GDC 058R136-000
Issue 2, April 1997

Installation and Operation

SNMP 540EN

Data Service Unit

General DataComm

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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.

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Preface

Scope

This manual describes how to install and operate a General DataComm SNMP 540EN Data Service Unit (DSU). It is written for installers, service technicians, and users. It assumes a working knowledge of data interfaces, DDS telephone service, and the Simple Network Management Protocol (SNMP).

Revision History

Issue 1 Initial publication.

Issue 2 Errata Sheet (058R136-000-E1) incorporated in the manual.
Changes to Equipment List Table 1-1 and DDS Line Connectors in Chapter 2.

Organization

This manual has five chapters and two 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 data terminal equipment (DTE) and to the DDS service or generic 56/64 Kbps digital circuit. It also describes the standalone enclosure that can houses the DSU.
- *Chapter 3 - Operation* describes the two ways in which the DSU can be controlled: terminal interface (using either a VT100 compatible terminal or a computer running the Telnet protocol) and SNMP. The chapter provides instructions for the use of the terminal interface.
- *Chapter 4 - Configuration Options* 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.
- *Appendix A - Technical Characteristics*
- *Appendix B - Interface Connector Pin Assignments*

Document Conventions

Level 1 paragraph headers introduce major topics.

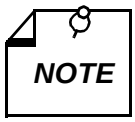
Level 2 paragraph headers introduce subsections of major topics.

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:

- *User's Guide for SNMP 540 Network Manager* GDC 058R694-V100

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. SNMP)
- 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.

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- 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.

GDC Educational Services provides hands-on training courses that range from basic data communications, modems and multiplexers, to complex networks and ATM systems. They can be taught in Connecticut or at a customer location. To discuss educational services or request a course schedule, call 1-800-242-1030 and follow the menu instructions .

Safety Instructions

Antistatic Precautions

Electrostatic discharge (ESD) resulting from the buildup of static electricity can cause computer components to fail. Electrostatic discharge 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 you install parts or cards. Keep parts and cards in antistatic packaging when they are not in use. If possible, use antistatic floor pads and workbench pads.

When you handle components or set switch options it is always best to use an antistatic wrist strap connected to a grounded equipment frame or chassis. *If a wrist strap is not available you should 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 only by qualified service personnel.

- Never install telephone jacks or lines in a wet location unless the equipment is certified for that application.
- 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 540/IFP DSU to the Public Telephone Network you are required to give the following information to the Telephone Company:

FCC Registration Number:AG6USA-74293-DE-N

FIC (Facility Interface Code):04DU5-24, 04DU5US-48, 04DU5-96, 04DU5-56

SOC (Service Order Code):6.0 N

Telephone Company jack type:RJ45S

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 Mbps 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.*

1 Introduction

Overview

This manual contains instructions for installing the SNMP 540EN Data Service Unit (DSU) and placing it into service. The SNMP 540EN DSU is intended primarily for use under the direction of a Simple Network Management Protocol (SNMP) controller that functions by interacting with the MIB tables in the DSU. Consult the *User's Guide for SNMP 540 Network Manager* (GDC 058R694-V100) for more extensive directions on how to perform operations and tests using SNMP.

Description

The SNMP 540EN is a single card, multi-rate Data Service Unit (DSU) that can operate at 56 Kbps in standard DDS or DDS with Secondary Channel (DDS/SC) applications, and at 64 Kbps in clear channel (generic) DDS or point-to-point wireline applications.

The DSU is a standalone unit housed in a Model DE-30 enclosure. The basic DSU is a 10.5-inch by 10.75-inch (267 mm by 273 mm) printed circuit (pc) card. It provides hardware-selectable integral support for both the EIA/TIA-232-E and the V.35 DTE interfaces. An optional 530 Interface piggyback card can be mounted on the DSU base card to support the EIA/TIA-530 DTE interface.

Table 1-1 defines part numbers of the standard and optional equipment available for the SNMP 540EN DSU. Technical characteristics are listed in *Appendix A*.

Features

- Combined CSU/DSU that provides a direct connect capability for DATAPHONE Digital Service (DDS)[1]
- Capable of operating at 56 Kbps in Standard DDS or DDS with Secondary Channel, and at 64 Kbps Clear Channel
- Fully compatible with Simple Network Management Protocol (SNMP) to provide complete software control for centralized configuration and diagnostic testing capabilities
- Supports user data stream in any format
- Supports out-of-band SNMP control via Ethernet LAN — 10BaseT or AUI
- Supports out-of-band SNMP via Point to Point Protocol (PPP) or Serial Line Internet Protocol (SLIP) connection at back panel Auxiliary connector; supports use of a modem for this connection
- Configurable with two IP addresses and subnet masks; one for management communications via LAN, and one for management communications at the Auxiliary connector

1. DATAPHONE Digital Service and DDS are registered trademarks of AT&T

- Provides terminal interface management capabilities. The terminal interface is accessible in two ways:
    - using a VT100-compatible terminal, through the console port interface on the front panel
    - using a computer and Telnet protocol, through the LAN or Auxiliary interfaces
- Provides standard equipment interfaces that conform to EIA/TIA-232-E and ITU-T V.35, With optional plug-in card can support EIA-530.
- Provides extended range performance at 56 Kbps and 64 Kbps.
- Provides circuit quality measurements, including Receive Level and Line Build-Out.

Diagnostics

The SNMP 540EN 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 or the 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 or the terminal interface through the console port. Some alarms can be assigned threshold values that must be met or exceeded before the alarm occurs.

The DSU supports STC loopback tests that can be commanded by the DDS service provider to check network operation.

Application

The SNMP 540EN DSU provides full duplex operation over four-wire private lines. It is fully software programmable for operation in the following network operating modes:

- DDS I (Standard DDS) — 56 Kbps
- DDS/SC (DDS with Secondary Channel) — 56 Kbps
- DDS 64 (Clear Channel) — 64 Kbps
- Wireline — 64 or 56 Kbps

DATAPHONE Digital Service (DDS) has proven to be a highly reliable means of transmitting data. Both local and interexchange carriers offer DDS with Secondary Channel (SC), an enhanced version of the service.

Wireline operation takes place over a local connection, using unloaded metallic lines.

Table 1-1 Equipment List

Description	GDC Part No.
SNMP 540EN DSU, V.35 DTE interface (in DataComm DE-30 standalone enclosure 010B207-001, 117 V ac)	058A160-001
SNMP 540EN DSU, DB-25 connector for EIA 232 or EIA 530 DTE interface (in DataComm DE-30 standalone enclosure 010B207-002, 117 V ac)	058A160-002
Optional Assembly	
EIA 530 Interface Module	048P042-001
Cables	
DB25M to V.35 Conversion cable	027H560-001
V.35M to V.35M cable	027H516-XXX
Console Port (modular) to DB-25 cable	029H210-XXX
Console Port (modul;ar) to DB-9 cable	029H211-XXX
* XXX represents three digits to identify cable length. For example, 001 = 1 foot	

2 Installation

Overview

This chapter describes the installation of the SNMP 540EN DSU.

The SNMP 540EN DSU is shipped pre-assembled, tested, and ready to use. The normal procedure after unpacking the unit is to connect it to ac power and perform the Preoperational Check described in this chapter. When the test is successfully completed you may proceed to make the DSU cable connections.

The SNMP 540EN DSU should be installed in a ventilated area where the ambient temperature does not exceed 122°F (50°C). Do not install the DSU above other equipment that generates large amounts of heat (e.g., power supplies).

The DSU requires configuration in order to be placed in service. *Chapter 3, Operation*, describes the methods of control by which you can perform configuration. *Chapter 4, Configuration*, describes the individual configuration characteristics.

Unpacking and Handling

Inspect the SNMP 540EN DSU for damage as soon after delivery as possible. If there is any damage, notify the shipper immediately.

Do not discard the box and packing material. Save them to use if you ever need to reship the unit.

Option Selection

Hardware options for the SNMP 540EN DSU consist of a selection on the base pc card between alternative grounding arrangements, and a plug-in module that can be mounted on the base card to provide an EIA-530 DTE interface.

The three grounding arrangements, selectable by Jumper J6 on the base card, are common, open (isolated), or separate. *Figure 2-1* indicates how to make the option selection.

Figure 2-2 illustrates how the EIA-530 interface module is to be installed and positioned when it is present.

The SNMP 540EN DSU stores its software configuration option settings in non-volatile memory. You can set most options means of either SNMP or the terminal interface. You must use the console port terminal interface on the front panel to assign the IP address(es) and subnet mask(s) required to support SNMP and Telnet control.

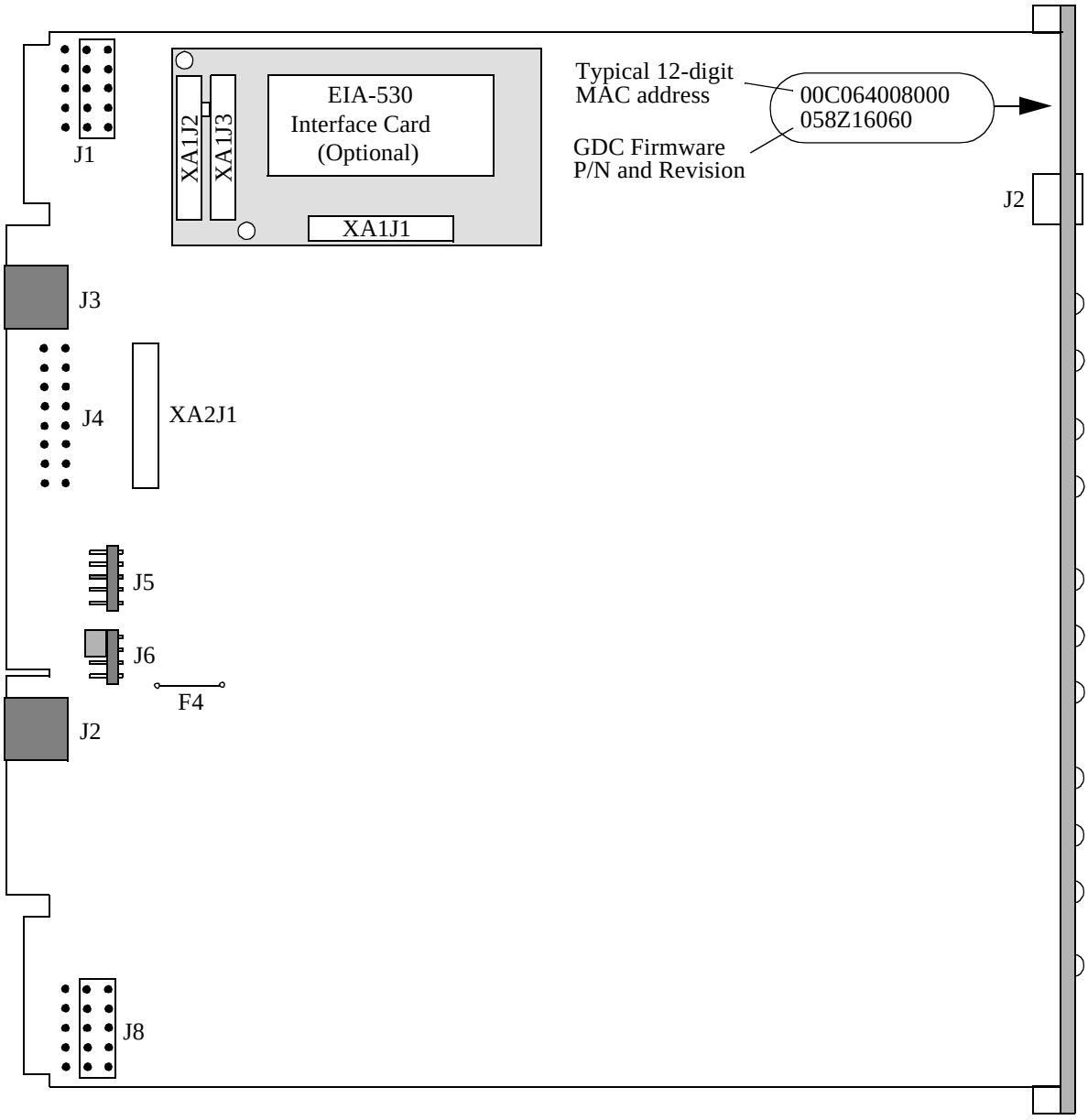


Figure 2-1 SNMP 540EN DSU PC Card

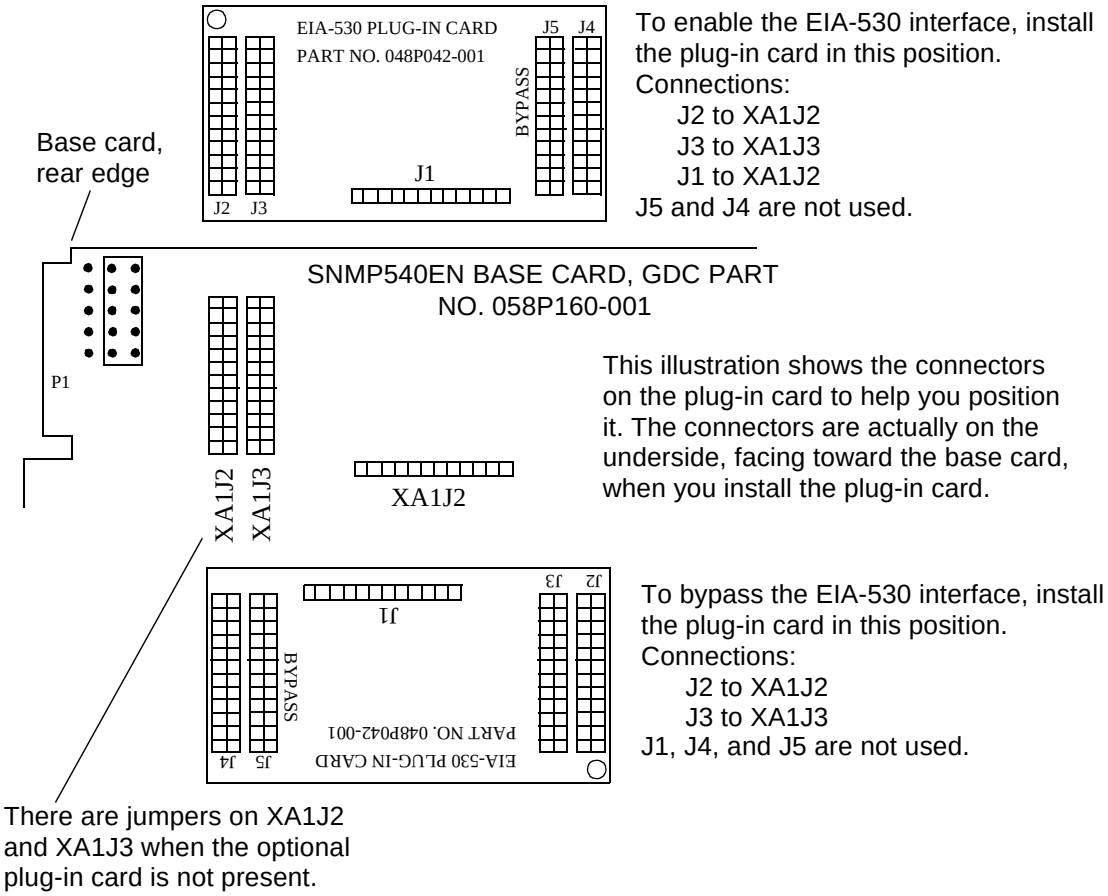


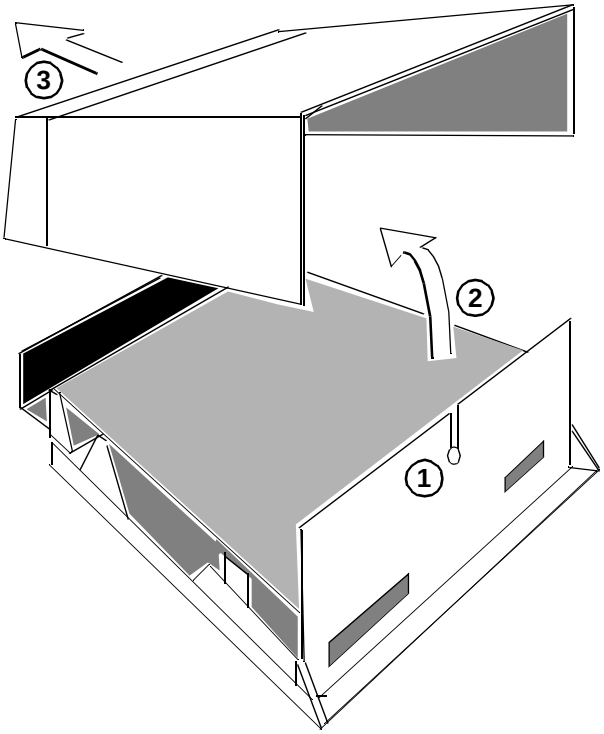
Figure 2-2 EIA-530 Card Installation

Installation Procedures

The SNMP 540EN DSU is delivered already installed in its Model DE-30 DataComm Enclosure. *Figure 2-3* shows how to access the SNMP 540EN pc card in the standalone enclosure if you ever need to.

Disconnect the power supply and line connections before you remove the cover. If you need to remove the pc card from the standalone base, disconnect the power supply connector from J5, at the rear center of the card, as shown in *Figure 2-3* and disconnect the ribbon cable plug from connector J4.

When you reinstall the card into the base, reconnect the power supply cable to J5 and the ribbon cable to J4.



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.
3. Slide cover left with an upward motion.

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

Figure 2-3 Standalone Cover Removal Procedure

Electrical Power Connection

The unit is equipped with a captive ac power cord terminated in a molded three-prong plug. Connect the cord to a polarized outlet providing the required ac power. The outlet should not be under switch control. The unit should be powered by the same ac source as the equipment interfaced with the unit to prevent large circulating currents caused by differences in ground potential. If it is not possible to determine whether the equipment is powered by the same ac source, it should be verified that a potential difference of less than 0.25 V rms exists between the grounding circuits of the respective power outlets.

Do not apply power to the DSU until all connections to peripheral equipment have been made. The pc card incorporates a fusible link, F4 (shown in Figure 2-1), which may open if the ground potential between the unit and peripheral equipment exceeds 0.25 V rms. If a fusible link opens, return the DSU to the factory for repair.

Business Equipment (Data Terminal) Connections

The SNMP 540EN supports three business equipment interfaces: EIA/TIA-232-E, ITU-T V.35 and optionally EIA-530. The EIA/TIA-232-E and V.35 interface hardware resides on the pc base card. An optional plug-in piggyback card is required for the EIA-530 interface. The EIA-530 Piggyback card mates with the base card via connectors XA1J1, XA1J2, and XA1J3. It may be oriented in two positions when plugged into the base card (*see Figure 2-2*). In one position, the 530 piggyback connects to P1 and the base card and provides an EIA-530 interface regardless of the interface strapping on the base card. In the other position, the 530 piggyback acts as a jumper so that the EIA/TIA-232-E or V.35 interface may be selected with the plug-in card mounted. Finally, the plug-in card may be removed entirely and jumpers placed across XA1J2 and XA1J3, so that non-EIA-530 units may operate without the card.

Appendix B describes the signals exchanged through each of the three DTE interfaces.

DDS Line Connectors

When the DSU is installed in the standalone enclosure, the four-wire private line to the DDS network connects to the RJ48S jack that is on the right as you face the back panel. *Figure 2-4* illustrates the enclosure back panel and shows the location of the DDS network jack.

NOTE

In the RJ48S modular jack of the DSU, Tx lines are on pins 1 and 2. Rx lines are on pins 7 and 8. Pin 1 is on the left and pin 8 is on the right when you face the rear panel.

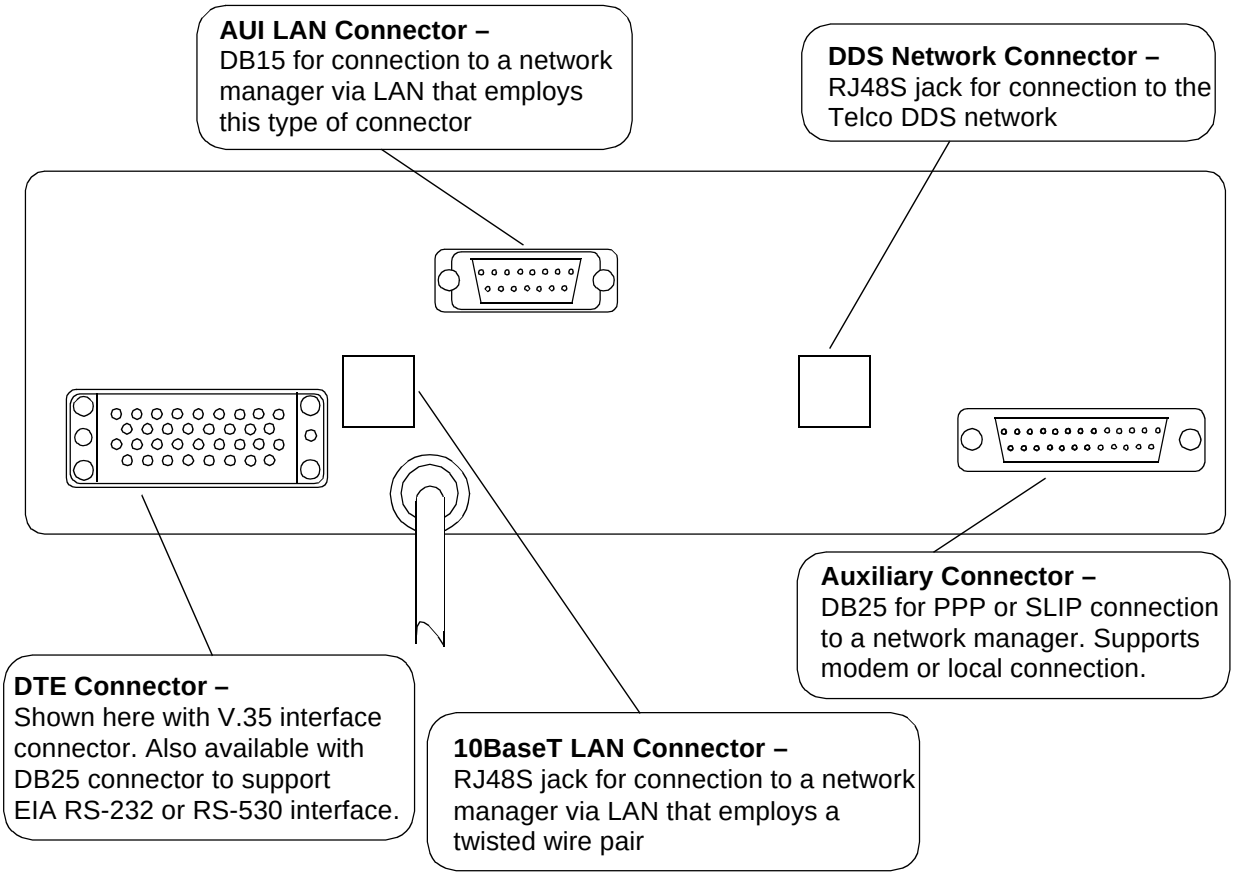


Figure 2-4 Standalone Enclosure Rear Panel

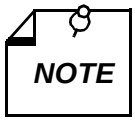
NOTE

Use of the AUI LAN connector is supported by SNMP 540EN pc cards built with revision C- or later artwork. The pc card part number, which includes the revision letter, is stenciled on the underside left edge of the pc card.

Preoperational Check

During installation, and before you connect the DSU to either the DDS line or the DTE, perform the following preoperational check procedure to verify normal operation of the DSU:

1. Connect the DSU to ac power.
2. Connect a VT100-compatible terminal to the console port.
3. Through the terminal interface, perform Initialize Configuration (Configuration/Unit Configuration/Initialize Configuration). *Chapter 3* contains instruction for using the terminal interface, and the path to this function is shown in *Figure 3-18*.
4. Perform a Line Loopback with Self-Test. The path to this test function is shown in *Figure 3-25*. No errors should occur during the test.
5. After the DSU successfully completes the Line Loopback with Self-Test, continue with the installation by connecting the DSU to the DDS line.
6. Watch for the front panel Link Down indicator to go Off when the DSU is connected to the DDS line. If it remains On there is a problem with the local loop.
7. Once the SNMP 540EN DSUs are installed at both ends of a link, but before they are connected to their DTEs, use a terminal connected to the console port to perform a Remote Loopback with Self-Test. The path to this test function is shown in *Figure 3-26*. A low error rate can be considered acceptable on this test, since errors may result from conditions on the network.



If the DSUs are being installed in an LDM environment, you should configure one of the DSUs to provide internal timing before you attempt to run the Remote Loopback with Self-Test. Initiate the test from the unit that supplies the timing.

Descriptions of the loopback tests appear in *Chapter 5*.

If the DSU and the line pass these tests, but subsequently fail to perform data communications, they are probably not at fault. Check connections between the DSUs and their DTEs. Also check all DSU and DTE configuration options that affect DSU/DTE compatibility.

In the event the DSU does not check out properly, replace it with a spare DSU, if available, and repeat the tests. Do not attempt to repair the DSU. For assistance, contact General DataComm Service (see Preface).

3 Operation

Overview

The SNMP 540EN DSU accepts two forms of control: SNMP or terminal interface. You can perform terminal interface control through the console port on the front panel, using a VT100-compatible terminal; or through the auxiliary port on the back panel, using the Telnet protocol. This chapter of the manual is concerned principally with the terminal interface mode of control. It also includes instructions for the down line loading procedures by which operating software can be loaded into the DSU.

IP Addressing

The DSU can be programmed, by means of the terminal interface, with two Internet Protocol (IP) addresses, one for management data communications on the Ethernet LAN and one for management data communications through the Auxiliary port. The IP addresses are used for both SNMP and Telnet control. The DSU distinguishes between SNMP and Telnet control data by recognizing the protocols.

Communications through the Auxiliary connector can use Point-to-Point Protocol (PPP) or Serial Line Internet Protocol (SLIP) to control the data transfer. The communications can take place either through a local connection or through a modem-supported remote connection.

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.

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. 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 Options* (as are the options that can be set by the terminal interface). *Chapter 5, Tests,* identifies the test procedures that can be commanded by means of SNMP.

Controls, Indicators, and Connectors

Figure 3-1 illustrates the DSU front panel. *Table 3-1,* immediately following the illustration, explains the functions of the front panel indicators and connector. *Figure 2-3* (*see Chapter 2*) illustrates the standalone enclosure rear panel connectors for 117 V ac voltage bases.

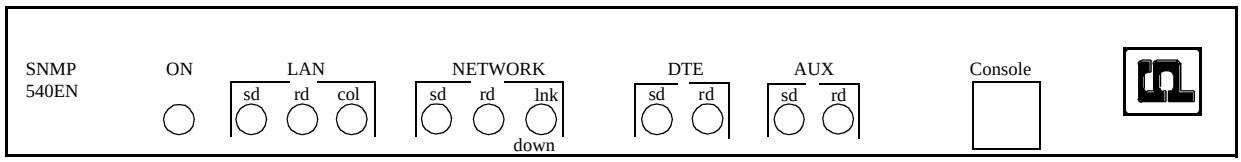


Figure 3-1 Front Panel

The front panel has four sets of Send Data (sd) and Receive Data (rd) LED indicators, designated LAN, Network, DTE, and AUX. The indicators blink in response to data passing through the corresponding interface.

The LAN and Network indicator groupings each have one additional LED to alert you in the event of problems with those interfaces. The LAN Collision (col) indicator lights when an attempt by the DSU to transmit LAN data is blocked by a LAN transmission from another unit. The Network Link Down (lnk down) indicator lights when there is not a usable signal being received at the network interface.

The LEDs also provide test status indication as detailed below in *Table 3-1*. In the table the term "live" denotes the normal, blinking condition for the sd and rd indicators. For the col and lnk down indicators, "live" denotes valid indication of current conditions.

Table 3-1 Diagnostic LED Matrix

Diagnostic Mode	**LAN**			**Network**			**DTE**		**AUX**	
	sd	rd	col	sd	rd	lnk down	sd	rd	sd	rd
Operating Mode	Live	Live	Live	Live	Live	Live	Live	Live	Live	Live
AnaLoop Test	Off	On	Off	Live	Live	Flashing	Live	Live	Live	Live
AL with Self Test	Off	On	On - flashes for errors	Live	Live	Flashing	Live	Live	Live	Live
Remote Loop Test	On	Off	Off	Live	Live	Flashing	Live	Live	Live	Live
RL with Self Test	On	Off	On - flashes for errors	Live	Live	Flashing	Live	Live	Live	Live
RL Test commanded by remote unit	On	On	Off	Live	Live	Flashing	Live	Live	Live	Live
CSU or DSU loopback test commanded by Telco or STC	On	On	Off	Live	Live	Flashing	Live	Live	Live	Live

Terminal Interface

The SNMP 540EN DSU also provides a terminal interface for configuration and control functions. The terminal interface is accessible in three ways:

- Through the LAN interface using Telnet protocol and the LAN port IP address.
- Through the Auxiliary interface using Telnet protocol and the Auxiliary port IP address.
- Direct connection through the console port on the front panel using a VT100 compatible terminal. This connection does not require IP addressing and the Telnet protocol.

There can only be one terminal interface session active at a time. The console port has the highest priority. If a terminal is plugged into the console port during a Telnet session, the session is aborted. An attempt to establish a Telnet session while a terminal session through the console port or another Telnet session is already active produces a "Connection refused" message.

When using the Telnet protocol, operate in line mode, not character mode, so that input is sent to the DSU only when you press the Enter key, not character by character. Line mode simplifies the communication process, and it permits you to backspace and make corrections before you send input to the DSU. To enter line mode, press the CTRL and] keys together, enter "mode line" and press Return.

The console port interface operates at 9600 bps, asynchronous, and uses 8 bit characters with 1 stop bit and no parity. *Table 1-1, Equipment List*, includes cables for connecting the console port to terminals that have either 25-pin or 9-pin interfaces.

To access the terminal interface:

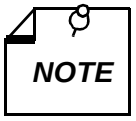
1. Either connect a terminal to the console port or establish a Telnet connection to the appropriate IP address (Unit or Auxiliary). The DSU responds with

   ```
   SNMP540EN Login:
   ```

2. Type in the six-character password and press Enter. The DSU responds

   ```
   Screen Cursor Control ? [Y=yes, N=no]
   ```

   If you respond Yes to this question, the terminal interface refreshes the screen each time you press Enter and presents each selection menu alone on the screen. If you respond No, the screen scrolls, with previous menus and input remaining on-screen until they scroll off at the top.



A. The DSU is delivered with the default password GDCGDC. A user-selected six-character password can be configured by means of a terminal connected to the console port.

B. You can access the console port with either the default password or the user-selected password. Only the user-selected password may be used for Telnet access.

3. Type in the appropriate response and press Enter. The DSU responds

   ```
   SNMP-540EN Auxiliary Control
        [0]Exit-Quit
        [1]CURRENT STATUS
        [2]CONFIGURATION
        [3]TESTS
   Next Selection:
   ```

Configuration changes made through the terminal interface do not take effect until you exit from the terminal interface session and answer Yes to the Save Changes? prompt.

The figures on the following pages provide graphical representations of the terminal interface menu structure. Each of the configuration menus, when you access it, 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.

NOTE

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 Telnet session by the service provider. It does display the changes in subsequent Telnet sessions.

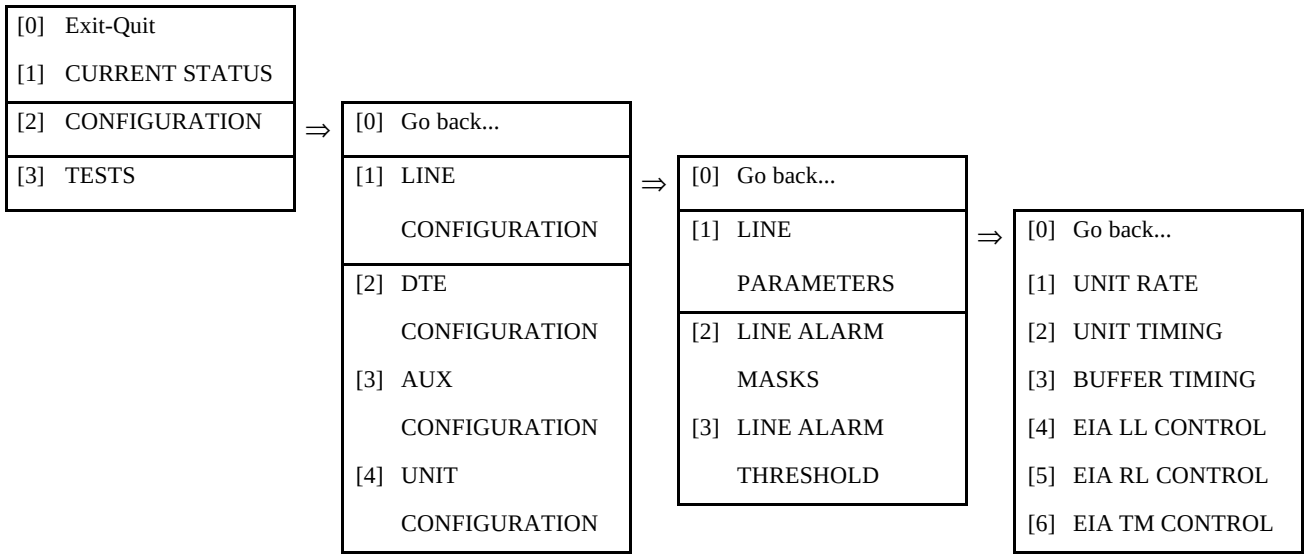


Figure 3-2 Terminal Interface: Configuration, Line Configuration, Line Parameters

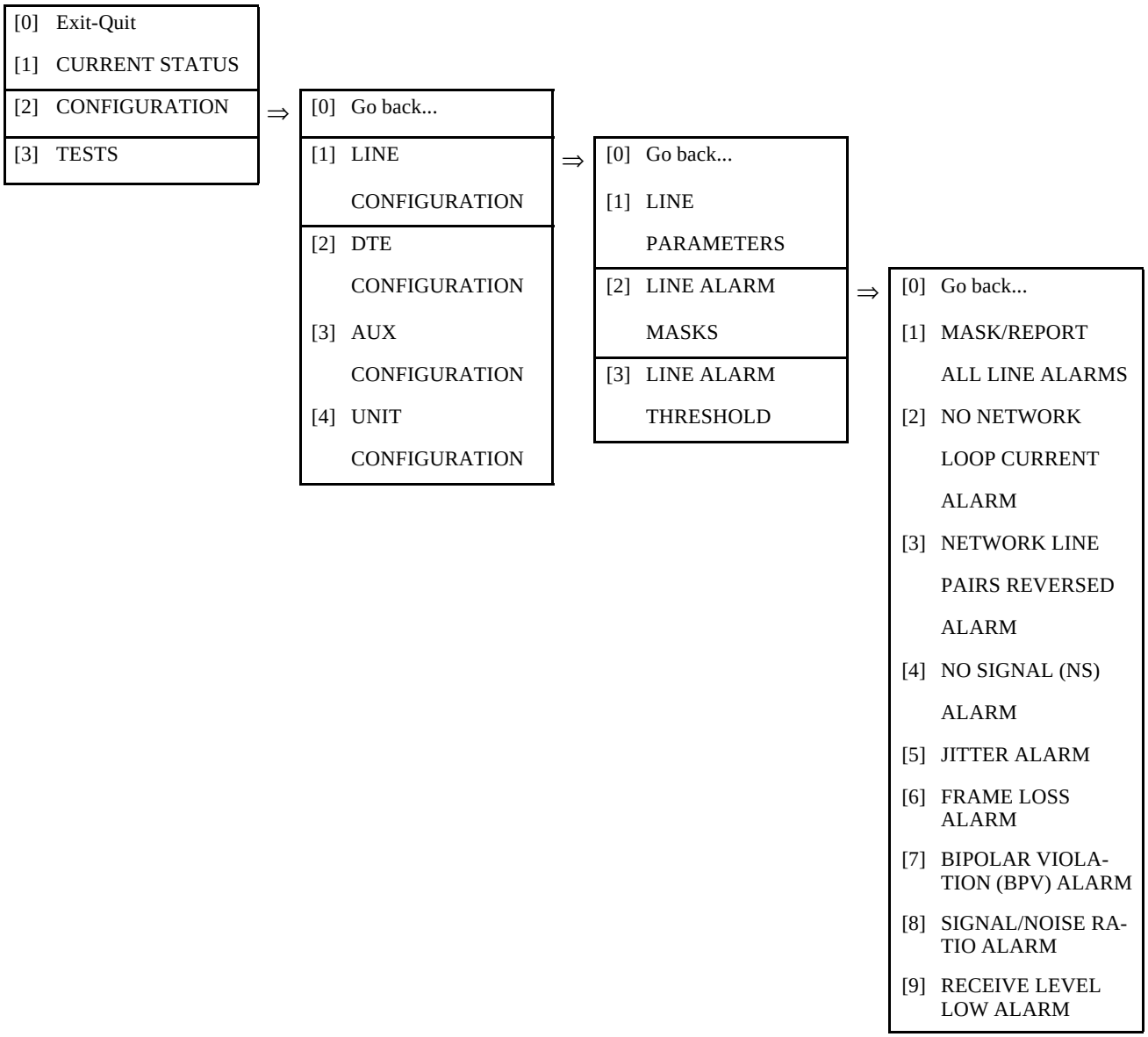


Figure 3-3 Terminal Interface: Configuration, Line Configuration, Line Alarm Masks

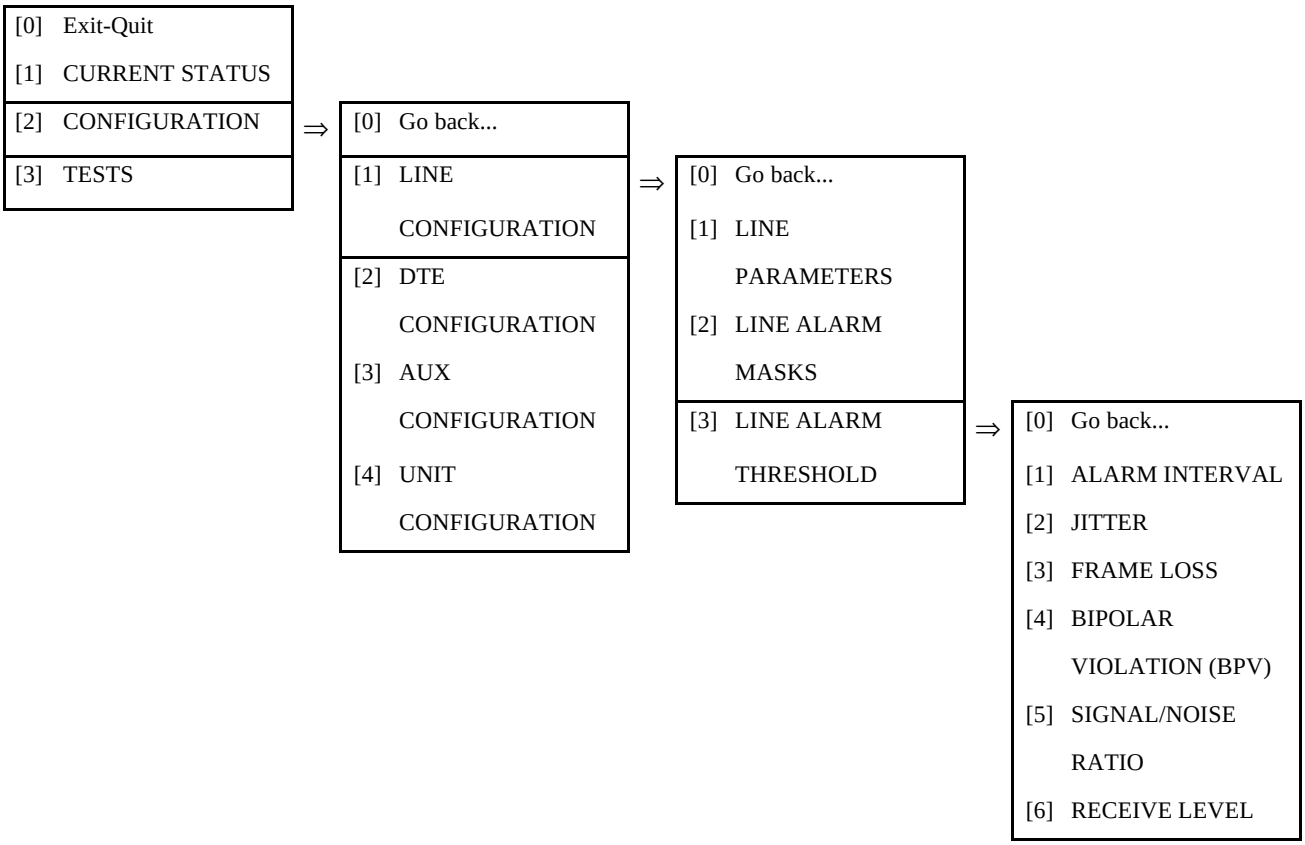


Figure 3-4 Terminal Interface: Configuration, Line Configuration, Line Alarm Threshold

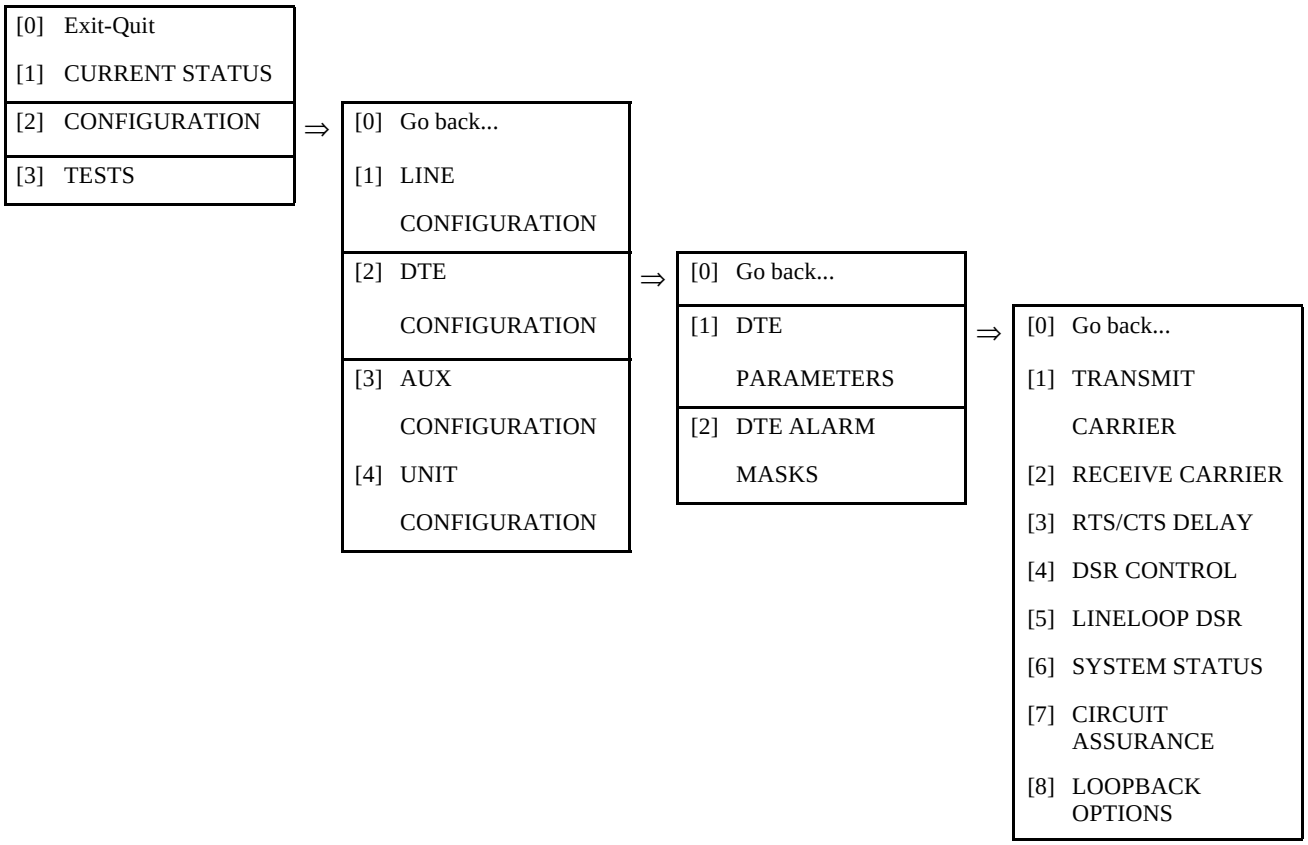


Figure 3-5 Terminal Interface: Configuration, DTE Configuration, DTE Parameters

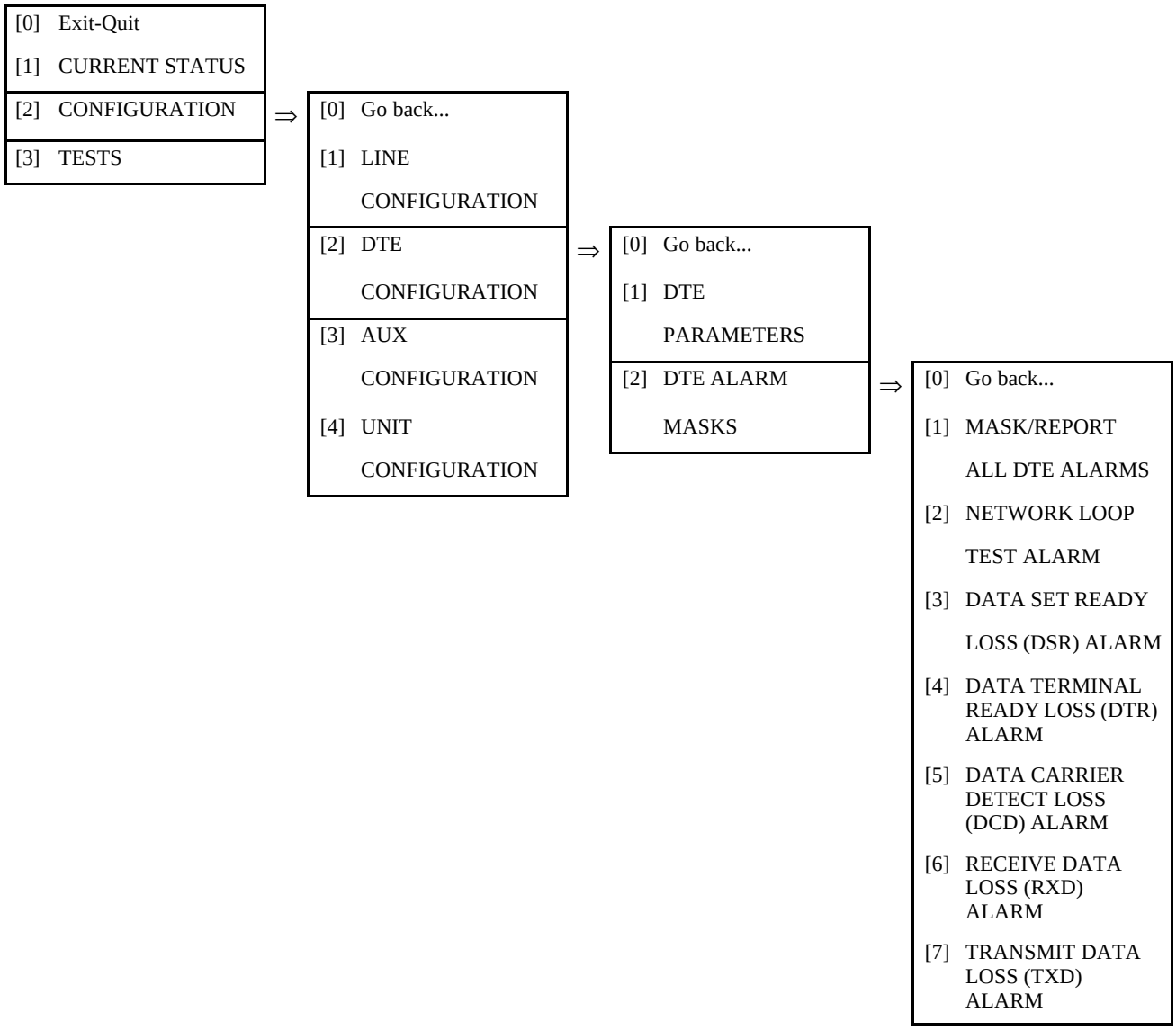


Figure 3-6 Terminal Interface: Configuration, DTE Configuration, DTE Alarm Masks

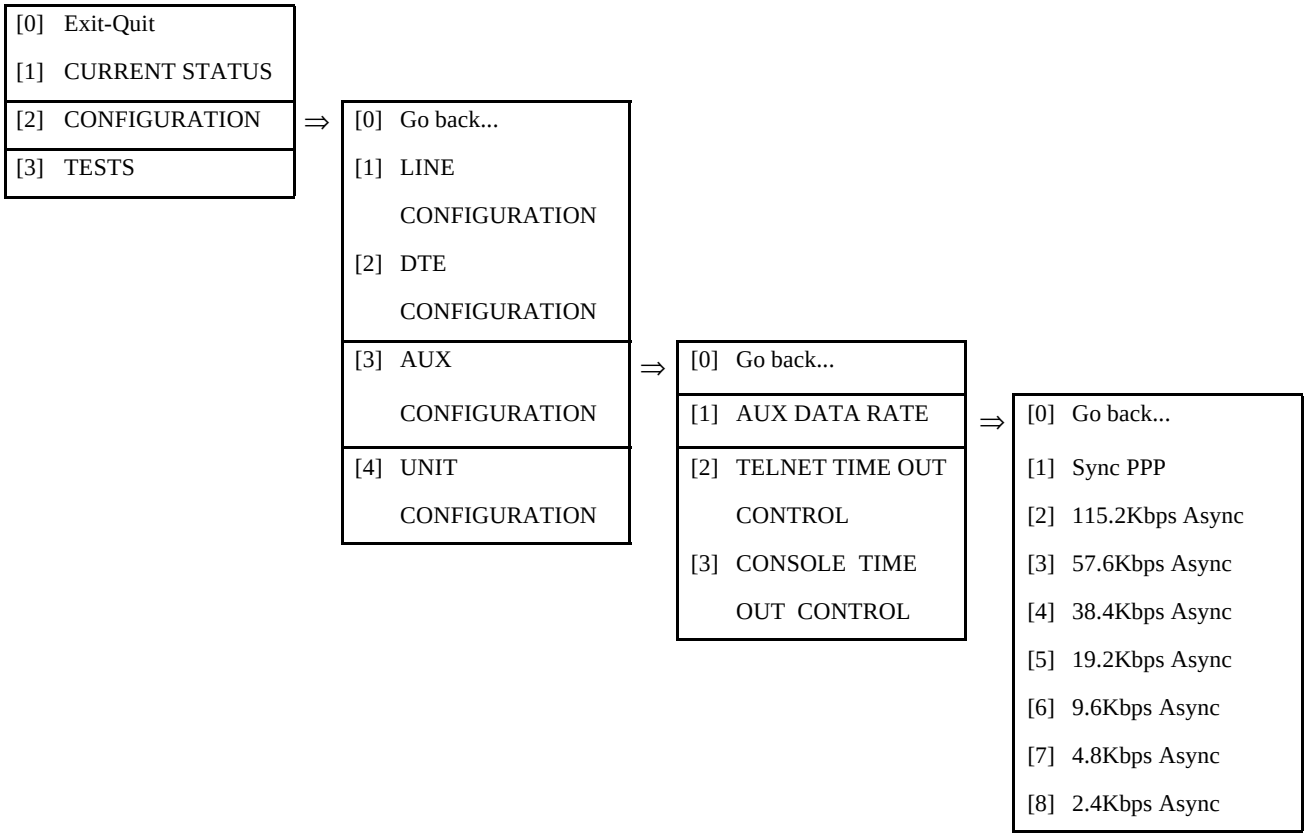


Figure 3-7 Terminal Interface: Configuration, Aux Configuration, Auxiliary Data Rate

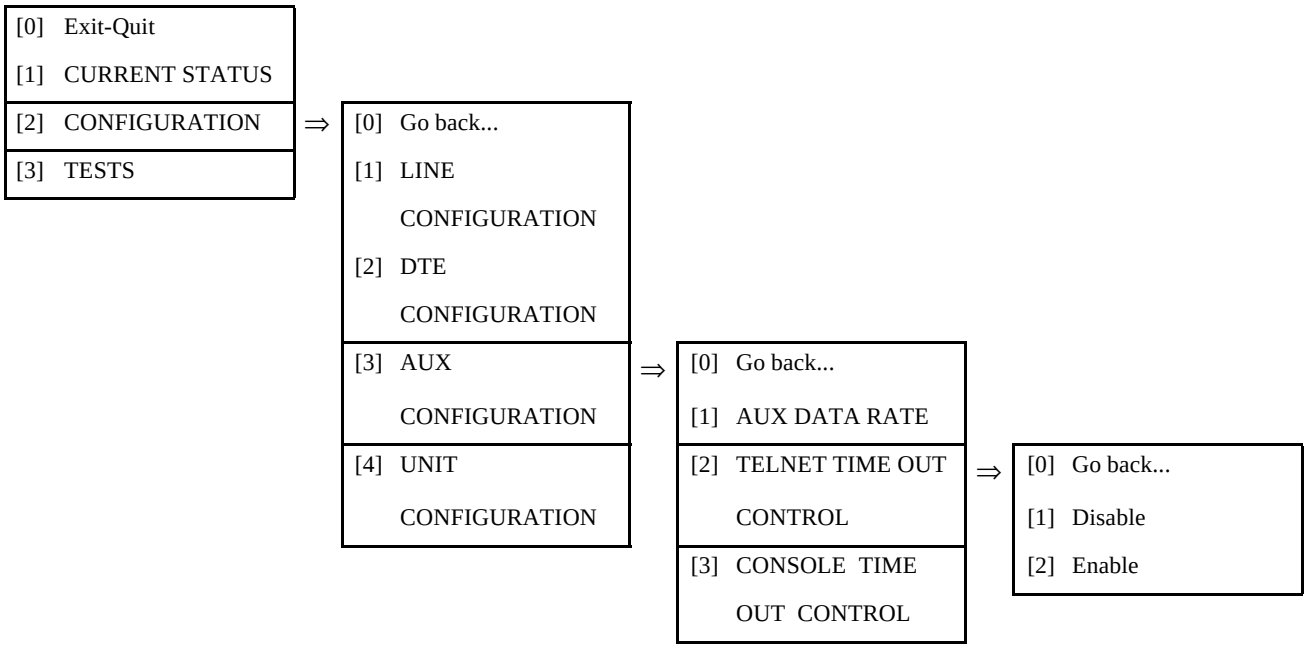


Figure 3-8 Terminal Interface: Configuration, Aux Configuration, Telnet Time Out Control

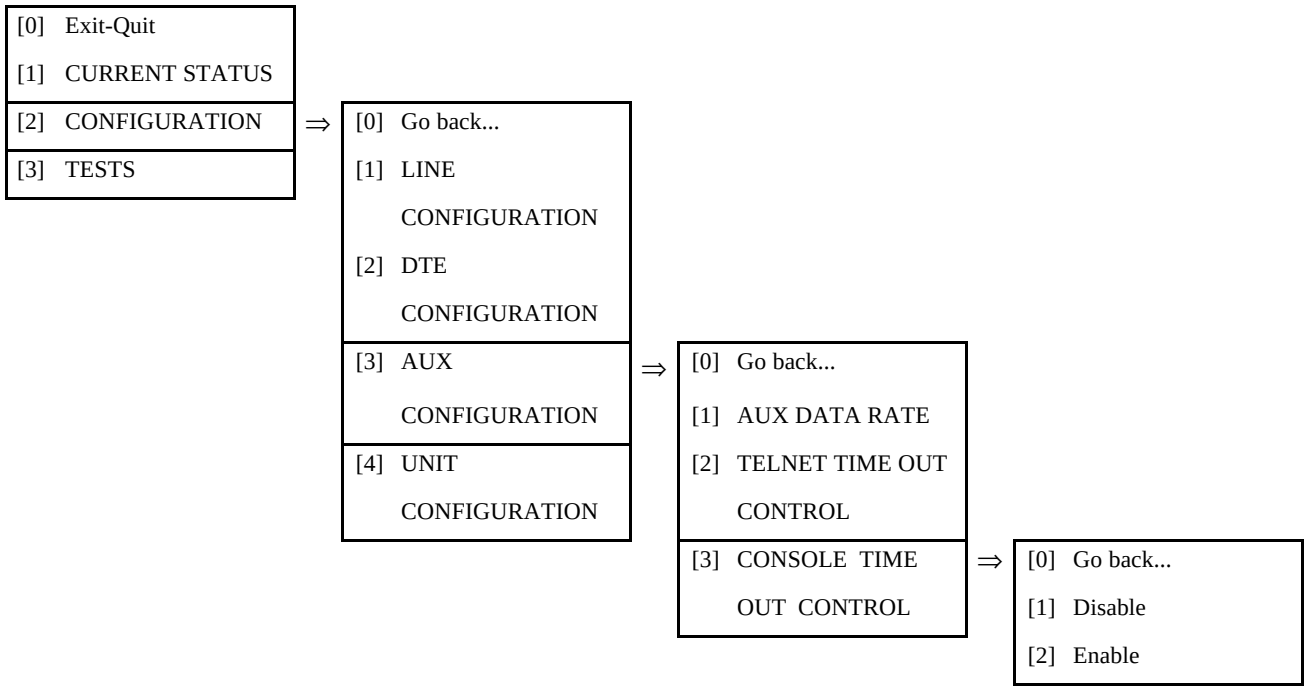


Figure 3-9 Terminal Interface: Configuration, Aux Configuration, Console Time Out Control

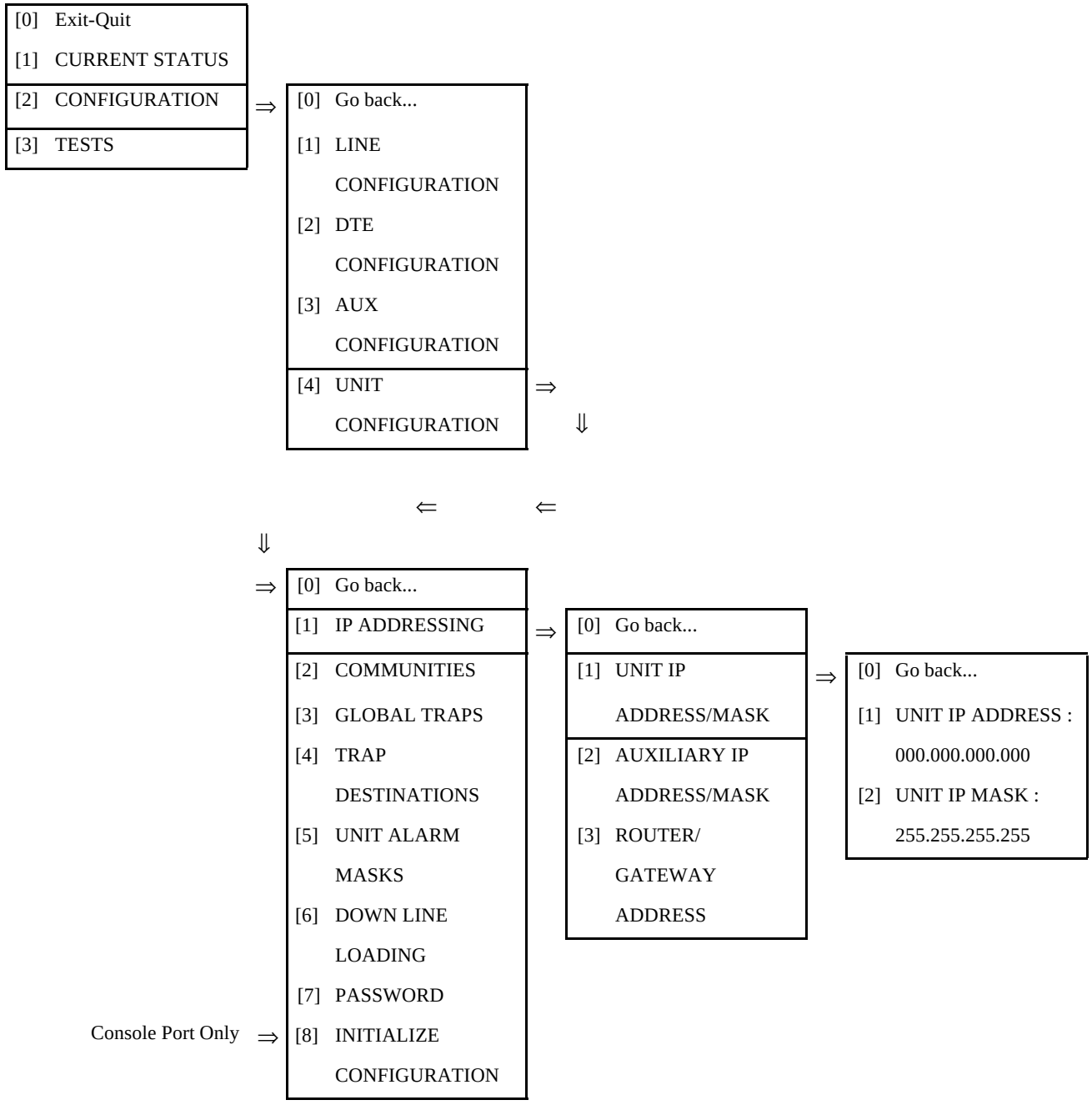


Figure 3-10 Terminal Interface: Configuration, Unit Configuration, IP Addressing, Unit IP Address/Mask (same options are displayed for Auxiliary IP Address/Mask)

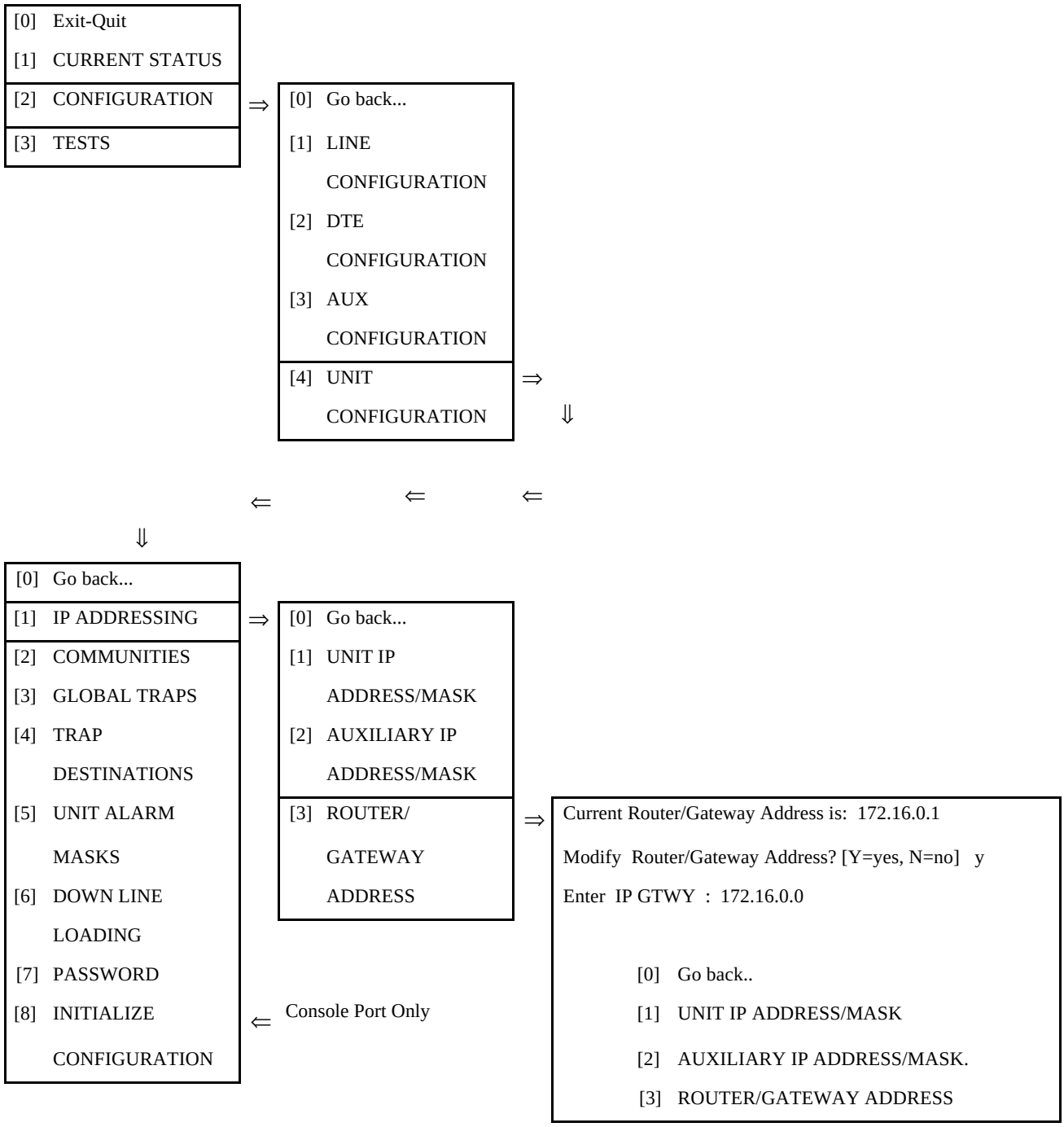


Figure 3-11 Terminal Interface: Configuration, Unit Configuration, IP Addressing, Router/ Gateway Address

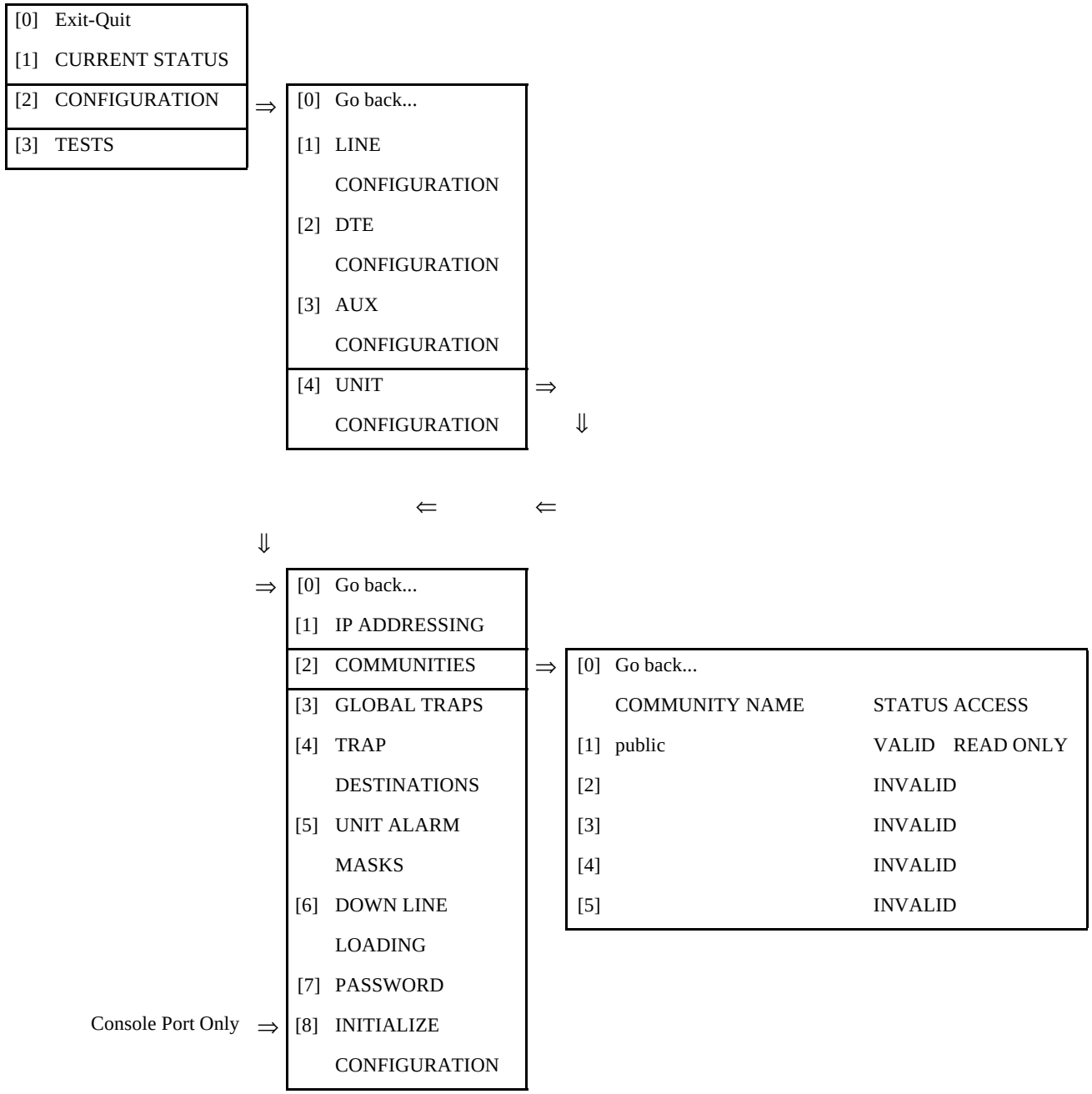


Figure 3-12 Terminal Interface: Configuration, Unit Configuration, Communities

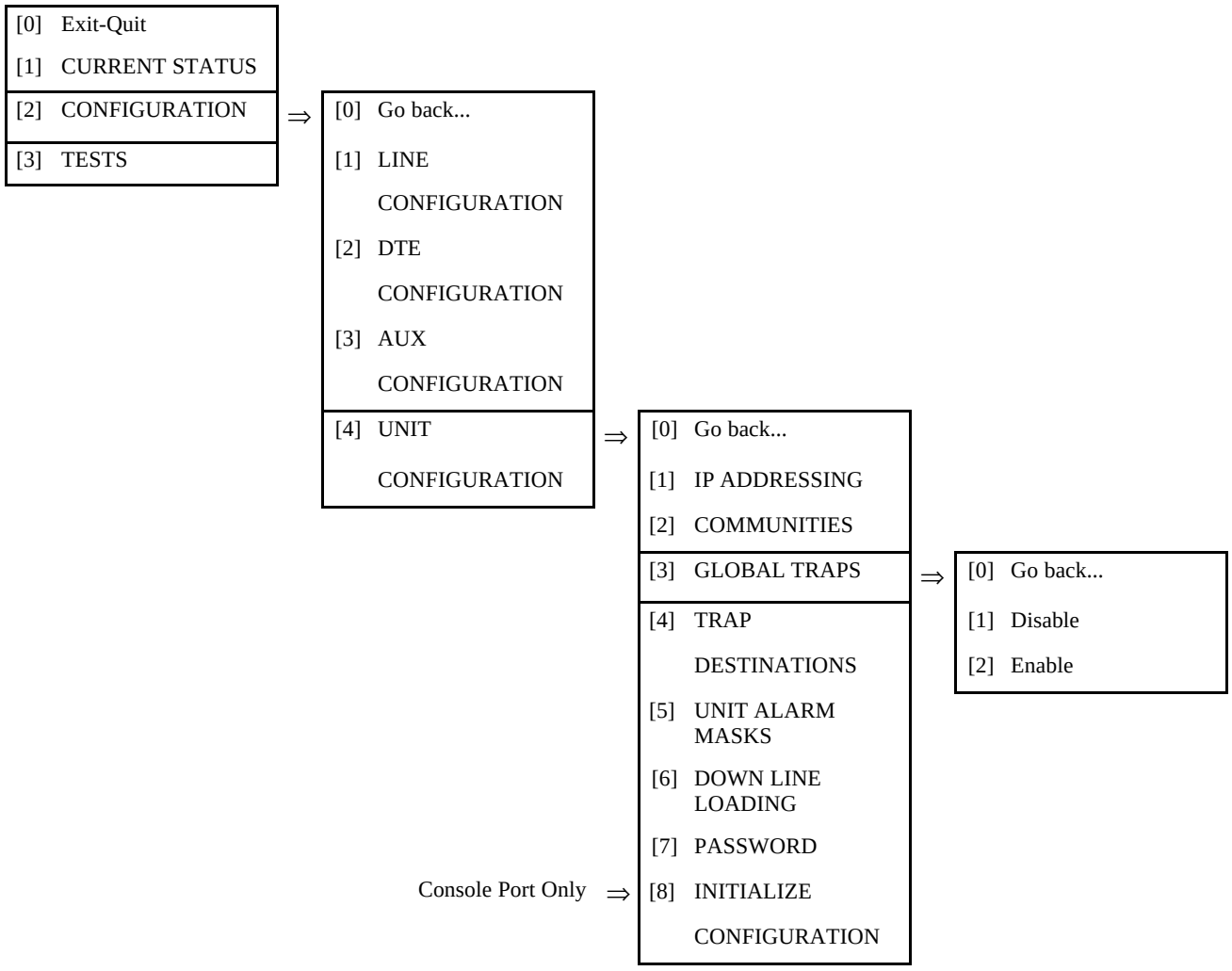


Figure 3-13 Terminal Interface: Configuration, Unit Configuration, Global Traps

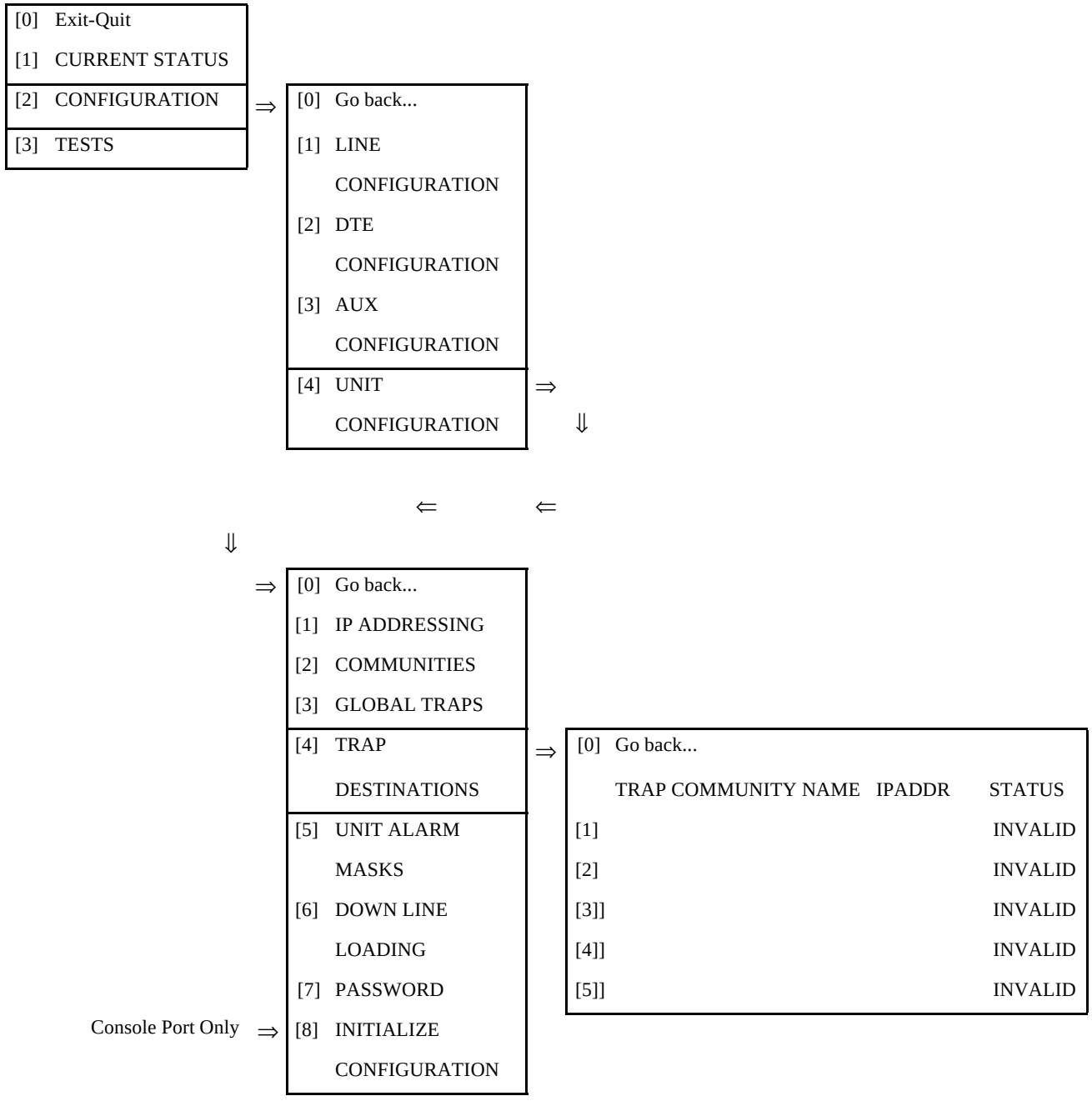


Figure 3-14 Terminal Interface: Configuration, Unit Configuration, Trap Destinations

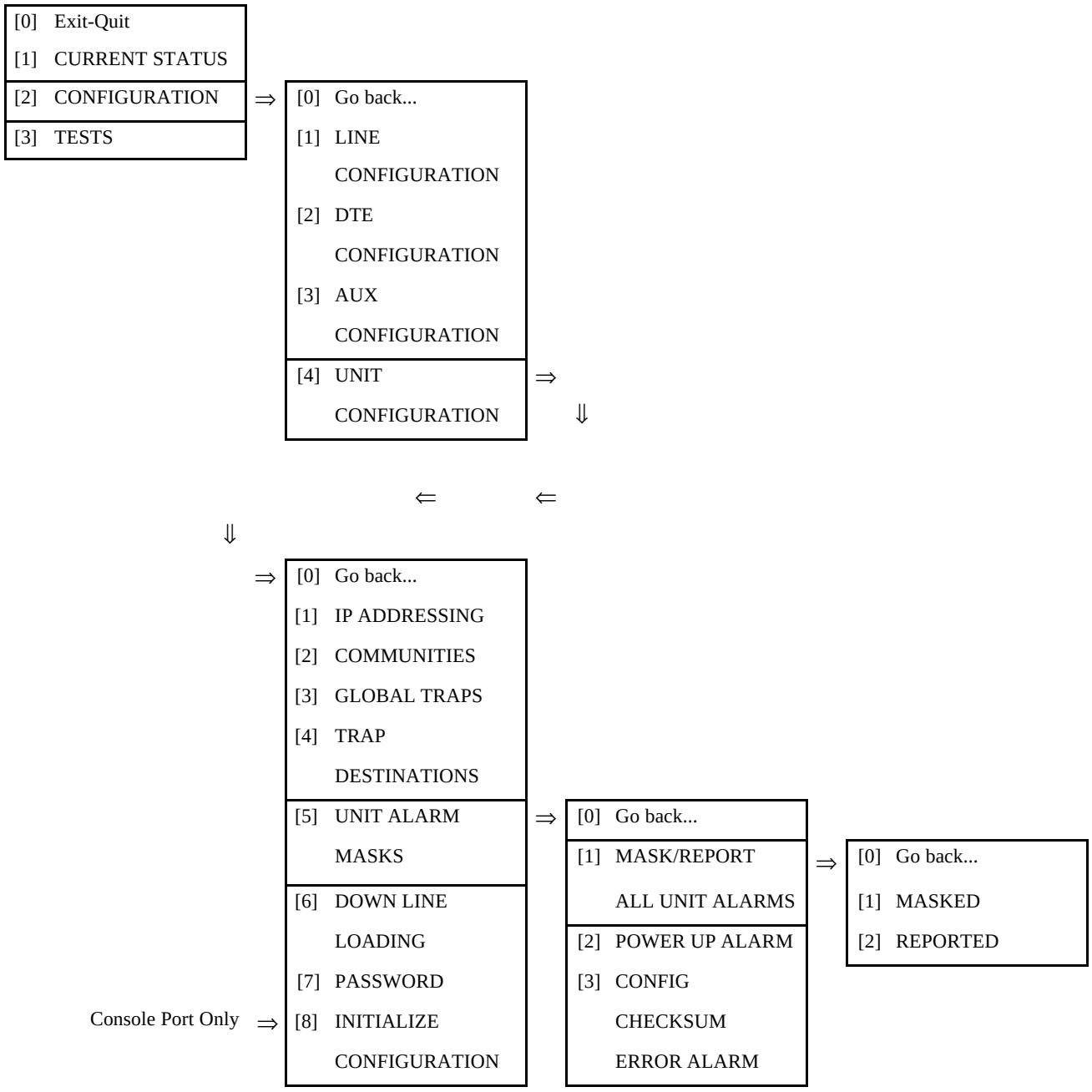


Figure 3-15 Terminal Interface: Configuration, Unit Configuration, Unit Alarm Masks, Mask/Report All Unit Alarms (Mask/Report Menu is identical for all Unit Alarm Masks)

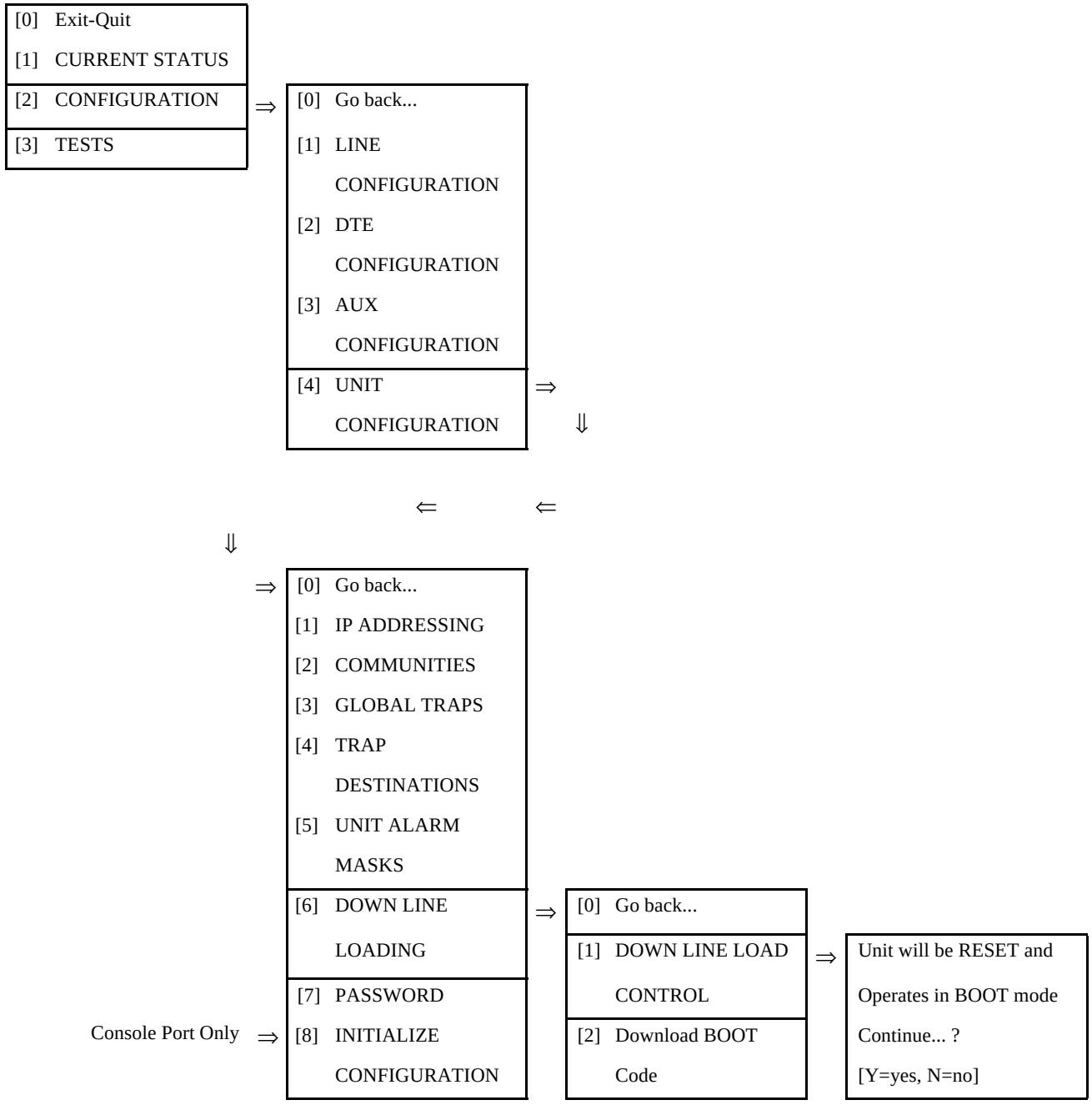


Figure 3-16 Terminal Interface: Configuration, Unit Configuration, Down Line Loading, Down Line Load Control (Display Is Identical for Download Boot Code)

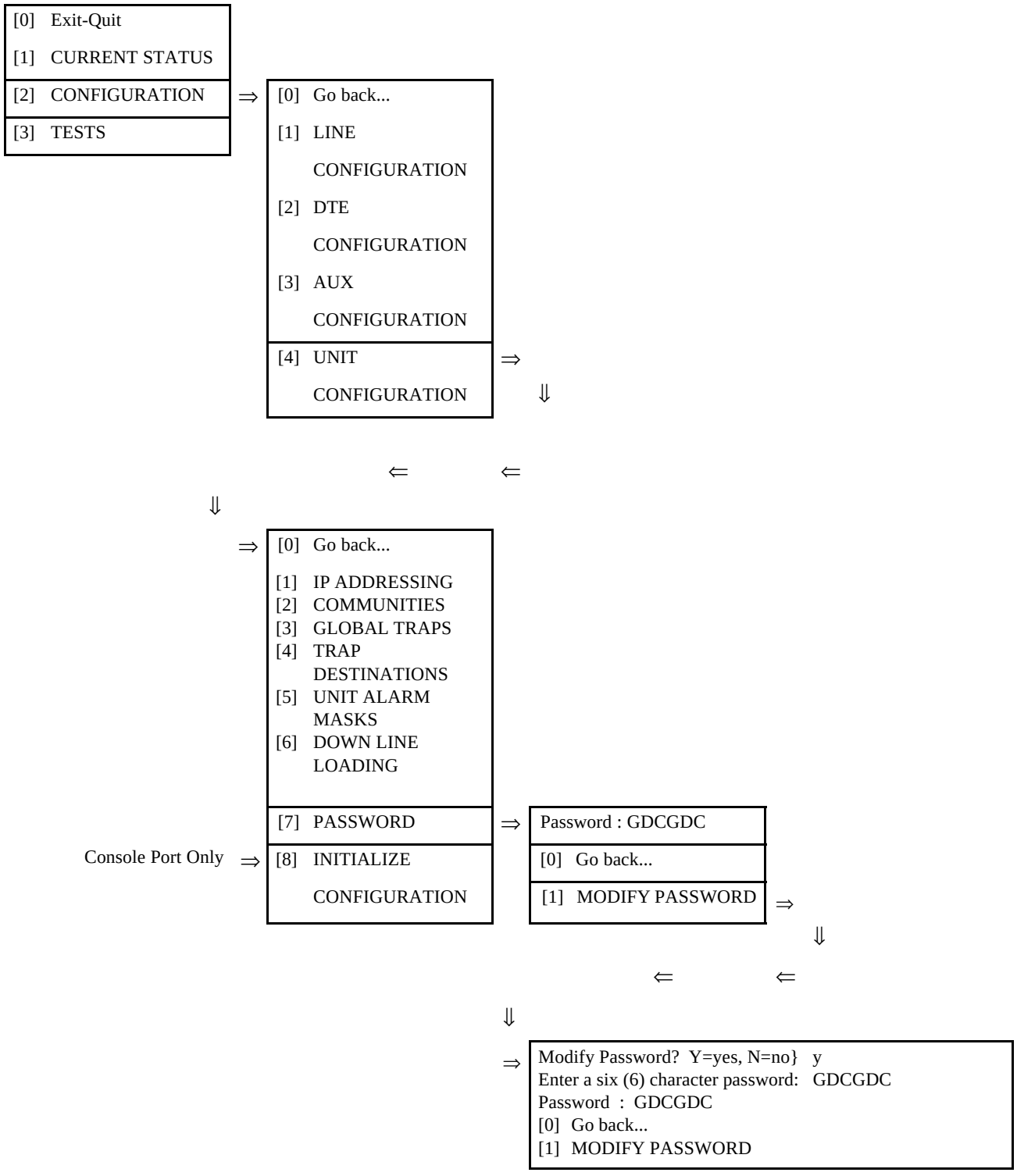


Figure 3-17 Terminal Interface: Configuration, Unit Configuration, Password

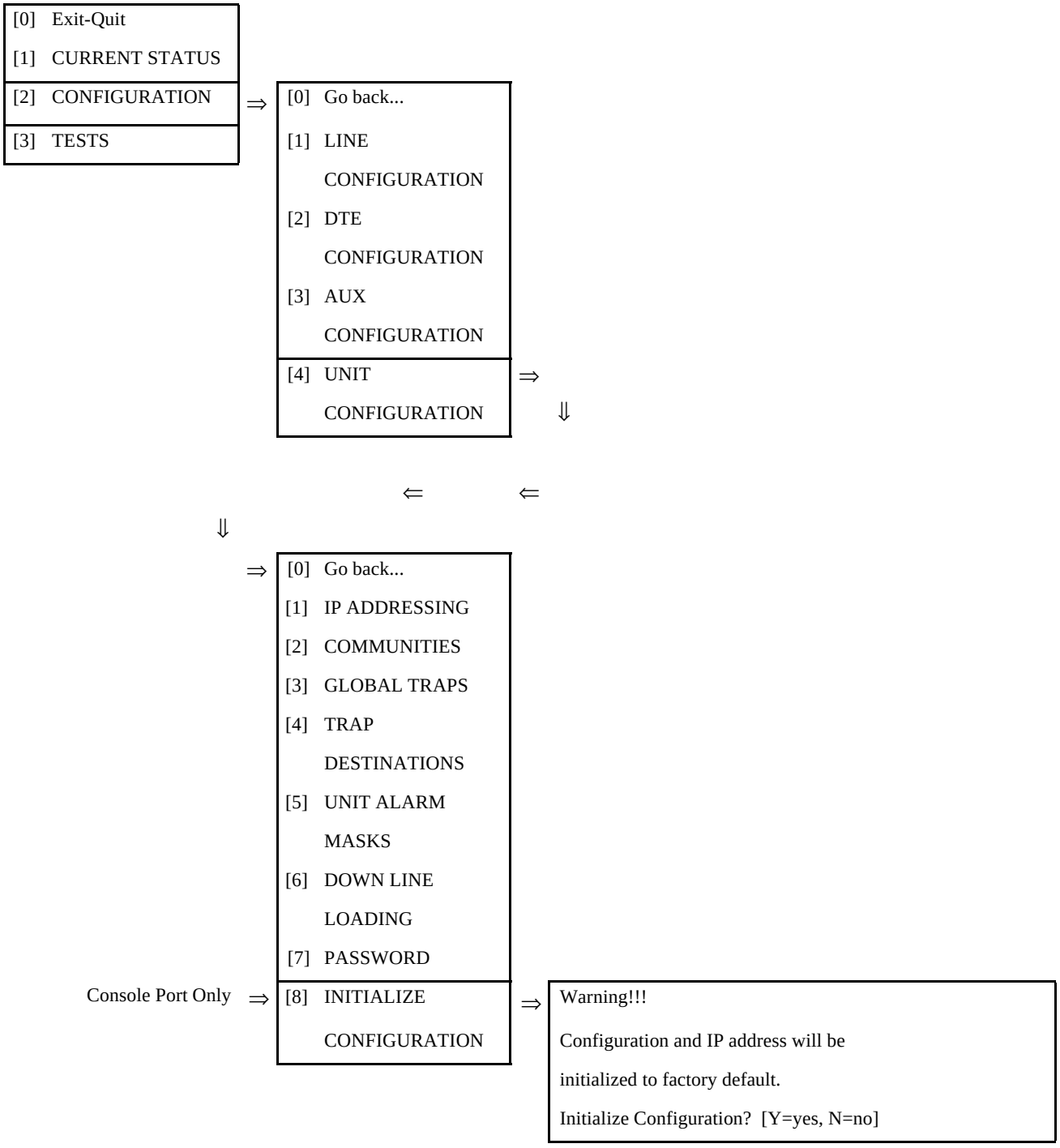


Figure 3-18 Terminal Interface: Configuration, Unit Configuration, Initialize Configuration (this menu selection appears only on a VT100-compatible terminal connected to the console port)

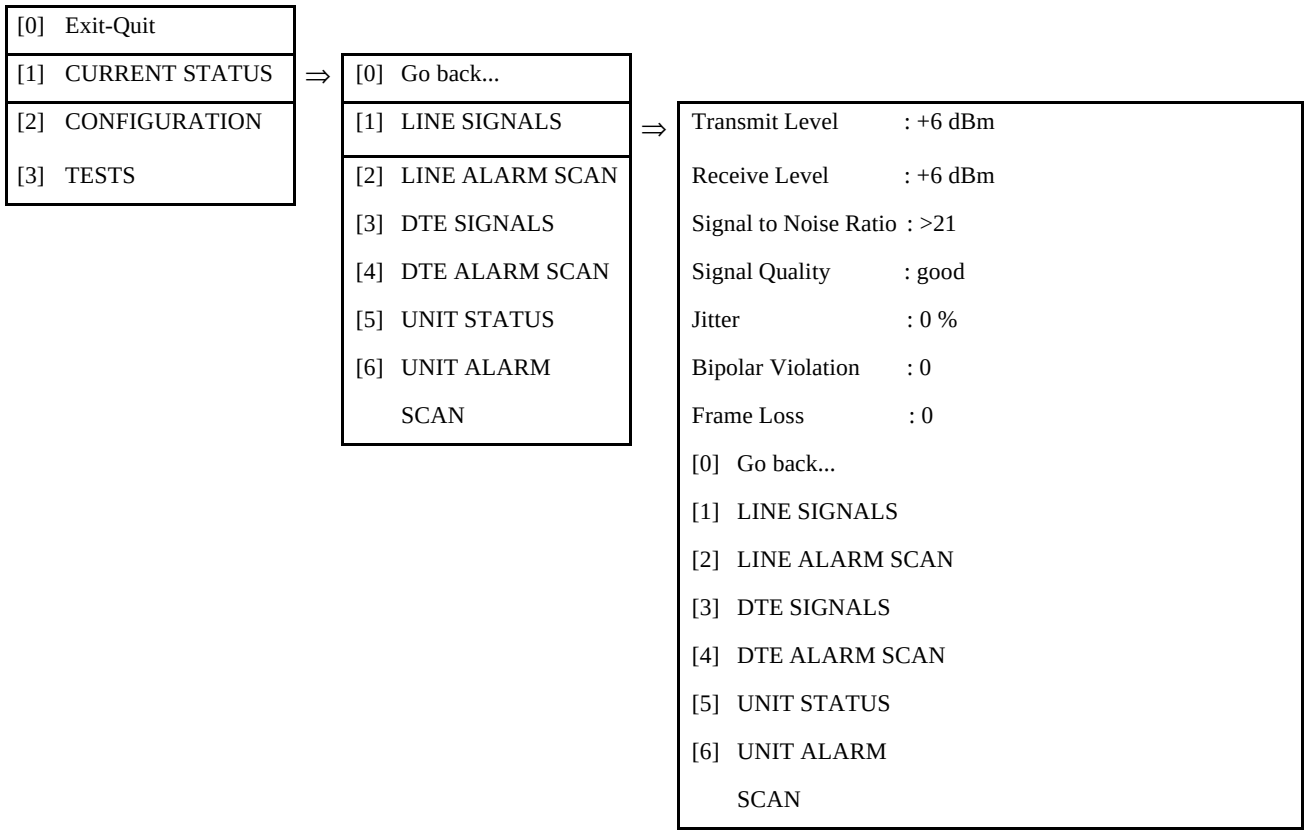


Figure 3-19 Terminal Interface: Current Status, Line Signals

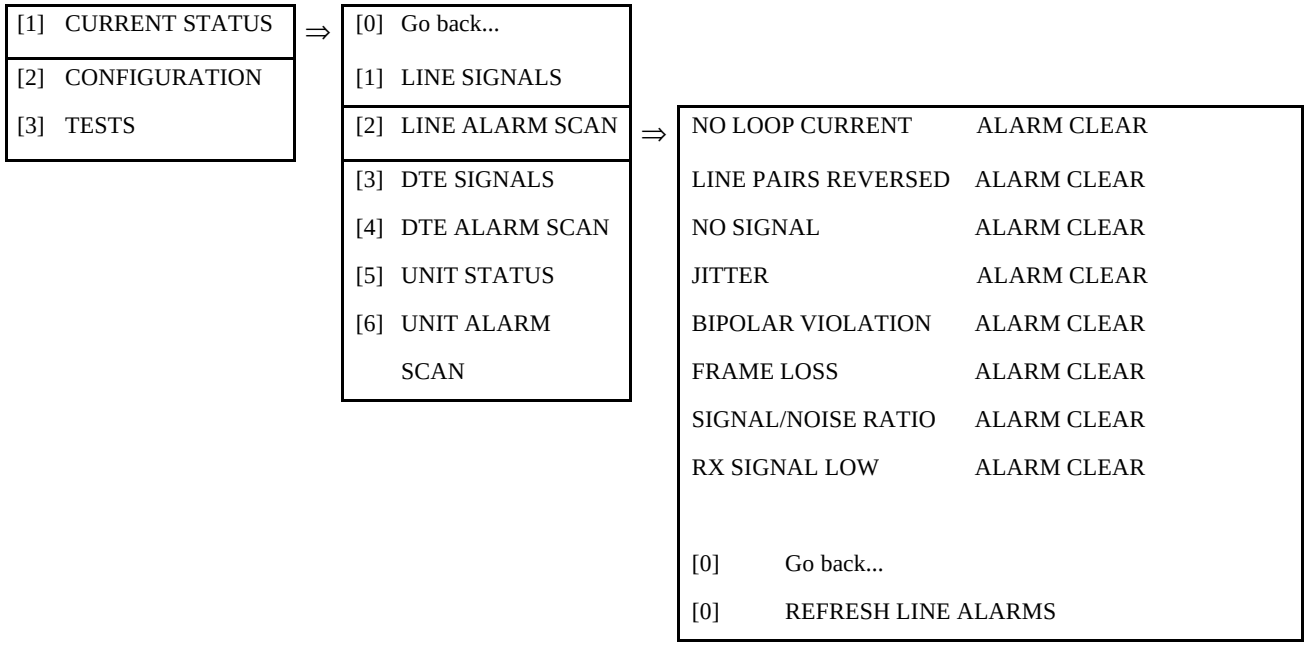


Figure 3-20 Terminal Interface: Current Status, Line Alarm Scan

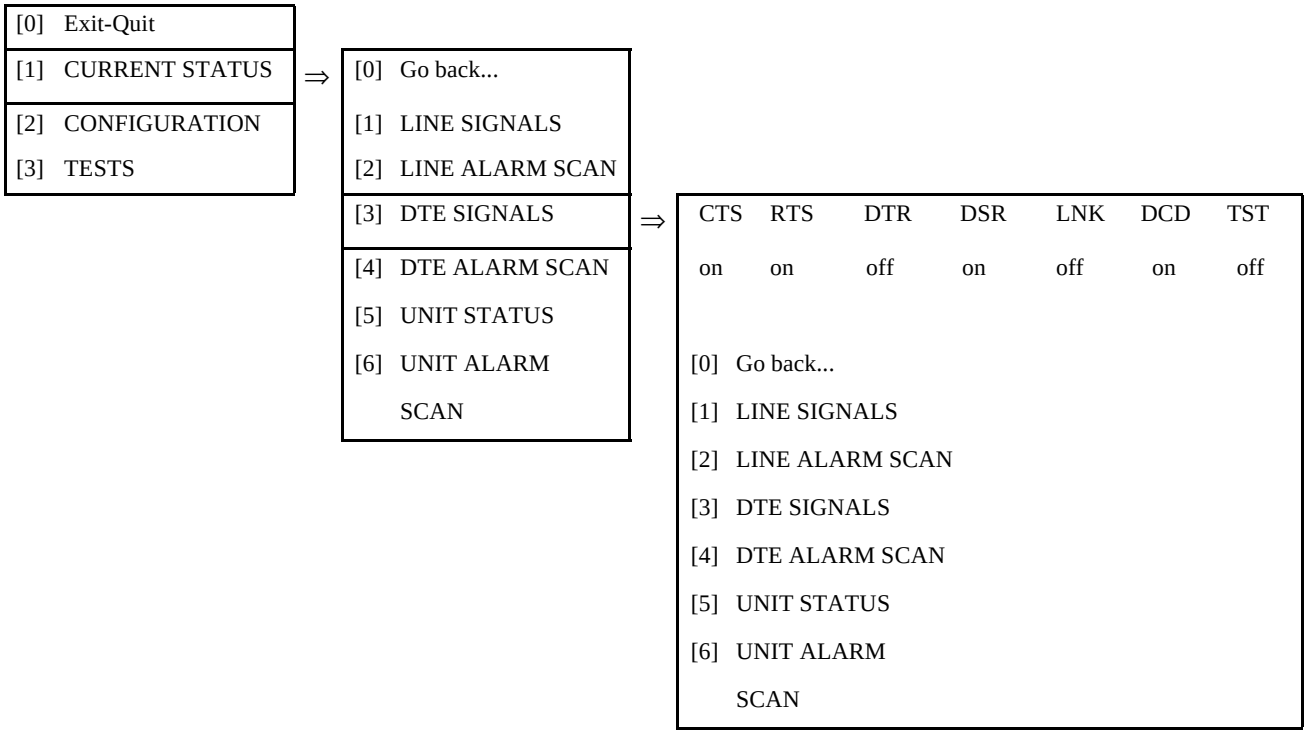


Figure 3-21 Terminal Interface: Current Status, DTE Signals

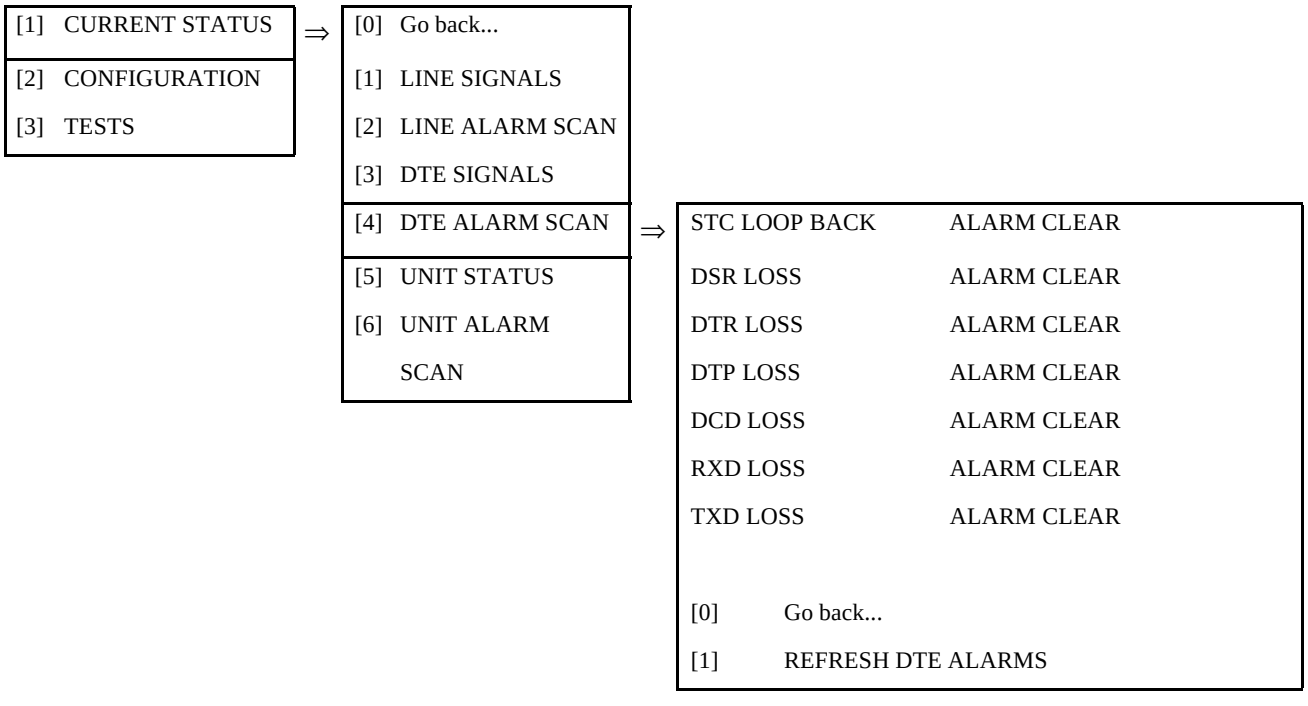


Figure 3-22 Terminal Interface: Current Status, DTE Alarm Scan

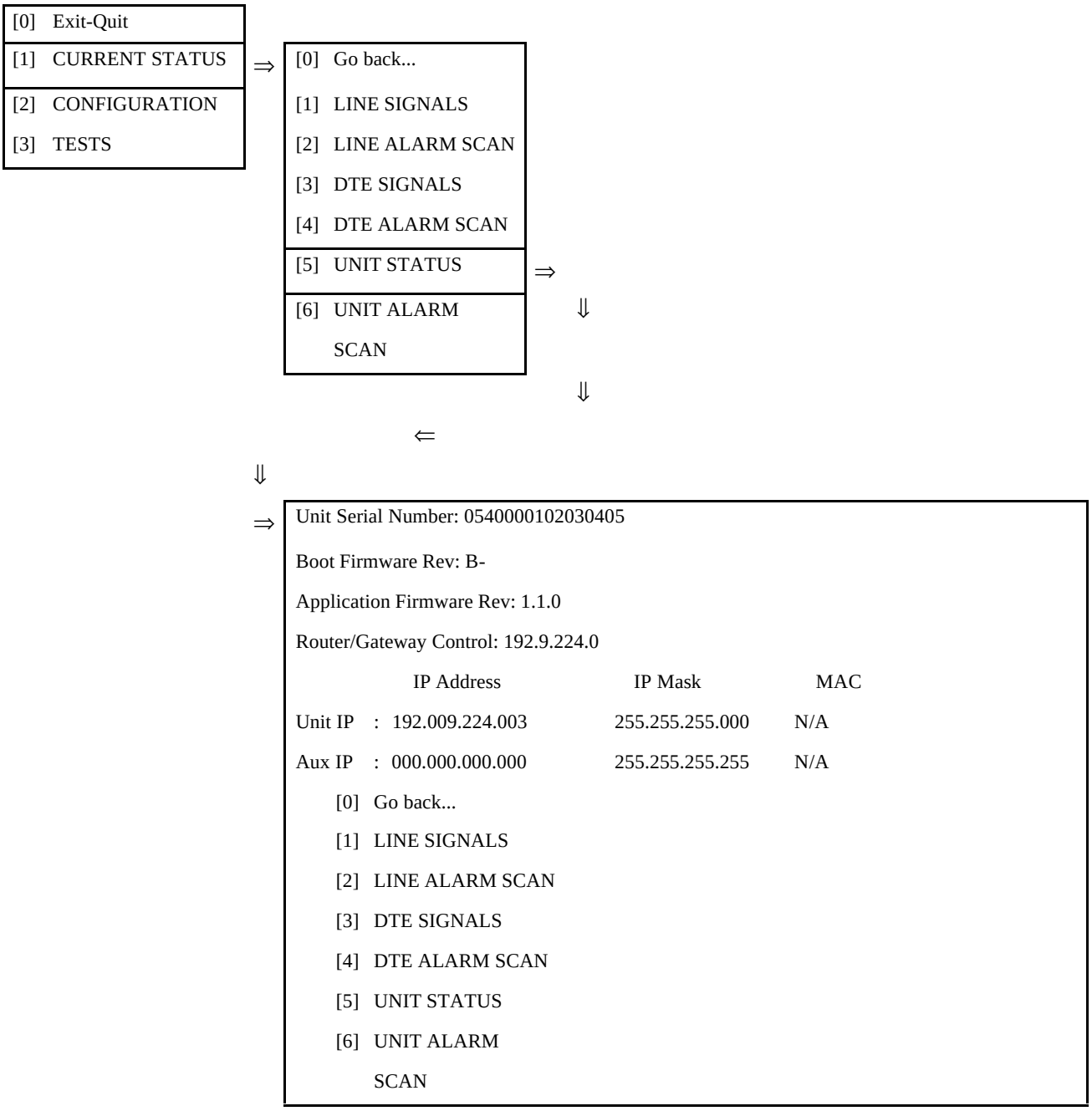


Figure 3-23 Terminal Interface: Current Status, Unit Status

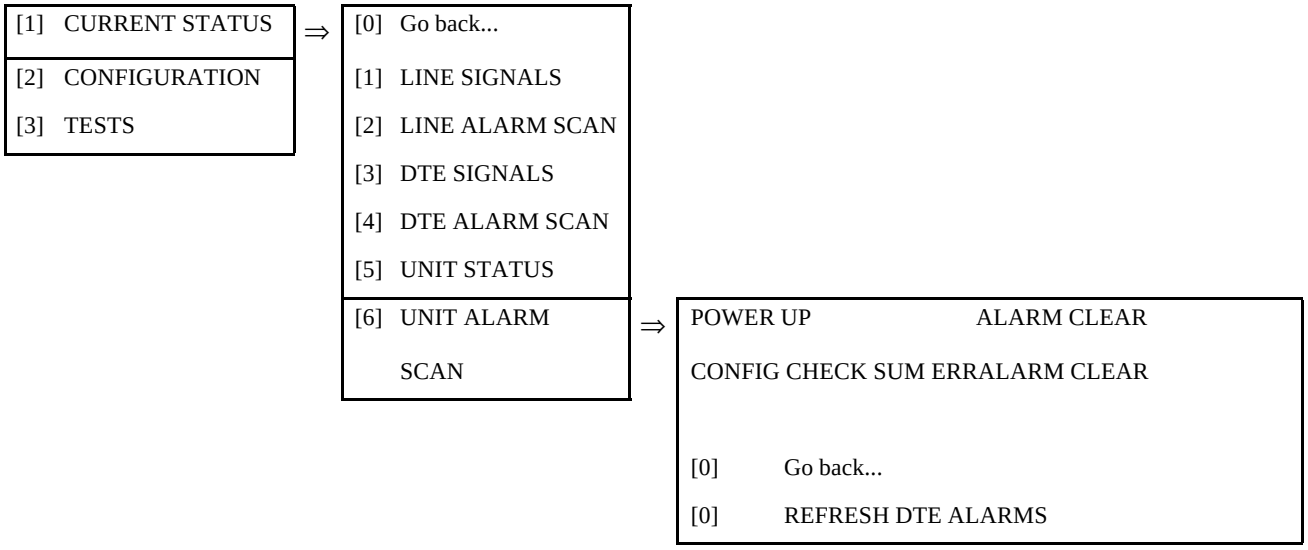


Figure 3-24 Terminal Interface: Current Status, Unit Alarm Scan

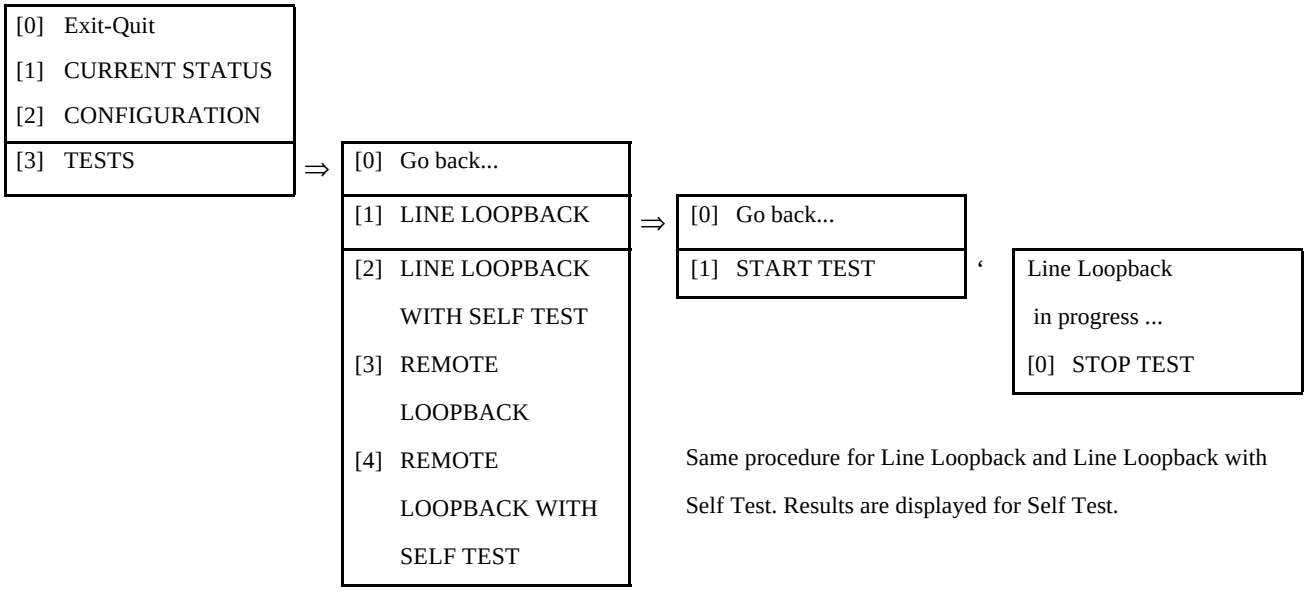


Figure 3-25 Terminal Interface: Tests, Line Loopback with Self Test

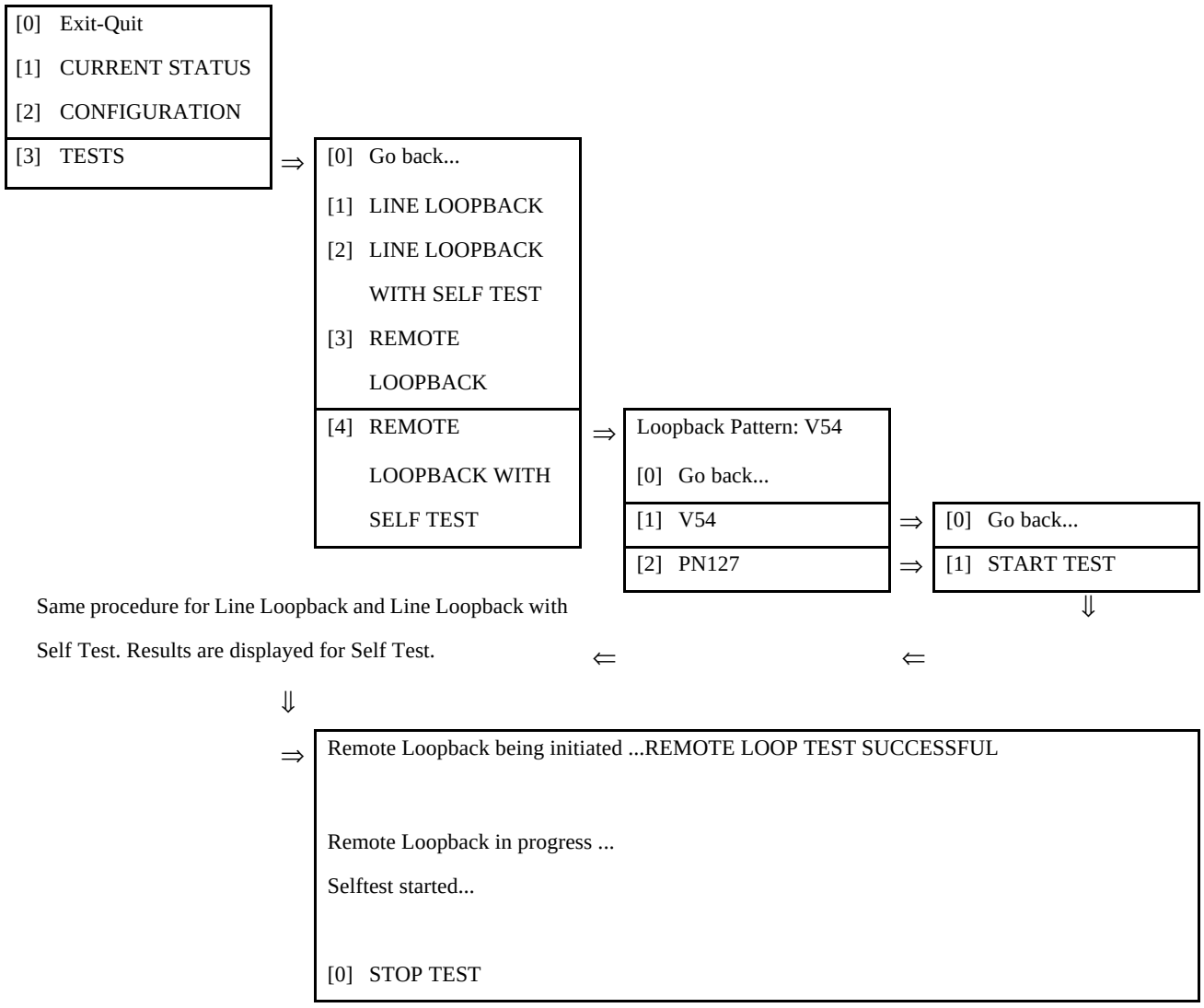


Figure 3-26 Terminal Interface: Tests, Remote Loopback with Self Test

Down Line Loading

The terminal interface Down Line Loading function (*Figure 3-16*), located in the Unit Configuration menu, enables you to upload new operating firmware into the DSU. 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. The transfer can be performed only through the LAN interface.

A. Do not, under any conditions, invoke the Down Line Loading function through the Console Port or the Auxiliary interface. Doing so can result in a severe error condition, preventing the DSU from functioning.

B. 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 the down line loading process you should

- Make sure you have a working version of TFTP available on a host that can "ping" the SNMP 540EN 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 S540EN.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 Telnet connection to the SNMP 540EN DSU through its LAN port and log in.
2. Select [2] Configuration. The Configuration menu is displayed.
3. Select [4] Unit Configuration.
4. Select [6] Down Line Loading. The resulting menu offers the choice [1] Down Line Load Control.

To load new software from the computer to the DSU:

1. 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 S540EN.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 Options

Overview

This chapter lists the configuration parameters that can be set by means of the terminal interface. Each of the option descriptions in this chapter identifies the terminal interface menu selections required to reach the option.

Option List

Rate

Options: 56 Kbps DDS
64 Kbps CC
56 Kbps DDS/SC

Selects the type of service to which the DSU is to be connected.

Corresponds to Line Configuration/Line Parameters/Unit Rate on the terminal interface.

Timing

Options: Receive
External
Internal

Selects the transmit timing source for the DSU. Receive (also called "Network") timing selects the DSU to derive transmit timing from the data it receives from the network. The Receive setting is mandatory when the DSU is connected to DDS service.

The remaining two selections are available for special applications, such as use with a multiplexer, or when the DSU is used for local, wire line operations. External timing selects the DSU to use transmit timing supplied by its DTE. Internal timing selects the DSU to use its own internal clock for transmit timing.

Corresponds to Line Configuration/Line Parameters/Unit Timing on the terminal interface.

Buffer Timing

Options: Internal
External

Determines whether or not a buffer is used in the transmit data path to compensate for clock jitter or frequency mismatches when external transmit timing is selected. Selecting Internal disables the buffer.

The buffer is active when External is selected. Data from the DTE is clocked into the buffer by the external transmit timing signal supplied by the DTE. Data is clocked out of the buffer and transmitted by the timing source selected with the Timing option (see above). Buffer Timing should always be set to External when the selected Timing option is External.

Accessed through Line Configuration/Line Parameters on the terminal interface.

Transmit Carrier

Options: Switched
Constant

When Switched is selected the DSU simulates switched carrier operation by transmitting an Idle indication signal on the line whenever RTS from its DTE is Off. The remote DSU turns Off DCD to its DTE while it is receiving the Idle indication. This option is usually set to Switched for a remote DSU in a multidrop application.

When Constant is selected RTS and CTS are forced On in the DSU. Constant is selected for point to point applications, and for the master (central site) DSU in a multidrop application. It should always be selected when the DSU is operating at 64 Kbps.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

Receive Carrier

Options: Switched
Constant

Selects the DSU receive signal to be either switched or constant.

When switched receive signal is selected, the incoming signal controls the state of DCD to the DTE. This is usually selected for the master (central site) DSU in a multidrop application.

When constant carrier is selected, DCD is forced on in the DSU. The DSU will continue to indicate Carrier On, even when it is not receiving a signal from the remote. This is usually selected for point to point applications, and for the remote DSUs in a multidrop application. It should always be selected when the DSU is operating at 64 Kbps.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

RTS/CTS Delay

Options: CTS On
CTS Fixed
0 msec
30 msec
60 msec
90 msec

This option controls the relationship between RTS from the DTE and CTS from the DSU.

CTS On is for use with constant transmit carrier. It forces both RTS and CTS On.

The 0, 30, 60, and 90 msec settings are for use with switched transmit carrier. Each specifies a period for the DSU to wait after the DTE asserts RTS before turning on CTS. CTS Fixed, also for use with switched transmit carrier, provides a delay equal to the time required to send three characters.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

DSR Control

Options: DSR Forced On
DSR Follows DTR

This option controls operation of the Data Set Ready output from the DSU. Forced On provides constant DSR. DSR Follows DTR (Data Terminal Ready) provides switched DSR controlled by the DTE.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

Lineloop DSR

Options: Normal
Off

This option controls how the Data Set Ready output from the DSU operates during loopback tests. DSR Normal configures the DSU to conform to the selected DSR Control option at all times. DSR Off configures the DSU to turn DSR Off during loopback tests.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

Circuit Assurance

Options: Disable
Enable

When this option is enabled the DDS service provider can command the DSU to clamp CTS Off, thereby preventing it from transmitting. The following network conditions cause the DSU to clamp CTS:

Idle
Out of Service (OOS) code
Abnormal Station Code (ASC)
No Signal
Inactive Channel Code (ICC)

When this option is disabled the DSU ignores the network codes.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

System Status

Options: Disable
Enable

When this option is enabled the DDS service provider can command the DSU to clamp DSR Off, thereby preventing it from transmitting. The following network conditions cause the DSU to clamp DSR:

Out of Service (OOS) code
Abnormal Station Code (ASC)

No Signal
Inactive Channel Code (ICC)

When this option is disabled the DSU ignores the network codes.

Accessed through DTE Configuration/DTE Parameters on the terminal interface.

RL Pattern

Options: V.54
PN127

This option selects the in-band code the DSU can transmit to initiate a remote loopback test. The same pattern must be selected at both the local DSU that transmits the remote loopback command and the remote DSU that performs the loopback.

When you use the terminal interface to perform remote loopback tests you specify the in-band code to be transmitted as part of the test initiation procedure. Use the following terminal interface procedure to display and select the pattern that the DSU can recognize:

1. Select Tests from the Main Menu.
2. Select Remote Loopback With Selftest. The terminal interface returns a display of the current selection, and a menu for changing the selection or returning to the main menu.
3. If you select [1] V54 or [2] PN127, the terminal interface returns a menu of Go back and Start Test.
4. Select Go back from each menu until the terminal interface returns to the Main Menu.

DTE LL Control

Options: Disable
Enable

When this option is enabled the DTE can command the DSU into a Local Loopback by turning an interface lead: Pin 18 in an RS-232 interface, or Pin L in a V.35 interface.

When this option is disabled the DTE cannot command a Local Loopback.

Accessed through Line Configuration/Line Parameters on the terminal interface.

DTE RL Control

Options: Disable
Enable

When this option is enabled the DTE can command the DSU to initiate a Remote Loopback by turning an interface lead: Pin 21 in an RS-232 interface, or Pin N in a V.35 interface.

When this option is disabled the DTE cannot command a Remote Loopback.

Accessed through Line Configuration/Line Parameters on the terminal interface.

DTE TM Control

Options: Disable
Enable

When this option is enabled the DSU turns On a Test Mode indication to its DTE while performing diagnostic functions. The indicator is Pin 25 in an RS-232 interface, or Pin NN in a V.35 interface.

When this option is disabled the DSU does not provide Test Mode indication.

Accessed through Line Configuration/Line Parameters on the terminal interface.

Line Loop Option

Options: To DTE
To DTE and Line

This option determines what loopback(s) the DSU establishes when a Local Loop is commanded. The option To DTE specifies a single loopback that directs transmit data back to the DTE as receive data. The option To DTE and Line specifies a bi-lateral loopback, in which signals are looped back both to the DTE and to the network.

Corresponds to DTE Configuration/DTE Parameters/Loopback Options on the terminal interface.

Telnet Time Out Control

Options: [1] Disable
[2] Enable

When this option is enabled a Telnet connection is automatically ended if 15 minutes pass without any key being pressed at the terminal keyboard. When the option is disabled there is no automatic disconnection.

This option is only accessible by means of the terminal interface, where it is reached through Aux Configuration.

5 Tests

Overview

This chapter describes the tests that you can perform on the SNMP 540EN DSU after installation or whenever its operation needs to be checked. The tests can help isolate problems in other portions of the data communications system as well as in the DSU itself (*see Figure 5-1, Fault Isolation Procedure*).

You can command SNMP 540EN tests from an SNMP controller or by means of the terminal interface. This chapter also describes two tests that are controlled by the DDS service provider from a Serving Test Center (STC).

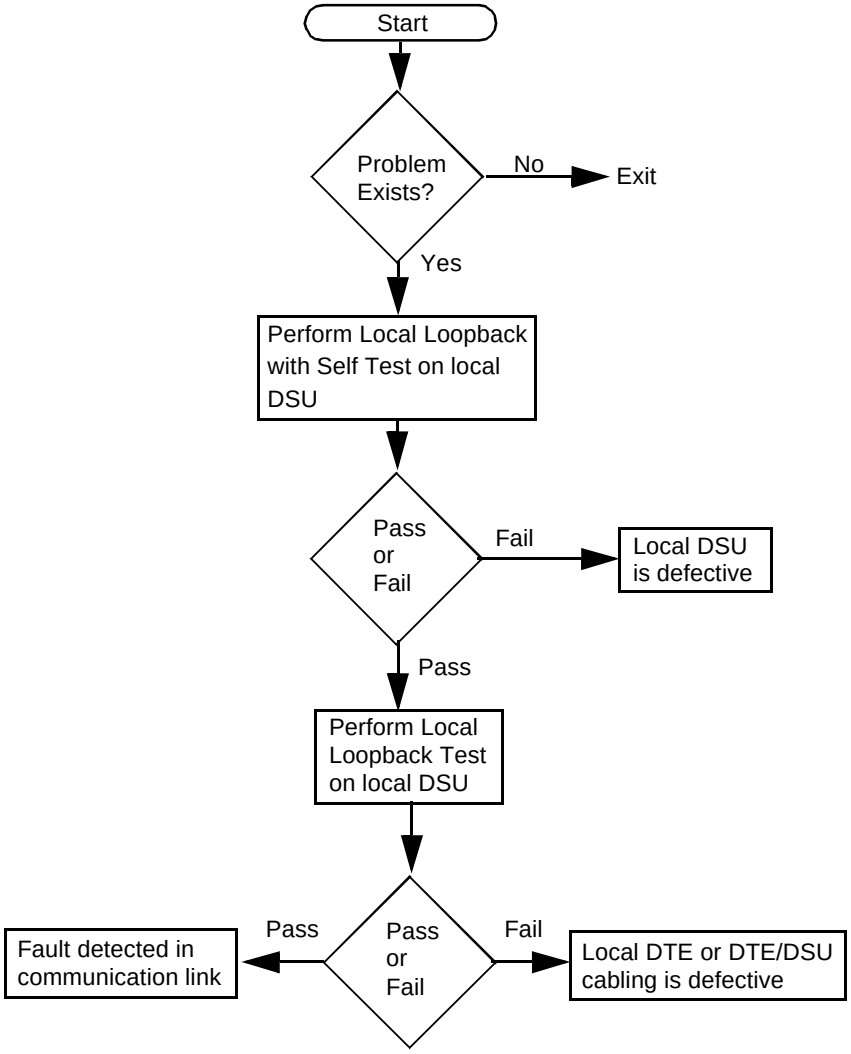


Figure 5-1 Fault Isolation Procedure

Local Loopback with Self Test

You can initiate the Local Loopback with Self Test either by SNMP or through the terminal interface. Consult controller documentation for how to command the test via SNMP. Consult *Chapter 3* for how to command the test using the terminal interface. The SNMP controller or terminal by which you initiate the test displays test results in detail.

The test uses an internal test pattern generator and detector to originate and monitor test signals. Configuration of the Loopback Option determines whether or not the DSU loops data back to the network during this test.

The DSU front panel indicators also provide information during the test. The NETWORK LNK LED flashes continuously to indicate that there is a test in progress. The three LAN LEDs identify the test by their states: LAN SD - Off, LAN RD - On, LAN COL -On. The LAN COL indicator also serves as the error display during the test, by flashing each time an error is detected in the self test pattern.

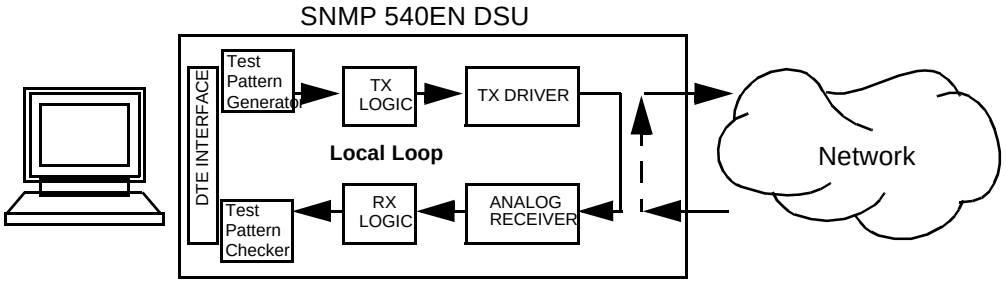


Figure 5-2 Local Loopback with Self-Test

Local Loopback

You can initiate Local Loopback by SNMP. Consult controller documentation for how to command the test via SNMP.

Local Loopback establishes a data path in the DSU through which you can direct a test signal from the DTE or a test device connected to the DTE interface. Configuration of the Loopback Option determines whether or not the DSU loops data back to the network during this test. Since external equipment generates and checks the test signal, this test does not display results at the SNMP controller or by means of a front panel LED.

During the test the NETWORK LNK LED on the DSU front panel flashes continuously to indicate that there is a test in progress, and the three LAN LEDs identify the test by their states: LAN SD - Off, LAN RD - On, LAN COL -Off.

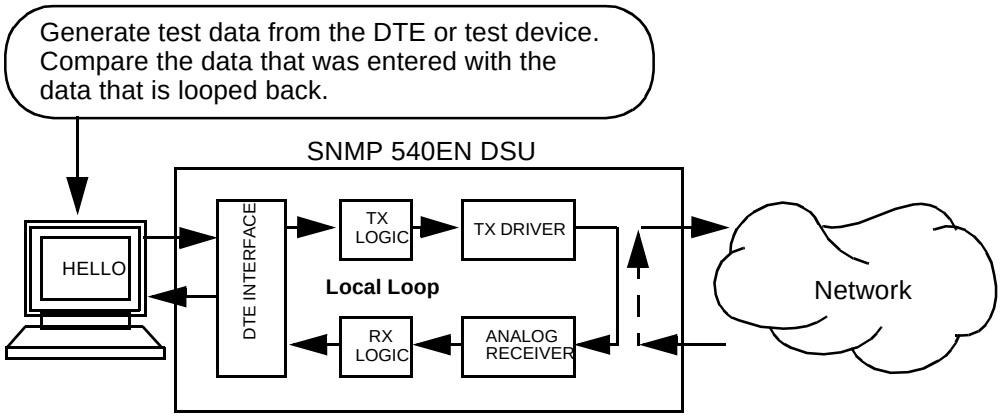


Figure 5-3 Local Loopback

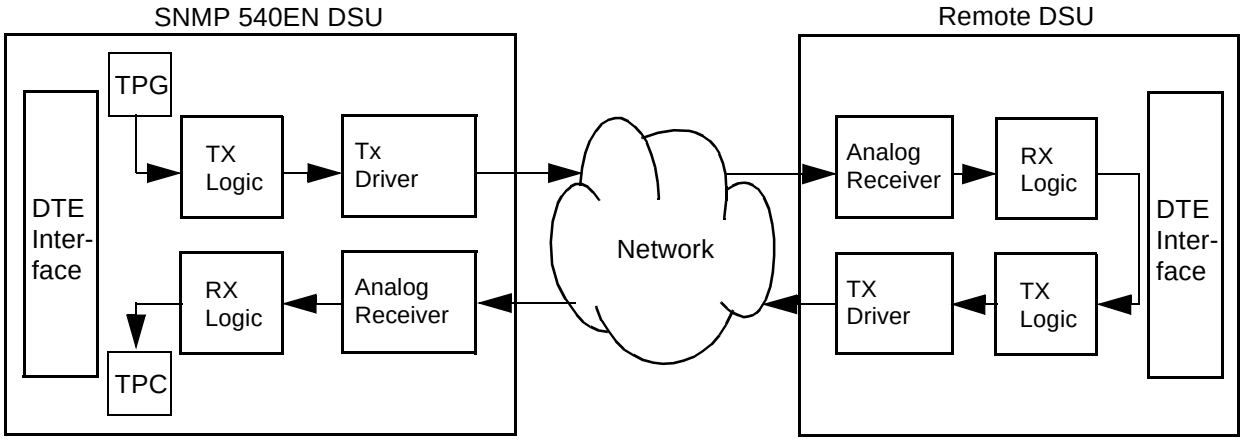
Remote Loopback with Self Test

You can initiate the Remote Loopback with Self Test either by SNMP or through the terminal interface. Consult controller documentation for how to command the test via SNMP. Consult *Chapter 3* for how to command the test using the terminal interface.

The local DSU initiates the test by transmitting an in-band code to the remote DSU. In response to the code the remote DSU connects its receiver and transmitter to establish a loopback. The local DSU then transmits the signal output by its internal test pattern generator. The signal received back is directed to the internal error detector of the local DSU. The SNMP controller or terminal by which you initiate the test displays test results in detail.

The in-band code that initiates the test is selectable to be either V.54 or PN 127.

The DSU front panel indicators also provide information during the test. The NETWORK LNK LED flashes continuously to indicate that there is a test in progress. The three LAN LEDs identify the test by their states: LAN SD - On, LAN RD - Off, LAN COL -On. The LAN COL indicator also serves as the error display during the test, by flashing each time an error is detected in the self test pattern.



TPG – Test Pattern Generator
TPC – Test Pattern Checker

Figure 5-4 Remote Loopback with Self-Test

Remote Loopback

You can initiate Remote Loopback by SNMP. Consult controller documentation for how to command the test via SNMP.

The local DSU initiates the test by transmitting an in-band code to the remote DSU. In response to the code the remote DSU connects its receiver and transmitter to establish a loopback through which you can direct a test signal from the DTE or a test device connected to the DTE interface. The in-band code that initiates the test is selectable. It can be either V.54 or PN 127. The two DSUs must be configured to use the same code.

Since external equipment generates and checks the test signal, this test does not display results at the SNMP controller or by means of a front panel LED.

During the test the NETWORK LNK LED on the DSU front panel flashes continuously to indicate that there is a test in progress, and the three LAN LEDs identify the test by their states: LAN SD - On, LAN RD - Off, LAN COL -Off.

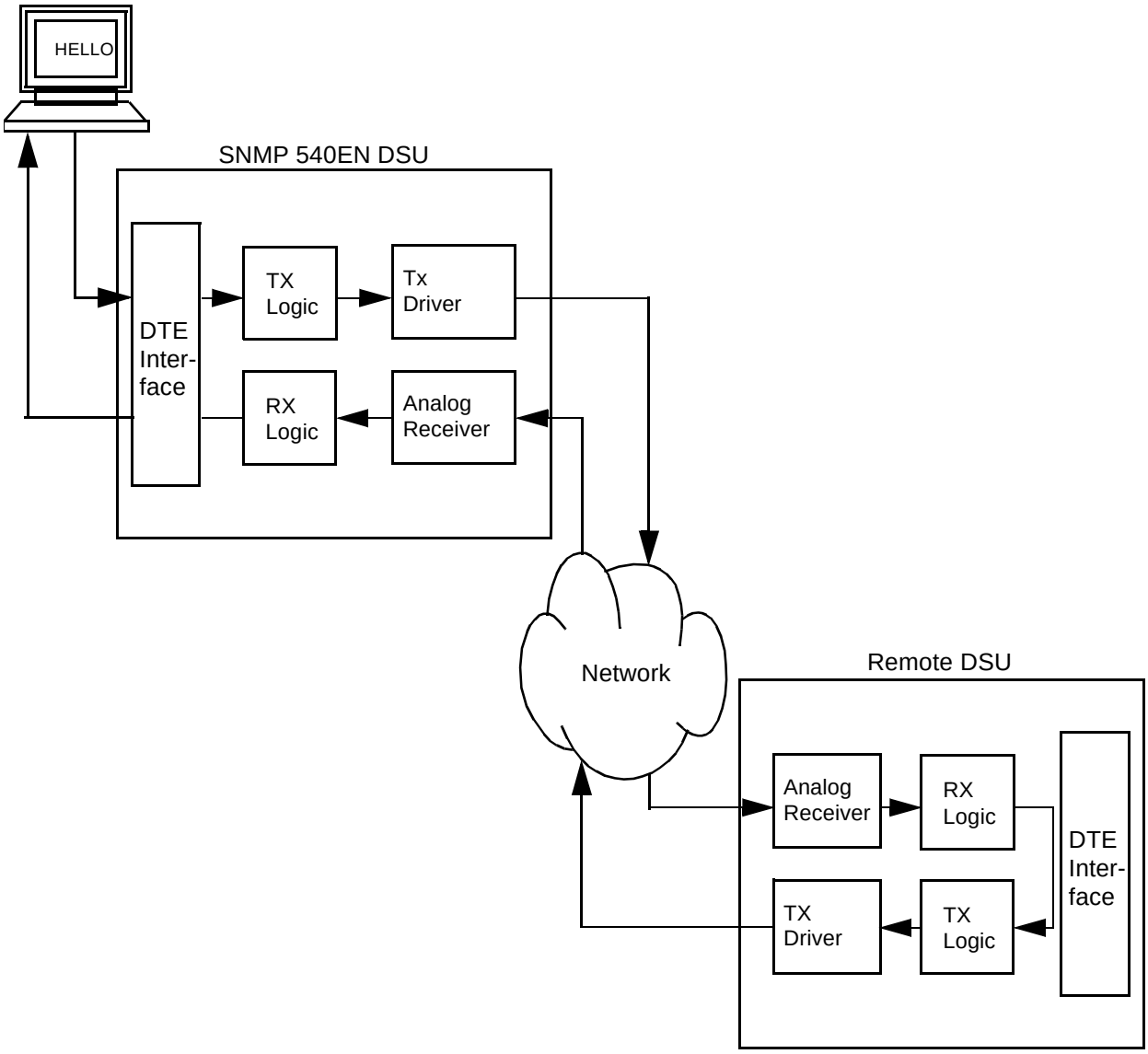


Figure 5-5 Remote Loopback

CSU Loopback Test (STC Controlled)

The CSU Loopback test is a remotely controlled diagnostic initiated by a Serving Test Center (STC). The STC reverses the polarity of the sealing current to initiate the test. When the SNMP 540EN DSU detects the reversed current, it disconnects the transmitter output and receiver input from the communications line and connects them together to create a CSU Loopback circuit. The circuit loops received signals back over the communications line to the originating station. *Figure 5-6* illustrates the CSU Loopback. When it is necessary to isolate a problem, contact the STC and ask them to initiate the CSU Loopback test. The test results should be used in conjunction with the fault isolation sequence (*see Figure 5-1*) to pinpoint a problem, if any.

During the test the NETWORK LNK LED on the DSU front panel flashes continuously to indicate that there is a test in progress, and the three LAN LEDs indicate that the test is remotely commanded by their states: LAN SD - On, LAN RD - On, LAN COL -Off.

NOTE

The unit initiates an auto rate sequence when the loopback is terminated. The unit may require a few seconds to complete the auto rate sequence and regain synchronization. The STC must therefore wait at least 10 seconds following the end of one test before it can begin another.

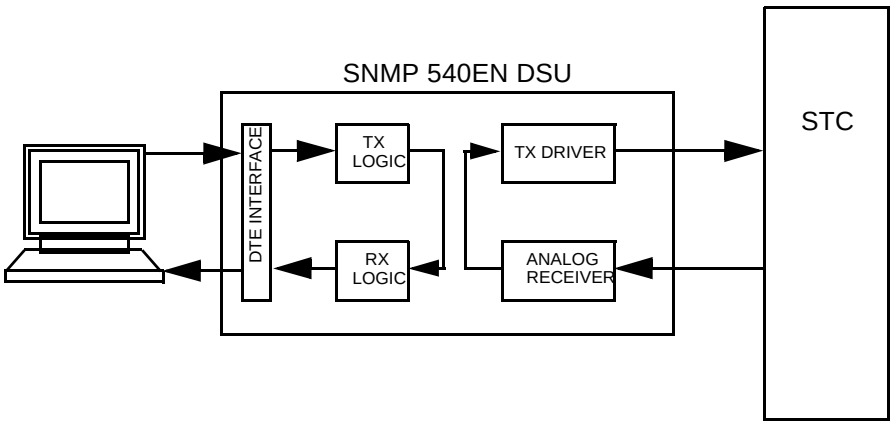


Figure 5-6 CSU Loopback Test (STC Controlled)

DSU Loopback Test, Alternating or Latched (STC Controlled)

The DSU Loopback test is a remotely controlled diagnostic that is initiated by the STC. When the test is initiated, the DSU disconnects its transmitter input and receiver output from the DTE interface and connects them together, creating a circuit that loops digital output signals from the receiver to the transmitter input. *Figure 5-7* illustrates the DSU Loopback test.

When it is necessary to isolate a problem, contact the STC and ask them to initiate the DSU Loopback test. The test results should be used in conjunction with the fault isolation sequence (*see Figure 5-1*) to pinpoint a problem.

During the test the NETWORK LNK LED on the DSU front panel flashes continuously to indicate that there is a test in progress, and the three LAN LEDs identify the test by their states: LAN SD - On, LAN RD - On, LAN COL -Off.

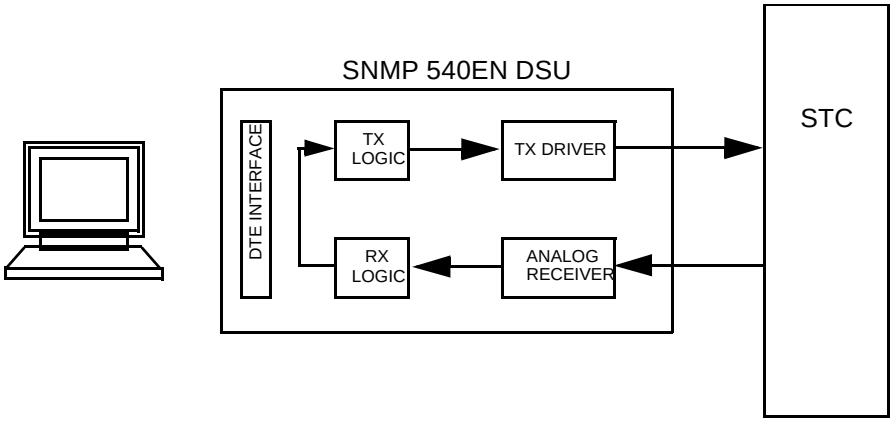


Figure 5-7 DSU Loopback Test, Alternating or Latched (STC Controlled)

A Technical Characteristics

Item	Specification
Physical	
SNMP 540EN PC Card:	
Height (pc card only)	0.87 in. (22 mm)
Width	10.5 in. (267 mm)
Depth	10.75 in. (273 mm)
Weight (pc card only)	1 lb 3 oz (0.54 kg)
Shipping weight (pc card only)	2 Ib 3 oz (1.0 kg)
Standalone enclosure	
Height	3.9 in. (99 mm)
Width	10.9 in. (277 mm)
Depth	12.5 in. (318 mm)
Weight (with pc card)	6 Ib 5 oz (2.8 kg)
Shipping weight (with pc card)	7 Ib 5 oz (3.3 kg)
Environmental	
Temperature, pc card assembly	
Non operating	–40° to 185°F (–40° to 85°C)
Temperature, standalone	
Operating	32° to 122°F (0° to 50°C) (Derate by 1°C/1000 ft above sea level)
Non operating	–40° to 158°F (–40° to 70°C)
Humidity, operating	5% to 95% without condensation
Altitude	
Operating	0 ft to 10,000 ft (0 m to 3,047 m)
Non-operating	0 ft to 40,000 ft (0 m to 12,191 m)

Item	Specification
Electrical	
Power requirements	
Voltage	117 V ac (+10%, –15%)
Frequency	60 Hz
Power dissipation	15 W maximum
Operation	
DDS, DDS/SC	Full- or half-duplex, point-to-point or full-duplex, multipoint
Customer-owned	Full- or half-duplex, point-to-point
Signal	
Format	Serial, synchronous, binary
Encoding	Bipolar, return-to-zero
Data rate	56000 or 64000 bps (synchronous)
Communications line	DDS or 4-wire, nonloaded metallic lines (19-26 ga)
Terminating impedance	135 ohms ±20%
DTE interface	EIA/TIA-232-E, CCITT V.35, or (with optional pc card) EIA-530
Transmitter Power	6.0 dBm, maximum (50% duty cycle, random bipolar sequence, 135-ohm impedance)
RTS-CTS delay (synchronous)	
56000 bps	0.35 ±0.02 ms
64000 bps	Forced On
Timing	Receiver (slave/network), internal (DSU) ±0.01%, or external (DTE) (will accept external clock up to ±0.02%)
Receiver	
Dynamic range	48 dB extended range at 56 kbps
Acquisition time	200 ms, maximum
Release time	1 sec, maximum

B DTE Interface Signals

Table B-1 EIA/TIA-232-E Interface Signals

Pin No.	Circuit Designation		Description
	ITU-T	EIA	
1	101	AA	This circuit is connected to the equipment frame. Optionally, it may be connected to signal ground, pin 7.
2	103	BA	Transfers data signals from DTE for modulation and transmission over communications line.
3	104	BB	Transfers data signals to DTE that were received over communications line and demodulated by Data Set.
4	105/ 133	CA/CJ (1)	Indicates to Data Set that DTE is prepared to transmit and is ready for receiving.
5	106	CB	Indicates to DTE that Data Set is prepared to transmit.
6	107	CC	Indicates to DTE that Data Set is prepared for data communications.
7	102	AB	Establishes common ground reference for all interface circuits except protective ground, pin 1.
8	109	CF	Indicates to DTE that Data Set is receiving data (not receiving idle or OOS codes).
9	—	—	(Reserved for testing)
10	—	—	(Reserved for testing)
11	126	(4)	Unassigned
12	122/ 112	SCF/CI (2)	Secondary Received Line Signal
13	121	SCB	Secondary Clear to Send
14	118	SBA	Secondary Transmitted Data
15	114	DB	Transfers transmitter signal timing information from Data Set to DTE.
16	119	SBB	Secondary Received Data
17	115	DD	Transfers receiver signal timing information from Data Set to DTE.
18	141	LL	Local Loopback
19	120	SCA	Secondary Request to Send

(Continued on following page)

Table B-1 EIA/TIA-232-E Interface Signals (Continued)

Pin	Circuit Designation		Description
No.	ITU-T	EIA	
20	108/1, /2	CD	Indicates to Data Set that DTE is prepared for data communications.
21	140/ 110	RL	Remote Loopback
22	125	CE	Ring Indicator
23	111/ 112	CH/CI (2)	Data Signal Rate Selector
24	113	DA	Transfers transmitter signal timing information from DTE to Data Set
25	142	TM	Indicates to DTE that Data Set is in a test mode.
26		(3)	No Connection

1. When hardware flow control is required Circuit CA may take on the functionality of Circuit CJ.
2. For designs using interchange circuit SCF, interchange circuits CH and CI are assigned to pin 23. If SCF is not used, CI is assigned to pin 12.
3. Pin 26 is contained on the Alt A connector only. No connection is to be made to this pin.
4. Pin 11 is unassigned. It will not be assigned in future versions of EIA/TIA-232. However, in international standard ISO 2110, this pin is assigned to CCITT Circuit 126, Select Transmit Frequency.

Table B-2 ITU-T V.35 Interface Signals

V.35 Pin	Circuit Designation		Description
	ITU-T	EIA	
A	101	AA	This circuit is connected to the equipment frame. Normally, it is separated from signal ground (pin B) by 100 ohms, but it may be connected to signal ground by means of an option strap (X1).
B	102	AB	Establishes a common ground reference for all interface circuits except protective ground, pin A.
C	105	CA	Indicates to Data Set that DTE is prepared to transmit.
D	106	CB	Indicates to DTE that Data Set is prepared to transmit.
E	107	CC	Indicates to DTE that Data Set is operational.
F	109	CF	Indicates to DTE that Data Set is receiving data (not idle or OOS codes).
K	142	TM	Indicates to DTE that Data Set is in a test mode.
L	141	LL	Local Loopback
N	140	RL	Remote Loopback
P S	103 103	BA(A) BA(B)	Transfers data signals from DTE for modulation and transmission over communication line.
R T	104 104	BB(A) BB(B)	Transfers data signals received over communication line and demodulated by Data Set to DTE.
U W	113 113	DA(A) DA(B)	Transfers transmitter signal timing information from DTE to Data Set.
V X	115 115	DD(A) DD(B)	Transfers receiver signal timing information from Data Set to DTE.
Y AA/a	114	DB(A) DB(B)	Transfers transmitter signal timing information from Data Set to DTE.
H	108/2	CO	Indicates to Data Set that DTE is prepared for data communication.

Table B-3 EIA-530 Interface Signals

P1 Pin	EIA Circuit Designation	Description
1	—	Allows shield connections via pin number 1.
2 14	BA(A) BA(B)	Transfers data signals from DTE for modulation and transmission over communication line.
3 16	BB(A) BB(B)	Transfers data signals received over communications line and demodulated by Data Set to DTE.
4 19	CA(A) CA(B)	Indicates to Data Set that DTE is prepared to transmit.
5 13	CB(A) CB(B)	Indicates to DTE that Data Set is prepared to transmit.
6 22	CC(A) CC(B)	Indicates to DTE that Data Set is operational.
20 23	CD(A) CD(B)	Indicates to Data Set that DTE is prepared for data communications.
7	AB	Establishes common ground reference for all interface circuits except protective ground.
8 10	CF(A) CF(B)	Indicates to DTE that Data Set is receiving data (not idle or OOS codes).
15 12	DB(A) DB(B)	Transfers transmitter signal timing information from Data Set to DTE.
17 9	DD(A) DD(B)	Transfers receiver signal timing information from Data Set to DTE.
24 11	DA(A) DA(B)	Transfers transmitter signal timing information from DTE to Data Set.
25	TM	Indicates whether the local DCE is in a test condition.
18	LL	Local Loopback
21	RL	Remote Loopback

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