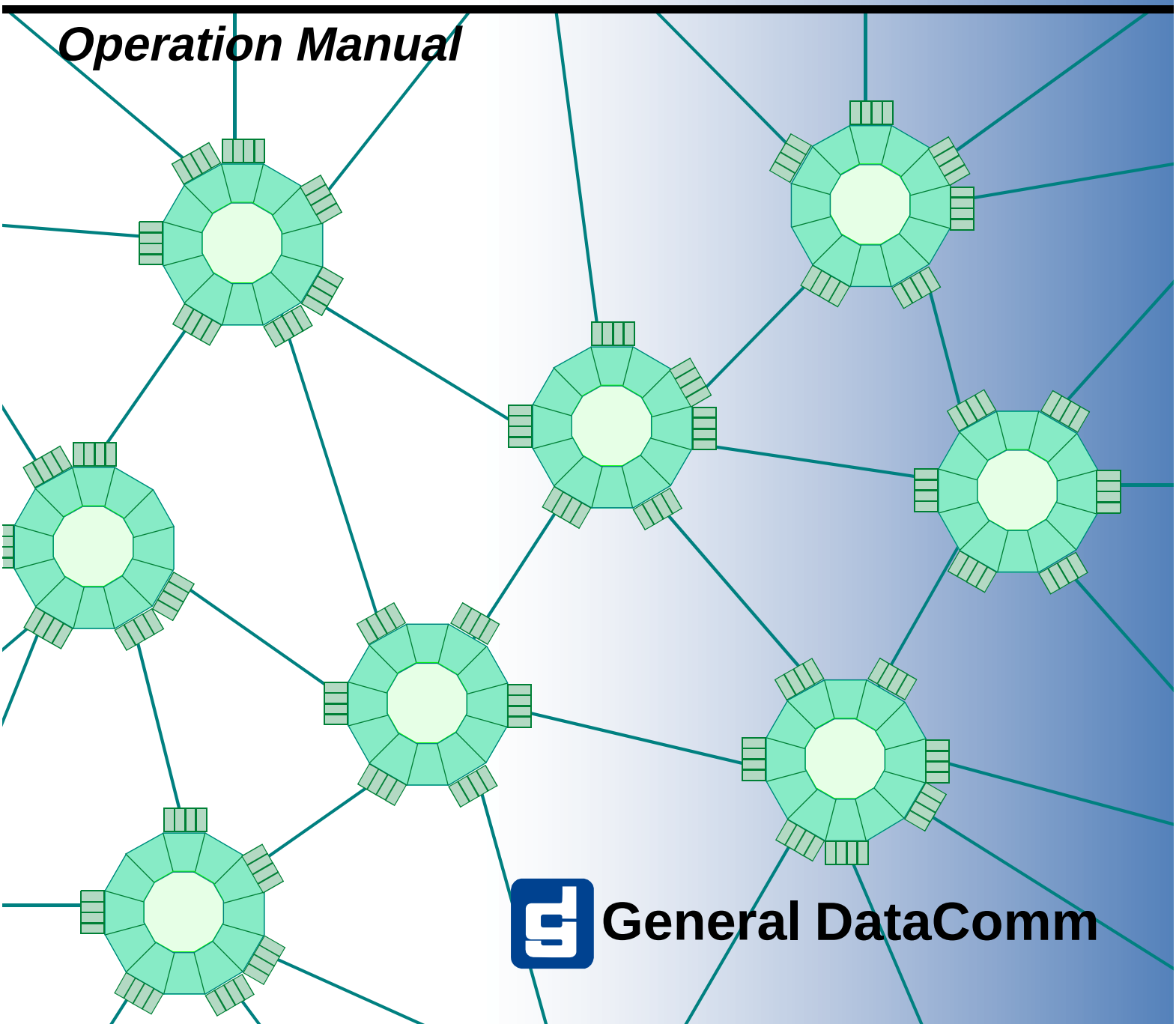
073R501-000
Issue 02
May 1999

GT 1020 / GT 2020 E1 HDSL Units

Operation Manual



General DataComm

073R501-000
Issue 02
March 1999

GT 1020 and GT 2020 E1 HDSL Units

Operation Manual

Safety Guidelines

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

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

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 and proper handling and grounding is 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 floorpads and workbench pads.

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

Canada DOC Notification

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operation and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). 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. 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 coordinated by a representative 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.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface.

The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Deutschland

Installations Anweisungen: Installieren Sie die Telefonleitungen nicht während eines Gewitters. Installieren Sie die Telefonleitungen nicht in einem feuchten Raum, auβer die Dose entspricht den Vorschriften für Feuchträume. Berühren Sie unisolierte Telefonleitungen oder Einrichtungen nicht, auβer diese sind vom Telefonnetz getrennt. Vorsicht bei der Installierung oder Änderung von Telefonleitungen. *Achtung:* Es gibt keine durch den Benutzer zu wartende Teile im Gerät. Wartung darf nur durch qualifiziertes Personal erfolgen.

Public Telecommunications Networks

The presence of this symbol indicates that this equipment is not intended to be connected to a public telecommunications network. The connection of such equipment to a public telecommunications network in a European Community Member State will be in violation of the national law implementing Directive 91/263/EEC on the approximation of the laws of the Member States concerning telecommunication terminal equipment, including the mutual recognition of their conformity

EC Declaration of Conformity

We: General DataComm Limited
Molly Millars Lane
Wokingham, Berkshire RG41 2QF, United Kingdom

On behalf of: General DataComm Inc.
1579 Straits Turnpike
Middlebury, CT 06762-1299, U.S.A.

The products to which this declaration relates are in conformity with the following relevant harmonized standards, the reference numbers of which have been published in the Official Journal of the European Communities;

Electromagnetic Compatibility

EN55022: 1994

Specification for limits and methods of measurement of radio interference characteristics of information technology equipment.

EN 50082-1: 1992

Generic immunity standard Part 1 Residential, Commercial, and Light Industry.

Safety

EN 60950: 1995 A1 through A3

Low Voltage Directive relating to electrical equipment designed for use within certain voltage limits.

Copyright

P.O. Box 1299, Middlebury, Connecticut 06762-1299 U.S.A.

Manual Revision History

Shown below is a chronological listing of revisions to this manual. The issue number, date, and synopsis of revised materials are included to provide the reader with a comprehensive manual history.

Note *In keeping with the policy of continuing development carried out by General DataComm Inc., the information in this manual is subject to revision without notice.*

Issue	Date	Description
01	03/1999	First issue.
02	05/1999	Added German test in Safety Information; Deleted references to TB1 permanent HDSL connection.

Table of Contents

Preface

Scope

This manual describes how to install and operate GT 1020 and GT 2020 E1 HDSL Units.

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, the possibility exists that information may not be current. If you require updated information for these products, or on any other General DataComm product information, contact:

General DataComm, Inc.
Park Road Extension
Middlebury, Connecticut, USA 06762-1299
Tel: 1 203 758 1811
Toll Free: 1 800 794 8246

Organization

This manual is divided into the following principle chapters:

Chapter 1 - System Description

Chapter 2 - Installation

Chapter 3 - Operation

Chapter 4 - Tests

Chapter 5 - Application Guide

Document Conventions

Headings are used throughout the manual to introduce primary topics, subsections of primary topics, and to introduce secondary topics.

```
This typewriter font designates output displayed on the screen,
input entered by you, or panel indicators.
```

This bold font designates window names and menu selections.

Note *A note indicates something you should be particularly aware of; something not readily apparent. A note is typically used as a suggestion.*

Important *An important statement indiactes something you should be particularly aware of; something not readily apparent. Important is typically used to prevent equipment damage.*

Safety Information

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 definitions and symbols for CAUTION, WARNING, and DANGER 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.

The following examples show the symbols and definitions of CAUTION, WARNING, and DANGER as they are used in this manual.

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.*

TUV required safety information:

VORSICHT
Potentielle Gefahr. Bei Nichtbeachtung besteht die Gefahr von leichter bis mäßiger Verletzung. Wird auch benutzt zum Schutz vor unsicherer Anwendung.

WARNUNG
Warnung vor drohender Gefahr. Folge bei Nichtbeachtung könnte Tod oder ernsthafte Verletzung sein.

GEFAHR
Bei Nichtbeachtung führt zum Tod oder ernshafter Verletzung.

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.

GDC's 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 regarding GDC's VITAL Network Services' service programs, training courses, or for assistance with your support requirements, contact GDC's VITAL Network Services at the address or phone number listed below, or visit our website at:

http//www.vitalnetsvc.com

VITAL Network Services World Headquarters
6 Rubber Avenue
Naugatuck, Connecticut 06770 USA

North America: 1 800 243 1030
1 888 248 4825
1 203 729 2461
Training Information:1 203 729 0271
French Speaking Canada:1 800 361 2552
North America Fax: 1 203 723 5012
1 203 729 7611

VITAL Network Services Regional Sales and Service Offices:

Europe, Middle East, Africa

VITAL Network Services
Molly Millars Close
Molly Millars Lane
Wokingham, Berkshire RG41 2QF UK

Telephone: +44 1189 657200
Training: +44 1189 657240
Fax: +44 1189 657279

Central America, Latin America

VITAL Network Services
Periferico Sur 4225, Desp. 306
C.P. 14210, Mexico D.F., Mexico

Telephone:+52 5 645 2238
Training:+52 5 645 2238
Fax:+52 5 645 5976

Asia Pacific

VITAL Network Services
501 Orchard Road 05-05
Wheelock Place, Singapore 238880

Telephone: +65 735 2123
Training: +65 735 2123
Fax: +65 735 6889

International Calling Code (+)

When calling from outside the country of origin, use the appropriate International Calling Code where the + symbol is shown.

Chapter 1: System Description

Overview

This manual describes installation and operation of GT 1020 and GT 2020 HDSL units manufactured by General DataComm Industries, Inc.

The GT 1020 and the GT 2020 each provide local loop transmission for full and fractional E1 services. They employ High-Bit-Rate Digital Subscriber Line (HDSL) technology to transmit and receive data over a two-wire metallic pair, and conform to ETSI standards.

The units are intended for use by either a telephone company/carrier or an end user. The GT 2020 supports data rates up to 2.048 Mbps, while the GT 1020 supports rates up to 1.152 Mbps. They both operate over unconditioned metallic cable at distances up to 4.0 Km when using 0.5 mm cable, or up to 3.2 Km when using 0.4 mm cable.

The GT 2020 can operate as a master unit. It can be used in a point to point system with a second GT 2020 or a multipoint system with two GT 1020 serving as slave units at separate locations connected by fractional E1 service.

Part numbers for standard and optional equipment for the GT 1020 and GT 2020 appear in the *Equipment List, Table 1-1*. The *Technical Characteristics List, Table 1-2*, lists operating parameters.

Features

The GT 1020 and GT 2020 are customer-side interfaces for an HDSL system. They provide the following features:

- Configurable as either a Line Terminating Unit (LTU) or a Network Terminating Unit (NTU).
- Software configurable through an optional ASCII terminal or hardware configurable via on-board switches.
- May be used as a Network Managed Element within a GDC Network Management System.
- Provides internal BERT capability.
- Provides Local Loopback and Remote Digital Loopback capabilities.

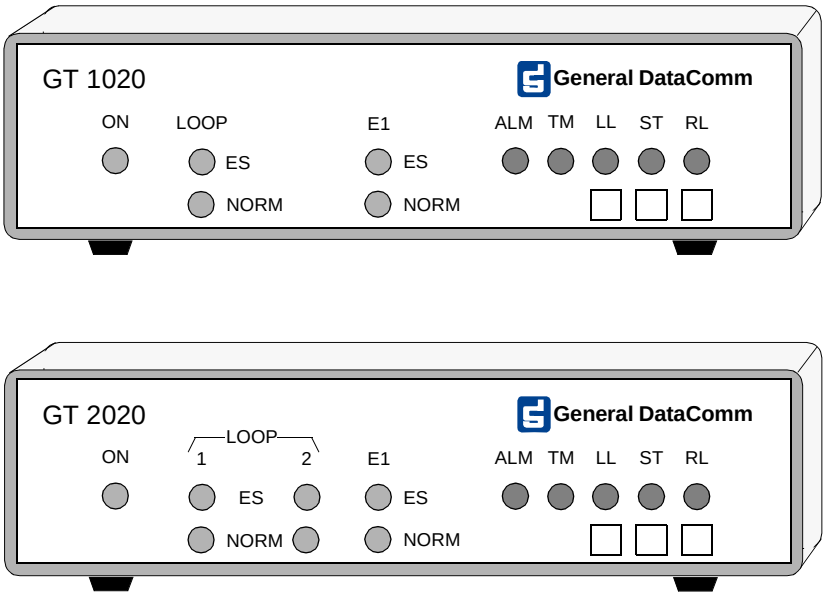


Figure 1-1 GT 1020 and GT 2020 HDSL Units

Applications

Point-to-Point

The GT 1020 and GT 2020 can operate in one of several configurations. Three are shown in *Figure 1-2*. This application provides bandwidth of Nx64 kbps for N=1 to N=18 for the GT 1020 and N=1 to N=32 for the GT 2020. Both units in the HDSL system must be configured for the same data rate.

Point-to-MultiPoint

This application accomplishes E1 provisioning services. Bandwidth at each remote GT 1020 supports Nx64 kbps for N=1 up to N=18. The total bandwidth of the combined remote GT 1020s may not exceed N=31. E1 time slot allocation is determined at the master side of the HDSL system.

Fractional G.704 Service

This application provides for Fractional G.704 service. Bandwidth is N=1 (64 kbps) up to N=18 (1152 kbps) for the GT 1020 and up to N=32 (2048 kbps) for GT 2020. G.704 time slot allocation is left justified for rates up to N=31. If N=32 is desired, the GT 2020 must be configured in UNFRAMED mode.

Note *Other applications may be found in Chapter 5 of this manual.*

Note *In order for the GT 1020 or GT 2020 to operate correctly, the timing source for all applications must be the E1 network.*

Diagnostics/Network Management

Operation and parameters are controlled by switches mounted on the printed circuit card. A back panel terminal interface jack labeled CONTROL is also provided. This terminal interface enables access to a full set of menu-driven diagnostic and configuration controls via a standard terminal interface. These include loopback and test pattern control, access to performance monitoring, and configuration control. Instructions for using the terminal feature are in *Chapter 2, Installation*.

A GT 1020 or GT 2020 standalone unit may be used as part of a Universal Access System (UAS). The UAS is a family of network managed metallic loop transmission products. A shelf mounted UAS family member is linked by the access loop to a standalone unit located at the far end. Full network management capabilities are achieved by using a SpectraComm Manager (SCM), installed in the UAS shelf, as the interface to an SNMP controller.

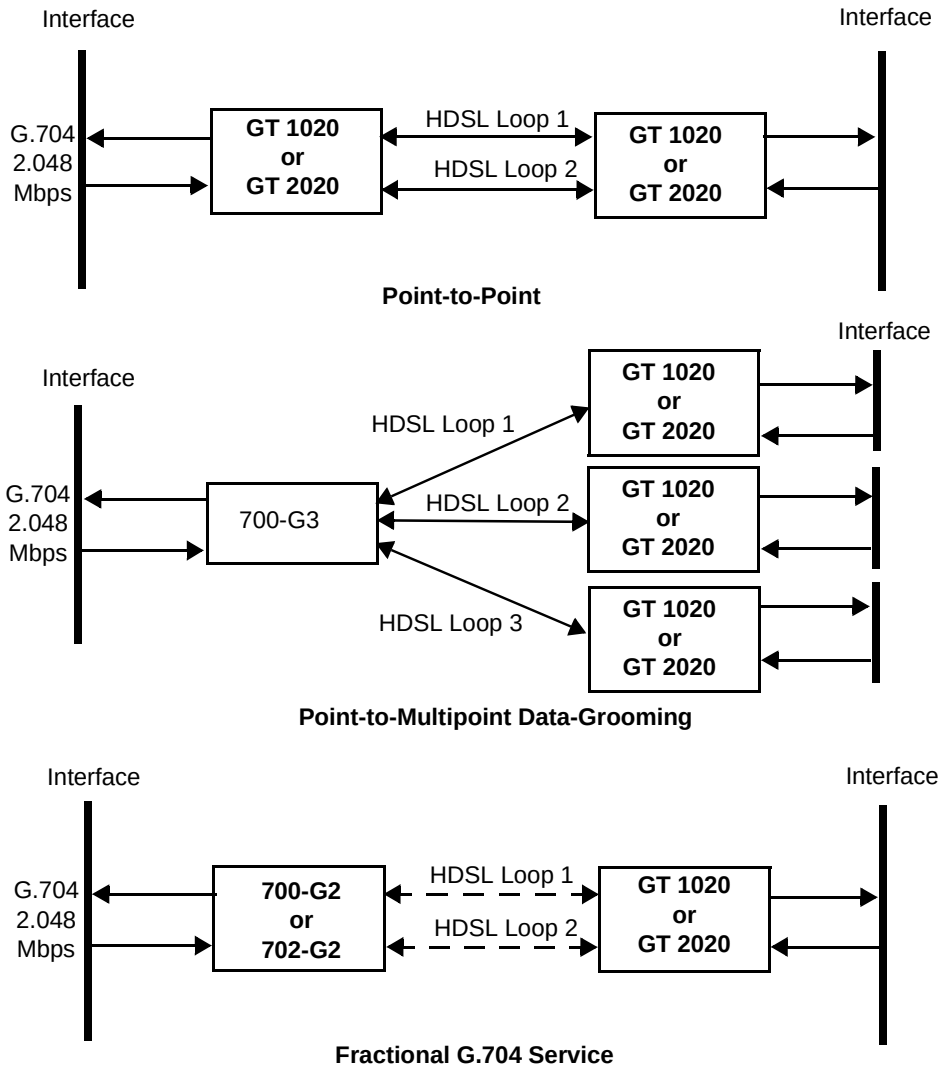


Figure 1-2 Typical GT 1020/GT2020 Applications

Technical Characteristics

Table 1-1 Equipment List

Description	GDC Part No.
GT 1020 - 100 to 240 V ac, 50/60 Hz	073A502-001
GT 2020 - 100 to 240 V ac, 50/60 Hz	073A502-002
Cables	
E1 Line Cable, shielded crossover	027H266-005 -015 -025 -050
Adapter, RJ48C to dual 75 Ohm unbalanced E1 BNC connectors	209-044-001
Terminal Cable, 8-position modular to 8-position modular	830-028-807
HDSL Line Cable, shielded	022H024-001 -002 -005 -010 -015 -025 -050
Power Cords (IEC320)	
Domestic	830-024-003
Europe	830-061-002
Italy	830-002-008
Japan	830-002-009
Australia	830-002-010
Taiwan	830-002-011
U.K.	830-060-102
Switzerland	830-061-003

Table 1-2 Technical Specifications

Local Side	
Data Rates	2048 kbps
Framing	E1 Framed G.704 and E1 Unframed data
Interface	2048 kbps per G.703 and G.704 (-6 dB receiving sensitivity)
Data Encoding	HDB3 or AMI
Remote Side	
Rate	Dual duplex 584 Kbaud signaling rate, with 2B1Q line code (each loop)
Framing	HDSL framing per ETSI ETR, including performance monitoring via the embedded operation channel (EOC)
Interface	One or two non-loaded DLL - loops
Transmit Power	13.5 dBm (± 0.5 dB)
Transmission Line	
Two metallic twisted-pairs (Loop # 1 and Loop # 2)	Non-loaded DLL type with no loading coils and no additional shielding: up to 3.2 Km at 0.4 mm up to 4.5 Km at 0.5 mm When Bridged-Taps (BTs) are present, the following rules apply: Maximum number of bridged-taps = 2 Maximum tap length = 1000 meters No loop impairments Meets performance specification of ETSI ETR 152
Test Features	
Local Loopback Remote Loopback BER Test	Front panel switch or terminal screen selectable. Front panel switch or terminal screen selectable. Front panel switch or terminal screen selectable.
Dimensions	
Height	56 mm (2.2 in.)
Width	206 mm (8.1 in.)
Depth	163 mm (6.4 in.)
Weight	0.7 kg (1.5 lbs.)
Shipping Weight	3.6 kg (8.1 lbs.)
Temperature	0° to 40°C (32° to 104°F) operating –40° to 70°C (–40° to 158°F) non-operating
Electrical	
Input Power	7 watts at the ac mains
Environmental	
Temperature Card Assembly Operation Card Assembly Storage/ Non-Operating	0 to 40 degrees Celsius -40 to +85 degrees Celsius
Humidity	5 to 90% non-condensing
Altitude Operating Non-Operating	 0 to 10,000 feet 0 to 40,000 feet

Chapter 2: Installation

Overview

This chapter guides you through the process of installing and using the GT 1020 and GT 2020 in your communications network. If this is your first experience using these units you may wish to review *Chapter 1* to ensure that you understand the key features and the process of installing and using the unit in your network.

Unpacking and Handling

Inspect the unit for damage; if any is observed, notify the shipper immediately. Save the box and packing material; you can use it to reship the unit, if necessary.

Installation Requirements

The GT 1020/GT 2020 basecard occupies a standalone enclosure. Place the unit in a ventilated area where the ambient temperature does not exceed 104°F(40°C). Do not install it directly above equipment that generates a large amount of heat (such as power supplies).

If you need to remove the basecard from the standalone base, disconnect the power supply connector from the rear of the enclosure.

Important *Observe ESD precautions during the procedure. Most especially, be sure to wear a properly grounded antistatic wrist strap.*

1. Make sure that the unit's power cord is disconnected.
2. Remove the two screws from the bottom of the unit.
3. Place the unit right side up on a flat surface and carefully remove the top cover.

Note *The component card and rear panel are fixed to the bottom. The front panel, however, is floating.*

4. Perform the switch and jumper adjustments.
5. Replace the top cover, positioning it with the grille at the rear, and carefully align the front panel so that it fits into the grooves in the top and bottom covers.
6. Replace the two screws in the bottom of the unit.

Setting Hard Options

Option selections match the GT 1020/GT 2020's functional characteristics with the network in which it is installed. The unit's pc card has two switchbanks for option selection. Normally, the settings controlled by the switches can also be performed by means of software (terminal interface or SNMP network controller), but there is a hardware switch setting (switch S2-1) to lock out software optioning. *Tables 2-1 and 2-2* explain the functions of the switches and *Figure 2-1* shows their locations.

Note *The microprocessor in the GT 1020/2020 only reads the hardware option switch settings during the unit's power-up sequence. If you change hardware settings while the power is On, you must turn the power Off and then On again in order for the new settings to take effect. Software option settings take effect immediately without need for a power cycle. Software option settings are stored in non-volatile memory, so they do not need to be reset after power interruption.*

You need to make these adjustments only once, when first installing the unit. You don't have to repeat the procedure, unless you change your network or connect a different device to a data channel.

Table 2-1 Switchbank Functions: Option Selection (default settings shown in **bold** type)

Switch(es)	Label	Setting	Description
S1-1	SPARE	**Off**	Off setting is Mandatory for Spare switches.
S1-2	FP-EN/DIS	**Off**	Front panel switches enabled.
		On	Front panel switches disabled.
S1-3	DAT/SIG	**Off**	Data mode - G.704 Channel Associated Signalling disabled.
		On	Signalling mode - G.704 Channel Associated Signalling enabled.
S1-4	P2P/P2MP	**Off**	Unit configured for point-to-point application.
		On	Unit configured for point-to-multipoint application.
S1-5 - S1-8	SPARE	**Off**	Off setting is Mandatory for Spare switches.
S2-1	SFT/HARD	**Off**	Configuration can be changed by means of hardware switches, terminal interface, or SNMP control. When power is cycled, the unit retains configuration selected by terminal interface or SNMP control.
		On	Configuration can be changed by means of hardware switches, terminal interface, or SNMP control. When power is cycled, the unit comes up using the configuration selected by the hardware switches.
S2-2	HDB3/AMI	**Off**	HDB3 Line Coding selected.
		On	AMI Line Coding selected.
S2-3	FR/UNFR	**Off**	Framed mode - unit receives and transmits framed E1 data.
		On	Unframed mode - unit receives and transmits E1 data on a bit by bit basis.
S2-4	TLU/ILU	**Off**	Terminal Line Unit (TLU) - unit regenerates G.704 frame structure, including recalculation of CRC-4 error checking.
		On	Intermediate Line Unit (ILU) - unit passes E1 data transparently, without frame regeneration.
S2-5	NTU/LTU	**Off**	Unit functions as a Network Terminating Unit (NTU), located on the user side.
		On	Unit functions as a Line Terminating Unit (LTU), located on the central office side. LTU acts as a master unit in relation to an NTU for timing and supervision.
S2-6	SPARE		
S2-7 S2-8	N LOOPS	**Off/Off**	Maximum number of loops enabled: 2 in the GT 2020, 1 in the GT1020.
		Off/On	1 loop enabled.
		On/Off	2 loops enabled (GT 2020 only).
		On/On	2 loops enabled (GT 2020 only).
Jumpers			
X1 & X2	**75 Ohm**		75 Ohm position selects 75 Ohm unbalanced termination for the E1 interface.
	120 Ohm		120 Ohm position selects 120 Ohm balanced termination for the E1 interface.
	X1 and X2 must be set in the same position, either 75 Ohm or 120 Ohm.		

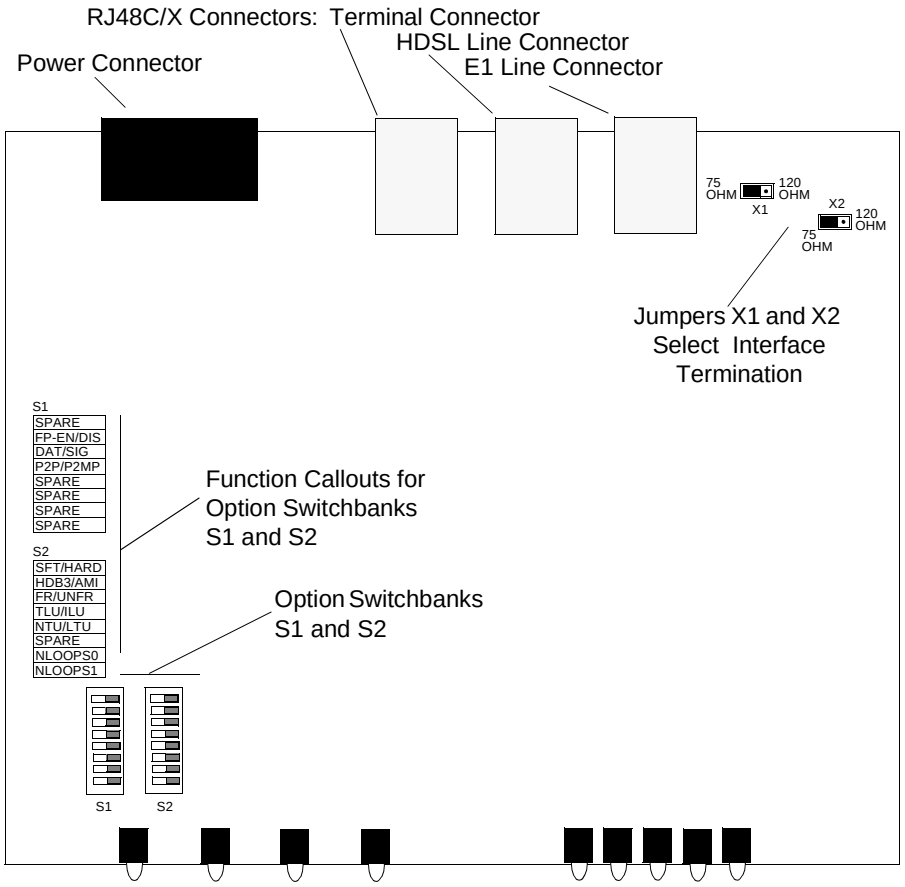


Figure 2-1 PC Board: Options and Connectors

Electrical Connections

The following paragraphs describe the power and line connections to the GT 1020/2020.

Note *Before you power up the unit, refer to the Preoperational Hard/Soft paragraphs that follow the Electrical Connections information.*

Power

Attach the appropriate power cord to the rear panel IEC 320 connector and to the wall receptacle. The unit should be powered by the same ac source as the equipment interfaced with the unit to prevent large circulating currents caused by differences in ground potential. If you cannot determine whether the equipment is powered by the same ac source, verify that a potential difference of less than 0.25 V rms exists between the grounding circuits of the respective power outlets.

E1 Line Connection

The E1 Line connection to the GT 1020 or GT2020 unit is made through the back panel 8-position RJ48C/X modular connector labeled E1 Line. *Table 2-2* lists the pin-outs for that connector.

HDSL Line Connections

The HDSL Line connection to the GT 1020 or GT2020 unit is made through the back panel 8-position RJ48C/X modular connector labeled HDSL Line. *Table 2-3* lists the pin-outs for the RJ48C/X connector.

Control Connection

Connection of a VT100-compatible terminal for controlling the unit is optional. When a terminal is used, its connection to the GT 1020 or GT2020 unit is made through the back panel 8-position RJ48C/X modular connector labeled Control. *Table 2-5* lists the pin-outs for the RJ48C/X connector. The Control port provides an EIA/TIA 232-E asynchronous DTE interface to support communication with and standard ASCII terminal (VT100 ANSI terminal or personal computer performing terminal emulation).

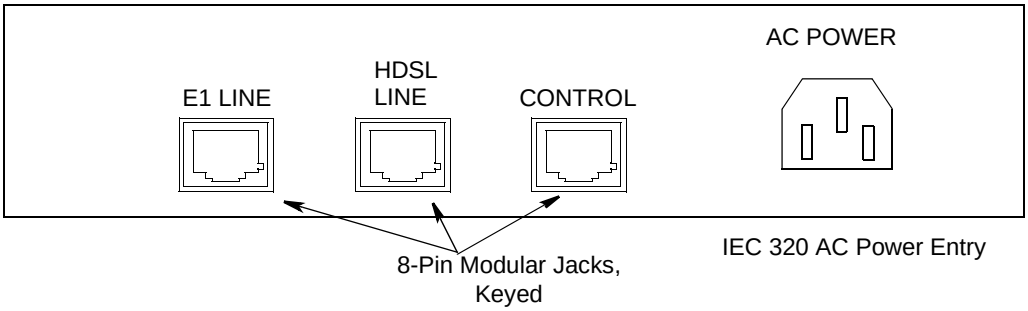


Figure 2-2 Rear Panel

Preoperational Configuration Setup

Hard

Configure the unit as follows:

1. Set the switches according to *Table 2-1*. Verify NTU/LTU configuration. If S2-1 is placed in the SOFT configuration position, all other switch settings are ignored, and the unit must be configured via the optional terminal screen. Refer to Setup (Soft).
2. Connect the E1 interface and HDSL loops to the rear panel connectors.
3. Apply power to the unit.
4. The card automatically performs internal self-tests. If one of these tests fails, the front panel ALM LED blinks.
5. Follow step 5 under Setup (Soft).

Soft

1. Follow steps 1 through 5 above.
2. Connect a terminal to the CONTROL connector on the back panel.

3. To view the test results on the terminal, go to the View H/S Config Screen on the terminal. Refer to *Chapter 3* paragraph - "Setting Soft Options.".
4. After performing the self-tests, the HDSL loops (LTU and NTU) initiate start-up, and the green LEDs should blink. The start-up should last less than three minutes. When complete, the NORM LEDs should be ON and the ES LEDs should be OFF. If not, the start-up failed. The card automatically initiates a new start-up procedure. During this time, the ALM LED will blink until the LOOP and E1 status indicators clear.
5. E1 data transfer should occur. The NORM LED should be ON, and the ES LED should be OFF. If not, refer to the troubleshooting procedure in *Chapter 4.*

Table 2-2 E1 Connector Pin Assignments

Pin No.	Function	Description
1	E1-RX-RING	Network Receive Ring
2	E1-RX-TIP	Network Receive Tip
3	No Connection	
4	E1-TX-RING	Network Transmit Ring
5	E1-TX-TIP	Network Transmit Tip
6, 7, 8	No Connection	

Table 2-3 HDSL Connector Pin Assignments

Pin No.	Function	Description
1	HDSL-LP2-RING	Loop 2 Ring (GT 2020 only)
2	HDSL-LP2-TIP	Loop 2 Tip (GT 2020 only)
3	No Connection	
4	HDSL-LP1-RING	Loop 1 Ring
5	HDSL-LP1-TIP	Loop 1 Tip
6, 7, 8	No Connection	

Table 2-4 Control Line Connector, Pin Assignments

Pin No.	Function	Description
1, 3, 7, 8		No connection
2	DCD	Data Carrier Detect - constant On
4	Ground	
5	RXD	Receive Data - from unit to terminal
6	TXD	Transmit Data - from terminal to unit

Chapter 3: Operation

Overview

Figure 3-1 illustrates the GT 1020/GT 2020 front panel and explains the function of each control and indicator. You may check the operation of the unit by monitoring the front panel indicators and using the test procedures provided in *Chapter 4*.

You can find some unit configurations for typical applications in *Chapter 5*.

Once the options are set and the communication line properly connected, the units need no additional operator commands. The units are transparent to your network and communicate automatically with each other and with your connected network devices.

Front Panel Description

Table 3-1 describes the front-panel LED indicators and push buttons. Red LEDs indicate critical or major failures and errors. Green LEDs indicate satisfactory operation or completion of a process.

Table 3-1 Front Panel

Label	LED Color	Function
ON	Green	Lit while +5V is applied to the unit
LOOP ES	Red	Errored Seconds - indicates loop status in conjunction with the LOOP NORM indicator; see *Table 3-2* for interpretation. GT 2020 has two sets of these indicators, labeled Loop 1 and Loop 2.
LOOP NORM	Green	Normal Operation - indicates loop status in conjunction with the LOOP ES indicator; see *Table 3-2* for interpretation. GT 2020 has two sets of these indicators, labeled Loop 1 and Loop 2.
E1 ES	Red	Errored Seconds - indicates E1 status in conjunction with the E1 NORM indicator; see *Table 3-2* for interpretation.
E1 NORM	Green	Normal Operation - indicates E1 status; this indicator is interpreted in conjunction with the E1 ES indicator; see *Table 3-2* for interpretation.
ALM	Red	Lights to indicate the presence of a major alarm. Blinks to indicate failure during self-test. Also blinks to indicate detection of LOS, LOSW, or UAS on an HDSL loop.
TM	Red	Test Mode - lit during any loopback and/or self-test; blinks during self-test to indicate errors detected.
LL	Red	Local Line Loopback, indicator and push button. Indicator is lit during Local Loopback test mode, whether initiated by the pushbutton. TM is also lit when this indicator is On. In order for this test to operate properly, the E1 network must be the timing source.
ST	Red	Self Test, indicator and push button. Pushing the ST button activates a 2^{15}-1 pseudo-random test pattern and enables detection of an incoming 2^{15}-1 pattern. Indicator is lit during self test mode, whether initiated by the pushbutton. TM is also lit when this indicator is On.
RL	Red	Remote Line Loopback, indicator and push button. Indicator is lit during Remote Line Loopback test mode, whether initiated by the pushbutton. For this loopback to be functional, the unit must be configured as an LTU. TM is also lit when this indicator is On.

The Loop and E1 data path indicators enable visual monitoring of the HDSL Loop 1 input, the HDSL Loop 2 input (GT 2020 only), and the E1 Interface.

There are two indicators for the status of each HDSL loop and two indicators for the status of the E1 conection:

- NORM - system status.
- ES - transport status.

Each of LEDs can be in one of three states: ON, blinking (at a 2 Hz rate), or OFF. *Table 3-2* summarizes how to interpret the indicators.

Table 3-2 Front Panel Status Indicators

Loop Indicators		
ES	**NORM**	**Indicates...**
OFF	ON	Normal operation
ON	OFF	LOS/LOSW - Loss of input signal/Loss of synchronization word on loop
ON (for .5 sec.)	ON	ES - Errored second
ON	Blink	Start-up tests, No response from mating unit
OFF	Blink	Start-up in progress
E1 Indicators		
ES	**NORM**	**Indicates...**
OFF	ON	Normal operation
ON	OFF	LOS/LOFA - Loss of signal/Loss of frame alignment
ON (for .5 sec.)	ON	ES - Errored second
ON	Blink	Alarm Indication Signal (AIS) received

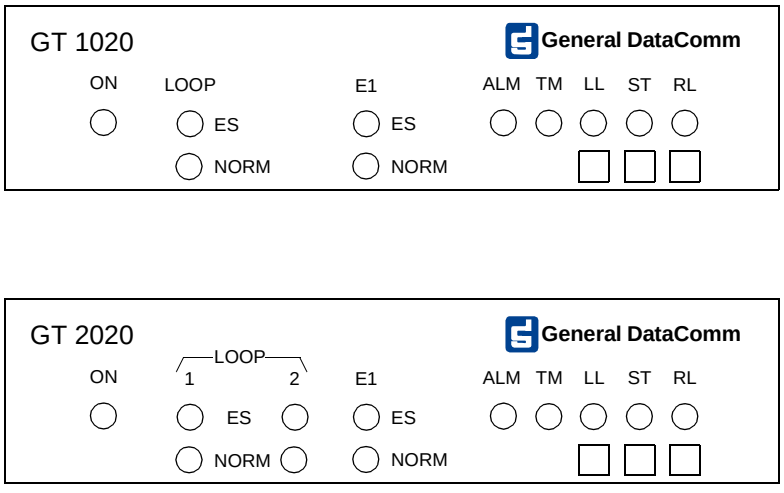


Figure 3-1 Front Panels

Soft Option Selection

You can use an optional terminal (a standard ASCII terminal equipped with an EIA/TIA-232-E communication interface) to configure and control the unit. Connect the terminal to the CONTROL port interface on the back panel. The port is an RJ48C/X jack that supports an EIA/TIA-232-E asynchronous DCE interface. Pin assignments for the port are shown in *Table 2-5*.

Terminal Requirements

The software necessary to run the supervision program for a GT 1020 or GT 2020 unit is contained in the unit itself. You can use any standard ASCII terminal (VT100 or ANSI terminal, or personal computer emulating an ASCII terminal) equipped with an EIA/TIA-232-E communication interface to control operation. Set the terminal communications parameters as follows:

- Data Rate = 9600 bps
- Character Format = 1 start bit, 8 data bits, no parity, one 1 stop bit

Startup Procedure

A management session starts automatically as soon as the terminal cable is connected to the CONTROL port of an operating unit. To end an ongoing management session, disconnect the terminal from the unit. Upon power-up, the unit sends the opening screen shown in *Figure 3-2*. Press the Enter key to move from this screen to the main menu.

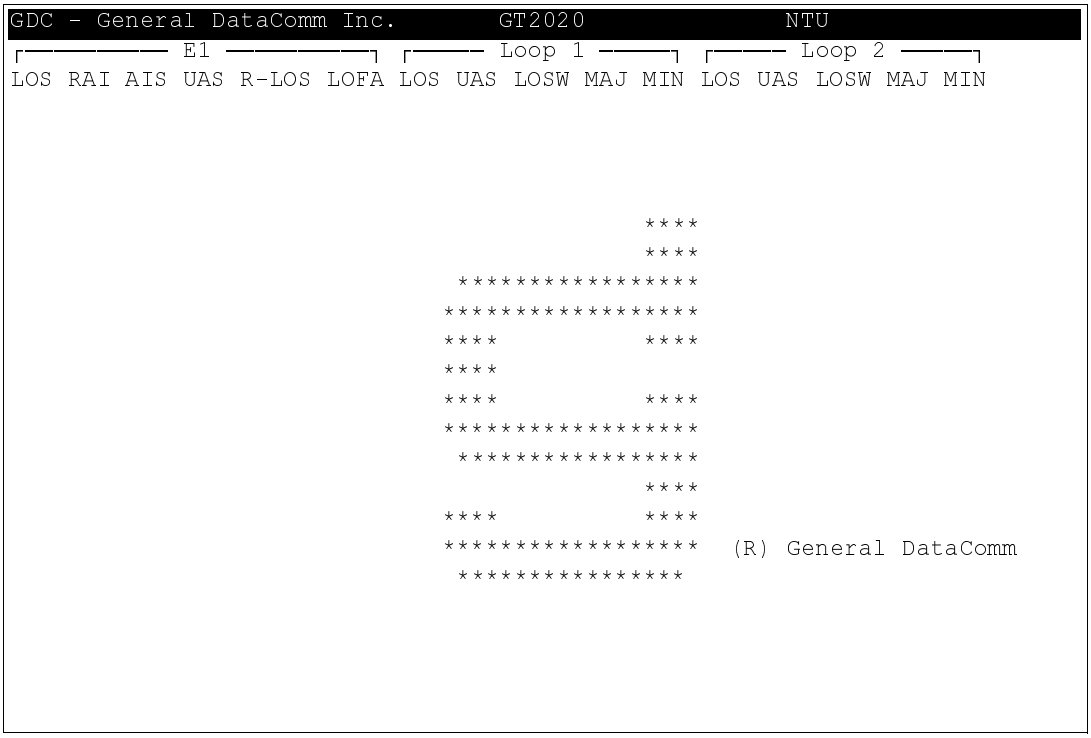


Figure 3-2 Opening Screen

Screen Organization

The screen includes the areas described in *Table 3-3*.

Table 3-3 Terminal Screen Organization

Header	Located at the top of the screen, the header displays GDC name and equipment model, followed by the current operating mode (LTU or NTU).
Status Line	Located below the header, the status line includes two main fields, which display the status of the various alarms and status signals. An active alarm and status indicators are displayed in reverse video.
E1 Field	Includes the following indications: LOS - Loss of input signal on the E1 trunk. RAI - reception of remote alarm indication via the E1 trunk. AIS - reception of alarm indication signal on the E1 trunk. UAS - Unavailable seconds threshold for the E1 trunk is being exceeded. R-LOS - Reception of remote loss-of-E1 signal report via the HDSL trunk. This field is disabled when the unit is configured for P2MP. LOFA - Local loss of frame alignment on the E1 trunk.
Loop Alarms Field	Loop alarms field is divided into several sub fields, one for each loop and includes the following indications: LOS - Loss of input signal on the corresponding loop. UAS - Unavailable seconds threshold for the corresponding loop is being exceeded. LOSW - Loss of synchronization word on the corresponding loop. MAJ - Major alarm threshold exceeded. MIN - Minor alarm threshold exceeded.
Work Area	Displays the menu and dialog boxes.
Active Keys Area	The active keys are constantly updated to show the keys and key combinations you can use on the current screen.

Operating Procedures

The following procedures apply to all the operations that you perform on the optional terminal.

Menu Selection

You can select a Menu item in two ways:

1. Move the selected block to the desired item by means of the arrows, then press the Enter key.
2. Type the number appearing to the side of the menu item.

Either action opens the sub menu or dialog box used to perform the selected operation.

Field Navigation

To move forward among the fields of a dialog box, press the Down arrow key. To move backward, press the Up arrow key.

Field Editing

You can modify the values displayed in the screen fields as follows:

1. Bring the cursor to the desired field, and then press Enter to display an option menu with the available values.
2. Highlight the desired value then press Enter to select the new value and close the option menu.

Restoring Default Values

When the unit stores default values for parameters displayed in a dialog box, you can replace the current values with the default values by pressing Ctrl D (Ctrl D means hold down the Ctrl (control) key and press D).

Saving Values

To save new parameter values entered in dialog boxes, press Ctrl W. These parameters are stored in non-volatile memory for use upon the next unit power-up in SOFT Config mode (Switch is set to SOFT).

Quitting Without Saving

To quit without saving the new parameter values entered in a dialog box, press Esc.. You can also press Esc as necessary to close any open submenus and to return to the main menu.

Refresh

You may refresh the screen at any time by typing Ctrl-R.

Main Menu

The Main Menu is displayed in *Figure 3-3*. The menu includes four options, described in the following paragraphs.

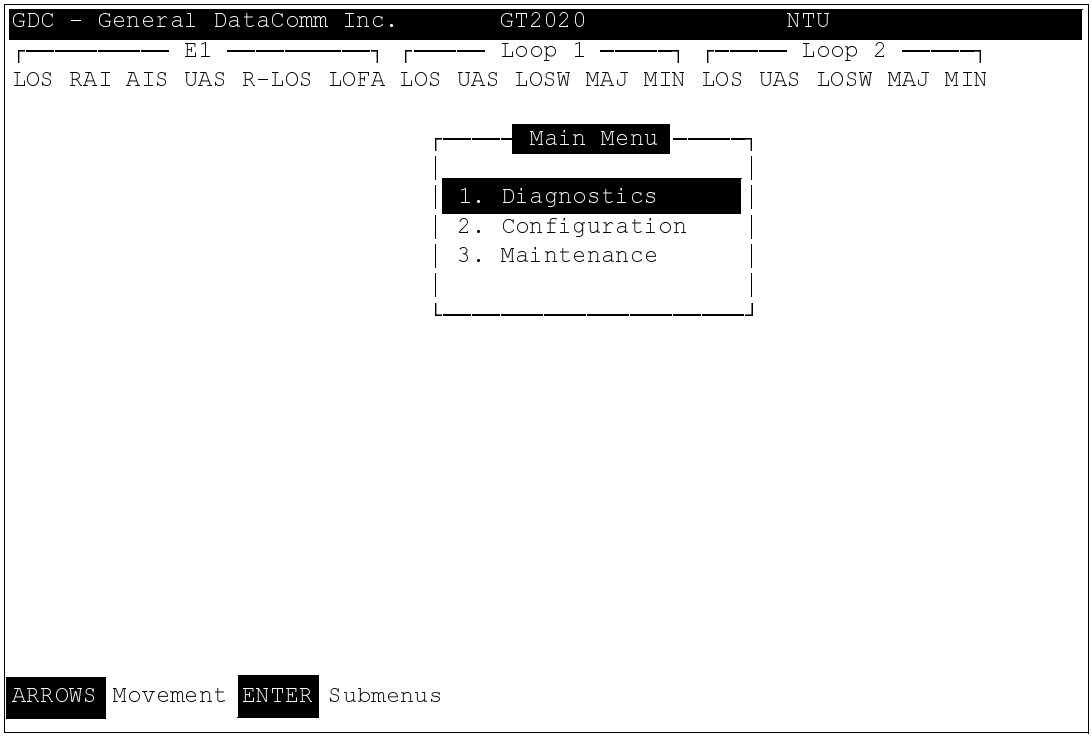


Figure 3-3 Main Menu

Diagnostics Option

Use this option to display diagnostic information and to activate or control diagnostic functions, as follows:

- Display of performance statistics collected on the E1 trunk.
- Display of performance statistics collected on each of the HDSL loops.
- Display HDSL loop status information, technical data on loop performance, HDSL loop noise margins, optional gain settings, etc.
- Cancel the start-up process.

Configuration Option

Use this option to configure the E1 and HDSL loop parameters, as follows:

- Modify the HDSL loop operating mode (NTU or LTU), number of loops enabled, and application type (point-to-point, point-to-multipoint), and front panel enable.
- Display and modify the E1 interface configuration, and E1 line code.
- Display and modify the E1 framing mode (only for GT2020 with the two loops enabled).
- Display system hardware and software data, and self-test results.
- Display unit information (revision, serial number, self-test results).

Maintenance Option

Use this option to perform maintenance activities, as follows:

- Enable both local and remote system loopbacks.
- Test system performance using the internal BER meter.
- Reset the statistics counters.
- Initiate manually the start-up process.
- Reset the unit. (Simulate a power-up.)

These screens are described in *Chapter 4* under Maintenance Menu.

Diagnostic Menu

You can use the diagnostic menu to display diagnostic information, and to activate diagnostic functions. See *Figure 3-4* . To open the diagnostics menu, select item 1 on the main menu.

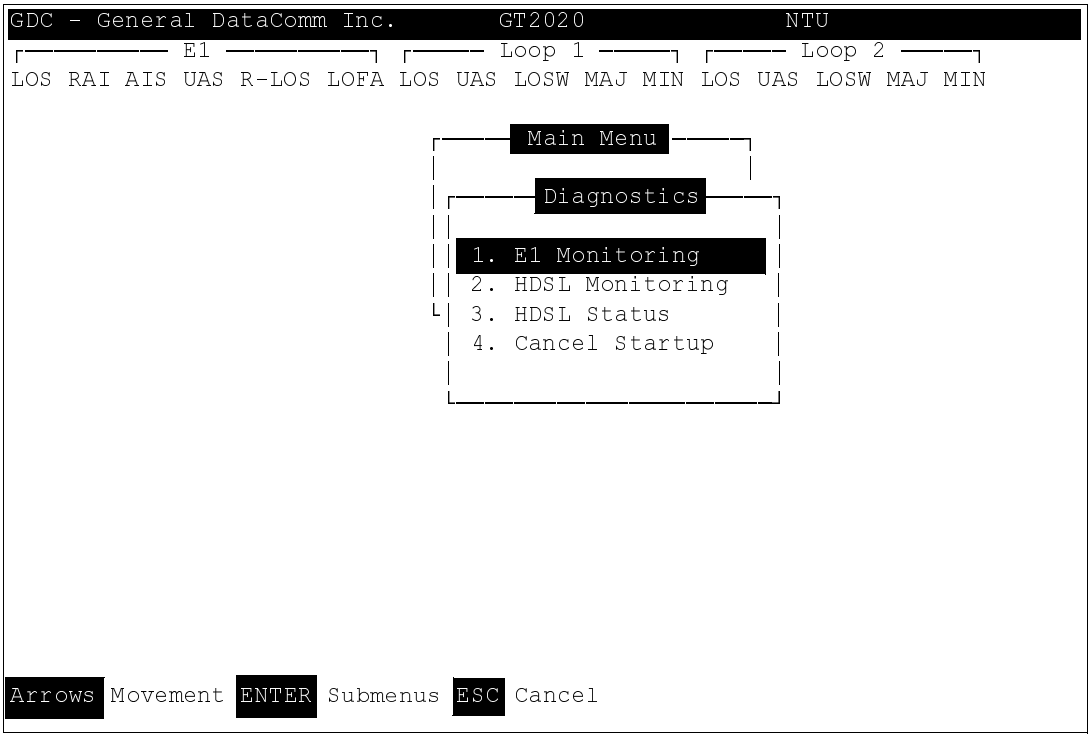


Figure 3-4 Diagnostic Menu

The functions available from the diagnostic menu are as follows:

- E1 Monitoring
- HDSL Monitoring
- HDSL Status
- Cancel Startup

E1 Monitoring

The E1 Monitoring screen, *Figure 3-5*, displays 24-hour performance statistics collected on the E1 trunk. To display the E1 Monitoring screen, select item 1 on the diagnostic menu.

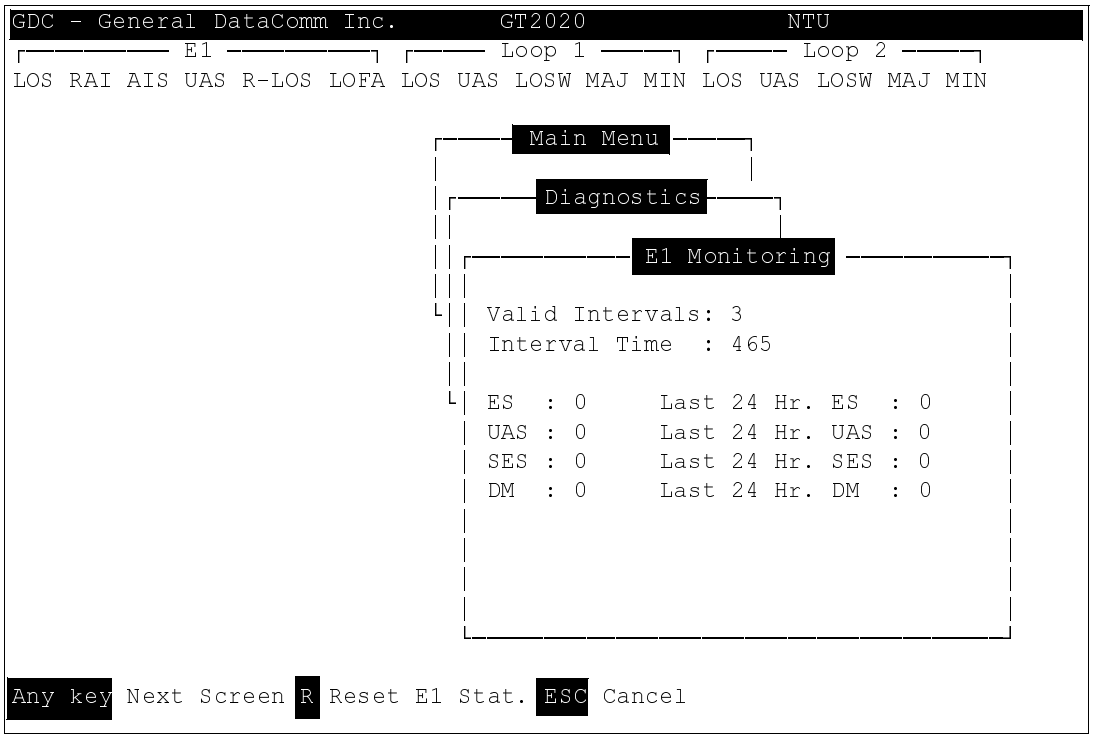


Figure 3-5 E1 Monitoring Screen

The screen includes the fields described in *Table 3-4*.

Table 3-4 E1 Monitoring Screen

Valid Intervals	Displays the number of 15-minute intervals (96 total) within the last twenty-four hours since power-up.
Interval Time	Displays the elapsed time in seconds from the beginning of the current 15-minute interval. The range is 0 to 900.
ES	Displays the number of errored seconds in the current 15-minute interval.
Last 24 Hr ES	Displays the number of errored seconds in the last 24-hour interval.
UAS -	Displays the number of unavailable seconds in the current 15-minute interval.
Last 24 Hr UAS	Displays the number of unavailable seconds in the last 24-hour interval.
SES	Displays the number of severely errored seconds in the current 15-minute interval.
Last 24 Hr SES	Displays the number of severely errored seconds in the last 24-hour interval.
DM	Displays the number of degraded minutes in the current 15-minute interval.
Last 24 Hr DM	Displays the number of degraded minutes in the last 24-hour interval.

After viewing the data collected in the current 15-minute interval, you can display the other 95 intervals within the current 24-hour interval by pressing any key, except 1, 2, 3, R, and Esc keys. The display is cyclic, that is, the current interval is displayed again after the 95th interval. The E1 statistics are computed based on G.821 thesholds and criteria.

To reset the E1 statistics counters, `type R.` A message appears: "Reset E1 Statistics?" Press Enter while the highlighting is on No (the default position) to continue current counts, or use the arrow keys to highlight Yes and press enter to reset all the displayed values to 0.

To exit and return to the `Diagnostics` menu, press the Esc.

HDSL Monitoring

The HDSL Monitoring screen, *Figure 3-6*, displays 24-hour performance statistics on the HDSL loops. To display the HDSL monitoring screen, select item 2 on the diagnostic menu.

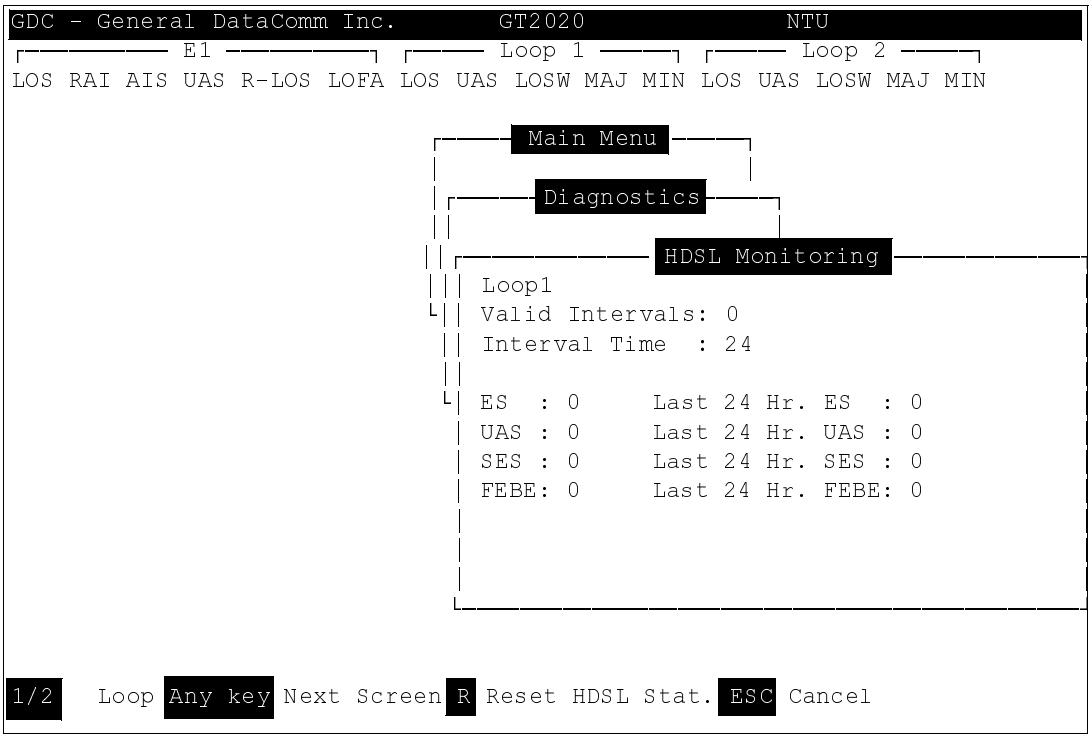


Figure 3-6 HDSL Monitoring Screen

The screen includes the fields described in *Table 3-5*.

Table 3-5 HDSL Monitoring Screen

Loop	
Valid Intervals	Displays the number of 15-minute intervals (96 total) within the last twenty-four hours since power-up.
Interval Time	Displays the elapsed time in seconds from the beginning of the current 15-minute interval. The range is 0 to 900.
ES	Displays the number of errored seconds in the current 15-minute interval.
Last 24 Hr ES	Displays the number of errored seconds in the last 24-hour interval.
UAS -	Displays the number of unavailable seconds in the current 15-minute interval.
Last 24 Hr UAS	Displays the number of unavailable seconds in the last 24-hour interval.
SES	Displays the number of severely errored seconds in the current 15-minute interval.
Last 24 Hr SES	Displays the number of severely errored seconds in the last 24-hour interval.
FEBE	Displays the number of Far-End-Block-Errors reported by the remote equipment in the current 15-minute interval.
Last 24 Hr FEBE	Displays the number of Far-End-Block-Errors reported in the last 24-hour interval.

To select another loop, type its number: 1 or 2.

Note *Powering up the GT 1020 or GT 2020 unit resets the 24 hour performance statistics on the HDSL loops.*

After viewing the data collected for the selected loop in the current 15-minute interval, you can display the other 95 intervals within the current 24-hour interval by pressing any key, except 1, 2, 3, R, and Esc keys. The display is cyclic, that is, the current interval is displayed again after the 95th interval.

To reset the HDSL statistics counters, `type R.` All the displayed values are reset to 0.

To exit and return to the `Diagnostics` menu, press the Esc.

HDSL Status

The option displays the HDSL Status screen, which shows you diagnostic information and technical data on HDSL loop performance. A typical screen is shown in *Figure 3-7*.

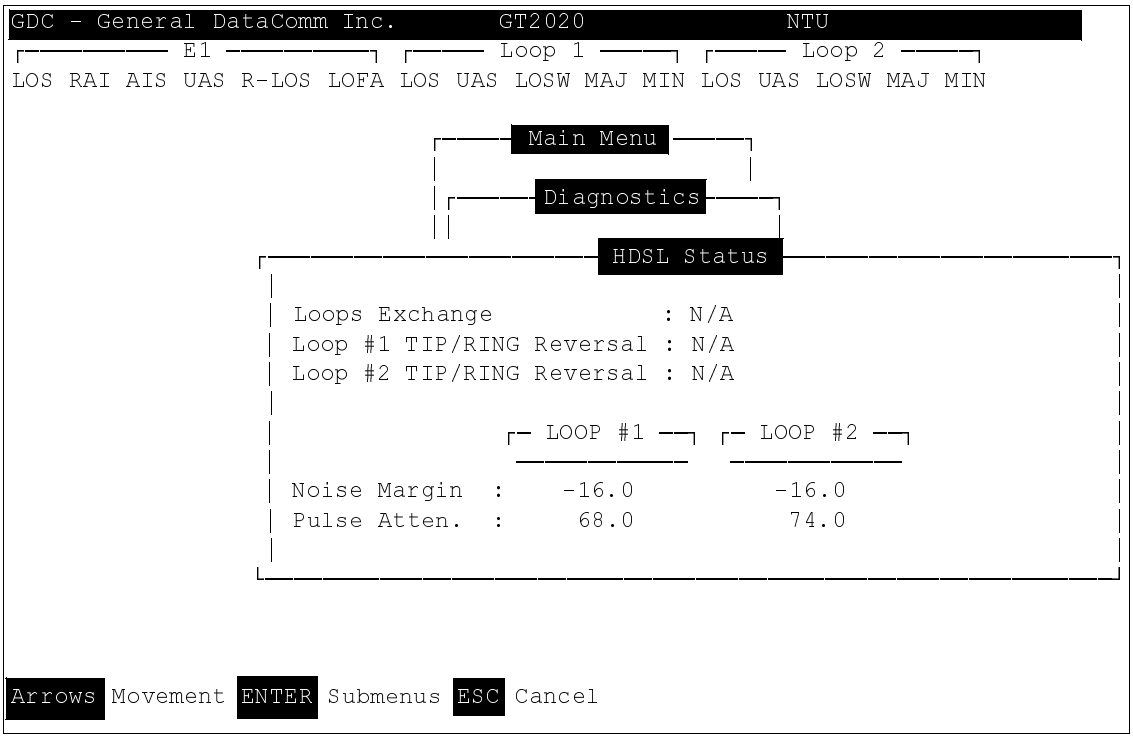


Figure 3-7 HDSL Status Screen

Table 3-6 describes the fields on the HDSL Status screen.

Table 3-6 HDSL Status Screen Fields

Loops Exchange	Indicates whether the HDSL loops carrying the data traffic are correctly connected or have been interchanged by error. This information is available only when the unit connected in a link can exchange information with the remote unit. Not applicable if unit is configured as an LTU.
Loop 1 TIP/RING Reversal	Indicates whether the two conductors of HDSL loop 1 are correctly connected or have been interchanged by error. This information is available only when the unit connected in a link can exchange information with the remote unit. Not applicable if unit is configured as an LTU.
Loop 2 TIP/RING Reversal	Indicates whether the two conductors of HDSL loop 2 are correctly connected or have been interchanged by error. This information is available only when the unit connected in a link can exchange information with the remote unit. Not applicable if unit is configured as an LTU.
Noise Margin	Displays amount of additional noise in dB which can be tolerated before exceeding $5X10^{-8}$ bit error ratio. Separate values are provided for each HDSL loop.
Pulse Attenuation	Displays the pulse attenuation, in dB, measured by the signal processing circuits of the unit. Separate values are provided for each HDSL loop for the local unit.

Operation

To display the HDSL Status screen, select item 3 on the Diagnostics menu. After viewing the data, press Esc to exit and return to the Diagnostic menu.

Cancel Startup

The Cancel Startup menu selection lets you cancel the startup process of the GT 1020/2020 during link initialization, or when the synchronization between the two units connected in a link is lost. When you make this selection the unit displays a confirmation box. Press Enter with the highlighting on No (default) to permit startup to continue, or move the highlighting to Yes and press Enter to terminate the startup.

Configuration Menu

Use the Configuration menu to configure the data interface and the HDSL loop parameters.

To open the Configuration menu, select item 2 on the Main Menu. *Figure 3-8* depicts the Configuration menu.

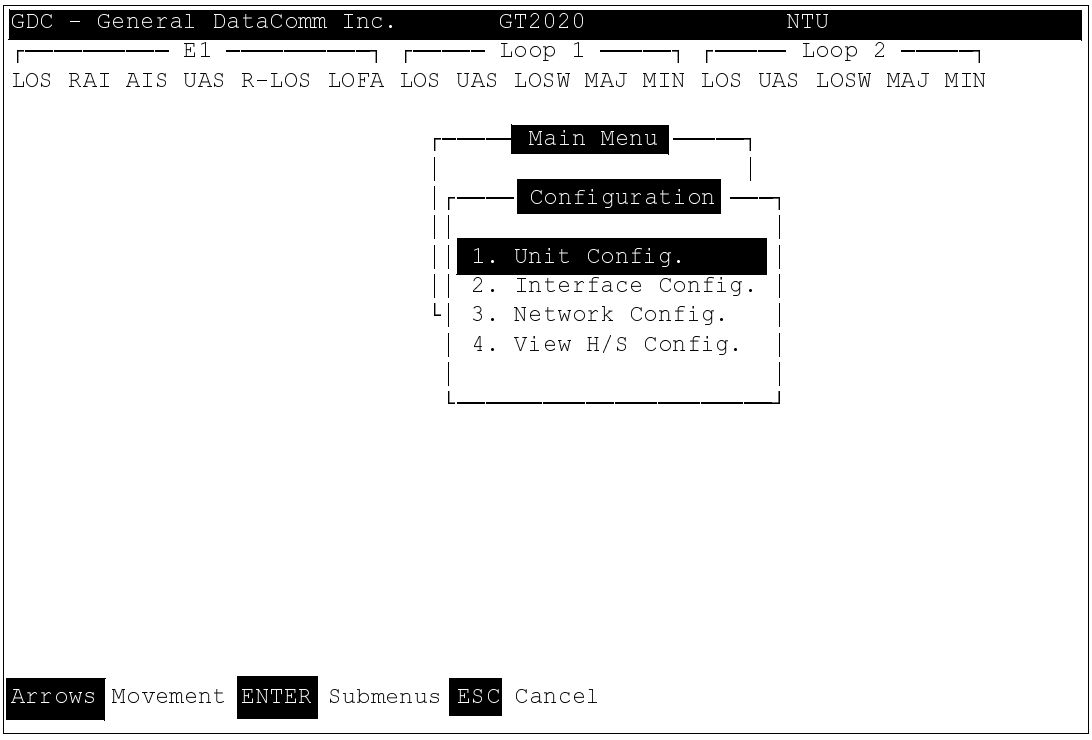


Figure 3-8 Configuration Menu

The functions available from the `Configuration` menu are as follows:

- `Unit Config.`
- `Interface Config.`
- `Network Config.`
- `View H/S Config.`

Unit Configuration Screen

The Unit Configuration option displays the Unit Configuration screen, showing the HDSL and E1 configuration parameters of the unit. A typical screen is shown in *Figure 3-9*.

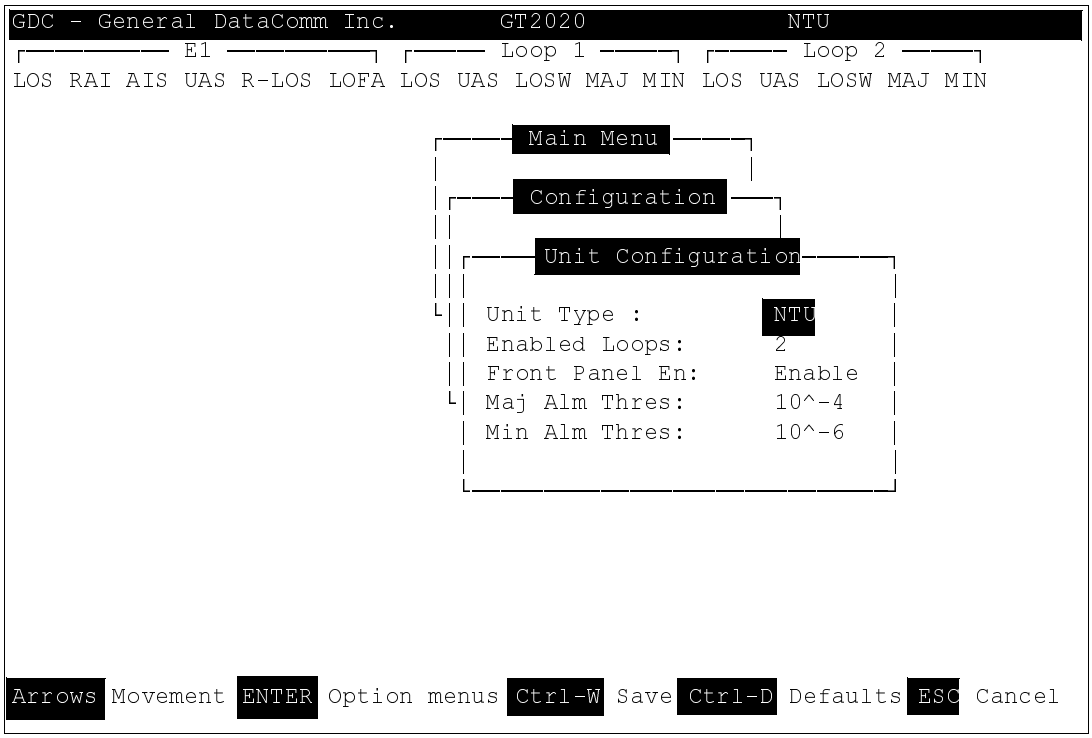


Figure 3-9 Unit Configuration Screen

The screen includes five fields that are used to select the operating mode of the unit:

- Unit Type
- Enabled Loops
- Front Panel Enable
- Major Alarm Threshold
- Minor Alarm Threshold

Table 3-7 Unit Configuration Screen Fields

Unit Type	Selects the unit to be a Line Terminating Unit (LTU) or a Network Terminating Unit (NTU). The default is NTU.
Enabled Loops	Selectable to enable 1 loop or 2 loops (default) in the GT 2020. Fixed at 1 in the GT 1020.
Front Panel Enable	Selectable. When the front panel is enabled (default), self-test diagnostics can be performed from the front panel.
Major Alarm Threshold	Determines the incoming bit error rate that will generate a major alarm. Selectable from 10^{-4} (default) to 10^{-8}. This value should be set higher than the Minor Alarm Threshold.
Minor Alarm Threshold	Determines the incoming bit error rate that will generate a minor alarm. Selectable from 10^{-4} to 10^{-8}. This value should be set lower than the Minor Alarm Threshold. The default is 10^{-6}.

Operation

To change the current value of a field, use the following procedure:

1. Use the arrow keys to place the highlighting on the desired field, then press Enter. This displays an option menu with the available options:
2. Highlight the desired option and press Enter. The option menu closes and the new selection appears in the screen.
3. To reset a highlighted field to its default value, press the Ctrl and D keys.
4. After making the desired change, press Ctrl W to save the change in the unit. To quit and cancel changes made in this screen, press the Esc key without pressing Ctrl W.
5. To exit and return to the configuration menu, press the Esc.

Interface Configuration Screen

The Interface Configuration option displays the E1 Interface Configuration parameters of the unit. A typical screen is shown in *Figure 3-10*.

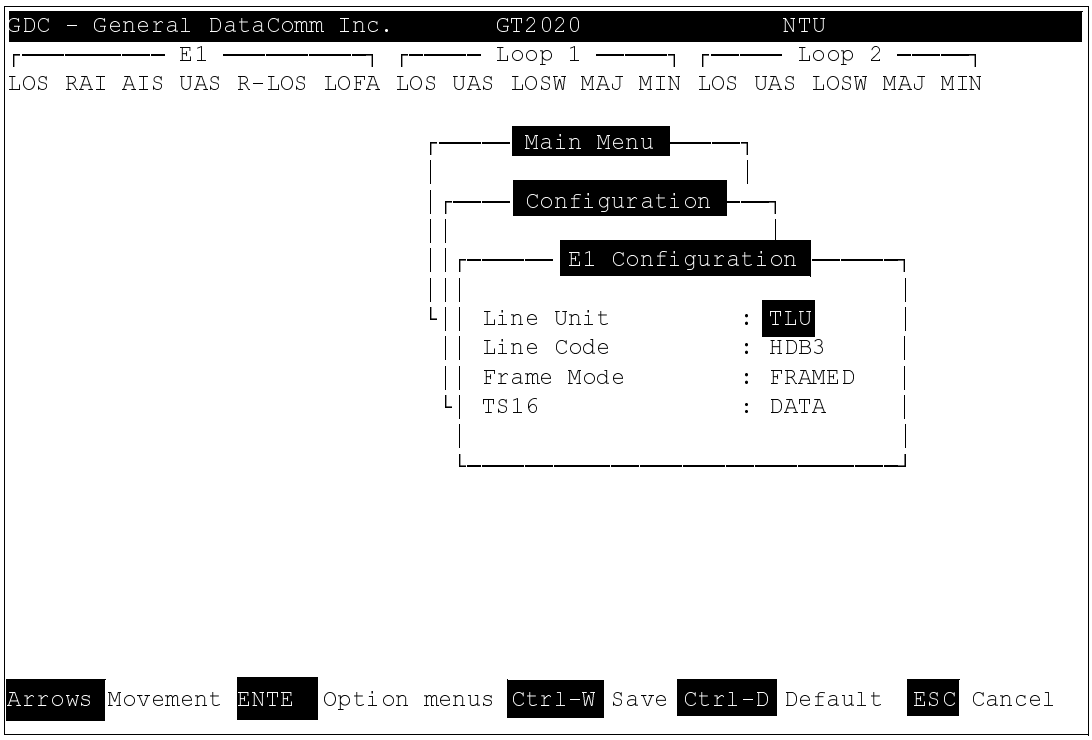


Figure 3-10 Interface Configuration Screen

The screen includes the following fields described in *Table 3-8*.

Table 3-8 Interface Configuration Screen

Line Unit	Displays the current operating mode of the GT 1020/2020 with respect to the E1 trunk: ILU - In this mode the unit operates as an intermediate line unit and transparently transfers the E1 frames. ILU is required if the unit is configured for Unframed Mode. TLU - In this mode the unit operates as a termination line unit and regenerates the E1 frames.
Line Code	Displays the current E1 line code used by the GT 1020/2020: AMI - The unit uses AMI line code. HDB3 - The unit uses HDB3 line code.
Frame Mode	Displays the current framing mode of the GT 2020 (only if the two loops are enabled) with respect to the E1 trunk: FRAMED - In this mode, the unit expects a framed E1 signal and maps the E1 data stream accordingly. UNFRAMED - In this mode, the unit transfers the E1 signal on a bit-by-bit basis.
TS16	Displays the current TS16 configuration: DATA - Time slot 16 used to carry data. SIGNALING - Time slot 16 used to carry signaling information.

Operation

To display the interface configuration screen, select item 2 on the configuration menu.

To change the current value of a parameter, use the following procedure:

1. Move the selection block to the desired line and press Enter. An option menu appears with the available options.
2. Highlight the desired option, and press Enter. The option menu closes, and the new selection appears in the corresponding line.
3. To reset the selected parameters to the default values, press Ctrl D.
4. To save changes, press Ctrl W.
5. To quit and cancel the changes made in this screen, press Esc.
6. To exit and return to the Configuration menu, press the Esc.

Network Configuration Screen

The Network Configuration option displays the Network Configuration screen, which shows the network topology and timeslot routing parameters of the unit. A typical screen is shown in *Figure 3-11*.

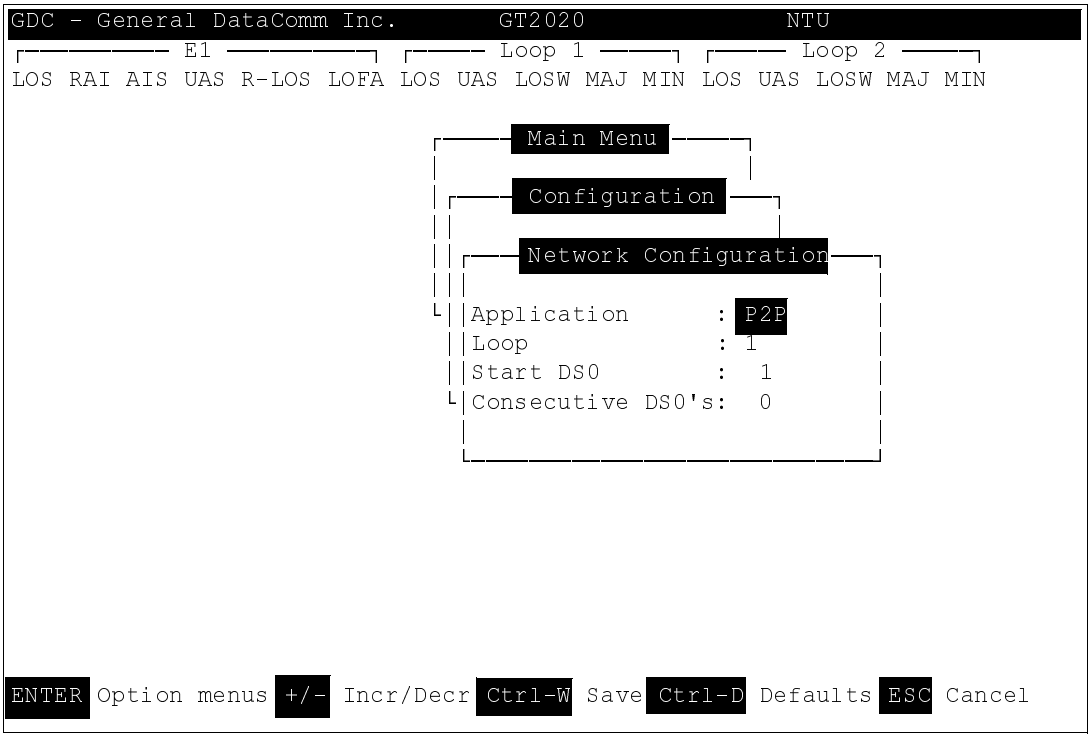


Figure 3-11 Network Configuration Screen

The screen includes the following fields described in *Table 3-9*.

Table 3-9 Network Configuration Screen Fields

Application	Selects the unit to operate in either a Point-To-Point (P2P) or a Point-To-Multi-Point (P2MP) network configuration.
Loop	Selects the HDSL loop that the Start DS0 and Consecutive DS0 options are being configured for. This option applies only in P2MP mode. In P2P mode it should be left at 1.
Start DS0	In P2MP mode, selects the first DS0 in the contiguous block of DS0s being provisioned for the selected Loop. In P2P mode this option should be left at 1.
Consecutive DS0	In P2MP mode, selects the number of DS0s in the contiguous block of DS0s being provisioned for the selected Loop. In P2P mode this option should be left at 1.

Operation

To display the network configuration screen, select item 3 on the configuration menu.

To change the current value of parameters, use the following procedure:

1. To change the value of Application between P2P and P2MP, highlight the current value and press Enter. An option menu appears with the two available options.
2. Highlight the desired option, and press Enter. The option menu closes, and the new selection appears in the corresponding line.

Note *Step 3 applies only when the selected Application is P2MP.*

3. To change the value of the Loop, Start DS0, or Consecutive DS0s field, position the highlight block on the field, use the space bar or shift/+ or shift/- (minus) to toggle the field's value, and press Enter.
4. To reset parameters to their default values, press Ctrl D.
5. To save changes, press Ctrl W.
6. To quit and cancel the changes made in this screen, press Esc.
7. To exit and return to the Configuration menu, press the Esc.

Point-to-Point (P2P) Options

When the GT 2020 is used in a P2P configuration with the Interface Config Frame Mode set for FRAME, E1 payload is distributed along the HDSL loops with alternating DS0s on each HDSL loop as shown in *Table 3-10*. In this configuration with a 700-G2 or 720-G2 LTU, the E1 payload is recombined at the GT 1020 or GT 2020 NTU in such a way that the full E1 frame is exactly reconstructed. When the Interface Config Line Unit option is set for TLU and Time Slot 0 of the E1 frame is regenerated, (while in ILU mode) Time Slot) is passed transparently. Note that when the Interface Config TS16 option is set for DATA, Time Slot 16 is routed only on Loop2 to the GT 1020/2020. When the Interface Config TS16 option is set for SIGNALING, it is assumed that Time Slot 16 of the E1 frame contains signaling information (necessary for voice applications) and Time Slot 16 is routed through Loops 1 and 2. Routing Time Slot 16 on both loops in this case is to ensure that if one loop were to have a fault, at least Time Slot 16 data and a fractional number of payload time slots would still be available at the remote, no matter which loop is faulty.

In P2P mode with Interface Config Frame Mode set for FRAMED, the GT 2020 configured as LTU, a 730-D2 remote, and two loops enabled, the E1 DS0s are recombined into a user-selectable aggregate data rate (V.35, EIA-530, X.21). For increasing 730-D2 aggregate rates, the 730-D2 data originates from the E1 DS0s in increasing order, that is, 1 x 64 kbps originates from E1 DS0s 1, 2, 3, and so on. Time slot routing over the HDSL loops follows that exhibited in *Table 3-10*.

With two loops enabled in P2P mode and the Interface Config Frame Mode set for UNFRAMED, an aggregate signal for 2048 kbps may be provisioned using a 700-G2 LTU (G.703) and a GT 2020 NTU (G.703), a 730-D2 LTU (V.35, EIA-530, or X.21) and a GT 2020 NTU, or a GT 2020 LTU and either a 720-G2 NTU or a 730-D2 NTU. If only one loop is enabled in P2P mode and Interface Config Frame Mode is set for FRAMED, then a fractional E1 service is furnished to the remote site, reserving a time slot following the consecutive DS0 pattern shown in *Table 3-10*. For this case Start DS0 and Consecutive DS0 options must be set as described below in P2MP Options. Up to 17 G.704 DS0s may be set aside for a GT 1020/2020 remote. Here the LTU may be either a 720-G2, 720-G1, 700-G2, 702-G2, or 700-G3. Furthermore, with the GT 1020/2020 configured as an LTU, an aggregate n x 64 kbps signal with up to 18 x 64 kbps may be allotted for a 730-D1/D2 NTU.

Table 3-10

Routed E1 Time Slots with Interface Config TS16 Set for DATA																	
Loop 1	0	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
Loop 2	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	f
Routed E1 Time Slots Interface Config TS16 Set for SIGNALING																	
Loop 1	0	1	3	5	7	9	11	13	15	16	18	20	22	24	26	28	30
Loop 2	0	2	4	6	8	10	12	14	16	17	19	21	23	25	27	29	31

f = all ones filled

Point-to-MultiPoint (P2MP) Options

With the 700-G2 or 700-G3 used as a LTU in a P2MP configuration, and with GT 1020 units as remotes (NTU), E1 payload is distributed along the HDSL loops in contiguous blocks of DS0s; remote E1 payload is then reconstructed. This means that the remote (NTU) DS0s are mapped into the same position in the E1 frame as they were at the local (LTU) side. A typical mapping example is shown in *Table 3-11*. GT 1020 units automatically configure themselves based on the setting of the Application, Start DS0, and Consecutive DS0s configuration options. In the P2MP configuration, Time Slot 0 of the recombined E1 frame of the LTUs and of the remote E1 frames are completely regenerated. To keep network timing integrity, the entire reconstructed E1 frame is looped back at a GT 1020 remote when no E1 signal is connected from the user's equipment to this GT 1020. Also, using E1 Time Slot 16 as a signaling channel is not supported now in this configuration and therefore the TS16 option under Interface Config screen must be set for DATA. Finally, note that the contiguous blocks of DS0s routed to each remote are treated as an aggregated data stream. So byte alignment is not currently maintained between individual DS0s at the LTU and the corresponding DS0s in the reconstructed E1 frames at the remote units. In this P2MP configuration as many as 17 G.704 E1 time slots are available at each GT 1020 remote site. An exception, however, is that the total number of allocated time slots for all three remotes cannot be more than 31.

Table 3-11 Typical E1 P2MP Time Slot Routing

If the Network Configuration Options at the LTU Are Set for:

Application	P2MP		
Loop	1	2	3
Start DS0	1	11	20
Consecutive DS0s	10	9	8

and If the Network Configuration Options at Each 720-G1 (NTU) Are Set for:

	Remote 1	Remote 2	Remote 3
Application	P2MP	P2MP	P2MP
Loop	1	1	1
Start DS0	1	11	20
Consecutive DS0s	10	9	8

Then the Resulting Time Slot Allocation at Each Remote 720-G1 E1 Interface is:

Remote 1	1	2	3	4	5	6	7	8	9	10

(time slots 11 - 31 filled with 1s)

Remote 2	11	12	13	14	15	16	17	18	19

(time slots 1 - 10 and 20 - 31 filled with 1s)

Remote 3	20	21	22	23	24	25	26	27

(time slots 1 - 19 and 28 - 31 filled with 1s)

View H/S Configuration

The View H/S Configuration option displays the Configuration and Selftest Results screen, showing hardware and software configuration data and the results of the last power-up self-test. The information displayed on this screen is intended for maintenance and technical support groups. A typical screen is shown in *Figure 3-12*.

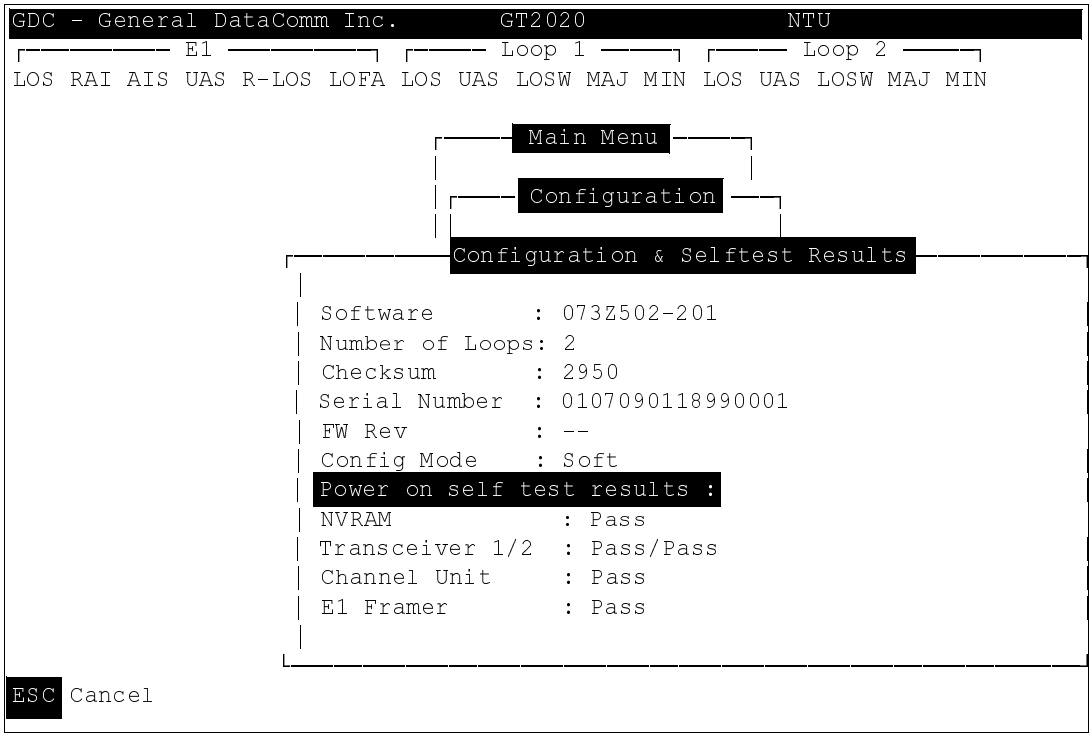


Figure 3-12 View H/S Configuration Screen

The upper area of the screen presents configuration data. The lower area presents the results of the last power-on self-test. *Table 3-12* describes the fields in the screen.

Table 3-12 Configuration and Selftest Results Screen Fields

Software Version	Displays the software version of the unit.
Serial Number	Displays the serial number of the unit.
Firmware Number	Displays the firmware number of the unit.
Number of Loops	Displays the number of HDSL loops of the unit.
Checksum	Firmware checksum.
Config Mode	Displays the current configuration mode of the unit: **Soft** - The unit is configured under software control. **Hard** - The unit is configured by means of the internal dip switches and jumpers.

The last power-on self-test results area lists each subsystem tested during the self-test, and the result: Pass or Fail.

Maintenance Menu

You may refer to *Chapter 4* to perform maintenance and troubleshooting.

Network Management

GT 1020s and GT 2020s can be used as Network Managed elements when used within a GDC Network Management System. The management software conforms to the MIB (Management Information Base) II standards set out for SNMP Version 1.0. Refer to the related SCM Manager Card publication listed in the *Preface*.

MIB Tables

This section consists of tables that list and describe the MIB objects by which an SNMP network manager can configure, control, and monitor a GT 1020 or GT 2020. Each table is arranged in five columns:

- MIB Object- name
- Syntax- MIB variable type
- Access- read-write, read-only, or write-only
- Enumeration- interpretation of specific possible values, or range of possible values
- Description - function of the MIB object

The way MIB objects appear on the screen and how they are manipulated varies depending on the network manager or MIB browser being used. The information in these tables is therefore intended for use in conjunction with the operating instructions for manager or browser.

Note *Many SNMP network managers and MIB browsers automatically perform a Get operation immediately following a Set to an object that permits read-write access. In that way the success of the write operation is confirmed. If your manager or browser does not perform this function automatically, it is highly advisable that you command a Get for each object you Set.*

Table 3-13 Version Group Table

MIB Object	Syntax	Access	Enumeration	Description
System MIB Version	Display String	Read-only		Identifies the version of the MIB. The format of the version is x = yzT, where "x" identifies the major revision number, "y" identifies the typographical revision, and "T" identifies the test revision. (not on formal release) Acceptable values for the individual revision components are: x: 1 - 9 y: 0 - 9 z: 0 - 9 T: A - Z
Version Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and sub-identifier. The table describes the maintenance objects for the unit and references the unit interface..
Firmware Level	Display String	Read-only		The version number of the firmware. This allows the products to know which revision is installed. The released version number is sequenced from , A_,...AA,...ZZ. Test versions are numerical from 01 to 99.
Model Number	Display String	Read-only		This variable is used to determine the type of card family installed .

Table 3-14 Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
Maintenance Line Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and sub-identifier. The table describes the maintenance objects for the unit and references the unit interface..
Soft Reset	SC instance	Read-write	Reset (1) Norm (2)	Supports the action of soft resetting the unit. When this object is set to reset, the unit performs a soft reset to the managed unit. Norm cannot be set by management.
Config Mode	Integer	Read-only	Software (1) Hardware (2)	The hardware configuration mode of the unit. A unit may be hardware or software configured.
System Up Time	Time Ticks	Read-only		This variable is used to report the elapsed system tick time.
Unit Type	Integer	Read-write	LTU (1) NTU (2)	This variable is used to define HDSL type. LTU selects line terminating unit, NTU selects network terminating unit.
Default Initiate	Integer	Read-write	Default (1) Normal(2)	Used to allow the non volatile configuration to be set to a factory default reset. Normal cannot be set by management.
Data Type	Integer	Read-write	Data (2) Voice (1)	Defines the HDSL data type, either data or voice.
Loop Provision	Integer	Read-write	Point-to-point (1) Point-to-MultiPoint (2)	This variable is used to define the HDSL loop provision. When P-P is selected, the unit is connected to another HDSL unit. When P-MP is selected, the unit is connected to more than one HDSL units or data grooming.
Number of Loops Enabled	Integer	Read-write	One Loop (1) Two Loops (2)	Used to define the HDSL loop configuration. It can be set for one to two loops in the GT 2020. Fixed to 1 in the GT 1020.
Front Panel	Integer	Read-write	Inhibit (1) Enable (2)	Enables or inhibits the front panel operation.

Table 3-8 Maintenance Table (Cont.)

MIB Object	Syntax	Access	Enumeration	Description
Private Storage 1	Display String	Read-write	(Size (16))	This variable is used for general purpose storage.
Private Storage 2	Display String	Read-write	(Size (16))	This variable is used for general purpose storage.
Private Storage 3	Display String	Read-write	(Size (16))	This variable is used for general purpose storage.
LED Status	Octet String	Read-only	Octet 1 Bit 7 - not used Bit 6 - not used Bit 5 - not used Bit 4 - not used Bit 3 - NORM E1 Bit 2 - ES E1 Bit 1 - AL Bit 0 - TM Octet 2 Bit 7 - not used Bit 6 - not used Bit 5 - not used Bit 4 - not used Bit 3 - NORM L2 Bit 2 - ES L2 Bit 1 - NORM L1 Bit 0 - ES L1 Octet 3 Bit 7 - not used Bit 6 - not used Bit 5 - ST Bit 4 - RL Bit 3 - LL Bit 2 - not used Bit 1 - not used Bit 0 - not used	Returns a bitwise snapshot of the front panel LED status.

Table 3-15 E1 Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
E1 Config Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop and sub-identifier, the E1 interface.
E1 Framing Mode	Integer	Read-write	Framed (1) Unframed (2)	Used to determine the E1 framing mode.
E1 Line Unit	Integer	Read-write	TLU (1) ILU (2)	Used to determine the operating mode of the HDSL system with respect to the E1 trunk. When TLU is selected the system operates as a termination line unit. When ILU is selected the unit operates as an intermediate line unit.
E1 Line Coding	Integer	Read-write	AMI (1) HDB3 (2)	Selects the type of Zero Code Suppression used on the link. This setting affects a number of the link's characteristics. Either code can be used with or without CRC.

Table 3-16 HDSL Diagnostic Table

MIB Object	Syntax	Access	Enumeration	Description
Diagnostic Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and sub-identifier, which is in this case, a network interface.
Loopback	Integer	Read-write	No Loopback (1) Line Loop (2) Local Loop (3) Line and Local Loop (4)	Supports the action of a diagnostic loop at the point indicated.
BER Test	Integer	Read-write	Inhibit (1) Enable (2)	Supports the action of bit error rate test. When set to inhibit, no BERT test is in progress. When set to enable, BERT is in progress.

Table 3-17 HDSL Diagnostic Results Table

MIB Object	Syntax	Access	Enumeration	Description
Diagnostic Results Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and sub-identifier, which is in this case, a network interface.
Test Execution Status	Integer	Read-only	In Sync (1) Not In Sync (2)	The current execution status of the diagnostic test. When set to In Sync, BERT test is in sync and BER rate is valid. When set in NOT IN Sync, BERT test is not in sync, and BER rate is not valid.
Diagnostic Result Error Count	Integer	Read-only	(0..65535)	The results of the last diagnostic test. This can be the current test running or the last completed test. Note that the interpretation of these test results may be affected by the value of the Test Execution Status object.
Diagnostic Result Interval	Integer	Read-only	(0..65535)	This variable represents the BER test intervals. A time interval is defined as the time required for transmission of a block of bits.

Table 3-18 E1/HDSL Performance Tables

Currrent Performance Table				
MIB Object	**Syntax**	**Access**	**Enumeration**	**Description**
Current Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which in this case can be an E1 interface or a loop interface.
Current ESs	Gauge	Read-only		The number of errored seconds encountered by an E1 or loop interface in the current 15 minute interval.
Current SESs	Gauge	Read-only		The number of severely errored seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current UASs	Gauge	Read-only		The number of degraded seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in the current 15 minute interval.
Current FEBEs	Gauge	Read-only		The number of Far End Block Errors encountered by a loop interface in the current 15 minute interval.
Internal Performance Table				
Interval Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which in this case can be an E1 interface or a loop interface.
Interval Number	Integer	Read-only	(1..96)	A number between 1 and 96, where 1 is the most recently completed 15-minute interval and 96 is the oldest 15-minute interval (assuming that all 96 intervals are valid).
Interval ESs	Gauge	Read-only		The number of errored seconds encountered by a loop or E1 interface in one of the previous 96 individual 15-minute intervals.
Interval SESs	Gauge	Read-only		The number of severely errored seconds encountered by a loop or E1 interface in one of the previous 96 individual 15-minute intervals.
Interval UASs	Gauge	Read-only		The number of unavailable seconds encountered by a loop or E1 interface in one of the previous 96 individual 15-minute intervals.
Interval DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in one of the previous 96 individual 15-minute intervals.
Interval FEBEs	Gauge	Read-only		Variable represents the HDSL loop's Far End Block Errors.

Table 3-15 E1/HDSL Performance Tables (Cont.)

Total Performance Table				
MIB Object	**Syntax**	**Access**	**Enumeration**	**Description**
Total Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and interface, which in this case can be an E1 interface or a loop interface.
Total ESs	Gauge	Read-only		The number of errored seconds encountered by an E1 or loop interface in the previous 24-hour interval.
Total SESs	Gauge	Read-only		The number of severely errored seconds encountered by a loop or E1 interface in the previous 24-hour interval.
Total UASs	Gauge	Read-only		The number of unavailable seconds encountered by a loop or E1 interface in the previous 24-hour interval.
Total DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in the previous 24-hour interval.
Total FEBEs	Gauge	Read-only		The number of Far End Block Errors encountered by a loop interface in the previous 24-hour interval.

Table 3-19 Loop/E1 Performance Interval Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
HDSL Interval Maintenance Index	SC instance	Read-only		The index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which is in this case, can be an E1 or loop interface.
HDSL Reset Intervals	Integer	Read-write	Normal (1) Reset (2)	This variable is used to reset loop/E1 performance intervals. When it is set to reset, the loop/E1 performance tables are set to zero.
HDSL Number of Valid Intervals	Integer	Read-only	(1..96)	This variable is used to read the number of intervals collected. Each interval is an increment of 15 minutes.

Table 3-20 HDSL Status Table

MIB Object	Syntax	Access	Enumeration	Description
HDSL Loop Status Line Index	SC instance	Read-only		This object identifies status parameters associated with the managed object.
HDSL Loop Startup	Integer	Read-write	Normal (1) Start (2) Cancel (3)	Supports the action of initializing HDSL loop startup sequence. When set to start, HDSL unit reinitialize the startup sequence. Set to cancel, the unit aborts the startup sequence. Normal, the unit operates normally.
HDSL Loop Tip and Ring Reversal Mode	Integer	Read-only	Normal (1) Reversed (2)	Signals the loop Tip and Ring status. When normal, the loop operates normally. When reversed, loop Tip and Ring have been reversed.
HDSL Loop Signal to Noise Margin	Integer	Read-only	(0..127)	Represents the loop signal to noise margin in dB units.
HDSL Loop SN Frac	Integer	Read-only	(0..5)	Used with the HDSL loops signal to noise margin variable in the following manner: 1. Only the values 0 and 5 are allowed. 2. The value of zero means HDSL loops signal to noise margin is a whole number. 3. The value of five means HDSL loop signal to noise margin is a real number and that 0.5 must be added to it.
HDSL Loop SN Atten Sense	Integer	Read-only	Positive (1) Negative (2)	Identifies the sense of the HDSL loop signal to noise margin variable.
HDSL Loop Pulse Atten	Integer	Read-only	(0..100)	Represents twice the HDSL loop pulse attenuation level in dB units.
HDSL Loop Pulse Atten Frac	Integer	Read-only	(0..5)	This variable is used with the HDSL loop pulse attenuation variable under the following conditions: 1. Only the values 0 and 5 are allowed. 2. The value of zero means HDSL loop pulse atten is a whole number. 3. The value of five means HDSL loop pulse atten is a real number and that 0.5 must be added to it.
HDSL Loop Gain	Integer	Read-only	Low (1) High (2) OK (3)	Represents the HDSL loop gain setting.

Table 3-21 HDSL Alarm Object Identifier Definitions

Alarm Name	Maskable?	Applies To
HDSL No Response Alarm	No	Unit
HDSL Diagnostic Rx Error Alarm	No	Unit
HDSL Power Up Alarm	No	Unit
HDSL Unit Failure	No	Unit
HDSL Check Sum Corrupt	No	Unit
HDSL Loss of Signal	Yes	E1, L1, L2
HDSL Unavailable Second	Yes	E1, L1, L2
HDSL Errored Second	Yes	E1, L1, L2
HDSL Loss of Sync Word	Yes	L1, L2
HDSL Loss of Frame Align	Yes	E1
HDSL All Ones	Yes	E1
HDSL Remote Loss of Signal	Yes	E1
HDSL Remote Alarm Indicator	Yes	E1

Chapter 4: Tests

Overview

This chapter is divided into the following main paragraphs: Loopback testing hard and soft, troubleshooting procedures, and the Maintenance Menu screens and descriptions.

Important *The activation of any loopback disrupts the flow of user data traffic.*

The unit displays the status of these tests through the indicators on the front panel. You may also use the optional terminal connected to the CONTROL port on the back panel. Doing so provides a comprehensive set of features for testing operation and identifying trouble areas. This chapter provides instructions for managing the system by means of a terminal, and tells you how to enable and disable various loopbacks.

Troubleshooting Procedures

- LEDs are OFF:

1. If all the LEDs are OFF, verify that there is power to the unit.

- Start Up Continuously Fails:

1. If an HDSL red ES LED is continuously ON during start-up, the card is not receiving a signal from the far end of its channel. Check the loop connections between the two cards (LTU and NTU).
2. Verify that one card is configured as LTU and the other as NTU.
3. Check the status of the card in the View H/S Config screen.

Maintenance Menu

The Maintenance Menu is used to perform maintenance and troubleshooting activities. To open the maintenance menu, select item 3 on the main menu. *Figure 4-1* illustrates the Maintenance Menu.

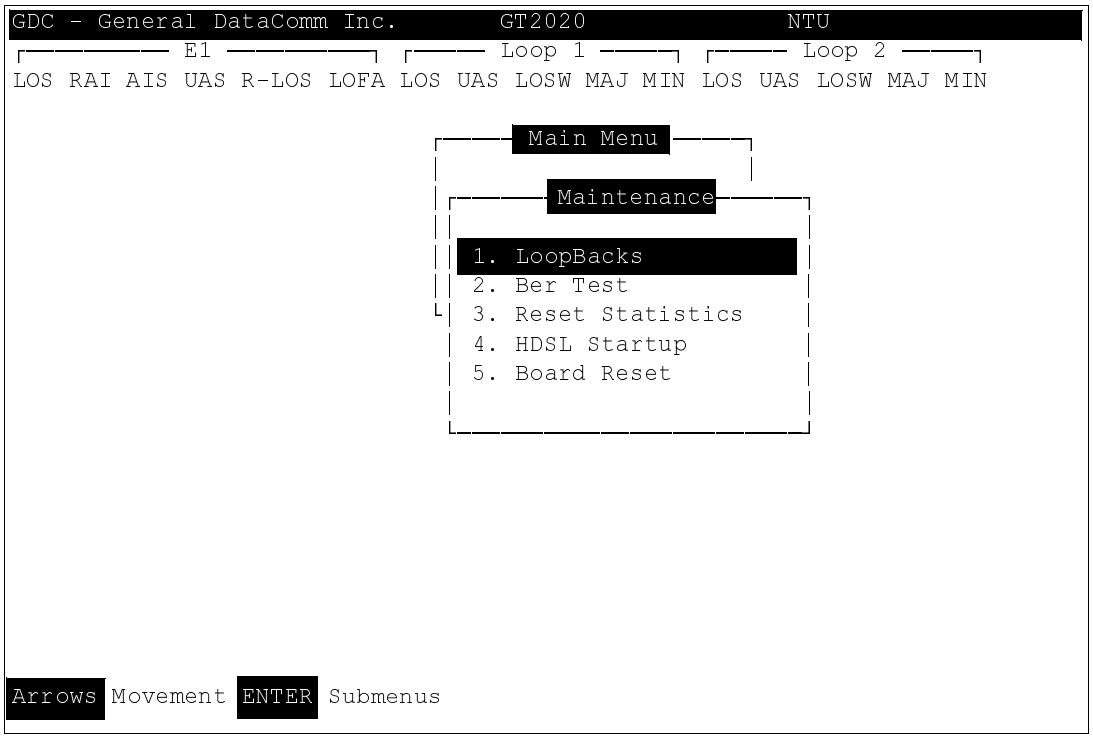


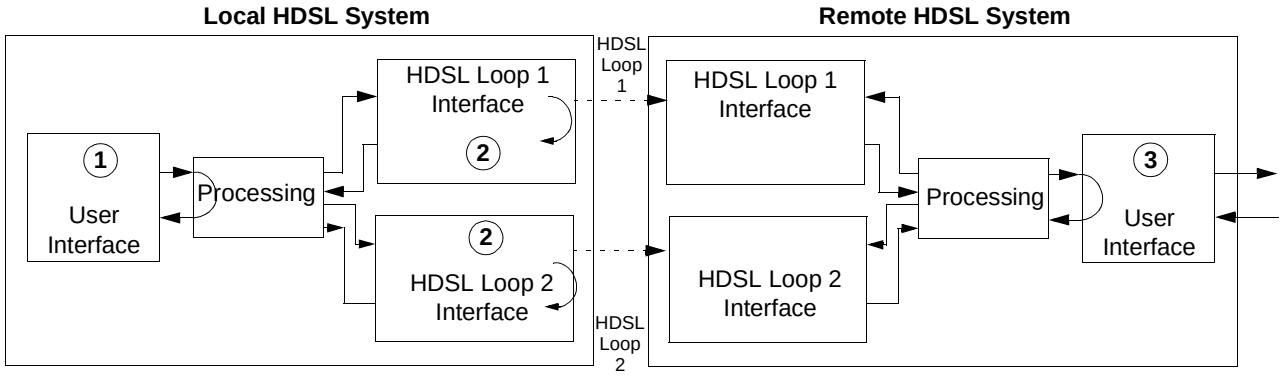
Figure 4-1 Maintenance Menu

The functions available from the maintenance menu are as follows:

- Loopbacks
- BER Test
- Reset Statistics
- HDSL Startup
- Board Reset

Loopback Testing

This function is used to enable/disable loopbacks on the user's equipment interface and on the HDSL loops for maintenance purposes. The HDSL systems offered by GDC provide three types of test loopbacks. *Figure 4-2* shows the simplified signal paths when the loopbacks are connected.



Line loopback	[1]
HDSL loopback	[2]
Remote local loopback	[3]

Figure 4-2 Loopbacks Signal Paths

Figure 4-3 shows a typical loopback setting screen for a HDSL system using a DTE interface.

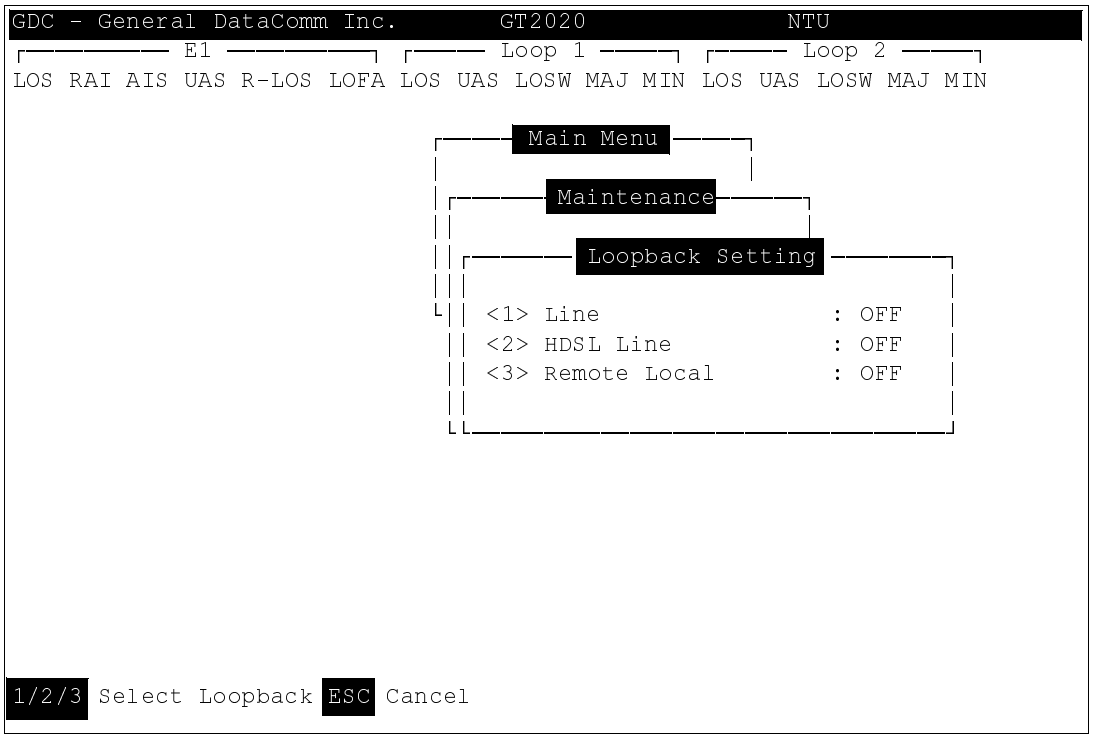


Figure 4-3 Loopback Screen

Operation

To access the Loopbacks function, select item 1 on the Maintenance Menu.

To change the state of a loopback, use the following procedure:

1. Type the number of the line of the desired loopback. This toggles the selected loopback ON and OFF.
2. Highlight the desired option, and press Enter to send the command to the HDSL system. The option menu closes, and the new selection appears in the corresponding line.
3. To exit and return to the Maintenance Menu, press the Esc.

Note *In order for tests to operate properly, timing must come from the E1 network.*

Loopback Testing (Hard)

The GT 1020 and GT 2020 support two types of loopbacks at the front panel:

LL - Line Loopback loops the data back towards the user's equipment interface.

RL - Remote Loopback signals the remote unit, via the EOC, to loop back the data at its user equipment interface.

Loopback Testing (Soft)

You may also use the optional terminal connected to the CONTROL port on the back panel which provides a comprehensive set of features for testing operation and identifying trouble areas. You may use loopbacks to enable/disable loopbacks on the user's equipment interface and on the HDSL loops, for maintenance purposes.

The HDSL systems offered by GDC provide three types of test loopbacks available from the optional terminal. *Figure 4-2* shows the simplified signal paths when the loopbacks are connected.

Line Loopback

The line loopback is generally used to test the connections between the local user's equipment and the HDSL system module.

When the local line loopback is connected (ON) (loopback **[1]**), the data signal received from the local user via the transmit line of the user's equipment interface is returned by the HDSL system module on the receive line of that interface. Therefore, during normal operation the local user's equipment should receive it own signal without errors.

The local user transmit signal is transparent and therefore is sent to the remote HDSL system, however the signal received from the remote HDSL system is lost.

HDSL Line Loopback

The HDSL loopback is generally used to test the proper operation of the HDSL system, and therefore should be used after normal operation is obtained.

When the HDSL loopback is connected (ON) (loopback **[2]**), the transmit signal of each HDSL loop is returned by the HDSL loop interface (s) of this HDSL system module on the receive path of the same loop. Therefore during normal operation the local user's equipment should receive its own signal without errors.

The local user transmit signal is transparent and therefore sent to the remote HDSL system, however the signal received from the remote HDSL system is lost.

Remote Local Loopback

The remote local loopback is generally used to test end-to-end the proper operation of the HDSL link, and therefore should be initiated by the LTU only and used after normal operation is obtained.

When the EOC remote line loopback is connected (ON) (loopback **[3]**), the data received by the remote module from the local user is returned by the HDSL system module on the receive path, within the remote user's equipment interface. Therefore, during normal operation the local user's equipment should receive its own signal without errors.

The local user transmit signal is also passed to the remote user's equipment connected to the HDSL system, however the signal transmitted by the remote user is lost.

Considerations in the Use of Test Loopbacks

The test loopbacks are designed to allow systematic testing of the signal paths along the link, starting from one end of the link (the "local" HDSL module). In most situations, it is recommended to initiate the loopbacks from the side serving as the LTU, because this would allow you to follow the signal path starting from the office and continue toward the end user in addition to maintaining system timing. All of the test loopbacks are transparent.

The recommended order of test activation is as follows:

1. Line loopback.
2. HDSL line loopback.
3. Remote local loopback

This is also the order in which the loopbacks are listed on the LOOPBACKS screen.

BER Test

This screen is used to perform bit error measurements on an HDSL system module.

Testing Method

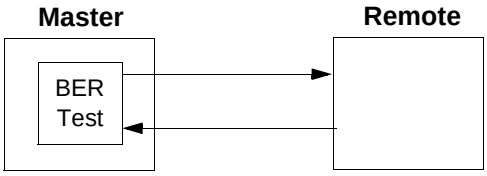
BER testing is performed by repeatedly transmitting a pseudo test sequence having a length of 2^{-15}-1 bits, and comparing by means of an error detector the received sequence. Any difference is assumed to be an error and is counted. To perform a meaningful comparison, the error counting is inhibited until the error detector becomes synchronized to the incoming sequence. During this synchronization, it is possible to see a burst of 255 errors.

During this testing, your traffic is disconnected. BER tests may be performed in an end-to-end mode that requires both LTU and NTU BER testers to be on. If testing is initiated at one end, a loopback along the signal path needs to be connected. The loopback can be a physical connection made somewhere along the signal path or a test loopback activated at the desired location as described in the Loopbacks paragraphs of this manual. Alternatively, an external BERT may be connected to the remote unit to facilitate testing.

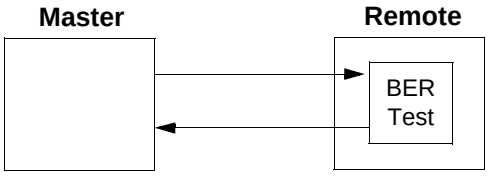
The measurement is carried out over discrete intervals (an interval corresponds to the time required for a transmission block of 2^{24} bits). The number of errors that are counted in each interval can be up to 255. If the actual number of errors in a given interval is higher, this maximum count is considered in the calculation of the BER. The calculated BER is updated at the end of each interval.

The bit error rate test can be performed over individual HDSL loops or over the entire HDSL bandwidth. (Only one BERT test can be active at a time). For the point-to-point mode of operation, the BER test can only be performed over all the loops. For point-to-multipoint, you can perform the BERT test on individual loops.

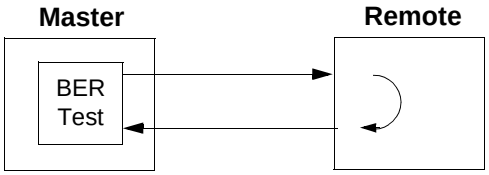
Test Configuration Notes



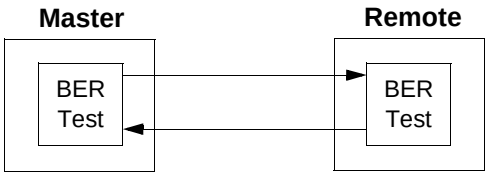
Master Self-Test:
Enable Master BER test. Be sure you have an external loopback or test equipment at the remote unit to facilitate this test.



Remote Self-Test:
Enable BER test on remote unit. Be sure you have an external loopback or test equipment at the master unit to facilitate this test.



Self-Test with Remote Loopback:
From Master unit, assert Remote Loopback (RL) and enable BER test.



Master to Remote Self-Test:
Enable BER test on both Master and Remote unit.

BER Screen Description

A typical screen for BER testing is shown in *Figure 4-4.*

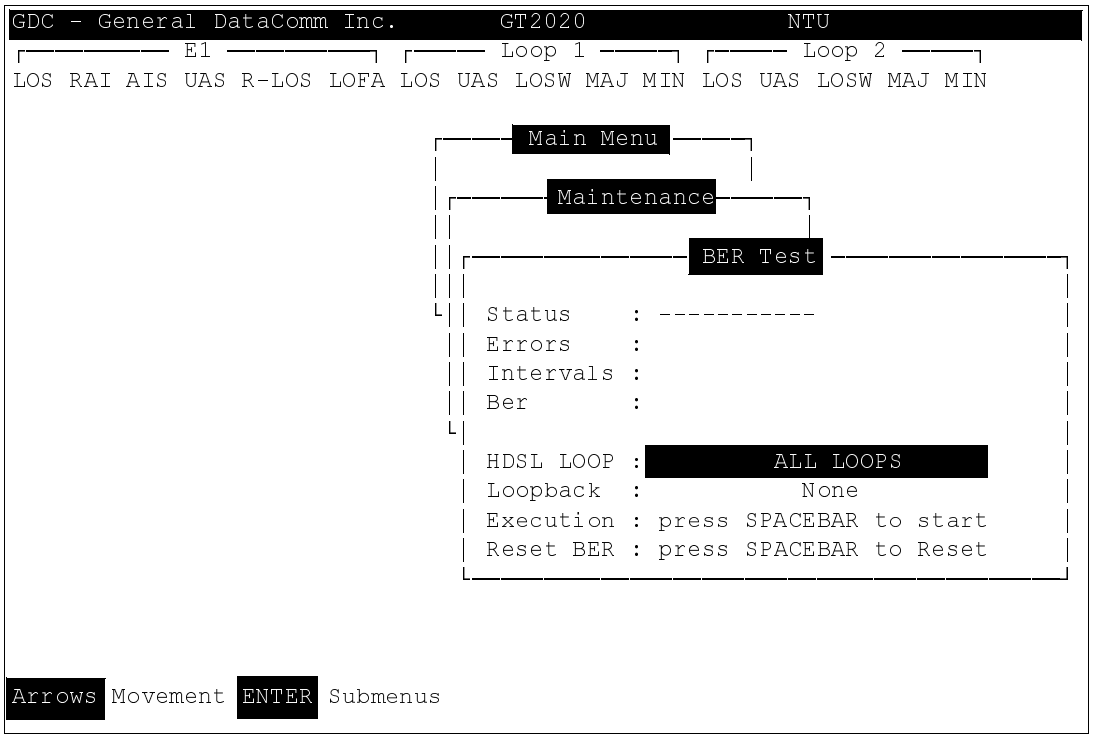


Figure 4-4 HDSL BER Test Screen

The dialog box used to control BER testing has two areas:

- The top area is used to display BER results.
- The bottom area is used to select the desired HDSL loop you want to perform the test on, and to start/stop BER measurement.

The fields of the BER Test dialog box are described in *Table 4-1*.

Table 4-1 BER Test Screen Fields

Status	Displays the current status of the error detector: Sync - The error detector is synchronized, and the BER measurement is possible. Out-of-Sync - The error detector is not synchronized, and BER measurement is inhibited.
Errors	Displays the number of errors detected in the current or most recent BER test.
Intervals	Displays the number of measurement intervals up to this point.
BER	Displays the BER calculated up to this point.
HDSL LOOP	Displays which HDSL loop is selected for the BER test.
Loopback	Displays the current state of the loopback activated for the purpose of the BER test: No loopback has been activated. In this case, an external loopback, e.g., a physical loopback connection, must be connected before starting the BER test. Remote Local - Remote line loopback is activated for the BER test.
Execution	Displays "Press SPACEBAR to start" while BER measurement is idle. Displays "Press SPACEBAR to stop" while BER measurement is active.

Operation

1. To display the BER TEST screen, select item 2 on the Maintenance Menu.
2. Select the HDSL loop you want to perform the test on by moving the selection block to the HDSL loop field. Press the spacebar to select the desired HDSL loop.
3. Make sure a loopback is activated. If the Loopback field displays None and no external loopback is currently connected, change the state of the loopback used for BER measurement. Move the selection block to the Loopback line and press the spacebar.

To enable/disable BER testing:

1. To start the BER measurement, move the selection block to the Execution field and press the space bar. The Execution field now shows Stop.
2. To stop the BER measurement, move the selection block to the Execution line and press the space bar. The Execution field now shows Press SPACEBAR to start.

To exit and return to the maintenance menu, make sure that BER testing has been disabled, and press the **ESC** key.

Note *You cannot exit the BER TEST screen while a BER test is running.*
When you start or stop the BER test on one of the HDSL loops, the other loop(s) see bursted errors on its data.
The BER test detector will synchronize and show error-free for all 1s and all 0s pattern.

Reset Statistics

The Reset Statistics option resets all the performance statistics entries of the unit.

Operation

To instruct the unit to reset all the performance statistics counters:

1. Select item 3 on the Maintenance Menu. You will see a dialog box with two options: `Yes` and `No`.
2. To reset the statistics, move the selection block to `Yes,` and press Enter.
3. To exit without resetting press Esc, or move the selection block to `No`, and press Enter.

HDSL Start-Up

This option is used to initiate the HDSL loops start-up process manually. Normally this process is performed automatically upon link initialization and whenever the synchronization between two linked units is lost.

Important *Activation of this function will disrupt transfer of data through the link for a short time.*

To instruct the unit to perform the start-up process, select item 4 on the Maintenance Menu.

Board Reset

This option is used to reset the unit. To reset the unit, select item 5 on the Maintenance Menu. After a few seconds, the opening screen will appear. The unit performs the start-up process and displays the Main Menu screen.

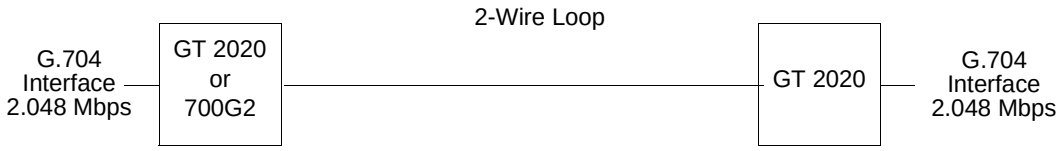
Chapter 5: Application Guide

Overview

This chapter describes typical applications to assist you in configuring your system.

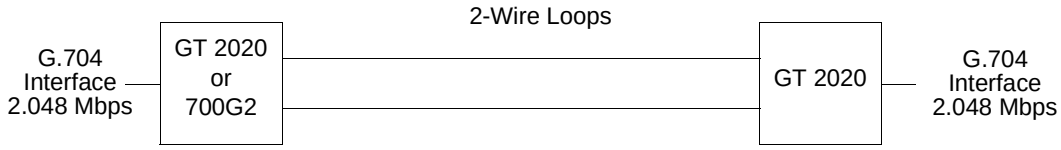
Typical Applications

Figures 5-1 through *5-5* show typical applications and option settings for configuring your system.



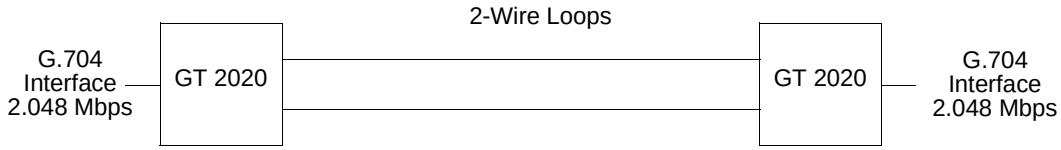
Unit Type:	LTU	NTU
Enabled Loops:	1	1
FP Enable:	Enabled	Enabled
Line Unit:	TLU	TLU
Line Code:	HDB3	HDB3
Frame Mode:	Framed	Framed
TS16	Data	Data
Network Configuration		
Application:	P2P	P2P
Loop 1 Start DS0:	1	1
Loop 1 Consecutive DS0:	10	10
Loop 2 Start DS0:	Not Applicable	Not Applicable
Loop 2 Consecutive DS0:	Not Applicable	Not Applicable

Figure 5-1 Point-To-Point Fractional G.704 Application



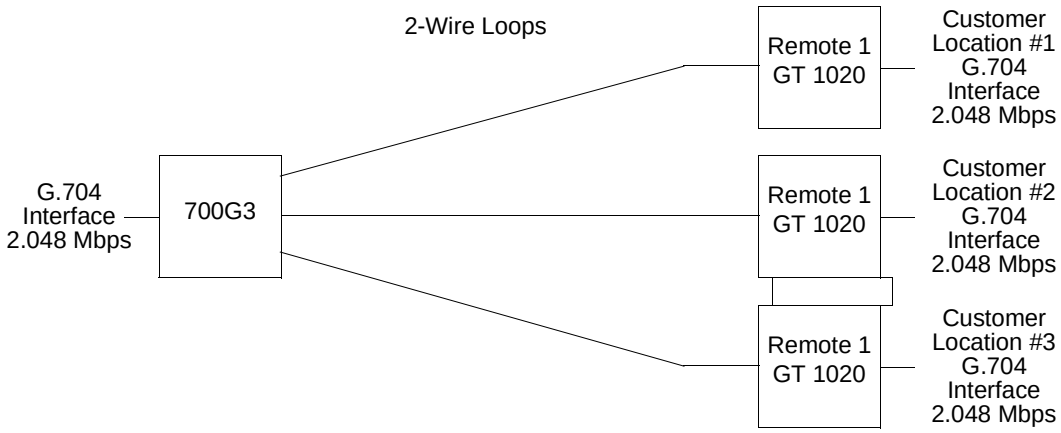
Unit Type:	LTU	NTU
Enabled Loops:	2	2
FP Enable:	Enabled	Enabled
Line Unit:	TLU	TLU
Line Code:	HDB3	HDB3
Frame Mode:	Framed	Framed
TS16	Data	Data
Network Configuration		
Application:	P2P	P2P
Loop 1 Start DS0:	Not Applicable	Not Applicable
Loop 1 Consecutive DS0:	Not Applicable	Not Applicable
Loop 2 Start DS0:	Not Applicable	Not Applicable
Loop 2 Consecutive DS0:	Not Applicable	Not Applicable

Figure 5-2 Point-To-Point Framed Data Application



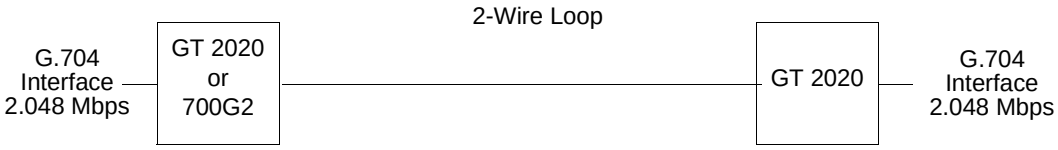
Unit Type:	LTU	NTU
Enabled Loops:	2	2
FP Enable:	Enabled	Enabled
Line Unit:	ILU	ILU
Line Code:	HDB3	HDB3
Frame Mode:	Unframed	Unframed
TS16	Data	Data
Network Configuration		
Application:	P2P	P2P
Loop 1 Start DS0:	Not Applicable	Not Applicable
Loop 1 Consecutive DS0:	Not Applicable	Not Applicable
Loop 2 Start DS0:	Not Applicable	Not Applicable
Loop 2 Consecutive DS0:	Not Applicable	Not Applicable

Figure 5-3 Point-To-Point Campus Unframed Data Application



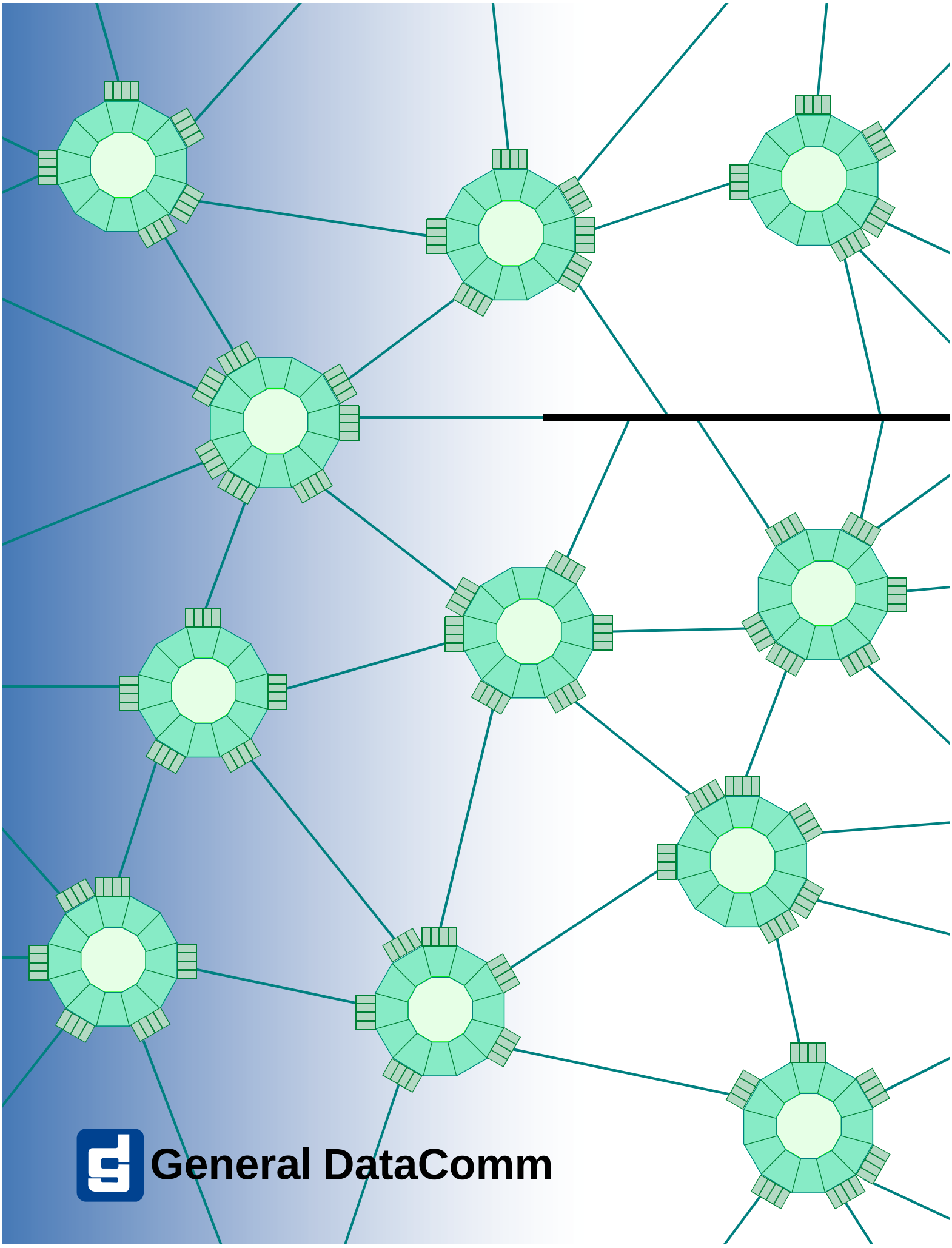
		Remote 1	Remote 2	Remote 3
Unit Type:	LTU	NTU	NTU	NTU
Enabled Loops:	3	1	1	1
FP Enable:	Enabled	Enabled	Enabled	Enabled
Line Unit:	TLU	TLU	TLU	TLU
Line Code:	HDB3	HDB3	HDB3	HDB3
Frame Mode:	Framed	Framed	Framed	Framed
TS16	Data	Data	Data	Data
Network Configuration				
Application:	P2MP	P2MP	P2MP	P2MP
Loop 1 Start DS0:	1	1	18	28
Loop 1 Consecutive DS0:	17	17	10	4
Loop 2 Start DS0:	18	Not Applicable	Not Applicable	Not Applicable
Loop 2 Consecutive DS0:	10	Not Applicable	Not Applicable	Not Applicable
Loop 3 Start DS0:	28	Not Applicable	Not Applicable	Not Applicable
Loop 3 Consecutive DS0:	4	Not Applicable	Not Applicable	Not Applicable

Figure 5-4 Point-To- MultiPoint Application



Unit Type:	LTU	NTU
Enabled Loops:	1	1
FP Enable:	Enabled	Enabled
Line Unit:	TLU	TLU
Line Code:	HDB3	HDB3
Frame Mode:	Framed	Framed
Network Configuration		
Application:	P2P	
Loop 1 Start DS0:	1	
Loop 1 Consecutive DS0:	4	

Figure 5-5 Fractional G.704 Service (1 Loop) Application


General DataComm