Publication No. 073R115-000-E1

ERRATA SHEET

FOR

700-G2/G3 and 702-G2

Operating and Installation Instructions

Publication 073R115-000, Issue 3

Attached are errata sheets shipped with Issue 1 of this manual, which will be obsolete when Issue 4 of the manual is printed. These errata pages reflect changes in text or figures and replace their respective pages in Issue 3. Following text items have been changed as shown:

Chapter 2, Installation:

Table 2-1 Option Selection. Jumpers: Row 1 has been changed; Rows 3 and 4 have been replaced with only one row for Jumpers X6 and X7; and Row 2 is moved to Row 3 as shown below.

Jumpers	Description
X4 (75/120 ohm) X5 (installed on some units only)	Fix the termination of the E1 receiver: 75 ohm unbalanced, 120 ohm balanced.
X6, X7 (installed on some units only)	Must be installed in the SH position.
X8 (E1 unbal.)	Install for unbalanced E1 lines.

Figure 2-1 Option Switch and Jumper Locations. Switches have been added as shown in the upper right hand corner of board.

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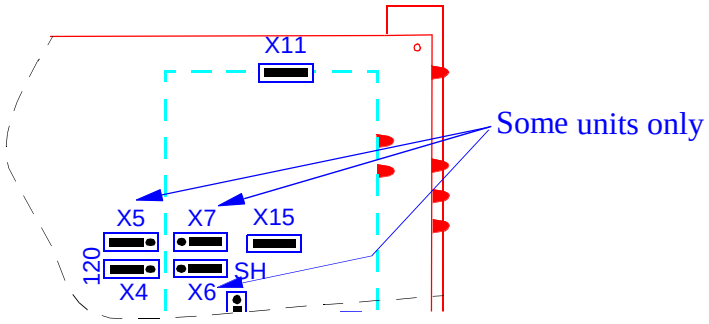

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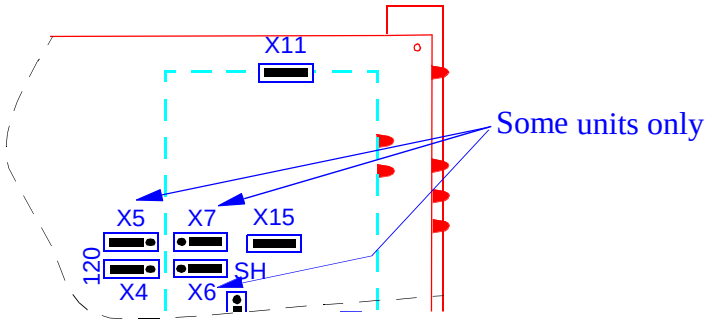

GDC 073R115-000
Issue 3, June 1997

Installation and Operation

Universal Access System

700-G2/G3 and 702-G2

General DataComm

Warning

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

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

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

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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.

Safety Guidelines

The following symbols are used when unsafe conditions exist or when potentially hazardous voltages are present:

Caution statements identify conditions or practices that can cause damage to the equipment or loss of data

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

Always use caution and common sense. *To reduce the risk of electrical shock, do not operate 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.

Preface

Scope

This manual describes how to install and operate the Universal Access System (UAS) 700-G2/G3 and 702-G2, and explains how to monitor and manage network devices. This documentation is written for operators and installers, and assumes a working knowledge of data communications equipment.

Organization

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

- *Chapter 1 -System Description* provides an overview to the Universal Access System (UAS) 700-G2/G3 and 702-G2 Models. It includes a general description, and equipment, assembly, and cabling information of the Universal Access System (UAS) 700-G2/G3 and 702-G2.
- *Chapter 2 - Installation* tells you how to install the UAS 700-G2/G3 and 702-G2. Only typical or fundamental applications are given because of the variety of specific customer system choices.
- *Chapter 3 - Operation* describes the front panels of the UAS 700-G2/G3 and 702-G2.
- *Chapter 4 - Tests* describes front panel and external tests.

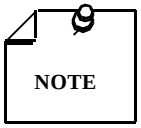
The *Index* contains topics on the Universal Access System (UAS) 700-G2/G3 and 702-G2 with page numbers.

Document Conventions

Level 1 paragraph headers introduce major topics.

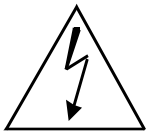
Level 2 paragraph headers introduce subsections of major topics.

Level 3 paragraph headers introduce subsections of secondary topics.



Notes present special instructions, helpful hints or general rules.

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



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

Related Publications

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

- *Operating and Installation Instructions for SpectraComm Manager Card GDC 048R303-000*
- *Operating and Installation Instructions for SpectraComm Shelf GDC 010R302-000*
- *Installation and Operating Instructions for Universal Access System, SCM/HDSL Devices GDC 058R699-V100*

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

GDC NNNRnnn-000 or GDC NNNRnnn-Vnnn

NNN	identifies the product family (e.g. UAS)
R	denotes a technical publication
nnn	a number assigned by Technical Publications
000	identifies a hardware product and does not change
Vnnn	designates software version associated with a product, which may be updated periodically

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

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

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

Hands-on training courses are provided by GDC Educational Services. Courses range from basic data communications, modems and multiplexers, to complex network and ATM systems and are taught in Connecticut or at a customer location. To discuss educational services or receive a course schedule, call 1-800-242-1030 and follow the menu instructions.

Glossary of Terms

2B1Q Code

Line code for basic rate ISDN at the U reference point.

Address

A sequence of bits, a character, or a group of characters that identifies a network station, user, or application; used mainly for routing purposes.

Analog

Transmission employing variable and continuous wave forms to represent information values.

BERT

Bit Error Rate Test, or tester. (see Bit Error Rate.)

Bipolar

The predominant signaling method used for digital transmission services, such as DDS and T1, in which the signal carrying the binary value successively alternates between positive and negative polarities. Zero and one values are represented by the signal amplitude at either polarity, while no-value spaces are at zero amplitude; also, polar transmission.

Bit Error Rate (BER)

The percentage of received bits that are in error, relative to a specific amount of bits received; usually expressed as a number referenced to a power of 10; e.g., 1 in 10^5.

Bps

Bits per second.

CSU

Channel Service Unit.

Data

Digitally represented information, which includes voice, text, facsimile, and video.

DDS

Dataphone digital service; private-line digital service offered intra-LATA by BOCs, inter-LATA by AT&T Communications, with data rates typically at 2.4, 4.8, 9.6, and 56 kbps; now a part of the services listed by AT&T under the Accunet family of offerings.

Diagnostics

Tests used to detect malfunctions in a system or component.

Digital Loopback (DL)

Technique for testing the digital processing circuitry of a communications device; may be initiated locally or remotely via a telecommunications circuit; device being tested will echo back a received test message, after first decoding and then re-encoding it, the results of which are compared with the original message.

DSU

Data Service Unit.

E1

European telecommunications standard defined by CCITT standards G.703, G.704, and G.732.

Ground

An electrical connection or common conductor that, at some point, connects to the earth.

HDSL

High-Bit Rate Digital Subscriber Line.

Interface

A shared boundary; a physical point of demarcation between two devices, where the electrical signals, connectors, timing, and handshaking are defined; the procedure, codes, and protocols that enable two entities to interact for the meaningful exchange of information.

Local Area Network

A type of high-speed data communications arrangement wherein all segments of the transmission medium (typically, coaxial cable, twisted-pair wire, or optical fiber) are under the control of the network operator.

Loopback

Diagnostic procedure used for transmission devices; a test message is sent to a device being tested, which is then sent back to the originator and compared with the original transmission; loopback testing may be within a locally attached device or conducted remotely over a communications circuit.

Modem

Modulator/demodulator; electronic device that enables digital data to be sent over (typically) analog transmission facilities.

Network

An interconnected group of nodes; a series of points, nodes, or stations connected by communications channels; the assembly of equipment through which connections are made between data stations.

Node

A point where one or more functional units interconnect transmission lines (ISO); a physical device that allows for the transmission of data within a network; an end-point of a link or a junction common to two or more links in a network (IBM SNA); typically includes host processors, communications controllers, cluster controllers, and terminals.

Self-Test

A diagnostic test mode to check modem performance in which the modem is disconnected from the telephone facility and its transmitter output is connected to its receiver input, permitting the looping of test messages (originated by the modem test circuitry) through the modem.

Terminal

A point in a network at which data can either enter or leave; a device, usually equipped with a keyboard, often with a display, capable of sending and receiving data over a communications link (IBM).

Transmission

The dispatching of a signal, message, or other form of intelligence by wire, radio, telegraphy, telephony, facsimile, or other means (ISO); a series of characters, messages or blocks, including control information and user data; the signaling of data over communications channels.

1 System Description

Overview

The 700-G2/G3 and 702-G2 provide local loop transmission for Full and Fractional E1 (FE1) services. These units conform to the ETSI HDSL standard and operate on a 2-wire metallic pair using High Bit-Rate Digital Subscriber Line (HDSL) technology.

Using the 700-G2/G3 and 702-G2, a telephone company/carrier or an end user can transmit up to 2.048 Mbps on an unconditioned metallic cable, up to 4.5 Km on 0.5mm cable, or 3.2 Km on 0.4mm cable.

The 700-G2 can be installed in the SpectraComm shelf (16 per shelf) for either carrier central office or customer premises applications. It can operate in one of two configurations: as a master unit connected to a slave 702-G2, 720-G2, or 730-D2 (point-to-point operation); or as master unit connected to two single pair slave units (e.g., 720-G1, or 730-D1) (point-to-multipoint operation).

The 700-G3 is a double width card installed in a SpectraComm shelf (8 per shelf) for either carrier central office or customer premises applications. The 700-G3 can operate in a point-to-multipoint configuration where the NTUs are 720-G1 or 730-D1 slave units.

The 702-G2 is installed in the SpectraComm shelf and operates in all modes supported by the 700-G2. Additionally, the 702-G2 can operate as an NTU in a point-to-point network configuration.

The 700-G2 and 702-G2 can also be configured to operate as single loop units, enabling them to operate with 720-G1 and 730-D1 NTUs in a point-to-point configuration. The 700-G3 can be configured to operate as either a single loop or two loop unit, in addition to its three loop configuration. This enables it to operate with the 720-G2, 730-D2 or 702-G2 NTUs in a point-to-point network configuration. The 700-G2/G3 and 702-G2 may be configured and controlled by dip-switches and/or jumpers on the board, from an optional ASCII terminal, or from GDC's UAS Network Management System.

Applications

The Universal Access System (hereafter called UAS)700-G2/G3 and 702-G2 can provide connectivity between equipment such as the following:

- Workstations — Data terminals
- LAN bridges — Cluster controllers
- Host mainframes — Mini-computers
- Digital telephones — Telephone switches
- Video terminals — Video conference stations
- E1 Multiplexers — Sub-rate multiplexers
- VSAT terminals — Microwave equipment

The 700-G2 and 700-G3 are designed to operate as LTU (Line Terminating Unit) type equipment only. The 702-G2 is designed to perform functions common to operation as either an LTU (Line Terminating Unit) or NTU (Network Terminating Unit). A 700-G2 and 702-G2 enable you to connect any two devices such as those listed above in a point-to-point link with inexpensive telephone wires (*see Figure 1-1 and Figure 1-2*).

The 700-G3 is intended to be used in a point-to-multipoint network configuration where the remote units (NTUs) may be 720-G1 or 730-D1 type units (*See Figure 1-1 and Figure 1-2*). You can also use the 700-G2/G3 or 702-G2 to add new links to networks or to replace older expensive links. For example, you could replace coaxial cable with inexpensive telephone wire.

Features

Full E1 Service Provisioning (Point-to-Point)

The 700-G2 and 702-G2 can operate in one of several configurations. Three are shown in *Figure 1-1 and Figure 1-2*. The units G.703/G.704 input/output can be connected directly to a carrier-central-office, E1 cross-connect, a Digital Cross-Connect System, or into a higher order multiplexer for inter-office transport.

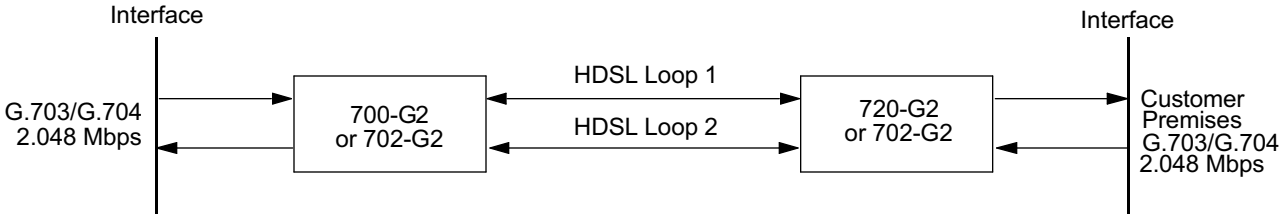
For full E1-service-provisioning applications the master 700-G2 or 702-G2 is connected to a slave 702-G2, 720-G2 or 730-D2 to provide the end user G.703/G.704 or V.35 interface. The 700-G2 and 702-G2 transport can also be used to extend 2 Mbps applications within a customer-owned facility.

Fractional E1 (FE1) Service Provisioning (Point-to-Point)

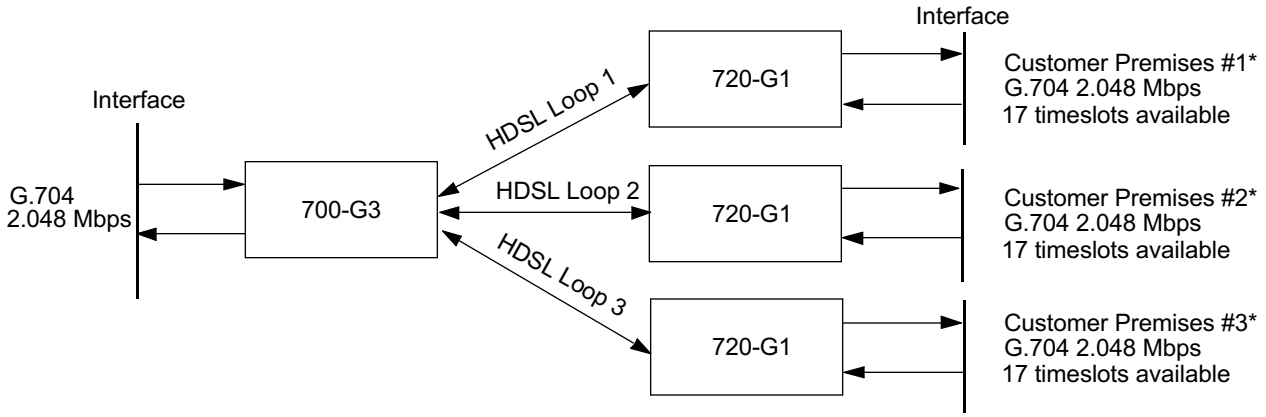
The 700-G2 and 702-G2 can be used to provide fractional E1 data service to customer sites from a central office location. When 720-G1 or 730-D1 remote units are used in a single loop provisioning configuration, up to 17 G.704 E1 timeslots are available at the customer site in the 720-G1 case, and a V.35 nx64kbps signal is available in the 730-D1 case (up to 18x64kbps). When the 720-G2 or 730-D2 remote units are used in a two loop configuration, up to 31 G.704E1 timeslots are available at the customer site in the 720-G2 case, and a V.35 nx64kbps signal is available in the 730-D2 case (configurable up to 31x64kbps).

Fractional E1 (FE1) Service Provisioning (Point-to-Multipoint)

When connected to three different customer premises HDSL units, the 700-G3 can be used to combine the customers' data into a single G.704 interface. This signal can be sent into the network for proper routing. The 700-G3 maps the DS0s or V.35 nx64kbps from the individual customer sites into proper alignment in its G.704 frame. When 720-G1 units are used at the remote sites, up to 17 G.704E1 timeslots are available at each remote site, with the exception that the total number of provisioned timeslots for all three remotes must be less than or equal to 31 timeslots. When 730-D1 units are used at the remote sites, a V.35 nx64kbps signal is available at each remote (up to 18x64kbps), with the exception that the aggregate data rate of all three remote sites must be less than or equal to 31x64kbps. *Chapter 3 - Operation* describes in detail these timeslot mapping functions.

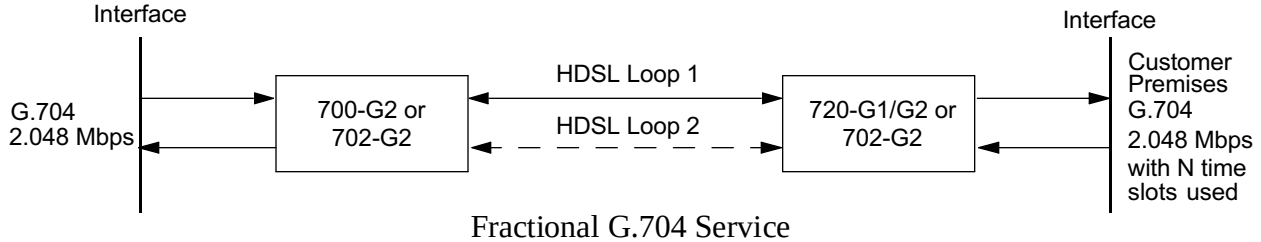


Point-to-Point



Point-to-Multipoint Data-Grooming

* 31 Time Slots Total



Fractional G.704 Service

Figure 1-1 Typical UAS 700-G2, 702-G2 and 700-G3 Applications

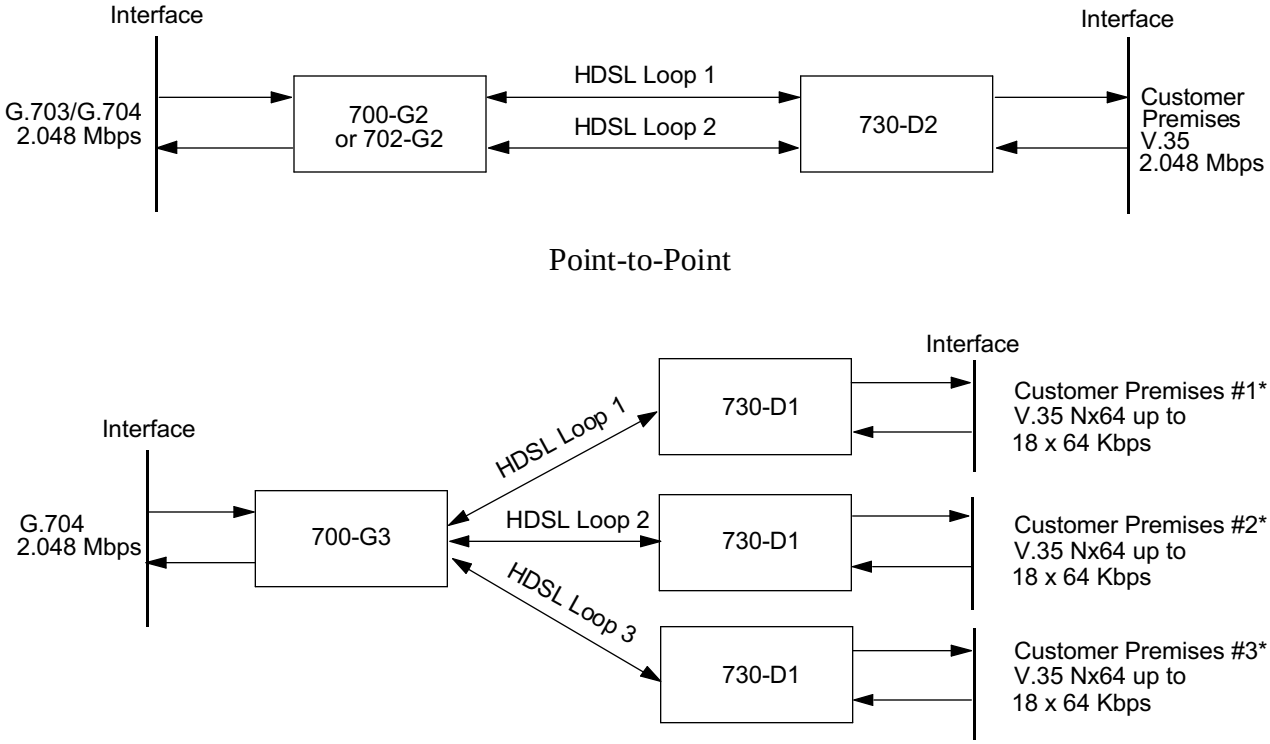
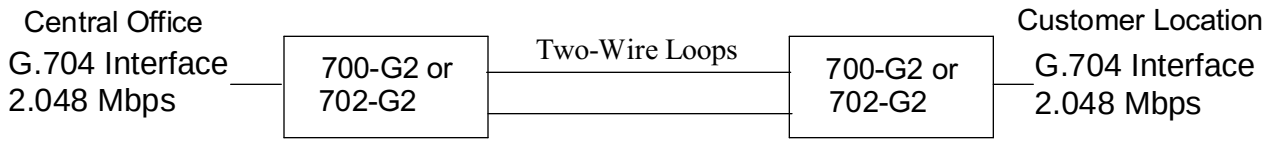


Figure 1-2 Typical UAS 700-G2, 702-G2 and 700-G3 Applications

Typical Applications--Examples

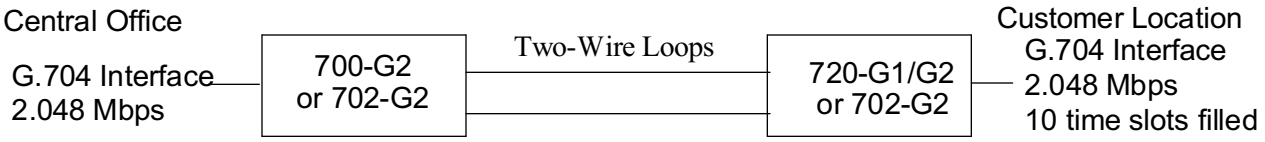
This section includes timing notes and typical applications to assist you in configuring your system. *Figures 1-3* through *1-8* show you a few more examples of applications and option settings for configuring your system.



Unit Type:	LTU	NTU
Enabled Loops:	2	2
Front Panel Enable:	Enabled	Enabled
Line Unit:	ILU	ILU
Line Code:	HDB3	HDB3
Frame Mode:	Unframed	Unframed
TS16:	Data	Data

Network Configuration	LTU	NTU
Application:	P2P	P2P
Loop 1 Start DS0:	Not Applicable (N/A)	N/A
Loop 1 Consecutive DS0:	N/A	N/A
Loop 2 Start DS0:	N/A	N/A
Loop 2 Consecutive DS0:	N/A	N/A

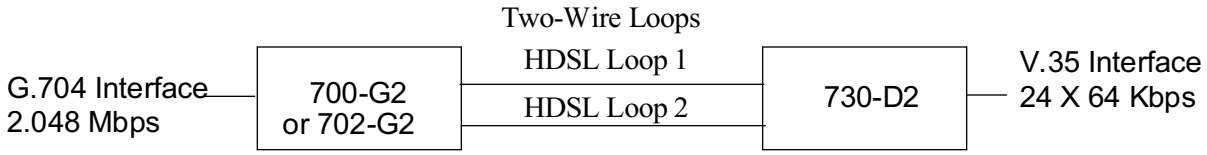
Figure 1-3 Point-To-Point Application Unframed Data



Unit Type:	LTU	NTU
Enabled Loops:	1	1
Front Panel Enable	Enabled	Enabled
Line Unit:	TLU	TLU
Line Code:	HDB3	HDB3
Frame Mode:	Framed	Framed
TS16:	Data	Data

Network Configuration	LTU	NTU
Application:	P2P	P2P
Loop 1 Start DS0:	1	1
Loop 1 Consecutive DS0:	10	10
Loop 2 Start DS0:	N/A	N/A
Loop 2 Consecutive DS0:	N/A	N/A

Figure 1-4 Point-to-Point Fractional G.704

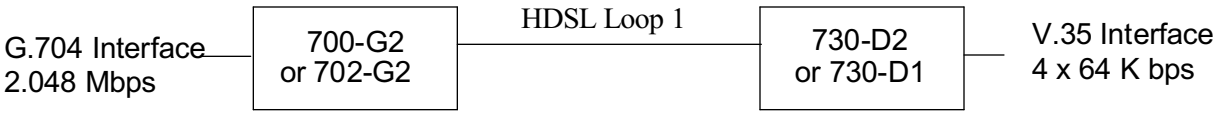


Unit Type:	LTU
Enabled Loops:	2
Front Panel Enable:	Enabled
Line Unit:	TLU
Line Code:	HDB3
Frame Mode:	Framed
TS16:	Data

Unit Type:	NTU
Enabled Loops:	2
Application:	P2P
Front Panel Enable:	Enabled
Tx Clock Mode:	Looped
CTS Mode:	On
Data Rate:	24 x 64 Kbps
V54 Rx Mode:	Enabled
FP RL Mode:	V54

Network Configuration	LTU
Application:	P2P
Loop 1 Start DS0:	Not Applicable
Loop 1 Consecutive DS0:	Not Applicable
Loop 2 Start DS0:	Not Applicable
Loop 2 Consecutive DS0:	Not Applicable

Figure 1-5 Fractional G.704 Service (2-Loop)

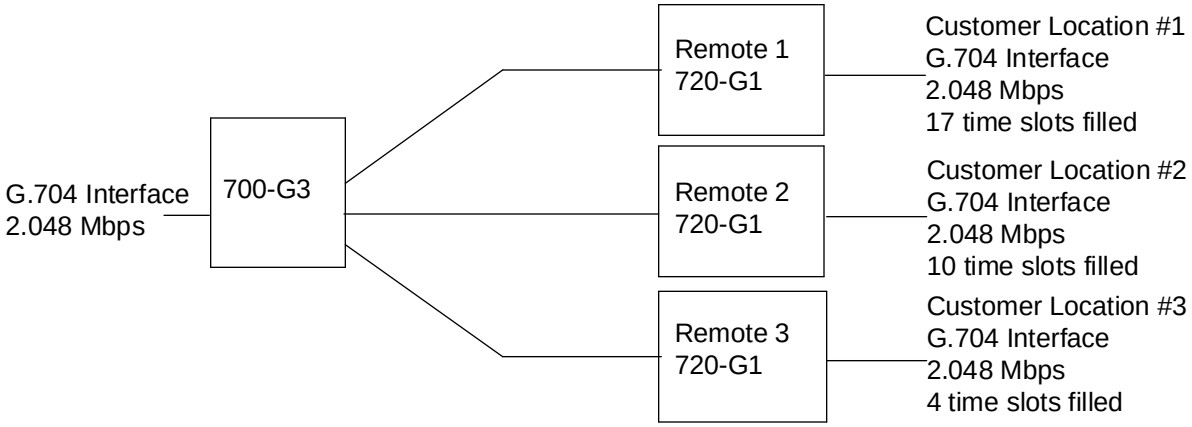


Unit Type:	**LTU**
Enabled Loops:	1
Front Panel Enable:	Enabled
Line Unit:	TLU
Line Code:	HDB3
Frame Mode:	Framed
TS16:	Data

Unit Type:	**NTU**
Enabled Loops:	1
Application:	P2P
Front Panel Enable:	Enabled
Tx Clock Mode:	Looped
CTS Mode:	On
Data Rate:	4 x 64 Kbps
V54 Rx Mode:	Enabled
FP RL Mode:	V54

Network Configuration	**LTU**
Application:	P2P
Loop 1 Start DS0:	1
Loop 1 Consecutive DS0:	4

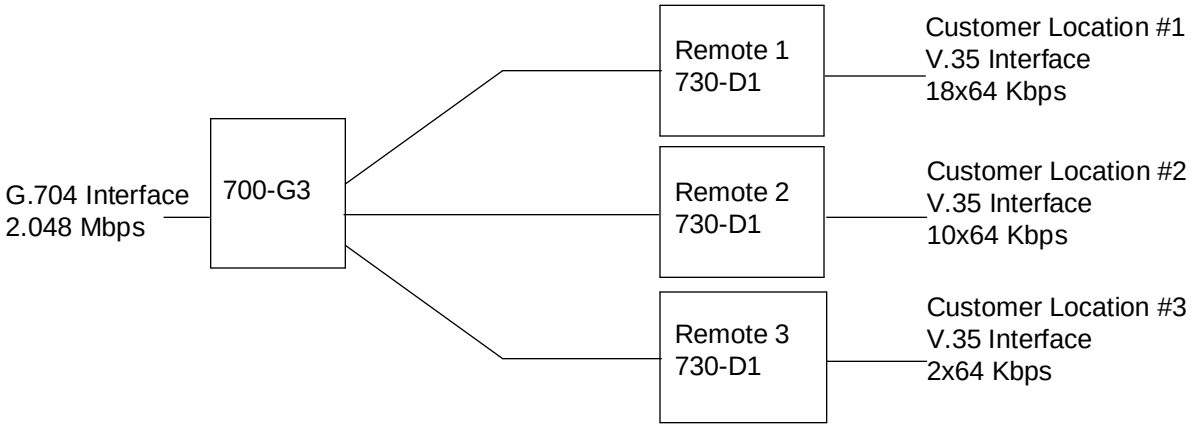
Figure 1-6 Fractional G.704 Service (1-Loop)



Unit Type:	LTU	Remote 1 NTU	Remote 2 NTU	Remote 3 NTU
Enabled Loops:	3	1	1	1
Front Panel Enable	Enabled	Enabled	Enabled	Enabled
Line Unit:	TLU	N/A	N/A	N/A
Frame Mode:	Framed	Framed	Framed	Framed
TS16:	Data	Data	Data	Data

Network Configuration	LTU	Remote 1	Remote 2	Remote 3
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	N/A	N/A	N/A
Loop 2 Consecutive DS0:	10	N/A	N/A	N/A
Loop 3 Start DS0:	28	N/A	N/A	N/A
Loop 3 Consecutive DS0:	4	N/A	N/A	N/A

Figure 1-7 Point-to-Point MultiPoint



			Remote 1	Remote 2	Remote 3
Unit Type:	**LTU**	**Unit Type:**	**NTU**	**NTU**	**NTU**
Enabled Loops:	3	Enabled Loops:	1	1	1
Front Panel Enable:	Enabled	Application:	P2MP	P2MP	P2MP
Line Unit:	TLU	Front Panel Enable:	Enabled	Enabled	Enabled
Line Code:	HDB3	Tx Clock Mode:	Looped	Looped	Looped
Frame Mode:	Framed	CTS Mode:	On	On	On
TS16:	Data	Data Rate:	18x64 Kbps	10 x 64 Kbps	2 x 64 Kbps
		V54 Rx Mode:	Enabled	Enabled	Enabled
		FP RL Mode:	V54	V54	V54

Network Configuration	**LTU**
Application:	P2MP
Loop 1 Start DS0:	1
Loop 1 Consecutive DS0:	18
Loop 2 Start DS0:	19
Loop 2 Consecutive DS0:	10
Loop 3 Start DS0:	29
Loop 3 Consecutive DS0:	2

Figure 1-8 Point-to-Point MultiPoint

Diagnostics/Network Management

A front panel terminal interface jack (CTRL) enables full access to the diagnostic and configuration controls via a terminal interface. The optional menu-driven interface provides loopback control, access to performance monitoring registers, and control of the configuration of the unit.

The 700/702 may also be used as a shelf unit as part of the Universal Access System (UAS). The UAS is a family of network managed metallic loop transmission products. A shelf mounted UAS family member interworks with a standalone unit located at the far end of the access loop. Full network management capabilities are achieved using the SpectraComm Manager (SCM) and its interface to TEAM HDSL or a MIB browser SNMP Controller.

Table 1-1 Equipment List

Description	GDC Part No.
UAS 700-G2 (LTU R/M - short haul E1)	073P200-001
UAS 702-G2 (NTU/LTU R/M - short haul E1)	073P200-002
UAS 700-G3 (LTU R/M - short haul E1)	073M200-001
SPECTRACOMM Shelf Systems	
SpectraComm Shelf MS-2 Model 1 (100/120 V ac) Includes two 8-slot, dual RJ45 Zone 1 connector panels	010M054-001
SpectraComm Shelf MS-2 Model 2 (-48 Vdc) Includes two 8-slot, dual RJ45 Zone 1 connector panels	010M055-001
SpectraComm Shelf MS-2 Model 3 (220/240 V ac, international) Includes two 8-slot, dual RJ45 Zone 1 connector panels	010M056-001
SpectraComm Shelf MS-2 Model 10 (-48 Vdc, with redundant power supplies) Includes two 8-slot, dual RJ45 Zone 1 connector panels	010M070-001
Cables	
Interface cable, RJ48C plug to 9-pin female (HDSL Port to terminal connections)	027H250-010
Adapter RJ48C to Dual 75 ohm unbalanced E1 BNC connectors	209-044-001
Interface Cable 50-pin Amp Connector to six 8-position modular jacks. Each cable can suppor up to six cards.	024H608-002

Technical Specifications

Local Side	
Rate	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	AMI or HDB3
Remote Side	
Rate	Dual duplex 584 Kbaud signaling rate, with 2B1Q line code (each loop)
Framing	HDSL framing per ETSI RTR/TM-03036.
Interface	One to three non-loaded DLL -loops (max. = 2 loops for 700-G2, 702-G2, 3 loops for 700-G3)
Transmit Power	13.5 dBm (+ - 0.5 dB)

Transmission Line	
Two metallic twisted-pairs (loop #1 and loop#2), non-loaded DLL type, up to 3.2 Km at 0.4 mm or 4.5 Km at 0.5 mm under the following conditions: No loading coils, no additional shielding 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 specifications of ETSI RTR/TM-03036.	
Test Features	
Local Loopback	Terminal screen selectable.
Remote Loopback	Terminal screen selectable.
Self-Test	Front panel switch or Terminal screen selectable.
Dimensions	
Dimensions	Height: 0.8 in. (27 mm) Width: 7.0 in. (178 mm) Depth: 9.5 in. (241 mm) Weight: 10 oz (0.28 kg) Shipping Weight: 1 LB 10 oz (0.74 kg)
Electrical	
Power	700-G2/702-G2 +5 Vdc 657mA +12 Vdc 70mA -12 Vdc 75mA Load Number = 0.8 700-G3 +5 Vdc 900mA +12 Vdc 100mA -12 Vdc 100mA Load Number = 1.2
Environmental	
Temperature Card Assembly Card Assembly Storage	 Operation - 0 to 50 degrees Celsius Non-Operating -40 to +85 degrees Celsius
Humidity	5 to 95% non-condensing
Altitude	Operating - 0 to 10,000 feet Non-Operating - 0 to 40,000 feet

2 Installation

Overview

This chapter guides you through the process of installing and using the SpectraComm 700-G2/G3, and 702-G2 in your communications network. If this is your first experience using these units you may wish to review *Chapter 1 - System Description* 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 units 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

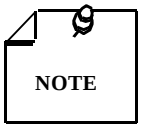
You may install the 700-G2/G3, and 702-G2 basecard in the SpectraComm Shelf. All electrical connections are made through backplane interfaces.

Place the unit in a ventilated area where the ambient temperature does not exceed 122^0F (50^0C).

Do not install the unit directly above equipment that generates a large amount of heat (such as power supplies).

Shelf Installation

To install the SpectraComm Shelf, refer to *Operating and Installation Instructions for SpectraComm Shelf, GDC Publication Number 010R302-000.*



Be sure to install shelves and power supplies as described in the SpectraComm Shelf manual. Failure to do so may result in overheating and subsequent power supply shutdown.

Module Installation

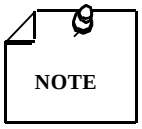
You can install the modules in any unused slot in the shelf that has the Zone 1 connectors required for the network. To install:

1. With the GDC logo on top, insert the module into its slot 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.

Setting Hard Options

Setting the hard options on the cards means adjusting configuration Switches S34 and S35 and jumpers to match your networks operation. *Table 2-1* explains the functions of the switches and jumpers, and *Figure 2-1* shows their location. The hard configuration option is selected by Switch S34-1.

The 073P200-001 and 073M200-001 are LTU only versions and therefore cannot be configured as NTUs



The microprocessor in the UAS 700-G2/G3 and 702-G2 reads the switch settings only when you first power up. If you change the settings while the power is on, you must turn the power off and power up again for the new settings to take effect. Soft options that are changed while the power is on do not require a power cycle. Soft options are stored in non-volatile memory and do not need to be reset after a power interruption.

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

Table 2-1 Option Selection

Switches	Description (Factory defaults are shown in **bold** type.)
S35-1 (SPARE)	Future use.
S35-2 (FP-DIS/EN))	**Open: Front panel TST button is enabled.** Closed: Front panel TST button is disabled.
S35-3 (SIG/DAT)	Data or Signalling mode: **Open: Data - G.704 Channel Associated Signalling is disabled.** Closed: Signalling - G.704 Channel Associated Signalling is enabled.
S35-4 (SPARE)	Future Use.
S35-5 (SPARE)	Future Use.
S35-6 (SPARE)	Future Use.
S35-7 (SPARE)	Future Use.
S35-8 (SPARE)	Future Use.
S34-1 (HRD/SFT)	Selects either soft or hard configuration mode. When soft mode is enabled, the option switch settings are ignored and configuration is determined by stored values and the optional terminal or network manager. **Open: Soft configuration mode** Closed: Hard mode configuration
S34-2 (AMI/HDB3)	Selects line coding. **Open: HDB3** Closed: AMI (Alternate Mark Inversion)
S34-3 (UNFR/FR)	Framed or unframed mode: **Open: Framed - the unit expects a framed E1 signal and maps the E1 data stream accordingly**. Closed: Unframed - the unit transfers the E1 signal on a bit by bit basis.
Switches	**Description**
S34-4 (ILU/TLU)	Configures the Framed 700-G2/G3, and 702-G2 for either a 2048 kbps Terminating Line Unit (TLU) or Intermediate Line Unit (ILU). **Open: TLU**, the 700-G2/G3 and 702-G2 regenerates the G.704 frame structure, and recalculates the CRC-4 error checking of the G.704 frame structure. Closed: ILU, the E1 data is passed transparently without frame regeneration.
S34-5 (NTU/LTU)	Selects whether unit is configured as a line terminating unit (LTU) or network terminating unit (NTU). **Open: LTU** Closed: NTU Must be in LTU mode for GDC Part Nos. 073P200-001 and 073M200-001. May be in LTU mode or NTU mode for GDC Part No. 073P200-002 (UAS 702-G2). Note: For the UAS 702-G2, the position of this switch always determines LTU/NTU status, even when the unit is configured through SOFT mode or by a network management system.
S34-6 (SPARE)	This item is for future use.

S34-7, S34-8 (N LOOPS)	Selects the number of enabled loops: for the 700-G3, this may be 1, 2, or 3.; for the 700-G2 and the 702-G2, this may be 1 or 2. S34-7 S34-8 **Open Open Maximum number of loops enabled** Open Closed 1 loop enabled Closed Open 2 loops enabled Closed Closed 2 loops enabled An invalid selection causes the maximum number of loops to be enabled.
Jumpers	**Description**
X4 (75/120 ohm)	Fix the termination of the E1 receiver: 75 ohm unbalanced, 120 ohm balanced.
X8 (E1 unbal.)	Install for unbalanced E1 lines.
X4 (75/120 ohm)	Fix the termination of the E1 receiver: 75 ohm unbalanced, 120 ohm balanced.
X8 (E1 unbal.)	Install for unbalanced E1 lines.
X11, X15 (basecard) X11 (3rd loop option card) (Remote Power - optional)	Removal enables sealing current feeding. Unless the remote power feed piggyback card is connected to the basecard's XA1J1, these must be shorted. On the 700-G3 3rd loop option card, X11 must always be installed when the remote power feed card is not installed.
X12, X16 (Receiver Gain Select) (basecard) X12 (3rd loop option)	Selects receiver gain for each channel and the third loop option to operate with normal DLL loops or longer loops. Should be set to high gain unless otherwise specified on the optional terminal screen.
X30 (JTAG)	For factory use. (Install jumper for Normal operation.)
X3 (JTAG)	Must be shorted for 702-G2 and 700-G2 and must be removed for 700-G3.

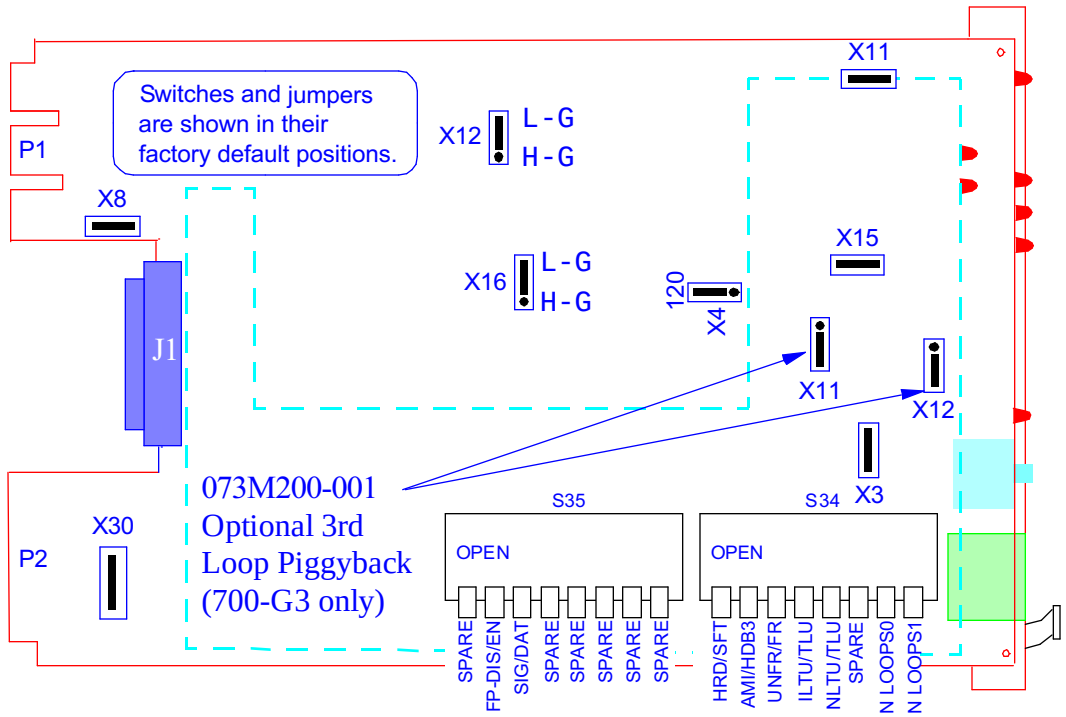


Figure 2-1 Option Switch and Jumper Locations

Electrical Connections

The following paragraphs describe the power line and communications line connections to the UAS 700-G2/G3 and 702-G2.

NOTE

Before applying power to the unit, check that the edge connectors on the rear panel of the card are inserted firmly in their receptacles, which are mounted on the rear panel of the SpectraComm Shelf, shown in Figure 2-2 below.

Power Line

The 700-G2/G3 and 702-G2 obtain power directly from the SpectraComm Shelf.

Communications Line

See *Figure 2-2* for instructions.

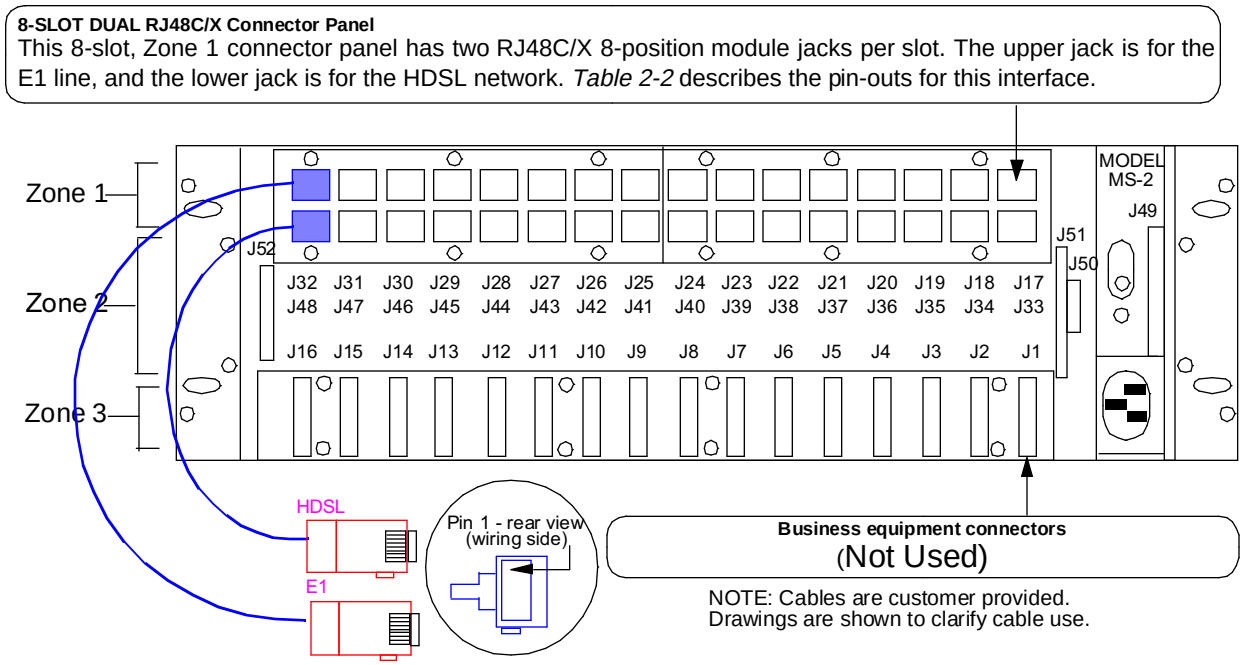


Figure 2-2 Rear Panel SpectraComm Shelf

Table 2-2 Connector Pin Assignments

Pin No.	RJ48C/X	Color
1	E1-RX-R	Blue
2	E1-RX-T	Orange
3		Black
4	E1-TX-R	Red
5	E1-TX-T	Green
6		Yellow
7		Brown
8		Slate
HDSL Connector		
1	HDSL2-R	Blue
2	HDSL2-T	Orange
3		Black
4	HDSL1-R	Red
5	HDSL1-T	Green
6		Yellow
7	HDSL3 - R (700-G3 only)	Brown
8	HDSL3 - T (700-G3 only)	Slate

Upper jacks
J17 to J32
(E1 Connector)

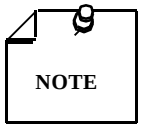
Lower jacks
J33 to J48
(HDSL Connector)

Pre-Operational Configuration

Setup (Hard)

Configure the unit as follows:

3. Verify that Jumper X30 is installed, and that Jumper X3 is installed according to *Table 2-1*.
4. Fix the E1 receiver termination to the proper impedance setting (X4)-75 ohm unbalanced, 120 ohm balanced.
5. Verify that Jumper X8 is not installed for balanced E1 lines and *is* installed for unbalanced E1 lines.
6. On the basecard, fix the HDSL receiver gains to HIGH (X12, X16) and verify that Jumpers X11 and X15 are installed.
7. Verify that the card is configured as an LTU or NTU based upon *Table 2-1*.



For the UAS 702-G2, LTU/NTU status is determined solely by the on-board configuration switch. When configured as an LTU, the UAS 702-G2 responds to commands from a network manager connected to an SCM only in the installed shelf; when configured as an NTU, it acts as a remote unit and only responds to network management commands which are forwarded by the HDSL unit at the far end (LTU).

8. On the 3rd loop option card, fix the HDSL receiver gain (X12) to HIGH and verify that Jumper X11 is installed. Note that this step is required only for the 700-G3.

9. Set the remaining switches and jumpers according to *Table 2-1* and *Figure 2-1*.

   If S34-1 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 the following section: *Setup (Soft)*.

10. Connect the E1 line and HDSL loops to the network connectors on the rear panel.

11. Insert the card (NTU or LTU) into a previously powered-up SpectraComm Shelf.

12. The card automatically performs internal self-tests. If one of these tests fails, the front panel ALM LED blinks.

13. Follow Step 5 under *Setup (Soft)*.

Setup (Soft)

1. Follow steps 1 through 6 and steps 8 through 10 in *Setup (Hard)* above.

2. Connect a terminal to the CTRL connector on the front panel.

3. To view the test results on the terminal, go to the `View H/S Config` option on the terminal. (Refer to *Setting Soft Options* in *Chapter 3 - Operation)*.

4. Verify the configuration of the 2 Mbps parameters (Refer again to *Setting Soft Options).* These should be set as follows:

   - AMI/HDB3
   - FRAMED/UNFRAMED
   - ILU/TLU.

   These settings should match those on the switches and jumpers in *Table 2-1* if in Hard configuration mode (Switch S34-1).

5. After performing the self-tests, the HDSL loops (LTU and NTU) initiate start-up, and the HDSL green LEDs blink. Verify that the HDSL receiver gain on each loop is the same as displayed on the terminal `HDSL Status` screen.

   If the gains are configured differently than specified on the terminal screen, reconfigure the cards jumpers (X12, X16 on the basecard, X12 on the optional 3rd loop piggyback card) to match the `HDSL Status` screen specifications.

   The start-up should last less than 3 minutes. When complete, the HDSL NORM LEDs should be ON and the HDSL ES LEDs should be OFF. If not, the start-up failed. The two cards automatically initiate a new start-up procedure.

   During this time the ALM light blinks until all E1 and HDSL Status Indicators clear.

6. E1 data transfer now occurs; the E1 NORM LED should be ON, and the ES LED should be OFF. If not, refer to the troubleshooting procedure in C*hapter 4- Tests.*

3 Operation

Overview

Figure 3-1 illustrates the UAS 700-G2/G3 and 702-G2 front panels and explains the function (which are common to all front panels) 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.*

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

Front Panel Description

The front panel enables you to visually monitor four data streams, represented by the following LED indicators:

HDSL loop 1 input	- ES LP1 or NORM LP1
HDSL loop 2 input	- ES LP2 or NORM LP2
HDSL Loop 3 input (700-G3 only)	- ES LP3 or NORM LP3
Incoming E1 signal	- E1 ES or E1 NORM

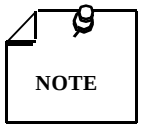
Each LED indicator can be in one of three states: ON, blinking, or OFF, (Blinking is at a 2 Hz rate). *Table 3-1* summarizes.

Table 3-1 Front Panel Indicators

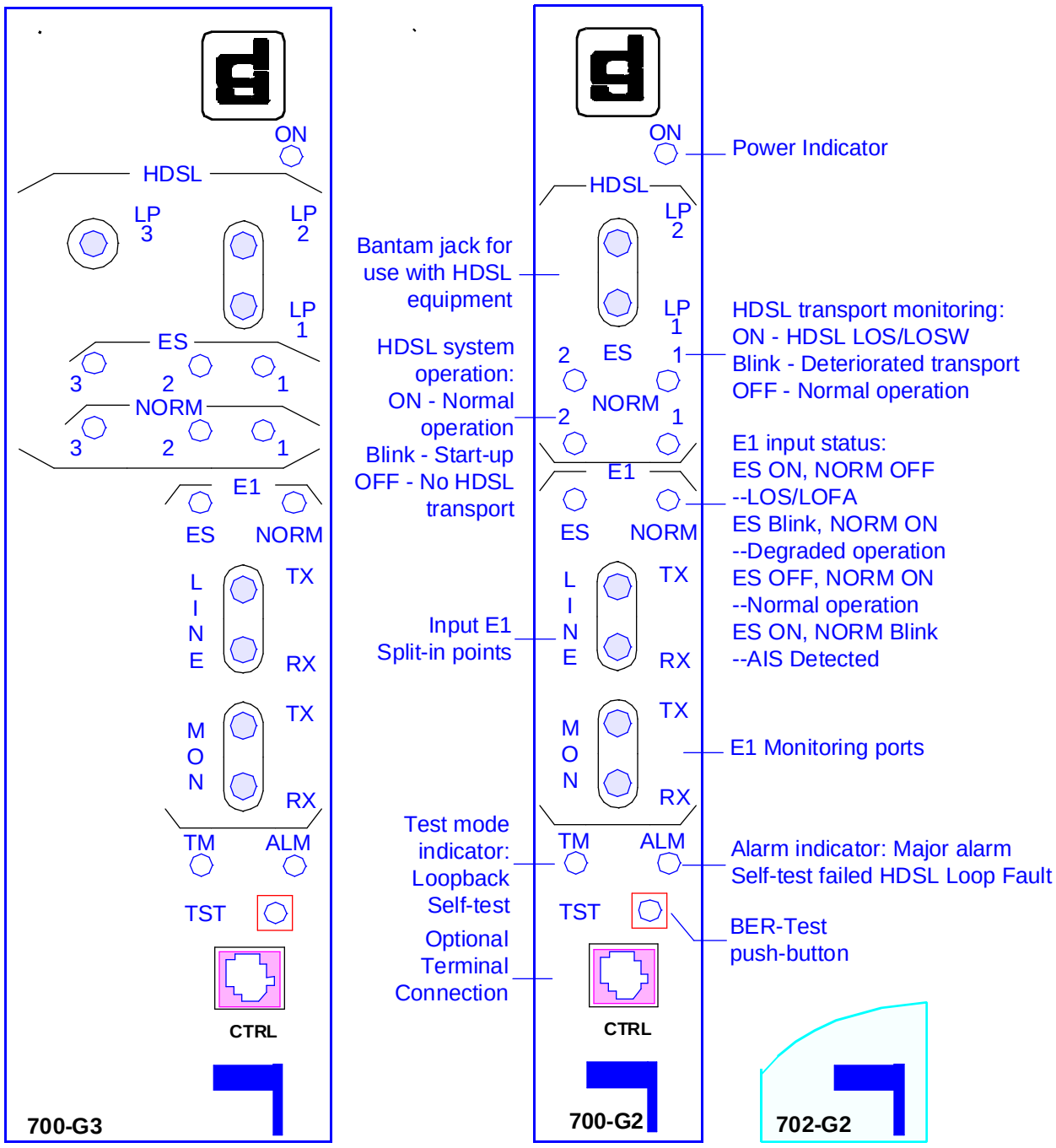
HDSL Indicators		
ES Indicators	**NORM Indicators**	**Indication**
Off	On	Normal operation
On	Off	LOS/LOSW
On (for .5 sec.)	On	ES - Errored second
On	Blink	Start-up in progress. No response received from mating unit.
Off	Blink	Start-up in progress. Signal from mating unit has been received.
E1 Indicators		
ES Indicator	**NORM Indicator**	**Indication**
Off	On	Normal operation
On	Off	LOS or LOFA
On (for .5 sec.)	On	ES - Errored second
On	Blink	AIS received

Other Indicators	
ON	Lit when +5V is applied to the card
ALM	Indicates 'Major Alarm' is present. If a failure is detected during self-test, this LED blinks. It also blinks upon the detection of LOS, LOSW, or UAS on any HDSL loop.
TM	This LED is on during one of the following conditions: • Loopback is activated at the local unit • Loopback is activated at the remote unit • The BER meter has been activated This LED blinks when a BER test is in progress and bit errors are present.

The front panel also provides the TST push button. Pushing the TST button activates the internal unit's BER test. Refer to *Chapter 4* for more information on the operation of this test. Lamp-test is also activated when power is applied to the card.



The TST button has limited functionality on the 700-G3. Refer to Chapter 4 - Tests for more information.



Note that the TST button has limited functionality on the 700-G3.
Refer to *Chapter 4 - Tests* for more information.

Figure 3-1 Front Panels, 700-G2/G3 and 702-G2

Setting Soft Options

You can use an ASCII terminal equipped with an EIA/TIA-232-E communication interface to control the 700-G2/G3 or 702-G2. You connect the terminal to the control (CTRL) jack on the front panel.

To end an ongoing management session, disconnect the terminal from the 700-G2/G3 or 702-G2.

Terminal Requirements

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 unit operation. The screens depicted in the remaining sections of this chapter were derived by plugging the Comm port of a pc (using Microsoft Windows[a] terminal emulator program) into the front panel CTRL jack of the unit.

Set the terminal communications parameters as follows:

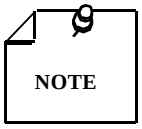
- Data Rate = 9600 bps
- Character Format = 1 start bit / 8 data bits / no parity / 1 stop bit

The software necessary to run the supervision program is contained in the 700-G2/G3 and 702-G2 units.

Control Port Characteristics

The control port is terminated in an RJ45 connector designated CTRL on the front panel. The connector is wired as shown below:

Pin	Function
1, 2, 3	Not connected
4	Ground
5	Transmit output (RXD of terminal)
6	Receive input (TXD of terminal)
7, 8	Connected internally



The remainder of this chapter refers only to the 700-G2. Unless otherwise specified, all terminal screens operate identically for the 702-G2 and 700-G3. The exception is that the 700-G3 screens contain additional fields for loop 3 where appropriate.

Start-up Procedure

A management session is automatically started as soon as you connect the terminal cable to the CTRL port of an operating 700-G2. Upon power-up, the 700-G2 sends the opening screen, shown in *Figure 3-2,* followed by the main menu.

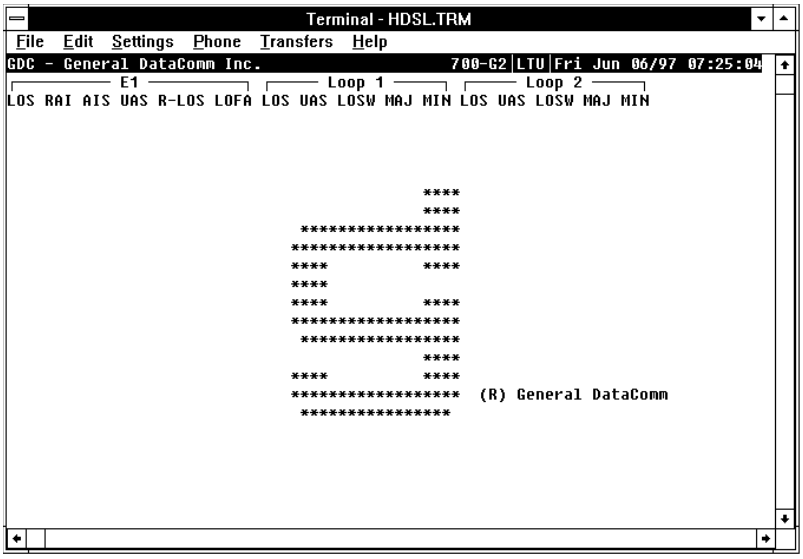


Figure 3-2 Opening Screen

Screen Organization

The screen includes the areas described in *Table 3-2*.

Table 3-2 Terminal Screen Organization

Header	Located at the top of the screen; displays the: • manufacturer name and equipment model • current operating mode (LTU or NTU) • data and time sent by the 700-G2.
Status Line	Located below the header; includes two main fields displaying the status of the various 700-G2 alarms. An active alarm indicator is displayed in reverse video.
E1 alarms 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	Divided into sub-fields, one for each loop; 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 - Incoming bit error rate exceeds selected major alarm threshold. This field is displayed for all units except the 700-G3. MIN - Incoming bit error rate exceeds selected minor alarm threshold.
Work Area	Displays the menu and dialog boxes.
Active Keys Area	Constantly updated to show keys and combinations available on the current screen.

Operating Procedures

The following procedures apply to all the operations that can be performed on the control terminal.

Menu Selection

You can select a Menu item in one of two ways:

1. Move the selected block to the desired item by using the arrow keys, 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.
3. For free-text fields, bring the cursor to the desired field, then type in the desired value.

   You can use the Backspace and Delete keys to make changes or correct errors. When done, press `Enter`.

Restoring Default Values

When the 700-G2 stores default values for parameters displayed in a screen field, you can replace the current values with the default values by pressing `Ctrl D` (`Ctrl D` means hold down the 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 (S34-1 switch is set to SOFT).

Quitting Without Saving

To quit without saving the new parameter values entered in a field, press `Esc`. You can also press `Esc` as necessary to close any open sub-menus 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 three options, described in the following sections.

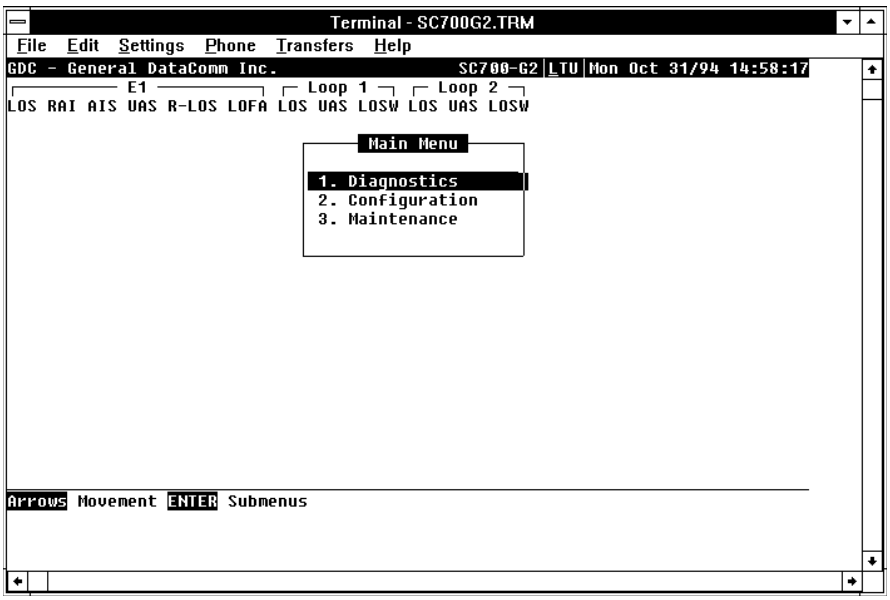


Figure 3-3 Main Menu

Diagnostics Option

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

- Display performance statistics collected on the E1 trunk and 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.
- Display and modify the E1 operating mode of the 700-G2, the E1 line code, and the E1 framing mode.
- Set/modify the network circuit configuration and E1 timeslot routing over the HDSL loops.
- Display system hardware and software data and 700-G2 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 700-G2 BER meter.
- Set the real-time clock of the 700-G2.
- Reset the 700-G2 statistics counters.

- Initiate manually the start-up process.
- Reset the 700-G2. (Simulate a power-up.)

Refer to *Chapter 4 - Tests*.

Diagnostic Menu

Selecting the `Diagnostics` option from the `Main Menu` displays the *`Diagnostics`* menu, shown in *Figure 3-4*. Use this menu to display diagnostic information and to activate diagnostic functions.

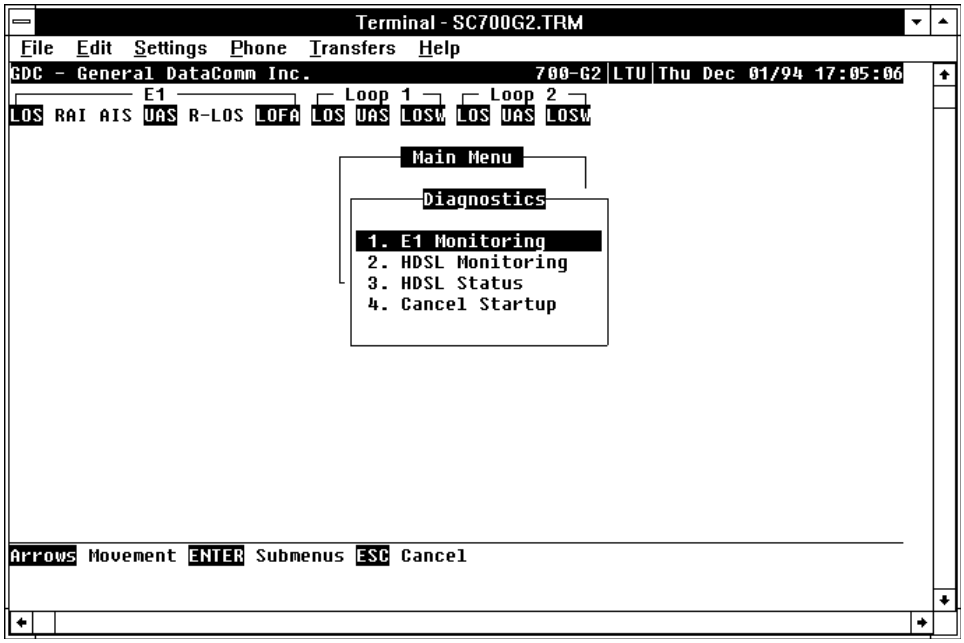


Figure 3-4 Diagnostics Menu

The functions available from the diagnostics menu are as follows:

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

E1 Monitoring

This menu item displays the 24-hour performance statistic data collected on the E1 trunk. *Figure 3-5* depicts a typical `E1 Monitoring` screen.

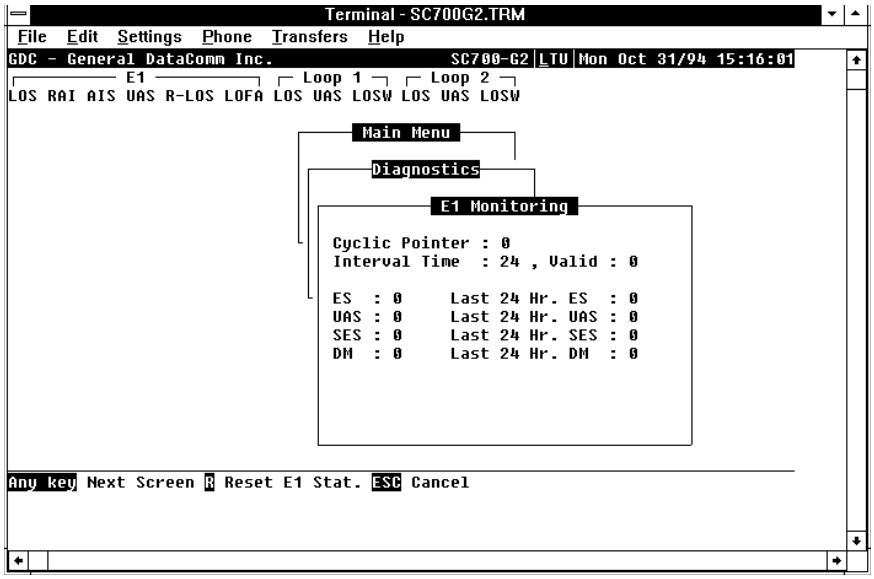


Figure 3-5 E1 Monitoring Screen

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

Table 3-3 E1 Monitoring Screen Fields

Cyclic Pointer	Displays the number sequence of the current 15-minute interval within the current 24-hour interval. The range is 0 to 95.
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.

Operation

The `E1 Monitoring` screen displays data for the current 15-minute interval.

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

To reset the E1 statistics counters, type R. All the displayed values are reset to 0.

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

HDSL Monitoring

The HDSL Monitoring screen displays 24-hour performance statistics on the HDSL loops. A typical screen is shown in *Figure 3-6.*

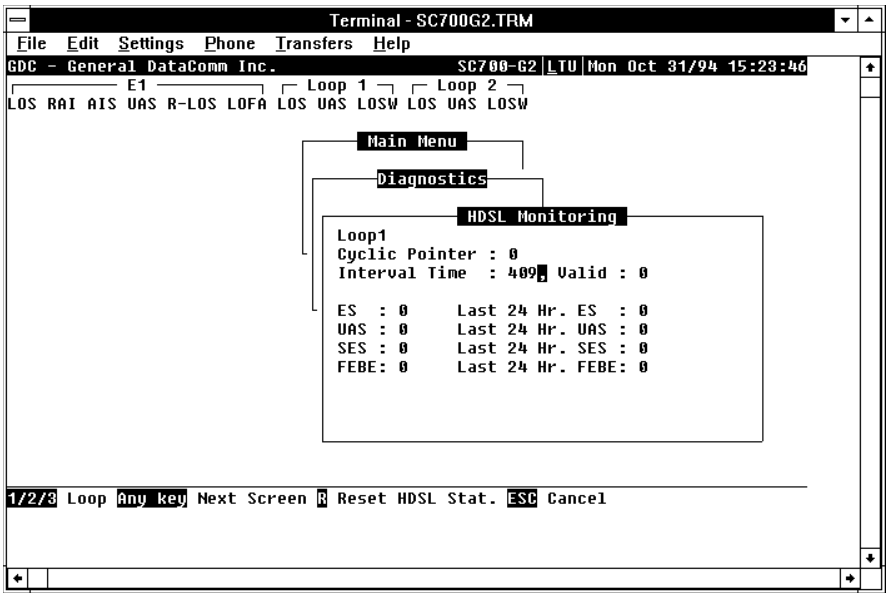


Figure 3-6 HDSL Monitoring Screen

The HDSL Monitoring screen is similar to the E1 Monitoring screen. The main difference is the addition of a loop field that identifies the HDSL loop described by the screen, and the inclusion of a FEBE field. *Table 3-4* describes the fields on the HDSL Monitoring screen.

NOTE

DM is not available on this screen, and ES, UAS and SES are computed according to the same error threshold as the E1 error statistics.

Table 3-4 HDSL Monitoring Screen Fields

FEBE	Displays the number of far-end block errors reported by the remote HDSL unit in the current 15 minute interval.
Last 24 Hr. FEBE	Displays the number of far-end block errors in the last 24-hour interval.

Operation

To display the HDSL Monitoring screen, select Item 2 on the Diagnostics menu. The screen displays the data collected for loop 1 in the current 15-minute interval.

To select another loop, type its number: 1, 2, or 3 (optional).

To display the other 95 intervals within the current 24-hour period, press any key except 1, 2, 3, R, and Esc. 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 Esc.

HDSL Status

This 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*.

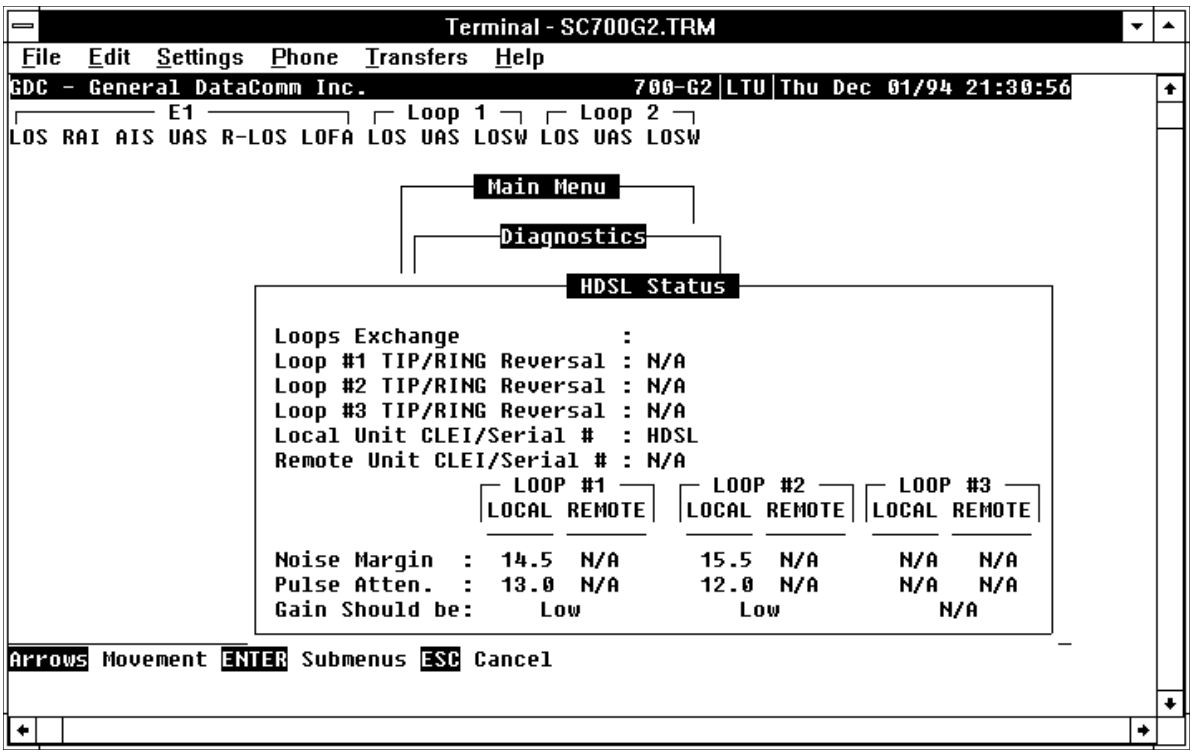


Figure 3-7 HDSL Status Screen

Table 3-5 describes the fields on the `HDSL Status` screen.

Table 3-5 HDSL Status Screen Fields

Loops Exchange	Indicates whether the HDSL loops carrying the E1 traffic are correctly connected or have been interchanged by error. This information is available only when the two 700-G2 units connected in a link can exchange information, and is not applicable if unit is configured as an LTU. If the Loops Exchange indicates `Yes`, then the swapped wires must be corrected.
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 two HDSL units connected in a link can exchange information, and is not applicable if unit is configured as an LTU. If Tip/Ring Reversal indicates `Yes`, the 700 series automatically detects and recovers from this condition.
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 two HDSL units connected in a link can exchange information, and is not applicable if unit is configured as an LTU. If Tip/Ring Reversal indicates `Yes`, the 700 series automatically detects and recovers from this condition.
Loop 3 TIP/RING Reversal	Indicates whether the two conductors of HDSL Loop 3 are correctly connected or have been interchanged by error. This information is available only when the two HDSL units connected in a link can exchange information, and is not applicable if unit is configured as an LTU. If Tip/Ring Reversal indicates `Yes`, the 700 series automatically detects and recovers from this condition.

Local Unit CLEI/ Serial #	This is a future option that is presently not supported.
Remote Unit CLEI/ Serial #	This is a future option that is presently not supported.
Noise Margin*	Displays the noise margin, in dB, measured by the signal processing circuits of the 700-G2. Separate values are provided for each HDSL loop.
Pulse Attenuation*	Displays the pulse attenuation, in dB, measured by the signal processing circuits of the 700-G2. Separate values are provided for each HDSL loop.
Gain Should Be	Indicates the optimal receiver gain value that should be set. This value is calculated by the signal processing circuitry of the 700-G2/G3 or 702-G2.
*Note: Noise margin and pulse attenuation are only valid when X12 and X16 are set to HIGH gain.	

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 Diagnostics menu.

Cancel Startup

The `Cancel Startup` option is used to cancel the startup process performed by the 700-G2 upon link initialization and whenever the synchronization between the two 700-G2 units connected in a link is lost.

Operation

To instruct the 700-G2 to stop performing the startup process, select Item 4 from the `Diagnostics` menu.

Configuration Menu

Use the `Configuration` menu to configure the E1 and the HDSL loop parameters.

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

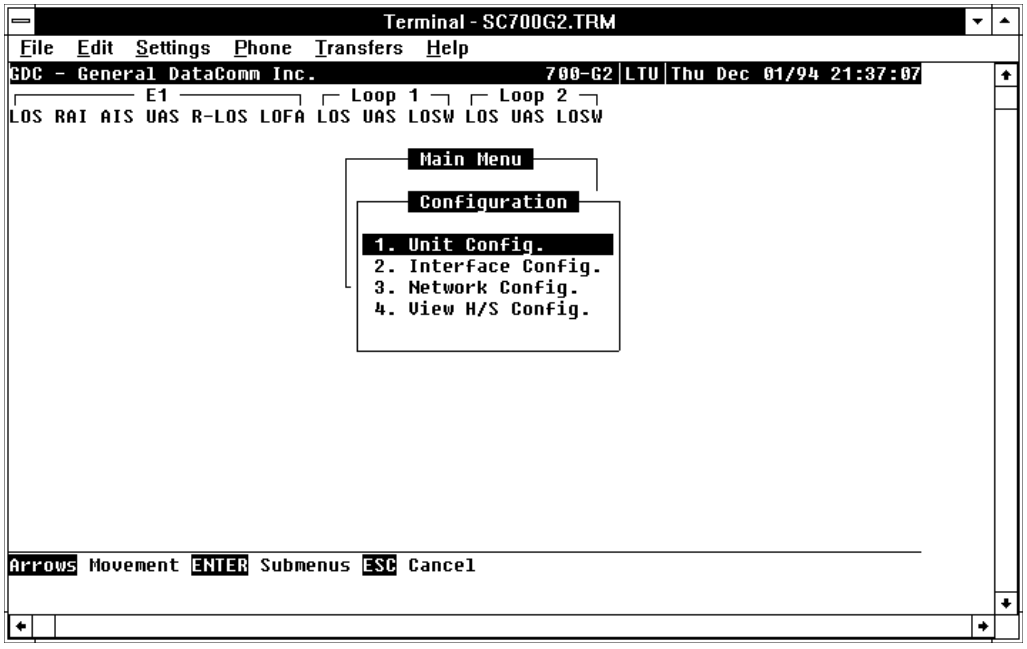


Figure 3-8 Configuration Menu

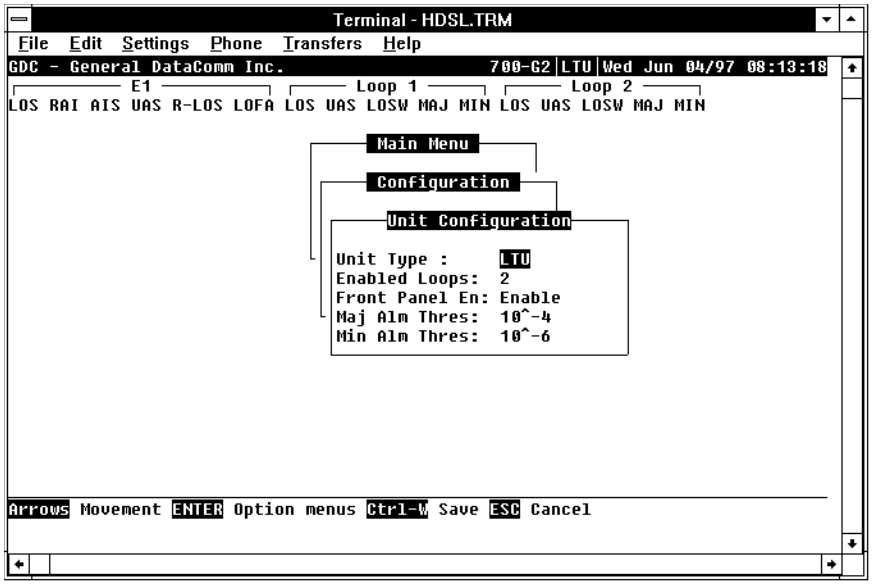
The functions available from the `Configuration` menu are as follows:

- `Unit Configuration`
- `Interface Configuration`
- `Network Configuration`
- `View H/S Configuration`

Unit Configuration

The `Unit Configuration` option displays the `Unit Configuration` screen, showing the HDSL configuration parameters of the 700-G2. A typical screen is shown in *Figure 3-9*.

Figure 3-9 Unit Configuration Screen



The screen includes five fields that you use to select the unit configuration of the 700-G2 on the HDSL loops side:

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

The screen includes the fields described in *Table 3-6*.

Table 3-6 Unit Configuration Screen Fields

Unit Type	Read-Only LTU - Line Terminating Unit NTU - Network Terminating Unit
Enabled Loops	1 or **2** loops available with 700-G2 and 702-G2 1, 2, or **3** loops for the 700-G3
Front Panel En	**Enabled**: allows self-test diagnostics from the front panel. Disabled: prohibits self-test diagnostics from the front panel.

MAJ Alarm Threshold	Programmable threshold from **10^{-4}** to 10^{-8} for determining incoming line bit error rate. Set to a higher threshold than MIN ALM THRES to indicate conditions of major line problems.
MIN Alarm Threshold	Programmable threshold from 10^{4} to 10^{-8} for determining incoming line bit error rate. Set to a lower threshold than MAJ ALM THRES to indicate conditions of minor line problems. **10^{-6}** is the default value.
Default values are shown in **bold** type.	

Operation

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

1. Move the selection block to the desired field 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 field.

3. To reset the selected fields 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 `Esc`.

Interface Configuration

The `Interface Configuration` option displays the `Interface Configuration` screen, showing the E1 configuration parameters of the 700-G2. A typical screen is shown in *Figure 3-10.*

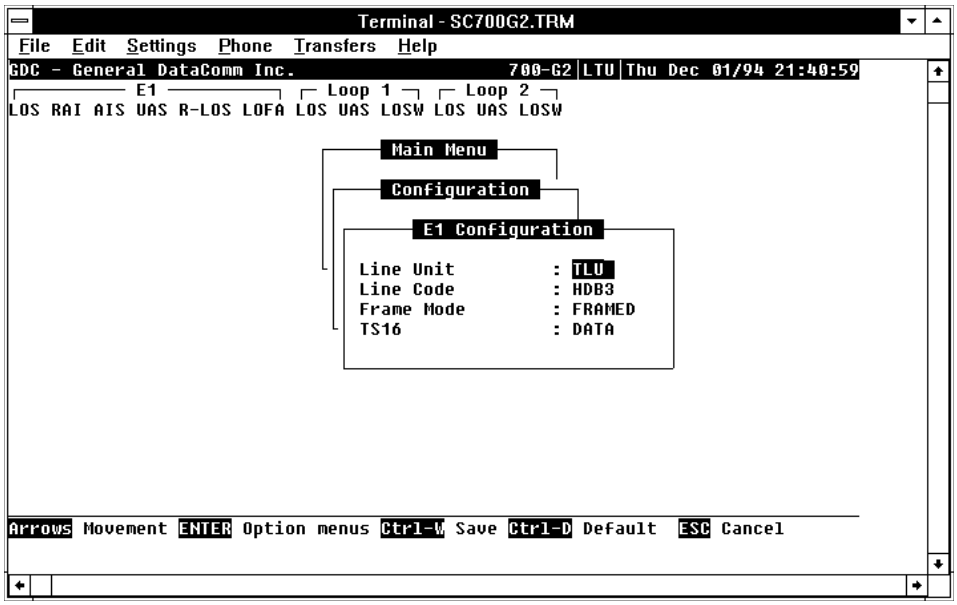


Figure 3-10 Interface Configuration Screen

The screen includes the fields described in *Table 3-7*.

Table 3-7 Interface Configuration Screen Fields

Line Unit	Displays the current operating mode of the 700-G2 with respect to the E1 trunk: ILU - 700-G2 operates as an intermediate line unit and transparently transfers the E1 frames. TLU - 700-G2 operates as a termination line unit and regenerates the E1 frames including the CRC.
Line Code	Displays the current E1 line code used by the 700-G2: AMI - The 700-G2 uses the AMI line code. HDB3 - The 700-G2 uses the HDB3 line code.
Frame Mode	Displays the current framing mode of the 700-G2 with respect to the E1 trunk: FRAMED - 700-G2 expects a framed E1 signal and maps the E1 data stream accordingly. UNFRAMED - 700-G2 transfers the E1 signal on a bit-by-bit basis.
TS16	Displays the current E1 timeslot routing option: DATA - E1 timeslot 16 is routed as a normal data channel to remotes. This option is required for operation with 730-D1/D2 remotes. SIGNALING - E1 timeslot 16 carries signaling information and is routed to all remotes in a PTMP configuration, or on all loops in a PTP configuration.

Operation

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

1. Move the selection block to the desired field 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 field.

3. To reset the selected fields 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 `Esc`.

Network Configuration

The Network Configuration option displays the Network Configuration screen, showing the network topology and timeslot routing options of the 700-G2, 700-G3, and 702-G2. A typical screen is shown in *Figure 3-11*.

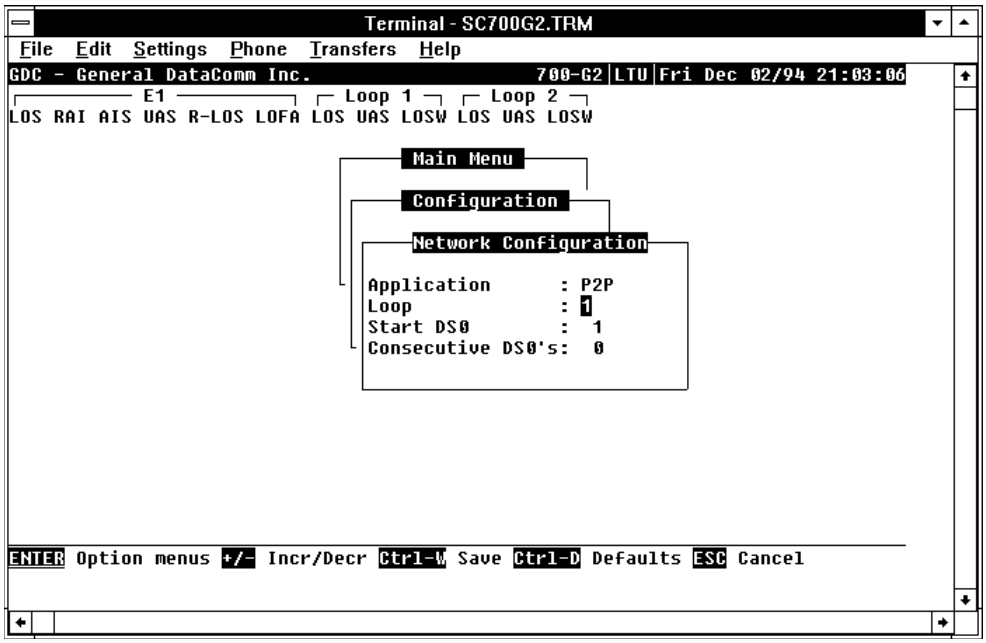


Figure 3-11 Network Configuration Screen

Operation

1. To display the Network configuration screen, select Item 3 on the configuration menu.

This screen includes the following fields, shown in *Table 3-8*.

Table 3-8 Network Configuration Screen Fields

`Application`	Determines whether the unit is being used in Point-To-Point (P2P) or in a Point-To-Multi-Point (P2MP) network configuration. The 700-G3 is intended to be used in a P2MP configuration, but may be used in a P2P configuration when only two loops are enabled. The 700-G2 is intended to be used in a P2P configuration, but may be used in a two-loop P2MP configuration.
`Loop`	Selects the HDSL loop that the Start`DS0` and `Consecutive DS0` options are being configured for. Not used for P2P mode.This is available for P2MP mode only; in P2P mode, this option should be left at `1`.
`Start DS0`	For P2MP mode, selects the starting DS0 of the contiguous block of DS0s being provisioned for a particular`Loop`. Not used for P2P, mode, except in a single loop P2P network configuration. In P2P mode, this option should be left at `1`.
`Consecutive DS0s`	For P2MP mode, selects the number of DS0s in the contiguous block of DS0s being provisioned for a particular`Loop`. Not used for P2P mode, except in a single loop P2P network configuration. In P2P mode, with two loops enabled, this option should be left at `0`.

2. To change the current value of Application, highlight the desired option and press ENTER. This displays and option menu with the available options P2P and P2MP.

3. Highlight the desired option and press enter. The option menu closes and the new selection appears on the screen.

4. To change the current value of Loop, Start DS0, or Consecutive DS0s, highlight the desired option and press the (+) key or the space bar to increment, or the (-) key to decrement the loop number to the desired loop.

5. To save the changes made in this screen press Ctrl W.

6. To quit and cancel the changes made in this screen, press ESC.

7. To return to the Configuration menu without saving, press ESC.

Point-To-Point Options

When the 700-G2/G3, or 702-G2 is used in a P2P configuration, with the Interface Config. Frame Mode set for FRAMED, E1 payload is distributed along the HDSL loops with alternating DS0s on each HDSL loop, as shown in *Table 3-9* In this configuration with a 702-G2 or 720-G2 remote, the E1 payload is recombined at the remote end such that the full E1 frame is exactly reconstructed. When the Interface Config. Line Unit option is set for and TLU, timeslot 0 of the E1 frame is regenerated, while in ILU mode, timeslot 0 is passed transparently. Note that when the Interface Config. TS16 option is set for DATA, timeslot 16 is only routed on loop 1 to the remote. When the Interface Config. TS16 option is set for SIGNALING, it is assumed that time slot 16 of the E1 frame contains signaling information (such as that necessary for voice applications), and timeslot 16 is routed on loops 1 and 2. The reason for routing timeslot 16 on both loops in this case is to insure that if one loop were to experience a fault condition, the timeslot 16 data and a fractional number of payload timeslots would still be available at the remote, regardless of which loop is faulty.

In P2P mode, with Interface Config. Frame Mode set for FRAMED, 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 is sourced from the E1 DS0s in an increasing order, i.e, 1x64kbps are sourced from E1 DS0 1, 2x64kbps are sourced from E1 DS0s 1 and 2, 3x64kbps are sourced from E1 DS0s 1, 2, and 3, etc. Time slot routing over the HDSL loops follows that shown in *Table 3-9*.

With two loops enabled in P2P mode and the Interface Config. Frame Mode set for UNFRAMED, an aggregate signal of 2048kbps must be provisioned using 702-G2 (G.703), 720-G2 (G.703), or 730-D2 (V.35, EIA-530, or X.21) remotes.

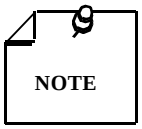
If only one loop is enabled in P2P mode and the Interface Config. Frame Mode is set for FRAMED, then a fractional E1 service is provided to the remote site, with a timeslot allocation following the consecutive DS0 pattern shown in *Table 3-10*. The Start DS0 and Consecutive options of the DS0 must be set as described below in P2MP Options for this case. Up to 17 G.704 DS0s may be provisioned for a 702-G2 or 720-G1/G2 remote, and an aggregate nx64kbps signal up to 18x64kbps may be provisioned for a 730D1/D2.

Point-To-MultiPoint Options

When the 700-G2/G3 or 702-G2 is used in a P2MP configuration, with 720-G1 units as remotes, E1 payload is distributed along the HDSL loops in contiguous blocks of DS0s, with the remote E1 payload reconstructed such 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 3-10*. The 720-G1 units automatically configure themselves based on the setting of their Application, Start DS0, and Consecutive DS0s configuration options. In the P2MP configuration, timeslot 0 of the LTUs recombined E1 frame and of the remote E1 frames is completely regenerated. The use of E1 timeslot 16 as a signaling channel is presently not supported in this configuration, and therefore, the TS16 option under the Interface Config. screen must be set for DATA. Finally, it should be noted that the contiguous blocks of DS0s routed to each remote are treated as an aggregate data stream, and therefore, byte alignment is not presently maintained between individual DS0s at the LTU and the corresponding DS0s in the reconstructed E1 frames at the remote units.

When used in a P2MP configuration with 730-D1 units as remotes, E1 payload is again distributed along the HDSL loops in contiguous blocks of DS0s, but here, the payload is reconstructed at the remote V.35 interface at a data rate that corresponds to the number of DS0s selected to be routed along a particular loop (nx64kbps). The 730-D1 units automatically configure themselves based on the setting of their Application and Data Rate configuration option.

When 720-G1 units are used at the remote sites, up to 17 G.704 E1 timeslots are available at each remote site, with the exception that the total number of provisioned timeslots for all three remotes must be less than or equal to 31 timeslots. When 730-D1 units are used at the remote sites, a V.35 nx64kbps signal is available at each remote (up to 18x64kbps), again with the exception that the total data rate of all three remote sites must be less than or equal to 31x64kbps.



A short burst of errors occurs on a loop which is in normal operation when one of the other HDSL loops transition in or out of normal operation.

720G1/G2s and 730-D1/D2 remotes cannot simultaneously be connected to a 700-G2/G3 or 702-G2 LTU.

Table 3-9 E1 P2P Timeslot Routing

Routed E1 timeslots w/Interface Configuration 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 timeslots w/Interface Configuration 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

Table 3-10 Typical E1 P2MP Timeslot Routing (Data Mode)

If Network Configuration Options are set for:				
		remote 1	**remote 2**	**remote 3**
Application	:	P2MP		
Loop	:	1	2	3
Start DS0	:	1	11	20
Consecutive DS0s	:	10	9	8
and 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 timeslot allocation at remote 720-G1 E1 interface is:											
Remote 1:											
0	1	2	3	4	5	6	7	8	9	10	<ts 11 - 31 filled with 1s>

Remote 2:														
0	<ts 1 - 10 filled with 1's>						11	12	13	14	15	16	17	18	19	<ts 20 - 31 filled with 1s>

Remote 3:														
0	<ts 1 - 19 filled with 1's>						20	21	22	23	24	25	26	27	<ts 28 - 31 filled with 1s>

View H/S Configuration

The `View H/S Configuration` option displays the `Configuration & 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 personnel. A typical screen is shown in *Figure 3-12*.

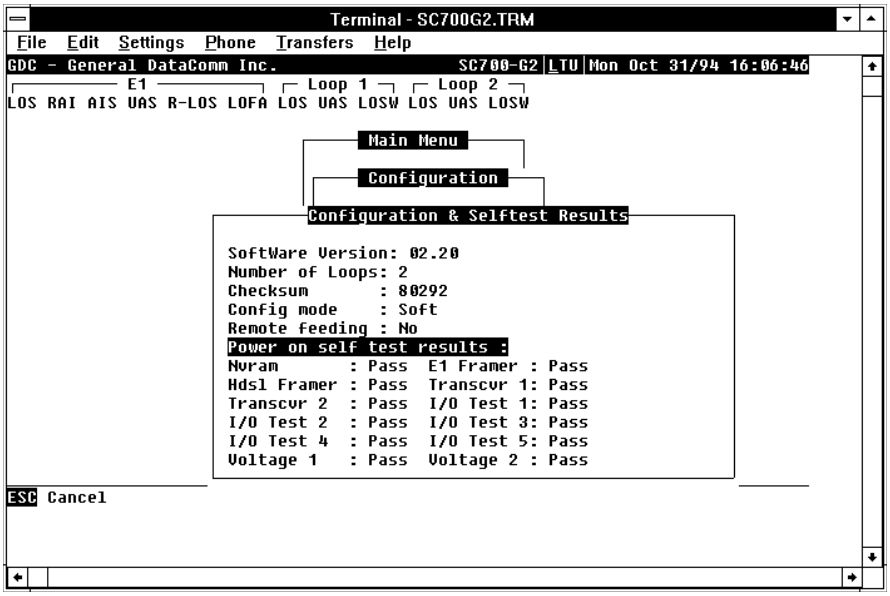


Figure 3-12 Configuration & Selftest Results Screen

The upper area presents configuration data. The lower area presents the results of the last power-on self-test. *Table 3-11* describes the fields in the screen.

Table 3-11 Configuration & Selftest Results Screen Fields

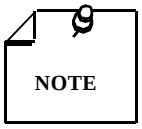
Software Version	Displays the software version of the unit.
Number of Loops	Displays the number of HDSL loops available (two for 700-G2, 702-G2, and three for 700-G3).
Checksum	Firmware checksum.
Config Mode	Displays the current configuration mode of the unit: Soft - The unit is configured under software control. Hard - The unit is configured by means of the internal switches.
Remote Feeding	Indicates whether the unit is power feeding the remote unit, via the interconnecting lines.
The last power-on self-test results area lists each subsystem of the unit tested during the self-test, and the self-test result, Pass or Fail.	

Maintenance Menu

You may refer to *Chapter 4 - Tests* to perform tests from the optional terminal.

Network Management

The UAS 700-G2/G3 and 702-G2 can be used as Network Managed elements when used within a GDC Network Management System. The UAS 700-G2/G3 and 702-G2 management software conforms to the MIB (Management Information Base) II standards set out for SNMP Version 1.0. Refer to the *Operating and Installation Instructions for SpectraComm Manager Card*, *Publication GDC 048R303-000.*



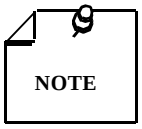
For the UAS 702-G2 only, its LTU/NTU configuration determines how a Network manager can access the unit. When configured as an LTU (master unit), the 702-G2 accepts commands from a Network Manager only by way of a SpectraComm Manager Card installed in the same shelf as the 702-G2. When configured as an NTU (remote unit), the 702-G2 accepts commands only which have been forwarded by the HDSL far end master unit.

MIB Tables

This section consists of tables that list and describe the MIB objects by which you can configure, control, and monitor the UAS 700-G2/G3 and 702-G2 using an SNMP network manager. 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 the manager or browser.



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 3-12 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		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		Version number of the firmware. This identifies the installed revision. The released version number is sequenced from A,...AA,...ZZ. Test versions are numerical from 01 to 99.
Model Number	Display String	Read-only		Determines the type of card family installed.

Table 3-13 Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
Maintenance Line Index	SC instance	Read-only		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 soft resetting of 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)	Hardware configuration mode of the unit. A unit may be hardware or software configured.
System Up Time	Time Ticks	Read-only		Reports the elapsed system tick time.
Unit Type	Integer	Read-write	LTU (1) NTU (2)	Defines HDSL type. LTU selects line terminating unit, NTU selects network terminating unit. For 700-G2/G3, this variable can only be a LTU. For 702-G2, this variable is read-only.
Default Initiate	Integer	Read-write	Default (1) Normal(2)	Allows the non volatile configuration to be reset to a factory default. 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)	Defines 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	Integer	Read-write	One Loop (1) Two Loops (2) Three Loops (3)	Defines the HDSL loop configuration. It can be set for one to three loops.
Front Panel	Integer	Read-write	Inhibit (1) Enable (2)	Enables or inhibits the front panel operation.
Private Storage 1	Display String	Read-write	(Size (16))	General purpose storage.
Private Storage 2	Display String	Read-write	(Size (16))	General purpose storage.

Private Storage 3	Display String	Read-write	(Size (16))	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 - NORM L3 Bit 4 - ES L3 Bit 3 - NORM L2 Bit 2 - ES L2 Bit 1 - NORM L1 Bit 0 - ES L1	Returns a bit wise snapshot of the front panel LED status.

Table 3-14 E1 Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
E1 Config Index	SC instance	Read-only		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)	Determines 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, ILU the system operates as a n intermediate line unit.
E1 Line Coding	Integer	Read-write	AMI (1) HDB3 (2)	Describes the variety of Zero Code Suppression used on the link, which in turn affects a number of it's characteristics. For E1 links with or without CRC use HDB3 or AMI.

Table 3-15 HDSL Diagnostic Table

MIB Object	Syntax	Access	Enumeration	Description
Diagnostic Index	SC instance	Read-only		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. Set to inhibit, no BERT test in progress. Set to enable, BERT is in progress.

Table 3-16 HDSL Diagnostic Results Table

Object	Syntax	Access	Enumeration	Description
Diagnostic Results Index	SC instance	Read-only		Identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and sub-identifier, in this case, a network interface.
Test Execution Status	Integer	Read-only	In Sync (1) Not In Sync (2)	Current execution status of the diagnostic test. When set to In Sync, BERT test is in sync and BER rate is valid. When set to Not In Sync, BERT test is not in sync, and BER rate is not valid.
Diagnostic Result Error Counts	Integer	Read-only	(0..65535)	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)	BER test intervals, defined as the time required for transmission of a block of bits.

Table 3-17 E1/HDSL Performance Tables

Current Performance Table				
MIB Object	**Syntax**	**Access**	**Enumeration**	**Description**
Current Index	SC instance	Read-only		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.
Current ESs	Gauge	Read-only		Number of errored seconds encountered by an E1 or loop interface in the current 15 interval.
Current SESs	Gauge	Read-only		Number of severely errored seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current UASs	Gauge	Read-only		Number of degraded seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current DMs	Gauge	Read-only		Number of degraded minutes encountered by the E1 interface in the current 15 minute interval.
Current FEBEs	Gauge	Read-only		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		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.
Interval Number	Integer	Read-only	(1..96)	Number between 1 and 96, where 1 is the most recently completed 15 minutes interval and 96 is the least recently completed 15 minutes interval (assuming that all 96 intervals are valid).
Interval ESs	Gauge	Read-only		Number of errored seconds encountered by a loop or E1 interface in one of the previous 97 individual 15 minute intervals.
Interval SESs	Gauge	Read-only		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		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		Number of degraded minutes encountered by the E1 interface in one of the previous 96 individual 15 minute intervals.
Interval FEBEs	Gauge	Read-only		HDSL loops Far End Block Errors.
Total Performance Table				
MIB Object	**Syntax**	**Access**	**Enumeration**	**Description**
Total Index	SC instance	Read-only		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.
Total ESs	Gauge	Read-only		Number of errored seconds encountered by an E1 or loop interface in the previous 24 hour interval.
Total SESs	Gauge	Read-only		Number of severely errored seconds encountered by a loop or E1 interface in the previous 24 hour interval.
Total UASs	Gauge	Read-only		Number of unavailable seconds encountered by a loop or E1 interface in the previous 24 hour interval.
Total DMs	Gauge	Read-only		Number of degraded minutes encountered by the E1 interface in the previous 24 hour interval.
Total FEBEs	Gauge	Read-only		Number of Far End Block Errors encountered by a loop interface in the previous 24-hour interval.

Table 3-18 Loop/E1 Performance Interval Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
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.
Reset Intervals	Integer	Read-write	Normal (1) Reset (2)	Resets loop/E1 performance intervals. When it is set to reset, the loop/E1 performance tables are set to zero.
Number of Valid Intervals	Integer	Read-only	(1..96)	Number of intervals collected. Each interval is an increment of 15 minutes.

Table 3-19 HDSL Status Table

Mib Object	Syntax	Access	Enumeration	Description
HDSL Loop Status Line Index	SC instance	Read-only		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 re-initialize 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 Loop 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 Loop 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)	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 Attenuation is a whole number. 3. The value of five means HDSL Loop Pulse Attenuation 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.
HDSL Loop Exchange	Integer	Read-only	Normal (1) Exchange (2)	Represents the HDSL Loop status. When set to normal, HDSL Loops are correctly connected. Set to exchange, the HDSL Loop has been interchanged.

Table 3-20 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, L3
HDSL Unavailable Sec	Yes	E1, L1, L2, L3
HDSL Errored Sec	Yes	E1, L1, L2, L3
HDSL Loss of Sync Word	Yes	L1, L2, L3
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

4 Tests

Overview

The UAS 700-G2/G3 and 702-G2 provide a comprehensive set of features for testing operation and identifying trouble areas, using an optional terminal connected to the control port (CTRL) on the front panel.

The activation of any loopback disrupts the flow of user traffic.

The 700-G2/G3 and 702-G2 display the status of these tests through the TM indicator on the front panel.

You may also use the optional terminal connected to the Control Port (CTRL) on the front panel which provides a comprehensive set of features for testing operation and identifying trouble areas. This chapter provides instructions for managing the 700 system with the optional terminal and tells you how to enable and disable various E1 loopbacks.

Internal functions are checked when you first turn on power and during operation. The quality of the connecting communications line is also checked continuously during operation.

Troubleshooting Procedures

LEDs are OFF:

1. If all the LEDs are OFF, verify that the fuse on the rear panel is good and that the unit is properly seated in the shelf.
2. If the terminal is working, check the status of the unit using the View H/S Config option. If any of the test results show FAIL, return the unit for repair.

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. Verify that the HDSL receiver gain jumper settings (X12, X16 on basecard, X12 on 3rd loop option card) on each channel (on both cards) match that reported on the terminal screen. High gain should be used for all loops greater than 1.5km in length.
4. Check the status of the card using the View H/S Config option.

Metallic Access Testing

The 700-G2 /G3 and 702-G2 provide front panel bantam jacks for customer use in testing the HDSL and E1 lines and the unit circuitry. *Figure 4-1* illustrates the break-in points of these jacks.

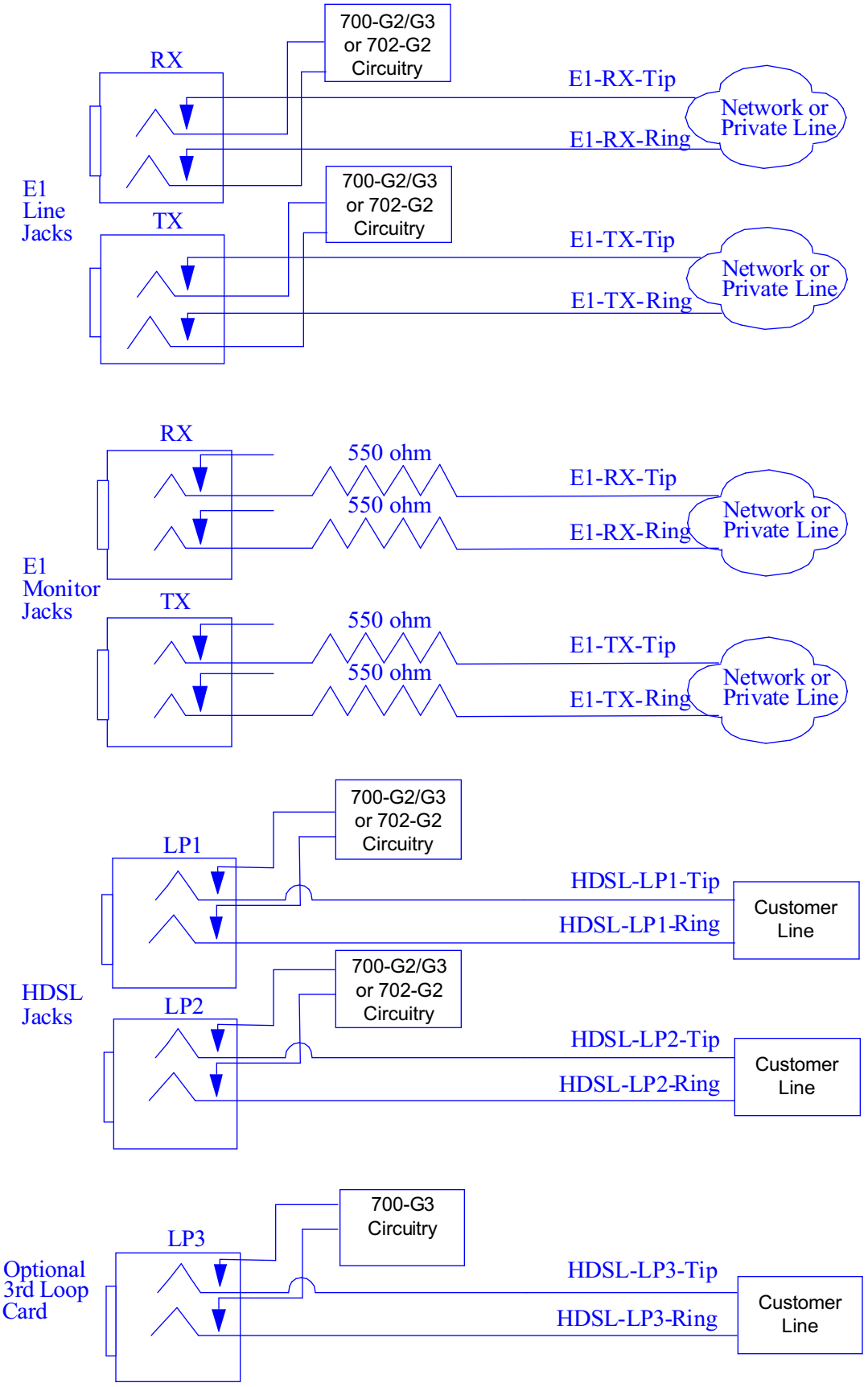


Figure 4-1 Metallic Access Jacks

Maintenance Menu

The `Maintenance Menu`, shown in *Figure 4-2*, is used to perform maintenance and trouble-shooting activities. To open the maintenance menu, select Item 3 on the `Main Menu`.

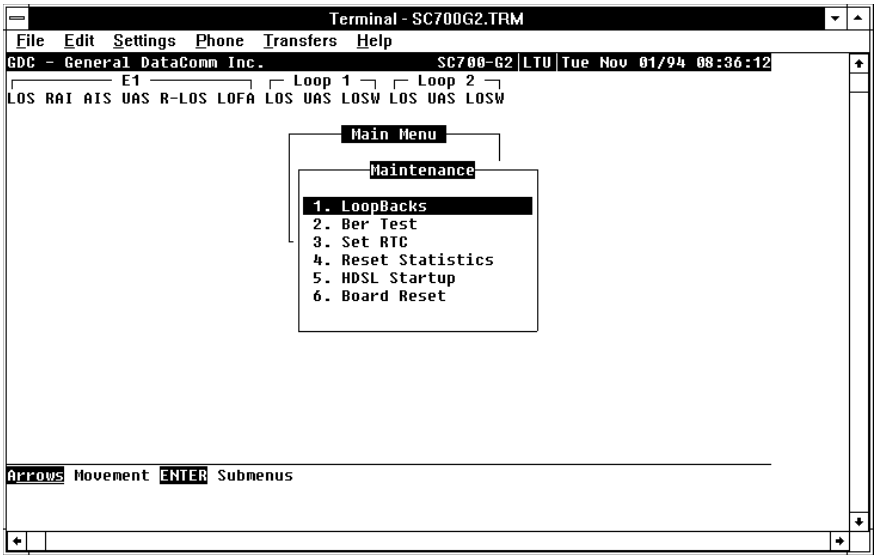


Figure 4-2 Maintenance Menu

The functions available from the maintenance menu are as follows:

- `Loopbacks`
- `BER Test`
- `Set RTC`
- `Reset Statistics`
- `HDSL Startup`
- `Board Reset`

NOTE

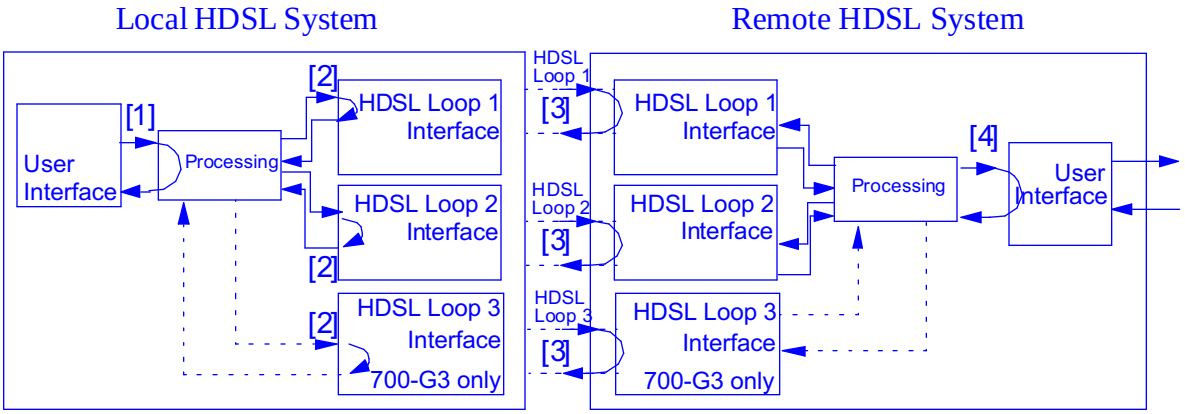
Performing loopbacks or BER testing on any single loop causes a burst on the other loops which are in normal operation.

Loopbacks

The activation of any loopback disrupts the flow of user traffic.

This function is used to initiate/terminate loopbacks on the user equipment interface (E1 or DCE) and on the HDSL loops, for maintenance purposes.

The HDSL systems offered by GDC provide four types of test loopbacks. *Figure 4-3* shows the simplified signal paths when the loopbacks are connected.



Line Loopback	[1]	
HDSL Line Loopback	[2]	The status of these tests are displayed on the front panel
Remote HDSL Local Loopback	[3]	indicators and on the terminal screen.
Remote Local Loopback	[4]	

Figure 4-3 Loopbacks Signal Paths

Figure 4-4 illustrates a typical `Loopback Setting` screen for an HDSL system module using the E1 interface.

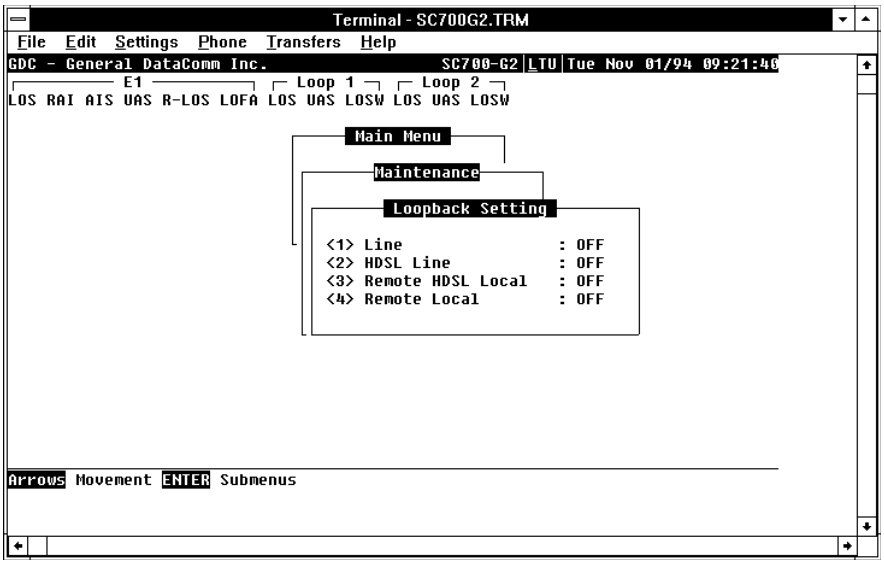


Figure 4-4 Loopbacks Screen

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 to toggle the selected loopback on and off.
2. To exit and return to the `Maintenance Menu`, press `Esc`.

Line Loopback

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

When the line loopback is connected (`ON`) (loopback **[1]**), the data signal received from the local user via the transmit line of the user equipment interface is returned by the HDSL system module on the receive line of that interface. Therefore, during normal operation the local user 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.

HDSL Line Loopback

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

When the HDSL Line 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 equipment should receive its own signal without errors.

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

Remote HDSL Local Loopback

The remote HDSL local loopback is presently not supported.

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 remote local loopback is connected (`ON`) (loopback **[4]**), 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 equipment interface. Therefore, during normal operation the local user equipment should receive its own signal without errors.

The local users transmit signal is also passed to the remote user equipment that is 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, you should initiate the loopbacks from the side serving as the LTU, because this enables you to follow the signal path starting from the office and continuing toward the end user.

The recommended order of test activation is as follows:

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

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

Only one loopback should be activated at any time.

The activation of any loopback disrupts the flow of user traffic.

BER Test

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, user 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 section 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 the transmission of a block of 2^{21} bits). The number of errors that are counted in each interval is up to 255. If the actual number of errors in a given interval is higher, only this maximum count is considered in the calculation of the BER. The calculated BER is updated at the end of each interval.

When configured as multi-point the BER tester can be used on individual loops. When used in point to point operation both HDSL loops are used to transmit the 2^{-15} -1 bit pattern.

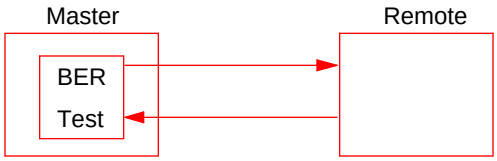
The bit error rate test can be performed over individual HDSL loop or over entire HDSL bandwidth. But only one BERT test can be active at a time. For point to point mode of operation, BER test can only be performed over all the loops simultaneously. For point to multipoint application, user can invoke BERT test on individual HDSL loops.

BER test can be invoked through GDC UAS controller, supervisory terminal port or front panel switch.

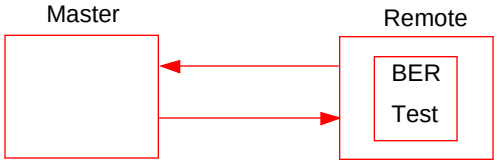
Front panel TM led illuminates when the BER test is activated. When the error detector is in sync and detects no errors, the TM led is constant. However when the error detector is not in sync or detects some errors, the TM led blinks. See *Figure 4-5* to illustrate the self-tests.

Front Panel BER Test

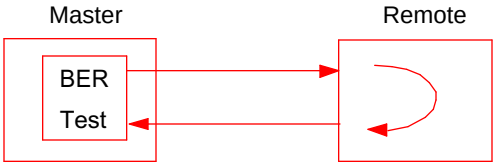
Front panel TST button is only applicable for point to point mode of operation. It has no function in point to multipoint mode. The TST button operates only if the front panel has been enabled via S35-2, via the soft option on the VT-100 unit configuration screen, or via the UAS manager.



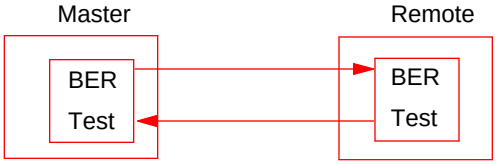
Master Self-Test:
Enable Master BER test. Be sure you have an external loopback or test equipment at the remote unit to facilitate this test.



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



Self-Test with Remote Loopback:
From Master unit, assert Remote loopback (RL) (activated via the supervisory terminal or UAS manager) and enable BER test.



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

Figure 4-5 Test Configuration

BER Screen Description

A typical *BER Test* screen for the HDSL system is shown in *Figure 4-6.*

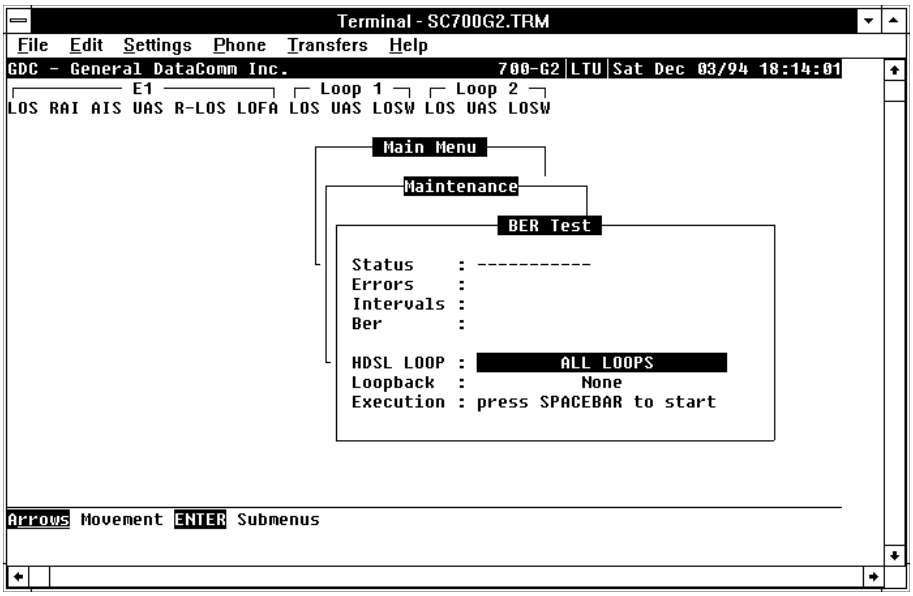


Figure 4-6 HDSL BER Test Screen

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 test loop and to start/stop BER measurement.

The fields of the `BER Test` screen are described in *Table 4-1*.

Table 4-1 BER Test Screen Fields

`Status`	Displays the 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 counted up to this point.
`Intervals`	Displays the number of measurement intervals up to this point.
`BER`	Displays the BER calculated up to this point.
`Loopback`	Displays the current state of the loopback activated for the BER test: None 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 local loopback is activated for the BER test.
`Execution`	Displays the next state of BER measurement: Stop - BER measurement disabled; Start - BER measurement enabled.

Operation

1. To display the `BER Test` screen, select Item 2 on the `Maintenance Menu`.
2. Select desired HDSL test loop by moving the selection block to HDSL loop field. Press space bar to select 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 space bar.

To enable or 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` field and press the space bar. The `Execution` field now shows `Start`.
3. To exit and return to the `Maintenance Menu`, make sure that BER testing has been disabled, and press `Esc`.

NOTE

You cannot exit the BER TEST screen while a BER test is running.

When starting or stopping the BER TEST on one of the HDSL loop, other loop(s) see bursted errors on its data.

BER Test detector synchronizes and shows extensively error free for 1s and 0s.

You must exit the BER Test screen after running a BER test in order to release test mode and resume data transfer from the E1 interface.

Set RTC

The `Set RTC` option enables you to set the real-time clock of the 700-G2/G3 and 702-G2. Selecting this option displays the `Set RTC` screen. A typical screen is shown in *Figure 4-7*.

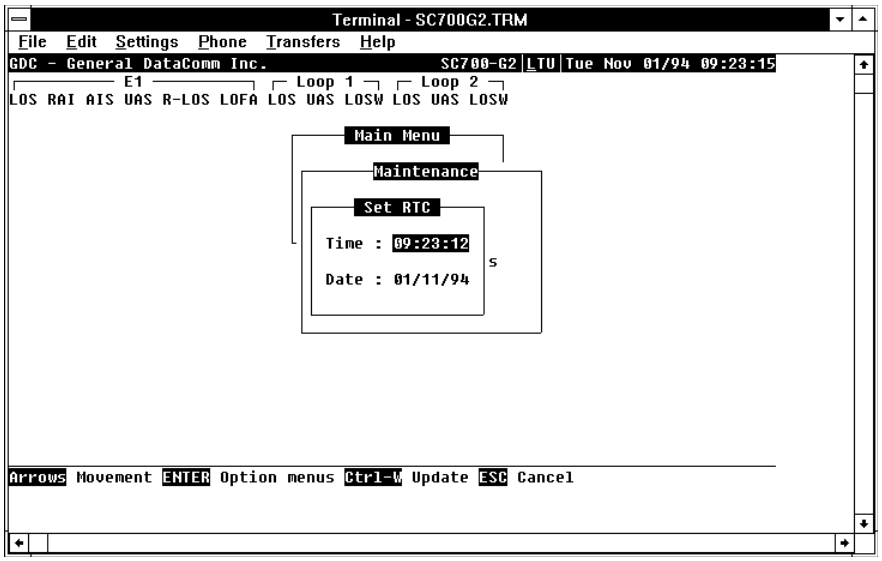


Figure 4-7 Set RTC Screen

The screen includes the two fields described in *Table 4-2*.

Table 4-2 Set RTC Screen Fields

`Time`	Displays the time in 24-hr military format showing hours:minutes:seconds retrieved from the unit at the time the screen is opened.
`Date`	Displays the date (day/month/year) retrieved from the unit at the time the screen is opened.

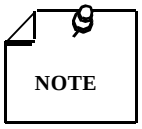
Operation

To change the current time or date, use the following procedure:

1. Move the selection block to the desired line and press `Enter`.

2. Type the new time or date in the format seen on the screen, then press `Enter`. The option menu closes, and the new time and/or date appears in the corresponding line.
3. To save changes, press `Ctrl W`.
4. To quit and cancel the changes made in this screen, press `Esc` without pressing `Ctrl W`.

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



The 700-G2/G3 and 702-G2 internal time is updated at the instant you press `Ctrl W`.

Reset Statistic

The `Reset Statistics` option resets all the performance statistics entries of the 700-G2/G3 and 702-G2.

Operation

To instruct the 700-G2/G3 or 702-G2 to reset all the performance statistics counters:

1. Select Item 4 on the `Maintenance Menu`. This displays 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 manually initiate the 700-G2/G3 or 702-G2 HDSL Loop start-up process. Normally this process is automatically performed upon link initialization and whenever the synchronization between two linked HDSL units is lost.

The activation of this function disrupts the transfer of data through the link for a short time.

To instruct the 700-G2/G3 or 702-G2 to perform the start-up process, select Item 5 on the `Maintenance Menu.`

Board Reset

This option is used to reset the 700-G2/G3 and 702-G2. To reset the 700-G2/G3 or 702-G2, select Item 6 on the `Maintenance Menu`. After a few seconds, the opening screen appears. The unit performs the start-up process, and displays the `Main Menu` screen.

The activation of this function disrupts the transfer of data through the link for a short time.

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