GDC 073R132-000
Issue 1, January 1997

Installation and Operation

DataComm 720-G2RP

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.

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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.

FCC Part 68 Compliance

Connection of data communications equipment to the public telephone network is regulated by FCC Rules and Regulations. This equipment complies with Part 68 of these regulations which require all of the following.

All connections to the telephone network must be made using standard plugs and telephone company provided jacks or equivalent. Connection of this equipment to party lines and coin telephones is prohibited. A label on the back of the front panel of data communications equipment and on the underside or rear panel of other equipment provides the FCC Registration number and the Ringer Equivalence Number (REN) for the unit. If requested, give this information to the telephone company.

If the unit causes harm to the telephone network, the telephone company may discontinue your service temporarily and if possible, you will be notified in advance. If advance notice is not practical, you will be notified as soon as possible and will be advised of your right to file a complaint with the FCC. The telephone company may change its communication facilities, equipment, operations and procedures where reasonably required for operation. If so, the telephone company will notify you in writing. You must notify the telephone company before disconnecting equipment from 1.544 Mbps digital service. All repairs or modifications to the equipment must be performed by General DataComm. Any other repair or modification by a user voids the FCC registration and the warranty.

Canada DOC Notification

The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operation and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Deutschland

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

Preface

Scope

This manual describes how to install and configure a 720-G2RP 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 and five appendices. The information is arranged as follows:

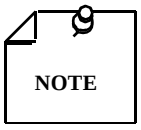
- *Chapter 1 -System Description* introduces important concepts and features of the DataComm 720-G2RP.
- *Chapter 2 - Installation* tells you how to install the DataComm 720-G2RP. Only typical or fundamental applications are given because of the variety of specific customer system choices.
- *Chapter 3 - Operation* describes the front panels and how to use managed options.
- *Chapter 4 - Tests* describes front panel and managed tests.
- The *Index* contains 720-G2RP topics 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.

Related Publications

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

- Operating and Installation Instructions for the DataComm Shelf GDC 010R310-000
- Operating and Installation Instructions for Universal System ShelfGDC 010R380-000
- GDC publication numbers *(e.g., GDC 073R132-000*) 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. Team)
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.

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

Data phone digital service; private-line digital service offered inter-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.

EIA

Electronic Industries Association.

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 the output of the transmitter is connected to the input of the receiver, 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 DataComm 720-G2RP, together with a 700-G2RP or 710-D2RP, makes available local loop transmission for Full and Fractional E1 (FE1) services. The DataComm 720-G2RP conforms to ETSI standards and operates on a two-wire metallic pair using High Bit-Rate Digital Subscriber Line (HDSL) technology.

The unit provides a short haul, four-wire E1, user-interface (per G.703, G.704, and G.821), and a two-loop, High Bit-Rate Subscriber Line (HDSL) network interface. Using the 720-G2RP, a telephone company or carrier, or an end-user, can transmit up to 2.048Mbps with an unconditioned metallic cable. Cabling can be as long as 4.0 Km with 0.5-mm diameter or, as long as 3.2 Km with 0.4-mm diameter, such that the data is sent over two HDSL loops. The unit is powered with dc voltage from a HDSL Remote Power Source module, located on a 700-G2RP or 710-D2RP. In this point-to-point configuration, the Remote Power of the 720-G2RP converter module converts the high DC Network voltage to the voltages necessary to power the unit (See *Figure 1-1*).

Internal BER tests and remote and local loopbacks enhance diagnostic features. The SpectraComm management bus, which takes advantage of GDC's proprietary Multiport Management Bus Protocol (MMBP), can be used to control the DC720-G2RP. Part numbers for standard and optional equipment for this unit are found in *Table 1-1*.

Table 1-1 Equipment List

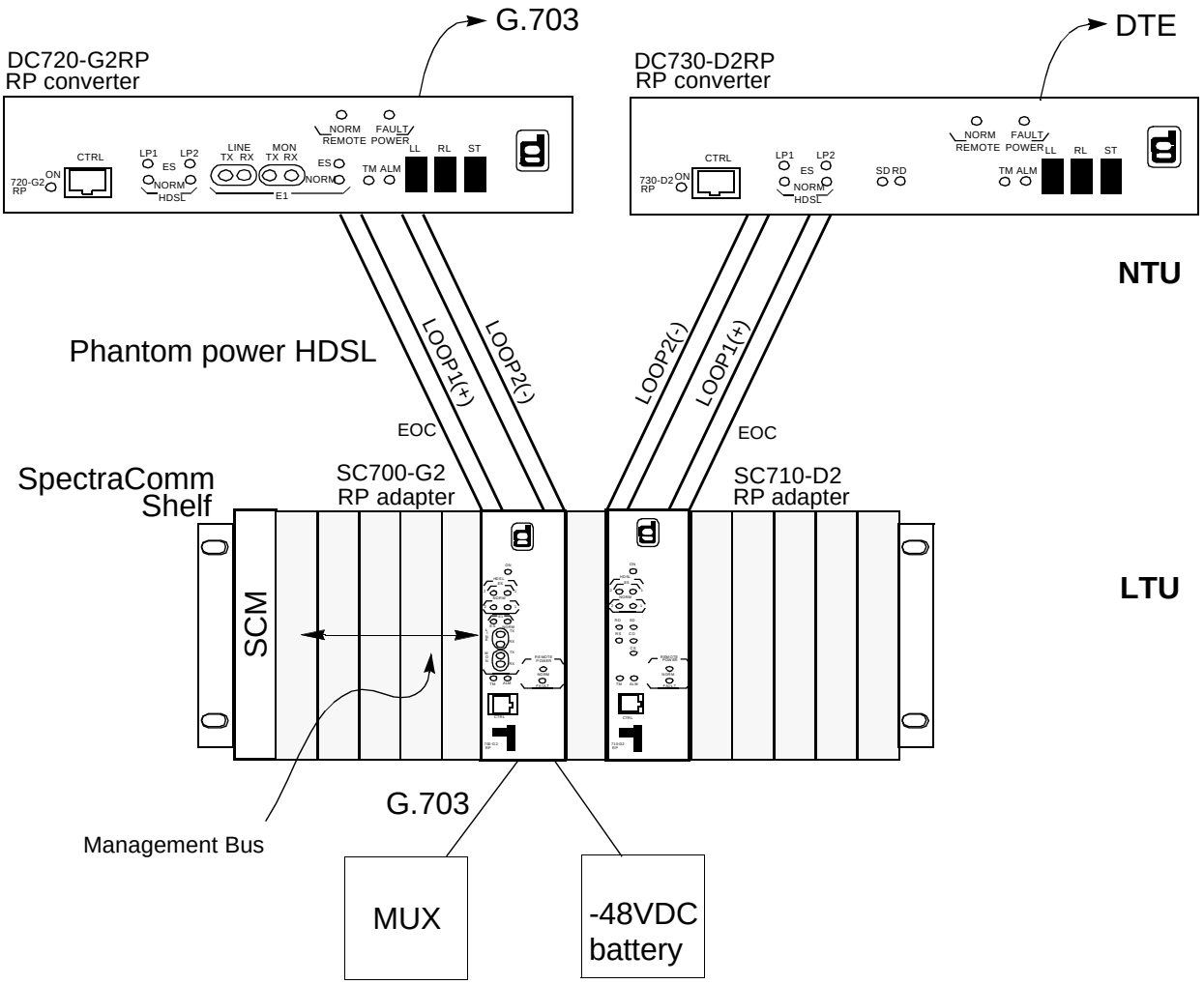
Description	GDC Part No.
DataComm 720-G2RP	073A420-001
DataComm 720-G2RP (Standalone)	073M420-001
Enclosure/Shelves	
DE Cover	010D500-004
Base Assembly, 720-G2RP	010B211-001
Cables	
Interface cable, RJ48C Plug to 9-pin female. (HDSL CTRL port to terminal)	027H250-010
Modular Adapter DB25 male to dual BNC connectors	209-036-009

Features

The DataComm 720-G2RP supplies 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

DataComm 720-G2RPs let you connect any two devices like those above point-to-point links with inexpensive telephone wires. *Figure 1-1*, next, shows a point-to-point, framed application and option settings so that you can configure your system.



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

Figure 1-1 Point-to-Point Framed Data Application for the DataComm 720-G2RP

Some typical network applications are:

- Campus data networks
- Local Area Networks
- Terminal-host connections
- SNA networks
- VSAT/microwave networks
- Packet data networks
- Video Conferences

You can also use the DataComm 720-G2RP to add new links to such networks or to replace older expensive links. For example, you could replace coaxial cable with inexpensive telephone wire. You may configure and control the 720-G2RP by dip switches and jumpers on the card, or from an optional standard ASCII terminal, or from a Remote 700-G2RP via a SNMP Controller.

Applications

Full E1 Service Provisioning (Point-to-Point)

The 720-G2RP works in one of several configurations. *(See Figure 1-1.)* Equipment 720-G2RP G.703/G.704 (input/output) connect directly to a carrier-central-office, E1 cross-connect, Digital Cross-Connect System, or into a higher order multiplexer for inter-office transport.

For full E1-service-provisioning applications you can connect the master 700-G2RP to a slave 720-G2RP to give end-users' G.703/G.704 interface. You can apply the transport of the 720-G2RP and 700-G2s to extend 2-Mbps functions at customer locations.

Diagnostics/Network Management

A front-panel terminal interface jack (CTRL) lets you fully access diagnostic and configuration controls through a standard terminal interface. When you employ the optional terminal, a menu-driven interface provides loopback control, grants you access to performance monitoring registers, and controls 720-G2RP configuration.

The 720 may also be used as a standalone 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. You get full network management capabilities using the SpectraComm Manager (SCM) and its interface to MEGAVIEW (a UNIX workstation), or a PC based SNMP controller. *Chapter 3, Operation,* deals with both management options.

Technical Characteristics

For your convenience, tabulated below are the specifications or characteristics of the 720-G2RP.

EI Interface	
Rate	2048 Kbps
Framing	E1 framed G.704 and E1 unframed data.
Interface	2048 kbps per G.703 (-6 dB receiving sensitivity)
Data Encoding	AMI or HDB3
HDSL Interface	
Rate	Dual duplex 584 Kbaud signaling rate, with 2B1Q line code (each loop)
Framing	HDSL framing per ETSI DTR/TM 3017 including performance monitoring via HDSL CRC indication.
Transmit Power	13.5 dBm (+/- 0.5 dB)
Transmission Line	
Two non-loaded metallic twisted-pairs (Loop #1 and Loop #2), 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 3017.	
Test Features	
Local Loopback	Front panel switch or terminal screen selectable.
Remote Loopback	Front panel switch or terminal screen selectable.
BER Testing	Front panel switch or terminal screen selectable.
Dimensions	
Dimensions	Height: 99 mm (3.9 in.) Width: 277 mm (10.9 in.) Depth: 318 mm (12.5 in.) Weight: 3.6 kg (8.1 lbs.)
Electrical	
Power	7 watts at card edge
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 shows you how to install and operate the 720-G2RP in your communications network. If this is your first time with these units, you may wish to review *Chapter 1, System Description* so that you understand how to use and appreciate the unit for your network.

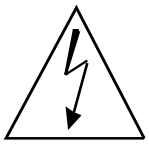
Unpacking and Handling

As you unpack the unit, see if there is any unit damage; if so, notify the shipper immediately. Save the box and packing material for returning any damaged goods.

Installation Requirements

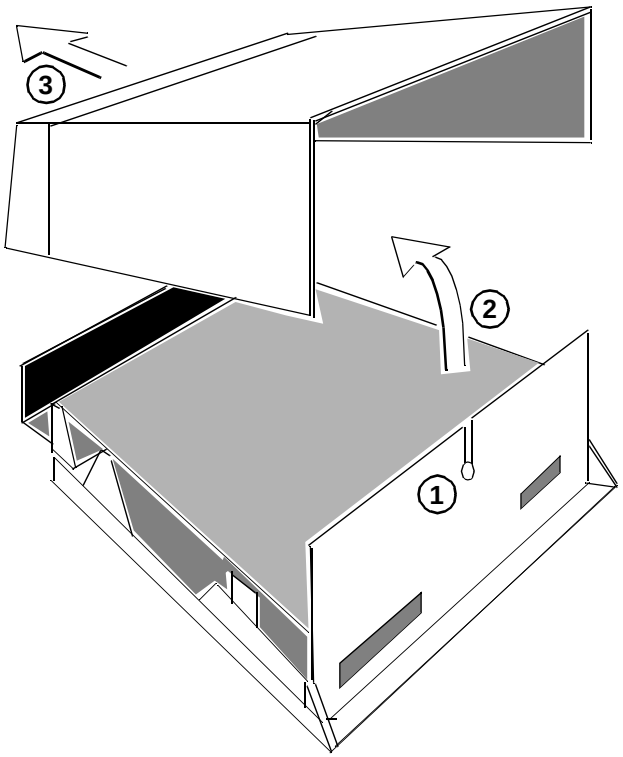
The 720-G2RP basecard comes assembled in a standalone DataComm Enclosure. Place unit in a ventilated area where the ambient temperature does not exceed 122^{o}F (50^{o}C). Do not install the unit directly above anything which puts out a lot of heat, like power supplies.

Standalone Installation



Risk of electric shock. High voltages may be present on telecommunications circuits. HDSL remote power utilizes harmful voltages on the phone lines. Disconnect HDSL loop wires from the power source located at the 700 G2RP or 710 D2RP before handling wires on HDSL terminal block.

If you need to remove the card from the standalone base, disconnect the green chassis ground wire from TB1 of the lower card and TB1 of the upper card. When you reinstall the component cards in the base, reinstall the wires to the appropriate terminal blocks. See *Figures 2-1 and 2-2.*



Caution:
Disconnect power cable and phone connections before removing cover.

1. With front of unit facing left, turn screw to release cover.
2. Lift right end of cover upward.
3. Slide cover left with an upward motion.

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

Figure 2-1 Standalone Cover Removal Procedure

Pre-Installation Setup

Configure the card jumpers and switches as follows (See *Figure 2-2* for their locations):

1. Fix the E1 receiver termination to the proper impedance setting (X4) and verify that jumper X8 is installed for unbalanced E1 lines but not installed for the balanced.
2. Check that Jumpers X1 and X2 are installed.
3. Set remaining switches and jumpers according to *Table 2-1 and Figure 2-2. (*Refer to *Paragraph, Setting Hard Options.)* If Switch 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 *Paragraph, Setting Hard Options.)*

Setting Hard Options

Setting the hard options on the DataComm 720 card means adjusting configuration switches and jumpers to match the operation of your network. *Table 2-1* explains switch functions and jumpers, and *Figure 2-2* points out their locations. Switch S34-1 activates hard configuration. You need to make these adjustments only once, when you first install the unit. You do not have to do this again, unless you change your network or connect a different device to a data channel.

.

NOTE

The microprocessor in the DataComm 720 reads 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 any new settings to work. Soft options that are changed while the power is on do not need a power cycle. Soft options are stored in non-volatile memory and do not have to be reset after power interruption.

Table 2-1 Option Selection

Switches	Description
S34-1 (**SFT**/HRD)	Selects either soft or hard configuration mode. When you enable soft configuration, optional terminal selections override option switch settings. Soft is selected if the 720 is configured from GDC's SNMP managed Universal Access System.
S34-2 **(HDB3**/AMI)	Selects line coding. AMI (Alternate Mark Inversion) or HDB3
S34-3 (**FR**/UNFR)	Framed or unframed mode. Framed, unit looks for a framed E1 signal and maps the E1 data stream accordingly. Unframed, unit transfers E1 signal, bit-by-bit.
S34-4 (**TLU**/ILU)	Configures the Framed 720 for either a 2048-Kbps Terminating Line Unit (TLU) or Intermediate Line Unit (ILU). Configured as a TLU, the 720 regenerate G.704 frame structure and recalculates CRC-4 error-checking of the G.704 frame structure. Configured as an ILU, E1 data is passed transparently without frame regeneration. When configured as unframed, select ILU.
S34-5 (**NTU**/LTU)	Selects whether unit is configured as a line terminating unit (LTU) or network terminating unit (NTU).
S34-6 (NLOOPS) S34-7 (NLOOPS)	Selects the number of enabled loops. For the 720-G2RP this is always two. Switches are set to the binary equivalent of the number of enabled loops with S34-8 being the MSB.
S34-8 (SPARE)	Future use.
S35-1 (**RPEN**/DIS)	Future use.
S35-2 (**FP EN**/DIS)	EN = Enables front panel switches RL, LL and ST. DIS = Disables front panel switches RL, LL and ST.
S35-3 (**DAT**/SIG)	In data mode, the G.704 Channel Associated Signaling is disabled. In signaling mode, G.704 Channel Associated Signaling is enabled.
S35-4 (SPARE)	Future use.
S35-5 (SPARE)	Future use.
S35-6 (SPARE0)	Future use.
S35-7 (SPARE1)	Future use.
S35-8 (SPARE)	Future use.
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.
X1 (on piggyback)	Install jumper over Pins 2 and 3.
X1, X2	Jumpers must be installed for normal operation.
X520 (JTAG)	For factory use. (Install jumper for normal operation.)
X400	Select `0` for common signal and chassis grounds. Select `100` for grounds isolated by 100 ohm resistor. `Open` must not be used.
Default in bold print.	

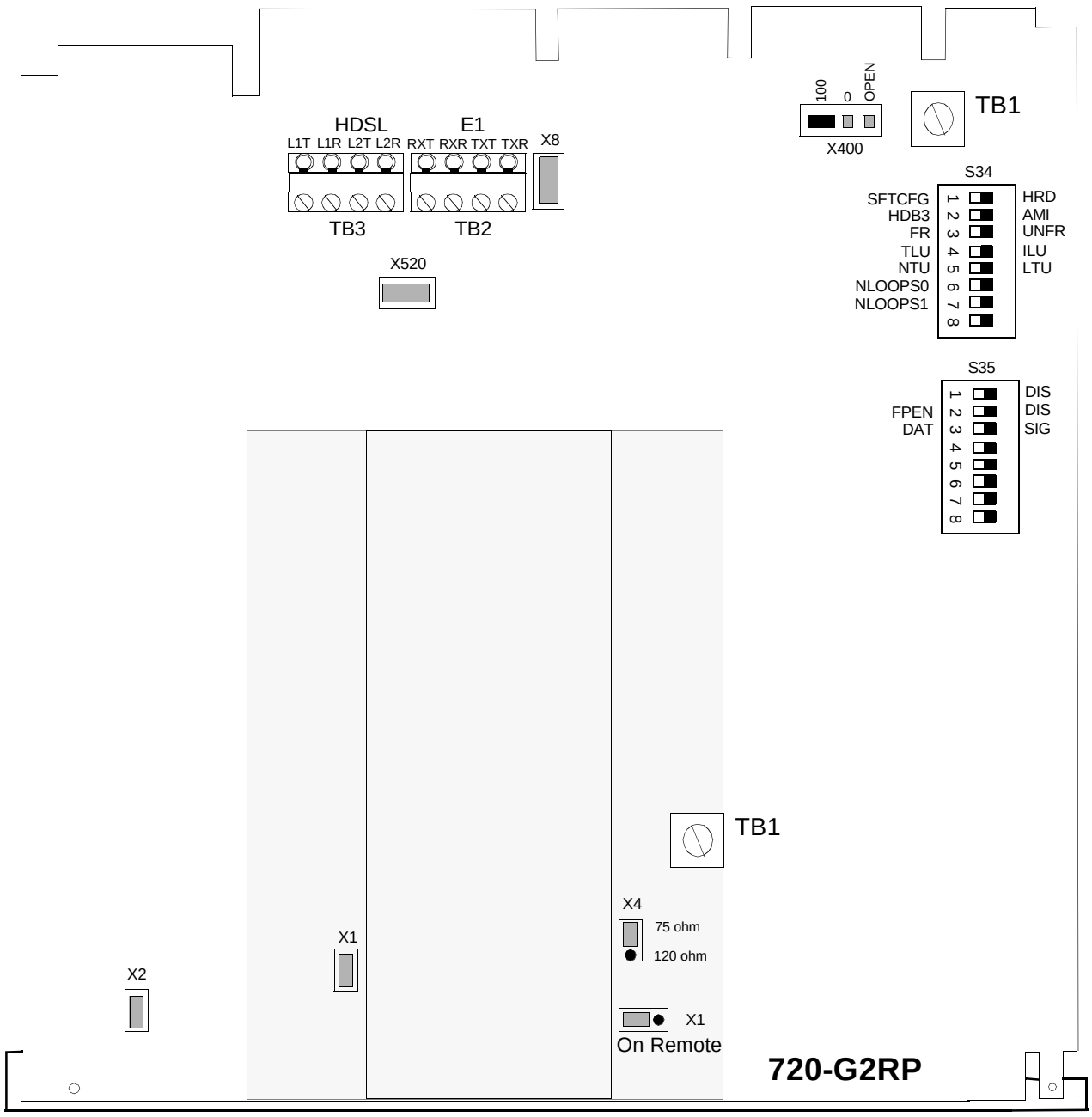


Figure 2-2 Option Switch and Jumper Locations

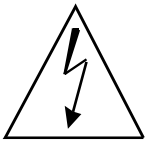
Electrical Connections

Next paragraphs describe the power and line connections to the 720-G2RP.

NOTE

Before power-up, refer to the Pre-operational Hard/Soft paragraphs that follow the Electrical Connections information.

Power - Standalone



Risk of electric shock. High voltages may be present on telecommunications circuits.

E1 Line Connections

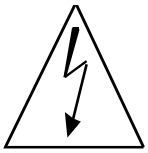
You may make E1 line connections to the 720-G2RP standalone using the DB-25 connector at the rear panel or TB1 which is located on the basecard. *Table 2-2* displays these pin-out connections.

Table 2-2 E1 Connector (25-Pin Connector)

Pin No.	Pin Type
14	E1-RX-R
2	E1-RX-T
16	E1-TX-R
3	E1-TX-T

HDSL Line Connections

You may make HDSL line connections to the 720-G2RP standalone using TB2, located on the basecard. Refer to *Figure 2-3*, shown next.



Risk of electric shock. High voltages may be present on telecommunications circuits. Make sure power is disconnected from the Network HDSL loops at the source 700 G2RP or 710 D2RP before handling wires.

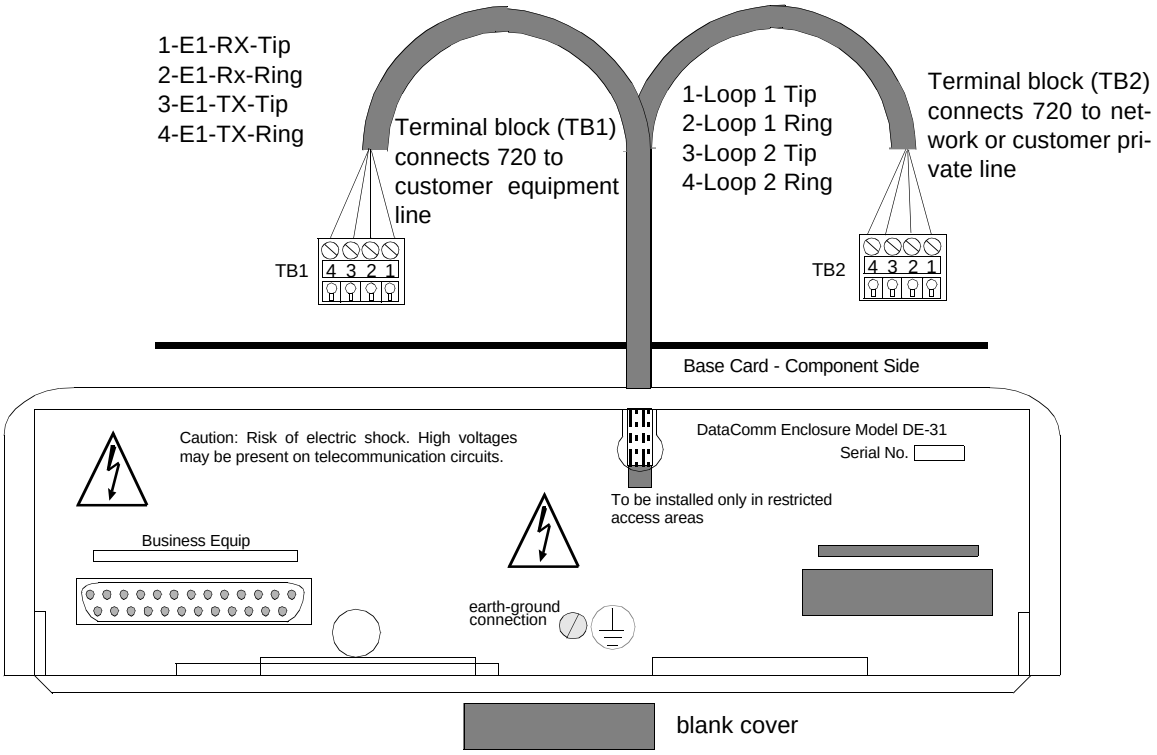


Figure 2-3 DE-31 Standalone Enclosure Rear Panel

Pre-Operational Configuration

Control Port Characteristics

The 720 control port has an EIA/TIA-232-E asynchronous DCE interface, terminated in an RJ45 connector designated CTRL on the front panel; pins are shown here:

Control Port Connector (RJ45)

Pin No.	Function
1, 2, 3	Not connected
4	Ground
5	Transmit output (RXD of terminal)
6	Receive input (TXD of terminal)
7, 8	Shorted internally

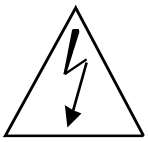
Setup (Hard)

Configure the unit as follows:

1. Fix the E1 receiver termination to the proper impedance (75 ohms unbalanced, 120 ohms balanced) setting (X4). Check that Jumper X8 is not installed for balanced E1 lines but is installed for unbalanced E1 lines.

2. Verify that Jumpers X1 and X2 are installed. See that the card is configured as a LTU or NTU, based on *Table 2-1*.

3. Set remaining switches and jumpers according to *Table 2-1 and Figure 2-1.* If S34-1 is placed in the SOFT (SFT) configuration, all other switch settings are ignored and you must configured unit by the optional terminal screen. Refer to *Setup (Soft).*



Risk of electric shock. High voltages may be present on telecommunications circuits.

4. See *Figure 2-3* and connect the E1 line and HDSL loops to the network connectors on the rear panel.
5. Place the cover back on the unit.
6. At this time power may be connected to the source 700 G2RP or 710 D2RP. The Remote Power NORM LED lights on the 720-G2RP unit. When powered up the unit automatically performs internal self-tests. If one of these tests fails, the ALRM LED lights, or if the red FAULT light on the Remote power section lights, refer to the troubleshooting procedures in *Chapter 4, Tests.* If the Remote power FAULT LED is On, there is insufficient power to run the unit. Refer to trouble shooting procedure *Chapter 4, Tests.*
7. Follow *Step 5* under *Setup (Soft).*

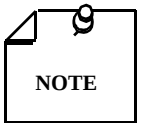
Setup (Soft)

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 configured as follows:

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

Software necessary to run the 720 supervision program is already built into the 720 unit.

1. Follow *Steps* 1 through 5 above.
2. Connect a terminal to the CTRL connector on the front panel.



The signal and chassis ground are connected on the 720 G2RP.

3. To view the test results on the terminal, go to the View H/S Config Screen on the terminal.
4. Verify configuration of the two-Mbps parameters (Refer to *Paragraph Setting Soft Options.*) These are set as follows: AMI/HDB3, FRAMED/UNFRAMED, and ILU/TLU. These settings match those On the switches and jumpers in *Table 2-1* if in Hard (HRD) configuration mode (Switch S34-1).

   After performing the self-tests, the HDSL loops (LTU and NTU) initiate start-up while HDSL green LEDs blink. Start-up lasts less than three minutes, and when finished starting up, the HDSL NORM LEDs show ON with HDSL ES LEDs off. If this not the case, start-up has failed, which means that the two cards automatically redo the start-up. During this time, the ALM light blinks until all HDSL and E1 status indicators clear.
5. Verify that E1 data transfer takes place, E1 NORM LED is ON, and the ES LED is off. Otherwise, refer to the troubleshooting procedure in *Chapter 4, Tests.*

3 Operation

Overview

Figure 3-1 illustrates the DataComm 720 G2RP front panel and explains the function of each control and indicator. You may check the operation of the unit by monitoring the front panel indicators and using the test procedures provided in *Chapter 4.* Refer to unit configurations in *Chapter 1.*

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

Front Panel Description

The front-panel red and green data path indicators (LEDs) are described below and shown in *Table 3-1*. Red LED indicates critical or major failure, or error, while the green LED acknowledges satisfactory operation or procedures finished.

Data Path Indicators - Three data streams are visually monitored:

- HDSL Loop 1 input
- HDSL Loop 2 input
- Incoming E1 signal

Two indicators pertain to data streams:

- Green LED, designated as NORM, indicates system status.
- Red LED is referred to as ES and means data transport status.

Each LED can be in one of three states:

- ON
- Blinking (blinks at 2 Hz)
- OFF

Table 3-1 Front Panel Data Path Indicators

HDSL Indicators		
ES	NORM	Indication
Off	On	Normal operation
On	Off	LOS/LOSW
On (For 0.5 Sec.)	On	ES - Errored second
On	Blink	Start-up in progress. No response from mating unit.
Off	Blink	Start-up in progress. Signal from mating unit has been received.
E1 Indicators		
Off	On	Normal operation
On	Off	LOS or LOFA
On (for 0.5 sec.)	On	ES - Errored second
On	Blink	AIS received

The front panel red and green Remote Power indicators (LEDs) are described below in *Table 3-2.*

Table 3-2 Front Panel for Red and Green Remote Power Indicators

Remote Power		
NORM	FAULT	Indication
Off	On	HDSL line voltage too low
On	Off	Voltage is on and is within operating parameters

Three additional front panel indicators:

ON - Lit when power is applied to the card.

ALM - Indicates that there is a Major Alarm. If a failure was detected during self-test, this LED blinks. Additionally, it blinks when detecting LOS, UAS, or LOSW on any HDSL loop.

TM - LED is on during one of the following conditions:

- Loopback is activated at the local unit.
- Loopback is activated at the remote unit.
- BER meter has been activated.

This LED blinks when a BER test is in progress and bit errors are present.

ST push button - Pushing this button brings about a self-test, generating 215 pseudo-random test pattern while simultaneously detecting an incoming 215 pseudo-random test pattern.

LL push button - Pushing this button initiates the same loopback as the Local Line Loopback described in *Chapter 4, Tests.*

RL push button - Pushing this button initiates the same loopback as the Remote Line Loopback described in *Chapter 4, Tests.* RL push button functions only when unit is configured as a LTU.

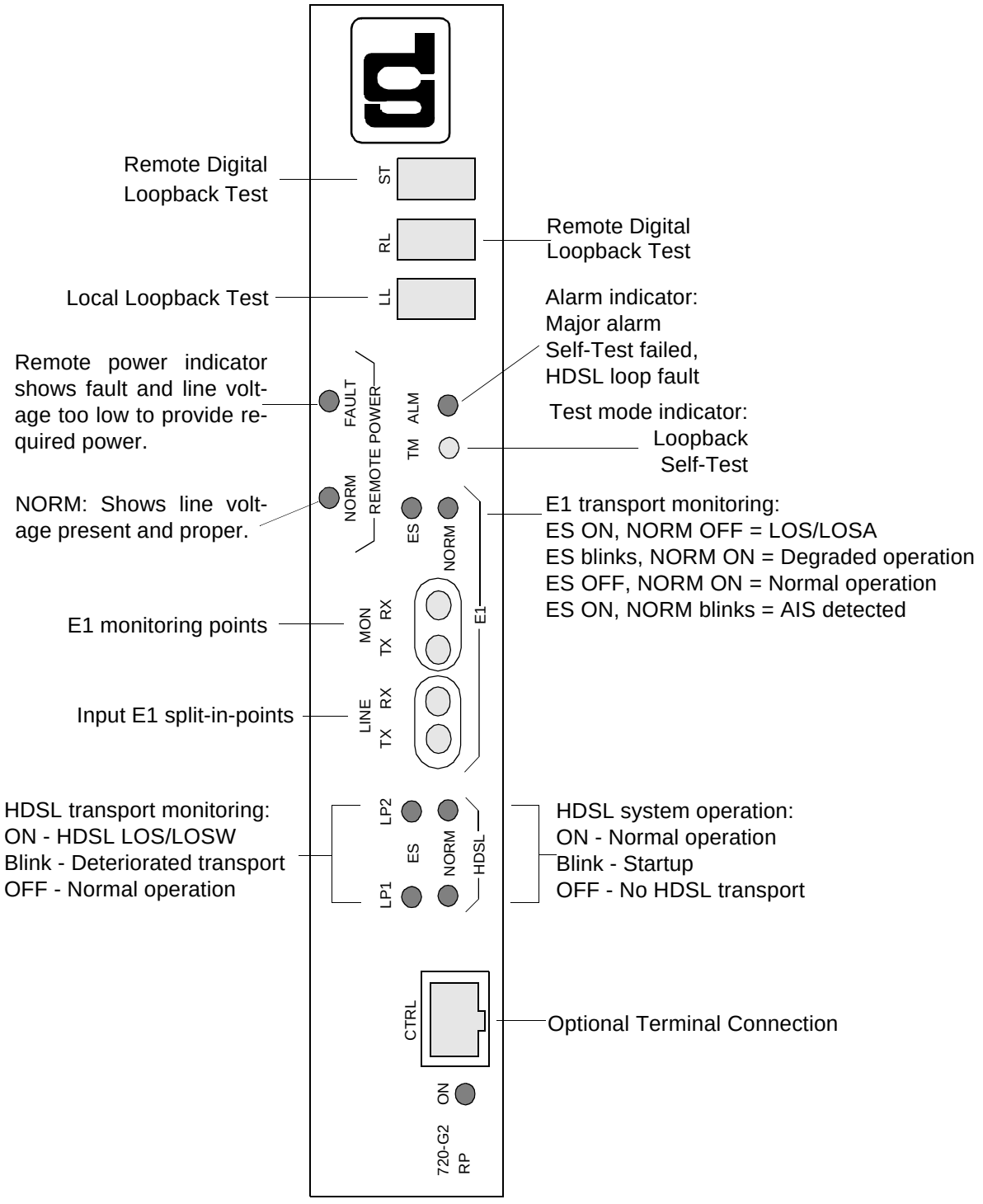


Figure 3-1 Front Panel

Startup Procedure

A management session is automatically started as soon as the terminal cable is connected to the CTRL port of an operating 720. As it power-ups, the 720 gives you the first screen, that is, the opening screen *(Figure 3-2)*, then the main menu. To end an ongoing management session, disconnect the terminal from the 720.

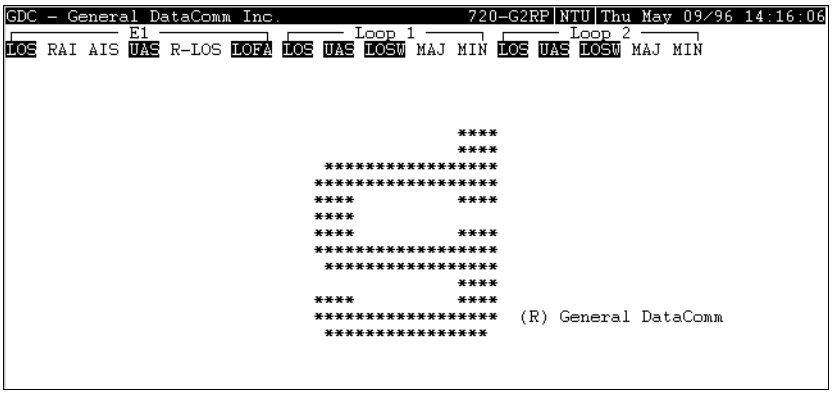


Figure 3-2 Opening Screen

Screen Organization

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

Table 3-3 Terminal Screen Organization

Header	Located at the top of the screen, the header displays the manufacturers name and equipment model, followed by the current operating mode (LTU or NTU), and the data and time sent by the 720.
Status Line	Located below the header, the status line includes two main fields, which display the status of various alarms of the 720. An active indicator of an alarm is exhibited in reverse video.
E1 Alarms Field	E1 alarms field includes the these indications for framed E1: 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 where the E1 trunk is being exceeded. R-LOS - Reception of remote loss of E1 signal report via the HDSL trunk. LOFA - Local loss of frame alignment on the E1 trunk.
Loop Alarms Field	Loops alarm field is divided into several sub fields, one for each loop and includes the following indications: LOS - Loss of input signal on the corresponding loop. UAS - Unavailable seconds threshold where the corresponding loop is being exceeded. LOSW - Loss of synchronization word on the corresponding loop. MAJ - Selected major alarm bit error rate threshold (of the 1168 Kbs HDSL loop) has been exceeded. MIN - Selected minor alarm bit error rate threshold (of the 1168 Kbs HDSL loop) has been exceeded.
Work Area	Displays the menu and dialog boxes.
Active Keys Area	Active keys are constantly updated to show the keys and their combinations for you to use on the current screen.

Operating Procedures

The following procedures apply to all the operations that you perform on a supervision terminal connected to a 720.

Menu Selection - Select a Menu item in two ways:

1. Move the selected block to the desired item by means of the arrows, then press the Enter key.

   Or:

2. Type the number appearing to the side of the menu item.

Either opens the sub menu or dialog box for performing 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

Values displayed in the dialog box fields can be changed:

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

Restoring Default Values

When the 720 stores default values for parameters displayed in a dialog box, you can replace the current values with the default values by pressing Ctrl-D (Ctrl-D means hold down the Ctrl (control key) while you depress D).

Saving Values

To save new parameter values entered in dialog boxes, press Ctrl-W. The board configurations are stored in non-volatile memory, regardless of how Switch S34-1 is set. If Switch S34-1 is set to HARD (HRD), the next power cycle uses the switch settings of S34 and S35 to obtain the board configuration, and at the same time, stores this configuration. If Switch S34-1 is set to SOFT (SFT), the next power cycle uses the stored values to set up the board configuration.

Quitting without Saving

To quit without saving the new parameter values entered in a dialog box, press Esc key. Also press Esc key when you have to close any open submenus and return to the main menu.

Refresh

Refresh screen at any time by typing Ctrl-R.

Main Menu

The Main Menu is shown in *Figure 3-3.* Menu includes three options, talked about in the following sections.

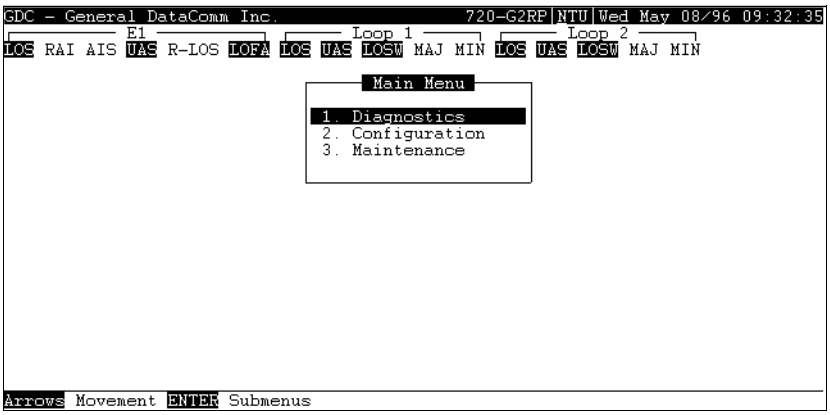


Figure 3-3 Main Menu Screen

Diagnostics

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

- Display of performance statistics collected on the E1 trunk and on each of the HDSL loops.
- Display HDSL loop status information, technical data on loop performance, loop noise margins, and so on.
- Cancel start-up.

Configuration

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

- Modify the HDSL loop operating mode.
- Display and modify the E1 operating mode of the 720, E1 line code, and E1 framing mode, line unit, and signaling mode
- Set/modify network circuit configuration and E1 time slot routing over HDSL loops.
- Display system hardware and software data and 720 self-test results.

Maintenance Option

Use this option for maintenance:

- Enable both local and remote system loopbacks.
- Test system performance using the internal BERT meter.
- Set the real-time clock.
- Reset the statistics counters.
- Manually initiate the start-up process.
- Reset the 720. (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.

To open the diagnostic menu, select Item 1 on the main menu:

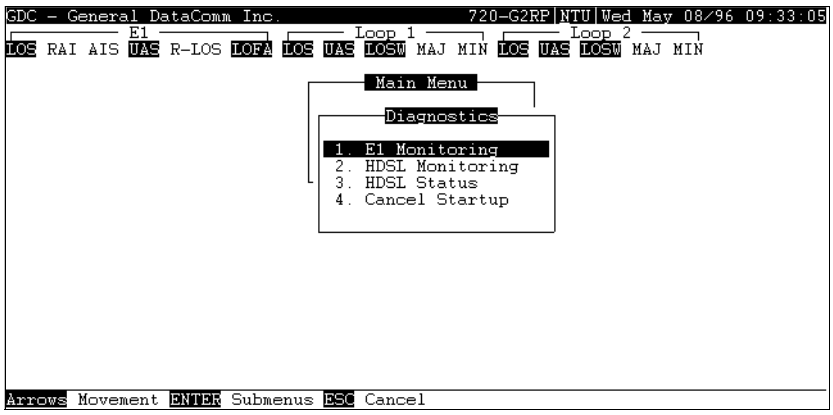


Figure 3-4 Diagnostic Menu Screen

Here are the diagnostic menu functions:

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

E1 Monitoring

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

Powering the unit resets the statistics of the last twenty-four hours.

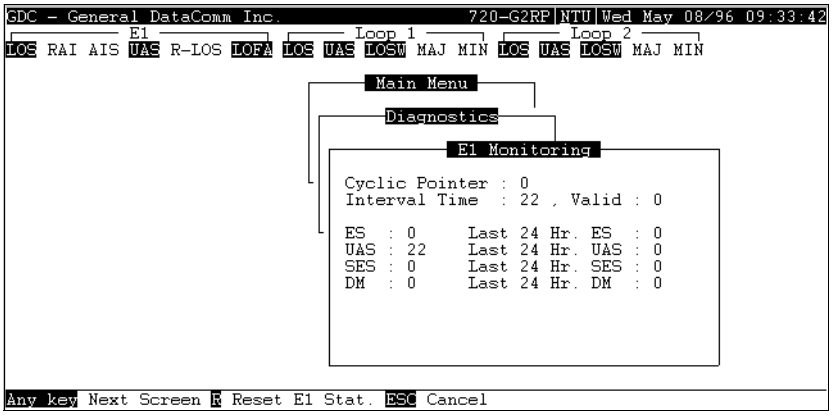


Figure 3-5 E1 Monitoring Screen

The screen includes the fields described in *Table 3-4* and what you see:

Table 3-4 E1 Monitoring Screen Fields

Cyclic Pointer	Sequence of the current 15-minute interval within the current 24-hour interval. The range is 0 to 95.
Interval Time	Elapsed time in seconds from the beginning of the current 15-minute interval. The range goes from 0 to 900.
ES	Number of errored seconds in the current 15-minute interval.
Last 24 Hr ES	Number of errored seconds in the last 24-hour interval.
UAS	Number of unavailable seconds in the current 15-minute interval.
Last 24 Hr UAS	Number of unavailable seconds in the last 24-hour interval.
SES	Number of severely errored seconds in the current 15-minute interval.
Last 24 Hr SES	Number of severely errored seconds in the last 24-hour interval.
DM	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.

1. To reset the E1 statistics counters, type R. All the displayed values are reset to 0.
2. To exit and return to the diagnostics menu, press the Esc key.

HDSL Monitoring

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

Powering the unit resets all of the 24 hour performance statistics.

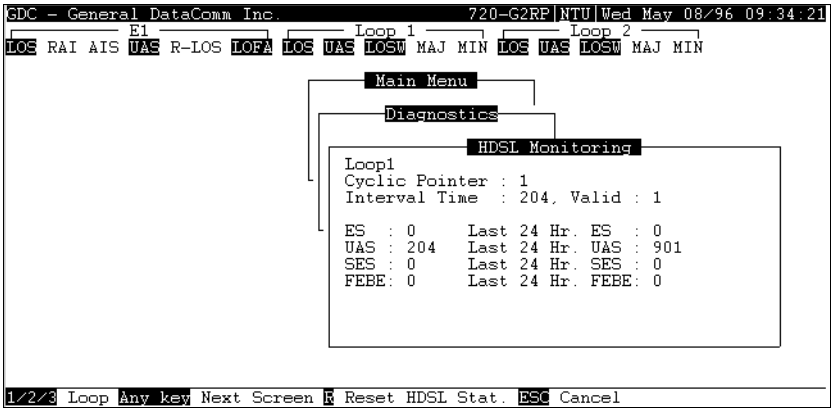


Figure 3-6 HDSL Monitoring Screen

The HDSL monitoring screen is similar to the E1 monitoring screen described previously. 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 3-5* describes the fields on the HDSL monitoring screen. Note that DM is not available on this screen and that ES, UAS, and SES are computed according to the same error thresholds as the E1 error statistics.

Table 3-5 HDSL Monitoring Screen Fields

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

Displaying HDSL

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` or `2`.

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

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*.

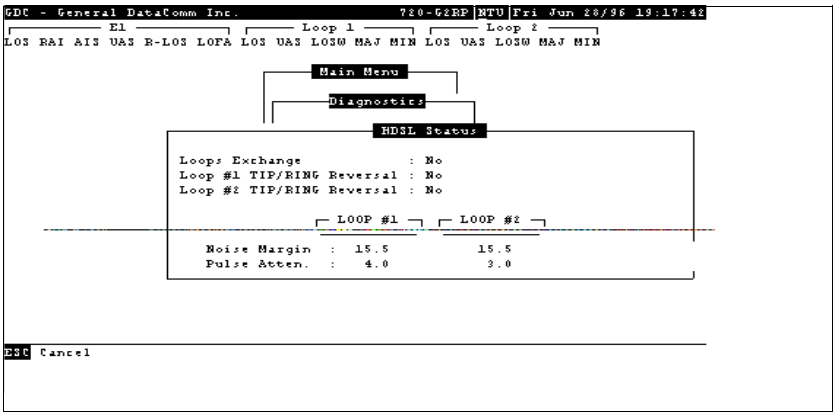


Figure 3-7 HDSL Status Screen

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

Table 3-6 HDSL Status Screen Fields (LTU to a NTU)

Loops Exchange	Indicates if the HDSL loops carrying the E1 traffic are correctly connected or have been interchanged by error. Information is available only when the two units (LTU to a NTU) connected in a link can exchange information, but is not available on the LTU. If the Loops Exchange indicates `Yes`, then the swapped wires on the TB2 connector must be corrected.
Loop 1 TIP/RING Reversal	Indicates if the two conductors of HDSL Loop 1 are correctly connected or have been interchanged by error. Information is available only when the two units (LTU to a NTU) connected in a link can exchange information but is not available on the LTU. If Tip/Ring Reversal indicates `Yes`, the 720 automatically detects and recovers from this condition.
Loop 2 TIP/RING Reversal	Indicates if the two conductors of HDSL Loop 2 are correctly connected or have been interchanged by error. Information is available only when the two units (LTU to a NTU) connected in a link can exchange information, but is not available on the LTU. If Tip/Ring Reversal indicates `Yes`, the 720 automatically detects and recovers from this condition.
Noise Margin	Noise margin in dB, measured by signal processing circuits of the 720. Separate values supplied for each HDSL loop.
Pulse Attenuation	Displays the pulse attenuation in dB, measured by signal processing circuits of the 720. Separate values supplied for each HDSL loop.

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

Cancel Start-Up

The Cancel Start-Up option is used to cancel the start-up process performed by the 720 upon link initialization and whenever the synchronization between the two 720 units connected in a link is lost. To instruct the 720 to stop performing the start-up 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 Configuration menu.

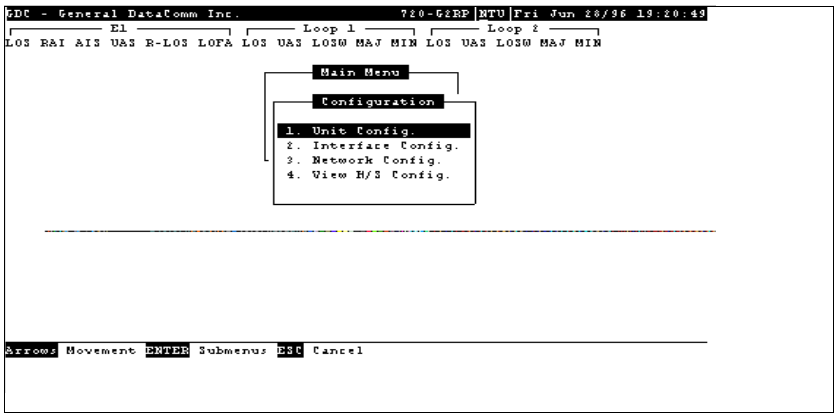


Figure 3-8 Configuration Menu Screen

The functions available from the Configuration menu are as follows:

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

Unit Configuration

The Unit Configuration option displays the Unit Configuration screen, showing the HDSL configuration parameters of the 720. A typical screen is shown in *Figure 3-9.*

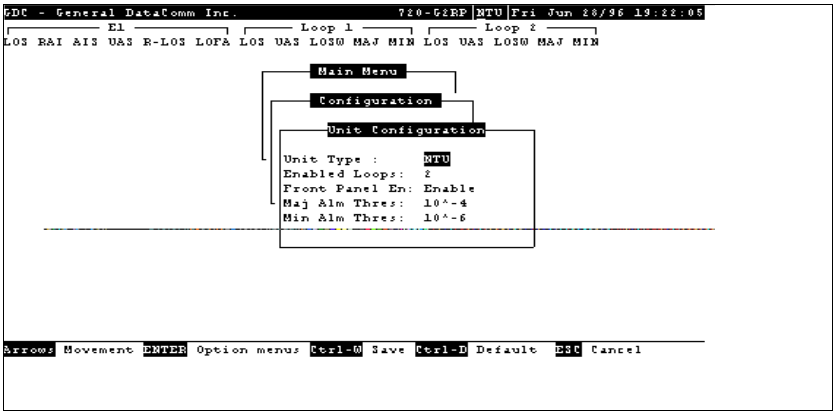


Figure 3-9 Unit Configuration Screen

The screen includes two fields for choosing the operating mode of the 720 on the HDSL loops side:

- Unit Type
- Enabled Loops
- Front Panel Enable
- MAJ Alarm Threshold
- MIN Alarm Threshold

Operation

1. To display the Unit Configuration screen, select Item 1 on the Configuration menu.
2. To change the current value of Unit Type parameter, press Enter. This displays an option menu with the available options:
   - LTU
   - NTU
3. Highlight the desired option and press Enter. The option menu closes and the new selection appears in the screen.
4. Make sure that you always enable two loops in the Enable Loops field.
5. To change the Front Panel Enable field to Front Panel Disable, highlight the field and press Enter (repeat for switching Front Panel Disable field to Front Panel Enable).

6. To change the current major alarm Maj Alm Thres, bit-error rate threshold, select Item 3 on the `Unit Configuration` menu. This value is changed in the same way as other unit configuration items. Available selections are 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}, and 10^{-8}.

7. To change the current minor alarm Min Alm Thres, bit-error rate threshold, select Item 4 on the `Unit Configuration` menu. This value is changed the same way as other unit configuration items. Available selections are 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}, and 10^{-8}.

8. After making the desired changes in the unit configuration, press `CTRL W` to save the change in the 720. To quit and cancel changes made in this screen, press the `Esc` key without pressing `CTRL W`.

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

Interface Configuration

The `Interface Configuration` option displays the `Interface Configuration` screen, showing the E1 configuration parameters of the 720. A framed screen is shown in *Figure 3-10* and an unframed screen in *Figure 3-11*. Note the change in the E1 `Alarms` field. Refer to *Table 3-7* for information on the interface configuration fields.

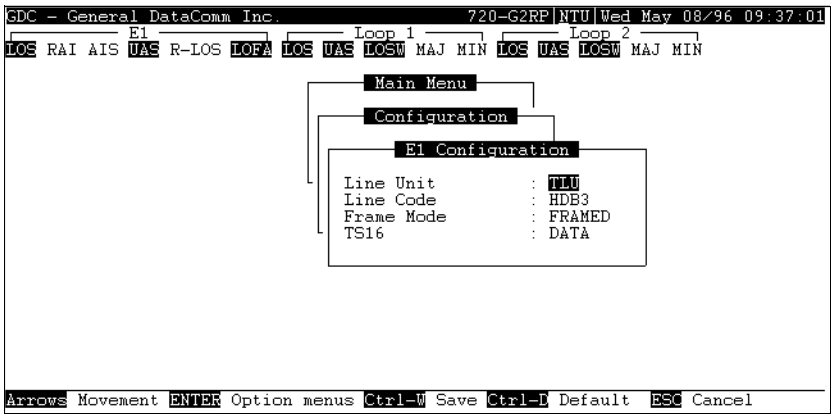


Figure 3-10 Interface Configuration Screen, Framed

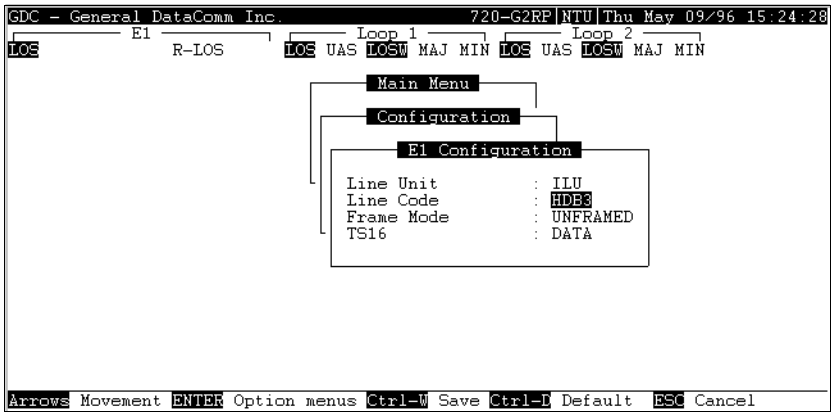


Figure 3-11 Interface Configuration Screen, Unframed

Table 3-7 Interface Configuration Fields

Line Unit	Displays the current operating mode of the 720 with respect to the E1 trunk: ILU - In this mode, the 720 operates as an intermediate line unit and transparently transfers the E1 frames. ILU is required if the unit is configured for Unframed Mode. TLU - In this mode, the 720 operates as a termination line unit and regenerates the E1 frames.
Line Code	Displays the current E1 line code used by the 720: AMI - The 720 uses the AMI line code. HDB3 - The 720 uses the HDB3 line code.
Frame Mode	Displays the current framing mode of the 720 with respect to the E1 trunk: FRAMED - In this mode, the 720 expects a framed E1 signal and maps the E1 data stream accordingly. UNFRAMED - In this mode, the 720 transfers the E1 signal on a bit-by-bit basis.
TS16	Displays the current TS16 configuration: DATA--TS16 used to carry data. SIGNALING--TS16 reserved to carry signaling information.

To display the E1 configuration screen, select Item 2 on the configuration menu.

To change the current value of a parameter, do these steps:

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

   An option menu appears with the available options.

2. Highlight the desired option, and press `Enter`.

   Option menu closes and the new selection appears in the corresponding field.

3. To reset the selected parameters to the default values, press `CTRL D`.

4. To save changes, press `CTRL W`.

5. To quit and cancel the changes made in this screen, press `Esc`.

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

Network Configuration

The Network Configuration option displays the Network Configuration screen, showing the network topology and time slot routing options of the 720. A typical screen is shown in *Figure 3-12*.

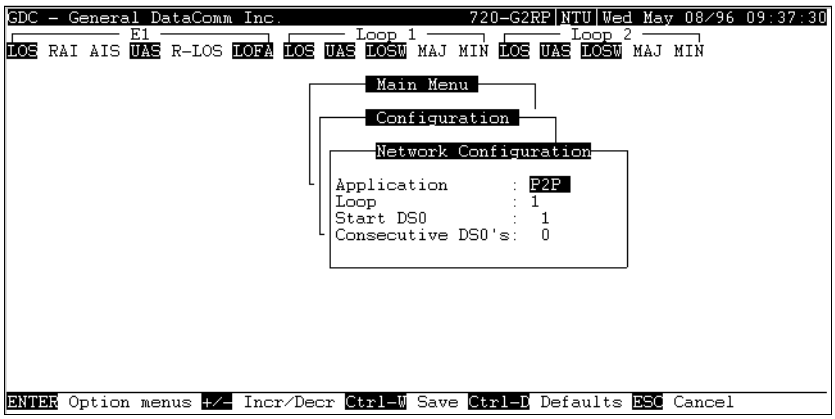


Figure 3-12 Network Configuration Screen

Operation

To display the Network configuration screen, select Item 3 on the configuration menu. This screen includes these fields:

- Application - Always P2P mode.
- Loop - Not used for P2P mode.
- Start DSO - Not used for P2P mode, except in a single loop P2P network configuration.
- Consecutive DSOs - Not used for P2P mode.

Point-to-Point Options

The 720-G2RP is used in a P2P configuration, with the Interface Config. Frame Mode set for FRAME, E1 payload is distributed along the HDSL loops with alternating DSOs on each HDSL loop, as shown in *Table 3-8*. In this configuration with a 700-G2RP LTU, the E1 payload is recombined at the 720-G2 NTU such that the full E1 frame is exactly reconstructed. When the Interface Config. Line Unit option is set for TLU and Time Slot 0 of the E1 frame is regenerated, (while in ILU mode) Time Slot 0 is passed transparently. Note that when the Interface Config. TS16 option is set for DATA, Time Slot 16 is routed only on Loop 2 to the 720-G2. When the Interface Config. TS16 option is set for SIGNALING, it is assumed that Time Slot 16 of the E1 frame contains signaling information (necessary for voice applications) and Time Slot 16 is routed through Loops 1 and 2. Routing Time Slot 16 on both loops in this case is to ensure that if one loop were to have a fault, at least Time Slot 16 data and a fractional number of payload time slots would still be available at the remote, no matter what loop is faulty.

When the 720-G2RP NTU is used with a 710-D2RP, the E1 DSOs are recombined into a user selectable aggregate data rate (V.35, EIA-530, X.21).

For increasing 710-D2RP aggregate rates, the 710-D2RP data originates from the E1 DSOs in increasing order, that is, 1 x 64 Kbps originates from E1 DSOs 1, 2, and 3, and so on. Time slot routing over the HDSL loops follows that exhibited in *Table 3-8*.

With two loops enabled in P2P mode and the Interfaced Config. Frame Mode set for UNFRAMED, an aggregate signal for 2048 Kbps may be provisioned for using a 700-G2RP LTU (G.703) and a 720-G2 NTU (G.703), a 710-D2RP LTU (V.35, EIA-530, or X.21) and a 720-G2 NTU, or a 710-D2RP NTU and a 720-G2.

Table 3-8 E1 P2P Time Slot Routing

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

f = all 1s pattern

View H/S Configuration

The View H/S Configuration option displays the Configuration & Self-Test Results screen, showing hardware and software configuration data and the results of the last power-up self-test. Information displayed on this screen is intended for maintenance and technical support groups. A typical screen is shown in *Figure 3-13*.

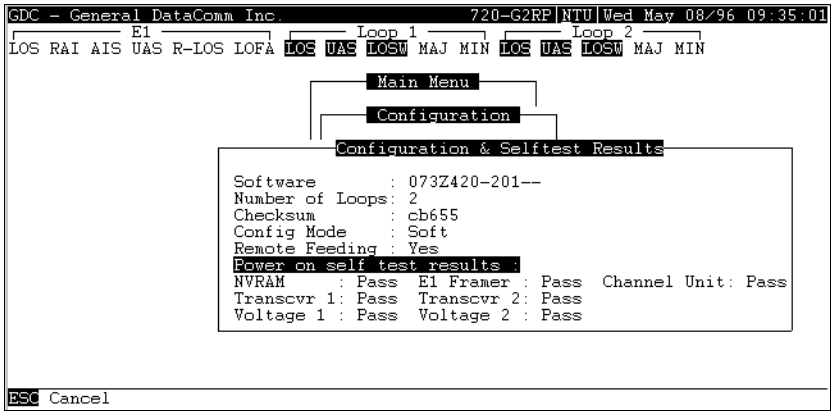


Figure 3-13 View H/S Configuration Screen

Upper area denotes configuration data., while lower area are the results of the last power-on self-test. *Table 3-9* portrays the fields in the screen.

Table 3-9 Configuration and Self-Test Results Screen Fields

Software Version	Displays the software version of the 720.
Number of Loops	Number of HDSL loops of the 720.
Checksum	Firmware checksum.
Config Mode	Displays the current configuration mode of the 720: Soft - The 720 is configured under software control. Hard - The 720 is configured by means of the internal switches.
Remote Feeding	Indicates whether the 720 is power fed from the remote unit, via the interconnecting lines.
The last power-on self-test results area lists each 720 subsystem tested during the self-test, including 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

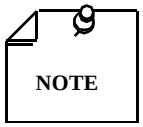
The DataComm 720-G2RP can be used as Network Managed elements if an integral part of the GDC Network Management System. Combined with a GDC SpectraComm Manager, a 700-G2RP, and the management software of DataComm 720-G2RP, the modem conforms to the MIB (Management Information Base) II standards set out for SNMP Version 1.0. Refer to the *Operating and Installation Instructions for SpectraComm Manager* listed in the Preface of this manual.

MIB Tables

This section consists of tables that list and describe the MIB objects by which an SNMP network manager can configure, control, and monitor the DataComm 720-G2RP. 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

How MIB objects appear on the screen and are manipulated varies with the network manager or MIB browser being used. Purpose of information in these tables is for supplementing 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 3-10 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		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and sub-identifier. The table describes the maintenance objects for the unit and references the unit interface.
Firmware Level	Display String	Read-only		The version number of the firmware. This allows the products to know which revision is installed. The released version number is sequenced from, A_,...AA,...ZZ. Test versions are numerical from 01 to 99.
Model Number	Display String	Read-only		Variable is used to determine the type of card family installed.

Table 3-11 Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
Maintenance Line Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop, and sub-identifier. The table describes the maintenance objects for the unit and references the unit interface.
Soft Reset	SC instance	Read-write	Reset (1) Norm (2)	Supports the action of soft resetting the unit. When this object is set to reset, the unit performs a soft reset to the managed unit. Norm cannot be set by management.
Config Mode	Integer	Read-only	Software (1) Hardware (2)	The hardware configuration mode of the unit. A unit may be hardware or software configured.
System Up Time	Time Ticks	Read-only		Variable is used to report the elapsed system tick time.
Unit Type	Integer	Read-write	LTU (1) NTU (2)	Variable is used to define HDSL type. LTU selects line terminating unit, NTU selects network terminating unit. For 700-G2RP, Variable can only be a LTU.
Default Initiate	Integer	Read-write	Default (1) Normal(2)	Used to allow the non volatile configuration to be set to a factory default reset. Normal cannot be set by management.
Data Type	Integer	Read-write	Data (2) Voice (1)	Defines the HDSL data type, either data or voice.
Loop Provision	Integer	Read-write	Point-to-point (1) Point-to-Multi-Point (2)	Variable is used to define the HDSL loop provision. When P-P is selected, the unit is connected to another HDSL unit. When P-MP is selected, the unit is connected to more than one HDSL units or data grooming.
Number of Loops Enabled	Integer	Read-write	One Loop (1) Two Loops (2)	Used to define the HDSL loop configuration. It can be set for one to two loops.
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))	Variable is used for general purpose storage.
Private Storage 2	Display String	Read-write	(Size (16))	Variable is used for general purpose storage.
Private Storage 3	Display String	Read-write	(Size (16))	Variable is used for general purpose storage.
LED Status	Display String	Read-only	Octet 1 Bit 7 - not used Bit 6 - not used Bit 5 - not used Bit 4 - not used Bit 3 - NORM E1 Bit 2 - ES E1 Bit 1 - AL Bit 0 - TM Octet 2 Bit 7 - not used Bit 6 - not used Bit 5 - not used Bit 4 - not used Bit 3 - NORM L2 Bit 2 - ES L2 Bit 1 - NORM	Returns a bit wise snapshot of the front panel LED status.

Table 3-11 Maintenance Table (Cont.)

Frac Execution	Integer	Read-write	Execute (1) (Write only) NORM (2) (Read only)	For Set, only execute is allowed.
Alarm Status	Display String	Read-only	(Size(1..255))	The current alarms of the unit without the alarm masks.
LED Status 1	Displays 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 Octet 3 Bit 7 - not used Bit 6 - not used Bit 5 - not used Bit 4 - not used Bit 3 - not used Bit 2 - not used Bit 1 - RPF FAULT Bit 0 - RDF NORM	Returns a bit wise snapshot of the front panel LED status. This MIB object is used only for the new HDSL elements.

Table 3-12 E1 Configuration Table

MIB Object	Syntax	Access	Enumeration	Description
E1 Config Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop and sub-identifier, the E1 interface.
E1 Framing Mode	Integer	Read-write	Framed (1) Unframed (2)	Used to determine the E1 framing mode.
E1 Line Unit	Integer	Read-write	TLU (1) ILU (2)	Used to determine the operating mode of the HDSL system with respect to the E1 trunk. When TLU is selected, the system operates as a termination line unit, 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 3-13 HDSL Diagnostic Table

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

Table 3-14 HDSL Diagnostic Results Table

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

Table 3-15 E1/HDSL Performance Tables

Current Performance Table				
MIB Object	**Syntax**	**Access**	**Enumeration**	**Description**
Current Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which is in this case, can be an E1 or loop interface.
Current ESs	Gauge	Read-only		The number of errored seconds encountered by an E1 or loop interface in the current 15 interval.
Current SESs	Gauge	Read-only		The number of severely errored seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current UASs	Gauge	Read-only		The number of degraded seconds encountered by a loop or E1 interface in the current 15 minute interval.
Current DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in the current 15 minute interval.
Current FEBEs	Gauge	Read-only		The number of Far End Block Errors encountered by a loop interface in the current 15 minute interval.
Internal Performance Table				
Interval Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which is in this case, can be an E1 or loop interface.
Interval Number	Integer	Read-only	(1..96)	A 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).
Current Performance Table				
Interval LESs	Gauge	Read-only		The 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		The number of severely errored seconds encountered by a loop or E1 interface in one of the previous 96 individual 15 minute intervals.
Interval UASs	Gauge	Read-only		The number of unavailable seconds encountered by a loop or E1 interface in one of the previous 96 individual 15 minute intervals.
Interval DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in one of the previous 96 individual 15 minute intervals.
Interval FEBEs	Gauge	Read-only		Variable represents the HDSL loops Far End Block Errors.
Total Performance Table				
Total Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which is in this case, can be an E1 or loop interface.
Total ESs	Gauge	Read-only		The number of errored seconds encountered by an E1 or loop interface in the previous 24 hour interval.
Total SESs	Gauge	Read-only		The number of severely errored seconds encountered by a loop or E1 interface in the previous 24 hour interval.
Total UASs	Gauge	Read-only		The number of unavailable seconds encountered by a loop or E1 interface in the previous 24 hour interval.
Total DMs	Gauge	Read-only		The number of degraded minutes encountered by an E1 interface in the previous 24 hour interval.
Total FEBEs	Gauge	Read-only		The number of Far End Block Errors encountered by a loop interface in the current 15 minute interval.

Table 3-16 Loop/E1 Performance Interval Maintenance Table

MIB Object	Syntax	Access	Enumeration	Description
Interval Maintenance Index	SC instance	Read-only		Index value that uniquely identifies the interface to which this entry is applicable. SC instance defines the slot, line, drop. and interface, which is in this case, can be an E1 or loop interface.
Reset Intervals	Integer	Read-write	Normal (1) Reset (2)	Variable is used to reset 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)	Variable is used to read the number of intervals collected. Each interval is an increment of 15 minutes.

Table 3-17 HDSL Status Table

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

Table 3-18 HDSL Alarm Object Identifier Definitions

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

4 Tests

Overview

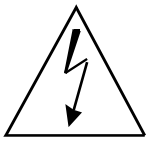
The DataComm 720-G2RP furnishes a comprehensive set of features for testing its operation and identifying trouble areas, using an optional terminal connected to the control port (CTRL) on the front panel.

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

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

The 720 displays the status of these tests through the indicators on the front panel.

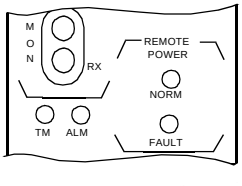
You may also use the optional terminal connected to the Control Port (CTRL) on the front panel which provides a comprehensive set of features for testing operation and identifying trouble areas. This chapter provides instructions for managing the 720 system with the optional terminal and tells you how to enable and disable various loopbacks.



Caution: Risk of electric shock. High voltages may be present in telecommunication circuits.

Troubleshooting Procedures

All Remote power diagnostics are available from the VT-100 control terminal or from the SpectraComm Management system. Front panel LEDs are used to indicate the presence of a FAULT condition or an ALARM state of the basecard. The details of these faults are found by examining the control terminal screens or the Management system.



Front panel ALARM
and FAULT indicators.

Unit Plugged in Shelf, No Power-Up

If the unit is plugged into a shelf, but does not power up, then:

- Verify that the shelf power supply is ON.
- Verify the fuse on the rear of the shelf is good.
- Verify that the unit is seated properly in the shelf.

Fault LED, No Power-Up

If the DataComm unit has a FAULT LED indicator, but does not power up, then:

- This LED indicates that the voltage applied to this unit is not within the required limits and therefore will not power the unit. Also, it may be that the loop length exceeds the limitations for Remote Power.

Power-Up, But No Handshake

Refer to *Table 4-1* below for fault LEDs during power-up.

Table 4-1 Panel Indicator Faults, Symptoms, and Possible Reasons

Front Panel Indicator	Symptom	Possible Reasons
FAULT LED	Continuously ON	This is most likely a -48V input battery problem. Confirm this by observing the VT-100 screen. Verify that the battery cable is connected properly and is connected to the correct Zone3 DB25 connector.
FAULT LED	Continuously ON	VT-100 screen indicates a GND FLT. This means that the remote power ground fault detector has detected a foreign voltage on the loop. The unit does not attempt to power the line under these conditions. Verify that the connections to the HDSL loops are correct and have not been connected to another live circuit.
FAULT LED	Cycles 10 times, then stays ON for 25 seconds. The NORM LED tries to turn on but then goes off.	VT-100 screen indicates GND-FLT. This means no foreign voltages were detected and the unit attempted to turn on, but encountered a ground fault on one of the loops. In the case of large current draw, protection circuitry inside the unit requires 25 seconds before attempting to turn on. The unit makes ten attempts before it shuts down; after 25 seconds, the unit automatically starts the cycle again.
FAULT LED	Cycles 10 times, then stays ON for 25 seconds. The NORM LED tries to turn on but then goes off	VT-100 screen indicates OVR CUR. This means the unit attempted to turn on, but encountered excessive current draw on the loops. In the case of large current draw, protection circuitry inside the unit requires 25 seconds before attempting to turn on. The unit makes ten attempts before it shuts down; after 25 seconds, the unit automatically starts the cycle again.
FAULT LED	Continually cycles while the NORM LED tries to turn on.	VT-100 screen displays UNDR CUR. This means that not enough current is being drawn, most likely because of an open circuit. The unit continues to test the line to see if the fault has been cleared--this accounts for the NORM LED periodically turning on.

No Handshake and No Remote Power Fault

If the unit does not handshake and there is no Remote Power FAULT, then:

- It is possible that one wire of a loop is connected (TIP) and the other (RING) is open. If the loop length is short enough so that it does not exceed the maximum current draw, one wire of a loop can complete the phantom circuit and supply sufficient power to the remote unit.
- If units are connected on loops exceeding the maximum reach of the HDSL transmitter, it is possible that the voltage from the Remote Power source module can power the remote unit.
- It is possible the basecard may have a defective component Verify the VIEW H/S Config screen does not report a component failure.
- Both units could be configured as LTU (or NTU). Verify that one unit is LTU and its Remote is an NTU.

Over-Current Problem at Power-Up and Handshake

If units appears to power up, but during handshake there is an over-current fault OVR CUR and the unit shut down, then:

Loop exceeds maximum reach of Remote Power supplies or one of the wires of a loop is not connected. If one wire is not connected and a long loop is used, the Power source unit on the shelf tries to supply maximum current. When power is supplied to the loop, the remote unit performs self-test power-up and does not demand maximum current. As soon as it has satisfied the self test power up routine, the unit begins the handshake routine; this requires more current and trips the over-current fault circuitry at the source card.

Metallic Access Testing

The 720-G2RP provides front panel bantam jacks for customer use in testing the E1 lines, and the

720-G1RP circuitry. *Figure 4-1* illustrates the break-in points of these jacks.

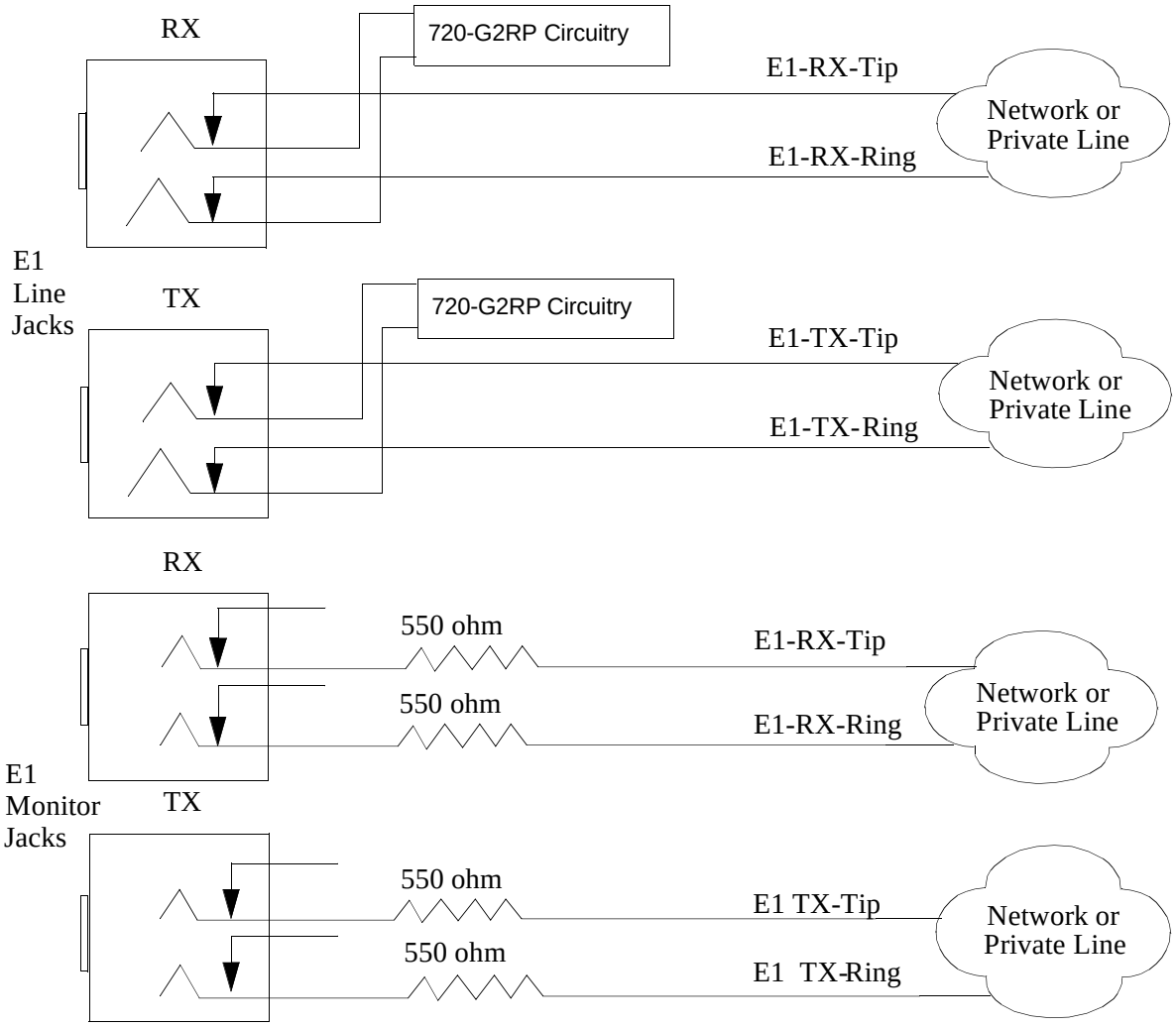


Figure 4-1 Metallic Access Jacks

Maintenance Menu

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

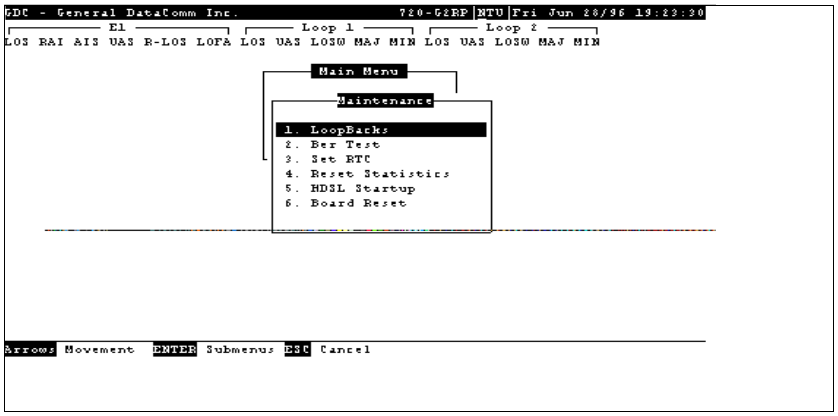


Figure 4-2 Maintenance Menu Screen

Here is what is available from the maintenance menu:

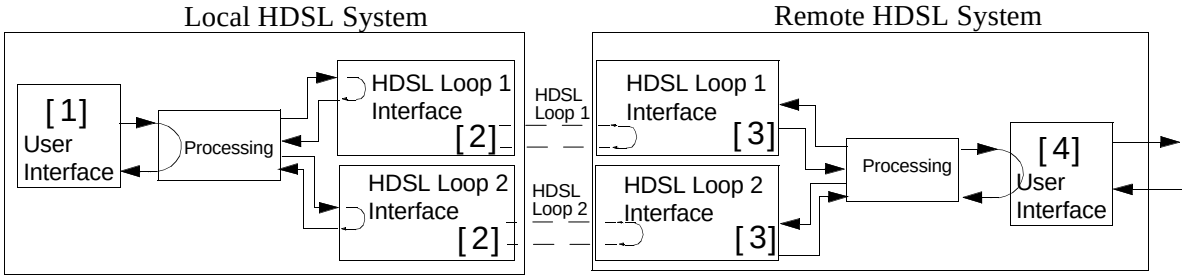
- Loopbacks
- BER Test
- Set RTC
- Reset Statistics
- HDSL Startup
- Board Reset

Loopback Testing

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

This function is used to enable/disable loopbacks on the user's equipment interface and on the HDSL loops, for maintenance purposes.

The HDSL systems offered by GDC provide 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]**
Remote HDSL local loopback	**[3]** Not Available
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.

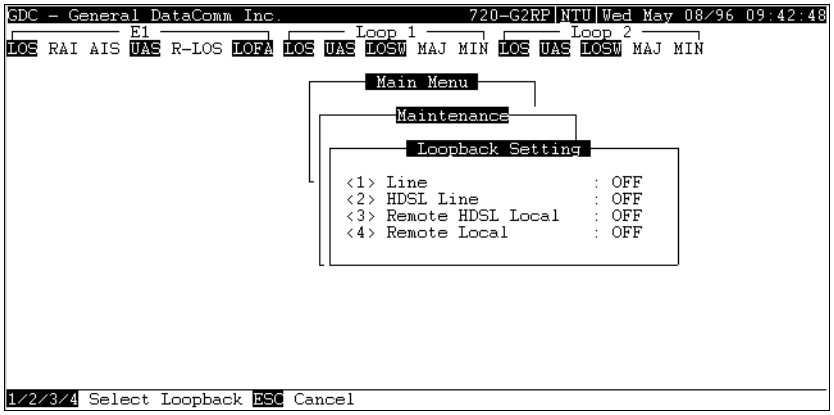


Figure 4-4 Loopbacks Screen

Operation

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

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

1. Type the number of the line of the desired loopback. This toggles the selected loopback on and off.
2. To exit and return to the Maintenance Menu, press the Esc.

Loopback Testing (Hard)

The 720 supports two types of loopbacks at the front panel:

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

RL - Remote loopback signals the remote unit to loopback the data at it's user's equipment interface. This is functional in LTU mode only. The RL switch is disabled when the unit is set for point-to-multipoint.

The forward signal for both of these loopbacks is transparent. Additional loopbacks are available through the optional terminal. The loopbacks are described in *Paragraph Loopback Testing (Soft).*

Loopback Testing (Soft)

You may also use the optional terminal connected to the Control Port (Ctrl) on the front panel which gives you a lot of features for testing operation and identifying trouble areas. You may use loopbacks to enable/disable loopbacks on your equipment interface and on the HDSL loops for maintenance. The HDSL systems offered by GDC provide four test loopbacks at the optional terminal. *Figure 4-3* shows the simplified signal paths when the loopbacks are connected.

Line Loopback

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

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

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

HDSL Line Loopback

The local 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 local HDSL line loopback is activated (ON) (Loopback [2]), the transmit signal of each HDSL loop is returned by the HDSL loop interface(s) of this HDSL system module on the receive path of the same loop. Therefore during normal operation the local user's equipment receives its own signal without errors. Local user transmit signal is also sent to the remote HDSL system. Signal received, however, from the remote HDSL system is lost.

Remote HDSL Loopback

At this time units do not support this loopback.

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. When the remote local loopback is activated (ON) (loopback [4]), data received by the remote module from the local user is returned by the HDSL system module on the receive path, within the remote user's equipment interface. Thus, during normal operation the local user's equipment receives its own signal without errors. The local user transmit signal is also passed to the remote user's equipment, connected to the HDSL system, but the signal transmitted by the remote user is lost.

Considerations in the Use of Test Loopbacks

The test loopbacks are designed to allow systematic testing of the signal paths along the link, starting from one end of the link (the local HDSL module). In most situations, it is recommended to initiate the loopbacks from the side serving as the LTU, because this would allow you to follow the signal path starting from the office and continue toward the end user. Testing should be done from the unit optioned for internal, or external timing.

The recommended order of test activation is as follows:

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

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

Only one loopback should be activated at any time.

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

BER Test

Testing Method

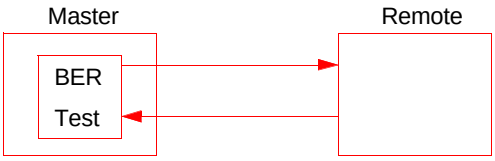
BER testing is done by repeatedly transmitting a pseudo-test sequence having a length of 2^{15}-1 bits and then comparing, by means of an error detector, the received sequence. Any difference is assumed to be an error and is counted. To make a meaningful comparison, error counting is inhibited until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

During this testing, your traffic is disconnected. BER tests may be done 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. Loopback can be physically connected, somewhere along the signal path; or you could have a test loopback started at the desired location as described. Or you could have an external BERT connected to the remote unit to make testing easier.

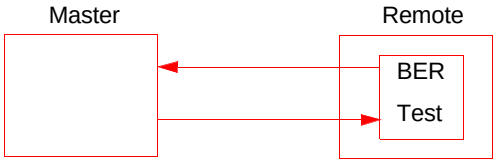
Measurements are carried out over discrete intervals (an interval corresponds to the time needed for the transmission of a block of 2^{24} bits). Errors tallied for each interval can be as many as 255. Only the maximum number of errors for an interval is recognized in the calculation of the BER. Calculated 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.

Rate test for bit errors is achieved over individual HDSL loop or over entire HDSL bandwidth. But only one BERT test can be active at a time. BER test can be invoked through GDC UAS controller, supervisory terminal port, or front panel switch. Front panel TM LED is started by turning on the BER test. When the error detector is in sync and detects no errors, the TM LED is solidly ON. But, when the error detector is not in sync or detects some errors, the TM LED blinks. See *Figure 4-5*.

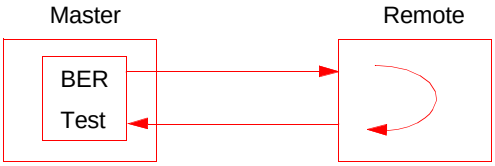
Test Configuration Notes



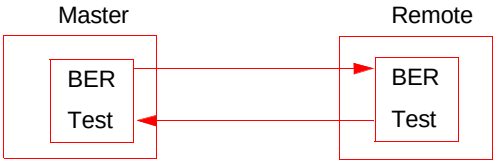
Master Self-Test:
Enable master BER test. Be sure you have an external loopback or test equipment at the remote unit to facilitate this test.



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



Self-Test with Remote Loopback:
From master unit, assert Remote Loopback (RL) (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 units.

Figure 4-5 Notes on Configuration Tests

BER Screen Description

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

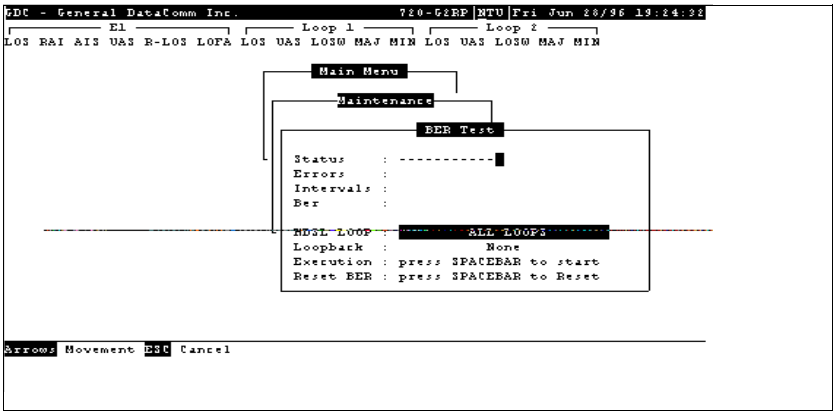


Figure 4-6 HDSL BER Test Screen

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 loopback (HDSL loop you want to perform the test on) and to start/stop BER measurement.

The fields of the BER Test screen are described in *Table 4-2*.

Table 4-2 BER Test Screen Fields

`Status`	Displays the current status of the error detector: *Sync* - The error detector is synchronized, and the BER measurement is possible; Out-of-Sync - The error detector is not synchronized, and BER measurement is inhibited.
`Errors`	Number of errors counted up to this point.
`Intervals`	Number of measurement intervals up to this point.
`Errors`	Number of errors counted up to this point.
`BER`	Displays the BER calculated up to this point.
`Loopback`	Displays the current state of the loopback activated for the purpose of 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 line loopback is activated for the BER test.
`Execution`	Displays the next state of BER measurement: Stop - BER measurement disabled; *Start* - BER measurement enabled.
`Reset BER`	Resets the errors and interval counters.

Operation

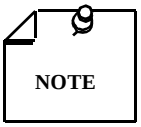
1. To display the BER Test screen, select Item 2 on the `Maintenance Menu`.
2. Select desired HDSL loop you want to perform test on by moving the selection block to HDSL loop field. Press space bar to select desired HDSL loop.
3. Make sure a loopback is activated. If the Loopback field displays `None` 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/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 the `Esc`.

To reset BER:

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 the Esc.



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 loops see bursted errors on its data. BER tester detector is synchronize and show error-free for all 1s and 0s pattern.

Set RTC

The Set RTC option enables you to set the real-time clock of the 720. A typical screen is shown in *Figure 4-7*.

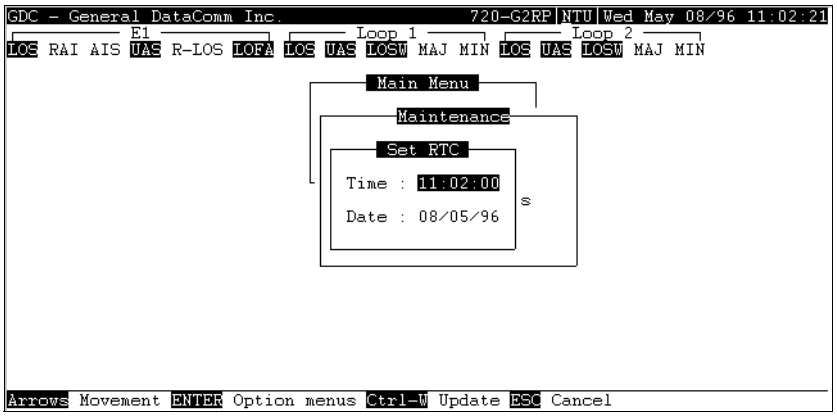


Figure 4-7 Set RTC Screen

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

Table 4-3 Set RTC Test Screen Fields

`Time`	Displays the time in 24-hr military format showing hours: minutes: seconds retrieved from the 720 at the time the screen is opened.
`Date`	Displays the date (day/month/year) retrieved from the 720 at the time the screen is opened.

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

The 720 internal time is updated at the instant you press `CTRL-W`.

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

Reset Statistic

The `Reset Statistics` option resets all the performance statistics entries of the 720.

To instruct the 720 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 initiate manually the 730 HDSL loops start-up process: Normally this process is automatically performed upon link initialization and whenever the synchronization between two linked 720 units is lost.

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

To instruct the 720 to perform the start-up process, select Item 5 on the `Maintenance Menu`.

Board Reset

To reset the 720, select Item 6 on the `Maintenance Menu`. After a few seconds, the opening screen will appears. The unit performs the start-up process, and displays the `Main Menu` screen.

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

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