

GDC 076R150-000
Issue 4 - September 1997

Installation and Operation

SpectraComm 521

Data Service Unit

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Preface

Scope

This manual describes how to install and configure a General DataComm SC 521 Data Service Unit. It is written for installers, service technicians, and users. It assumes a working knowledge of data interfaces, DDS data transmission service, and the Simple Network Management Protocol (SNMP).

Revision History

This is Issue 4 of the manual. It has been revised to reflect the addition of firmware downloading and line statistics display to the terminal interface functionality, and to correct a cable number error in the Equipment List.

Issue 3 incorporated minor errata material.

Issue 2 reflected the addition of terminal interface functionality.

Organization

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

- *Chapter 1 - Introduction* describes the Data Service Unit, its features, and its options. This chapter contains the Equipment List table.
- *Chapter 2 - Installation* provides directions for installing the DSU in a SpectraComm Shelf and making the cable connections it requires.
- *Chapter 3 - Operation* describes DSU command and monitoring functions that can be performed by means of front panel controls and indicators, and by means of the terminal interface.
- *Chapter 4 - Tests* describes tests that can be performed on the DSU by means of its front panel controls, by means of the terminal interface, or by the Telco Serving Test Center (STC).
- *Appendix A - Technical Characteristics*
- *Appendix B - DTE Interface Signals* lists pin/signal assignments for the three DTE interfaces that the DSU can support: EIA/TIA-232-E, ITU-T V.35, and EIA-530.
- *Appendix C - SC 521 MIB Support* consists of tables defining the Management Information Base (MIB) objects that enable SNMP control of the SC 521 DSU and its remote DSUs.

Document Conventions

Level 1 paragraph headers introduce major topics.

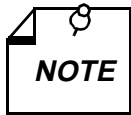
Level 2 paragraph headers introduce subsections of major topics.

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 documents have additional information that may be helpful when using this product:

- *TEAM 521 Operation* GDC 058R735-V200

GDC publication numbers (e.g., *GDC 032R101-000*) 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. SpectraComm)
- 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. 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 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.

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 component side of the SC 521 pc board provides the FCC Registration number for the unit. If requested, give this information to the telephone company.

To connect the SpectraComm 521 DSU to the Public Telephone Network you are required to give the following information to the Telephone Company:

FCC Registration Number:AG6USA-2406-DD-N

FIC (Facility Interface Code):04DUS-24, 04DUS-96, 04DUS-19, 04DUS-56, 04DUS-64

SOC (Service Order Code):6.0Y

Telephone Company jack type:RJ48S

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. 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 während eines Gewitters. Installieren Sie nie die Telefonbuchsen in einem feuchten Raum es sei denn die Buchs ist spezielle für Feuchtroder 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 Gerur durch qualifiziertes Personal erfolgen. Vor Wartung vom Stromnetz trennen.

1 Technical Overview

Description

The SpectraComm 521 Data Service Unit (DSU) from General DataComm is a multi-rate data service unit capable of operating in standard DATAPHONE Digital Service (DDS), DDS with a secondary channel (DDS/SC), or 64 kbps clear channel mode. It can support DTE data rates of 2.4, 4.8, 9.6, 19.2, 56.0, and 64.0 kbps.

The DSU operates in conjunction with a GDC SpectraComm Manager (SCM) card to provide comprehensive network management capabilities using the Simple Network Management Protocol (SNMP). Under the direction of an SNMP controller the SCM card acts as the local control device for SC 521 DSUs and other compatible devices installed in the shelf it occupies.

The DSU is software controllable. You can configure data set options from an SNMP manager at a central site. You can also perform diagnostic testing and alarm management.

The basic SC 521 DSU is a 7-inch by 9.5-inch (178 mm by 241 mm) printed circuit (pc) card. It conforms to the unique GDC SpectraComm packaging concept that enables a variety of data communication products to be mounted in the same high-density shelf. Each 16-slot shelf can hold 16 single card devices.

The following optional piggyback cards may be mounted on the SC 521 base card:

530 Interface Card — This option card supports the use of an EIA-530 DTE interface. When the 530 Interface Card is not installed, the DSU provides an EIA/TIA-232-E or V.35 interface as selected by hardware jumpers on the base card.

Data Rate Adapter Card — This option card can adapt a synchronous or asynchronous DTE data transmission speed of 19.2, 9.6, 4.8, or 2.4 kbps to an aggregate line speed of 56 or 64 kbps. At 56 kbps it can be used in both point-to-point and multipoint applications. At 64 kbps it can be used in point-to-point applications only.

Table 1-1 defines part numbers for standard and optional equipment available for the SC 521 DSU. *Appendix A* lists its technical characteristics.

SC 521 Data Service Unit Features

The SC 521 DSU provides the following features:

- Operates in Standard DDS mode, DDS with secondary channel mode, and clear channel (64 kbps) mode.
- Supports synchronous communications at 64000, 56000, 19200, 9600, 4800, and 2400 bps; asynchronous communications at 19200, 9600, 4800, 2400, 1800, 1200, and 600 bps.
- Communicates with SNMP controller through the shelf-resident SpectraComm Manager (SCM) card for comprehensive, non-intrusive network management.
- Fully compatible with Simple Network Management Protocol network management. SNMP provides complete software control for configuration, alarm reporting, and diagnostic testing capabilities, as well as supporting the display of line measurements performed by the DSU.

- Provides terminal interface functions that are accessible through the shelf-resident SCM card using either a VT100-compatible ASCII terminal or a computer running the Telnet protocol.
- Provides selectable transmit timing: Receive, Internal, or External (DTE).
- Provides DTE interface that conforms to EIA/TIA-232-E, ITU-T V.35, or (with optional plug-in card) EIA-530.
- Provides programmable RTS-CTS delay.
- Compatible with remote NMS 520 and NMS 510 DSUs for transmission and reception of user data.
- Stores operating firmware in flash based memory that supports downloading of new application firmware by means of TFTP for upgrades
- Supports dual application firmware storage, with user control of switchover between active and standby firmware versions

Management

As an SNMP controlled device, the SC 521 DSU receives the commands that set its configuration and control its functions in the form of entries in its Management Information Base (MIB) tables. SNMP interface functions between the DSU and its SNMP controller are the responsibility of a SpectraComm Manager (SCM) card installed in the same SpectraComm Shelf (or pair of shelves) that holds the DSU.

The SCM card stores and administers MIBs for compatible GDC products in its SpectraComm Shelf. The SCM card communicates with an SNMP controller, and passes commands and responses between the controller and the DSU.

In addition to the SC 521 DSU, SCM-compatible products include GDC V.F 28.8 and Dual V.34 modems, and the data set emulators and line terminating units in the GDC SpectraComm 5000 system. The SC 521 DSU can be installed in a shelf that holds other types of SCM-compatible products, with a single SCM used for the control of all the devices in the shelf.

The DSU facilitates fault isolation in a digital network by providing comprehensive loopback and testing capabilities, that include Local Test, Remote Loop, Data Loop and Self-Test. The operator can use these loopbacks and tests to isolate system faults to a particular DTE, data set, or line. Diagnostic testing performed through SNMP does not require intervention by personnel at remote sites.

The operator can select Alarm reporting to occur on any of the following conditions:

EEPROM Checksum	RXD Loss	Front Panel Test Mode
External Clock Loss	Bipolar Violations	DTR Loss
No Signal	Jitter	STC Loopback
DCD Loss	RX Signal Low	TXD Loss
Streaming	No Loop Current	DSR Loss
Frame Loss		
Line Pairs Reversed		
TX Failure		

Application

The SC 521 DSU supports full duplex operation over four-wire private lines. It can be software programmed to operate in the following network modes:

- DDS I (Standard DDS)
- DDS/SC (DDS with Secondary Channel)
- DDS 64 (Clear Channel)
- Wireline

The SC 521 DSU is fully compatible with remote GDC NMS 520 or NMS 510 DSUs, and can pass data to any existing DDS-compatible DSU. It is intended principally for space efficient, high density central site installations.

The DATAPHONE Digital Service (DDS) offered by local and interexchange carriers is a highly reliable means of data transmission. The enhanced DDS/SC version provides an in-band, synchronous secondary channel (SC). The SC 521 DSU can employ that secondary channel for its diagnostic and management communications with remote NMS 520 and NMS 510 DSUs.

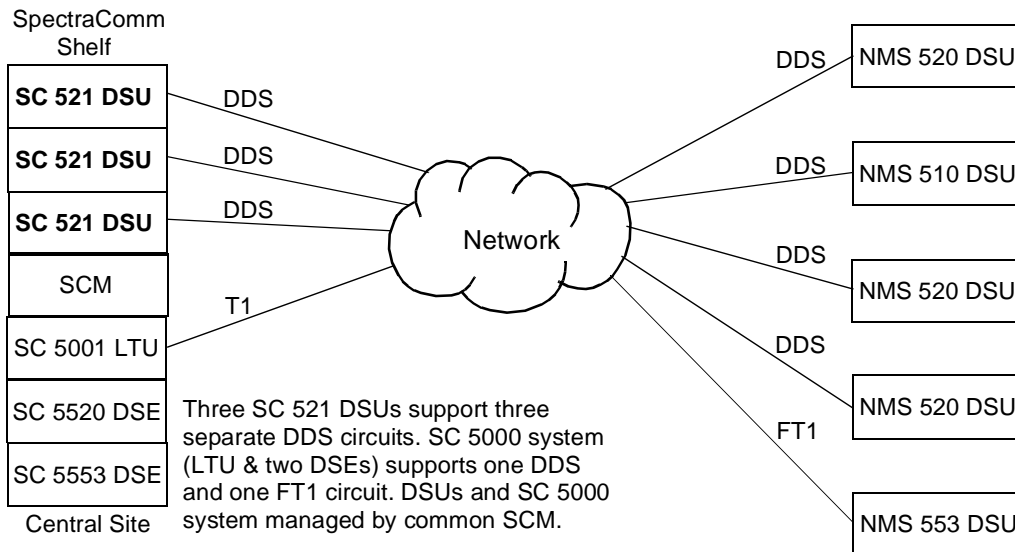


Figure 1-1 SC 521 DSU Application Example

Data Rate Adapter Applications

Diagrams 1-1 and 1-2 illustrate timing configurations for use when the DSU has the optional Data Rate Adapter card installed for synchronous operation. In these applications always option the DSU for Receive timing from the network. External timing sources must be 100 PPM.

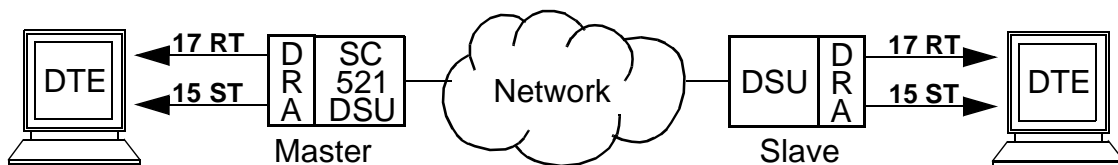


Figure 1-2 Data Rate Adapter Application 1 (Master: Internal, Slave: Internal)

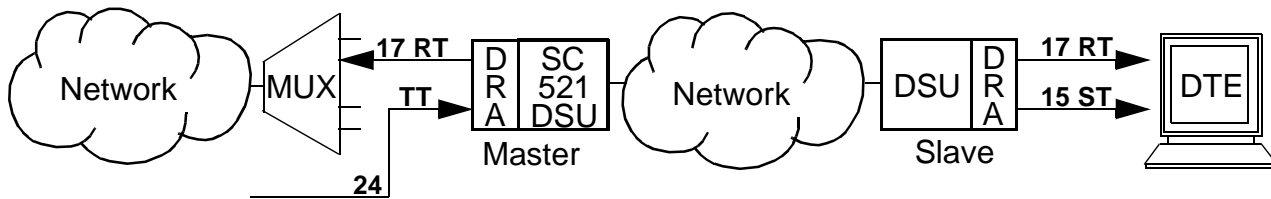


Figure 1-3 Data Rate Adapter Application 2
(Master: External, Slave: Internal)

Table 1-1 Equipment List

Description	GDC Part No.
GDC SC 521 Data Service Unit	076P018-001
Shelves	
SpectraComm Shelf MS-2 Model 1 (100/120 V ac) Includes two 8-slot, dual RJ48 Zone 1 connector panels	010M054-001
SpectraComm Shelf MS-2 Model 2 (-48 V dc) Includes two 8-slot, dual RJ48 Zone 1 connector panels	010M055-001
SpectraComm Shelf MS-2 Model 10 (-48 V dc, with redundant power supplies) Includes two 8-slot, dual RJ48 Zone 1 connector panels	010M070-001
Unless otherwise stated, systems include one base shelf, one power supply and one power supply blank front panel, Zone 1 connector panels as stated, one 16-slot DB25 Zone 3 connector panel, two standard mounting brackets (19-/23-inch), and assorted mounting hardware.	
Connector Panels	
Kit, Zone 1, 8-slot Blank Rear Panel (Z1-S-B)	010K341-001
Kit, Zone 1, 8-slot dual RJ45 connector panel (Z1-S-16DRJ45)	010K342-001
Kit, Zone 3, 16-slot DB25 connector panel (Z3-S-16DB25)	010K339-001
Cables	
V.35 Male-to-Male, Straight Through Cable	027H516-XXX*
DB25 Male/V.35 Female Adapter Cable	027H572-001
EIA-530/442 (25-pin male) to EIA-422/449 (37-pin female) Adapter Cable Assembly	027H501-001
EIA/TIA-232-E Male-to-Male, Straight Through Cable	028H502-XXX*
EIA/TIA-232-E Male-to-Female, Straight Through Cable (Shielded)	028H506-XXX*
Options	
EIA-530 Interface Module	048P042-001
Data Rate Adapter (DRA) card	058P128-002
Manuals	
Operating and Installation Instructions for SpectraComm Shelf	010R302-000
Operating and Installation Instructions for SpectraComm Manager Card	048R303-000
* XXX represents three digits which indicate cable length in the actual part number.	

2 Installation

Overview

This chapter describes the installation of the SC 521 DSU.

The SC 521 DSU is shipped pre-assembled, tested, and ready to use. There is one hardware option, for selection between V.35 and RS-232 DTE interface, to be set on the SC 521 DSU pc card.

The normal procedure after unpacking the unit is to insert it in its intended shelf slot and perform the Preoperational Check described in this chapter. When the test is successfully completed you may make the DSU cable connections.

The SC 521 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).

SpectraComm Shelf

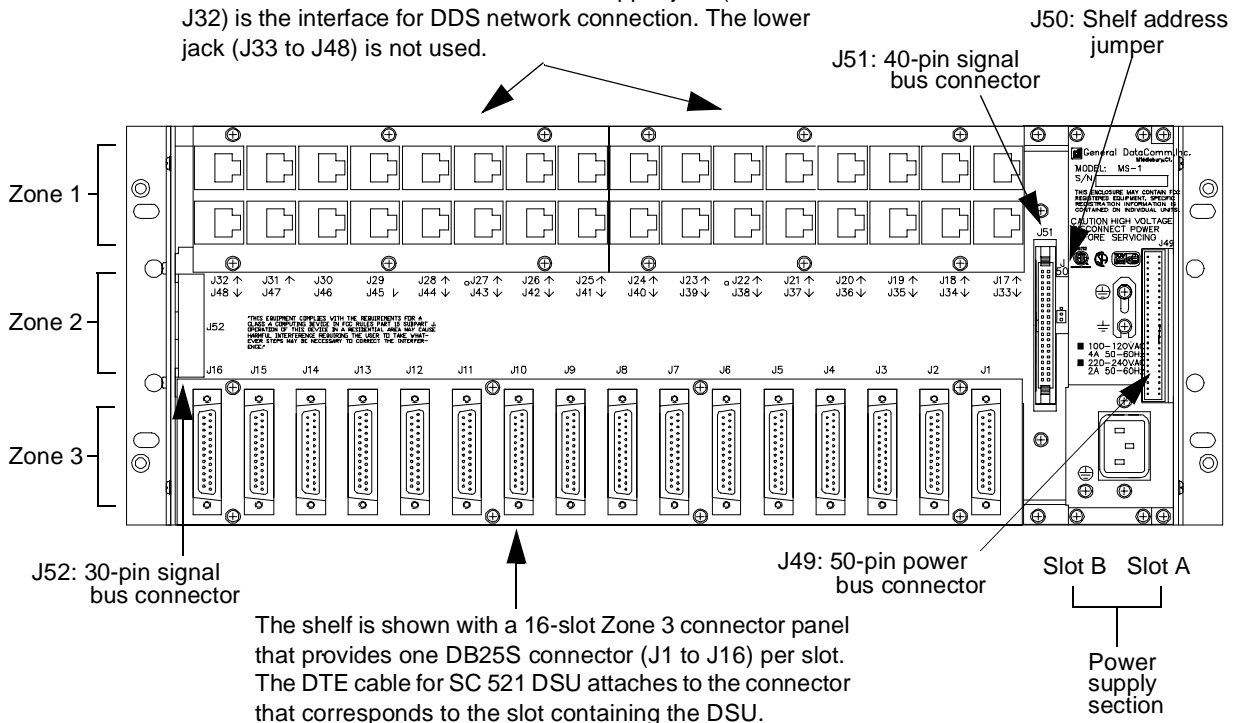
A rack-mountable SpectraComm Shelf can house up to 16 plug-ins and the SC 521 DSU can be installed in any card slot. The shelf fits into 19- and 23-inch wide equipment racks. The backplanes of two shelves can be linked by cables so that a total of 32 card slots function as though connected to the same backplane.

In a two-shelf installation, Shelf Address Jumper J50 must be in the 0 position for the base shelf (slots 1 – 16) and in the 1 position for the second shelf (slots 17 – 32). Jumper J50 must always be in the 0 position for a single shelf installation.

The shelf backplane supports a management bus for the transfer of management data between an SCM card and the managed devices in the shelf. The SCM card functions as an SNMP agent for the control of a variety of compatible devices. In addition to the SC 521 DSU, SCM-compatible devices include GDC V.F 28.8 and Dual V.34 modems, and the data set emulators and line terminating units that compose a SpectraComm 5000 system. The SpectraComm Shelf can contain a single SCM card, or two SCM cards installed as a primary and a backup.

Figure 2-1 shows the SpectraComm Shelf back panel. An SC 521 DSU employs two back panel connectors: the upper RJ48S connector in Zone 1 that serves as its DDS network interface, and the Zone 3 connector for its slot that serves as its DTE interface. The shelf is available with DB25 connectors or V.35 connectors in Zone 3. Consult the *SpectraComm/UAS Shelf and Enclosure Installation and Operation Manual (GDC P/N 010R302-000)* for detailed information on the shelf and its back panel connectors.

The shelf is shown with a pair of 8-slot Zone 1 connector panels that provide two RJ48 modular jacks per slot. In a slot that contains an SC 521 DSU the slot's upper jack (J17 to J32) is the interface for DDS network connection. The lower jack (J33 to J48) is not used.



The shelf is shown with a 16-slot Zone 3 connector panel that provides one DB25S connector (J1 to J16) per slot. The DTE cable for SC 521 DSU attaches to the connector that corresponds to the slot containing the DSU.

Figure 2-1 SpectraComm Shelf Back Panel

Unpacking and Handling

The SC 521 DSU is shipped enclosed in a corrugated box and protected by packing material. Inspect the SC 521 DSU when you receive it. Notify the shipper of any damage immediately.

Keep the box and packing material to use if you ever need to reship the SC 521 DSU.

Preoperational Check

You should verify that the SC 521 DSU is in good working order by observing it during power up, and then performing a Local Test with Self Test by means of the front panel controls.

When you insert the SC 521 DSU into the shelf all the front panel LEDs should light for approximately one second. If this does not occur, there is a problem with the unit. Install a spare unit if one is available. If you require assistance, contact General DataComm Service at the toll-free telephone number listed in the Preface of this manual. Do not attempt to repair the SC 521 DSU.

Local Test/Self Test

Once the SC 521 DSU has successfully powered up and before you connect it to its DTE or the network, you should perform a **Local Test with Self Test** to verify that the internal circuits of the DSU are capable of normal operation. Local Test causes the DSU to loop transmit data back as receive data. Self Test enables both an internal Test Pattern Generator to provide a signal for the test loop and a Test Pattern Checker to verify the signal.

1. Initiate the test by briefly pressing the LT (Local Test) and Self Test (ST) switches on the front panel. The LT, ST, and TM (Test Mode) indicators are On during the test.
2. Run the test for approximately 15 seconds.
3. The TM indicator blinks when an error is detected. The test should run entirely error-free.
4. If the test is successful, the TM indicator remains On until you end the test by depressing the LT and ST buttons a second time.

If errors are detected during this test there is a problem with the unit. Install a spare unit if one is available. If you require assistance, contact General DataComm Service at the toll-free telephone number listed in the *Preface* of this manual. Do not attempt to repair the SC 521 DSU.

Installation Procedures

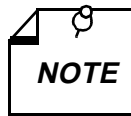
Module Installation Procedures

An SC 521 DSU card may be installed in any slot in a SpectraComm Shelf. To install the DSU card in the shelf:

1. Insert the module into its slot with the GDC logo on top, then slide it in until it makes contact.
2. Pull down the ejector tab and firmly push the module in until it seats in the rear connectors.

Data Rate Adapter Card

To field install a Data Rate Adapter (DRA) piggyback card refer to *Figure 2-2* and the following text. Ensure that the SC 521 DSU is disconnected from service and from the main power source before you proceed with the installation.



Use of the Data Rate Adapter might impact round-trip delays north network to varying degrees for different data rates. Network design engineers should consult GDC Tech Support if in doubt.

The DRA does not supply test voltages +12 V on EIA-232 Pin 9 and -12 V on EIA-232 Pin 10 of the Business Equipment connector.

Data Rate Adapter Card Options

- EXT/INT (X1) — This option provides clock selection for internal (Default) or external timing.
- B0, B1, (S1-1, S1-2) — When Switch S1-3 is OFF (Sync mode), Switches S1-1 and S1-2 determine synchronous DTE data rate. The switch settings for each rate are as follows —

B0 (S1-1)	B1 (S1-2)	DTE Data Rate (bps)
OFF	OFF	2400
ON	OFF	4800
OFF	ON	9600
ON	ON	19.2K



When the DSU is operating in synchronous mode, the Send Data (SD) and Receive Data (RD) LEDs are dimly lit when the DSU is not passing data.

When Switch S1-3 is ON (Async mode), Switches S1-1 and S1-2 determine asynchronous DTE data rate. The switch settings for each rate are as follows —

B0 (S1-1)	B1 (S1-2)	DTE Data Rate (Bps)
OFF	OFF	1200
ON	OFF	2400
OFF	ON	9600
ON	ON	19.2K

- **ASYNC (S1-3)** — ON enables asynchronous DTE transmission. OFF selects synchronous DTE communication.
- **7B/8B (S1-4)** — When asynchronous operation is selected, ON selects 7 data bits per async character and OFF selects 8 data bits per async character.

When synchronous multipoint operation is selected, ON selects 8 data bits per character and OFF selects 5 data bits per character.

- **P/64 (S1-5)** — When asynchronous operation is selected, ON enables transmission of the parity bit and OFF inhibits transmission of the parity bit.

When synchronous operation is selected, ON provides 64 Kbps rate adaption to the aggregate line rate and OFF provides 56 Kbps rate adaption.

- **OD/EX (S1-6)** — When asynchronous operation is selected, ON selects odd parity and OFF selects even parity.

When synchronous multipoint operation is selected, ON selects external (DTE) timing and OFF defaults to internal timing. This switch selects the timing source in conjunction with the X1 header.

- **MPT (S1-7)** — ON for multipoint operation; OFF for point-to-point applications.
- **SLV (S1-8)** — In multipoint applications only, OFF options the DSU to be the MASTER and ON options the DSU to be a SLAVE (Remote).

Data Rate Adapter Card Installation

The Data Rate Adapter plugs into the SC 521 DSU pc card through connectors XA1P2, XA1P3, and XA1P1. The connectors and the space on the card can be used for either the DRA or an optional 530 interface plug-in card. Berg-type jumpers are installed in the connectors if neither card is installed.

If the 530 card is present, first remove the two screws that attach it to the base card. Then pull straight up on the 530 card to remove it from the base card.

If the 530 card is not present, pull out the jumpers on the connector.

Install the DRA card to connectors XA1P2, XA1P3, and XA1P1 on the base card, component side down. Secure the card with one screw from the bottom of its base card and reassemble your unit.

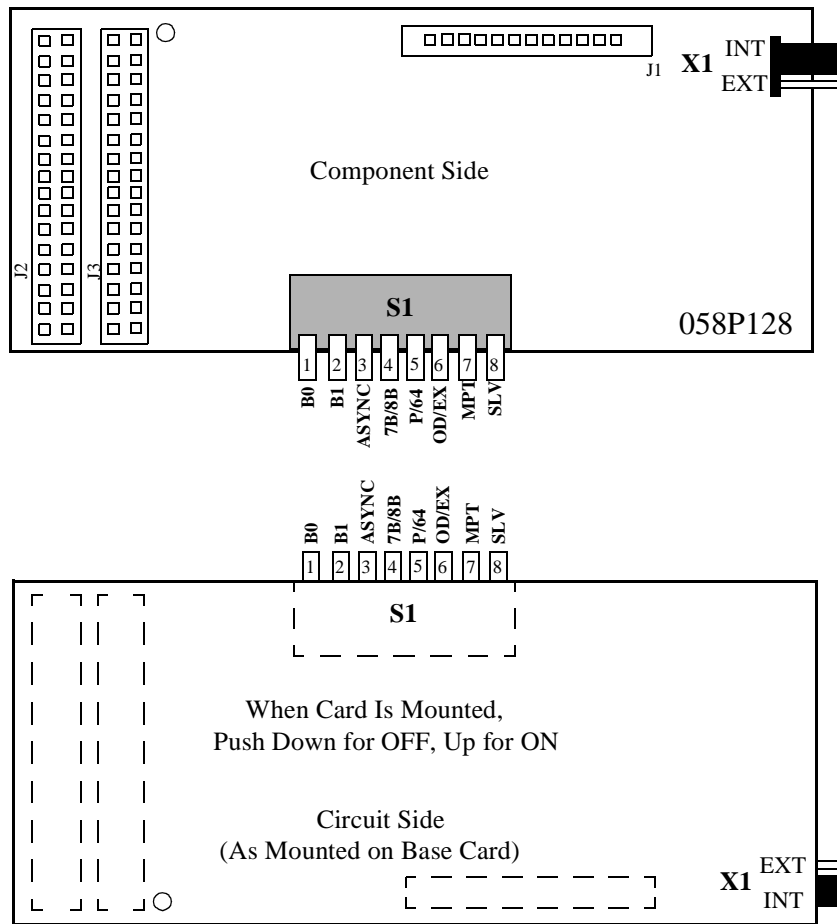


Figure 2-2 Data Rate Adapter Card

DDS Network Connection

The back panel of the SpectraComm Shelf has 16 RJ48 jacks, labeled **J17** through **J32**, for network interface connections. J17 corresponds to shelf slot 1 and J32 corresponds to shelf slot 16, as shown in *Figure 2-1*.

Connect the SC 521 DSU to the DDS network by means of the jack for its slot, using a straight-through cable, terminated at each end with an RJ48S modular plug. The pin assignments in the back panel connector are

Function	Direction	Pin No.
Send Data (Ring)	From DSU	1
Send Data (Tip)	From DSU	2
Receive Data (Ring)	To DSU	7
Receive Data (Tip)	To DSU	8

Wireline Connection

A wireline connection is one in which the DSU is connected directly to another DSU rather than to a DDS network. If you are installing the DSU in a wireline connection, you must use a cross-over cable that connects Send Data from one unit to Receive Data at the other unit.

Business Equipment Connections (DTE)

The SC 521 DSU 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 base card. The placement of jumpers on connectors X1 and X2 makes the selection between the EIA-232 and the V.35 interface (see Figure 2-3). When the optional EIA-530 interface card is installed and enabled, the jumper settings at X1 and X2 are disregarded.

Appendix B describes the signals exchanged through each of the business equipment interfaces.

EIA-530 Card Installation

The EIA-530 interface requires an optional, plug-in, piggyback card. The EIA-530 card mates with the base card via connector XA1P1 and it can be oriented in either of two positions (see Figure 2-3). In one position, the 530 card provides an EIA-530 interface. In the other position, it acts as an XA1P1 jumper so that the EIA/TIA-232-E or V.35 interface can be selected with the plug-in card mounted. Finally, the plug-in card may be removed entirely and jumpers, or a program plug placed across XA1P2 and XA1P3, so that non-EIA-530 units may operate without the card.

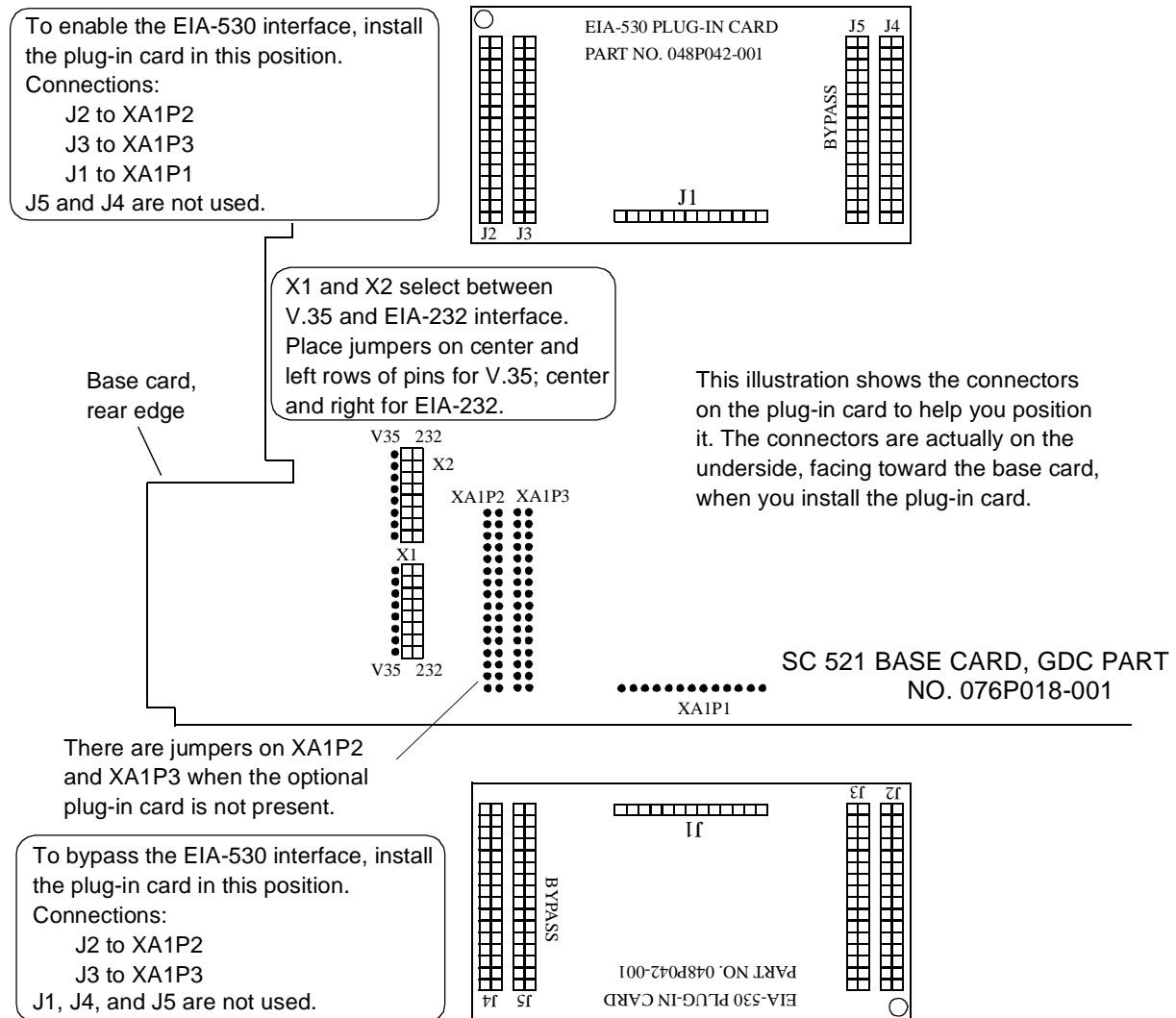


Figure 2-3 Interface Optioning

Electrical Power Connection

The DSU obtains power directly from the SpectraComm shelf.

DSU Addressing

The network management system employs a slot-line-drop method of addressing. The DSU slot address is the number of the slot it occupies in the SpectraComm Shelf. In a single shelf installation, slot numbers are 1 through 16. In a two-shelf installation, the slots of the second shelf are designated 17 through 32. The setting of Shelf Address Jumper J50 on the back panel of the SpectraComm shelf selects the shelf as first or second in a two-installation (*see Figure 2-1*).

The line address for the DSU is always 1, and the DSU is drop 0 for its line. In a point-to-point circuit the single remote unit is drop 1. In a multi-point circuit the drop numbers of the remote units are selectable.

If the firmware is ever changed on the SC 521 DSU, the EEPROM containing configuration for the DSU is automatically erased and the unit has to be reconfigured.

Timing Options

Timing options determine the clock source for the data the SC 521 DSU transmits to the network. The DSU supports three timing modes:

- Receive Timing, based on the incoming signal from the network
- Internal Timing, provided by the oscillator incorporated in the DSU (used for wire line mode)
- External Timing, based on timing signals from the DTE

Receive timing is the default Transmit Timing option for the DSU.

While the SC 521 DSU can occupy the same shelf as the components of a SpectraComm 5000 system and be controlled through an SCM card that is also controlling an SC 5000 system, the DSU timing is completely independent. The SC 521 DSU is not involved in the shelf timing arrangement employed by the SC 5000 system.

Elastic Transmit Buffer

The SC 521 DSU provides an Elastic Transmit Buffer feature. When enabled it places a 16-bit (± 8) buffer in the transmit path to permit the use of separate timing sources at the DTE and network interfaces. The buffer can be selected by means of software as either Internal (the default condition) or External.

When Internal is selected, the DSU bypasses the buffer and uses the selected timing mode to time data at both the DTE interface and the network interface.

When External is selected, the DSU uses the External Timing signal provided by the DTE to time transmit data into the buffer, and DSU transmit timing to time data out of the buffer.

3 Operation

Overview

This chapter begins by describing the functions of the SC 521 DSU front panel indicator displays and limited test functions.

The chapter then provides instructions for using the DSU terminal interface to control and monitor its functions. Through the terminal interface you can alter the configuration of the DSU, invoke more extensive diagnostic test functions, view the current status of DTE interface signals and unit alarm conditions, and display information on the unit.

This chapter describes how to access the DSU diagnostic functions by means of the terminal interface. *Chapter 4, Tests*, describes the actual test procedures in detail.

Access to the DSU terminal interface functionality takes place through a SpectraComm Manager (SCM) card installed in the SpectraComm shelf that houses the DSU. The SCM card supports two types of connection for terminal interface functions:

- connection of a VT100-compatible terminal via the Craft port on the SCM front panel
- Telnet connection via the SCM LAN port located on the back panel of the shelf

There are small differences between the two types of connection.

In addition to the terminal interface, you can control and monitor the SC 521 DSU by means of a Simple Network Management Protocol (SNMP) controller software application, such as the TEAM 521 application available from GDC. Specifics of SNMP control depend on the control application that you use, and so are beyond the scope of this manual. Consult the manual for your SNMP controller for detailed instructions on the use of its functions. This manual does provide information specific to the SC 521 DSU as a supplement to those instructions, in particular the MIB tables contained in *Appendix C*.

Controls and Indicators

Figures 3-1 and 3-2 illustrate the SC 521 DSU front panel and explain the function of each control and indicator.

SpectraComm Shelf

The manual supplied with the SpectraComm shelf describes front panel controls, indicators, and fuses for the shelf.

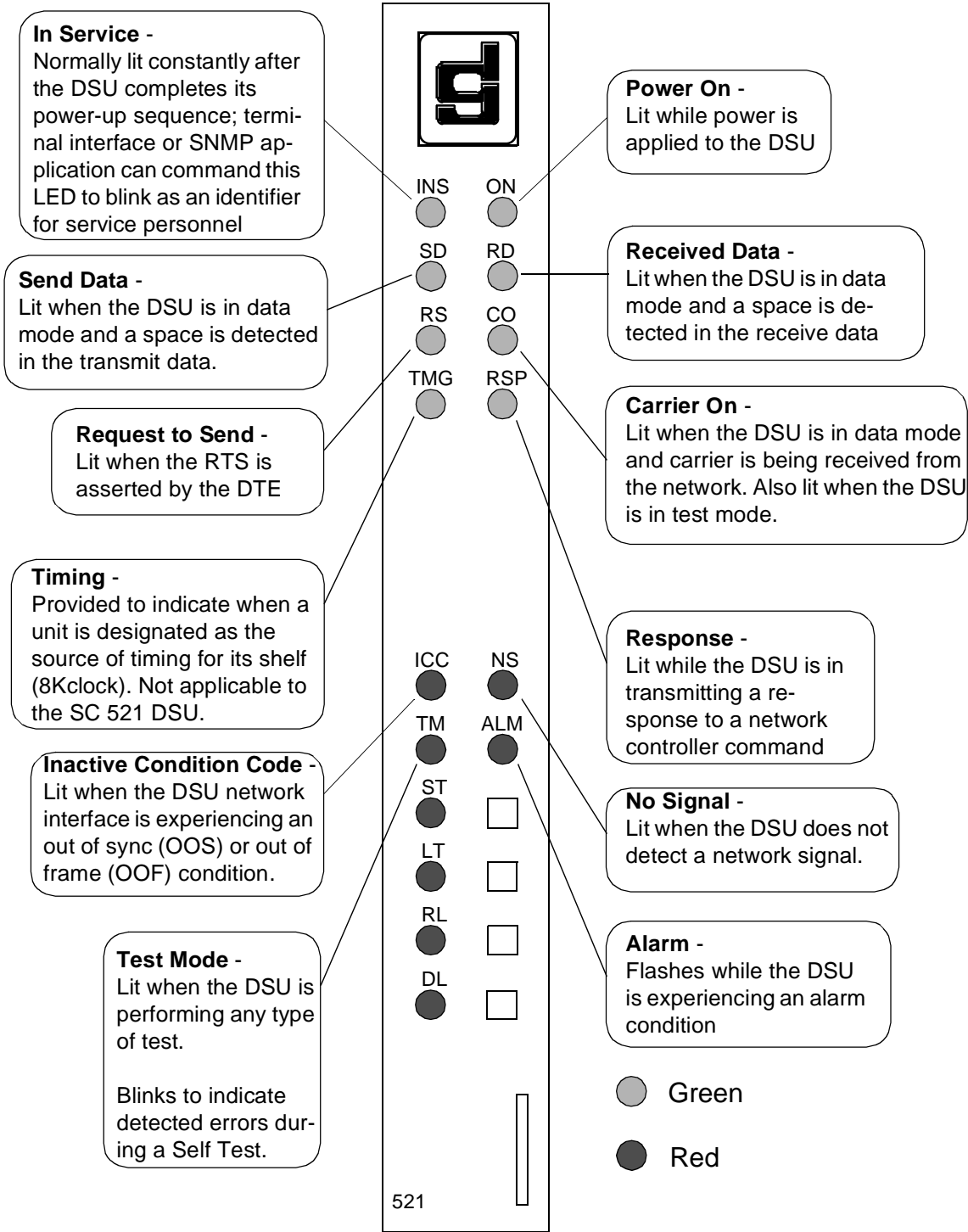


Figure 3-1 Front Panel Indicators

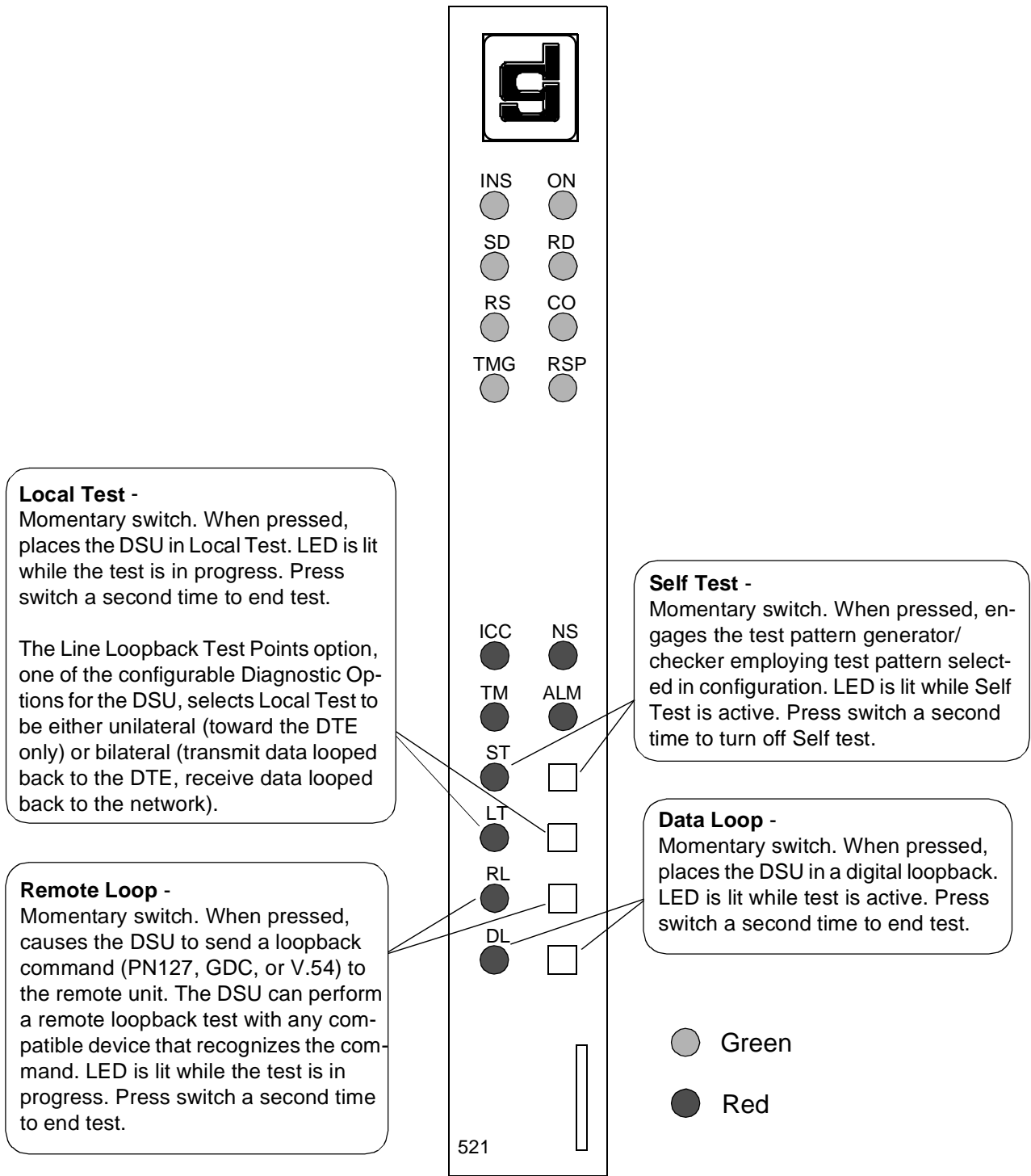


Figure 3-2 Front Panel Controls

Terminal Interface

Access to the SC 521 DSU terminal interface takes place through the SCM, which provides this functionality for the DSUs installed with it in a SpectraComm shelf or a pair of shelves connected by daisy chain cables. One SCM, then, supports interface functions for up to 15 units in a single shelf or up to 31 units in a pair of shelves.

Initiating a Terminal Interface Session

The first portion of a terminal interface session varies depending on whether you're using a VT100-compatible terminal connected directly to the SCM front panel or a computer with a Telnet connection to the SCM LAN port.

VT100-compatible Terminal

When you connect a terminal to the SCM front panel, the following screen is the first to appear

```
Main Menu
1. IP Address
2. Security
3. Element Access
4. Test
Enter Selection:
```

Type 3 and press the Enter key. The screen then displays the Shelf Inventory screen that appears below.

The other selections in this menu all relate to SCM functionality. They are discussed in the *SpectraComm Manager Card Installation and Operation Manual*, GDC Publication Number 048R303-000.

Telnet Connection

The *SpectraComm Manager Card Installation and Operation Manual*, GDC Publication Number 048R303-000 explains how to establish a Telnet connection to the SCM LAN port. When you do so, the following screen is the first to appear

```
Copyright (c) 1993-1997 General DataComm Industries Inc.
All rights reserved
SCM Application Version 3.32A

login:
```

After you enter the login password the screen displays the Shelf Inventory screen that appears below.



There is a 10-minute timeout on the terminal interface. If you allow 10 minutes to pass with no activity, that is without pressing any key on the keyboard, the DSU terminates the session. At that point the display returns to the SCM Main Menu if you are using a terminal connected to the SCM front panel, or to the SCM login screen if you are using a Telnet connection.

Selecting a DSU (Shelf Inventory Screen)

From this point, procedures are the same for both types of connection. The Shelf Inventory screen below is for a two-shelf installation in which both shelves are filled with SC 521 DSUs. The two columns for Slots 17 through 32 do not appear when there is only one shelf.

SHELF INVENTORY			
Slot	Card	Slot	Card
[1]	SCM	[17]	SC521
[2]	SC521	[18]	SC521
[3]	SC521	[19]	SC521
[4]	SC521	[20]	SC521
[5]	SC521	[21]	SC521
[6]	SC521	[22]	SC521
[7]	SC521	[23]	SC521
[8]	SC521	[24]	SC521
[9]	SC521	[25]	SC521
[10]	SC521	[26]	SC521
[11]	SC521	[27]	SC521
[12]	SC521	[28]	SC521
[13]	SC521	[29]	SC521
[14]	SC521	[30]	SC521
[15]	SC521 (alarm)	[31]	SC521
[16]	SC521	[32]	SC521
[0] Close Session			
Enter slot number: []			

The Shelf Inventory displays the word "alarm" in parentheses next to the name of any unit that currently has an active alarm condition.

Type the slot number of the unit you intend to work with, and press the Enter key. The DSU responds by displaying the SC 521 Main Menu as shown below.

```

SC 521

SHELF SLOT = 12

[1] Configuration          [2] Diagnostics
[3] Alarm Configuration    [4] Monitor/Alarms
[5] Maintenance           [6] Line Statistics

[0] Return to Shelf Inventory

Select: [ ]

```

Type the number that corresponds to the function with which you intend to work.

Configuration

The Configuration function presents a screen of configuration options. Each option is identified by a selection number or letter, and displays its current setting.

```

SC 521 Configuration

[1] Network: Circuit Type:      Pt to Pt DDS - 1
[2]   Carrier:                 TX Const. RX Const.
[3]   Data Rate:               56 kbps Sync
[4] Circuit: TX Clock Source:   Receive
[5]   Buffer Clock:             Internal
[6]   Zero Encoding:           Enable
[7]   Remote Unit Type:        NMS 510
[8]   Sentry Timer (pt to pt): 60 Minutes
[9]   Remote Response Interval: 10 Seconds
[A]   Circuit Assurance:       Disable
[B]   System Status:           Disable
[C] DTE Control: AAS:          Disable
[D]   Constant DSR:            Enable
[E]   CTS Delay:               CTS ON
[F]   HDLC Invert:             Disable
[G] Async: Character Size:     11 bits
[H]   Overspeed:               1%
[I]   Suppression:             Disable
[J]   Rate Adaption:           Disable

[0] Return to Main Menu   [S] Save & Update Unit
Select: [ ]

```

Figure 3-3 Configuration Screen, with Default Settings

The procedure for changing configuration option settings involves the following steps:

1. Type the selection number or letter of the option you intend to change, and press the Enter key. Highlighting appears on the current setting field for the corresponding option.
2. Use the arrow keys to toggle the highlighted field through its potential settings.
3. When the field displays the desired setting, press the Enter key again. The highlight returns to the Select field.
4. Repeat steps 1 through 3 for each option you need to change.
5. After you've made all required changes, type selection S, Save & Update Unit and press the Enter key. In response the prompt ARE YOU SURE (Y/N)? appears.
6. If you are certain that your changes are correct, type Y and press the Enter key to put the changed configuration into effect in the DSU.
If you decide not to put your changes into effect, type N and press the Enter key. You can then either make further changes or proceed to dismiss the screen.
7. To dismiss the Configuration screen, type selection 0, Return to Main Menu, and press the Enter key. If there are no unsaved changes the display returns to the SC 521 Main Menu and the configuration procedure is complete.
8. If there are unsaved changes when you attempt to dismiss the Configuration screen, the prompt Pending Edits, Exit without saving (Y/N)? appears. You can type Y and press the Enter key to dismiss the screen and discard the unsaved changes. If you type N and press the Enter key, the Configuration screen remains on display so that you can perform a Save or make further changes before you type 0 again to dismiss the screen.

Table 3-1 lists the configuration options that appear on the terminal interface display and all the settings available for each.

Table 3-1 SC 521 Configuration Option Settings

Option	Potential Settings
[0] Return to Main Menu	
[1] Network: Circuit Type:	Point to Point DDS-1
	Point to Point DDS-SC
	Point to Point Clear Channel
	Multipoint DDS-1
	Multipoint DDS-SC
[2] Carrier:	TX Constant, RX Constant
	TX Constant, RX Switched
	TX Switched, RX Constant
	TX Switched, RX Switched

(Continued on next page)

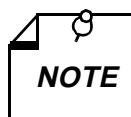
Table 3-1 SC 521 Configuration Option Settings (Continued)

Option	Potential Settings
[3] Data Rate:	64 kbps Synchronous
	56 kbps Synchronous
	19.2 kbps Synchronous
	9.6 kbps Synchronous
	4.8 kbps Synchronous
	2.4 kbps Synchronous
	19.2 kbps Asynchronous
	9.6 kbps Asynchronous
	4.8 kbps Asynchronous
	2.4 kbps Asynchronous
	[4] Circuit: TX Clock Source:
External	
Internal	
[5] Buffer Clock:	Internal
	External
[6] Zero Encoding:	Enable
	Disable
[7] Remote Unit Type:	NMS 510
	NMS 520
[8] Sentry Timer (pt to pt):	1 – 5 Minutes (1-minute increments)
	10 Minutes
	15 Minutes
	30 Minutes
	45 Minutes
	60 Minutes
	90 Minutes
	120 Minutes
	Disable
[9] Remote Response Interval:	10 – 120 Seconds (10-second increments)
	Disable
[A] Circuit Assurance:	Enable
	Disable
[B] System Status:	Enable
	Disable
[C] DTE Control: AAS: (Auto Anti Streaming)	Disable
	45 Seconds
	30 Seconds
	10 Seconds
	5 Seconds

(Continued on next page)

Table 3-1 SC 521 Configuration Option Settings (Continued)

Option	Potential Settings
[D] Constant DSR:	Enable
	Disable (follows DTR)
[E] CTS Delay:	CTS On
	0 msec
	Fixed 3 Char
	30 msec
	60 msec
	90 msec
[F] HDLC Invert	Enable
	Disable
[G] Async: Character Size	11 bits
	10 bits
	9 bits
	8 bits
[H] Overspeed	1%
	2.3%
[I] Suppression	RX + TX EOT
	TX EOT
	RX EOT
	Disable
[J] Rate Adaption	Disable
	1200
	600
	1800 to 2400



Be especially careful in setting Option 7, Remote Unit Type. The DSU may not be able to correctly recognise the type of communication link between itself and its remote unit if that option is set incorrectly.

Diagnostics

The terminal interface SC 521 Diagnostics screen combines configuration and command functions. Selections 1 through 9 are configuration options that affect DSU diagnostic functionality. Changes to the options don't go into effect until you save them to the unit. Once saved, they remain in effect until new changes are made and saved.

Selections A through F are command fields by which you can begin and end test procedures. The Test Results field below selection F displays the results of tests that employ Self Test. The result is either Passed, if no errors are detected, or the number of RX Errors.

Figure 3-4 illustrates the Diagnostics screen. Detailed instructions for setting its configuration options follow the illustration. Instructions for using the screen to perform tests appear in *Chapter 4, Tests*, together with descriptions of the diagnostic functions.

```

                                SC 521 Diagnostics

                                Diagnostic Options
[1] DTE: Line Loopback Control:  Enable
[2] Remote Loopback Control:    Disable
[3] Data Set Ready:             Normal
[4] Network: Line Loopback Test Pts: DTE Only
[5] Telco Latching Loopbk Rsp:  Enable
[6] Customer Remote Loop Rsp:   Enable
[7] Remote Loop Auto Timeout:   Disable
[8] Remote Loop Initiation Seq.: GDC
[9] Self Test Pattern:          511

                                TESTS:
[A] Line Loopback:              Idle
[B] Line Loopback & Self Test:  Idle
[C] Remote Loopback:           Idle
[D] Remote Loopback & Self Test: Idle
[E] Digital Loopback:          Idle
[F] Self Test:                  Idle

                                Test Results:

[0] Return to Main Menu [S] Save 1 - 9 & Update Unit
    Select: [ ]

```

Figure 3-4 Diagnostics Screen

The procedure for changing Diagnostic configuration option settings involves the following steps:

1. Type the selection number of the option you intend to change, and press the Enter key. Highlighting appears on the current setting field for the corresponding option.
2. Use the arrow keys to toggle the highlighted field through its potential settings.
3. When the field displays the desired setting, press the Enter key again. The highlight returns to the Select field.
4. Repeat steps 1 through 3 for each option you need to change.
5. After you've made all required changes, type selection S, *Save 1 - 9 & Update Unit* and press the Enter key. In response the prompt *ARE YOU SURE (Y/N)?* appears.
6. If you are certain that your changes are correct, type Y and press the Enter key to put the changed configuration into effect in the DSU. You can then perform tests or proceed to dismiss the screen.
If you decide not to put your changes into effect, type N and press the Enter key. You can then make further changes, perform tests, or proceed to dismiss the screen.
7. For instructions on performing tests, consult *Chapter 4*. To dismiss the Diagnostics screen, type selection 0, *Return to Main Menu*, and press the Enter key. If there are no unsaved diagnostic configuration changes, the display returns to the SC 521 Main Menu and the procedure is complete.

8. If there are unsaved configuration changes when you attempt to dismiss the Diagnostics screen, the prompt `Pending Edits, Exit without saving (Y/N)?` appears. You can type `Y` and press the Enter key to dismiss the screen and discard the unsaved changes. If you type `N` and press the Enter key, the Diagnostics screen remains on display so that you can perform a Save, perform tests, or make further changes before you type `0` again to dismiss the screen.

Table 3-2 lists the Diagnostic configuration options that appear on the terminal interface display and all the settings available for each.

Table 3-2 SC 521 Diagnostic Configuration Option Settings

Option	Potential Settings
[1] DTE: Line Loopback Control:	Disable (default)
	Enable
[2] Remote Loopback Control:	Disable (default)
	Enable
[3] Data Set Ready (this option is valid only when Configuration option Constant DSR is Disabled)	Normal (default - DSR Off during DL and ST)
	Off During LT Test (DSR Off during LT, DL, and ST)
[4] Network Line Loopback Test Pts	DTE Only (default)
	Network & DTE
[5] Telco Latching Loopback Rsp	Enable (default)
	Disable
[6] Customer Remote Loop Rsp	Enable (default)
	Disable
[7] Remote Loop Auto Timeout	Disable (default)
	10 minute
[8] Remote Loop Initiation Seq.	GDC (default)
	V.54
	PN 127
[9] Self Test Pattern	511 (default)
	15 bit
	2047

Alarm Configuration

The Alarm Configuration function presents a screen of configuration options that determine which alarms the DSU is to report. Unit and DTE alarms can be individually designated either to be reported when they occur or to masked (not reported). For definitions of the alarm conditions consult the description of the Monitor/Alarms screen, which begins on *page 3-13*

Network Alarms, when they are to be reported, are determined by means of an interval and a threshold. The configured Alarm Interval is the time span against which thresholds are evaluated for all four network alarms. For BPV (bipolar violation) and Frame Loss alarms the interval is the length of time during which a configured number of events must occur in order to cause an alarm. For Jitter and Rx Signal Low alarms the interval is how long the condition must persist at the configured level of severity in order to cause an alarm. Each type of Network Alarm can also be configured as Masked.

```

SC 521 Alarm Configuration
[R] Report All Alarms,  [N] Report None
[1] Unit: No Signal:      Masked
[2] Line Pairs Reversed:  Masked
[3] STC Loopback:        Masked
[4] Front Panel Test:     Masked
[5] No Loop Current:      Masked
[6] EEPROM Checksum:      Masked
[7] Transmitter Failure:  Masked
[8] DTE: DCD Loss:       Masked
[9] DSR Loss:             Masked
[A] DTR Loss:             Masked
[B] RXD Loss:             Masked
[C] TXD Loss:             Masked
[D] External Clock Loss:  Masked
[E] Streaming:           Masked
[F] Network: Alarm Interval: 15 min
[G] BPV Threshold:       Masked
[H] Jitter Threshold:    Masked
[I] Frame Loss Threshold: Masked
[J] RX Signal Low Threshold: Masked
[0] Return to Main Menu  [S] Save & Update Unit
    Select: [ ]

```

Figure 3-5 Alarm Configuration Screen, with Default Settings

Each option on the Alarm Configuration screen is identified by a selection number or letter, and displays its current setting.

The procedure for changing Alarm Configuration option settings involves the following steps:

1. You may want to begin with the Report All or the Report None command, depending on how you intend to set the majority of the alarm options. Type R for Report All or N for Report None, then press the Enter key. Report All causes previously masked options that require threshold values (G through J) to switch from Masked to their last saved values. The R and N selections have no effect on option F, Alarm Interval.

Go to step 6 if you don't need to change any of the individual alarm options. If you do need to change individual options, follow steps 2 through 5.

2. Type the selection number or letter of the option you intend to change. Highlighting appears on the current setting field for the corresponding option.
3. Use the arrow keys to toggle the highlighted field through its potential settings. Consult *Table 3-3* for the potential settings available to each option.
4. When the field displays the desired setting, press the Enter key. The highlight returns to the Select field.
5. Repeat steps 2 through 4 for each option you need to change.
6. After you've made all required changes, type selection S, Save & Update Unit and press the Enter key. In response the prompt ARE YOU SURE (Y/N)? appears.
7. If you are certain that your changes are correct, type Y and press the Enter key to put the changed configuration into effect in the DSU.

If you decide not to put your changes into effect, type N and press the Enter key. You can then either make further changes or proceed to dismiss the screen.

8. To dismiss the Alarm Configuration screen, type selection 0, Return to Main Menu, and press the Enter key. If there are no unsaved changes the display returns to the SC 521 Main Menu and the configuration procedure is complete.
9. If there are unsaved changes when you attempt to dismiss the Alarm Configuration screen, the prompt Pending Edits, Exit without saving (Y/N)? appears. You can type Y and press the Enter key to dismiss the screen and discard the unsaved changes. If you type N and press the Enter key, the Alarm Configuration screen remains on display so that you can perform a Save or make further changes before you type 0 again to dismiss the screen.

Table 3-3 lists the Alarm Configuration options that appear on the terminal interface display and all the settings available for each.

Table 3-3 SC 521 Alarm Configuration Option Settings

Option	Potential Settings
[1] Unit: No Signal	Masked (default) or Report
[2] Line Pairs Reversed	
[3] STC Loopback	
[4] Front Panel Test	
[5] No Loop Current	
[6] EEPROM Checksum	
[7] Transmitter Failure	
[8] DTE: DCD Loss	
[9] DSR Loss	
[A] DTR Loss	
[B] RXD Loss	
[C] TXD Loss	
[D] External Clock Loss	
[E] Streaming	
[F] Network: Alarm Interval	1 to 15 min (default 15)
[G] BPV Threshold	Masked (default) 0 to 99 (initially 10 when set to Report)
[H] Jitter Threshold	Masked (default) 0 to 99% (initially 10% when set to Report)
[I] Frame Loss Threshold	Masked (default) 0 to 99 (initially 10 when set to Report)
[J] RX Signal Low Threshold	Masked (default) -50 to 6 dB (initially -30 dB when set to Report)

Monitor/Alarms

The terminal interface SC 521 Monitor/Alarms function displays a screen of status information concerning DTE interface signals and alarm conditions. *Figure 3-6* illustrates the Monitor/Alarms screen.

The DTE Status portion of the screen displays the current status of eight DTE interface signals as OFF, ON, or TRANS. TRANS indicates that the signal is transitioning, as opposed to being in a prolonged On or Off condition.

The Alarm Status portion of the screen displays ACTIVE or NO for each alarm condition to indicate whether or not the condition currently exists. Definitions of the alarm conditions appear below.

When you are done viewing the Monitor/Alarms screen, type 0 and press the Enter key to return to the Main Menu.



The screen updates every five seconds so that current information is always displayed. The cursor highlight flickers from field to field on the screen during the brief time required to complete the update. Do not attempt to Return to Main Menu by typing 0 while an update is taking place. Wait until the cursor highlight returns to the Select field.

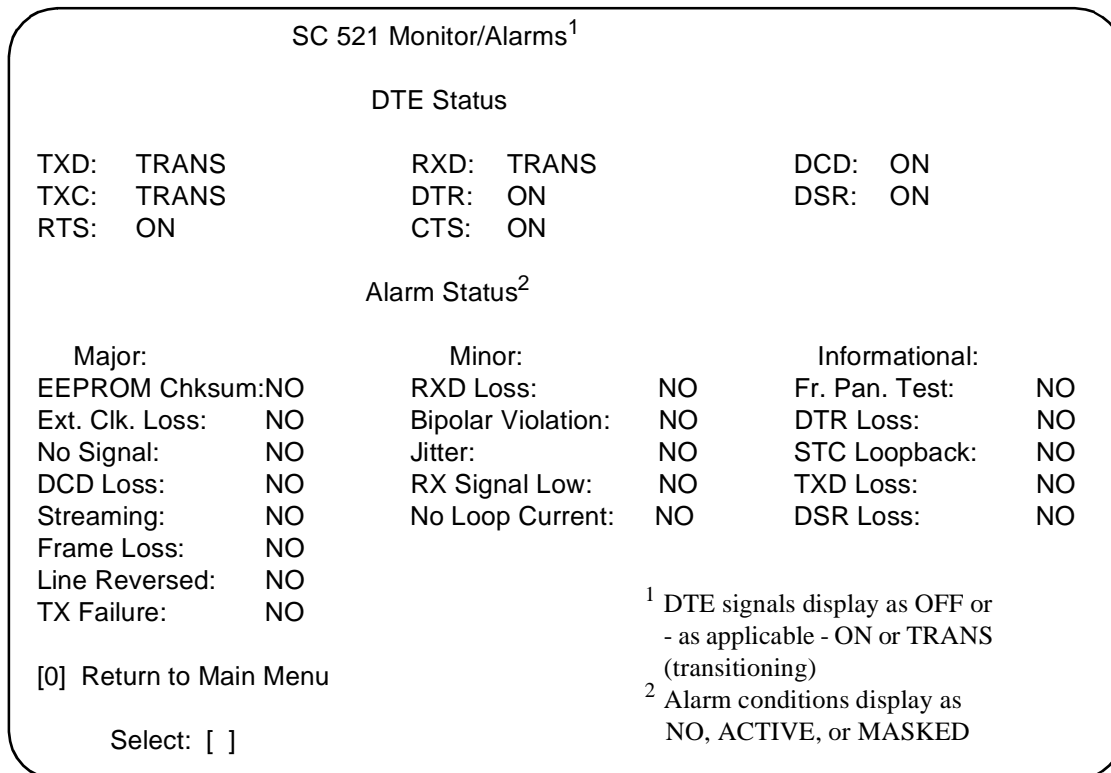


Figure 3-6 Monitor/Alarms Screen

The Monitor/Alarms screen displays alarms grouped into three categories:

- Major
- Minor
- Informational

Major Alarms

EEPROM Checksum – indicates that the non-volatile memory that stores the DSU configuration has become corrupted

External Clock Loss – indicates loss of external clock signal from the DTE

No Signal – indicates loss of signal at the network interface

DCD Loss – indicates loss of incoming data (this alarm is not valid when Data Rate is configured for 64 kbps Synchronous)

Streaming – indicates constant RTS condition

Frame Loss – indicates out of frame condition at the network interface

Line Reversed – indicates the DDS line was incorrectly installed at the network interface

TX Failure – indicates loss of signal to network

Minor Alarms

RXD Loss – indicates reception of valid carrier without data: for constant RX Carrier, indicates at least one minute without RXD transitions; for switched RX Carrier, indicates at least five consecutive polls without data

Bipolar Violation – indicates failure of consecutive ones to alternate states in the signal being received

Jitter – indicates excessive jitter (phase shift) in the signal being received

RX Signal Low – indicates low signal level being received at the network interface

No Loop Current – indicates absence of dc current at the network interface

Informational Alarms

Front Panel Test – indicates the DSU has been commanded into a test by means of its front panel switches

DTR Loss – indicates the DSU is not receiving Data Terminal Ready from the DTE

STC Loopback – indicates the DSU has been commanded into a test by the Telco Serving Test Center (STC)

TXD Loss – indicates DTE asserted RTS without providing Transmit Data; for constant TX Carrier, indicates at least one minute without TXD transitions

DSR Loss – indicates the DSU is not outputting Data Set Ready to the DTE

Maintenance

The terminal interface Maintenance screen displays information about the unit and provides three specialized control functions: Front Panel Switches enable/disable, Soft Reset, and Reset to Factory Defaults. *Figure 3-7* illustrates the Maintenance screen.

```

SC 521 Maintenance

General Datacomm.
SpectraComm 521 Data Service Unit

Firmware/Boot Revision: B-
Serial Number:          0076010527970000
DTE Interface Type:     rs232
Interface Adapter:      none

[1] Front Panel Switches: Enabled
[2] F.P. Blink INS LED:  Off

Reset Options:
[3] Soft Reset.          * WARNING * Disrupts communications.
[4] Reset to Factory Defaults. * WARNING * Disrupts communications.

[5] Firmware Down Load.

[0] Return to Main Menu

Select: [ ]

```

Figure 3-7 Maintenance Screen

The information display identifies the unit, its firmware revision level, the type of DTE interface selected, and its serial number. The DTE Interface Type can be "RS 232" or "V.35" depending on the setting of hardware jumpers on the DSU pc card. Interface Adapter displays either "none" or "installed" depending on whether or not the EIA 530 adapter daughter card is installed. The presence of the adapter card renders the displayed DTE Interface Type invalid

The Maintenance screen includes five command selections:

[1] Front Panel Switches – permits you to enable or disable the hardware switches on the front panel of the SC 521 DSU.

[2] F.P. Blink INS LED – permits you to make the In Service (INS) indicator on the DSU front panel blink continuously. This is a convenience when using the terminal interface and Telnet for diagnostics from a remote location. When you determine the unit requires replacement or other on-site attention, this feature enables you to identify it for easy location by on-site personnel.

[3] Soft Reset – causes the DSU to perform a reset and resume operation using its current configuration when you type 2 and press the Enter key.

[4] Reset to Factory Defaults – causes all options in the DSU to return to their factory default settings when you type 3 and press the Enter key.

[5] Firmware Down Load – invokes the download function, which is described on the following pages.

You set Front Panel Switches or F.P. Blink INS LED in much the same way that you do configuration selections on other screens:

1. Type the selection number and press the Enter key. Highlighting appears on the setting field.
2. Use the arrow keys to toggle the highlighted field between its two values, Enabled /Disabled or On/Off.
3. When the field displays the desired setting, press the Enter key. The highlight returns to the Select field. The new setting goes into effect immediately.

When you are done with the Maintenance screen, type 0 and press the Enter key to return to the Main Menu.

Firmware Download

The terminal interface Firmware Download function enables you to load new operating firmware into the DSU. Loading of firmware is typically required when GDC makes changes to improve performance or to include new features.

The SC 521 DSU can store two versions of operating firmware, designated as the Active Revision and the Standby Revision. You can have newly downloaded firmware immediately serve as the Active Revision, or you can store it as the Standby Revision. You can switch between Active and Standby Revisions as needed.

SC 521 Firmware Download

Active Firmware Revision: 01.00.00
Standby Firmware Revision:01.00.00
Standby Firmware Status: VALID- OK
Download Mode: DISABLE ALL DOWNLOADS
Download Status: Idle

[1] SWITCH TO STANDBY FIRMWARE NOW
[2] DISABLE ALL DOWNLOADS
[3] ENABLE DOWNLOADS AND STORE ZIPPED
[4] ENABLE DOWNLOADS, UNZIP AND EXECUTE

[0] Return to SC 521 Maintenance

Select: []

Figure 3-8 Firmware Download Screen

The Firmware Download screen contains five lines of read-only information display, and five command selections. The following information is displayed:

Active Firmware Revision – displays the version and revision number of firmware that is currently operating in the DSU

Standby Firmware Revision – displays the version and revision number of inactive firmware that the DSU has stored in zipped (compressed) format

Standby Firmware Status – displays one of five status indications:

Invalid- Blank – new DSU with no standby firmware loaded

Valid- OK – standby firmware loaded and ready for use

Invalid- Checksum Failed – standby firmware corrupted during download

Invalid- Download Aborted – download aborted in progress by SCM

Invalid- Unzip Failed – problem occurred during unzip of standby firmware

Download Mode – displays the DSU's selected response to a download of new firmware; see the command selections below for the potential modes

Download Status – displays one of five status indications:

Idle – no current activity

Active – transfer currently taking place

Calculating Checksum – approximately 40 seconds following completion of transfer

Checksum GOOD – indicates successful completion of transfer

Checksum BAD – indicates failure of transfer

The command selections are

[1] Switch to Standby Firmware Now – commands the DSU to unzip (decompress) the stored, inactive firmware and place it into service as the current operating firmware; at the same time the DSU zips and stores the firmware that it had been operating with.

[2] Disable All Downloads – commands the DSU not to accept download of firmware; appears in the Download Mode display when selected

[3] Enable Downloads and Store Zipped – commands the DSU to accept download of firmware, storing the newly downloaded code as the zipped and inactive Standby Firmware until it is placed into service by the Switch to Standby Firmware Now command; appears in the Download Mode display when selected

[4] Enable Downloads, Unzip and Execute – commands the DSU to accept download of firmware, immediately unzipping the newly downloaded code and placing it into operation, while storing the former operating code as zipped and inactive Standby Firmware; appears in the Download Mode display when selected

[0] Return to SC 521 Maintenance – dismisses the Firmware Download screen

Command selections 2, 3, and 4 are configuration options. The one you select is displayed on-screen as the Download Mode for the DSU, and the selection remains in effect until it is changed. Download Mode determines how the DSU responds to having firmware downloaded. You perform the actual firmware download procedure by means of Trivial File Transfer Protocol (TFTP).

Unlike those three command selections, command selection 1 initiates an immediate response by the DSU. A description of that response appears following the directions for downloading.

Firmware download procedure using TFTP:

1. Open a second window in which to perform the TFTP functions. Keep the Firmware Download screen on display in order to monitor the Download Status.
2. Initiate a TFTP session to the SCM.

3. At the TFTP prompt type

bin

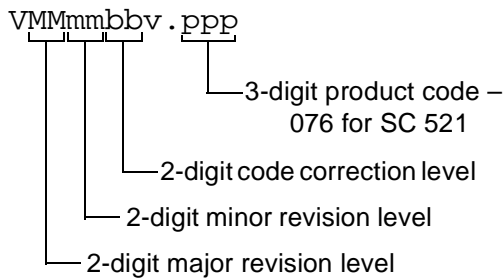
and press the Enter key so that the transfer takes place in binary mode.

4. Type

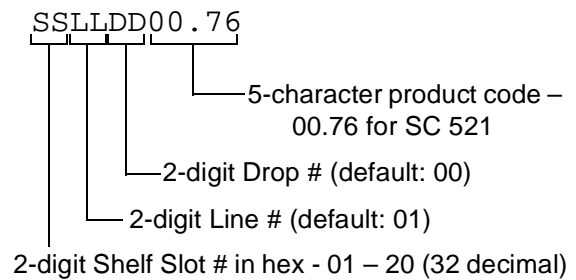
put "firmware filename" "address & product code"

and press the Enter key to initiate the actual transfer. The firmware filename is provided with the firmware that is to be downloaded. The address portion of the address & product code is the slot/line/drop address when you are downloading to a single unit. There is also a broadcast code that enables you to send new firmware to all the SC 521 DSUs in a shelf (or pair of shelves) at once. The figure on the following page provides further definitions of the filename and address formats.

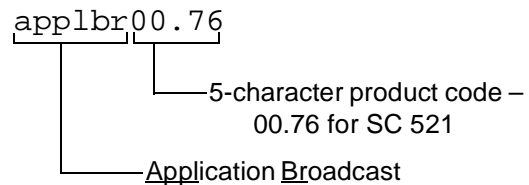
Firmware Filename Format:



Address and Product Code Format, Single Unit:



Address and Product Code Format, All SC 521 Units in Shelf:



5. The Download Status line of the Firmware Download screen displays *Active* while the download takes place, then displays *Calculating Checksum* for approximately 40 seconds. When the calculation is complete, the status line displays either *Checksum GOOD* or *Checksum BAD*. When you perform a download to a single unit, the RSP indicator LED of that unit flashes during the download. When you perform a download to all units in a shelf, their RSP indicator LEDs remain Off.
6. If the selected Download Mode is *Enable Downloads and Store Zipped*, the procedure is complete once the checksum is calculated. The DSU stores the newly loaded firmware as its standby firmware until you put it into service by means of the *Switch to Standby Firmware Now* command. If the selected Download Mode is *Enable Downloads, Unzip and Execute*, the DSU continues with the process of placing the new firmware into service as described below.

You can monitor the process as the DSU unzips and begins to execute firmware by observing the indicator LEDs on its front panel. The sequence is the same whether the activity occurs in response to a *Switch to Standby Firmware Now* command or as the last part of a download with *Enable Downloads, Unzip and Execute* selected as the Download Mode:

1. All LEDs light briefly.

2. Then, while the unzip process takes place, the four test function LEDs (ST, LT, RL, DL) flash in sequence.
3. When the unzip process is complete, all LEDs light as the DSU performs a reset.
4. The Test Mode (TM) indicator lights while the DSU performs its power-on self test.
5. The indicators return to their normal operating states as the DSU resumes operation using the newly activated firmware.

Line Statistics

The terminal interface SC 521 Line Statistics function displays a screen of information detailing conditions at the network interface during the past 15 minutes. Each of the 15 lines in the display represents one minute of operation, with Line 1 displaying the most recently completed minute.

SC 521 Line Statistics (Last 15 Minutes)							
Minute Interval	Status	Transmit Level	Receive Level	Phase Jitter	BPV Count	Frame Loss	Signal Quality
1	Normal	06 dB	04 dB	00%	00	00	Good
2	Normal	06 dB	04 dB	00%	00	00	Good
3	Normal	06 dB	04 dB	00%	00	00	Good
4	Normal	06 dB	04 dB	00%	00	00	Good
5	Normal	06 dB	04 dB	00%	00	00	Good
6	Normal	06 dB	04 dB	00%	00	00	Good
7	Normal	06 dB	04 dB	00%	00	00	Good
8	Normal	06 dB	04 dB	00%	00	00	Good
9	Normal	06 dB	04 dB	00%	00	00	Good
10	Normal	06 dB	04 dB	00%	00	00	Good
11	Normal	06 dB	04 dB	00%	00	00	Good
12	Normal	06 dB	04 dB	00%	00	00	Good
13	Normal	06 dB	04 dB	00%	00	00	Good
14	Normal	06 dB	04 dB	00%	00	00	Good
15	Normal	06 dB	04 dB	00%	00	00	Good

[0] Return to Main Menu

Select: []

Figure 3-9 Line Statistics Screen

Each line of the display consists of the following information:

Status	Normal – signal is present; No Signal – either signal is not detected or no line is connected; Not Available – DSU has been operating less than 15 minutes so there are no statistics for the corresponding one-minute period
Transmit Level	average strength, in dBm, of signal output by the DSU during the one-minute period
Receive Level	average strength, in dBm, of signal received by the DSU during the one-minute period; displays n/a when Status is No Signal

Phase Jitter	amount of jitter, expressed as a percentage, in signal received by the DSU during the one-minute period; displays n/a when Status is No Signal
BPV Count	number of bipolar violations in signal received by the DSU during the one-minute period; displays n/a when Status is No Signal
Frame Loss	number of lost frames that occurred in signal received by the DSU during the one-minute period; displays n/a when Status is No Signal
Signal Quality	Good, Fair, or Bad based on the amount of jitter measured in the AMI pulse; displays n/a when Status is No Signal

While the screen is on display it is refreshed with new data at five-second intervals. When you are done viewing the Line Statistics screen, type 0 and press the Enter key to return to the Main Menu

4 Tests

Overview

This chapter describes the tests you can perform on the SC 521 DSU from the front panel and from the terminal interface. It also describes tests that the service provider can perform from a Serving Test Center (STC).

You should test the equipment when it is first installed to verify correct installation. After the equipment is in service you can use the tests to diagnose any problems that occur in the operation of the DSU or the data communications system.



The DSU may be performance tested in five ways: by tests performed from an SNMP controller; by tests initiated from the DSU front panel using the ST, LT, RL, and DL switches; by tests initiated from the DSU terminal interface; by tests initiated from the DTE using the EIA Remote Loop and EIA Line Loop leads; and by tests initiated from the Telco Serving Test Center (STC). This chapter of the manual deals with the front panel, terminal interface, and STC tests. Consult controller documentation for information on testing the DSU from an SNMP controller.

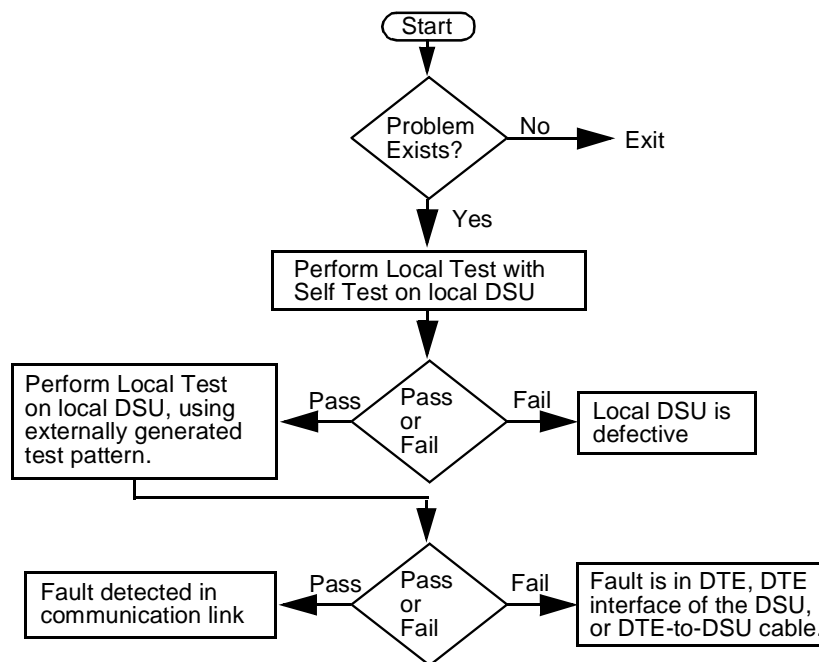


Figure 4-1 Fault Isolation Procedure

Terminal Interface Diagnostics Screen

The terminal interface SC 521 Diagnostics screen combines configuration and command functions. Selections A through F are the command fields by which you can begin and end test procedures. The Test Results field below selection F displays the results of tests that employ Self Test. The result is either Passed, if no errors are detected, or the number of RX Errors.

Figure 4-2 illustrates the Diagnostics screen. Instructions for using the screen to perform tests appear follow the illustration.

SC 521 Diagnostics

Diagnostic Options

[1] DTE: Line Loopback Control:	Enable
[2] Remote Loopback Control:	Disable
[3] Data Set Ready:	Normal
[4] Network: Line Loopback Test Pts:	DTE Only
[5] Telco Latching Loopbk Rsp:	Enable
[6] Customer Remote Loop Rsp:	Enable
[7] Remote Loop Auto Timeout:	Disable
[8] Remote Loop Initiation Seq.:	GDC
[9] Self Test Pattern:	511

TESTS:

[A] Line Loopback:	Idle
[B] Line Loopback & Self Test:	Idle
[C] Remote Loopback:	Idle
[D] Remote Loopback & Self Test:	Idle
[E] Digital Loopback:	Idle
[F] Self Test:	Idle

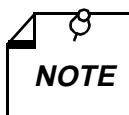
Test Results:

[0] Return to Main Menu [S] Save 1 - 9 & Update Unit
Select: []

Figure 4-2 Diagnostics Screen

The procedure for performing tests from the Diagnostic screen involves the following steps:

1. Type the selection letter of the test you intend to perform and press the Enter key. Highlighting appears on the status field for the corresponding test, which displays "Idle" at this point.
2. Use the arrow keys to toggle the highlighted field so that it displays "Active." The DSU begins the selected test.



The terminal interface does not permit a test to run 10 minutes or longer. A timeout disconnect occurs if 10 minutes pass without any keyboard activity. If the DSU disconnects due to a timeout, it performs an orderly shut-down of the test. It does not display results for a test that employs Self Test.

3. To end the test, use the arrow keys again to toggle the highlighted field so that it again displays "Idle" then press the Enter key. The DSU ends the test and the highlighting returns to the Select field. If the test employed Self Test, the screen displays the number of RX Errors (if any) in the Test Results field.
4. To dismiss the screen, type selection 0, Return to Main Menu, and press the Enter key.

Local Test

The Local Test loopback condition isolates the DSU from the network by connecting the transmit logic circuits to the receive logic circuits. The loopback provides a path through the DSU for an externally generated test signal, as shown in *Figure 4-3*.

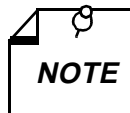
If the Diagnostic Option Line Loopback Test Points is configured for Network & DTE, the DSU also loops its receive data back to the network during Local Test. The default condition is DTE Only (no loopback to the network).

During Local Test:

- The DTE interface remains active.
- The DSU loops transmit data from the DTE back as receive data.
- Either the DTE or a bit error rate tester (BERT) connected to the DTE interface can supply and check a test signal.
- The device supplying the test signal is responsible for error detection and reporting.
- If Network & DTE is selected for Line Loopback Test Points, receive data is returned to the network interface as transmit data so that tests performed from the remote DSU can check everything in the circuit except the DSU.

There are four ways to control the Local Test function:

- briefly press the LT switch on the front panel to initiate the loopback; press the switch again to end the loopback.
- select [A] Line Loopback from the terminal interface Diagnostics screen
- assert a signal from the DTE on the LT lead (Pin 18) of the DTE interface to initiate the loopback; turn the signal Off to end the loopback.
- transmit commands from an SNMP controller to initiate and end the loopback.



Tests cannot be performed by means of front panel switches when the front panel has been inhibited by an SNMP controller or the terminal interface. Front panel enabled is the default condition.

The DTE interface LT lead can only command Local Test if Line Loopback Control has been enabled by an SNMP controller. The default condition is Line Loopback Control disabled.

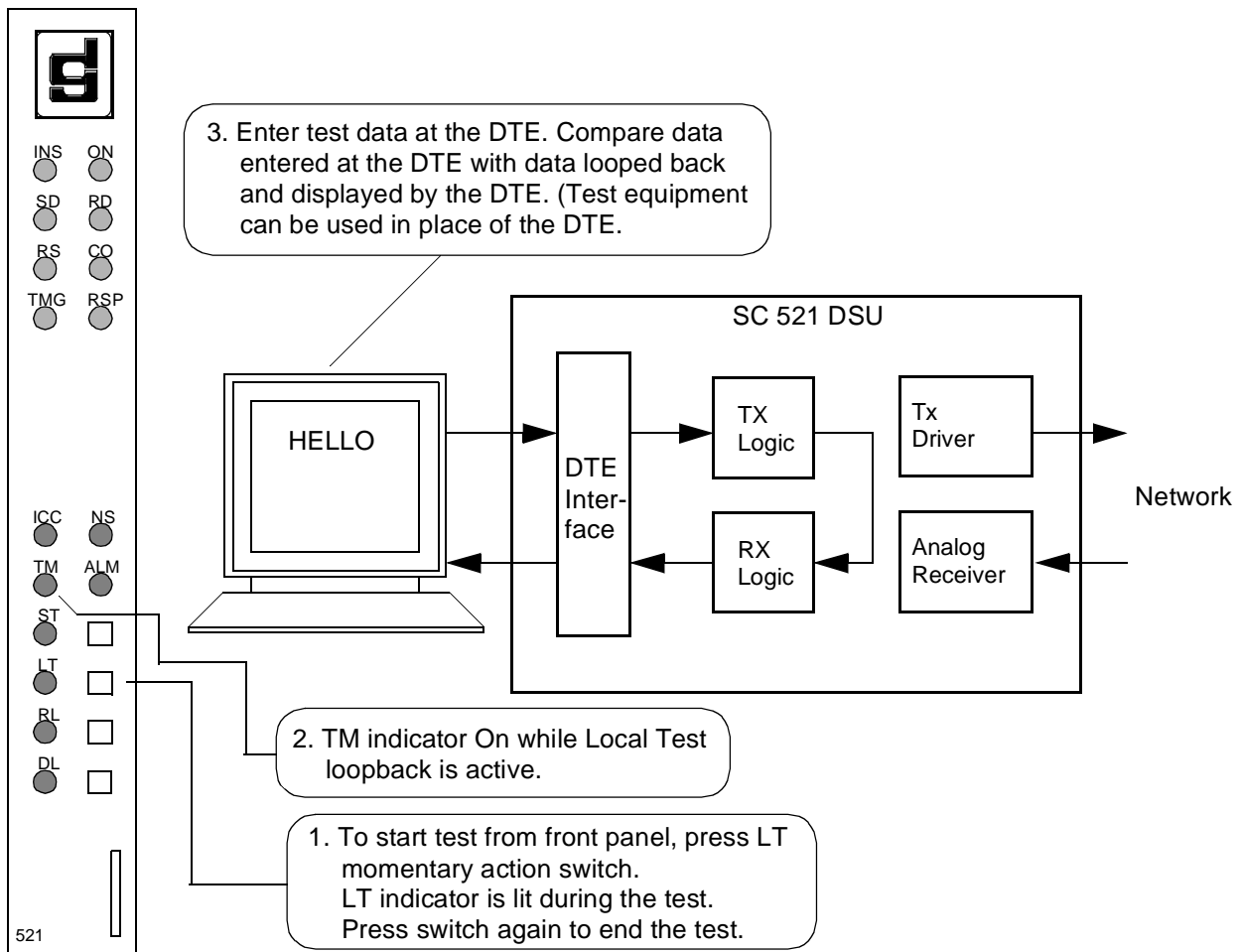


Figure 4-3 Local Test

Local Test with Self-Test

Local Test with Self-Test checks the internal circuits of the local DSU, isolated from both the DTE and the network. The test procedure involves two functions:

- Local Test — the DSU loops transmit data back as receive data. If the Diagnostic Option Line Loopback Test Points is configured for Network & DTE, the DSU also loops its receive data back to the network.
- Self-Test — the DSU enables its internal Test Pattern Generator to provide the signal for the Local Test loop and enables its Test Pattern Checker to verify the signal. The DSU is configurable to use a 511, 2047, or 15 bit test pattern. The DSU is isolated from its DTE while the Test Pattern Generator and Checker are enabled.

The LT, ST, and TM indicators are On during the test. The Test Mode (TM) indicator remains On as long as the test pattern is received without errors and blinks when an error is detected.

There are three ways to control the Local Test with Self-Test function:

- briefly press the LT and ST switches on the front panel to initiate the test; press the switches again to end the test.
- select [B] Line Loopback & Self Test from the terminal interface Diagnostics screen
- transmit commands from an SNMP controller to initiate and end the test.

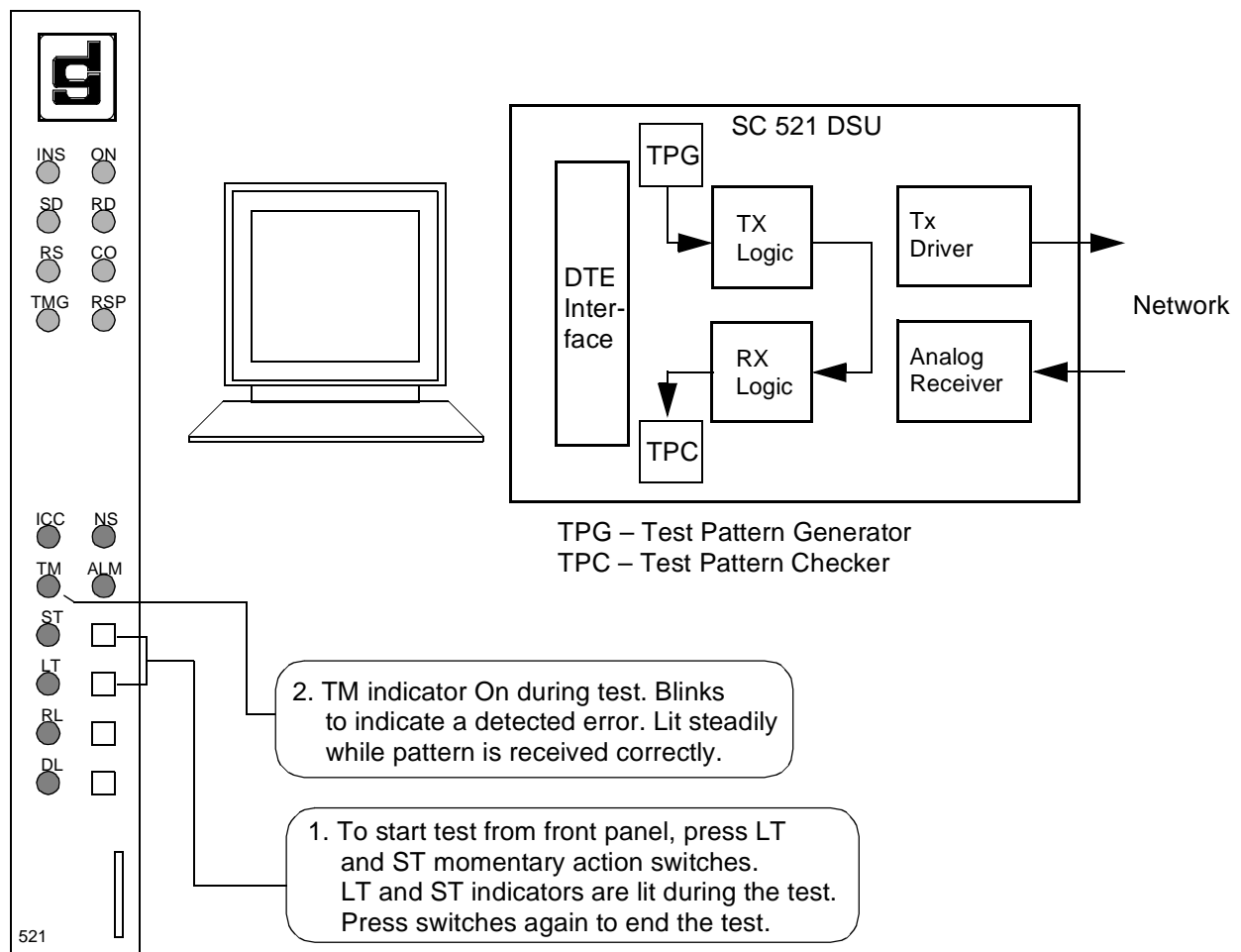


Figure 4-4 Local Test with Self-Test

Remote Loop

In the Remote Loop test function the local DSU transmits an in-band command to its remote DSU, directing the remote to loop received signals back onto the network. The DSU is configurable to send (and accept) any of three remote loop commands: GDC (proprietary), V.54, or PN 127. The remote DSU must be configured to accept the same command the DSU transmits.

The Remote Loop Timeout option determines whether or not the DSU ends this test automatically. When the option is enabled the DSU ends the test after ten minutes. When the option is disabled the DSU runs the test until it is terminated manually.



The Remote Loop function is for use only on point to point links.

The V.54 and PN 127 remote loop commands are industry standards, compatible with correctly configured units from other manufacturers.

When the Remote Loop function is configured for the GDC loop command it is compatible with a remote GDC NMS 520 DSU or GDC NMS 510 DSU. The SC 521 DSU must have Revision B- or higher firmware to be configured for the GDC loop command.

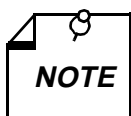
The remote loopback provides a path through the DSU, the network, and the remote DSU for an externally generated test signal, as shown in *Figure 4-5*. Remote Loop checks the local DSU, a portion of the remote unit, and the T1 line.

During Remote Loop:

- The DSU transmits the in-band loop-up command to its remote DSU.
- In response to the command, the remote unit performs a digital loopback and loops the receive signal back to its transmit path.
- The DTE and backplane interfaces of the local DSU remain active.
- A test signal can be supplied and checked either by the DTE or by a bit error rate tester (BERT) connected to the DTE interface.
- The device supplying the test signal is responsible for error detection and reporting.
- The loopback remains in effect until the DSU transmits a loop down code for five seconds, commanding the remote unit to release the loopback. The DSU does this automatically after ten minutes when the Remote Loop Timeout option is enabled.

There are four ways to control the Remote Loop function:

- briefly press the RL switch on the front panel to initiate the loopback; press the switch again to end the loopback.
- select [C] Remote Loopback from the terminal interface Diagnostics screen
- assert a signal from the DTE on the RL lead (Pin 21) of the DTE interface to initiate the loopback; turn the signal Off to end the loopback.
- transmit commands from an SNMP controller to initiate and end the loopback.



Tests cannot be performed by means of front panel switches when the front panel has been inhibited by an SNMP controller or the terminal interface. Front panel enabled is the default condition.

The DTE interface RL lead can only command Remote Loop if Remote Loopback Control has been enabled by an SNMP controller. The default condition is Remote Loopback Control disabled.

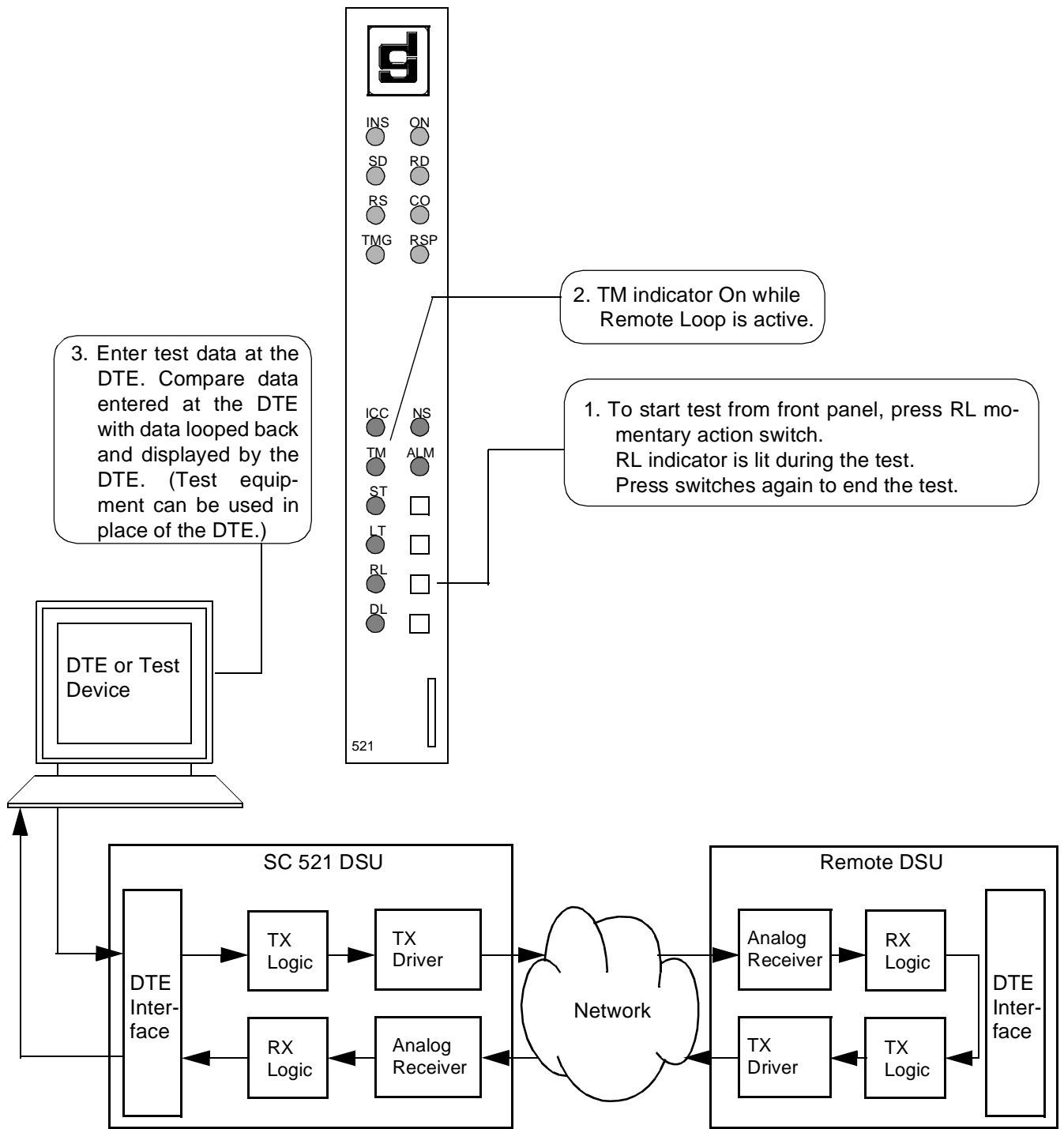


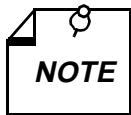
Figure 4-5 Remote Loop

Remote Loop with Self-Test

Remote Loop with Self-Test, shown in *Figure 4-6*, isolates the local DSU from the DTE and checks the DSU internal circuits, the network link, and the remote DSU. The test procedure involves two functions:

- **Remote Loop** — the local DSU transmits an in-band command to its remote DSU, directing the remote to loop received signals back onto the network. The DSU is configurable to send (and accept) any of three remote loop commands: GDC (proprietary), V.54, or PN 127. The remote DSU must be configured to accept the same command the DSU transmits.
- **Self-Test** — the DSU enables its internal Test Pattern Generator to provide the signal for the Remote Loop and enables its Test Pattern Checker to verify the signal. The DSU is configurable to use a 511, 2047, or 15 bit test pattern. The DSU is isolated from its DTE while the Test Pattern Generator and Checker are enabled.

The Remote Loop Timeout option determines whether or not the DSU ends this test automatically. When the option is enabled the test DSU ends the test after ten minutes. When the option is disabled the DSU runs the test until it is terminated manually.



The Remote Loop function is for use only on point to point links.

The V.54 and PN 127 remote loop commands are industry standards, compatible with correctly configured units from other manufacturers.

When the Remote Loop function is configured for the GDC loop command it is compatible with a remote GDC NMS 520 DSU or GDC NMS 510 DSU. The SC 521 DSU must have Revision B- or higher firmware to be configured for the GDC loop command.

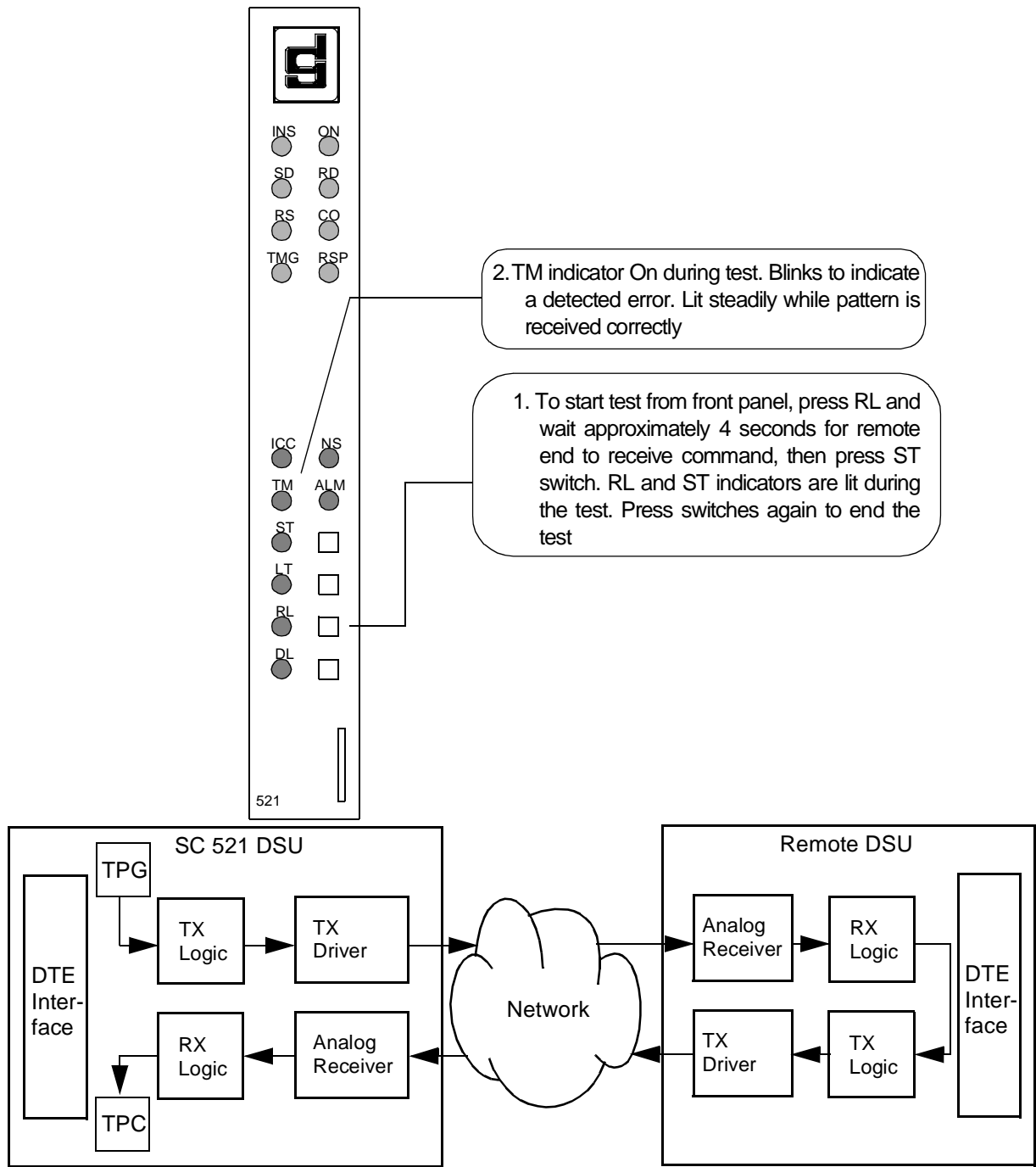
The RL, ST, and TM indicators are On during the test. The Test Mode (TM) indicator remains On as long as the test pattern is received without errors and blinks when an error is detected.

There are three ways to control the Local Test with Self-Test function:

- briefly press the RL and ST switches on the front panel to initiate the test; press the switches again to end the test. Test ends automatically after ten minutes if Remote Loop Timeout is enabled.
- select [D] Remote Loopback & Self Test from the terminal interface Diagnostics screen
- transmit commands from an SNMP controller to initiate and end the test. Test ends automatically after ten minutes if Remote Loop Timeout is enabled.



Tests cannot be performed by means of front panel switches when the front panel has been inhibited by an SNMP controller or the terminal interface. Front panel enabled is the default condition.



TPG – Test Pattern Generator
 TPC – Test Pattern Checker

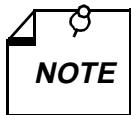
Figure 4-6 Remote Loop with Self-Test

Data Loop

The Data Loop loopback condition, shown in *Figure 4-7*, isolates the DSU from the DTE by connecting the receive logic circuits to the transmit logic circuits. The loopback provides a path through the receive and transmit circuits of the DSU for a test signal from a remote site. Equipment at the remote site is responsible for generating and checking the test signal.

There are three ways to control the Data Loop function:

- briefly press the DL switch on the front panel to initiate the test; press the switch again to end the test.
- select [E] Digital Loopback from the terminal interface Diagnostics screen
- transmit commands from an SNMP controller to initiate and end the test.



Tests cannot be performed by means of front panel switches when the front panel has been inhibited by an SNMP controller or the terminal interface. Front panel enabled is the default condition.

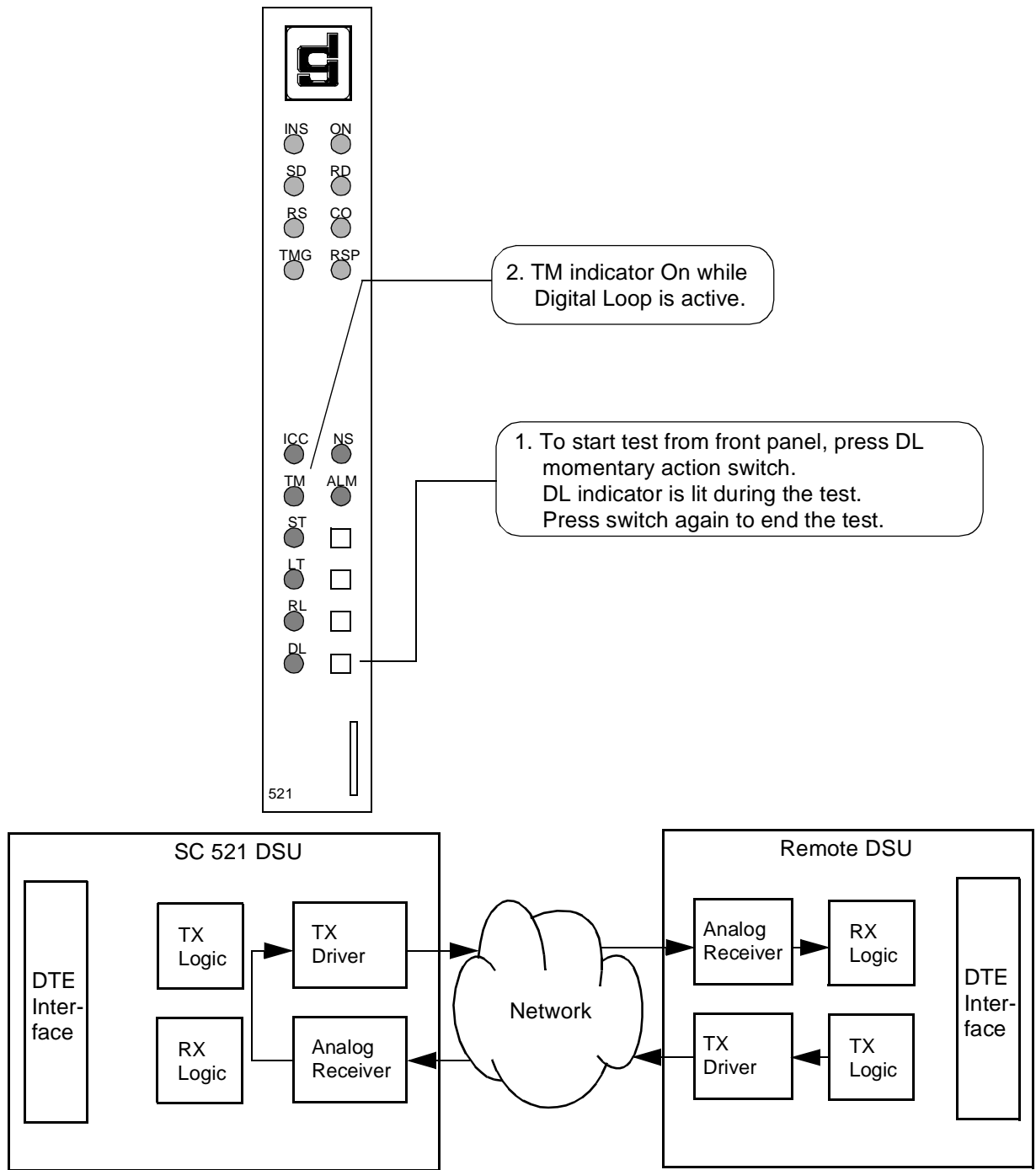


Figure 4-7 Data Loop

CSU Loopback Test (STC Controlled)

The CSU Loopback test is a remotely controlled diagnostic that is initiated by a code sent from a Serving Test Center (STC).

During the test the DSU establishes two loopbacks:

- It connects its receiver input and transmitter output to create a circuit that loops received signals back to the network. The STC transmits a test signal to the DSU and then checks it for errors after it has returned through the loopback.
- It connects its transmit and receive logic circuits to loop data back to the DTE interface. This loopback permits the use of a test signal from the DTE to check cabling, the DTE interface, and the transmit and receive logic circuits while the STC is conducting its test.

Figure 4-8 illustrates the CSU Loopbacks.

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 (*Figure 4-1*) to pinpoint a problem, if any.

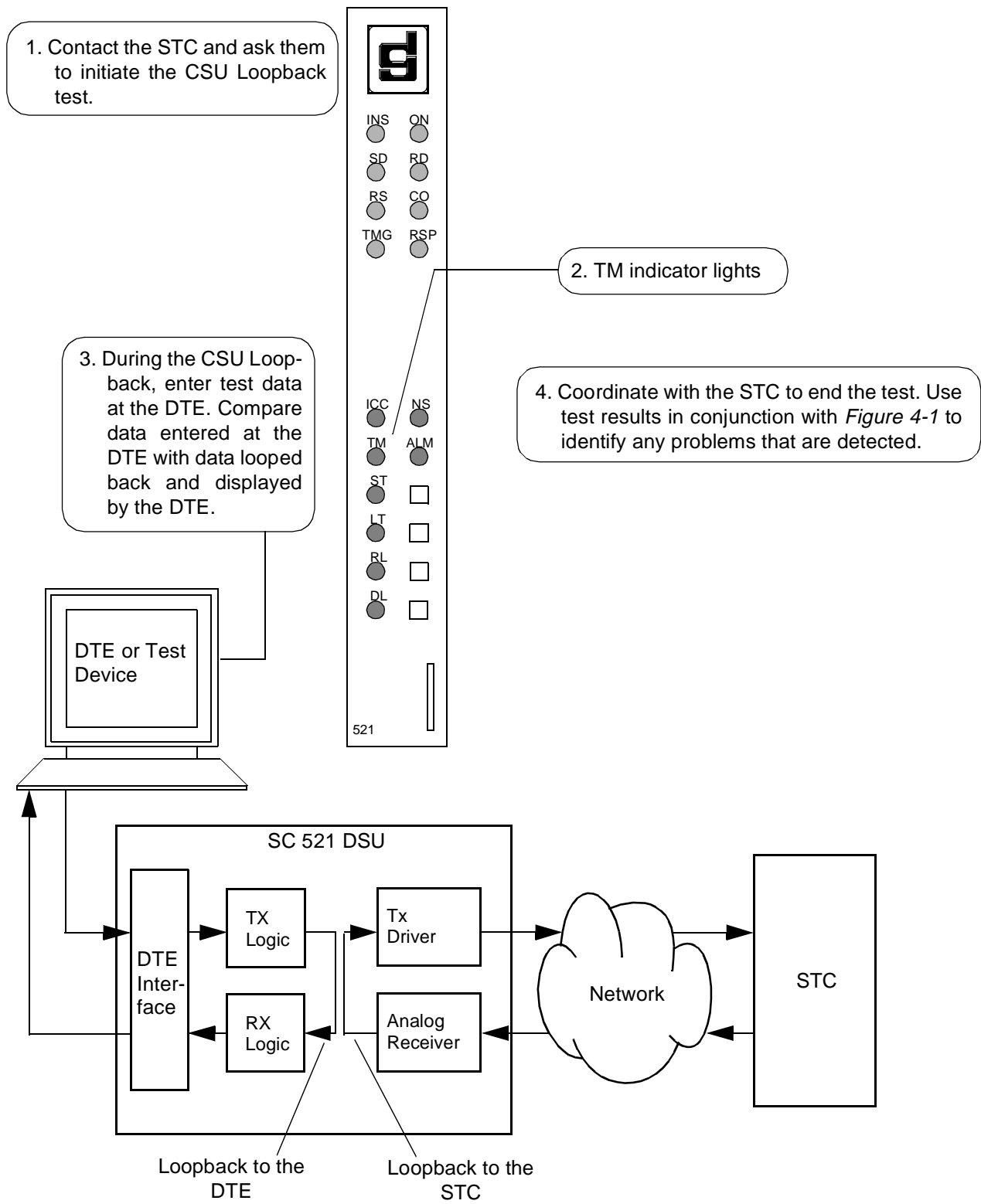


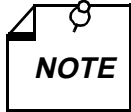
Figure 4-8 CSU Loopback Test

DSU Loopback Test (STC Controlled)

The DSU Loopback test is a remotely controlled diagnostic, initiated by either of two codes sent from a Serving Test Center (STC). During the test the DSU connects its receive logic and transmit logic circuits to loop received signals back to the network. The STC transmits a test signal to the DSU and then checks it for errors after it has returned through the loopback. *Figure 4-9* illustrates the DSU Loopback.

The two codes by which the STC can command the test are classified as latching and non-latching:

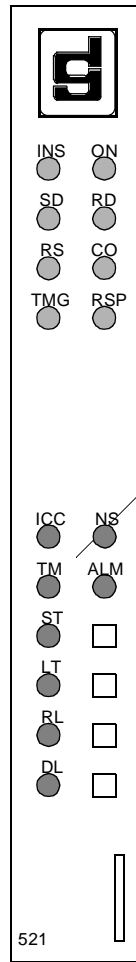
- The latching loopback code commands the unit to initiate the test condition, which it remains in until the STC sends a terminating code to end the test.
- The non-latching loopback code commands the unit into the test condition as long as the code is being received; when the STC stops sending the non-latching code the unit ends the DSU Loopback.



The Telco Latching Loop option, configurable in the DSU from an SNMP controller, can be set to Disable, which causes the unit to disregard the latching loopback code. The default setting of the option is Enable. When the option is set to Disable, the STC can still command a non-latching DSU Loopback.

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 (*Figure 4-1*) to pinpoint a problem, if any.

1. Contact the STC and ask them to initiate the DSU Loopback test.



2. TM indicator lights

3. Coordinate with the STC to end the test. Use test results in conjunction with Figure 4-1 to identify any problems that are detected.

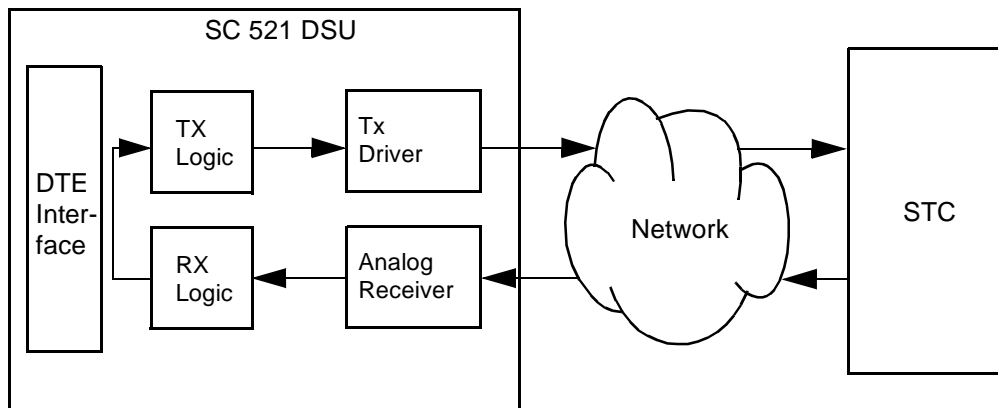


Figure 4-9 DSU Loopback Test

A Technical Characteristics

Item	Specification
Physical	
PC card (rackmount installation) Height (SC 521 card only) (With DRA or 530 Card) Width Depth Weight (SC 521 card only) Shipping weight (SC 521 card only)	0.81 in. (21 mm) 1.75 in. (45 mm) 7 in. (178 mm) 9.5 in. (241 mm) 10 oz (0.28 kg) 1 lb 10 oz (0.74 kg)
Environmental	
Temperature Operating Non-operating Humidity, operating Altitude Operating Non-operating	32° to 122°F (0° to 50°C) (Derate by 1°C/1000 ft above sea level) -40° to 185°F (-40° to 85°C) 5% to 95% without condensation 0 ft to 10,000 ft (0 m to 3,047 m) 0 ft to 40,000 ft (0 m to 12,191 m)
Electrical	
Power dissipation (SC 521 card only) Fusing	4 W maximum Two 2.5 A, 125 V (GDC Part No. 215-201-009) One 5 A, 125 V (GDC Part No. 215-201-021)

(Continued on next page)

Item	Specification
Operation	
DDS, DDS/SC Customer-owned Signal format Character format Overspeed Signal encoding Data rate, synchronous Data rate, asynchronous Transmitter power 2400, 4800, 19200, 56000, or 64000 bps 9600 bps Transmit Timing Receiver Dynamic range Acquisition time Release time	Point-to-point: full- or half-duplex Multipoint: full-duplex Point-to-point: full- or half-duplex Serial, synchronous or asynchronous, binary 8 - 11 bits/character 1 or 2.3% Bipolar, return-to-zero 2400, 4800, 9600, 19200, 56000, or 64000 bps 600, 1200, 1800, 2400, 4800, 9600, or 19200 bps 6.0 dBm maximum (50% duty cycle, random bipolar sequence, 135 ohm impedance) 0 dBm maximum (50% duty cycle, random bipolar sequence, 135 ohm impedance) Receiver (slave/network), internal (DSU) $\pm 0.01\%$, or external (DTE – can accept external clock up to $\pm 0.02\%$) 48 dB extended range at 56 kbps 200 ms maximum 1 second maximum
Communications line Terminating impedance Range Line data rate 2400 bps 4800 bps 9600 bps 19200 bps 56000 bps 64000 bps	DDS or 4-wire, nonloaded, metallic lines (19 - 26 ga) 135 ohms $\pm 20\%$ Distance (using 26 ga cable) 11.5 mi (18.5 km) 8.7 mi (14 km) 6.1 mi (9.8 km) 5.0 mi (8.1 km) 3.6 mi (5.8 km) 3.2 mi (5.2 km)
DTE interface RTS-CTS delay (synchronous) 2400 bps 4800 bps 9600 bps 19200 bps 56000 bps 64000 bps	EIA/TIA-232-E, ITU-T V.35, optional EIA-530 8 ± 0.4 ms 4 ± 0.2 ms 2 ± 0.1 ms 1.0 ± 0.05 ms 0.35 ± 0.02 ms Constant carrier

B DTE Interface Signals

Table B-1 EIA/TIA-232-E DTE 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 transmission over communications line.
3	104	BB	Transfers data signals to DTE that were received over communications line 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
20	108/1, /2	CD	Indicates to Data Set that DTE is prepared for data communications.
21	140/ 110	RL/CG	Remote Loopback/Signal Quality

(Continued on next page)

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

Pin No.	Circuit Designation		Description
	ITU-T	EIA	
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 that use 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 ITU-T Circuit 126, Select Transmit Frequency.

Table B-2 ITU-T V.35 DTE 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.
P S	103 103	BA(A) BA(B)	Transfers data signals from DTE for transmission over communication line.
R T	104 104	BB(A) BB(B)	Transfers data signals received over communication line 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 DTE 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 transmission over communication line.
3 16	BB(A) BB(B)	Transfers data signals received over communications line 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.

C SC 521 MIB Support

Overview

This appendix details the Management Information Base (MIB) table objects by which an SNMP controller can command and monitor the SC 521 DSU. The DSU makes use of four groups of MIB tables developed by GDC:

- SC 521 MIB
- NMS 520 MIB
- NMS 510 MIB
- DDS MIB (supports remote NMS 520 and NMS 510 DSUs)

SC 521 MIB

Table C-1 Line Configuration Table (* indicates factory default setting)

MIB Object	Syntax	Access	Enumeration	Description
sc521NetworkConfigIndex	SCinstance	read-only		The index value: slot, line, drop, and interface.
sc521CircuitType	Integer	read-write	point-to-point(1)* multipoint(2)	This object defines the circuit type.
sc521DdsLineType	Integer	read-write	dds1(1)*-- Standard DDS line ddsSc(2)-- DDS/SC line clearChannel(3) -- 64K Clear Channel line	Identifies the type of line. The value dds1(1) defines the line type as a conventional DDS. The value ddsSc(2) defines the line type as a DDS line with secondary channel. The value clearChannel(3) indicates that the line type is 64K Clear Channel.
sc521TxRxCarrier	Integer	read-write	txConstant Rx-Constant(1)* txConstant Rx-Switched(2) txSwitched Rx-Constant(3) txSwitched Rx-Switched(4)	The Transmit and Receive Carrier option. This is feature allows the DTE equipment to directly control the transmitter carrier via signals on the RTS circuit and the operation of DCD. Typically, in point-to-point applications it is set to txConstantRxConstant(1). In multidrop applications it is set to txConstantRxSwitched(2). When the value of the sc521DataRate is sync64000(10), the value of this object is txConstantRxConstant(1). When this object is txConstantRxConstant(1), RTS and CTS are forced on internally.

(Continued on next page)

Table C-1 Line Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DataRate	Integer	read-write	async2400(1) -- Standard DDS and DDS/SC Rate of 2400 Asynchronous sync2400(2)-- Standard DDS and DDS/SC Rate of 2400 Synchronous async4800(3)-- Standard DDS and DDS/SC Rate of 4800 Asynchronous sync4800(4)-- Standard DDS and DDS/SC Rate of 4800 Synchronous async9600(5)-- Standard DDS and DDS/SC Rate of 9600 Asynchronous sync9600(6)-- Standard DDS and DDS/SC Rate of 9600 Synchronous async19200(7)- - Standard DDS and DDS/SC Rate of 19200 Asynchronous sync19200(8)-- Standard DDS and DDS/SC Rate of 19200 Synchronous sync56000(9)*- - Standard DDS and DDS/SC Rate of 56000 Synchronous sync64000(10)- - Clear Channel Rate of 64000 Synchronous	The DSU data rate option. This object is used to choose the operational data rate of the DSU. Similarities in DDS line coding of 56k DDS/SC and 64k Clear Channel require the user to select sync64000(10) implicitly if 64kbps data rate is required.

(Continued on next page)

Table C-1 Line Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521TxClockSource	Integer	read-write	external(1)-- External Clock, derived from the DTE receive(2)* -- Receive Clock, derived from the Line internal(4)-- In- ternal Clock, generated inter- nally in the Data Set	The DSU transmit clock source option. This is the selection for the transmitter timing clock source. If connecting to a DDS circuit the value of receive(1) must be selected.
sc521BuffClk	Integer	read-write	internal(1)* external(2)	The DSU transmit buffer option. An optional elastic transmit buffer is inserted into the data path when a value of external(2) is selected. This elastic buffer maintains network synchronization when an external frequency locked clock source is driven into the external transmit clock input on the DTE interface. Opposing phase relationships between the external transmit clock and network clock are compensated for by this buffer. No buffering is performed when this object is internal(1). If the transmitter timing is set to external, this object must be set to external(2).
sc521ZeroEncodingCfg	Integer	read-write	enable(1)* disable(2)	The DSU zero encoding option. This option, for point to point 56k DDS secondary channel circuits, allows the DTE equipment to transmit all '0' octets without violating the ones density requirements of DDS. This option is a GDC only feature and must be set to disable when coexisting with DSU equipment from other providers. Both local and remote DSU's must be set to the same value. The zero encoding feature is not applicable for any of the other data rates or line types.
sc521RemoteUnitType	Integer	read-write	nms520(1) nms510(2)*	The Remote Unit Type. This object allows the SC521 to behave in a manner compatible with that of the NMS510 or the NMS520. If this object has the value nms510(2), then the device can be used in conjunction with an NMS510. A value of nms520(1) implies that the device is not backwardly compatible with the NMS510.

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Table C-1 Line Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521PtToPtSentryTime	Integer (0..127)	read-write	default 60	The Point to point sentry time. This object is used to control the amount of time between unsolicited alarm responses from a remote unit in a point to point application when there are no alarm conditions to report. This unsolicited response maintains the management link between the two units. These alarm responses are intrusive to data. This object is not applicable when the object sc521RemoteUnitType is set to nms510(2). The range is from 1 minute to 127 minutes, with 60 minutes being the default value. The value of 0(zero) minutes will disable remote alarm sentry reporting.
sc521MtpointRmRspIntrvl	Integer (0..127)	read-write	default 10	The multipoint remote response interval. This object is used to control the amount of time between unsolicited alarm responses from a remote unit in a multipoint applications when there are no alarm conditions to report. This unsolicited response maintains the management link between the two units. This object is not applicable when the object sc521RemoteUnitType is set to nms510(2). The range is from 1 second to 127 seconds with 10 seconds being the default value. The value of 0(zero) seconds is disable remote alarm sentry reporting. All remotes in a multipoint application must be set the same. These alarm responses are non-intrusive to data.
sc521CircuitAssurance	Integer	read-write	disable(1)* enable(2)	The Circuit Assurance option. The enable(1) configures the DSU to clamp CTS upon receiving the following Network codes: <ul style="list-style-type: none"> 1. IDLE(no DCD) 2. Out of Service Code (OOS) 3. Abnormal Station Code (ASC) 4. No Signal(not a network code) 5. other inactive channel codes (ICC) When the value of this object is disable(2) no action occurs for any of the above network conditions.

(Continued on next page)

Table C-1 Line Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521SystemStatus	Integer	read-write	disable(1)* enable(2)	The System Status option enable(1) configures the DSU to clamp DSR upon receiving the following Network codes: <ol style="list-style-type: none"> 1. Out of Service Code (OOS) 2. Abnormal Station Code (ASC) 3. No Signal(not a network code) 4. other inactive channel codes (ICC) When the value of this object is disable(2) no action occurs for any of the above network conditions.

Table C-2 Unit Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
sc521InterfaceType	Integer	Read-only	rs232(1) v35(2)	The rs232(1), will indicate the DTE port is EIA/TIA-232-E, and v35(2), will indicate the DTE port is V.35.
sc521IntfceAdaptor	Integer	Read-only	not-installed(1) installed(2)	If set to installed(2) then either a Data Rate Adaptor or 530 card is installed.
sc521AasStatus	Integer	Read-write	disable(1)* enable(2)	The Auto-anti Streaming option. The Auto Anti-Streaming Timer monitors RTS. If RTS remains On for more then the selected time the DSU forces Off its primary channel transmitter and turns off CTS.
sc521AasTimer	Integer	Read-write	sec5(1) sec10(2) sec30(3) sec45(4)	The Auto-anti Streaming option. The Auto Anti-Streaming Timer monitor RTS. If RTS remains On for more then the selected time the DSU forces Off its primary channel transmitter and turns off CTS.
sc521LocalDSR	Integer	Read-write	followsDTR(1) forcedOn(2)*	The DSR option. This option controls the operation of DSR. When forcedOn(2) is selected, DSR is normally on, if set for followsDTR(1) then DSR is on only when DTR is on.

(Continued on next page)

Table C-2 Unit Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521CtsDelay	Integer	Read-write	ctsOn(1)* cts0mSec(2) ctsFixed3Char (3)	RTS/CTS Delay options ctsOn(1) Forces both RTS and CTS On regardless of the state of the attached business equipment (the transmitter is On regardless of the status of the RTS interface lead). MIB object sc521CtsDelayExt is ignored. cts0mSec(2) Provides zero bits of delay between active RTS and CTS being set to active. MIB object sc521CtsDelayExt must be set to ext0mSec(1). ctsFixed3Char(3) Provides three character bits of delay between active RTS and CTS being set to active. MIB object sc521CtsDelayExt must be set to ext0mSec(1).
sc521CtsDelay Ext	Integer	Read-write	ext0mSec(1)* ext30mSec(2) ext60mSec(3) ext90mSec(4)	RTS/CTS Delay options extension ext0mSec(1) Used to enable options cts0mSec(2) or ctsFix3Char(3) from MIB object sc521CtsDelay. ext30mSec(2) Provides 30 msec of delay between active RTS and CTS being set to active. MIB object sc521CtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3). ext60mSec(3) Provides 60 msec of delay between active RTS and CTS being set to active. MIB object sc521CtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3). ext90mSec(4) Provides 90 msec of delay between active RTS and CTS being set to active. MIB object sc521CtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3).
sc521Hdlc Invert	Integer	Read-write	normal(1)* invert(2)	Primary data invert option. Will enhance the quality of data when network does not provide B8Z5. Primarily used with DDS II 56k

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Table C-2 Unit Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521AsyncCharacterSize	Integer	Read-write	bits11(1)* bits10(2) bits9(3) bits8(4)	This option selects the Asynchronous word size. The available settings are: 1) 11 bits/character. 2) 10 bits/character. 3) 9 bits/character. 4) 8 bits/character. The character includes start and stop bits.
sc521AsyncOverSpeed	Integer	Read-write	overSpeed1Pct(1)* overSpeed2point3Pct(2)	This option is used to determine the amount of asynchronous overspeed the DSU tolerates. The overSpeed1Pct(1) indicates that the DSU will accept incoming async data that is up to 1% faster than the configured data rate. The overSpeed2point3Pct(2) will allow up to 2.3% of DTE overspeed.
sc521AsyncRxDelay	Integer	Read-write	short(1)* long(2)	When long(2) is selected, a 40 bit buffer is inserted in the receive data path. This buffer is used to filter out EOT. If sc521AsyncEotCfg is rxAndTxEot(1) or rxEot(2) the object long(2) is required. The short(1) enumeration may be used if the sc521AsyncEotCfg is txEot(3) or noEot(4).
sc521AsyncEotCfg	Integer	Read-write	rxAndTxEot(1) rxEot(2) txEot(3)* noEot(4)	When rxAndTxEot(1) or rxEot(2) is selected, a 40 bit buffer in the receive data path is inserted. This buffer is used to filter out EOT. The unit will expect End-of-Text (EOT) and remove it from the data stream. The values rxAndTxEot(1) and txEot(3) mean that End-of-Text (EOT) will be transmitted
sc521AsyncRateAdapt	Integer	Read-write	none(1)* halfLineRate(2) -- 1200 bps quarterLineRate(3) -- 600 bps from1800LineRate(4) -- 1800 bps	The Async rate adaption object. The speed relationship between DDS circuit and DTE interface when configured for async communication is defined here. The none(1) value maintains a one to one speed relationship between the DDS circuit and DTE interface. A value of halfLineRate(2) means that the DTE speed is equal to one half the DDS circuit rate. A value of quarterLineRate(3) means that only one fourth the DDS circuit rate will be available at the DTE interface. If the DTE speed required is 1800 bps, then the provisioned DDS circuit must be 2400 DDS or DDS with secondary channel and the enumeration (4) object specified.

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Table C-2 Unit Configuration Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521AlarmCountWindow	Integer	Read-write	minute1(1) minute2(2) minute3(3) minute4(4) minute5(5) minute6(6) minute7(7) minute8(8) minute9(9) minute10(10) minute11(11) minute12(12) minute13(13) minute14(14) minute15(15)*	The DDS Alarm Threshold Alarm Interval. It specifies the amount of time in minutes, 1 through 15 minutes, inclusive, in which the threshold setting is to be exceeded for the alarm to occur. There is one Alarm Interval for all five alarms that require thresholds: sc521JitterAlm, sc521BpvAlm, sc521FrameLossAlm, and sc521RxSignalLowAlm.

Table C-3 System Interface Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
sc521SystemCfgIndex	SCinstance	read-only		The index value which uniquely identifies the SC521 to which this entry is applicable. This has the form of a SCinstance which defines the slot, line, and drop of the SC521 with no sub-identifier value.
sc521FrontPanelInhibit	Integer	Read-write	fpInhibited(1) - - Read only fpEnabled(2)* - - Read only execute(3) - - Write only	Inhibits all front panel test switches. If a test switch is activated while inhibited it will simply be ignored. If enabled via the sc521FrontPanelEnable object the test switch will function as normal.
sc521FrontPanelEnable	Integer	Read-write	fpInhibited(1)-- Read only fpEnabled(2)*- - Read only execute(3)-- Write only	Enables all front panel test switches. If a test switch is activated while inhibited, via the sc521FrontPanelInhibit object, it will simply be ignored. If enabled the test switch will function as normal.

Table C-4 Diagnostic Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
sc521DiagCfg Index	SCinstance	read-only		The index value which uniquely identifies the SC521 to which this entry is applicable. This has the form of a SCinstance which defines the slot, line, and drop of the SC521 with no sub-identifier value.
sc521LineLpbk Ctrl	Integer	Read-write	disable(1)* enable(2)	The LT EIA test control lead option. This option either allows or blocks EIA initiated test inputs from the DTE interface. LT (or Analoop) can be either a bilateral or unilateral loopback depending on option dds DTE Termloop.
sc521DsrInLine Loop	Integer	Read-write	offDuring Test(1) normal(2)*	The DSR in Line Loopback (Analoop) option controls DSR operation during a Line Loopback test. When Line Loopback is active and this object is set to offDuringTest(1), a DSR off indication is output to the DTE interface. When this object is set to normal(2), the state of DSR responds in accordance with the sc521LocalDSR object.
sc521LpbkTest Points	Integer	Read-write	dteOnly(1)* networkAnd Dte(2)	The Loopback Termination Mode. The dteOnly(1) object stops the DSU from looping the DDS network interface while a local loopback is in progress. When the value of this object is networkAndDte(2) the DDS network service is looped back to itself during a local loopback test.
sc521Remote LpbkCtrl	Integer	Read-write	disable(1)* enable(2)	The Remote Loop (RL) EIA test control lead option. This option either allows or blocks EIA initiated test inputs from the DTE interface. The remote unit must support v.54 or PN127 remote loop.
sc521Rdl Response	Integer	Read-write	enable(1)* disable(2)	Inhibits or enables a unit from going into remote loop when requested by the far end.
sc521RdlAuto Timeout	Integer	Read-write	disable(1)* tenMinutes(2)	Inhibits or enables a 10 minute remote loop test timer. When enabled the remote loop test will be terminated 10 minutes after being initiated. If inhibited the unit will remain in remote loop test indefinitely.
sc521RdlInit Sequence	Integer	Read-write	patternV54(1)* patternPn127(2)	The value will select the pattern used to initiate a remote loopback test.
sc521Telco LatchingLoop	Integer	Read-write	enable(1)* inhibit(2)	Inhibits or enables a unit from going into a latching loopback when requested by Telco.

Table C-5 Remote Configuration Table

MIB Object	Syntax	Access	Enumeration	Description																																							
sc521Remote CfgIndex	SCInstance	read-only		The index value which uniquely identifies the SC521 to which this entry is applicable. This has the form of a SCInstance which defines the slot, line, and drop of the SC521 with no sub-identifier value.																																							
sc521Rate Broadcast	Integer	Read-write	normal(1) -- Read-Only enable(2) -- Write-Only	This should only be enabled when adding a remote unit and the Line Type is either DDSII with data rate equal to 56k or 64k Clear Channel.																																							
sc521WakeUp Remote	DisplayString (SIZE (16))	Read-only		This object is requested to initiate the add remote process in a point to point circuit. The serial number of the associated remote is returned.																																							
sc521ListOf Remotes	Octet String (Size(4))	Read-only	A bitwise snapshot of the elements associated with this circuit, the master is always drop zero, the remote in a point to point circuit is always drop one. <table style="margin-left: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center;">first octet</td> <td style="text-align: center;">second octet</td> <td style="text-align: center;">third octet</td> <td style="text-align: center;">fourth octet</td> </tr> <tr> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> </tr> <tr> <td>bit0 - drop 0</td> <td>bit0 - drop 8</td> <td>bit0 - drop 16</td> <td>bit0 - drop 24</td> </tr> <tr> <td>bit1 - drop 1</td> <td>bit1 - drop 9</td> <td>bit1 - drop 17</td> <td>bit1 - drop 25</td> </tr> <tr> <td>bit2 - drop 2</td> <td>bit2 - drop 10</td> <td>bit2 - drop 18</td> <td>bit2 - drop 26</td> </tr> <tr> <td>bit3 - drop 3</td> <td>bit3 - drop 11</td> <td>bit3 - drop 19</td> <td>bit3 - drop 27</td> </tr> <tr> <td>bit4 - drop 4</td> <td>bit4 - drop 12</td> <td>bit4 - drop 20</td> <td>bit4 - drop 28</td> </tr> <tr> <td>bit5 - drop 5</td> <td>bit5 - drop 13</td> <td>bit5 - drop 21</td> <td>bit5 - drop 29</td> </tr> <tr> <td>bit6 - drop 6</td> <td>bit6 - drop 14</td> <td>bit6 - drop 22</td> <td>bit6 - drop 30</td> </tr> <tr> <td>bit7 - drop 7</td> <td>bit7 - drop 15</td> <td>bit7 - drop 23</td> <td>bit7 - drop 31</td> </tr> </table> bit values are: 0 = no element, 1 = element present	first octet	second octet	third octet	fourth octet	-----	-----	-----	-----	bit0 - drop 0	bit0 - drop 8	bit0 - drop 16	bit0 - drop 24	bit1 - drop 1	bit1 - drop 9	bit1 - drop 17	bit1 - drop 25	bit2 - drop 2	bit2 - drop 10	bit2 - drop 18	bit2 - drop 26	bit3 - drop 3	bit3 - drop 11	bit3 - drop 19	bit3 - drop 27	bit4 - drop 4	bit4 - drop 12	bit4 - drop 20	bit4 - drop 28	bit5 - drop 5	bit5 - drop 13	bit5 - drop 21	bit5 - drop 29	bit6 - drop 6	bit6 - drop 14	bit6 - drop 22	bit6 - drop 30	bit7 - drop 7	bit7 - drop 15	bit7 - drop 23	bit7 - drop 31
first octet	second octet	third octet	fourth octet																																								
-----	-----	-----	-----																																								
bit0 - drop 0	bit0 - drop 8	bit0 - drop 16	bit0 - drop 24																																								
bit1 - drop 1	bit1 - drop 9	bit1 - drop 17	bit1 - drop 25																																								
bit2 - drop 2	bit2 - drop 10	bit2 - drop 18	bit2 - drop 26																																								
bit3 - drop 3	bit3 - drop 11	bit3 - drop 19	bit3 - drop 27																																								
bit4 - drop 4	bit4 - drop 12	bit4 - drop 20	bit4 - drop 28																																								
bit5 - drop 5	bit5 - drop 13	bit5 - drop 21	bit5 - drop 29																																								
bit6 - drop 6	bit6 - drop 14	bit6 - drop 22	bit6 - drop 30																																								
bit7 - drop 7	bit7 - drop 15	bit7 - drop 23	bit7 - drop 31																																								

Table C-6 Add/Delete Remote from Master Table

MIB Object	Syntax	Access	Enumeration	Description
sc521Master Index	SCinstance	Read-only		The index value which uniquely identifies the SC521 to which this entry is applicable. This has the form of a SCinstance which defines the slot, line, and drop of the SC521 with no sub-identifier value.
sc521Add RemoteAddress	Octet String (Size(18))	Read-write		Add Remote address from Master tells the master (SC521) how many remotes (nms520) units are in its network, the serial number of those remote units and its Drop address. This information allows the Master to perform alarm reporting functions in a multipoint configuration. This object allows the master unit to add remote units from its network table. To add a remote unit to the Master's network table SET this object and specify the Serial Number of the unit in the first 16 locations in the OCTET STRING, and the Drop address(00 to 31) in the last 2 locations of the OCTET STRING. Remote alarm reporting will work in DDS1 only. Reading this object will report the last serial/address added or deleted.
sc521Del RemoteAddress	Octet String (Size(18))	Read-write		Delete Remote address from Master tells the master (SC521) how many remotes (nms520) units are in its network, the serial number of those remote units and its Drop address. This information allows the Master to perform alarm reporting functions in a multipoint configuration. This object allows the master unit to delete remote units from its network table. To delete a remote unit from the Master's network table SET this object and specify the Serial Number of the unit in the first 16 locations in the OCTET STRING, and the Drop address(00 to 31) in the last 2 locations of the OCTET STRING. Remote alarm reporting will work in DDS1 only. Reading this object will report the last serial/address added or deleted.
sc521Enable RemoteAlarm	Integer (1..31)	Read-write		Enable Remote Alarm Control tells the master (SC521) how to configure the remote units (nms520) in a multipoint configuration with respect to alarm reporting. The master unit maintains alarm information about the remote units in its network. This object allows the master unit to enable alarm reporting on any remote unit in its network. To enable a remote unit to report alarms SET this object and specify the Drop address of the Remote, 1 to 31. Reading this object will report the last address added or deleted.

(Continued on next page)

Table C-6 Add/Delete Remote from Master Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DisableRemoteAlarm	Integer (1..31)	Read-write		Disable Remote Alarm Control tells the master (SC521) how to configure the remote units (nms520) in a multipoint configuration with respect to alarm reporting. The master unit maintains alarm information about the remote units in its network. This object allows the master unit to disable alarm reporting on any remote unit in its network. To disable remote alarm reporting on a remote unit SET this object and specify the Drop address of the Remote, 1 to 31. Reading this object will report the last address added or deleted.

Table C-7 DTE Signal Status Table

MIB Object	Syntax	Access	Enumeration	Description
sc521SignalStatusIndex	SCInstance	Read-only		The index value: slot, line, drop, and interface
sc521DteStat	Octet String (Size(2))	Read-only		Returns a bitwise snapshot of the DTE signals. Octet 1 bit 7 - not used bit 6 - CTS (1:ON; 0:OFF) bit 5 - RTS (1:ON; 0:OFF) bit 4 - DTR (1:ON; 0:OFF) bit 3 - DSR (1:ON; 0:OFF) bit 2 - NS (1:ON; 0:OFF) bit 1 - DCD (1:ON; 0:OFF) bit 0 - DTP (1:ON; 0:OFF) Octet 2 bit 7 - not used bit 6 - DSP (1:ON; 0:OFF) bit 5 - DCD (1:Transitions) bit 4 - RTS (1:Transitions) bit 3 - CTS (1:Transitions) bit 2 - RXD (1:Transitions) bit 1 - TXC (1:Transitions) (valid when ext clk buff) bit 0 - TXD (1:Transitions)

Table C-8 Diagnostics Table

MIB Object	Syntax	Access	Enumeration	Description										
sc521DiagIndex	SCInstance	Read-only		The index value which uniquely identifies the SC521 to which this entry is applicable. This has the form of a SCInstance which defines the slot, line, and drop of the SC521 with no sub-identifier value.										
sc521DiagSend Code	Integer	Read-write	send511 Pattern(2) send2047 Pattern(3) send15Bit Pattern(4)	Configures the selftest pattern to be run during any diagnostic test involving selftest. If option sendOtherPattern is selected, then pattern will default to 15 bit if unit is set for 56k-DDS/sc-multi point else pattern will default to 511 bit for all other conditions.										
sc521DiagTest Exceptions	Integer	Read-only	noExceptions(1) blocksOutOf Range(2) bitsOutOf Range(3) blocksAndBits OutOfRange(4)	Indicates exceptions that have occurred that may affect interpretation of the test results. The value of this object is a sum. This sum initially take the value zero. Then, for each exception, the value associated with the exception is added to the sum. The exception values are: <table border="0"> <tr> <td>value</td> <td>exception</td> </tr> <tr> <td>0</td> <td>No errors</td> </tr> <tr> <td>1</td> <td>bit over range</td> </tr> <tr> <td>2</td> <td>block over range</td> </tr> <tr> <td>4</td> <td>bit and block over range</td> </tr> </table>	value	exception	0	No errors	1	bit over range	2	block over range	4	bit and block over range
value	exception													
0	No errors													
1	bit over range													
2	block over range													
4	bit and block over range													
sc521DiagBit Errors	Integer (0..65535)	Read-only		The bit errors of the last diagnostic test that involved a Selftest pattern. Reading bit errors while a diagnostic test in running will cause the unit to drop out of test and invalidate the bit errors. Bit errors should be read only after the test is completed. The valid range for bit errors is 0 to 1,023, 65535 will be returned if for any reason the test was terminated early.										
sc521Diag BlockErrors	Integer (0..65535)	Read-only		The block errors of the last diagnostic test that involved a Selftest pattern. Reading block errors while a diagnostic test in running will cause the unit to drop out of test and invalidate the block errors. Block errors should be read only after the test is completed. The valid range for block errors is 0 to 1,023, 65535 will be returned if for any reason the test was terminated early.										
sc521Diag NetworkDelay Results	Integer (0..16383)	Read-only		This object reads the results of a Network Delay Test. The results are valid only after the test is completed which takes about 10 seconds. The unit for time delay is in milliseconds. The valid range for delay is 0 to 4096, 16383 will be returned if for any reason the test was terminated early. Reading this object while a test is in progress will terminate the test.										

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Table C-8 Diagnostics Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DiagTest Reset	Integer	Read-write	noTestActive (1) -- read only testActive(2) -- read only resetTest(3) -- write only	This object will halt the execution of any and all diagnostic test that may be running.
sc521DiagTest Status	Integer	Read-only	noTest(1) externalLine loop(2) -- Analoop internalLine loop(3) -- Analoop & Self- Test externalData loop(4) -- Data- loop serviceTest CenterLoop(5) - - Network initi- ated loopback endToend(6) -- EndToEnd & SelfTest remoteLoop(7) - - Remote Loop remoteLoop WithSelfTest(8) -- Remote Loop & SelfTest network De- lay(9) -- Network Delay Test	This object gives the current diagnostic test status. noTest indicates that no diagnostic test is currently active.
sc521DiagExt Lineloop	Integer	Read-write	lineloopOff(1) - - Read only lineloopOn(2) - - Read only external(3) -- Write only	Lineloop (or Analoop) can be either a Bilateral or Unilateral loopback depending on option ddsDteTermaloop. To initiate a Lineloop with no Selftest SET this object and specify external, this will allow the data from the DTE to looped back to itself. Enum external(3) is write only. The only valid response to a READ is lineloopOn(2) or lineloopOff(1). To halt this test you must SET the sc521DiagTestReset object. Reading test results via the sc521DiagBitErrors or sc521DiagBlockErrors objects while the test is running will also cause the test to terminate. There are no test results associated with this test.

(Continued on next page)

Table C-8 Diagnostics Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DiagInt Lineloop	Integer	Read-write	lineloopOff(1)- - Read only lineloopOn(2)-- Read only blocks1(3)-- Write only blocks10(4)-- Write only blocks100(5)-- Write only blocks500(6)-- Write only blocks1000(7)- - Write only blocks5000(8)- - Write only blocks10000(9) -- Write only blocks50000 (10) -- Write only	<p>Lineloop (or Analoop) can be either a Bilateral or Unilateral loopback depending on option ddsDteTermaloop. To initiate a Lineloop with Selftest SET this object and specify a blocksize. The blocksize indicates the number of blocks the Selftest pattern generator will run. There are 1000 bits/block. Enums 3 through 10 are write only. The only valid responses to a READ are lineloopOn(2) or lineloopOff(1). This test will terminate after the specified number of blocks have been run.</p> <p>Reading test results via the sc521DiagBitErrors or sc521DiagBlockErrors objects while the test is running will cause the test to terminate prematurely and render the results invalid. Test results should be only read after the test is completed. The current Test Status can be obtained by reading this object or the nms520DiagTestStatus object on the unit under test. This test can also be terminated by setting the sc521DiagTestReset object.</p>
sc521DiagExt Dataloop	Integer	Read-write	dataloopOff(1) -- Read only dataloopOn(2) -- Read only external(3) -- Write only	<p>To initiate a Dataloop test with no Selftest SET this object and specify external, this will allow the data from the DTE attached to the far end unit (nms520) to looped back to itself. Enum external(3) is write only. The only valid response to a READ is dataloopOn(2) or dataloopOff(1). To halt this test you must SET the sc521DiagTestReset object. Reading test results via the sc521DiagBitErrors or sc521DiagBlockErrors objects while the test is running will also cause the test to terminate. There are no test results associated with this test. Reading test status on the remote unit via nms520DiagTestStatus may interfere with the diagnostic test pattern generated from the terminal equipment.</p>

(Continued on next page)

Table C-8 Diagnostics Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DiagExt RemoteLoop	Integer	Read-write	remoteloop Off(1) -- Read only remoteloop On(2) -- Read only external(3) -- Write only	Point to Point Application only. To initiate a Remoteloop test with no Selftest SET this object and specify external. The sc521 DSE transmits an in-band command to its remote DSU, directing the remote to loop received signals back onto the network. The DSE is configurable to send (and accept) either a V.54 or a PN127 remote loop command. The remote DSU must be configured to accept the same command the DSE transmits. Enum external(3) is write only. The only valid response to a READ is remoteloop On(2) or remoteloopOff(1). To halt this test you must SET the sc521DiagTestReset object unless option RemLoopTimeOut is enabled. If enable maximum test time is 10 minutes. Reading test results via the sc521 DiagBitErrors or sc521DiagBlockErrors objects while the test is running will also cause the test to terminate. There are no test results associated with this test. Reading test status on the remote unit via nms520 DiagTestStatus may interfere with the diagnostic test pattern generated from the terminal equipment. The Remote Loop Function is for use ONLY on point to point links.

(Continued on next page)

Table C-8 Diagnostics Table (Continued)

MIB Object	Syntax	Access	Enumeration	Description
sc521DiagRemLoopWithSelf	Integer	Read-write	remoteloopOff (1) -- Read only remoteloopOn (2) -- Read only blocks1(3)-- Write only blocks10(4)-- Write only blocks100(5)-- Write only blocks500(6)-- Write only blocks1000(7)- Write only blocks5000(8)- Write only blocks10000(9) -- Write only blocks50000 (10) -- Write only	To initiate a Remoteloop with Selftest SET this object and specify a blocksize. The remote unit will go into remoteloop and the master (the sc521) unit will go into Selftest. The sc521 transmits an in-band command to its remote DSU, directing the remote to loop received signals back onto the network. The DSE is configurable to send (and accept) either a V.54 or a PN 127 remote loop command. The remote DSU must be configured to accept the same command the DSE transmits. The sc521 enables its internal Test Pattern Generator to provide the signal for the Remote Loop and enables its Test Pattern Checker to verify the signal. The DSE is isolated from its DTE while the Test Pattern Generator and Checker are enabled. The blocksize indicates the number of blocks the Selftest pattern generator will run. There are 1000 bits/block. Enums 3 through 10 are write only. If option Remlooptimeout is enabled then the maximum test time is 10 minutes otherwise block size time is used. The only valid responses to a READ are remoteloopOn(2) or remoteloopOff(1). This test will terminate after the specified number of blocks have been run. Reading test results via the sc521DiagBitErrors or sc521DiagBlockErrors objects while the test is running will cause the test to terminate prematurely and render the results invalid. Test results should be read only after the test is completed and are available from the master (sc521) unit. The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit, reading test status on the remote unit may interfere with the diagnostic test pattern and cause errors. This test can also be terminated by setting the nms520DiagTestReset object.

Table C-9 Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
sc521MaintIndex	SCInstance	Read-only		The index value: slot, line, drop, and interface
sc521LedStatus	Octet String (Size(3))	Read-only		Returns a bitwise snapshot of the front panel LED state and front panel switches. Octet 1 bit 7 - not used bit 6 - ON (power on) bit 5 - INSV (in service) bit 4 - RSP (responding to SCM) bit 3 - TMG (supplied timing) bit 2 - future use bit 1 - future use bit 0 - future use Octet 2 bit 7 - not used bit 6 - SD (send data) bit 5 - RD (rx data) bit 4 - RS (request to send) bit 3 - CO (carrier) bit 2 - future use bit 1 - ALM (alarm) bit 0 - TM (test mode) Octet 3 bit 7 - not used bit 6 - ST (self test) bit 5 - LT (line loop) bit 4 - RL (remote loop v.54 or pn127) bit 3 - DL (data loop) bit 2 - future use bit 1 - ICC (invalid control code) bit 0 - NS (no signal)
sc521SoftReset	Integer	Read-write	reset(1) -- write-only norm(2) -- read-only	Supports the action of soft resetting the unit. When this object is set to reset(1), then the unit performs a soft reset. The value norm will be returned when the reset is complete. The value of norm can not be set by management.
sc521DefaultInit	Integer	Read-write	factoryDefault(1) -- write-only normal(2) -- read-only	This is used to allow the NonVolatile Configuration to be set to a factory default state. When this value is set to factoryDefault, the unit will reset to the default configuration. The value of normal will be returned when the initialization is complete. The value normal can not be set by management.

Table C-10 Alarm Identifier Table

Alarm	Meaning
NoResponse Alm*	No Response
DiagRxErrAlm*	Diagnostic Receive Error — the DSE is not receiving signals from the SCM card on the backplane.
PowerUpAlm*	Power Up Alarm — sent each time the DSE is powered On or has its power cycled.
DCDLossAlm	DCD Loss
DSRLossAlm	DSR Loss
DTRLossAlm	DTR Loss
RXDLossAlm	RXD Loss
TXDLossAlm	TXD Loss
ExtClockLossAlm	External (DTE) Timing Loss
StreamingAlm	Streaming Condition (constant RTS)
JitterAlm	Jitter Condition on
BpvAlm	Bipolar Violations
RxSignalLowAlm	Low Receive Level from Network
FrameLossAlm	Network Framing Loss
NoSignalAlm	Loss of Network Signal
LinePairsReversed Alm	Network Line Pairs Reversed
StcLoopbackAlm	Unit Commanded into Test Mode by STC
FpTestAlm	Front Panel Test — Unit Commanded into Test Mode by a Front Panel Switch.
NoLoopCurrentAlm	No Current at Network Interface
EEChkSumErrAlm	EEPROM Corrupt — DSU firmware has failed a CRC check.
* Not maskable	

Table C-11 Alarm Threshold Table

MIB Object	Syntax	Access	Description																				
sc521AlarmThreshIndex	SCinstance	Read-only	This object is the index of the SC521 Alarm Threshold Configuration table.																				
sc521AlarmThreshIdentifier	Object Identifier	Read-only	The unique alarm identifier assigned to this alarm type. The format of this identifier is an OBJECT IDENTIFIER that has the following format: {iso(1) org(3) dod(6) internet(1) private(4) enterprises(1) gdc(498) xxx(x) alarm(z) yyy(y) where xxx(x) is the administratively assigned family object identifier (z) is the object identifier for alarms in the family defined MIB and yyy(y) is the administratively assigned alarm type identifier for this alarm.																				
sc521AlarmThreshold	Integer (-50..99)	Read-write	<p>This function sets/reads the alarm threshold settings criteria. This threshold is used along with the alarm window to determine the number of instances in a given time frame for an alarm to occur before the alarm is considered active.</p> <table border="1"> <thead> <tr> <th>Alarm</th> <th>Table Entry</th> <th>Threshold Range</th> <th>Defaults</th> </tr> </thead> <tbody> <tr> <td>Jitter</td> <td>sc521JitterAlm</td> <td>0 to 99 %</td> <td>9 %</td> </tr> <tr> <td>Bipolar Violations</td> <td>sc521BpvAlm</td> <td>0 to 99 Count</td> <td>10</td> </tr> <tr> <td>Receive Level Low</td> <td>sc521RxSignal LowAlm</td> <td>-50 to 6 dB</td> <td>-30 dB</td> </tr> <tr> <td>Frame Loss</td> <td>sc521Frame LossAlm</td> <td>0 to 99 Count</td> <td>10</td> </tr> </tbody> </table>	Alarm	Table Entry	Threshold Range	Defaults	Jitter	sc521JitterAlm	0 to 99 %	9 %	Bipolar Violations	sc521BpvAlm	0 to 99 Count	10	Receive Level Low	sc521RxSignal LowAlm	-50 to 6 dB	-30 dB	Frame Loss	sc521Frame LossAlm	0 to 99 Count	10
Alarm	Table Entry	Threshold Range	Defaults																				
Jitter	sc521JitterAlm	0 to 99 %	9 %																				
Bipolar Violations	sc521BpvAlm	0 to 99 Count	10																				
Receive Level Low	sc521RxSignal LowAlm	-50 to 6 dB	-30 dB																				
Frame Loss	sc521Frame LossAlm	0 to 99 Count	10																				

Table C-12 Line Status Table

MIB Object	Syntax	Access	Enumeration	Description
sc521LineStats Index	SCinstance	Read-only		The index value: slot, line, drop, and interface
sc521LineStats Interval	Integer (1..15)	Read-only		The DDS Line Statistics Interval. It specifies the amount of time in minutes (1 to 15 minutes) the unit will use to report statistical information. The unit will record statistics every minute and hold that information for 15 minutes. Past statistics can read from 1 to 15 minutes ago. A time must be specified to read any object in the sc521LineStatsTable.
sc521LineStats RxLevel	Integer (-50..6)	Read-only		This object will report the receive level measured at X minutes ago (1 to 15 minutes) as specified by sc521LineStats Interval. The range is between the -50dB to +6dB.
sc521LineStats Jitter	Integer (0..99)	Read-only		This object will report the percent jitter of the line measured X minutes ago (1 to 15 minutes) as specified by sc521LineStats Interval. The range is 0% to 99% Jitter.
sc521LineStats BpvCount	Integer (0..99)	Read-only		This object will report the number of bipolar violation that have occurred over the last X minutes (1 to 15 minutes). The range is from 0 to 99 violations.
sc521LineStats FrameLoss Count	Integer (0..99)	Read-only		This object will report the number of frame losses that have occurred over the last X minutes (1 to 15 minutes). The range is from 0 to 99 frame losses.
sc521LineStats TxInterpretation	Integer	Read-only	normal(1) noSignal(2) notAvailable(3) overRange(4)	This object will report the status of the line measurements for the selected period. If noSignal(2), it will indicate that there is no receive signal available. If notAvailable(3), it will indicate that the measurements have not completed. And if overRange(4), it will indicate that the measurements taken are over the measurement range.
sc521LineStats TxLevel	Integer	Read-only	txLevel0dB(1) txLevel6dB(2)	Will report the transmit Level of the line to be 0dB txLevel0dB(1), or 6dB txLevel6dB (2) as measured by the unit X minutes ago (1 to 15 minutes) as specified by sc521LineStatsInterval.
sc521LineStats SignalQuality	Integer	Read-only	good(1) fair(2) bad(3)	Will report the signal quality of the line measured X minutes ago (1 to 15 minutes) as specified by sc521LineStatsInterval.

NMS 520 MIB Tables

Table C-13 NMS520 Unit Configuration Table (GDC NMS520 MIB)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
PtToPtSentry Time	Integer (0..127)	read/write	(60 minutes default)	Point to point sentry time object. The value of this object controls how long a remote unit in a point to point application waits between sending unsolicited alarm responses when there are no alarm conditions to report. The unsolicited responses, which are intrusive to data, maintain the management link between the two units. Wait times range from 1 to 127 minutes, with a default of 60. The 0 (zero) minutes value disables remote alarm sentry reporting.
AlarmHyst Time	Integer (1..127)	read/write	(10 seconds default)	Alarm hysteresis time object. The value of this object controls how long a remote must wait between reporting unsolicited alarm conditions. A remote sends an unsolicited alarm response at the time of its first alarm. If a second alarm occurs, the remote must wait for the length of time specified by this object before it can send another alarm response. This time applies for both point to point and multipoint applications. The range is from 1 second to 127 seconds, with a default value of 10 seconds.
MtpointRm RspIntrvl	Integer (0..127)	read/write	(10 seconds default)	The Multipoint remote response object. The value of this object controls how long a remote unit in a multipoint application waits between sending unsolicited alarm responses when there are no alarm conditions to report. The unsolicited responses, which are non-intrusive to data, maintain the management link between the two units. The range of wait times is from 1 to 127 seconds, with a default of 3. The 0 (zero) seconds value disables remote alarm sentry reporting. All remotes in a multipoint application must be set the same.
DtePortType	Integer (1 - 3)	read/write	rs232(1) v35(2) auto(3)*	The DTE Port Type object. The value rs232(1) forces the DTE port to operate as an EIA/TIA-232-E interface. The value v35(2) forces the DTE port to operate as a V.35 interface. The value auto(3) specifies that the DTE port interface type is to be detected and set automatically.

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Table C-13 NMS520 Unit Configuration Table (GDC NMS520 MIB) (Continued)
 (* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
DteCtsDelay	Integer (1 - 3)	read/write	ctsOn(1)* cts0mSec(2) ctsFixed3Char(3)	<p>The RTS/CTS Delay object. The value of this object specifies how long the DSE delays after RTS from the DTE goes On before it turns CTS On.</p> <p>ctsOn(1) Forces both RTS and CTS On (transmitter On) regardless of the state of RTS. MIB object nms520DteCtsDelayExt is ignored.</p> <p>cts0mSec(2) Provides a zero bit-time delay. This delay can be extended by the value of MIB object nms520DteCtsDelayExt.</p> <p>ctsFix3Char(3) Provides a delay equal in duration to three characters. This delay can be extended by the value of MIB object nms520DteCtsDelayExt.</p>
DteCtsDelayExt	Integer (1 - 4)	read/write	ext0mSec(1)* ext30mSec(2) ext60mSec(3) ext90mSec(4)	<p>RTS/CTS Delay options extension</p> <p>ext0mSec(1) Used to enable options cts0mSec(2) or ctsFix3Char(3) from MIB object nms520DteCtsDelay.</p> <p>ext30mSec(2) Provides 30 msec of delay between active RTS and CTS being set to active. MIB object nms520DteCtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3).</p> <p>ext60mSec(3) Provides 60 msec of delay between active RTS and CTS being set to active. MIB object nms520DteCtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3).</p> <p>ext90mSec(4) Provides 90 msec of delay between active RTS and CTS being set to active. MIB object nms520DteCtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3).</p>

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Table C-13 NMS520 Unit Configuration Table (GDC NMS520 MIB) (Continued)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
nms520 FirmwareLevel	Display string	read-only		This object displays the version identifier of the DSU firmware.
DaisyChainBps	Integer (1 - 2)	read/write	bps75(1) -- data rate is 75 bits/sec bps9600(2)* -- data rate is 9600 bits/sec	Indicates data rate at which management data is sent/received when the gdcNmsManagementSource is daisyChain(4).
AlarmCfg CountWindow	Integer (1..15)	read-write		The DDS Alarm Threshold Alarm Interval. It specifies the amount of time in minutes, 1 to 15, in which the threshold setting must be exceeded for the alarm to occur. There are five alarms that require an interval and threshold: Jitter, BPV, Frame Loss, Signal to Noise Ratio, and Rx Signal Low. The threshold is set in the NMS 520 Alarm Configuration table.
SoftReset	Integer (1 - 2)	(1) read only (2) write only	normal(1) reset(2)	This object is used to command a software reset in the dataset.
FrontPanel Inhibit	Integer (1 - 3)	read/write	fpInhibited(1) -- Read only fpEnabled(2)* -- Read only execute(3) -- Write only	This object can be used to inhibit operation of the DSU front panel test switches. If a test switch is activated while inhibited, it is ignored. The values fpInhibited(1) and fpEnabled(2) display the current status of the front panel. To change the status from Enabled to Inhibited, perform a SET on this object using the value execute(3). The SET has no effect if the front panel is already inhibited. The nms520FrontPanelEnable object is used to change front panel status from Inhibited to Enabled.
FrontPanel Enable	Integer (1 - 3)	read/write	fpInhibited(1) -- Read only fpEnabled(2)* -- Read only execute(3) -- Write only	This object can be used to enable operation of the DSU front panel test switches. The values fpInhibited(1) and fpEnabled(2) display the current status of the front panel. To change the status from Inhibited to Enabled, perform a SET on this object using the value execute(3). The SET has no effect if the front panel is already enabled. The nms520FrontPanelInhibit object is used to change front panel status from Enabled to Inhibited.

(Continued on next page)

Table C-13 NMS520 Unit Configuration Table (GDC NMS520 MIB) (Continued)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
HdlcInvert	Integer (1 - 2)	read/write	normal(1)* invert(2)	Primary data invert option. Can be used to enhance the quality of data when network does not provide B8Z5. Primarily used with DDS II 56k.
PiggyBack Detect	Integer (1 - 2)	read-only	not-installed(1) installed(2)	Set to 2 when either a Data Rate Adapter or 530 card is installed on the DSU.
UnitType	Integer (1 - 2)	read-only	singleHeight(1) withIFP(2)	with IFP(2) means that the unit has an LCD configurable display. single-height(1) means that the unit does not have an LCD configurable display.
ExtPortCtrl Out1	Integer (1 - 2)	read/write	on(1) off(2)	This option sets the state (on/off) of external output 1 at the current network element and displays the output state.
ExtPortCtrl Out2	Integer (1 - 2)	read/write	on(1) off(2)	This option sets the state (on/off) of external output 2 at the current network element and displays the output state.

Table C-14 NMS520 Alarm Table (GDC NMS520 MIB)

Alarm	Meaning
NoResponse Alm*	No Response
DiagRxErrAlm*	Diagnostic Receive Error
PowerUpAlm*	Power Up Alarm — sent each time the DSU is powered On or has its power cycled.
EEChkSum ErrAlm	EEPROM Corrupt — DSU firmware has failed a CRC check.
StcLoopback Alm	DSU commanded into loopback by Telco Serving Test Center.
NoNtwkLoop CurrentAlm	No network loop current at the DSU.
LinePairs ReversedAlm	Line pairs reversed at the DSU.
NoSignalAlm	No signal
FpTestAlm	Front Panel Test — DSU is in a test mode commanded by a front panel switch.
StreamingAlm	Streaming condition at the DSU.
DSRLossAlm	DSR Loss
DTRLossAlm	DTR Loss
DTPLossAlm	DTP Loss
DCDLossAlm	DCD Loss
RXDLossAlm	RXD Loss

(Continued on next page)

Table C-14 NMS520 Alarm Table (GDC NMS520 MIB) (Continued)

Alarm	Meaning
TXDLossAlm	TXD Loss
TmShortedAlm	Each of these alarms indicates that a possible short circuit involving the specified DSU output signal has been detected in the DSU-to-DTE cable.
DcdShortedAlm	
DsrShortedAlm	
CtsShortedAlm	
RxdShortedAlm	
RxcShortedAlm	
TxcShortedAlm	
JitterAlm	
BpvAlm	Excessive bipolar violations detected at the DSU — subject to configured interval and threshold.
FrameLossAlm	Indicates Frame Loss condition at the DSU — subject to configured interval and threshold.
Signal ToNoiseAlm	Poor signal to noise ratio at the DSU — subject to configured interval and threshold.
RxSignalLow Alm	Low receive signal at the DSU — subject to configured interval and threshold.
DBURequestFor Scan Alm	Future use
DBUOnAlm	Future use
DBUFailedAlm	Future use
NoDSU ResponseAlm	
NoDTE PollingAlm	
* Not maskable	

Table C-15 NMS520 Alarms Configuration Table (GDC NMS520 MIB)

MIB Object	Syntax	Access	Description
AlarmCfg Threshold	Integer (0..99)	read/write	<p>This function sets/reads the alarm threshold settings criteria. This threshold is used, along with the alarm window, to determine the value that must be exceeded in a given time frame for a given alarm to be considered active.</p> <p>The following values apply to the alarms that are subject to configured interval and threshold:</p> <ul style="list-style-type: none"> AlarmRangeDefault Jitter0 to 99 %9% BPV0 to 99 Count10 Frame Loss0 to 99 Count10 S/N Ratio 0 to 50 0 Rx Signal Low -50 to 6 dB-33 dB

Table C-16 NMS520 Line Statistics Table (GDC NMS520 MIB)

MIB Object	Syntax	Access	Enumeration	Description
LineStats Interval	Integer (1..15)	read-only		The DDS Line Statistics Interval. It specifies the amount of time in minutes (1 to 15 minutes) that the unit uses to report statistical information. The unit records statistics every minute and holds the information for 15 minutes. Past statistics can read from 1 to 15 minutes ago. A time must be specified to read any object in the ms520LineStatsTable.
Line StatsTx Interpretation	Integer	read-only	normal(1) noSignal(2) notAvailable(3) overRange(4)	This object reports the status of the line measurements for the selected period. If noSignal(2), it indicates that there is no receive signal available. If notAvailable (3), it indicates that the measurements have not completed. And if overRange (4), it indicates that the measurements taken are over the measurement range.
LineStatsTx Level	Integer	read-only	txLevel0dB(1) txLevel6dB(2)	Reports the transmit Level of the line: 0dB txLevel0dB(1), or 6dB txLevel6dB(2).
LineStatsRx Level	Integer (-50..6)	read-only		This object reports the receive level measured X minutes ago (1 to 15 minutes) as specified by nms520Line StatsInterval. The range is from -50dB to +6dB.
LineStats Signal To Noise Ratio	Integer (0..50)	read-only		This object reports the signal to noise ratio measured X minutes ago (1 to 15 minutes) as specified by nms520Line StatsInterval. The range is from 0 to 50, for the selected period. The value is absolute.

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Table C-16 NMS520 Line Statistics Table (GDC NMS520 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
LineStats SignalQuality	Integer	read-only	good(1) fair(2) bad(3)	This object reports the signal quality of the line measured <i>X</i> minutes ago (1 to 15 minutes) as specified by nms520Line StatsInterval.
LineStatsJitter	Integer (0..99)	read-only		This object reports the percent jitter of the line measured <i>X</i> minutes ago (1 to 15 minutes) as specified by nms520Line StatsInterval. The range is from 0% to 99% jitter.
LineStatsBpv Count	Integer (0..99)	read-only		This object reports the number of bipolar violations that have occurred over the last <i>X</i> minutes (1 to 15 minutes) as specified by nms520Line StatsInterval. The range is from 0 to 99 violations.
LineStats FrameLoss Count	Integer (0..99)	read-only		This object reports the number of frame losses that have occurred over the last <i>X</i> minutes (1 to 15 minutes) as specified by nms520Line StatsInterval. The range is from 0 to 99 frame losses.

Table C-17 NMS520 Diagnostic Configuration Table (GDC NMS520 MIB)

MIB Object	Syntax	Access	Enumeration	Description										
DiagSendCode	Integer (1-4)	read/write	sendOther Pattern(1) send511 Pattern(2) send2047 Pattern(3) send15Bit Pattern(4)	Configures the selftest pattern to be run during any diagnostic test involving selftest. If SendOtherPattern is selected and the unit is set for 56k-DDS/sc-multi point, the pattern defaults to 15 bit. The pattern defaults to 511 bit for all other conditions.										
DiagTest Exceptions	Integer (1-4)	read-only	noExceptions(1) blocksOutOfRange(2) bitsOutOfRange(3) blocksAndBitsOutOfRange(4)	This object indicates the exceptions that have occurred that may affect the interpretation of test results. The value is a sum that has an initial value of zero. The value associated with each exception is added to the sum to arrive at the final, displayed result. <table border="0"> <tr> <td>value</td> <td>exception</td> </tr> <tr> <td>0</td> <td>No errors</td> </tr> <tr> <td>1</td> <td>bit over range</td> </tr> <tr> <td>2</td> <td>block over range</td> </tr> <tr> <td>4</td> <td>bit and block over range</td> </tr> </table>	value	exception	0	No errors	1	bit over range	2	block over range	4	bit and block over range
value	exception													
0	No errors													
1	bit over range													
2	block over range													
4	bit and block over range													

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Table C-17 NMS520 Diagnostic Configuration Table (GDC NMS520 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagBitErrors	Integer (0..65535)	read-only		<p>This object displays the number of bit errors that occurred in the last diagnostic test that involved a Selftest pattern. The valid range is 0 to 1,023 bit errors. The value 65535 is returned if the test was terminated early for any reason.</p> <p>Bit errors should be read only after the test is completed. Reading bit errors while a diagnostic test is running causes the unit to drop out of test and invalidates the bit errors.</p>
DiagBlock Errors	Integer (0..65535)	read-only		<p>This object displays the number of block errors that occurred in the last diagnostic test that involved a Selftest pattern. The valid range for block errors is 0 to 1,023. The value 65535 is returned if the test was terminated early for any reason.</p> <p>Block errors should be read only after the test is completed. Reading block errors while a diagnostic test is running causes the unit to drop out of test and invalidates the block errors.</p>
DiagTestReset	Integer (1-3)	read/write	normal(1) -- read only diagnostic(2) -- read only resetTest(3) -- write only	<p>The two read-only values of this object display test status. The write-only value, resetTest(3) halts execution of any diagnostic test that is running. This object should only be used to terminate the test because reading this object terminates the test.</p>

Table C-18 NMS520 Diagnostic Execution Table (GDC NMS520 MIB)

MIB Object	Syntax	Access	Enumeration	Description
DiagInt Lineloop	Integer (1-10)	read/write	lineloopOff(1) -- Read only lineloopOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>To obtain the current Test Status, read this object or the nms520DiagTestStatus object on the unit under test.</p> <p>Lineloop (or Analoop) can be either a Bilateral or Unilateral loopback, depending on the setting of the ddsDte Termaloop option.</p>
DiagInt Dataoop	Integer (1-10)	read/write	dataloopOff(1) -- Read only dataloopOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>To initiate a Dataoop with Selftest and specify the number of blocks the Selftest pattern generator is to run, SET this object. The remote (nms520) unit goes into Dataoop and the master (sc521) unit goes into Selftest. There are 1000 bits in each block. Enumerations 3 (1 block) through 10 (50,000 blocks) are write only. The only valid responses to a READ are dataoopOn(2) or dataloop Off(1). The test terminates after running the specified number of blocks. It can also be terminated by the DiagTest Reset object in the Diagnostic Configuration Table.</p> <p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. They are available from the master (sc521) unit. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the diagnostic test pattern and cause errors.</p>

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Table C-18 NMS520 Diagnostic Execution Table (GDC NMS520 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
Diag End ToEnd Selftest	Integer (1-10)	read/write	endToEndOff(1) -- Read only endToEndOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>To initiate an End To End Selftest and specify the number of blocks the Selftest pattern generator is to run, SET this object. Both the remote (nms520) and master (sc521) units go into Selftest. There are 1000 bits in each block. Enumerations 3 (1 block) through 10 (50,000 blocks) are write only. The only valid responses to a READ are endToEndOn(2) or endToEndOff(1). The test terminates after running the specified number of blocks. It can also be terminated by the DiagTest Reset object in the Diagnostic Configuration Table.</p> <p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. They are available from both the remote (nms520) and master (sc521) units. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the diagnostic test pattern and cause errors.</p>
DiagNetwork Delay	Integer (1-3)	read/write	delayTestOff(1) -- Read only delayTestOn(2) -- Read only runDelayTest(3) -- Write only	<p>To initiate a Network Delay test, SET this object and specify runDelayTest. Both the remote (nms520) and master (sc521) units go into a test to measure network delay. Enumeration 3 is write only. The only valid responses to a READ are delayTestOn(2) or delayTestOff(1). This test terminates after 10 seconds. Test results should be read only after the test is completed, and are available from the master (sc521) unit.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the test and cause errors. This test cannot be terminated early once it is started.</p>

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Table C-18 NMS520 Diagnostic Execution Table (GDC NMS520 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagTestStatus	Integer (1-6)	read only	noTest(1) internal- Lineloop (2) -- Analoop & Selftest externalData- loop (3) -- Dataloop internalData- loop (4) -- Dataloop & Selftest serviceTest- CenterLoop(5) -- Network ini- tiated loopback endToend(6) -- End To End	<p>This object gives the current diagnostic test status. noTest indicates that no diagnostic test is currently active. Reading this object while in a diagnostic test that involves two units may interfere with a selftest pattern and invalidate the test results.</p> <p>Reading the sc521DiagTestStatus (master unit) object during diagnostic tests involving two units does not disrupt the test results.</p>
DiagExt Dataloop	Integer (1-3)	read/write	dataloopOff(1) -- Read only dataloopOn(2) - Read only external(3) -- Write only	<p>To initiate a Dataloop test with no Selftest, SET this object and specify external. This command causes the DSU to loop the data it receives back to its source at the DTE attached to the master unit (sc521).</p> <p>Enumeration external(3) is write only. The only valid response to a READ is dataloopOn(2) or dataloopOff(1).</p> <p>To halt the test, SET the DiagTestReset object in the Diagnostic Configuration Table.</p> <p>There are no test results associated with this test. Note, however, that attempting to read test results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table while the test is running causes the test to terminate.</p> <p>Reading test status on the remote unit via nms520DiagTestStatus may interfere with the diagnostic test pattern generated from the terminal equipment.</p>

NMS 510 MIB Tables

Table C-19 NMS510 Unit Configuration Table (GDC NMS510 MIB)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
DteCtsDelay	Integer (1 - 3)	read/write	ctsOn(1)* cts0mSec(2) ctsFixed3Char(3)	The RTS/CTS Delay object. The value of this object specifies how long the DSE delays after RTS from the DTE goes On before it turns CTS On. ctsOn(1) Forces both RTS and CTS On (transmitter On) regardless of the state of RTS. MIB object nms510DteCtsDelay Ext is ignored. cts0mSec(2) Provides a zero bit-time delay. This delay can be extended by the value of MIB object nms510DteCtsDelay Ext. ctsFix3Char(3) Provides a delay equal in duration to three characters. This delay can be extended by the value of MIB object nms510DteCtsDelayExt.
DteCtsDelay Ext	Integer (1 - 4)	read/write	ext0mSec(1)* ext30mSec(2) ext60mSec(3) ext90mSec(4)	RTS/CTS Delay options extension ext0mSec(1) Used to enable options cts0mSec(2) or ctsFix3Char (3) from MIB object nms510DteCts Delay. ext30mSec(2) Provides 30 msec of delay between active RTS and CTS being set to active. MIB object nms510DteCtsDelay must be set for either cts0mSec(2) or ctsFix3Char(3). ext60mSec(3) Provides 60 msec of delay between active RTS and CTS being set to active. MIB object nms510DteCtsDelay must be set for either cts 0mSec(2) or ctsFix3Char(3). ext90mSec(4) Provides 90 msec of delay between active RTS and CTS being set to active. MIB object nms510DteCtsDelay must be set for either cts 0mSec(2) or ctsFix3Char(3).
nms510 FirmwareLevel	Display string	read-only		This object displays the version identifier of the DSU firmware.
AlarmCfg CountWindow	Integer (1..15)	read-write		The DDS Alarm Threshold Alarm Interval. It specifies the amount of time in minutes, 1 to 15, in which the threshold setting must be exceeded for the alarm to occur. There is one alarm that requires an interval and threshold: nms510FrameLossAlm. The threshold is set in the NMS 510 Alarm Configuration table.

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Table C-19 NMS510 Unit Configuration Table (GDC NMS510 MIB) (Continued)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
SoftReset	Integer (1 - 2)	(1) read only (2) write only	normal(1) reset(2)	This object is used to command a software reset in the dataset.
FrontPanel Inhibit	Integer (1 - 3)	read/write	fpInhibited(1) -- Read only fpEnabled(2)* -- Read only execute(3) -- Write only	This object can be used to inhibit operation of the DSU front panel test switches. If a test switch is activated while inhibited, it is ignored. The values fpInhibited(1) and fpEnabled(2) display the current status of the front panel. To change the status from Enabled to Inhibited, perform a SET on this object using the value execute(3). The SET has no effect if the front panel is already inhibited. The nms510FrontPanelEnable object is used to change front panel status from Inhibited to Enabled.
FrontPanel Enable	Integer (1 - 3)	read/write	fpInhibited(1) -- Read only fpEnabled(2)* -- Read only execute(3) -- Write only	This object can be used to enable operation of the DSU front panel test switches. The values fpInhibited(1) and fpEnabled(2) display the current status of the front panel. To change the status from Inhibited to Enabled, perform a SET on this object using the value execute(3). The SET has no effect if the front panel is already enabled. The nms510FrontPanelInhibit object is used to change front panel status from Enabled to Inhibited.
HdlcInvert	Integer (1 - 2)	read/write	normal(1)* invert(2)	Primary data invert option. Can be used to enhance the quality of data when network does not provide B8Z5. Primarily used with DDS II 56k.
PiggyBack Detect	Integer (1 - 2)	read-only	not-installed(1) installed(2)	Set to 2 when either a Data Rate Adapter or 530 card is installed on the DSU.
ExtPortCtrl Out1	Integer (1 - 2)	read/write	on(1) off(2)	This option sets the state (on/off) of external output 1 at the current network element and displays the output state.
ExtPortCtrl Out2	Integer (1 - 2)	read/write	on(1) off(2)	This option sets the state (on/off) of external output 2 at the current network element and displays the output state.

Table C-20 NMS510 Alarm Table (GDC NMS510 MIB)

Alarm	Meaning
NoResponse Alm*	No Response
DiagRxErr Alm*	Diagnostic Receive Error
PowerUpAlm*	Power Up Alarm — sent each time the DSU is powered On or has its power cycled.
EEChkSumErr Alm	EEPROM Corrupt — DSU firmware has failed a CRC check.
StcLoopback Alm	DSU commanded into loopback by Telco Serving Test Center.
NoSignalAlm	No Signal
FpTestAlm	Front Panel Test — DSU is in a test mode commanded by a front panel switch.
StreamingAlm	Streaming condition at the DSU.
DSRLossAlm	DSR Loss
DTRLossAlm	DTR Loss
DTPLossAlm	DTP Loss
DCDLossAlm	DCD Loss
RXDLossAlm	RXD Loss
TXDLossAlm	TXD Loss
DBURequest ForScan Alm	Future use
DBUOnAlm	Future use
DBUFailedAlm	Future use
ExtInput ChangeAlm	Indicates change in state of DSU external input.
ExtInputLow Alm	Indicates DSU external input is active.
FrameLossAlm	Indicates Frame Loss condition at the DSU — subject to configured interval and threshold.
* Not maskable	

Table C-21 NMS510 Alarms Configuration Table (GDC NMS510 MIB)

MIB Object	Syntax	Access	Description
AlarmCfg Threshold	Integer (0..99)	read/write	This function sets/reads the alarm threshold settings criteria. This threshold is used, along with the alarm window, to determine the number of instances of Frame Loss that must occur in a given time frame for a Frame Loss alarm to be considered active. Frame Loss alarms are only reported for the DDS-2 line type.

Table C-22 NMS510 Diagnostic Configuration Table (GDC NMS510 MIB)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description										
DiagSendCode	Integer (1-4)	read/write	sendOther Pattern(1)* send511 Pattern(2) send2047 Pattern(3) send15Bit Pattern(4)	Configures the selftest pattern to be run during any diagnostic test involving selftest. If SendOtherPattern is selected and the unit is set for 56k-DDS/sc-multi point, the pattern defaults to 15 bit. The pattern defaults to 511 bit for all other conditions.										
DiagTest Exceptions	Integer (1-4)	read-only	noExceptions(1) blocksOutOfRange(2) bitsOutOfRange(3) blocksAndBitsOutOfRange(4)	This object indicates the exceptions that have occurred that may affect the interpretation of test results. The value is a sum that has an initial value of zero. The value associated with each exception is added to the sum to arrive at the final, displayed result. <table border="0"> <tr> <td>value</td> <td>exception</td> </tr> <tr> <td>0</td> <td>No errors</td> </tr> <tr> <td>1</td> <td>bit over range</td> </tr> <tr> <td>2</td> <td>block over range</td> </tr> <tr> <td>4</td> <td>bit and block over range</td> </tr> </table>	value	exception	0	No errors	1	bit over range	2	block over range	4	bit and block over range
value	exception													
0	No errors													
1	bit over range													
2	block over range													
4	bit and block over range													
DiagBitErrors	Integer (0..65535)	read-only		This object displays the number of bit errors that occurred in the last diagnostic test that involved a Selftest pattern. The valid range is 0 to 1,023 bit errors. The value 65535 is returned if the test was terminated early for any reason. Bit errors should be read only after the test is completed. Reading bit errors while a diagnostic test is running causes the unit to drop out of test and invalidates the bit errors.										

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Table C-22 NMS510 Diagnostic Configuration Table (GDC NMS510 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagBlock Errors	Integer (0..65535)	read-only		<p>This object displays the number of block errors that occurred in the last diagnostic test that involved a Selftest pattern. The valid range for block errors is 0 to 1,023. The value 65535 is returned if the test was terminated early for any reason.</p> <p>Block errors should be read only after the test is completed. Reading block errors while a diagnostic test is running causes the unit to drop out of test and invalidates the block errors.</p>
DiagTestReset	Integer (1-3)	read/write	normal(1) -- read only diagnostic(2) -- read only resetTest(3) -- write only	<p>The two read-only values of this object display test status. The write-only value, resetTest(3) halts execution of any diagnostic test that is running. This object should only be used to terminate the test because reading this object terminates the test.</p>

Table C-23 NMS510 Diagnostic Execution Table (GDC NMS510 MIB)

MIB Object	Syntax	Access	Enumeration	Description
DiagInt Lineloop	Integer (1-10)	read/write	lineloopOff(1) -- Read only lineloopOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>To initiate a Lineloop with Selftest and specify the number of blocks the Selftest pattern generator is to run, SET this object. There are 1000 bits in each block. Enumerations 3 (1 block) through 10 (50,000 blocks) are write only. The only valid responses to a READ are lineloopOn(2) or lineloop Off(1). The test terminates after running the specified number of blocks. It can also be terminated by the DiagTest Reset object in the Diagnostic Configuration Table.</p> <p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>To obtain the current Test Status, read this object or the nms510DiagTest Status object on the unit under test.</p> <p>Lineloop (or Analoop) can be either a Bilateral or Unilateral loopback, depending on the setting of the ddsDte Termaloop option.</p>

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Table C-23 NMS510 Diagnostic Execution Table (GDC NMS510 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagInt Dataoop	Integer (1-10)	read/write	dataloopOff(1) -- Read only dataloopOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>To initiate a Dataloop with Selftest and specify the number of blocks the Selftest pattern generator is to run, SET this object. The remote (nms510) unit goes into Dataloop and the master (sc521) unit goes into Selftest. There are 1000 bits in each block. Enumerations 3 (1 block) through 10 (50,000 blocks) are write only. The only valid responses to a READ are dataloopOn(2) or dataloopOff(1). The test terminates after running the specified number of blocks. It can also be terminated by the DiagTest Reset object in the Diagnostic Configuration Table.</p> <p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. They are available from the master (sc521) unit. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the diagnostic test pattern and cause errors.</p>
Diag End ToEndSelftest	Integer (1-10)	read/write	endToEndOff(1) -- Read only endToEndOn(2) -- Read only blocks1(3) -- Write only blocks10(4) -- Write only blocks100(5) -- Write only blocks500(6) -- Write only blocks1000(7) -- Write only blocks5000(8) -- Write only blocks10000(9) -- Write only blocks50000(10) -- Write only	<p>To initiate an End To End Selftest and specify the number of blocks the Selftest pattern generator is to run, SET this object. Both the remote (nms510) and master (sc521) units go into Selftest. There are 1000 bits in each block. Enumerations 3 (1 block) through 10 (50,000 blocks) are write only. The only valid responses to a READ are endToEndOn(2) or endToEndOff(1). The test terminates after running the specified number of blocks. It can also be terminated by the DiagTest Reset object in the Diagnostic Configuration Table.</p> <p>Once the test is complete, you can read the results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table. Test results should be read only after the test is completed. They are available from both the remote (nms510) and master (sc521) units. Attempting to read results while the test is running causes it to terminate prematurely and renders the results invalid.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the diagnostic test pattern and cause errors.</p>

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Table C-23 NMS510 Diagnostic Execution Table (GDC NMS510 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagNetwork Delay	Integer (1-3)	read/write	delayTest-Off(1) -- Read only delayTestOn(2) -- Read only runDelay-Test(3) -- Write only	<p>To initiate a Network Delay test, SET this object and specify runDelayTest. Both the remote (nms510) and master (sc521) units go into a test to measure network delay. Enumeration 3 is write only. The only valid responses to a READ are delayTestOn(2) or delayTestOff(1). This test terminates after 10 seconds. Test results should be read only after the test is completed, and are available from the master (sc521) unit.</p> <p>The current Test Status can be obtained by reading the sc521DiagTestStatus object on the master unit. Reading test status on the remote unit may interfere with the test and cause errors. This test cannot be terminated early once it is started.</p>
DiagTestStatus	Integer (1-6)	read only	noTest(1) internal-Lineloop (2) -- Analoop & Selftest externalData-loop (3) -- Dataloop internalData-loop (4) -- Dataloop & Selftest serviceTest-CenterLoop(5) -- Network initiated loopback endToend(6) -- End To End Selftest	<p>This object gives the current diagnostic test status. noTest indicates that no diagnostic test is currently active. Reading this object while in a diagnostic test that involves two units may interfere with a selftest pattern and invalidate the test results.</p> <p>Reading the sc521DiagTestStatus (master unit) object during diagnostic tests involving two units does not disrupt the test results.</p>

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Table C-23 NMS510 Diagnostic Execution Table (GDC NMS510 MIB) (Continued)

MIB Object	Syntax	Access	Enumeration	Description
DiagExt Dataloop	Integer (1-3)	read/write	dataloopOff(1) -- Read only dataloopOn(2) - Read only external(3) -- Write only	<p>To initiate a Dataloop test with no Selftest, SET this object and specify external. This command causes the DSU to loop the data it receives back to its source at the DTE attached to the master unit (sc521).</p> <p>Enumeration external(3) is write only. The only valid response to a READ is dataloopOn(2) or dataloopOff(1).</p> <p>To halt the test, SET the DiagTestReset object in the Diagnostic Configuration Table.</p> <p>There are no test results associated with this test. Note, however, that attempting to read test results via the DiagBitErrors or DiagBlockErrors objects in the Diagnostic Configuration Table while the test is running causes the test to terminate.</p> <p>Reading test status on the remote unit via nms510DiagTestStatus may interfere with the diagnostic test pattern generated from the terminal equipment.</p>

GDC DDS MIB Tables

Table C-24 DDS Line Configuration Table (GDC DDS MIB) (* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
ddsLineType	Integer (1 - 4)	read/write	dds1(1)* -- Standard DDS line ddsSc(2) -- DDS/SC line clearChannel(3) -- 64K Clear Channel line auto(4) -- automatic mode determination	Identifies the type of line. The value dds1(1) defines the line type as a conventional DDS. The value ddsSc(2) defines the line type as a DDS line with secondary channel. The value clearChannel(3) indicates that the line type is 64K Clear Channel.
ddsDataRate	Integer (1 - 12)	read/write	async2400(1) sync2400(2) async4800(3) sync4800(4) async9600(5) sync9600(6) async19200(7) sync19200(8) sync56000(9)* sync64000(10) autoAsync(11) autoSync(12)	<p>The DSU data rate option. This object is used to choose the operational data rate of the DSU.</p> <p>Similarities in DDS line coding of 56k DDS/SC and 64k Clear Channel require the user to select sync64000(10) implicitly if 64kbps data rate is required.</p> <p>Interpretation (values 1- 9 apply to both Standard DDS and DDS/SC):</p> async2400(1)2400 bps Asynchronous sync2400(2)2400 bps Synchronous async4800(3)4800 bps Asynchronous sync4800(4)4800 bps Synchronous async9600(5)9600 bps Asynchronous sync9600(6)9600 bps Synchronous async19200(7)19200 bps Asynchronous sync19200(8)19200 bps Synchronous sync56000(9)56000 bps Synchronous sync64000(10)Clear Channel, 64000 bps Synchronous autoAsync(11)Automatic Synchronous rate determination autoSync(12)Automatic Asynchronous rate determination

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Table C-24 DDS Line Configuration Table (GDC DDS MIB) (Continued)
 (* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
ddsTxClock Source	Integer (1 - 3)	read/write	receive(1)* internal(2) external(3)	The DSU transmit clock source option. This is the selection for the transmitter timing clock source. If connecting to a DDS circuit, receive(1) must be selected. receive(1) Receive Clock, derived from the Line internal(2) Internal Clock, generated in the Data Set external(3) External Clock, from the DTE
ddsZero EncodingCfg	Integer (1 - 2)	read/write	enable(1)* disable(2)	The DSU zero encoding option for point to point 56k DDS secondary channel circuits (does not apply for any other data rates or line types). Allows the DTE equipment to transmit all '0' octets without violating DDS ones density requirements. Both the local and remote DSU must be set to the same value. This is a GDC-only feature, so it must be disabled when the DSU communicates with equipment from other providers.
ddsDefault Config	Integer (1 - 2)	read/write	noChange(1)* defaultCfg(2)	The DSU default config option. When the value defaultCfg(2), is selected, the memory of the dataset is erased, and the DSU configuration is returned to factory defaults.

Table C-25 DDS DTE Port Configuration Table (GDC DDS MIB)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
ddsDteExtBuff Clk	Integer (1 - 2)	read/write	internal(1)* external(2)	The DSU transmit buffer option. When external(2) is selected an optional elastic transmit buffer is inserted into the data path . This elastic buffer maintains network synchronization when an external frequency locked clock source is driven into the external transmit clock input on the DTE interface. The buffer compensates for differences in phase and frequency relationships between the external transmit clock and the network clock. When this object is internal(1) no buffering is performed . This object must be set to external(2) if the transmitter timing is set to external.
ddsDteCfgTx Carrier	Integer (1 - 2)	read/write	constant(1)* switched(2)	The Transmit Carrier option. This feature allows the DTE to control the transmitter carrier directly, by means of the RTS circuit. Transmit Carrier is typically set to switched(2) in remote DSU multidrop applications. Transmit Carrier constant(1) is used in point-to-point and multipoint master applications. RTS and CTS are forced on internally when this object is constant (1). When the value of ddsDataRate is sync64000 (10), the value of this object must be set to constant (1).
ddsDteCfgRx Carrier	Integer (1 - 2)	read/write	constant(1)* switched(2)	The Receive Carrier option. This option controls the operation of DCD. Set it to constant(1) to force DCD On for multipoint remote and point-to-point applications. Use switched(2) for multipoint master configurations. When the value of ddsDataRate is sync64000 (10), the value of this object must be set to constant (1).
ddsDteCfgCts Delay	Integer (1 - 6)	read/write	NA**	The CTS delay option. This option is not applicable in the SC 521 DSE.
ddsDteCfg LocalDSR	Integer (1 - 2)	read/write	follows DTR(1) forcedOn(2)*	The DSR option. This option controls operation of the Data Set Ready signal output from the DSU. DSR is normally On when forcedOn(2) is selected. When follows-DTR(1) is selected, DSR is On only when DTR is On.

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Table C-25 DDS DTE Port Configuration Table (GDC DDS MIB) (Continued)
 (* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
ddsDteCfg AnaloopDSR	Integer (1 - 2)	read/write	off(1) normal(2)*	The DSR in Line Loopback (Analoop) option. This option controls DSR during a Line Loopback test. When this option is off(1) and Line Loopback is active, a DSR off indication is output to the DTE interface. When this option is normal(2), the state of DSR responds in accordance with the ddsDteCfgLocalDSR object.
ddsDteCfgAas Status	Integer (1 - 2)	read/write	disable(1) enable(2)	Auto-anti Streaming option.
ddsDteCfgAas Timer	Integer (1 - 4)	read/write	sec5(1) sec10(2) sec30(3) sec45(4)	Auto Anti-Streaming Timer option.
ddsDteCfg Circuit Assurance	Integer (1 - 2)	read/write	disable(1)* enable(2)	The Circuit Assurance option. When this option is set to enable(2) the DSU clamps CTS upon receiving any of the following Network codes: <ol style="list-style-type: none"> 1. IDLE(no DCD) 2. Out of Service Code (OOS) 3. Abnormal Station Code (ASC) No action occurs for any of the above network conditions when the value of this object is disable(1).
ddsDteCfg SystemStatus	Integer (1 - 2)	read/write	disable(1)* enable(2)	The System Status option. When this option is set to enable(2) the DSU clamps DSR upon receiving the following Network codes: <ol style="list-style-type: none"> 1. Out of Service Code (OOS) 2. Abnormal Station Code (ASC) No action occurs for any of the above network conditions when the value of this object is disable(1).
ddsDteCfg Termaloop	Integer (1 - 2)	read/write	enable(1)* disable(2)	Loopback Termination Mode option, also called Termaloop Only. When the value of this object is enable(1) the DSU does not loop the DDS network interface while a local loopback is in progress. When the value of this object is disable (2) the DSU loops the DDS network service back to the service provider during a local loopback test.

Table C-26 DDS Async DTE Port Configuration Table (GDC DDS MIB)
(* = Default Setting)

MIB Object	Syntax	Access	Enumeration	Description
ddsDteAsyncRateAdapt	Integer (1 - 4)	read/write	none(1)* halfLineRate(2)s quarterLineRate(3) from1800to2400LineRate(4)	The Async rate adaption object. This object defines the speed relationship between the DDS circuit and the DTE interface when the DSE is configured for async communication. The value none(1) maintains a one-to-one speed relationship. The value halfLineRate(2) means that the DTE speed is one half the DDS circuit rate. The value quarterLineRate(3) means that the DTE speed is one fourth the DDS circuit rate. The value from1800to2400LineRate(4) is a special case. If the required DTE speed is from 1800 to 2400 bps, inclusive, then the DDS circuit must be provisioned as 2400 DDS or DDS with secondary channel, and the value of this object must be (4).
ddsDteAsyncRxDelay			short(1)* long(2)	The EOT Buffer object. When long(2) is selected, the DSU inserts a 40-bit buffer in the receive data path to filter out EOT. The buffer is required when ddsDteAsyncTxEOtcfg and ddsDteAsyncRxEOtcfg are enabled. The value short(1) may only be used when the EOT signal scheme is not in use.
ddsDteAsyncTxEOtcfg	Integer (1 - 2)	read/write	enable(1) disable(2)*	The Transmit End-of-Text object. The value enable(1) commands the DSU to insert and transmit End-of-Text (EOT) at the end of each transmission. The value disable(2) inhibits EOT transmission.
ddsDteAsyncRxEOtcfg	Integer (1 - 2)	read/write	enable(1) disable(2)*	The Receive End-of-Text object. The value enable(1) commands the DSU to expect End-of-Text (EOT) and remove it from the data stream when it is received. The value disable(2) commands the DSU not to monitor the data stream for EOT.
ddsDteAsyncOverSpeed	Integer (1 - 2)	read/write	overSpeed1(1)* overSpeed2point3(2)	This option determines the amount of asynchronous overspeed the DSU can tolerate. The value overSpeed1(1) commands the DSU to accept incoming async data that is up to 1% faster than the configured data rate. The value overSpeed2point3(2) commands the DSU to allow DTE overspeed of up to 2.3%.
ddsDteAsyncCharacterSize	Integer (1 - 4)	read/write	bits11(1)* bits10(2) bits9(3) bits8(4)	This option selects the Asynchronous character size, in bits/character, including start and stop bits.

Table C-27 DDS DTE Status Table (GDC DDS MIB)

MIB Object	Syntax	Access	Description
ddsDteStatus	Display string	read-only	<p>Returns four binary octets that serve as a snapshot of front panel EIA indicators and other conditions in the DSU.</p> <p>Octet 1 bit 7 - not used bit 6 - CTS (1:On; 0:Off) bit 5 - RTS (1:On; 0:Off) bit 4 - DTR (1:On; 0:Off) bit 3 - DSR (1:On; 0:Off) bit 2 - NS (1:On; 0:Off) bit 1 - DCD (1:On; 0:Off) bit 0 - DTP (1:On; 0:Off)</p> <p>Octet 2 bit 7 - not used bit 6 - DSP (1:On; 0:Off) bit 5 - DCD (1:Transitions 0:Off) bit 4 - RTS (1:Transitions 0:Off) bit 3 - CTS (1:Transitions 0:Off) bit 2 - RXD (1:Transitions 0:Off) bit 1 - TXC (1:Transitions 0:Off) bit 0 - TXD (1:Transitions 0:Off)</p> <p>Octet 3 bit 7 - not used bit 6 - Internal Test Pattern(1:On; 0:Off) bit 5 - STC Test Mode(1:STC loop; 0:Off) bit 4 - DataLoopTest Mode(1:DataLoop; 0:Off) bit 3 - Analoop Test Mode(1:Analoop; 0:Off) bit 2 - Dataset Inhibit (1:active) bit 1 - Dataset Streaming Inhibit(1:active) bit 0 - Auto Anti-Streaming(1:Enabled)</p> <p>Octet 4 bit 7 - not used bit 6 - Diagnostic RTS(1:On; 0:Off) bit 5 - Test Inhibit(1:active) bit 4 - Inactive Channel Code (1:On; 0:Off) bit 3 - LPDA Active(1:On; 0:Off) bit 2 - DBU Active(1:On; 0:Off) bit 1 - Front Panel (FP) Test Switch(1:Enabled) bit 0 - FP Test Switch Active(1:On)</p> <p>Only one of the three test modes displayed by Bits 5, 4, and 3 of Octet 3 can be On at one time.</p>

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