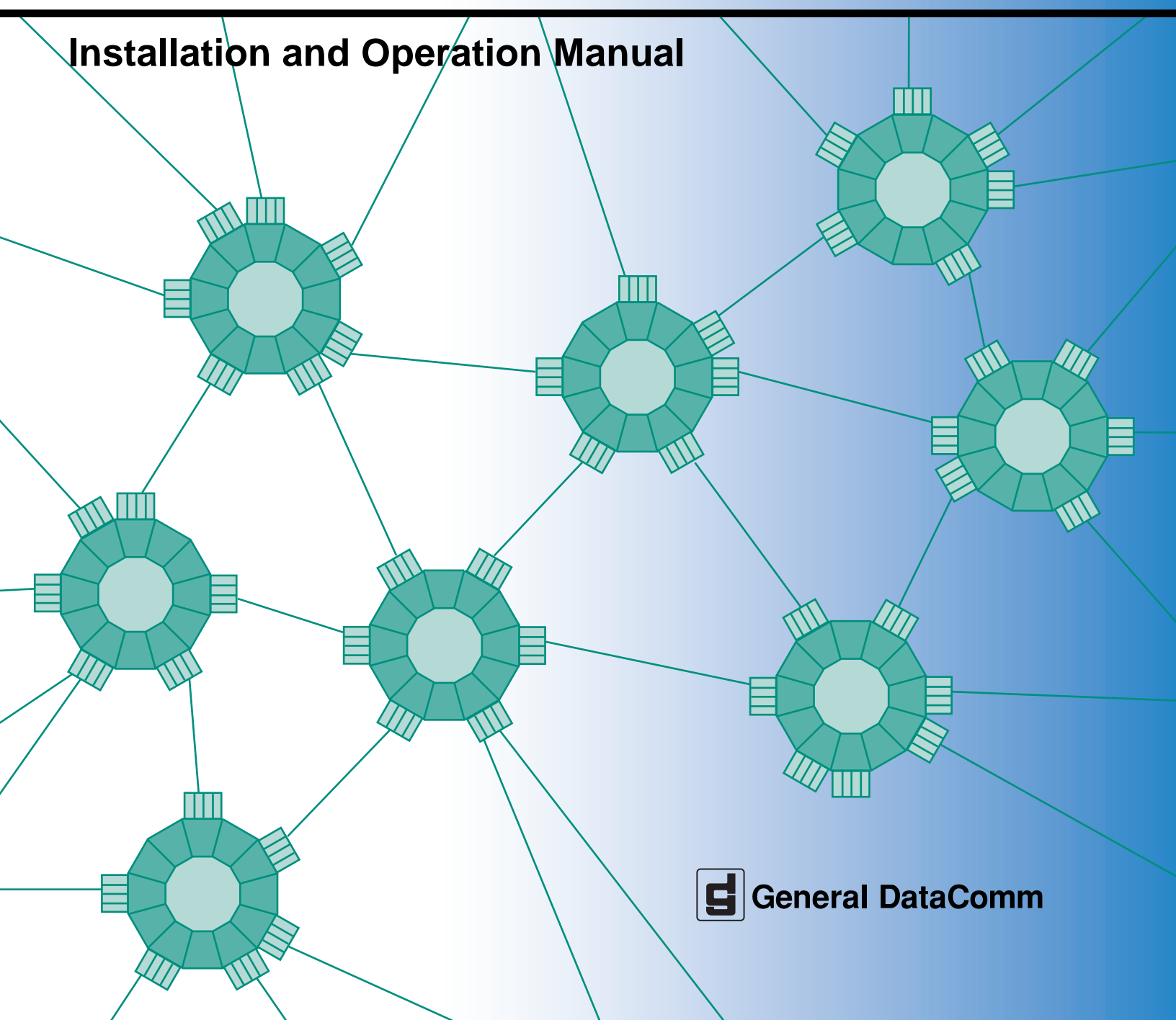


SpectraComm 5520[®] Data Set Emulator

Installation and Operation Manual



076R102-000
Issue 5
July 2001

SpectraComm 5520[®] Data Set Emulator

Installation and Operation Manual

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Documentation

Revision History

Issue Number	Date	Description of Change
1		Initial issue
2		Include compatibility with remote NMS 520 and NMS 510 DSUs; MIBs
3		Terminal interface functionality added; elimination of CSU loopback test; cable numbering correction
4	Jan 1998	Firmware change for downloading; front panel test feature; GDC proprietary code for remote loop initiation
5	Jul 2001	Ability to access remote SC521A and SC521A/S

Related Publications

A listing of related user manuals is provided below. In addition to the hardware and software manuals, always read the software System Release Notes supplied with your product.

Publication Name	Publication Number*
SC 5001 Line Terminating Unit Installation and Operation	032R101-000

* For publications numbers, **REV** is the hardware manual revision (for example, -000, -001, etc.). **VREF** (if listed) is the software revision (for example, -V120 would read: Version 1.2) and corresponds to the most current revision.

Preface

Scope

This manual describes how to install and configure a General DataComm SC 5520 Data Set Emulator. 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).

The information contained in this manual has been carefully checked and is believed to be entirely reliable. However, as General DataComm improves the reliability, function, and design of their products, it is possible that information may not be current. Contact General DataComm if you require updated information for this or any other General DataComm product.

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Manual Organization

The online (web-based) manual uses active areas which allow you to navigate through portions of the manual by clicking on any *blue* text.

This manual is divided into the following chapters:

- Chapter 1, Introduction and Specifications*
- Chapter 2, Installation*
- Chapter 3, Operation*
- Chapter 4, Tests*

Safety Information

This manual should be read in its entirety and all procedures completely understood before installing or operating the unit. The notes that appear throughout this manual must be read prior to any installation or operating procedure. Examples of notes used in this manual are shown below.

Note *A note provides essential operating information not readily apparent which you should be particularly aware of. A note is typically used as a suggestion.*

Important *Indicates an emphasized note. It is something you should be particularly aware of; something not readily apparent. Important is typically used to prevent equipment damage.*

The CAUTION, WARNING, and DANGER statements that appear throughout this manual are intended to provide critical information for the safety of both the service engineer and operator. These statements also enhance equipment reliability. The following definitions and symbols for CAUTION, WARNING, and DANGER as they are used in this manual comply with ANSI Z535.2, American National Standard for Environmental and Facility Safety Signs, and ANSI Z535.4, Product Safety Signs and Labels, issued by the American National Standards Institute.



CAUTION *Indicates a potentially hazardous situation which, if not avoided, may result in minor to moderate injury. It may also be used to alert against unsafe practices.*



WARNING *indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.*



DANGER *indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.*

Safety Guidelines

Always use the following guidelines when unsafe conditions exist or when potentially hazardous voltages are present:

- Always use caution and common sense.
- Repairs must be performed by qualified service personnel only.
- To reduce the risk of electrical shock, do not operate equipment with the cover removed.
- Never install telephone jacks in a wet location unless the jack is designed for that location.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Never install telephone wiring during an electrical storm.

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. This product may contain static-sensitive devices that are easily damaged. Proper handling, grounding and precautionary ESD measures are essential when installing parts or cards. Keep parts and cards in antistatic packaging when not in use or during transport. If possible, use antistatic floorpads and workbench pads.

When handling components, 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, like a screwdriver or a paper clip, to set switches.

Part 15 Compliance

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference and
2. This device must accept any interference received, including interference that may cause undesired operation.

Electromagnetic Compatibility

This Class A digital apparatus complies with Canadian ICES-003.

Avis D'industrie Canada

L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette précaution est particulièrement importante dans les régions rurales.

Avertissement: L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

Avis: L'indice d'équivalence de la sonnerie (IES) assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

La Compatibilité d' Eléctro-magnetique

Cet appareil numerique de la classe A est conforme a la norme NMB-003 du Canada.

Service Support and Training

VITAL Network Services, a General DataComm company, is committed to providing the service support and training needed to install, manage, and maintain your GDC equipment. **VITAL Network Services** provides hands-on training courses through **VITAL Network Services Global Technology Training Services**. Courses range from basic data communications, modems and multiplexers, to complex network and ATM systems. Training courses are available at our centers in the US, UK, France, Singapore and Mexico, as well as at a customer's site.

For more information on VITAL Network Services or for technical support assistance, contact VITAL Network Services at:

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Chapter 1: Introduction and Specifications

Description

The SpectraComm 5520 Data Set Emulator (DSE) is part of the SpectraComm 5000 family of products from General DataComm. An SC 5000 system consists of DSEs to provide interface functions for data terminal equipment (DTEs) and one or more Line Terminating Units to provide network interface. The system consolidates data traffic between a user-owned central data communication site and a Telco central switching office, and enables the use of a single, high-capacity line. Unlike a multiplexer, which consolidates data traffic for transmission over a point to point link, the SC 5000 system performs "line grooming" that permits the switching office to separate the signal back into its component parts for transmission to multiple locations.

The SC 5520 DSE card provides the channel interface functionality of a multi-rate data service unit (DSU) capable of operating in standard 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. It is termed a data set emulator rather than a DSU because, instead of including its own network interface circuitry, it interfaces with an SC 5001 LTU.

The LTU provides interface to a T1 line and can support up to 24 SC 5520 DSEs installed, with the LTU, in a pair of SpectraComm Shelves. The DSEs and LTU exchange channel data by means of a data highway implemented in the SpectraComm Shelf backplane. The backplane provides four data highways, so a pair of SpectraComm Shelves (32 slots, total) can accommodate up to four LTUs, each with its own group of associated DSEs.

In addition to DSEs and LTUs, each SC 5000 system includes a GDC SpectraComm Manager (SCM) card to provide comprehensive network management capabilities using the Simple Network Management Protocol (SNMP). The SCM card acts as the local control device for the other components of the SC 5000 system under the direction of an SNMP controller.

The DSE 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 5520 DSE 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 5520 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 DSE provides EIA/TIA-232-E and V.35 interfaces by soft-strap selection or automatic sensing.

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 5520 DSE. [Table 1-2](#) lists its technical characteristics.

SC 5520 Data Set Emulator Features

The SC 5520 DSE provides the following features:

- Operates in Standard DDS mode, DDS with secondary channel mode, and clear channel (64 Kbps) mode.
- 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 (SNMP) network management. SNMP provides complete software control for configuration, alarm reporting, and diagnostic testing capabilities.
- Provides terminal interface control functions accessible through the shelf-resident SCM card using either a VT100-compatible ASCII terminal or a computer running the Telnet protocol.
- Available with DTE interface that conforms to EIA/TIA-232-E, ITU-T V.35, or (with optional plug-in card) EIA-530.
- Senses and adapts automatically to the connection of either EIA/TIA-232-E or V.35 equipment at its DTE interface (this is a configurable feature that can be disabled).
- Compatible with remote NMS 520, NMS 510, SC521A or SC521A/S 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 5520 receives configuration and commands in the form of entries in its Management Information Base (MIB) tables which are available through the GDC internet website. The SCM card stores and administers MIBs for the DSEs and LTUs in its SpectraComm Shelf. The SCM card communicates with an SNMP controller, and passes commands and responses between the controller and the DSE.

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 Error
Receive Data Loss
Front Panel Test
External Clock Loss
Test Mode Shorted

Data Set Ready Loss
Data Terminal Power Loss
Data Set Ready Shorted
Data Terminal Ready Loss
Data Carrier Detect Loss
Transmit Data Loss
Data Carrier Detect Shorted
STC Loopback
Clear To Send Shorted
Receive Data Shorted
Receive Clock Shorted
Transmit Clock Shorted

The DSE 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.

Application

The SC 5520 DSE works in conjunction with the SC 5001 LTU to provide a groomed T1 environment. The SC 5000 system grooms the local end of multiple DDS circuits into a single T1 aggregate. Refer to *GDC Publication No. 073R100-000* for specific details on the SC 5001 LTU. The SC 5520 DSE is compatible with a remote NMS 520, NMS 510, SC 521A, or SC521A/S DSU, and can pass data to any existing DDS-compatible DSU.

The SC 5520 DSE is software programmable to interoperate with the following DDS network operating configurations:

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

Data Rate Adapter Applications

[Figure 1-1](#) and [Figure 1-2](#) illustrate timing configurations when the DSE has the optional Data Rate Adapter card installed for synchronous operation. In these applications always option the DSE for Receive timing from the network. External timing sources must be 100 PPM.

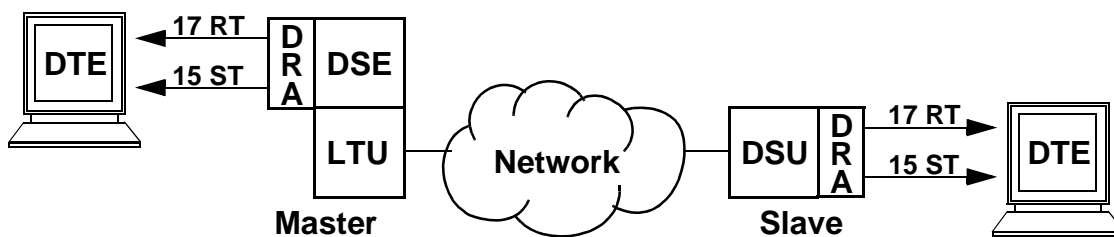


Figure 1-1 Data Rate Adapter Application 1 (Master: Internal, Slave: Internal)

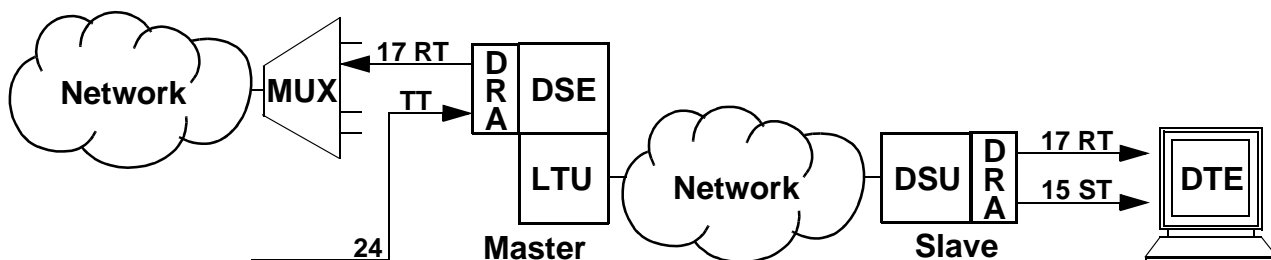


Figure 1-2 Data Rate Adapter Application 2 (Master: External, Slave: Internal)

Equipment List

Table 1-1 Equipment List

Description	GDC Part No.
GDC SC 5520 Data Set Emulator (compatible with remote NMS 520 DSU)	076P020-001
GDC SC 5520 Data Set Emulator (compatible with remote NMS 520 and NMS 510 DSUs; supports terminal interface and Telnet)	076P020-002
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.

Technical Characteristics

Table 1-2 Technical Characteristics

Item	Specification	Details
PC Card Physical Characteristics (rackmount installation)	Height	0.81 in. (21 mm) - SC 5520 card only
		1.75 in. (45 mm) - SC 5520 card with DRA or 530 card
	Width	7 in. (178 mm)
	Depth	9.5 in. (241 mm)
	Weight (SC 5520 card only)	10 oz (0.28 kg)
	Shipping weight (SC 5520 card only)	1 lb 10 oz (0.74 kg)
Environment	Operating Temperature	32° to 122°F (0° to 50°C) (Derate by 1°C/1000 ft above sea level)
	Non-operating Temperature	- 40° to 185°F (- 40° to 85°C)
	Operating Humidity	5% to 95% without condensation
	Operating Altitude	0 ft to 10,000 ft (0 m to 3,047 m)
	Non-operating	0 ft to 40,000 ft (0 m to 12,191 m)
Electrical	Power dissipation (SC 5520 card only)	4 W maximum
	Fusing	Two 2.5 A, 125 V (GDC Part No. 215-201-009) One 5 A, 125 V (GDC Part No. 215-201-021)
Operation	DDS, DDS/SC - 2.4 to 56 Kbps	Point-to-point or Multipoint
	64 Kbps clear channel	Point-to-point
	Signal format	Serial, synchronous, or asynchronous
	Asynchronous character format	8-11 bits/character
	Overspeed	1 or 2.3%
	Data rate, synchronous	2400, 4800, 9600, 19200, 56000, or 64000 bps
	Data rate, asynchronous	2400, 4800, 9600, or 19,200 bps
	Data rate, asynchronous (via Rate Adaption option)	600, 1200, 1800, 2400, 4800, 9600, or 19,200 bps
	DTE interface	EIA/TIA-232-E, ITU-T V.35, or optional EIA-530
	Transmit Timing	Shelf (Receive), internal (DSE) $\pm 0.01\%$, or external (DTE) (can accept external clock up to $\pm 0.02\%$)

Chapter 2: Installation

Overview

This chapter describes the installation of the SC 5520 DSE.

The SC 5520 DSE is shipped pre-assembled, tested, and ready to use. There are no hardware options to be set on the SC 5520 DSE 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 DSE cable connections.

The SC 5520 DSE should be installed in a ventilated area where the ambient temperature does not exceed 122°F (50°C). Do not install the DSE 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. It 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. The SC 5520 DSE can be installed in any card slot.

The shelf backplane is made up of four separate "data highways" and a management bus. Each data highway supports the transfer of data between an LTU and its DSEs, so there can be up to four LTU/DSE functional groupings in a shelf (or pair of shelves). The management bus supports the transfer of management data between an SCM card and the DSEs and LTUs in the shelf. The SCM card functions as an SNMP agent for the control of compatible devices, such as the DSE and LTU, in the shelf. The SpectraComm Shelf can contain a single SCM card, or two SCM cards installed as a primary and a backup.

An LTU/DSE functional group can consist of one or two LTUs (one primary and one backup) and up to 24 DSE cards. The application determines the exact selection of cards to be installed in a shelf. An LTU can be combined with 24 DSE channels only when each channel requires just a single DS0. The number of DSE cards the LTU can support is reduced when channels employ N X 56 Kbps or N X 64 Kbps rates. For example, the LTU can support no more than 12 DSE cards when each DSE is providing a 128 Kbps channel.

Two SC 5001 LTUs can be installed in a primary/secondary arrangement. If the primary LTU malfunctions, the SNMP controller can command the secondary LTU to take over.

Figure 2-1 shows the SpectraComm Shelf back panel. An SC 5520 DSE employs only one back panel connector: the DB25 connector in Zone 3 serves as its DTE interface.

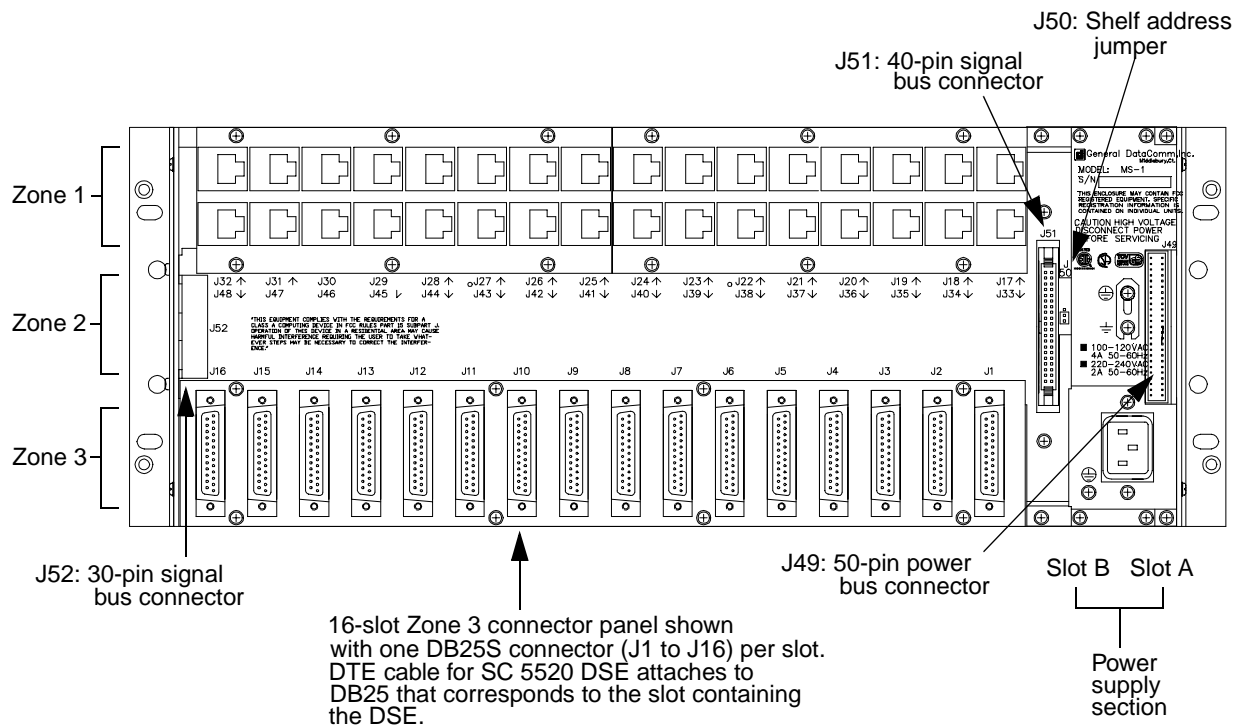


Figure 2-1 SpectraComm Shelf Back Panel

Unpacking and Handling

The SC 5520 DSE is shipped enclosed in a corrugated box and protected by packing material. Inspect the SC 5520 DSE 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 5520 DSE.

Preoperational Check

You should verify that the SC 5520 is in good working order by means of two tests: the Power Up Test that the unit performs automatically, and a Local Test with Self Test that you perform using the front panel controls.

Power Up Test Sequence

Inserting the SC 5520 DSE into the shelf automatically initiates a four-part Power Up Test, which you should observe by watching the front panel during power up. The following events verify that the SC 5520 DSE is in good electrical working order:

1. All LEDs and all segments of the 4-character, 7-segment LCD display light and are easily visible.
2. The SC 5520 front panel displays "SELF" and the Test Mode (TM) indicator lights, indicating the start of an internal diagnostic test of the circuitry.
3. The front panel displays "PASS" to indicate success of the internal diagnostic test.

4. The front panel displays "5520" product name following the results of the internal diagnostic test.

If any of those four events does not occur, or if "FAIL" is displayed instead of "PASS" 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 5520 DSE.

Local Test/Self Test

Once the SC 5520 DSE has passed the Power Up Test and before you connect it to its DTE, you should perform a **Local Test with Self Test** to verify that the internal circuits of the DSE are capable of normal operation. Local Test causes the DSE 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 5520 DSE.

Installation Procedures

Module Installation Procedures

An SC 5520 DSE card may be installed in any slot in a SpectraComm Shelf. To install the DSE 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 5520 DSE is disconnected from service and from the main power source before you proceed with the installation.

Note *Use of the Data Rate Adapter might impact round-trip delays in the 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 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

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

- 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 DSE to be the MASTER and ON options the DSE to be a SLAVE (Remote).

Data Rate Adapter Card Installation

The Data Rate Adapter plugs into the SC 5520 DSE 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 on connectors XA1P2 and XA1P3, 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 connectors XA1P2 and XA1P3.

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.

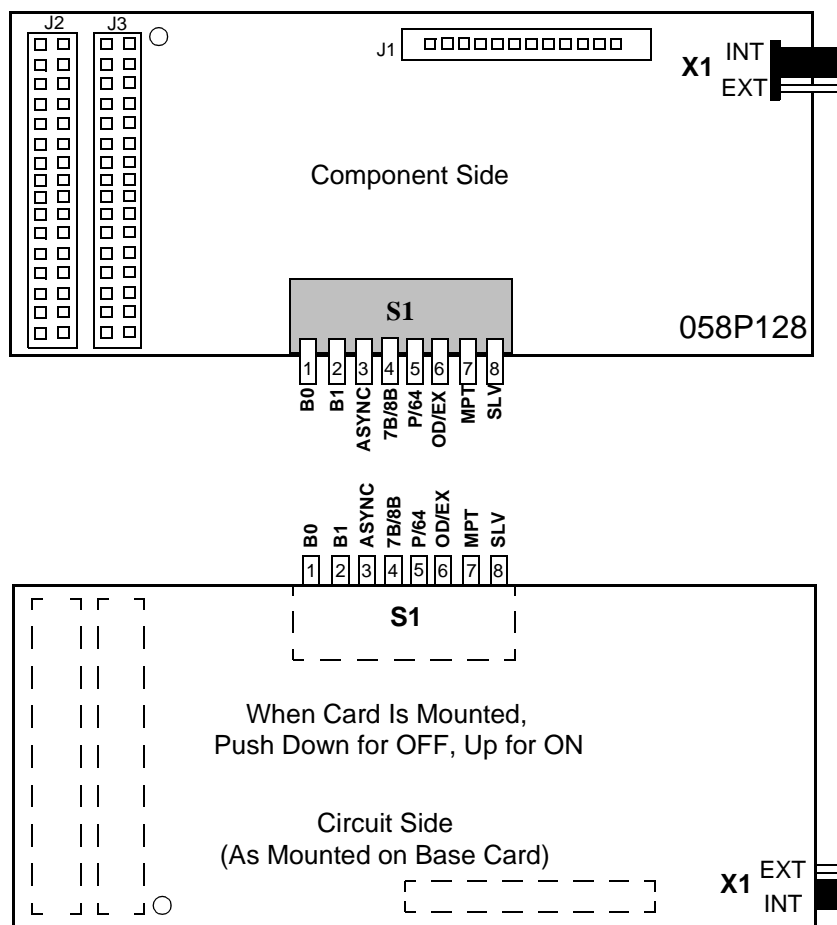


Figure 2-2 Data Rate Adapter Card

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 XA2P1 jumper so that the TIA/EIA-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.

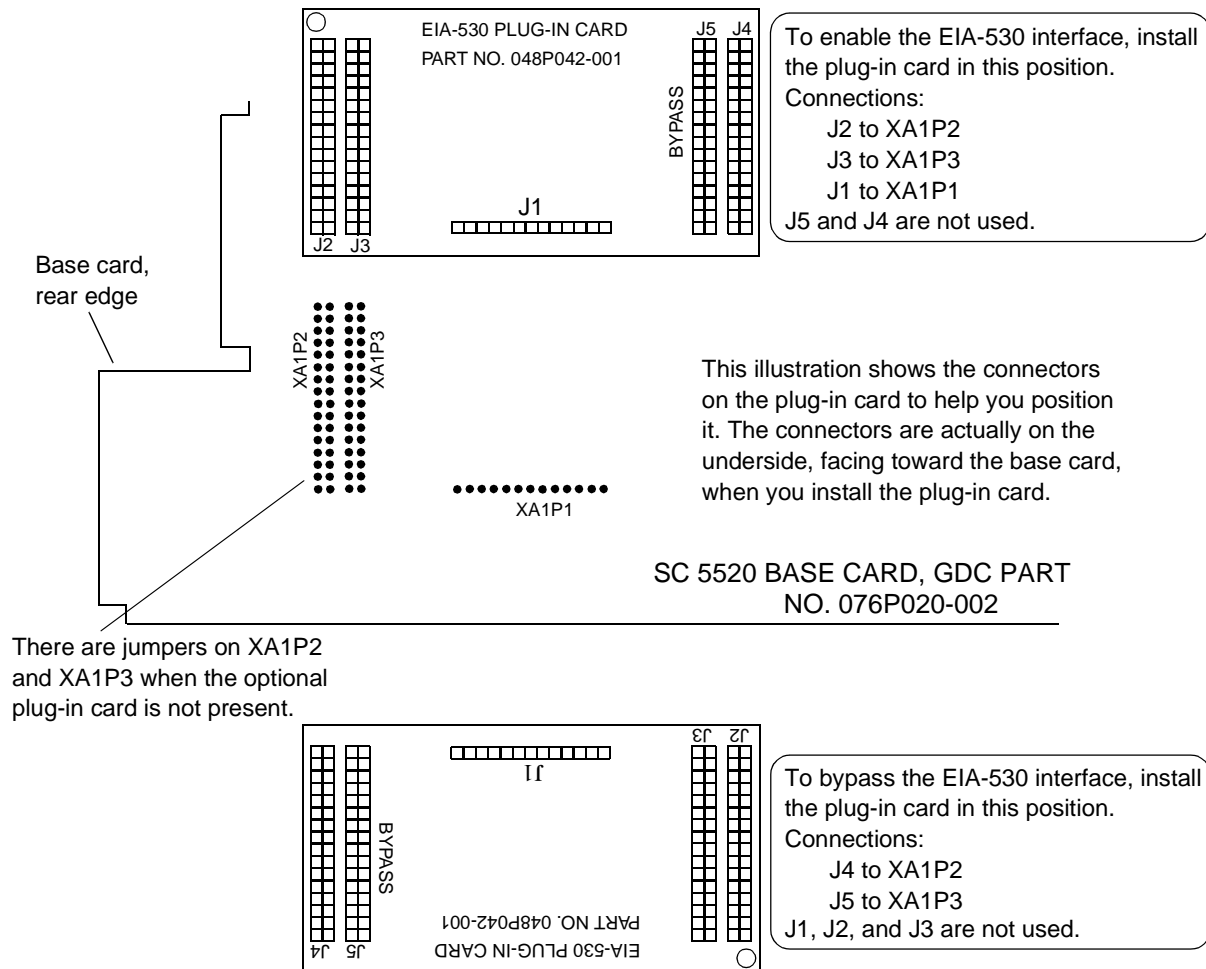


Figure 2-3 EIA 530 Interface Adapter Card

Electrical Power Connection

The DSE obtains power directly from the SpectraComm shelf.

Business Equipment Connections (DTE)

The SC 5520 DSE supports three business equipment interfaces: TIA/EIA-232-E, ITU-T V.35, and (optionally) EIA-530. The TIA/EIA-232-E and V.35 interface hardware resides on the base card.

Note *The SC 5520 DSE supports automatic detection and selection of either an TIA/EIA-232-E or V.35 DTE interface. This feature requires the presence of a valid transmit data (TXD) signal. If this signal is not always present, the DTE interface type must be specified during configuration.*

[Table 2-1](#) describes the signals exchanged through the TIA/EIA-232-E DTE interface; [Table 2-2](#) describes the ITU-T V.35 interface; and [Table 2-3](#) describes the EIA-530 interface.

Table 2-1 TIA/EIA-232-E DTE Interface Signals

Pin	ITU-T	EIA	Description
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	CA	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.
8	109	CF	Indicates to DTE that Data Set is receiving data.
15	114	DB	Transfers transmitter signal timing information from Data Set to DTE.
17	115	DD	Transfers receiver signal timing information from Data Set to DTE.
18	141	LL	Local Loopback
20	108/2	CD	Indicates to Data Set that DTE is prepared for data communications.
21	140	RL	Remote Loopback
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.

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

Pin P1	V.35	ITU-T	EIA	Description
7	B	102	AB	Establishes a common ground reference for all interface circuits except protective ground, pin A.
4	C	105	CA	Indicates to Data Set that DTE is prepared to transmit.
5	D	106	CB	Indicates to DTE that Data Set is prepared to transmit.
6	E	107	CC	Indicates to DTE that Data Set is operational.
8	F	109	CF	Indicates to DTE that Data Set is receiving data (not idle or OOS codes).
25	NN	142	TM	Indicates to DTE that Data Set is in a test mode.
2 14	P S	103 103	BA(A) BA(B)	Transfers data signals from DTE for transmission over communication line.
3 16	R T	104 104	BB(A) BB(B)	Transfers data signals received over communication line by Data Set to DTE.
24 11	U W	113 113	DA(A) DA(B)	Transfers transmitter signal timing information from DTE to Data Set.
17 9	V X	115 115	DD(A) DD(B)	Transfers receiver signal timing information from Data Set to DTE.
15 12	Y AA/a	114	DB(A) DB(B)	Transfers transmitter signal timing information from Data Set to DTE.
20	H	108/2	CO	Indicates to Data Set that DTE is prepared for data communication.
18	L	141	LL	Local Loopback
21	N	140	RL	Remote Loopback

Table 2-3 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.

DSE Addressing

The network management system employs a slot-line-drop method of addressing. The DSE slot address is the number of the slot it occupies in the SpectraComm Shelf. Its line address is always 1, and the DSE 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 5520 DSE, the EEPROM containing configuration for the DSE is automatically erased and the unit has to be reconfigured.

Timing Options

Timing options determine the clock source for the data the SC 5520 DSE transmits to the network. The default Transmit Timing option for the DSE is Receive timing.

The precise meaning of Receive timing for the DSE differs from that for a DSU because of the relationship between components in the SC 5000 system. In an SC 5000 system the selection of Receive timing actually means the use of a system shelf timing signal taken from the shelf backplane. A DSU derives Receive timing directly from the signal it receives at its network interface.

The SC5000 MIB options enable or inhibit the DSE as the source of the 8 KHz system shelf timing signal on the backplane. One component in each SC 5000 system, either a DSE or an LTU, may be configured to provide the 8 KHz signal. The MIB also controls the source of a second, 4 MHz, backplane timing signal that only an LTU can provide. (MIB option tables are available through the GDC internet website.)

A DSE that is providing the 8 KHz system shelf timing signal must itself employ either Internal or External transmit timing. All other DSEs in the system must be configured for Receive timing so that they use the system shelf timing signal.

Chapter 3: Operation

Overview

This chapter begins by describing the functions of the SC 5520 DSE front panel indicator displays and limited test functions.

The chapter then provides instructions for using the DSE terminal interface to control and monitor its functions. Through the terminal interface you can alter the configuration of the DSE, 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 DSE diagnostic functions by means of the terminal interface. [Chapter 4, Tests](#), describes the actual test procedures in detail.

Access to the DSE terminal interface functionality takes place through a SpectraComm Manager (SCM) card installed in the SpectraComm shelf that houses the DSE. 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

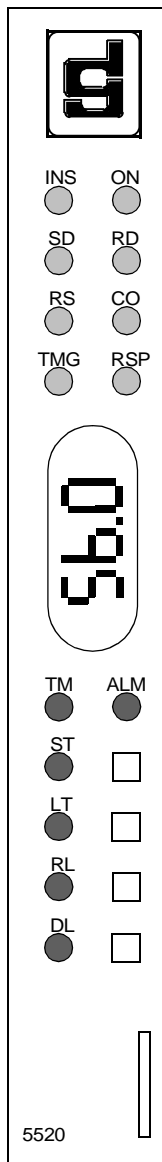
There are small differences between the two types of connection.

In addition to the terminal interface, you can control and monitor the SC 5520 DSE by means of a Simple Network Management Protocol (SNMP) controller software application, such as the TEAM 5520 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. GDC MIB option tables are available on the GDC internet web site.

Controls and Indicators

[Table 3-1](#) illustrates the SC 5520 DSE front panel and explain the function of each control and indicator.

Table 3-1 Front Panel Indicators and Controls



Label	Function
INS	In Service - lit when the DSE has been placed into service by the network controller.
ON	Power On - Lit while power is applied to the DSE.
SD	Send Data - Lit when the DSE is in data mode and a space is detected in the transmit data.
RD	Received Data - Lit when the DSE is in data mode and a space is detected in the receive data.
RS	Request to Send - Lit when the RTS is asserted by the DTE.
CO	Carrier On - Lit when the DSE is in data mode and carrier is being received from the network. Also lit when the DSE is in test mode.
TMG	Timing - Lit when the DSE is designated as the source of timing for its shelf (8Kclock).
RSP	Response - Lit while the DSE is in transmitting a response to a network controller command.
TM	Test Mode - Lit when the DSE is performing any type of test. Blinks to indicate detected errors during a Self Test.
ALM	Alarm - Flashes while the DSE is experiencing an alarm condition.
ST	Self Test - Momentary switch. When pressed, engages the test pattern generator/checker employing test pattern selected in configuration. LED is lit while Self Test is active. Press switch a second time to turn off Self Test.
LT	Local Test - Momentary switch. When pressed, places the DSE in Local Test. LED is lit while the test is in progress. Press switch a second time to end test. The Line Loopback Test Points option, one of the configurable Diagnostic Options for the DSE, selects Local Test to be either unilateral (toward the DTE only) or bilateral (transmit data looped back to the DTE, receive data looped back to the network).
RL	Remote Loop - Momentary switch. When pressed, causes the DSE to send a loopback command to the remote unit. DSE is configurable for GDC proprietary, PN127, or V.54 loopback command. Remote loopback test requires a compatible device that recognizes the command being used. LED is lit while the test is in progress. Press switch a second time to end test.
DL	Data Loop - Momentary switch. When pressed, places the DSE in a digital loopback. LED is lit while test is active. Press switch a second time to end test.

SpectraComm Shelf

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

Terminal Interface

Access to the SC 5520 DSE terminal interface takes place through the SCM, which provides this functionality for the DSEs 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. The SC 5520 DSE requires firmware revision level F- or higher and 076P020-002 to support the terminal interface functionality.

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 first screen to appear is the Main Menu screen, shown below.

```
Main Menu
1. IP Address
2. Passwords
3. Element Access
4. Test
Next Selection:
```

Type 3 and press the Enter key. The screen then displays the Shelf Inventory screen that appears in [Figure 3-1](#). 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 Telnet Connection Login screen, shown below, is the first to appear.

```
Copyright (c) 1993-1997 General DataComm Industries
Inc.
All rights reserved
SCM Application Version 3.2

login:
```

After you enter the login password the screen displays the Shelf Inventory screen that appears in [Figure 3-1](#).

Note *There is a 10-minute timeout on the telnet interface. If 10 minutes pass with no keyboard activity, the telnet session is terminated. At that point the SCM Main Menu appears if you are using a terminal connected to the SCM front panel.*

Selecting a DSE (Shelf Inventory Screen)

From this point, procedures are the same for both types of connection. The Shelf Inventory screen in [Figure 3-1](#) is for a two-shelf installation in which two LTUs support a total of 29 SC 5520 DSEs. 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]	SC5001
[2]	SC5001	[18]	SC5520
[3]	SC5520	[19]	SC5520
[4]	SC5520	[20]	SC5520
[5]	SC5520	[21]	SC5520
[6]	SC5520	[22]	SC5520
[7]	SC5520	[23]	SC5520
[8]	SC5520	[24]	SC5520
[9]	SC5520	[25]	SC5520
[10]	SC5520	[26]	SC5520
[11]	SC5520	[27]	SC5520
[12]	SC5520	[28]	SC5520
[13]	SC5520	[29]	SC5520
[14]	SC5520	[30]	SC5520
[15]	SC5520 (alarm)	[31]	SC5520
[16]	SC5520	[32]	SC5520
[0] Close Session			
Enter slot number: []			

Figure 3-1 Shelf Inventory Screen

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

A "+" sign to the left of the shelf number indicates that one or more remote units has been discovered. The shelf can be selected, but changes to the configurations of the remote can only be made from the master unit.

Type the slot number of the unit you intend to work with, and press the Enter key. The DSE responds by displaying the SC 5520 Main Menu.

Main Menu

The SC 5520 Main Menu screen, shown in [Figure 3-2](#), is the access point to the individual terminal interface functions. Type the number that corresponds to the function you need to use and press the Enter key.

```
          S C  5 5 2 0

          SHELF SLOT = 6

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

[0] Return to Shelf Inventory

Select: [ ]
```

Figure 3-2 Main Menu Screen

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 5520 Configuration
                Shelf timing: Disable                Data Highway: One
[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] Interface Type:             Auto
[H] Async: Character Size:      11 Bits
[I] Overspeed:                  1%
[J] Suppression:                Disable
[K] 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 DSE.

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 5520 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 3-2](#) lists the configuration options that appear on the terminal interface display and all the settings available for each.

Table 3-2 SC 5520 Configuration Option Settings (* = Default Setting)

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
[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:	Receive *
	External
	Internal
[5] Buffer Clock:	Internal *
	External
[6] Zero Encoding:	Enable *
	Disable
[7] Remote Unit Type:	NMS 510 *
	NMS 520

(Sheet 1 of 2)

Table 3-2 SC 5520 Configuration Option Settings (* = Default Setting) (Continued)

Option	Potential Settings
[8] Sentry Timer (pt to pt):	1 – 120 Minutes (default = 60 min.)
	Disable
[9] Remote Response Interval:	10 – 120 Seconds (10-second increments) (default = 10 sec.)
	Disable
[A] Circuit Assurance:	Enable
	Disable *
[B] System Status:	Enable
	Disable *
[C] DTE Control: AAS: (Auto Anti Streaming)	Enable
	Disable *
[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] Interface Type	Auto *
	RS232
	V.35
[H] Async: Character Size	11 bits *
	10 bits
	9 bits
	8 bits
[I] Overspeed	1% *
	2.3%
[J] Suppression	RX + TX EOT
	TX EOT
	RX EOT
	Disable *
[K] Rate Adaption	Disable *
	1200
	600
	1800 to 2400

(Sheet 2 of 2)

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

Diagnostics

The terminal interface SC 5520 Diagnostics screen combines configuration and command functions. Selections 1 through 9 are configuration options that affect DSE 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 5520 Diagnostics

Diagnostic Options
[1] DTE: Line Loopback Control:      Disable
[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]   Remote Loop Receive:          Enable
[7]   Remote Loop Auto Timeout:     Disable
[8]   Remote Loop Initiation Seq.:  V.54
[9]   Self Test Pattern:             511

T E S T S :
[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 and you are certain they are correct, 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 DSE. 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, Tests](#). 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 5520 Main Menu and the procedure is complete.

[Table 3-3](#) lists the Diagnostic configuration options that appear on the terminal interface display and all the settings available for each.

Table 3-3 SC 5520 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] Remote Loop Receive	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 DSE 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 appears in [Figure 3-6](#)

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

```

                                SC 5520 Alarm Configuration

[R]   Report All Alarms,      [N] Report None

[1] Unit: EEPROM Checksum:      Masked
[2]   Front Panel Test:        Masked
[3]   STC Loopback:            Masked
[4] DTE: DTP Loss:              Masked
[5]   DCD Loss:                 Masked
[6]   DSR Loss:                 Masked
[7]   DTR Loss:                 Masked
[8]   RXD Loss:                 Masked
[9]   TXD Loss:                 Masked
[A]   External Clock Loss:      Masked
[B]   Test Mode Shorted:        Masked
[C]   DCD Shorted:              Masked
[D]   DSR Shorted:              Masked
[E]   CTS Shorted:              Masked
[F]   RXD Shorted:              Masked
[G]   RXC Shorted:              Masked
[H]   TXC Shorted:              Masked

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

```

Figure 3-5 Alarm Configuration Screen, with Default Settings

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.

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 between its potential settings: **Masked** and **Report**.
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 and you are certain they are correct, 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 DSE.

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 5520 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 3-4](#) lists the Alarm Configuration options that appear on the terminal interface display and the settings available for each.

Table 3-4 SC 5520 Alarm Configuration Option Settings

Option	Potential Settings
[1] Unit: EEPROM Checksum	Masked (default) or Report
[2] Front Panel Test	
[3] STC Loopback	
[4] DTE: DTP Loss	
[5] DCD Loss	
[6] DSR Loss	
[7] DTR Loss	
[8] RXD Loss	
[9] TXD Loss	
[A] External Clock Loss	
[B] Test Mode Shorted	
[C] DCD Shorted	
[D] DSR Shorted	
[E] CTS Shorted	
[F] RXD Shorted	
[G] RXC Shorted	
[H] TXC Shorted	

Monitor/Alarms

The terminal interface SC 5520 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.

Note *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.*

```

SC 5520 Monitor/Alarms

          DTE Status1
TXD:  TRANS          RXD:  OFF          DCD:  OFF
TXC:  TRANS          DTR:  ON           DSR:  ON
RTS:  ON             CTS:  ON           DTP:  ON

          Alarm Status2

Major:                Minor:                Informational:
EEPROM Chksum:  MASKED  RXD Loss:          MASKED  Fr. Pan. Test:  MASKED
Ext. Clk loss:  MASKED  TM Shorted:        MASKED  DSR Loss:       MASKED
DTP Loss:       MASKED  DSR Shorted:       MASKED  DTR Loss:       MASKED
DCD Loss:       MASKED                                TXD Loss:       MASKED
DCD Shorted:    MASKED                                STC Loopback:   NO
CTS Shorted:    MASKED
RXD Shorted:    MASKED
RXC Shorted:    MASKED
TXC Shorted:    MASKED

[0] Return to Main Menu

          Select: [ ]

1 DTE signals display as OFF or -
as applicable - ON or TRANS
(transitioning)
2 Alarm conditions display as NO,
ACTIVE, or MASKED

```

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 DSE configuration has become corrupted

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

DTP Loss – indicates loss of power at the DTE

DCD Loss – indicates loss of incoming data

DCD Shorted – indicates a short circuit in the DCD interface lead

CTS Shorted – indicates a short circuit in the CTS interface lead

RXD Shorted – indicates a short circuit in the RXD interface lead

RXC Shorted – indicates a short circuit in the RXC interface lead

TXC Shorted – indicates a short circuit in the TXC interface lead

Minor Alarms

RXD Loss – occurs when a unit that is configured for constant RX carrier experiences one minute without transitions in the Receive Data

TM Shorted – indicates a short circuit in the TM interface lead

DSR Shorted – indicates a short circuit in the DSR interface lead

Informational Alarms

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

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

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

TXD Loss – occurs when a unit that is configured for constant TX carrier experiences one minute without transitions in the Transmit Data

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

Note A signal shorted alarm is reported when the short circuit to ground condition occurs while the affected signal is On or Active.

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 5520 Maintenance

General Datacomm.
SpectraComm 5520 Data Set Emulator

Firmware Revision:      G-
Serial Number:         0030000102030405
Interface Adapter:     none

[1] Front Panel Switches: Enabled
[2] Front Panel LED Test: 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 DSE 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 three command selections:

- [1] Front Panel Switches – permits you to enable or disable the hardware switches on the front panel of the SC 5520 DSE. You set it in the same way that you do configuration selections on other screens:
- [2] Front Panel LED Test - when set to On causes all LEDs on the DSE front panel to light. The LEDs remain lit until the command selection is set to Off. This is both a test of the LEDs themselves, and a convenience when using the terminal interface and Telnet for diagnostics from a remote location. This feature enables you to identify a unit for easy location by on-site personnel.
- [3] Soft Reset – causes the DSE 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 DSE 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 Front Panel LED Test 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 DSE. Loading of firmware is typically required when GDC makes changes to improve performance or to include new features.

The SC 5520 DSE can store two versions of operating firmware, designed 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.

Overview

You should test the SC 5520 DSE when it is first installed to verify correct installation. After the equipment is in service you may need to perform tests to diagnose any problems that occur in the operation of the DSE or the data communications system.

There are five ways to initiate performance testing of the SC 5520 DSE:

- commands from an SNMP controller
- terminal interface commands
- DSE front panel ST, LT, RL, and DL switches
- signals from the DTE on the EIA Remote Loop and EIA Local Loop leads
- commands from the Telco Serving Test Center (STC)

Test commands from an SNMP controller take priority over tests commanded in any other way. You can individually enable/disable front panel, EIA, and Telco test control in the DSE configuration.

This chapter describes tests that can be initiated on the SC 5520 DSE from the terminal interface, the front panel, the DTE, or the STC. Consult the appropriate SNMP controller documentation for information on the other forms of testing.

[Figure 4-1](#), *Fault Isolation Procedure*, illustrates an approach you can follow for using the front panel tests to identify the source of a problem.

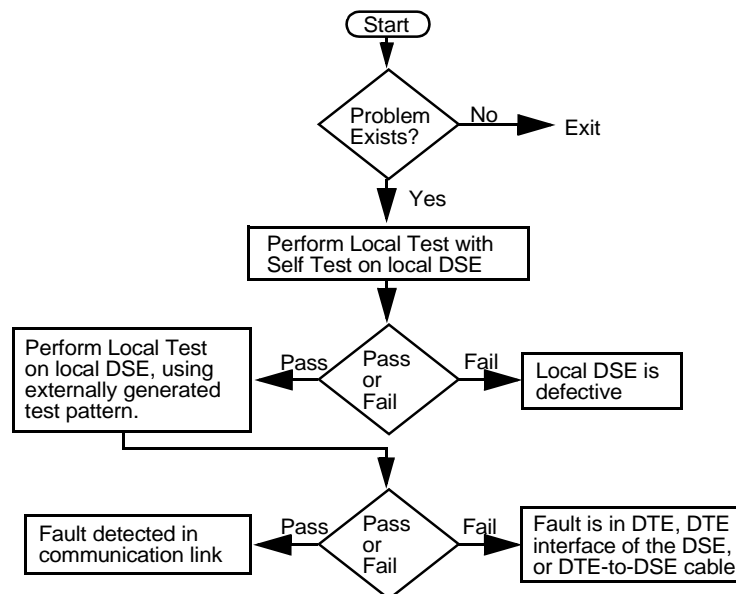


Figure 4-1 Fault Isolation Procedure

Terminal Interface Diagnostics Screen

The terminal interface SC 5520 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 5520 Diagnostics

Diagnostic Options
[1] DTE: Line Loopback Control:      Disable
[2] Remote Loopback Control:        Disable
[3] Data Set Ready:                  Normal
[4] Network: Line Loopback Test Puts: DTE Only
[5] Telco Latching Loopback Rasp:   Enable
[6] Remote Loop Receive:             Enable
[7] Remote Loop Auto Timeout:       Disable
[8] Remote Loop Initiation Sea.:    V.54
[9] Self Test Pattern:               511

T E S T S:
[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.
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 DSE 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 DSE from the backplane data highway by connecting the transmit logic circuits to the receive logic circuits. The loopback provides a path through the DSE for an externally generated test signal, as shown in [Figure 4-3](#).

If the Network Line Loopback is set for Network and DTE, the DSE also loops its backplane data highway time slot back to the LTU during Local Test. The default condition is Termaloop Only enabled (no loopback to the backplane).

During Local Test:

- The DTE interface remains active.
- The DSE 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 Line Loopback is set for Network and DTE, receive data from the backplane is returned to the backplane as transmit data so that tests performed from the remote DSU can check everything in the circuit except the DSE.

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 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.

Note *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 LT EIA has been enabled by an SNMP controller. The default condition is LT EIA disabled.

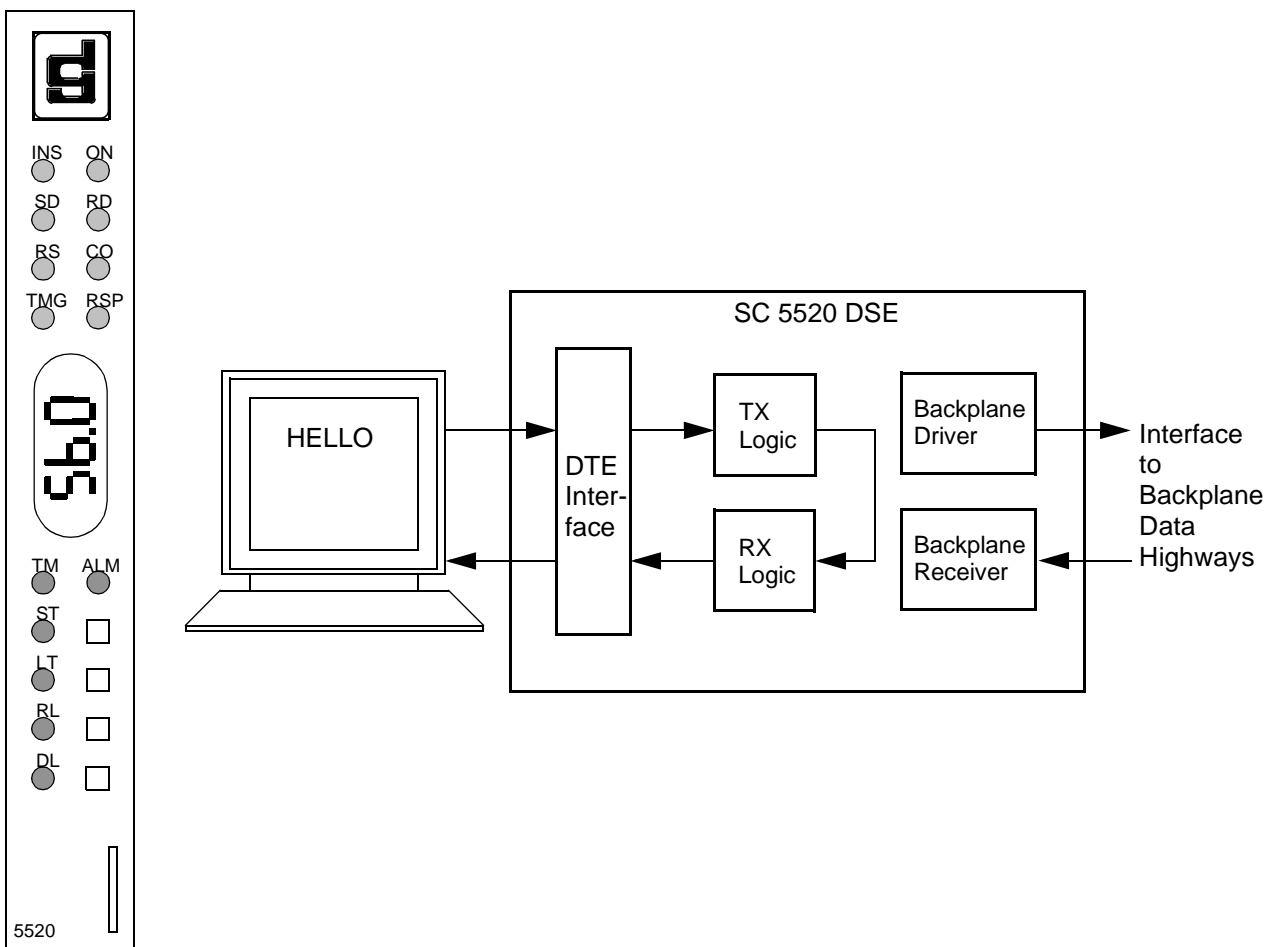


Figure 4-3 Local Test

To perform the Local Test from the front panel:

1. Press the LT momentary action switch to start the test.
2. The LT Indicator is lit during the test.
3. TM indicator is On while the Local Test loopback is active.
4. Enter test data at the DTE. Compare data entered at the DTE with data looped back and displayed by the DTE. (Test equipment can be used in place of the DTE).
5. Press the LT switch to end the test.

Local Test with Self-Test

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

- **Local Test** — the DSE loops transmit data back as receive data. If Network Line Loopback is set for Network and DTE, the DSE returns receive data in its backplane time slot to the LTU as transmit data.
- **Self-Test** — the DSE 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 DSE is configurable to use a 511, 2047, or 15 bit test pattern. The DSE 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.

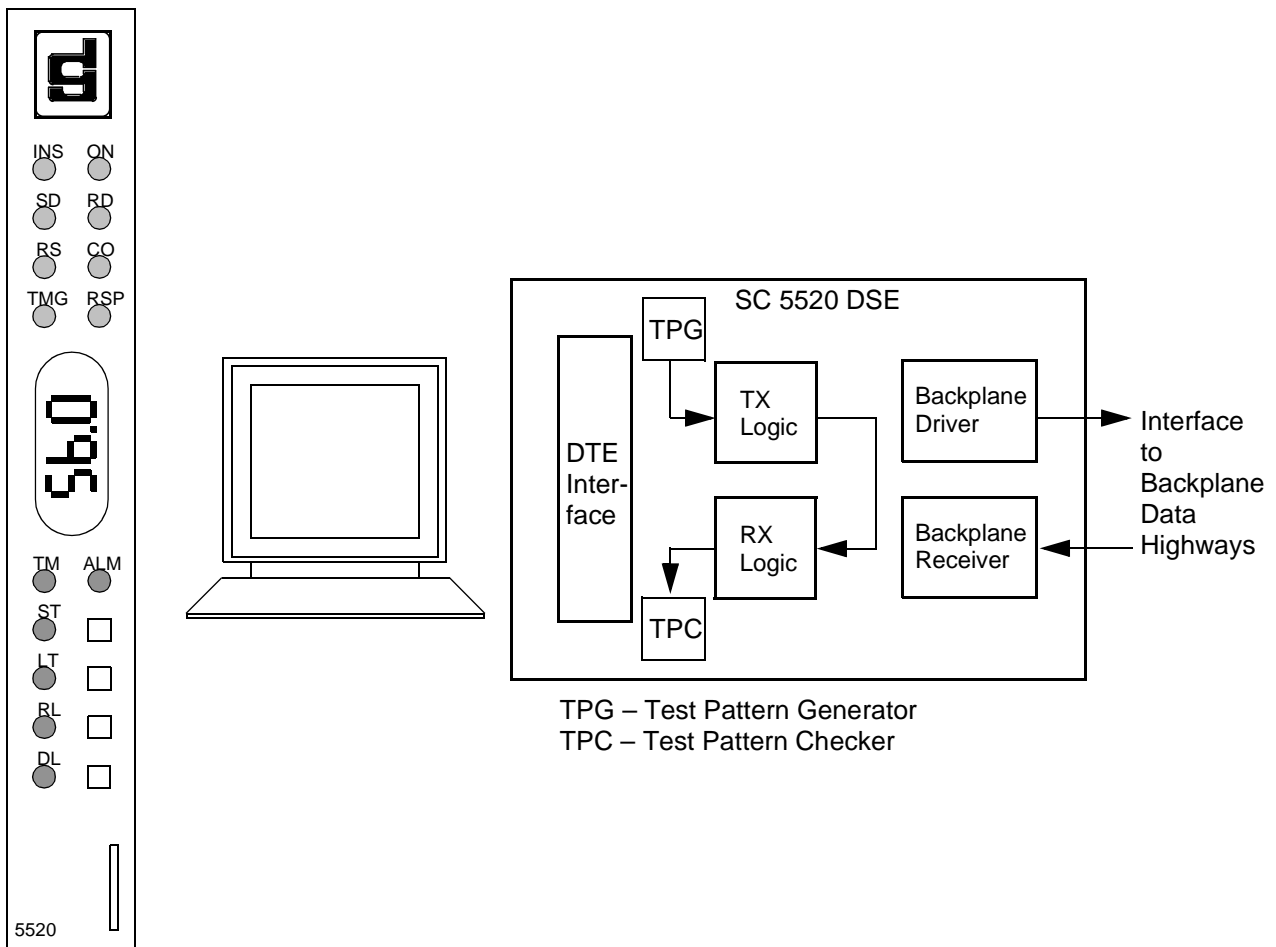


Figure 4-4 Local Test with Self-Test

To perform the Local Test with Self-Test from the front panel:

1. Press the LT and ST momentary action switches.
2. The LT and ST indicators are lit during the test.
3. The TM indicator is On during the test. TM blinks to indicate a detected error. Steady light indicates the pattern is received correctly.
4. Press the LT and ST switches to end the test.

Remote Loop

In the Remote Loop test function the local 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 PN 127 remote loop command. The remote DSU must be configured to accept the same command the DSE transmits.

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

Note *The Remote Loop function is for use only on point to point links.
The Remote Loop function is not compatible with a remote NMS 520 DSU or a remote NMS 510 DSU.*

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

During Remote Loop:

- The DSE 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 DSE 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 DSE transmits a loop down code for five seconds, commanding the remote unit to release the loopback. The DSE 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 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.

Note *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 RL EIA has been enabled by an SNMP controller. The default condition is RL EIA disabled.*

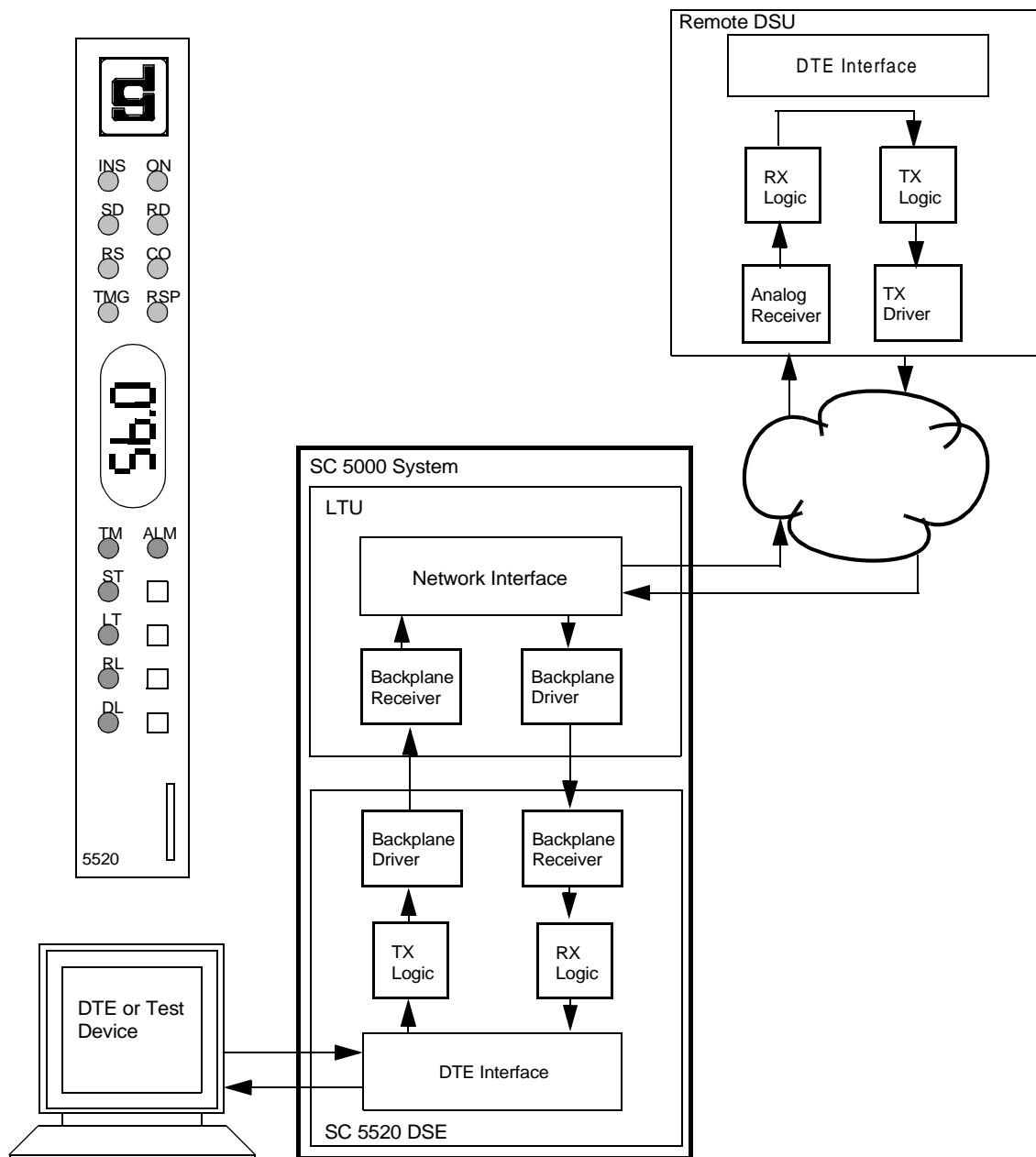


Figure 4-5 Remote Loop

To perform the Remote Loop test from the front panel:

1. Press the RL momentary action switch to start the test.
2. The RL indicator is On during the test.
3. The TM indicator is On while Remote Loop is active.
4. Enter test data at the DTE. Compare data entered at the DTE with data looped back and displayed by the DTE. (Test equipment can be used in place of the DTE.)
5. Press the RL switch to end the test.

Remote Loop with Self-Test

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

- Remote Loop — the local 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 PN 127 remote loop command. The remote DSU must be configured to accept the same command the DSE transmits.
- Self-Test — the DSE 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 configurable to use a 511, 2047, or 15 bit test pattern. The DSE is isolated from its DTE while the Test Pattern Generator and Checker are enabled.

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

Note *The Remote Loop with Self-Test function is for use only on point to point links.
The Remote Loop with Self-Test function is not compatible with a remote NMS 520 or NMS 510 DSU.*

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.

Note *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.*

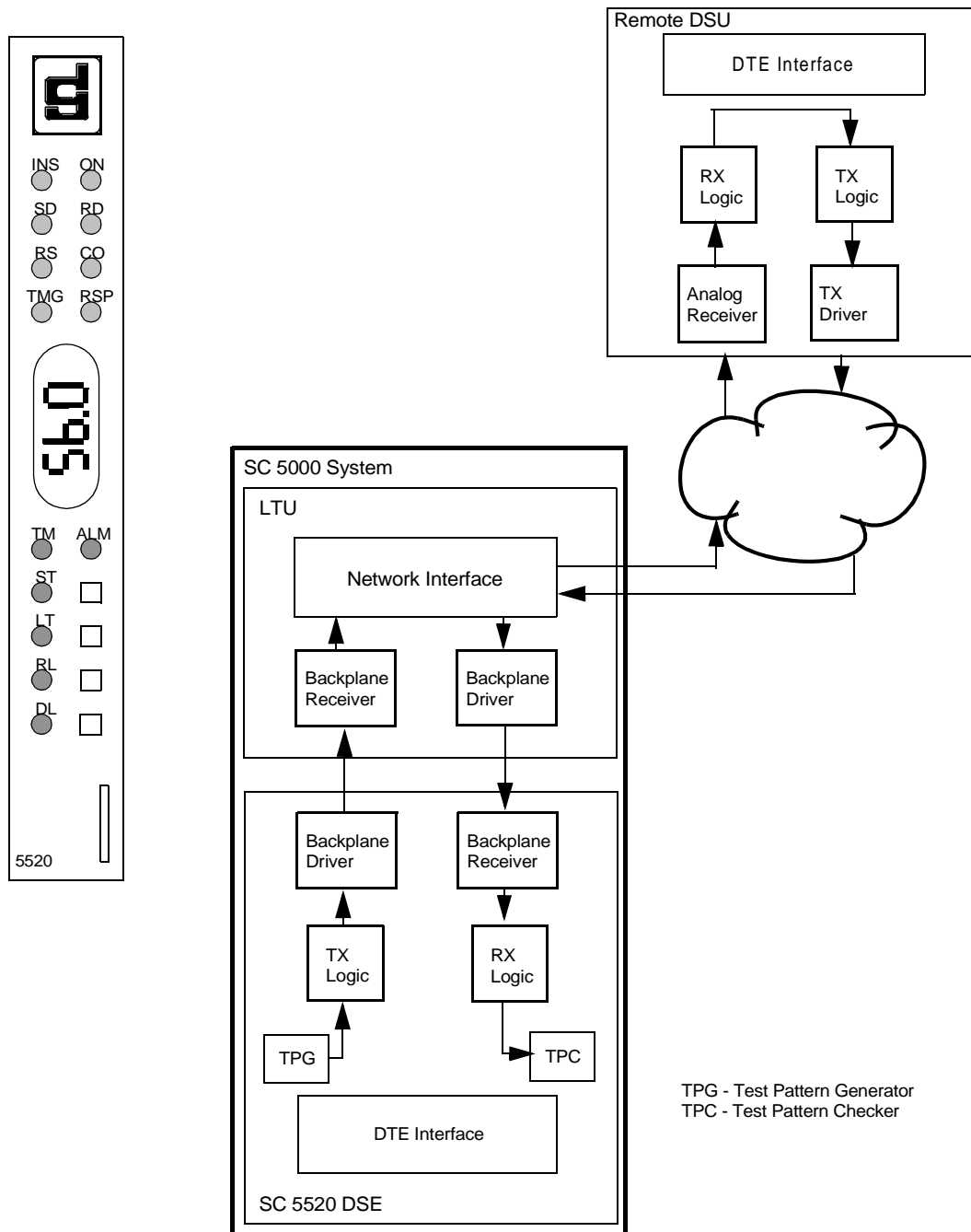


Figure 4-6 Remote Loop with Self-Test

To perform Remote Loop with Self-Test from the front panel:

1. To start the test, press RL and wait approximately 4 seconds for the remote end to receive the command, then press the ST switch.
2. The TM indicator will be On during the test. TM will blink to indicate a detected error. Steady light indicates pattern is received correctly.
3. Press RL switch to end the test.

Data Loop

The Data Loop loopback condition, shown in [Figure 4-7](#), isolates the DSE 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 DSE 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.

***Note** 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.*

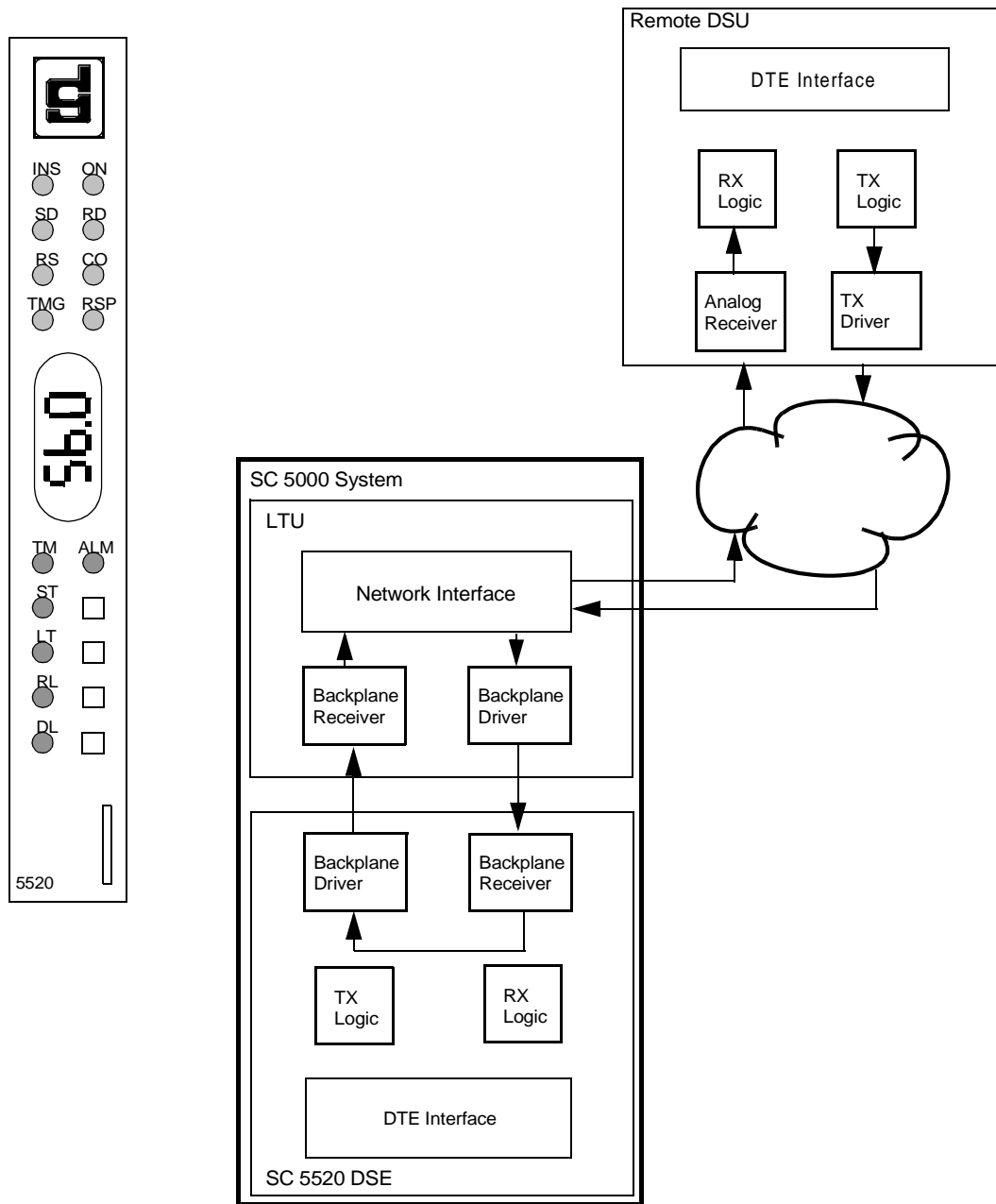


Figure 4-7 Data Loop

To perform the Data Loop test from the front panel:

1. Press the DL momentary action switch to start the test.
2. DL indicator will light during the test.
3. TM indicator is On while the Digital Loop is active.
4. Press the DL switch to end the 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 DSE connects its receive logic and transmit logic circuits to loop received signals back onto the backplane. The STC transmits a test signal to the DSE and then checks it for errors after it has returned through the loopback. [Figure 4-8](#) 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.

Note *The Telco Latching Loop option, configurable in the DSE 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.

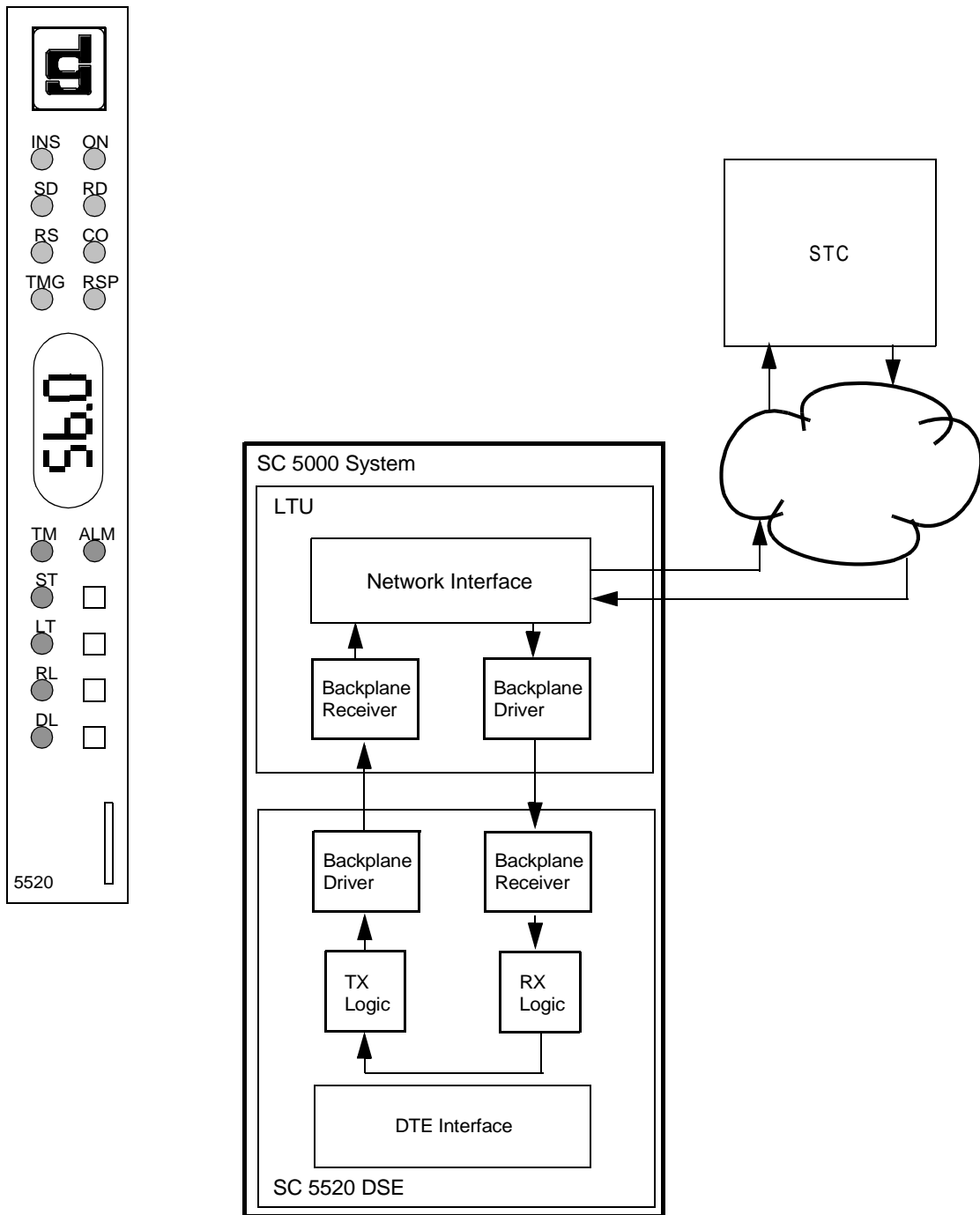


Figure 4-8 DSU Loopback Test

To perform the DSU Loopback Test:

1. Contact the STC and ask them to initiate the DSU Loopback test.
2. The TM indicator lights.
3. Coordinate with the STC to end the test.

CSU Loopback Test (STC Controlled)

The CSU Loopback test is a remotely controlled diagnostic, initiated by a CSU code sent from a Serving Test Center (STC). During the test the DSE connects its backplane receiver and driver to loop received signals back onto the backplane so that the LTU transmits them back to the STC. At the same time, the DSE connects its transmit logic and receive logic circuits so that data loops back toward the DTE interface.

While the loopback is in effect the STC transmits a test signal to the DSE and then checks it for errors after it has returned through the loopback and over the network. A test signal can also be directed through the DTE interface and checked for errors at the local site. [Figure 4-9](#) illustrates the CSU Loopback.

When it is necessary to isolate a problem, contact the STC and ask them to initiate the CSU Loopback test. The test results should be used in conjunction with the fault isolation sequence ([Figure 4-1](#)) to pinpoint a problem, if any.

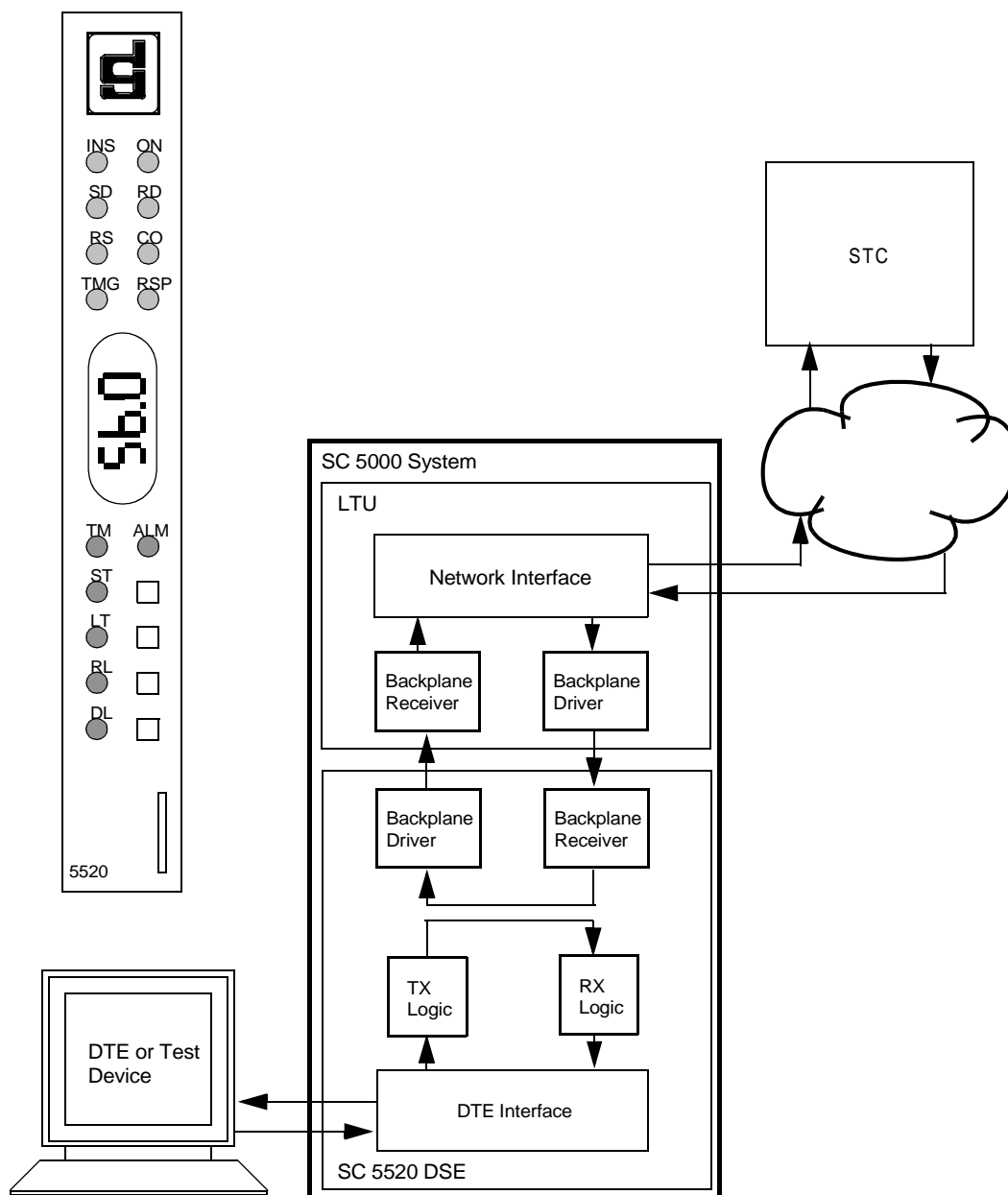


Figure 4-9 CSU Loopback Test

To perform the STC controlled CSU Loopback Test:

1. Contact the STC and ask them to initiate the CSU Loopback Test.
2. The TM indicator lights.
3. While the CSU loopback is in effect you can enter test data at the DTE.
4. Compare the data entered at the DTE with data looped back and displayed by the DTE. (Test equipment can be used in place of the DTE.)
5. Coordinate with the STC to end the test.

Self Test Procedure

The Self Test generates and transmits a test pattern on the channel supported by the SC 5520 DSE. It performs error checking on the pattern it receives back. There are three ways to control the Self Test function:

- briefly press the ST switch on the front panel to initiate the test; press the switch again to end the test.
- select **[F] Self Test** from the terminal interface Diagnostics screen
- transmit commands from an SNMP controller to initiate and end the test.

Note 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 function can be used for either of two tests, both of which require cooperation at another site. The remote site can be requested to loop the signal back for error checking by the local DSE. Or, if compatible equipment is available, the remote site can generate a matching pattern back to the DSE for end-to-end test checking at both sites.

The remote unit for this test can be located at the service provider switching office or at the far end of the link.

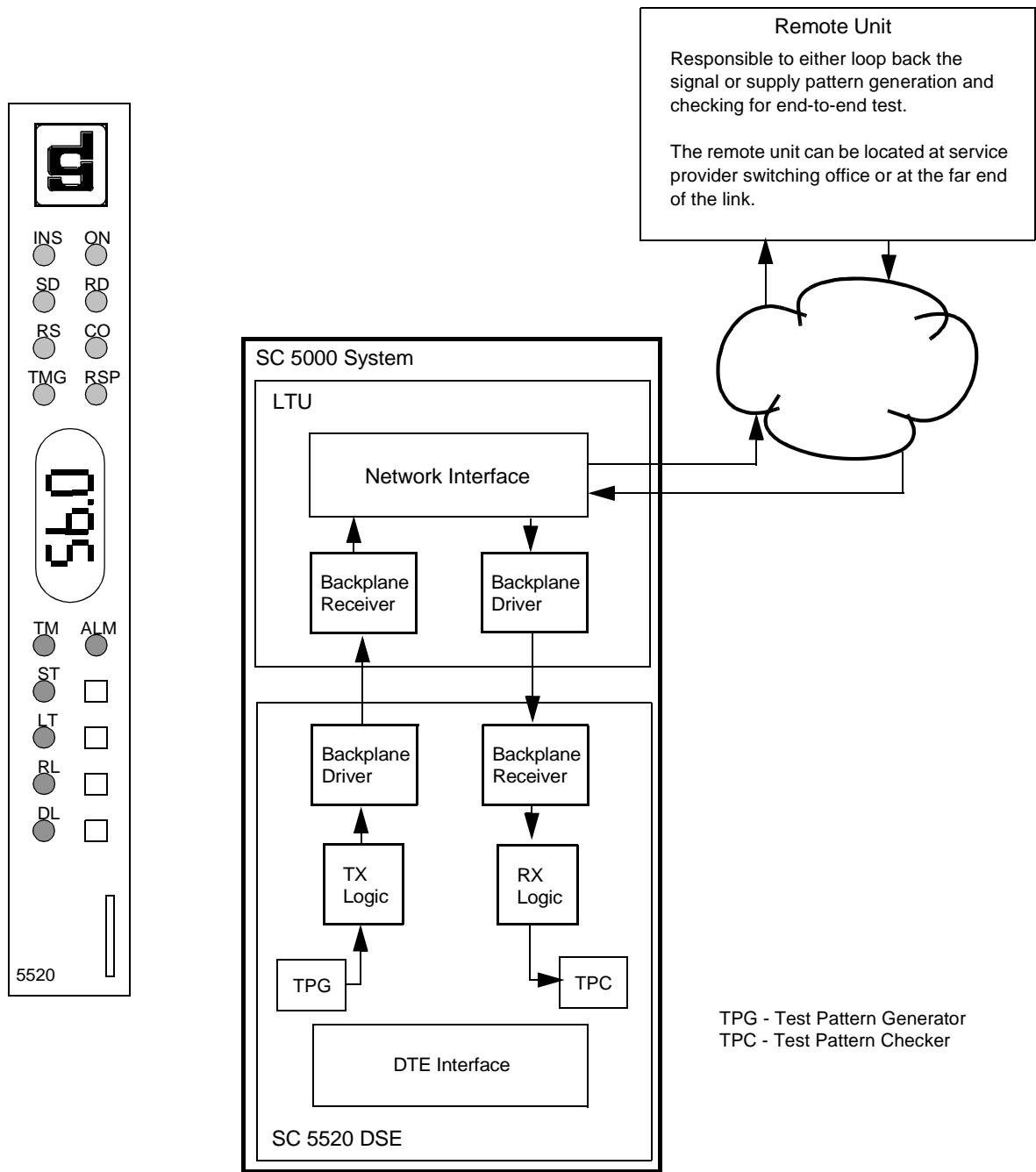


Figure 4-10 Self Test

To perform the Self Test from the front panel:

1. Press the ST switch.
2. The ST indicator is lit during the test.
3. The TM indicator is On during the test. The TM indicator will blink to indicate a detected error. A steady light indicates the pattern is received correctly.
4. Press the ST switch to end the test.

