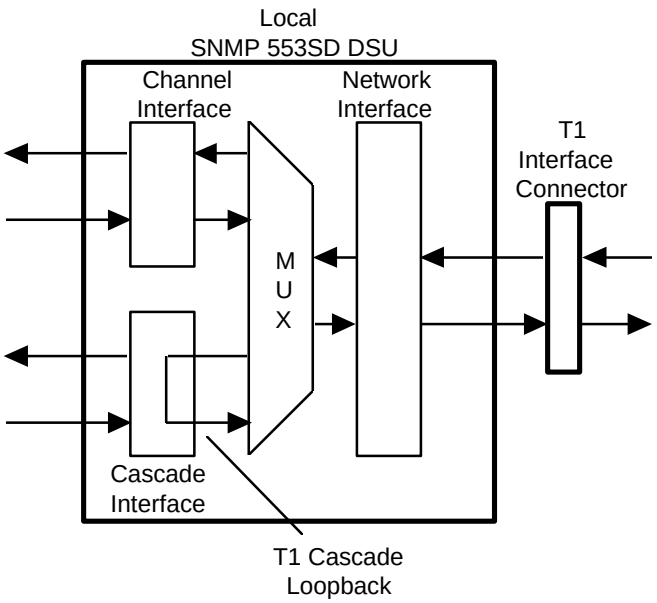


Figure 5-11 T1 Cascade Loopback

Tests Using the Front Panel Switches and Telnet

You can use the lower row of push button switches on the DSU front panel — T1, RL, ST, and DL — or Telnet to initiate test functions similar to those performed using the IFP. When you perform tests in this way, the front panel ER indicator displays results by flashing each time an error is detected. These tests do not produce a numerical bit error rate display on the IFP.

The `IFP Configuration` routine `FP Tests` determines what test patterns the tests employ. Channel tests may use either a 511-bit pattern or a 2047-bit pattern. Network (T1) tests may use a 511-bit pattern, a 2047-bit pattern, a programmable pattern, or a QRS pattern.

Table 5-1 identifies the various types of test you can perform from the front panel and the switch combinations by which you command them.

Table 5-1 Front Panel Tests and Switches

To Perform a —	Press —
Channel Digital Loop	DL
Channel Self Test	ST
Channel Remote Loop	RL
Channel Local Loop	RL, DL
Channel Remote Dataloop with Self Test	RL, ST
Channel Local Loop with Self Test	RL, ST, DL
Network Local Test	T1, RL, DL
Network Self Test	T1, ST
Network Remote Test	T1, RL
Network Line Loop	T1, DL
Network Local Test with Self Test	T1, RL, ST, DL
Network Remote Test with Self Test	T1, RL, ST

Front panel switch test procedure:

1. Press the switch, or combination of switches, that corresponds to the desired test. When a combination of switches is required, you may press the switches simultaneously or press them one at a time within one second of each other. When you are performing a Network test the screen briefly displays `Initiating Test...` at this point, and the process continues as described in Step 3.

2. When you are performing a Channel test the screen displays `Channel A?` You can use the NXT and PRV buttons to change the display through Channels A, B, and C until the screen displays the channel on which you intend to perform the test. Press the SEL button to start the test. The screen briefly displays `Initiating Test...`

3. The top line of the screen displays the name of the test being performed, and the second line displays `HIT ESC TO EXIT`.

   If the selected test employs the Self Test (ST) switch, observe the ER indicator while the test is underway. It blinks each time an error is detected.

4. Press the ESC key to end the test. The screen displays `RESETTING TEST TO NORMAL`.

A Technical Characteristics

Specifications

Item	Specification
Physical	
PC card assembly	
Height	3/4 in. (1.9 cm)
Width	10 1/2 in. (26.7 cm)
Depth	10 3/4 in. (27.3 cm)
Weight	14 oz. (0.4 kg)
Shipping weight	1 lb. 6 oz. (0.65 kg)
DataComm Enclosure (model DE-7)	
Height	3 7/8 in. (9.8 cm)
Width	10 7/8 in. (27.6 cm)
Depth	12 1/2 in. (31.8 cm)
Weight	7 lb. 1 oz. (3.2 kg)
Shipping weight	8 lb. 1 oz. (3.7 kg)
Four-slot DataComm FourPak Enclosure (model DFP-11)	
Height	5 1/4 in. (13.3 cm); 5 1/2 in. (14 cm) with rubber feet
Width	15 in. (38.1 cm)
Depth	13 1/2 in. (34.3 cm)
Weight	7 lb. 1 oz. (3.2 kg)
Shipping weight	8 lb. 1 oz. (3.7 kg)
Three-slot GDC TriPak Shelf (models TPS-1 and TPS-2)	
Height	3 1/2 in. (8.9 cm)
Width	19 in. (48.3 cm); 23 in. (58.4 cm) with adapter ears
Depth	12 in. (30.5 cm)
Weight	15 lb. 7 oz. (7 kg)
Shipping weight	20 lb. 7 oz. (9.3 kg)

(Continued on next page)

Item	Specification
Environmental	
Temperature	
Operating	32° to 122°F (0° to 50°C) (derate to 40°C with optional EIA-530 interface on a SNMP 553SD-1/IFP; derate by 1°C/1000 ft above sea level)
Non-operating	–40° to 185°F (–40° to 85°C)
Humidity, operating	5% to 95%, without condensation
Altitude	
Operating	0 to 10,000 ft (0 to 3,048 m)
Non-operating	0 to 40,000 ft (0 to 12,192 m)
Electrical	
Power requirements	
Voltage	99 to 129 V ac (Token Ring model with two EIA 530 interfaces - 058A140-622- 105 to 129 V ac)
Frequency	60 Hz
Power dissipation	20 W maximum
Fusing (pc card)	Two 1.0 A, 250 V, 3AG (GDC Part No. 215300-100)
Data rates	N x 64 kbit/s or N x 56 kbit/s (N = 1 to 24); maximum aggregate (payload) rate of 1,536,000 bit/s
Communication line	T1 digital carrier (non-loaded, staggered-twist ABAM, PIC, or pulp-insulated exchange-type cable, 19 to 26 gauge)
Line impedance	100½
Network port physical interface	RJ48C modular jack
Network transmitter	
Frequency	1,544,000 bit/s ± 75 bit/s
Pulse amplitude — with surge protection	2.40 to 3.60 V at 60°F — may vary over a cycle of 60 Hz current.
Unbalance in height of adjacent negative and positive pulses	200 mV (maximum)
Width of output pulse (half amplitude)	324 nsec ± 45 nsec
Unbalance in width of positive and negative pulses	20 nsec (maximum)
Time between two consecutive pulses of opposite polarity (measured at half amplitude point of leading edges)	648 nsec ± 15 nsec
Maximum rise or falling time	100 nsec
Overshoot at trailing edge of pulse	10% to 30% of pulse amplitude
Line Build-Out	0, 7.5, or 15 dB (selectable or automatic) at 772 kHz
Timing source	Internal clock, external clock (from Channel A), slave (received timing loopback)

(Continued on next page)

Item	Specification
Electrical (Continued)	
Network receiver	
Operating range	0 to -36 dB of cable loss at 772 kHz
Input impedance	100 Ohm
Jitter tolerance	Conforms to specifications defined in AT&T PUB 62411, December 1988
Longitudinal balance	35 dB from 50 to 1500 kHz
Transmitter	
Pre-equalization	0 to 655 feet of line length
Impedance	100 Ohm
Receiver	
Impedance	100 Ohm
Channel port (customer equipment) interface	
Standard	One to three ITU-T V.35-compatible synchronous serial data ports
Optional	EIA-530 compatible synchronous serial data port (Channel B and C only on an SNMP 553SD-3/IFP; Channel A only on an SNMP 553SD-1/IFP)
Physical interface	
DataComm Enclosure model DE-7	ITU-T V.35 (34-pin female connector)
DataComm Enclosure model DEF-1 and all others	DB25S (25-pin female subminiature-D connector)
Management port interface	
Interface standard	EIA-232-D, ANSI X3.64 ASCII-compatible
Baud rate	9600 bit/s
Character format	8/N/1 (word length/parity/stop bits)
Protocol — back panel interface	SLIP or PPP — automatically detected
Protocol — front panel interface	VT100
Physical interface — back panel	DB25P (25-pin male subminiature-D connector); requires adapter 209-036-012 for connection to modular plug cable 830-028-XXX. Local DTE device requires adapter 209-036-011; local DTE device requires adapter 209-036-010. Connection to GDC V.F 28.8 modem requires adapter 029H210-001. Supports simultaneous connection of local device and modem.
Physical interface — front panel	NMC jack; requires cable 024H139-06 (DB25 connector) or 024H130-06 (DB9 connector)

(Continued on next page)

Item	Characteristic
Electrical (Continued)	
T1 compatibility	
Data encoding	AMI with no bipolar violations, and B8ZS
Clear Channel Capability	B8ZS
Network interface	1.544 Mbit/s channelized DS1 in consecutive or alternate DS0s (complies with AT&T 54019A specifications for FT1 transmission)
Consecutive zeros enforcement	15 or 39 maximum
Average pulse density enforcement	Minimum 1 “one” per 8 bits, or 24 “ones” per 192 bits
Keep Alive signal	Type 1 (consecutive, framed ones filling the unused bandwidth)
Framing format	D4 Superframe Format, AT&T 54016 Extended Superframe Format (ESF), and ANSI T1.403 ESF, with automatic format option
Alarms and status conditions	Out of Frame (OOF), Alarm Indication Signal (AIS or Blue alarm), Loss of Signal (LOS), Red alarm, and Yellow alarm
Diagnostics	DS1 Line Loop, with Self-Test; DS1 Local Test with Self-Test; DS1 Network Interface Loopback, with Self-Test; DS1 Remote Test, with Self-Test; DS1 Self-Test; DS1 Test Loop, with Self-Test; DS0 Circuit Delay Measurement Test; DS0 Remote Test, with Self-Test; DS0 Self-Test; Channel Digital Loop; Channel Remote Digital Loop, with Self-Test; Channel Self-Test.
	Front panel test jacks for DS1 access

B DTE Interface Signals

Table B-1 IUT-T V.35 (Standard Interface)

34-Pin Pin No.	25-Pin Pin No.	Function	Direction
A	1	Frame Ground, AA	N/A
P	2	Send Data (a), BA	To DSU
S	14	Send Data (b), BA	To DSU
R	3	Rcv Data (a), BB	From DSU
T	16	Rcv Data (b), BB	From DSU
C	4	RTS, CA	To DSU
D	5	CTS, CB	From DSU
E	6	DSR, CC	From DSU
B	7	Sig Gnd, AB	N/A
F	8	DCD, CF	From DSU
CC	18	LL (Local Loop)	To DSU
U	12	Ext Clk (a), DA	To DSU
W	24	Ext Clk (b), DA	To DSU
V	13	Rcv Clk (a), DD	From DSU
X	17	Rcv Clk (b), DD	From DSU
Y	19	Tx Clk (a), DB	From DSU
AA	15	Tx Clk (b), DB	From DSU
H	20	DTR, CD	To DSU
BB	21	RDL, RL	To DSU
K	25	Test Mode, TM	From DSU

Table B-2 EIA-530 (Optional Interface)

Pin No.	Function	Direction
1	Frame Ground, AA	N/A
2	Send Data (a), BA	To DSU
14	Send Data (b), BA	To DSU
3	Rcv Data (a), BB	From DSU
16	Rcv Data (b), BB	From DSU
4	RTS (a), CA	To DSU
19	RTS (b), CA	To DSU
5	CTS (a), CB	From DSU
13	CTS (b), CB	From DSU
6	DSR (a), CC	From DSU
22	DSR (b), CC	From DSU
7	Sig Gnd, AB	N/A
8	DCD (a), CF	From DSU
10	DCD (b), CF	From DSU
17	Rcv Clk (a), DD	From DSU
9	Rcv Clk (b), DD	From DSU
24	Ext Clk (a), DA	To DSU
11	Ext Clk (b), DA	To DSU
15	Tx Clk (a), DB	From DSU
12	Tx Clk (b), DB	From DSU
20	DTR (a), CD	To DSU
23	DTR (b), CD	To DSU
21	RDL, RL	To DSU
25	Test Mode, TM	From DSU
18	LL (Local Loop)	To DSU

C Timing Options

Overview

The flexibility and complexity of the SNMP 553SD/IFP DSU's timing options require explanations that are more detailed than those normally provided. This appendix describes the details and applications of the SNMP 553SD/IFP DSU's timing options:

- Slave Timing
- Internal Timing
- Channel Timing (includes Channel A Timing and Channel B Timing)
- Channel Split Timing (includes Channel A Split Timing, Channel B Split Timing, and Channel A/B Split Timing)
- Cascade Timing
- Cascade/Channel Split Timing (includes Cascade/Channel A Split Timing, Cascade/Channel B Split Timing, and Cascade/Channel A/B Split Timing)

Each description is accompanied by an illustration showing how the timing clock is distributed throughout the network, as well as typical applications. Following the timing option descriptions are some representative network applications that show how to apply the timing options in a variety of network configurations.

Timing Option Descriptions

In synchronous networks, all devices' transmitters and receivers are usually referenced to a single master timing source. The timing source, or clock, which is frequently provided by the network and must be highly accurate and stable. The network's clock is the preferred timing source, but the SNMP 553SD/IFP DSU allows other timing options for use in applications where network timing is either not available or not applicable.

The SNMP 553SD/IFP DSU recovers the imbedded clock from the data stream and uses it to synchronize its own internal timing reference to the master clock. That allows it to extract the data reliably and to distribute timing to other devices connected to it. On the network and cascade ports timing is imbedded in the data stream, but it is provided on separate channel interface leads for the channels.

NOTE

Several techniques exist for providing timing to the customer equipment: smooth clock and variations of gapped clock. With a smooth or continuous clock, the type employed by the SNMP 553SD/IFP DSU, every clock pulse is the same length and occurs at the same interval. With a gapped clock, however, pulses are intentionally omitted. Customer equipment that is expecting a smooth clock may not function properly with a gapped clock if it interprets the missing pulses as loss of timing. On the other hand, equipment that can tolerate a gapped clock will probably work well with a smooth clock, so the smooth clock technique is more widely acceptable..

The default timing option for the SNMP 553SD/IFP DSU is Slave Timing, used when the network provides the timing source. When the network does not provide the timing source, one SNMP 553SD/IFP DSU must use Internal Timing (or Channel Timing when customer equipment connected to it provides timing) and the others must use Slave Timing. When both the network and the customer equipment provide timing, you may need to use Channel Split Timing, which is a combination of Slave Timing and Channel Timing. Finally, with the optional T1 Cascade Card installed, Cascade Timing (and Cascade/Channel Split Timing) allows the equipment on the cascade port to recover the clock from the timing source provided by the network while the SNMP 553SD/IFP DSU is essentially using Slave Timing (or Channel Split Timing).

One thing is common to all of the SNMP 553SD/IFP DSU's timing options: the DSU recovers the clock from the network receive data, then uses it to clock data into the receive buffer and to provide the channel *receive* clock signals for the channels. What differs is the source of the master clock reference and the source of the channel *transmit* clock signals, as shown in *Table C-1*:

- With Slave Timing, the master clock comes from the network and the channel's transmit clock signals are derived from the clock recovered from the network receive data.
- With Internal Timing, the DSU provides the master clock, but the channels' transmit clock signals are still derived from the recovered clock.
- With Channel Timing, the customer equipment on the selected channel provides its own transmit clock signal, from which the DSU derives a master clock.
- With Channel Split Timing, the customer equipment on the selected channel(s) provides its own transmit clock signal (like Channel Timing), but the network provides the master clock for the rest of the network (like Slave Timing).
- Cascade Timing extends the network receive T1 data stream to the cascade port, and uses timing imbedded in the network and cascade receive data.
- Cascade/Channel Split Timing, combines Cascade Timing and Channel Split Timing.

NOTE

All timing options that include split timing require each timing source to be traceable to a Stratum 1 clock.

On the network and cascade ports, the data rate is 1.544 Mbit/s. On the channel ports, however, the data rate may be from 56 kbit/s to 1.536 Mbit/s. The SNMP 553SD/IFP DSU compensates for this difference in data rates by translating the clock frequency when passing it from one port to another.

Table C-1 Timing Reference

Timing Option	Master Clock Source						Ch. A Trans. Clock Source		Ch. B Trans. Clock Source		Ch. C Trans. Clock Source	
	Net.	Cas.	DSU	Ch. A	Ch. B	Ch. C	Net.	Ch. A	Net.	Ch. B	Net.	Ch. C
Slave Timing	X						X		X		X	
Internal Timing			X				X		X		X	
Channel A Timing				X				X	X		X	
Channel B Timing					X		X			X	X	
Channel C Timing						X	X		X			X
Channel A Split Timing	X							X	X		X	
Channel B Split/Slave Timing	X						X			X	X	
Channel C Split/Slave Timing	X						X		X		X	
Channel A/B/C Split/Slave Timing	X							X		X		X
Cascade Timing (network source)	X						X		X		X	
Cascade Timing (cascade source)		X					X		X		X	
Cascade/Channel A Split Timing (network source)	X							X	X		X	
Cascade/Channel A Split Timing (cascade source)		X						X	X		X	
Cascade/Channel B Split Timing (network source)	X						X			X	X	
Cascade/Channel B Split Timing (cascade source)		X					X			X	X	
Cascade/Channel C Split Timing (network source)	X						X		X			X
Cascade/Channel C Split Timing (cascade source)		X					X		X			X
Cascade/Channel A/B/C Split Timing (network source)	X							X		X		X
Cascade/Channel A/B/C Split Timing (cascade source)		X						X		X		X

Slave Timing

With Slave Timing, illustrated in *Figure C-1*, the network (or a device at the remote end) provides the timing source (1). The SNMP 553SD/IFP DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (2) and to provide the send timing source for T1 data output from the transmit buffer (3) to the network. The DSU also translates (4) the receive T1 clock to provide the channel transmit and receive clock signals on the appropriate interface leads for each channel.

Select Slave Timing when using the SNMP 553SD/IFP DSU in a network (or with a device at the remote end) that supplies the clock, as in a DACS (Digital Access and Cross-connect System) network.

NOTE

Select the appropriate timing option for the customer equipment: The DSU provides transmit timing on the channel's Tx Clk lead.

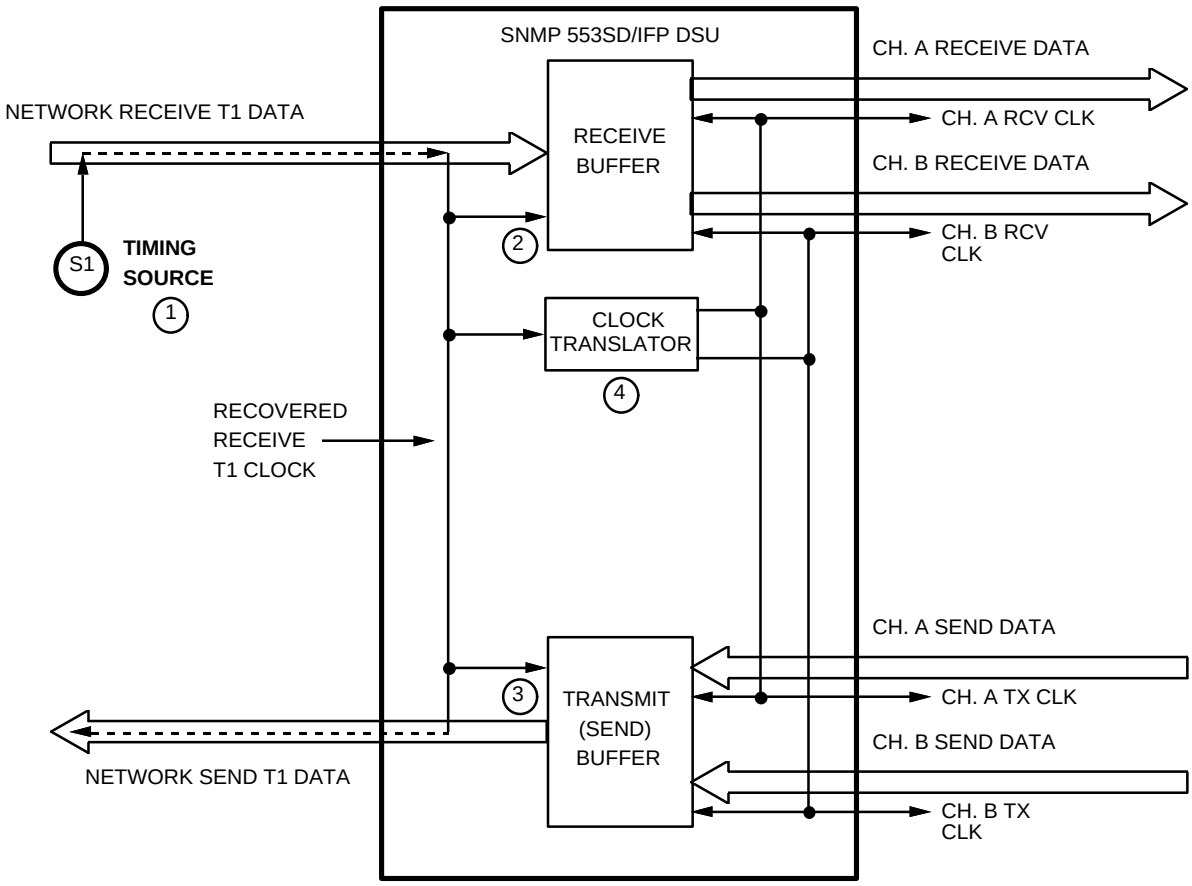


Figure C-1 Slave Timing

Internal Timing

With Internal Timing, illustrated in *Figure C-2*, the SNMP 553SD/IFP DSU provides the send timing source (1) for T1 data output from the transmit buffer (2) to the network. This clock satisfies the requirements of a Stratum 4, Level II clock, as defined in AT&T Technical Reference 62411. The remote DSU uses this as its timing reference (3) and loops it back to the local DSU (4). The local DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (5). The DSU also translates (6) the receive T1 clock to provide the channel transmit and receive clock signals on the appropriate interface leads for each channel.

Select Internal Timing when using the SNMP 553SD/IFP DSU in a private network that does not provide timing (e.g., a non-DACS based service).

NOTE

A. Configure only one DSU in your network for Internal Timing, and configure the others for Slave Timing.

B. Select the appropriate timing option for the customer equipment: The DSU provides transmit timing on the channel's Tx Clk lead.

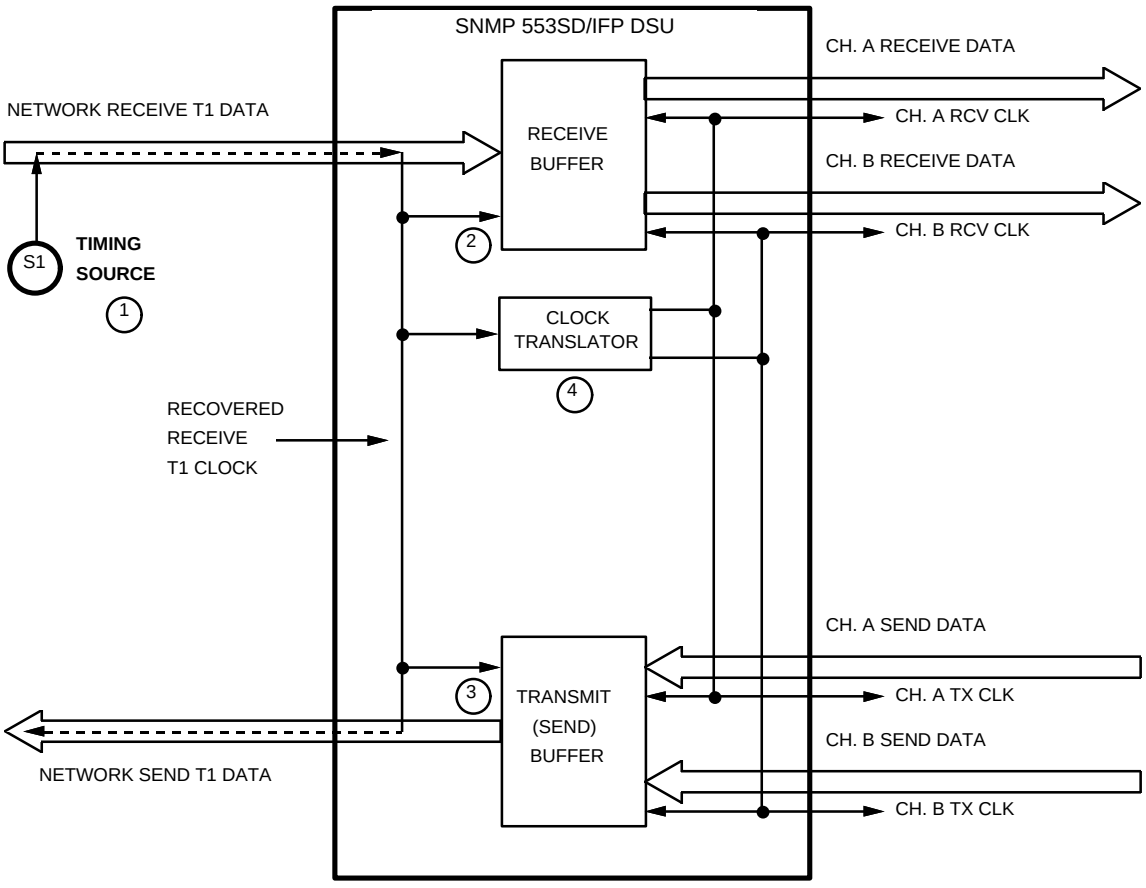


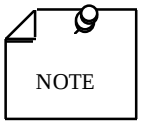
Figure C-2 Internal Timing

Channel Timing

Channel Timing includes Channel A Timing and Channel B Timing. With Channel A Timing, illustrated in *Figure C-3*, the customer equipment on Channel A provides its own channel transmit clock signal (1) on the appropriate interface lead. The SNMP 553SD/IFP DSU translates (2) this clock to provide the send timing source for T1 data output from the transmit buffer (3) to the network. The remote DSU uses this as its timing reference (4) and loops it back to the local DSU (5). The local DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (6). The DSU also translates (7) the receive T1 clock to provide the channel transmit clock signal for Channel B and the receive clock signals for both channels, on the appropriate interface leads for each channel.

Channel B Timing, illustrated in *Figure C-4*, is the same except that the customer equipment on Channel B provides the clock signal.

Select Channel Timing when using the SNMP 553SD/IFP DSU in a private network with the customer equipment on one of the channels supplying the clock.



Select the appropriate timing option for the customer equipment: The SNMP 553SD/IFP DSU expects external timing on the channel's Ext Clk lead.

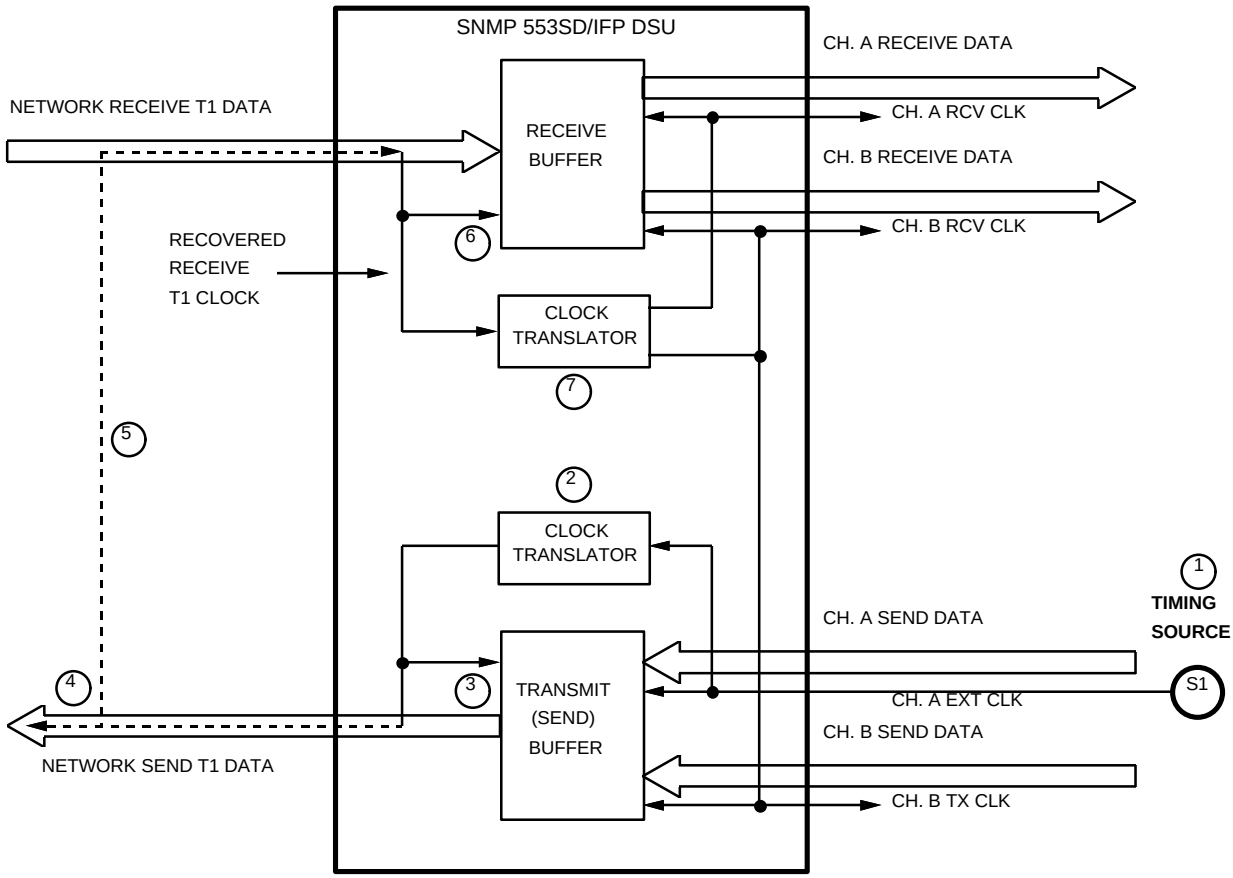


Figure C-3 Channel A Timing

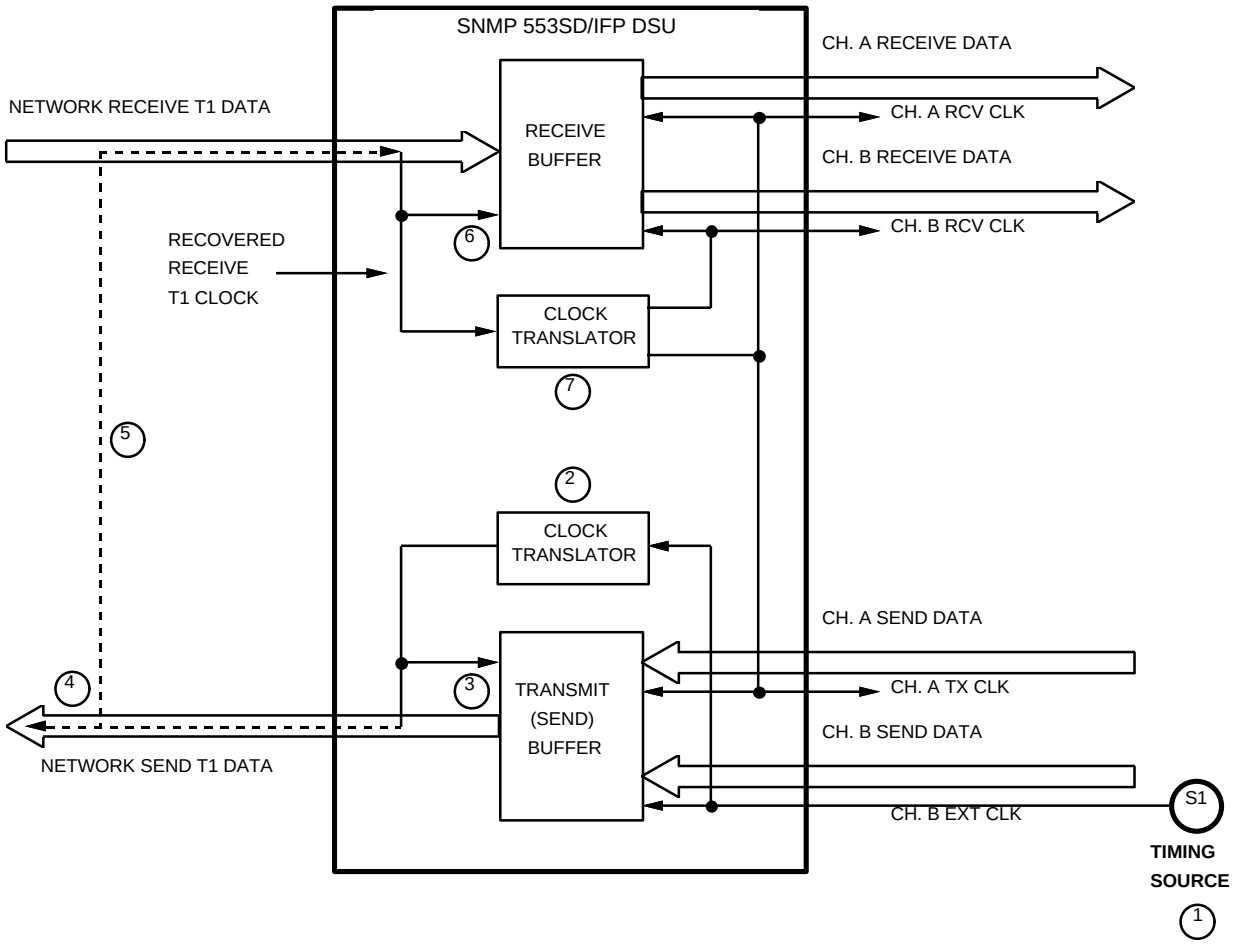


Figure C-4 Channel B Timing

Channel Split Timing

Channel Split Timing includes Channel A Split Timing, Channel B Split Timing, and Channel A/B Split Timing. Channel A Split Timing, illustrated in *Figure C-5*, is a combination of Slave Timing and Channel A Timing, and it utilizes two clock sources. As in Slave Timing, the network (or a device at the remote end) provides one timing source (1). The SNMP 553SD/IFP DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (2) and to provide the send timing source for T1 data output from the transmit buffer (3) to the network. The SNMP 553SD/IFP DSU also translates (4) the receive T1 clock to provide the channel transmit clock signal for Channel B and the receive clock signals for both channels, on the appropriate interface leads for each channel. As in Channel A Timing, the customer equipment on Channel A provides the other timing source, its own channel transmit clock signal (5) on the appropriate interface lead, but the DSU uses it for nothing else.

Channel B Split Timing, illustrated in *Figure C-6*, is the same except that the customer equipment on Channel B provides the clock signal. In Channel A/B Split Timing, illustrated in *Figure C-7*, each channel provides its own channel transmit clock signal.

Select Channel Split Timing when there are timing sources provided by both the network and the customer equipment.

NOTE

A. Select the appropriate timing option for the customer equipment: The SNMP 553SD/IFP DSU expects external timing on the channel's Ext Clk lead.

B. All timing options that include split timing require each timing source to be traceable to a Stratum 1 clock.

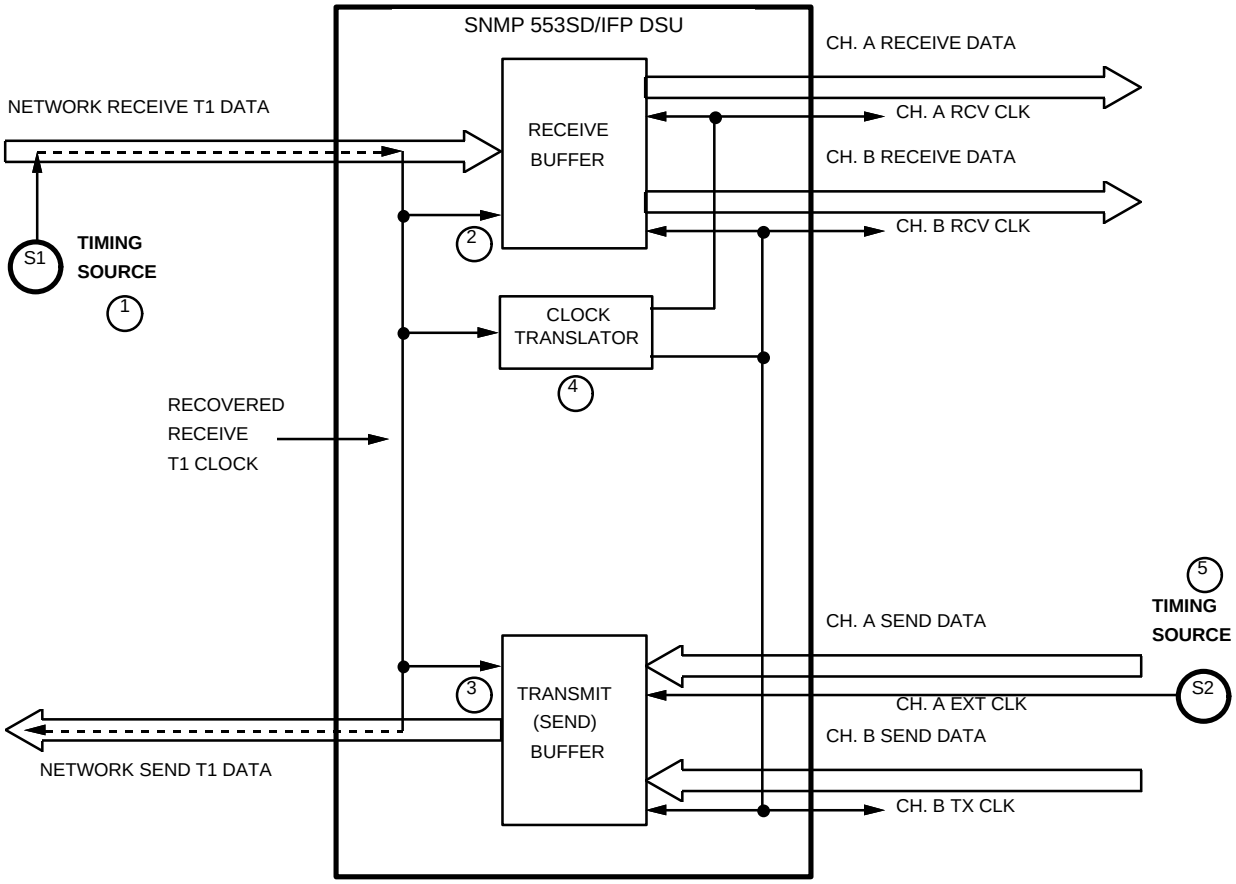


Figure C-5 Channel A Split Timing

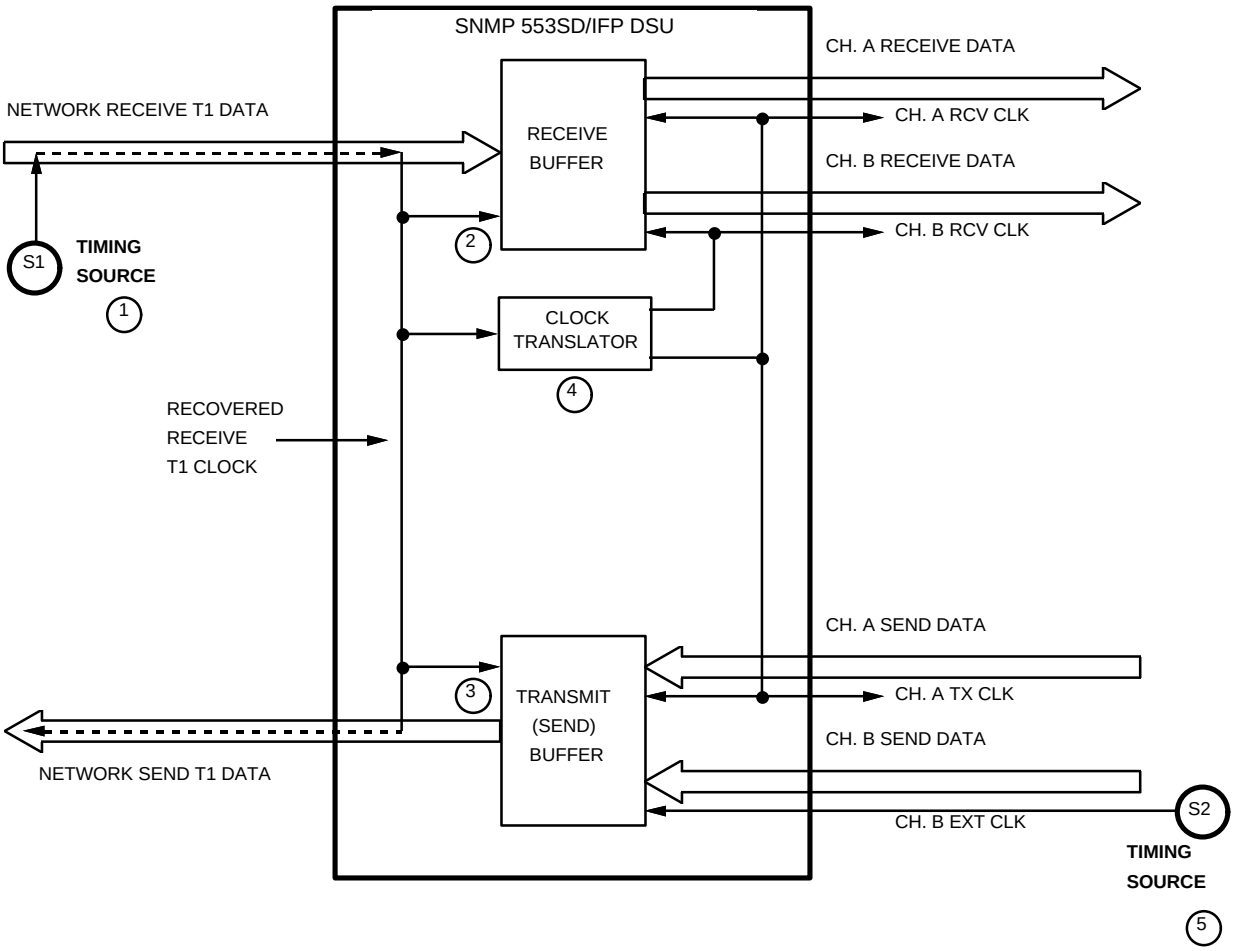


Figure C-6 Channel B Split Timing

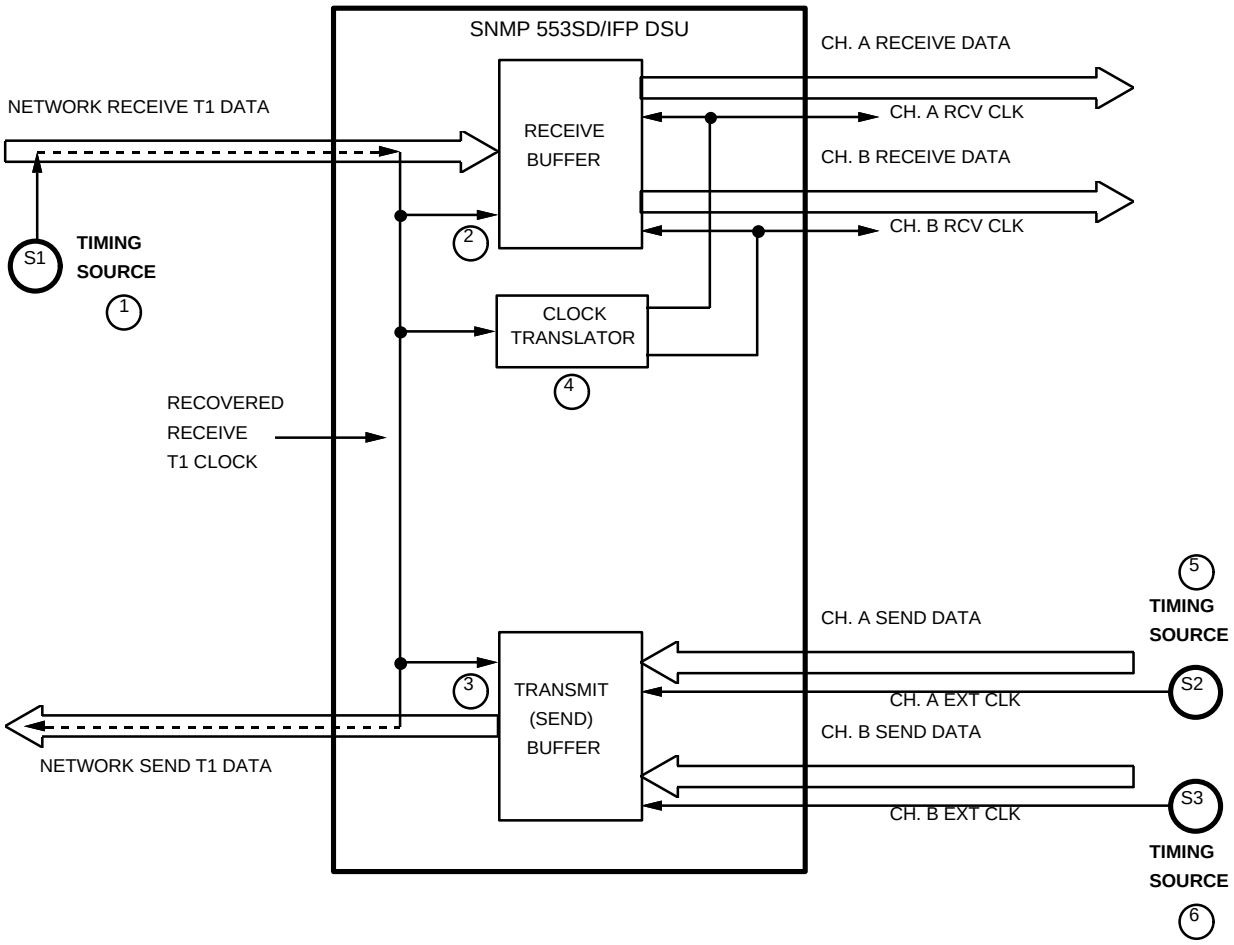


Figure C-7 Channel A/B Split Timing

Cascade Timing

The optional T1 Cascade Card extends the network receive T1 data stream to the cascade port. This makes timing more elaborate than with the basic configuration and results in several timing variations. The following paragraphs describe variations that are possible with Cascade Timing.

Cascade Timing with a Network Timing Source

As illustrated in *Figure C-8*, when Cascade Timing is selected the network (or a device at the remote end) provides the timing source (1). The SNMP 553SD/IFP DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (2) and into the cascade port transmitter (3). The DSU also translates (4) the receive T1 clock to provide the channel transmit and receive clock signals on the appropriate interface leads for each channel. The SNMP 553SD/IFP DSU extends the network receive T1 data stream to the remote equipment connected to the cascade port, which uses it as a timing reference (5) and loops it back to the local DSU (6). The local DSU recovers the receive T1 clock from the cascade receive DSX-1 (Digital Service Cross-connect, Level 1) data and uses it to multiplex the DSX-1 data with channel data and to provide the send timing source for T1 data output from the transmit buffer (7) to the network.

Cascade Timing with a Cascade Timing Source

As illustrated in *Figure C-9*, the remote cascade equipment provides the timing source (1), instead of the network. All timing and data handling functions internal to the SNMP 553SD/IFP DSU operate as they would with network timing, and the remote DSU uses the imbedded timing as its reference (2) and loops it back to the local DSU (3).

Cascade Timing with Loss of Cascade Data

Because the remote cascade equipment loops or sends imbedded timing to the SNMP 553SD/IFP DSU, Cascade Timing requires that an alternate timing source also be available, in case the cascade equipment fails to provide data. Without an alternate timing source, loss of cascade data would result in channel failure, since there would be no send timing source for T1 data output from the transmit buffer to the network. The valid alternate timing options are Slave Timing, Internal Timing, Channel Timing, and Channel Split Timing. The SNMP 553SD/IFP DSU automatically switches over to the alternate source when the remote cascade equipment fails to provide data, then automatically reverts to normal Cascade Timing only after it determines that data is available.

Cascade Timing without the T1 Cascade Card

When the T1 Cascade Card is installed but disabled, or when the card is removed, the SNMP 553SD/IFP DSU uses the alternate timing source.

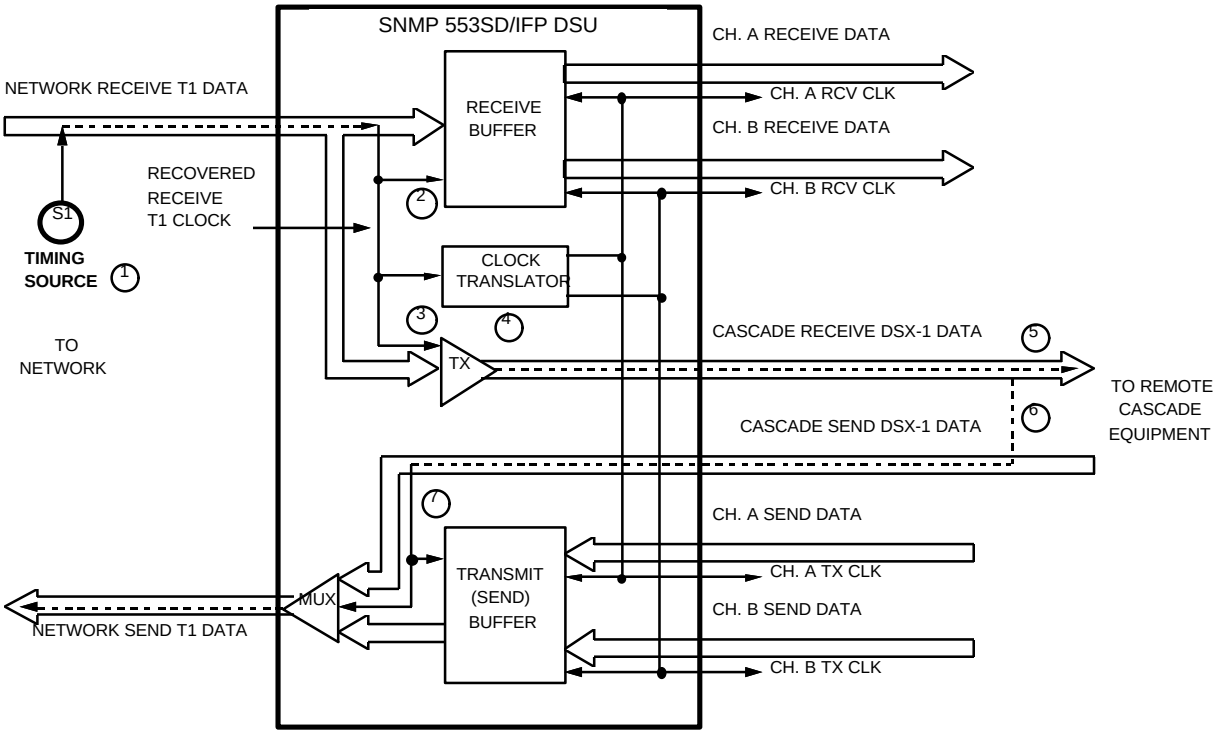


Figure C-8 Cascade Timing with a Network Timing Source

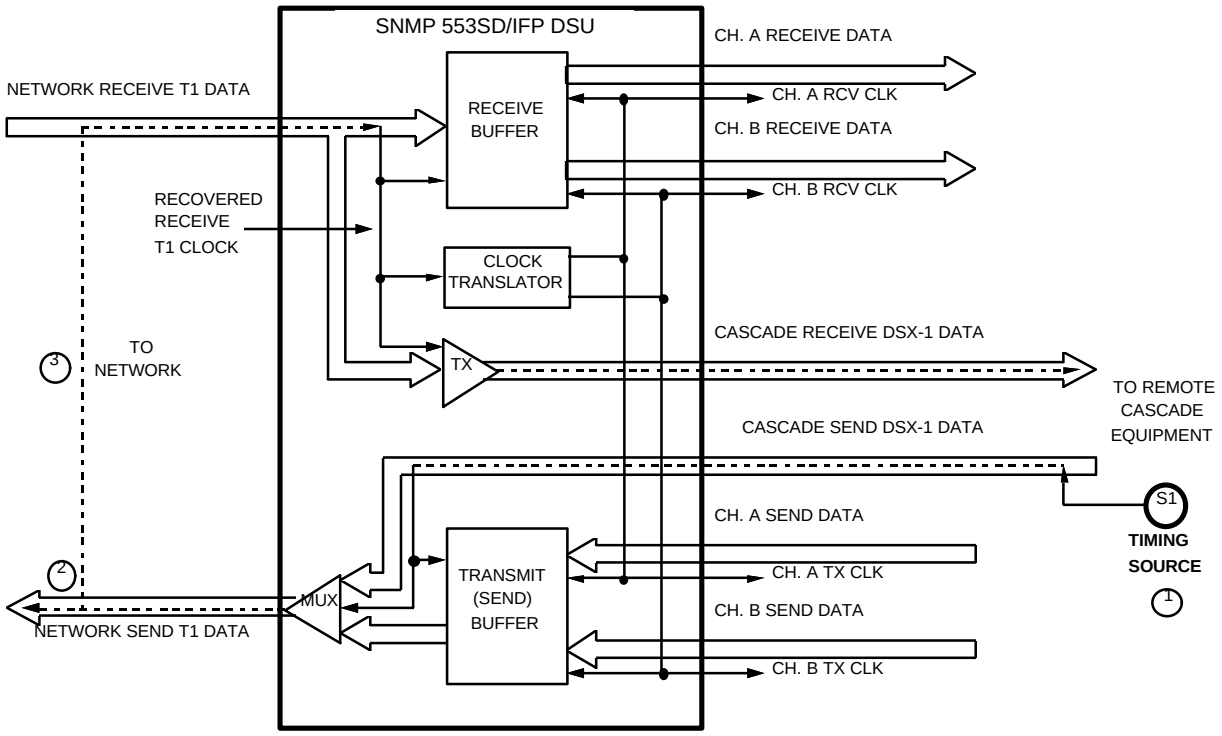


Figure C-9 Cascade Timing with a Cascade Timing Source

Cascade/Channel Split Timing

Cascade/Channel Split Timing includes Cascade/Channel A Split Timing, Cascade/Channel B Split Timing, and Cascade/Channel A/B Split Timing. Cascade/Channel A Split Timing, illustrated in *Figure D-10*, is a combination of Cascade Timing and Channel A Split Timing. As in Cascade Timing, the network (or a device at the remote end) provides the timing source (1). The SNMP 553SD/IFP DSU recovers the receive T1 clock from the network receive T1 data and uses it to clock T1 data into the receive buffer (2) and into the cascade port transmitter (3). The DSU also translates (4) the receive T1 clock to provide the channel transmit clock signal for Channel B and the receive clock signals for both channels, on the appropriate interface leads for each channel. The DSU extends the network receive T1 data stream to the remote equipment connected to the cascade port, which uses this as its timing reference (5) and loops it back to the local DSU (6). The SNMP 553SD/IFP DSU recovers the receive T1 clock from the cascade receive DSX-1 (Digital Service Cross-connect, Level 1) data and uses it to multiplex the DSX-1 data with channel data and to provide the send timing source for T1 data output from the transmit buffer (7) to the network. As in Channel A Timing, the customer equipment on Channel A provides the other timing source, its own channel transmit clock signal (8) on the appropriate interface lead, but the DSU uses it for nothing else.

Cascade/Channel B Split Timing, illustrated in *Figure C-11*, is the same Cascade/Channel A Split Timing except that the customer equipment on Channel B provides the clock signal. In Cascade/Channel A/B Split Timing, illustrated in *Figure C-12*, each channel provides its own channel transmit clock signal.

In these illustrations, the network provides the timing source. As described in Cascade Timing, the remote cascade equipment could instead provide the timing source.

Select Cascade/Channel Split Timing when there are timing sources provided by both the network (or the remote cascade equipment) and the customer equipment.

NOTE

a. Select the appropriate timing option for the customer equipment: The SNMP 553SD/IFP DSU expects external timing on the channel's Ext Clk lead.

b. All timing options that include split timing require each timing source to be traceable to a Stratum 1 clock.

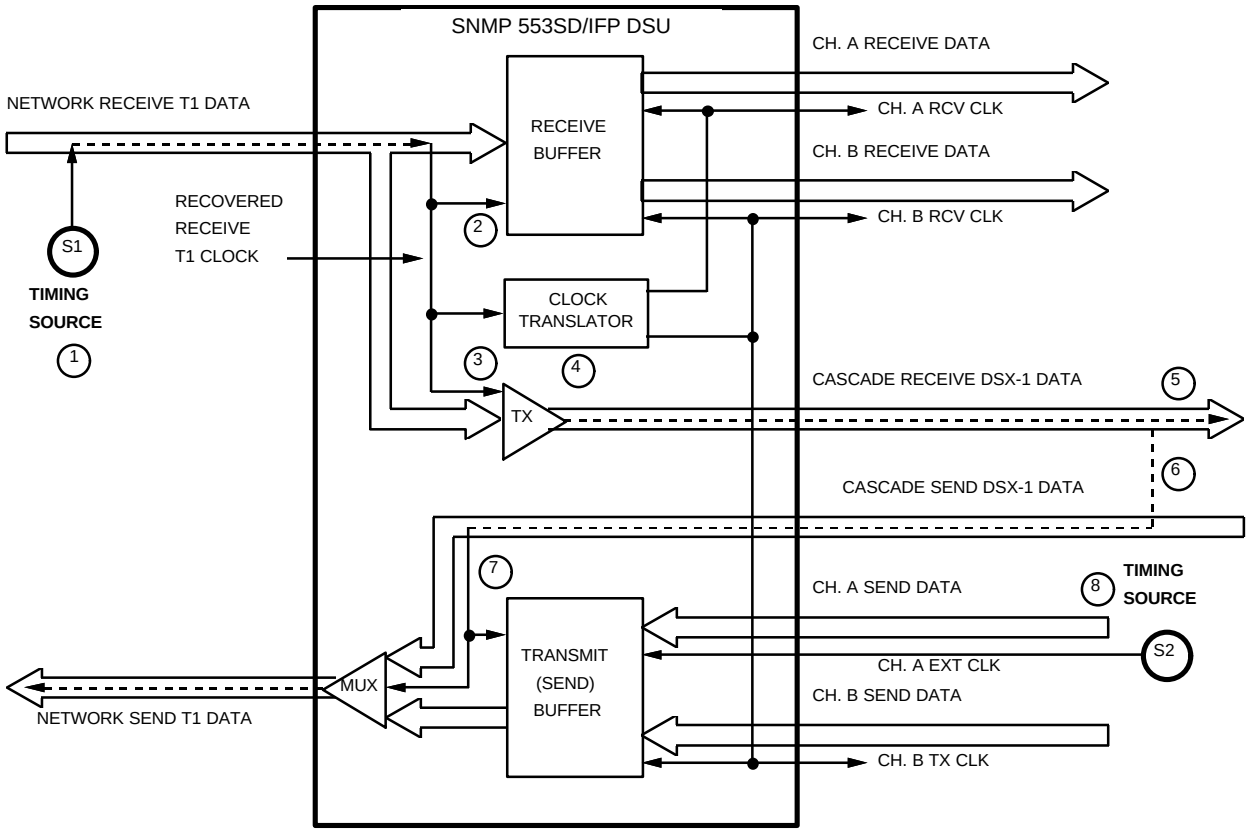


Figure C-10 Cascade/Channel A Split Timing

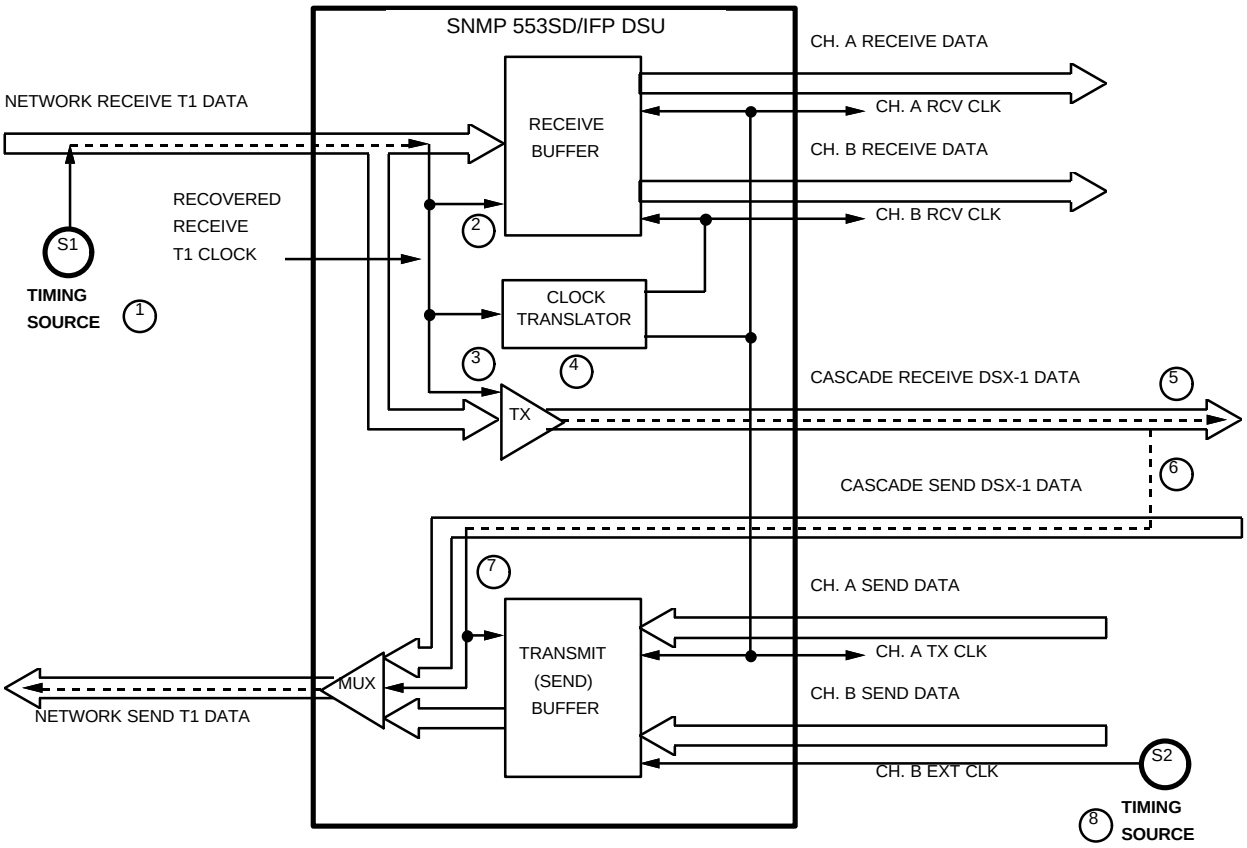


Figure C-11 Cascade/Channel B Split Timing

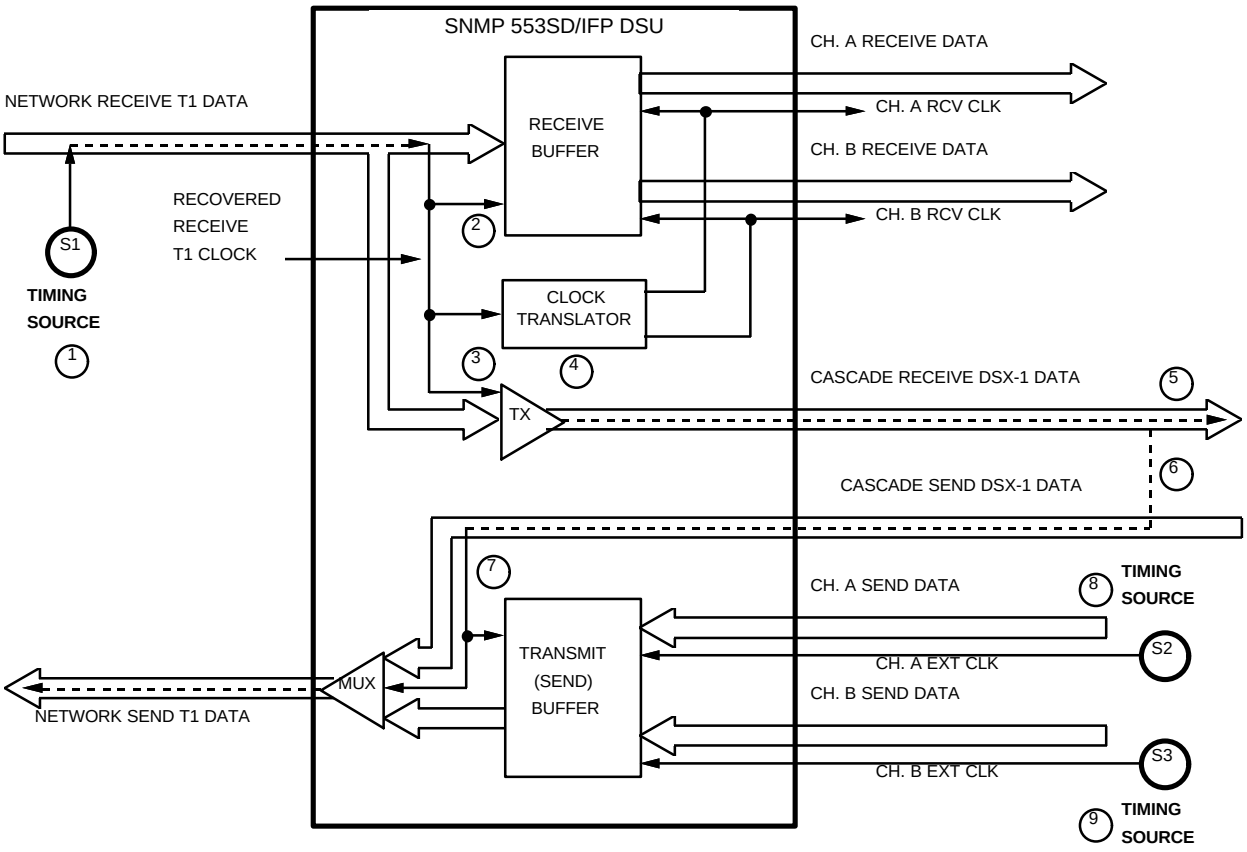


Figure C-12 Cascade/Channel A/B Split Timing

Typical Network Applications

Although you can use the SNMP 553SD/IFP DSU in various network configurations with different types of equipment, the following simple applications illustrate the fundamental reasoning you use to select the appropriate timing option.

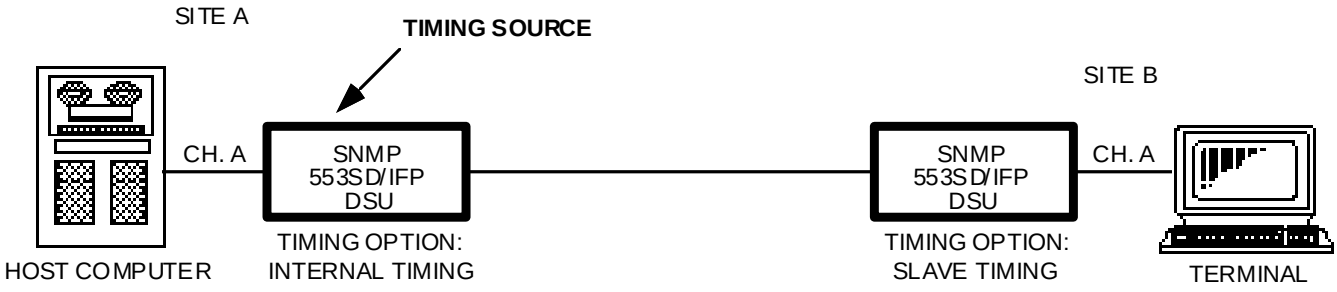
Back-to-Back Application

In an in-house data communications network, two SNMP 553SD/IFP DSUs are connected back-to-back. The only component connecting them is cable, so there is no network to provide the timing source.

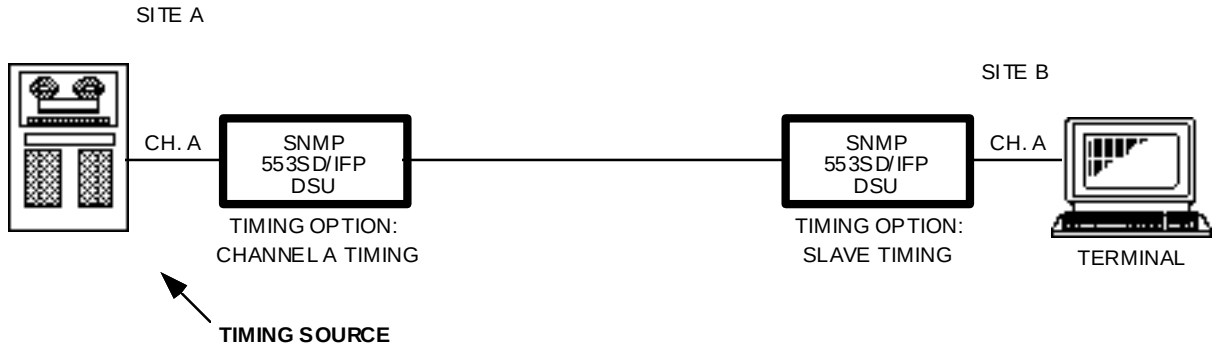
If the customer equipment connected to the channels cannot provide timing, select Internal Timing for the master or host end, and select Slave Timing for the other, as shown in *Figure C-13A*. In this example, the SNMP 553SD/IFP DSU at Site A is configured for Internal Timing, making it the timing source.

If the customer equipment is to provide an external timing source, select Channel Timing for the DSU connected to that equipment and select Slave Timing for the other, as shown in *Figure C-13B*. In this example, the host computer on Channel A at Site A is providing timing, so its DSU is configured for Channel A Timing.

In the master/slave multiplexer application illustrated in *Figure C-13C*, the multiplexer on Channel A at Site A is configured as the master (i.e., the timing source) and the multiplexer on Channel A at Site B is configured as a slave. By selecting Channel A Timing for both DSUs, the master multiplexer provides timing and the slave multiplexer loops back timing, so timing is dependent on the customer equipment.



A. SNMP 553SD/IFP DSU at Site A Supplies Timing



B. Customer Equipment at Site A Supplies Timing

C. Master/Slave Multiplexer Timing

Figure C-13 Typical Back-To-Back Applications

Basic Cascade Application

To expand channel capacity, you can cascade several SNMP 553SD/IFP DSUs together: two cascaded SNMP 553SD/IFP DSUs support four channels, and three SNMP 553SD/IFP DSUs support six channels.

In the back-to-back network illustrated in *Figure C-14*, the DSU at Site A is configured for Internal Timing, so it is the master timing source and the other DSUs must be configured for Slave Timing. Cascade Timing is automatic for SNMP 553SD/IFP DSU #B-1 and #B-2, but you must also select the alternate timing source for each: select Slave Timing so that it will recover and loop timing if the DSU cascaded to it loses cascade data.

If there is a loss of cascade data between #B-2 and #B-3, #B-2 will automatically switch to Slave Timing. Similarly, if there is a loss of cascade data between #B-1 and #B-2, #B-1 will switch to Slave Timing.

Select Slave Timing for #B-3, the last cascaded SNMP 553SD/IFP DSU, so that it always recovers and loops timing from the T1 data it receives from #B-2.

Figure C-15 illustrates a similar network, but with DSU #B-3 configured for Internal Timing so that it provides the master timing source. Again, Cascade Timing is automatic for SNMP 553SD/IFP DSU #B-1 and #B-2, but you must also select the alternate timing source for each: select Internal Timing so that it will supply the timing if the DSU cascaded to it loses cascade data.

If there is a loss of cascade data between #B-2 and #B-3, #B-2 will switch to Internal Timing. Similarly, if there is a loss of cascade data between #B-1 and #B-2, #B-1 will switch to Internal Timing.

Select Slave Timing for the SNMP 553SD/IFP DSU at Site A so that it always recovers and loops timing from the T1 data it receives from #B-1.

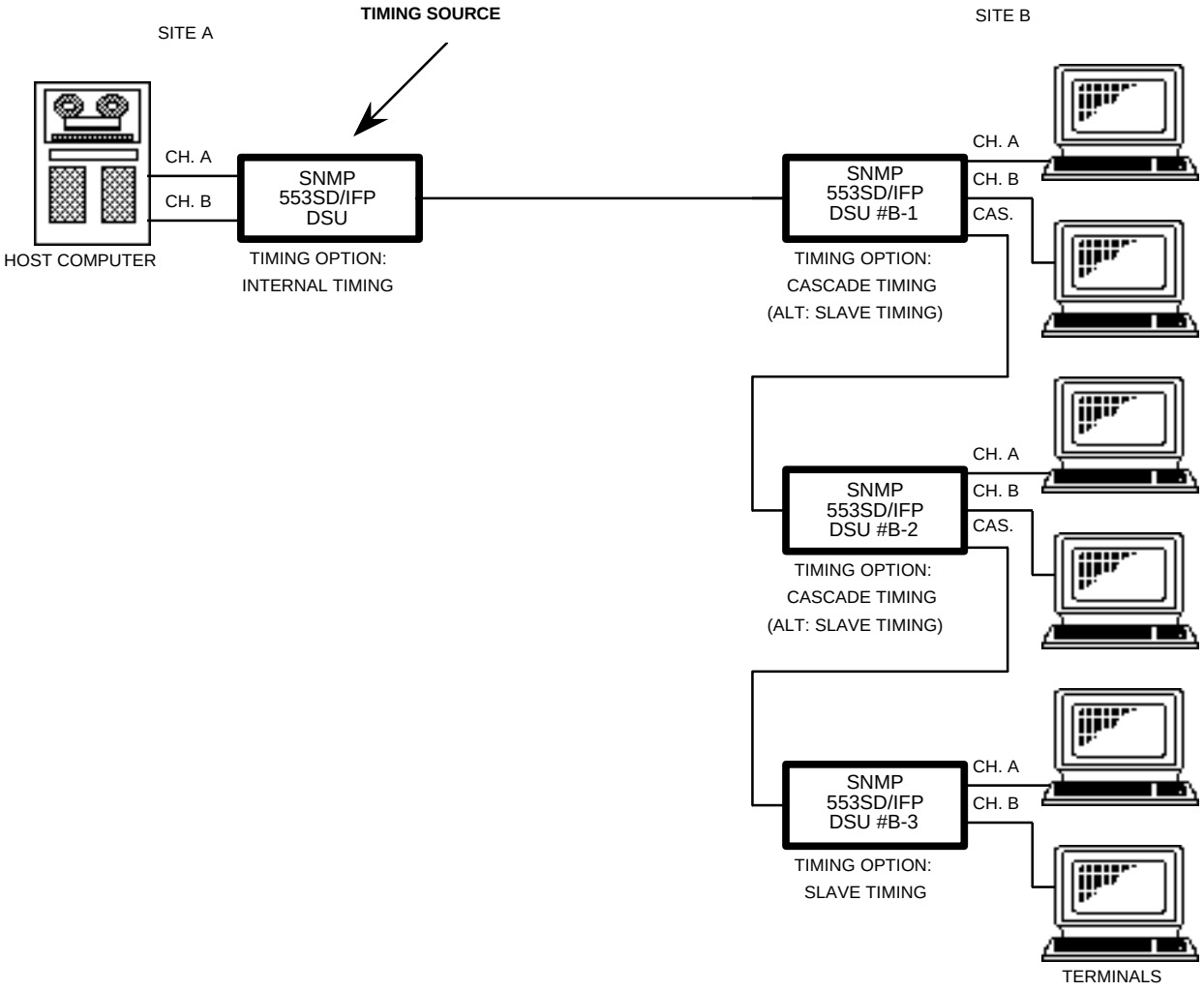


Figure C-14 Typical Basic Cascade Application (Alternate Slave Timing)

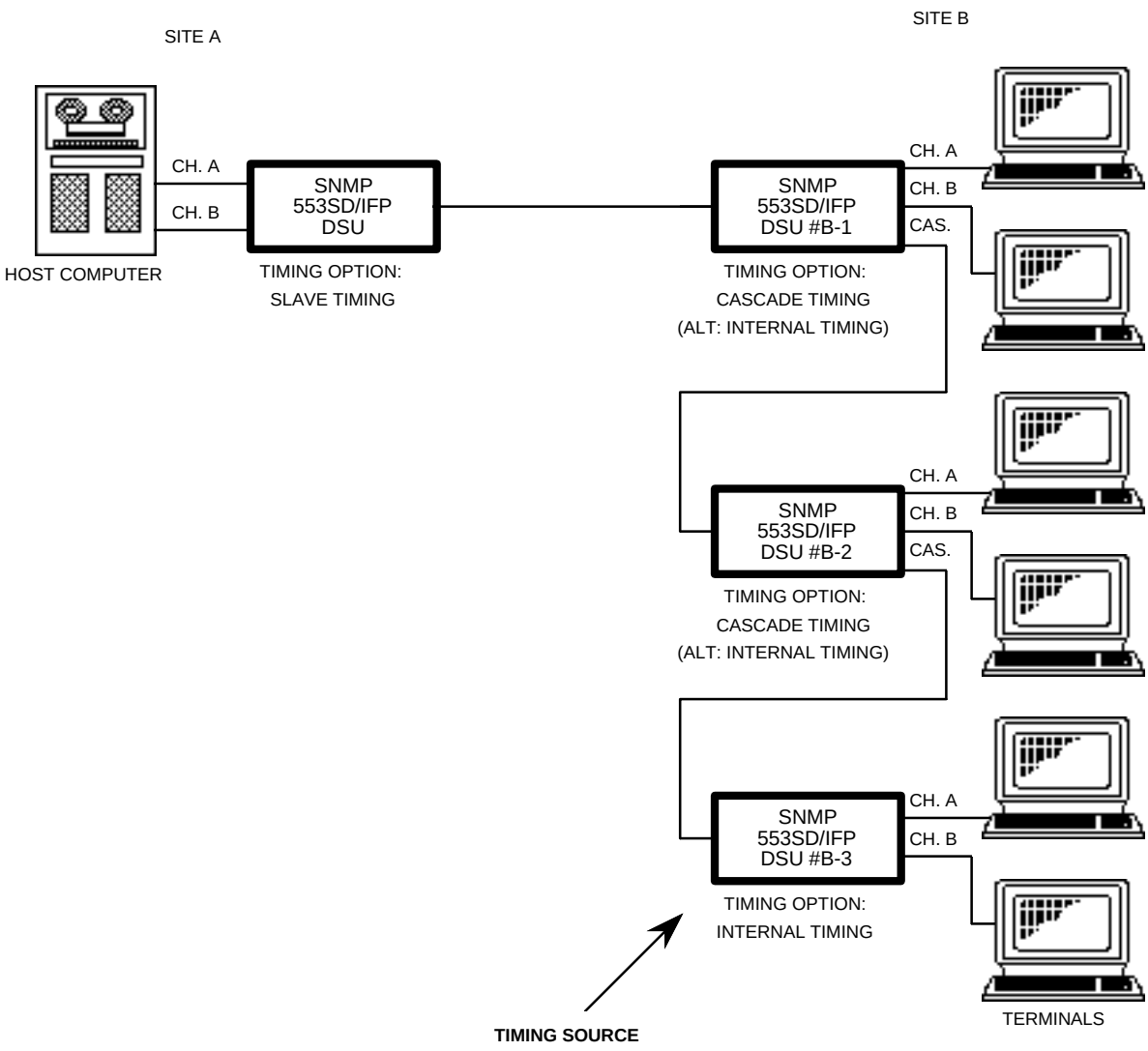


Figure C-15 Typical Basic Cascade Application (Alternate Internal Timing)

PBX Application

In a typical private network PBX application, as illustrated in *Figure C-16*, two SNMP 553SD/IFP DSUs are connected back-to-back. One PBX is configured as the master (the one at Site A in this example) and provides the timing source, and the other is configured as a slave and loops timing to its DSU. Cascade Timing is automatic for both SNMP 553SD/IFP DSUs, but you must also select the alternate timing source for each: Select Internal Timing for the DSU at Site A so that it will provide timing if the master PBX connected to it fails.

If there is a loss of cascade data between the PBX and the SNMP 553SD/IFP DSU, the SNMP 553SD/IFP DSU will switch to Internal Timing.

Select Slave Timing for the SNMP 553SD/IFP DSU at Site B so that it will recover and loop timing if the slave PBX connected to it fails. If both PBXs fail, the DSU at Site A will switch to Internal Timing and provide timing, and the DSU at Site B will switch to Slave Timing and recover and loop timing, so that the terminals on the channels can continue unaffected.

NOTE

DS0s used by Channel A or B must not be used by the PBX. Configure the PBX to busy out all DS0s used by Channel A or B..

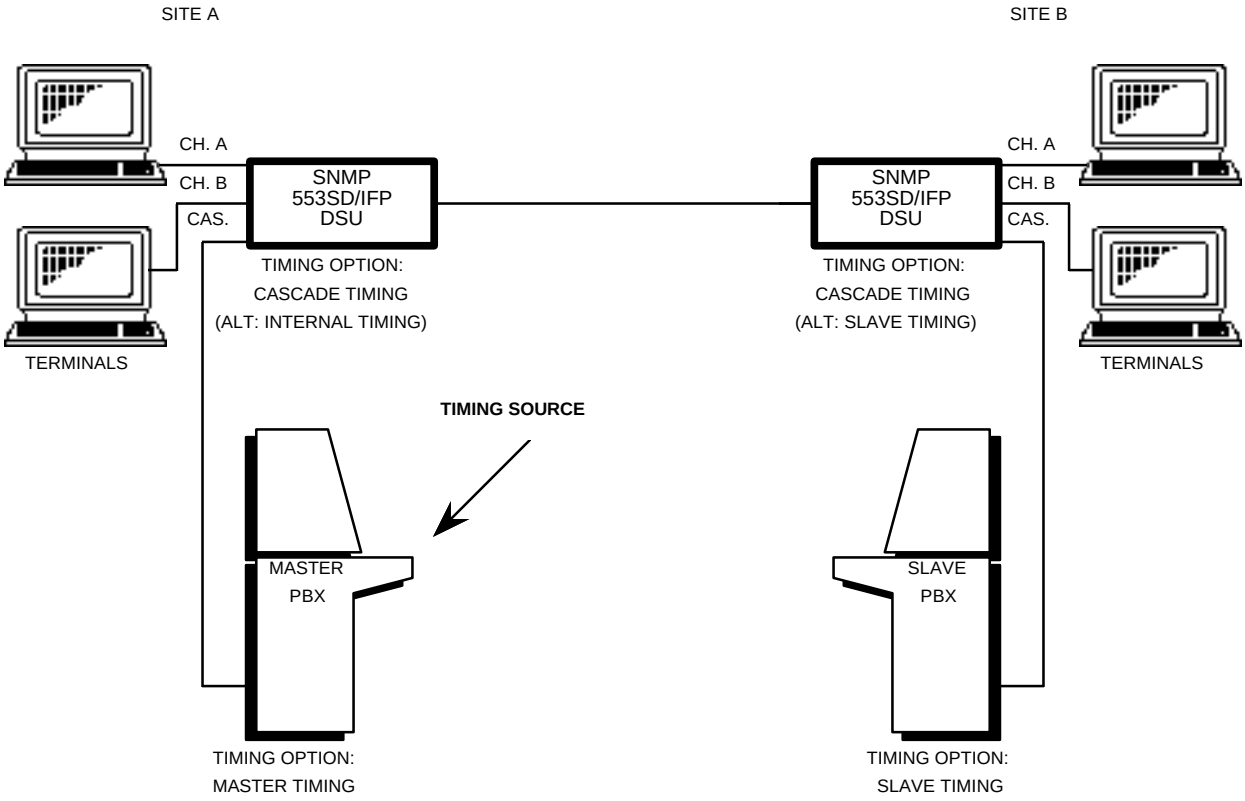


Figure C-16 Typical PBX Application

DACS Application

In a typical public data network application utilizing the Fractional T1 capabilities of the SNMP 553SD/IFP DSU, the network uses DACS for DS0 routing, as illustrated in *Figure C-17*. Because of its distributed nature and its interconnection to many devices, the public data network must be the master timing source, so you normally select Slave Timing for all SNMP 553SD/IFP DSUs connected directly to DACS. This example also shows a pair of cascaded SNMP 553SD/IFP DSUs at Site C. Cascade Timing is automatic for DSU #C-1, but you must also select the alternate timing source for it: select Slave Timing since it is connected to DACS.

If there is a loss of cascade data between #C-1 and #C-2, #C-1 will switch to Slave Timing.

Select Slave Timing for #C-2 so that it recovers timing from T1 data it receives from #C-1.

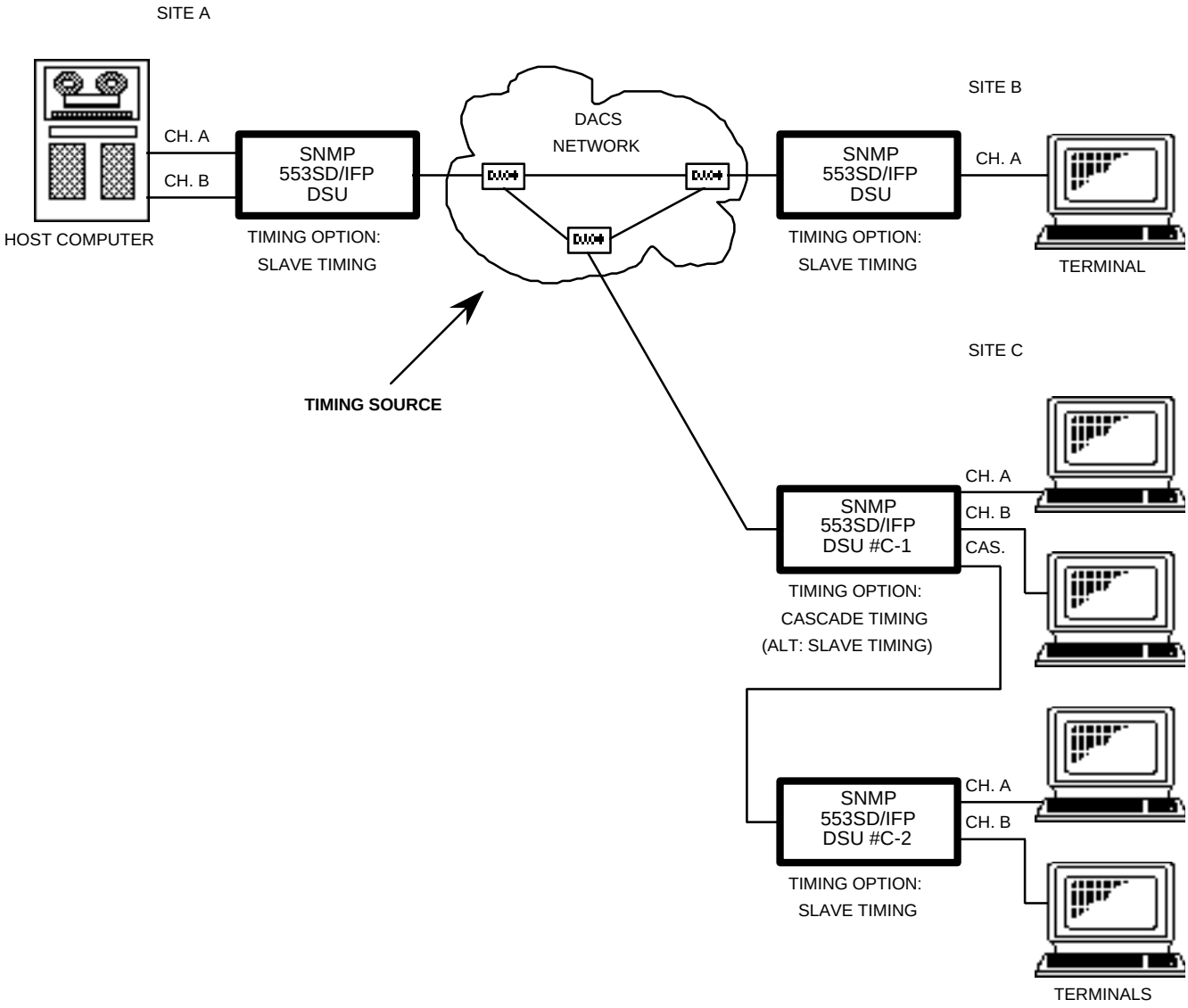


Figure C-17 Typical DACS Application

Plesiochronous Network Application

A plesiochronous network is one with multiple timing sources with accuracies that are close, but not precisely equal. If the timing option for any of the network devices is not correct, bit slips and other events can occur, which result in data errors or system failures. A typical plesiochronous network, with DACS and DDS, is illustrated in *Figure C-18*. Both DACS and DDS are master timing sources, so any devices connected to them, such as the SNMP 553SD/IFP DSUs at Sites A and B, must be configured for Slave Timing. By selecting Channel B Split Timing for the DSU at Site C, the DACS clock and the DDS clock are effectively isolated by internal buffers: the network side of the DSU terminates the DACS clock, and the channel side terminates the DDS clock.

NOTE

All timing options that include split timing require each timing source to be traceable to a Stratum 1 clock.

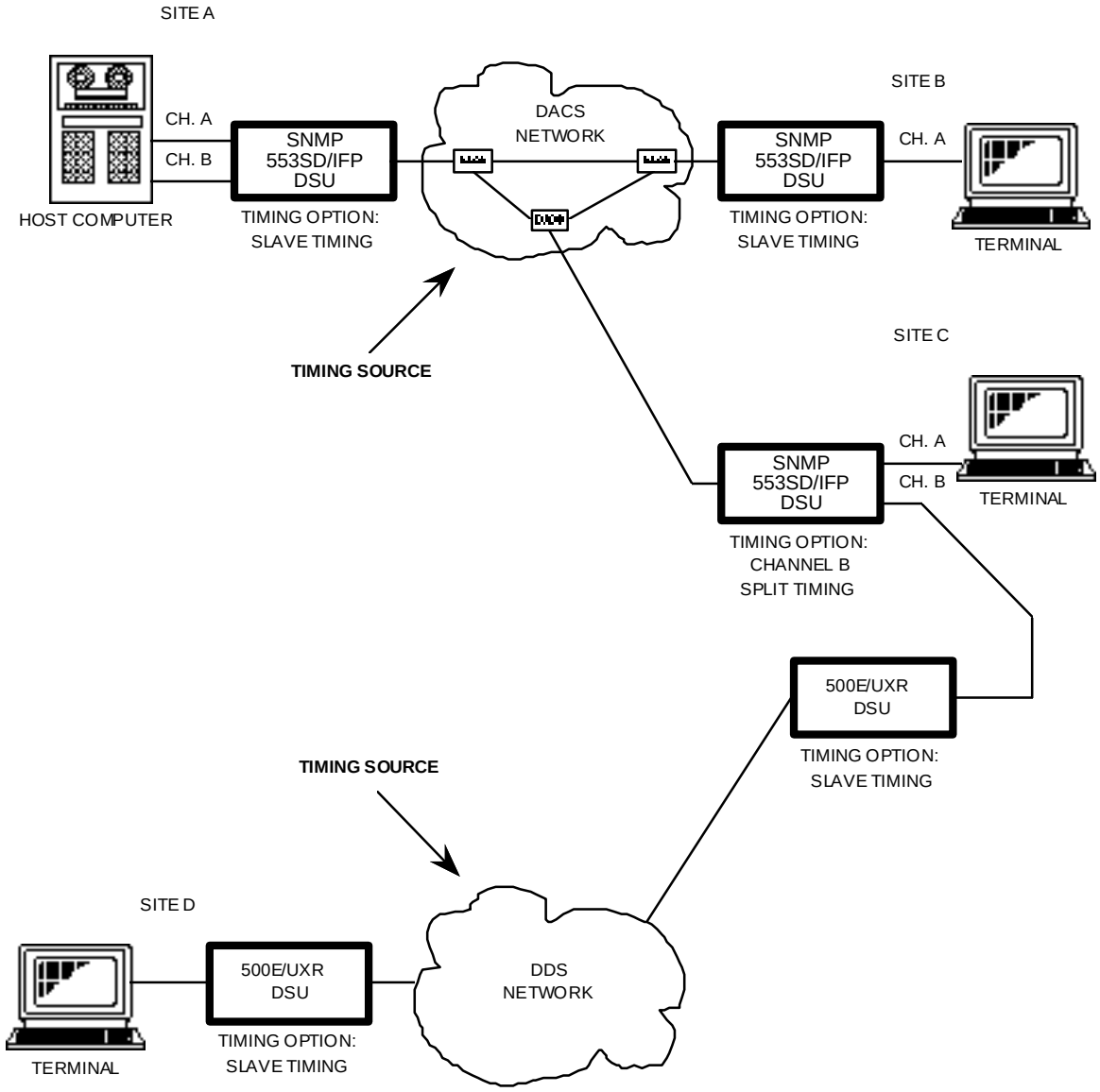


Figure C-18 Typical Plesiochronous Network Application

D Alarm Definitions

Overview

This appendix describes the SNMP 553SD DSU alarms that can appear on the IFP display:

Network OOF	(Network Out of Frame)
Network LOS	(Network Loss of Signal)
Network USS	(Network Unavailable Signal State)
Network AIS	(Network Alarm Indication Signal)
Network BPVS	(Network Bipolar Violations)
Network CRCS	(Network Cyclic Redundancy Checksum)
Network XS0	(Network Excessive Zeros)
Network YEL	(Network Received Yellow Alarm)
Network LAD	(Network Low Average Density)
Network CFS	(Network Controlled Frame Slips)
Network TIM LOS	(Network Loss of Transmit Timing)
Cascade OOF	(Cascade Out of Frame)
Cascade LOS	(Cascade Loss of Signal)
Cascade USS	(Cascade Unavailable Signal State)
Cascade AIS	(Cascade Alarm Indication Signal)
Cascade BPVS	(Cascade Bipolar Violations)
Cascade CRCS	(Cascade Cyclic Redundancy Checksum)
Cascade YEL	(Cascade Received Yellow Alarm)
Unit Failure	
Unsol Test	(Unsolicited Test Mode)
Power Cycled	
Config Error	(Configuration Error)
Status Change	

The Monitor function of the IFP displays current alarm status. The CSU also accumulates alarm counts, which can be displayed by an SNMP controller.

Network Alarms

Network Out Of Frame

A Network Out Of Frame (NETWORK OOF) alarm event occurs when the DSU misses two out of four framing bits in the signal coming from the network. The count for this alarm increments by one each time framing is lost, regardless of the number of frames affected.

The front panel NETWORK OOF indicator reflects the current status of DSU-to-network synchronization.

Network Loss Of Signal

A Network Loss of Signal (NETWORK LOS) alarm event occurs when the DSU senses an absence of network signal. The absence of signal for a time equivalent to 175 bits (± 75) is considered no signal. The front panel NETWORK LOS indicator reflects the current status of the network signal condition.

Network Unavailable Signal State

A Network Unavailable Signal State (NETWORK USS) alarm event occurs when 10 consecutive severely errored seconds occur. It ends when the DSU has processed 10 consecutive seconds of data without the occurrence of a severely errored second. The count for this alarm increments by one each time the alarm state occurs, regardless of how long it persists.

Network Alarm Indication Signal

A Network Alarm Indication Signal (NETWORK AIS) alarm event occurs when the DSU receives an AIS from the network. The front panel NETWORK AIS indicator reflects whether the DSU is receiving an AIS.

Network Bipolar Violations

A Network Bipolar Violation (NETWORK BPV) alarm event occurs when the signal the DSU receives from the network does not alternate between signal levels as required for Alternate Mark Inversion (AMI) or Bipolar with 8 Zero Substitution (B8ZS) data encoding.

The front panel NETWORK BPV indicator reflects the current status of BPV error events.

Network Cyclic Redundancy Checksum

A Network Cyclic Redundancy Checksum (NETWORK CRCS) error alarm event occurs when ESF framing is in use and the CRC-6 code calculated at the receiving DSU does not match the CRC-6 code calculated by the DSU that transmitted the signal. The DSU performs the CRC check on each ESF frame to detect errors in the DS1 signal.

The front panel ER indicator reflects the current status of NETWORK CRCS error events.

Network Excessive Zeros

A Network Excessive Zeros (NETWORK XS0) alarm event occurs when Max 15 Zeros or Max 39 Zeros is the configured selection for Ones Density and the DSU has to insert ones in the signal it transmits toward the network. The selected option determines the threshold for ones insertion and occurrence of this alarm. The DSU inserts ones when there are fewer than the Ones Density option requires in the signal from the DTE arriving at the Equipment port of the DSU.

The Network XS0 alarm is only valid when Max 15 Zeros or Max 39 Zeros is selected for Ones Density in the DSU configuration. When this alarm is valid Network LAD is not. Neither alarm is valid when No Enforcement is the option selected for Ones Density.

Network Received Yellow

A Network Received Yellow (NETWORK YEL) alarm event occurs when the DSU receives a Yellow alarm from the network.

Network Low Average Density

A Network Low Average Density (NETWORK LAD) alarm event occurs when 8(N+1)Restrict is the configured selection for Ones Density and the DSU has to insert ones in the signal it transmits toward the network. The DSU inserts ones when there are fewer than the Ones Density option requires in the signal from the DTE arriving at the Equipment port of the DSU.

The Network LAD alarm is only valid when the 8(N+1)Restrict option is selected for Ones Density in the DSU configuration. When this alarm is valid Network XS0 is not. Neither alarm is valid when No Enforcement is the option selected for Ones Density.

Network Controlled Frame Slips

A Network Controlled Frame Slips (NETWORK CFS) alarm event occurs when the DSU replicates or deletes a received DS1 frame. A DSU does this when the difference in synchronous timing between itself and the received signal is great enough to exhaust its buffer capacity. (Not currently supported)

Network Timing Loss

A Network Timing Loss (NETWORK TIM LOS) alarm event occurs when the DSU loses its source of Network Transmitter Timing. The DSU derives transmitter timing from the signal it receives at its Equipment port.

Cascade Alarms

Cascade Out of Frame

A Cascade Out Of Frame (CASCADE OOF) alarm event occurs when the DSU misses two out of four framing bits in the DSX-1 signal from the equipment connected to its DSX-1 cascade port. The count for this alarm increments by one each time framing is lost, regardless of the number of frames affected.

Cascade Loss of Signal

A Cascade Loss of Signal (CASCADE LOS) alarm event occurs when the DSU is not receiving an input signal from the equipment connected to its DSX-1 cascade port. Loss of that signal may also remove the primary source of Transmit Timing for the DSU.

Cascade Unavailable Signal State

A Cascade Unavailable Signal State (CASCADE USS) alarm event occurs when 10 consecutive severely errored seconds occur in the DSX-1 signal from the equipment connected to its DSX-1 cascade port. It ends when the DSU has processed 10 consecutive seconds of data without the occurrence of a severely errored second. The count for this alarm increments by one each time the alarm state occurs, regardless of how long it persists.

Cascade Alarm Indication Signal

A Cascade Alarm Indication Signal (CASCADE AIS) alarm event occurs when the DSU receives an AIS from the equipment connected to its DSX-1 cascade port.

Cascade Bipolar Violations

A Cascade Bipolar Violation (CASCADE BPV) alarm event occurs when the DSX-1 signal the DSU receives from the equipment connected to its DSX-1 cascade port does not alternate between signal levels as required for Alternate Mark Inversion (AMI) or Bipolar with 8 Zero Substitution (B8ZS) data encoding.

Cascade Cyclic Redundancy Check

A Cascade Cyclic Redundancy Checksum (CASCADE CRCS) error alarm event occurs when ESF framing is in use and the CRC-6 code calculated by the DSU does not match the CRC-6 code calculated by the equipment connected to the DSX-1 cascade port. The DSU performs the CRC check on each ESF frame to detect errors in the DSX-1 signal.

Cascade Received Yellow

A Cascade Received Yellow (NETWORK YEL) alarm event occurs when the DSU receives a Yellow alarm from the equipment connected to its DSX-1 cascade port.

Other Alarms

Unit Failure

A Unit Failure (UNIT FAILURE) alarm indicates that the DSU has not passed its Power On Self Test.

Unsolicited Test Mode

An Unsolicited Test Mode (UNSOL TEST) alarm event occurs any time the DSU enters a test mode that is not commanded by the IFP or an SNMP controller. The DSU generates this alarm when it is commanded to perform a test by a control lead in its DTE interface, an in-band loop code (Remote Test or Remote Digital Loopback), a front panel test switch, or a command from the service provider (Telco).

Power Cycled

A Power Cycled (POWER CYCLED) alarm event occurs each time power to the DSU is turned off and then back on. It also occurs when there is a system reset.

Configuration Error

A Configuration Error (CONFIG ERROR) alarm indicates that the DSU has computed a checksum for its software configuration that does not match the one it stored when it was configured. The DSU continually tests for this condition.

Status Change

A Status Change (STATUS CHANGE) alarm event occurs each time there is a change to the DSU configuration, or a change in the source of diagnostic control (from IFP to SNMP controller, or from SNMP controller to IFP).

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