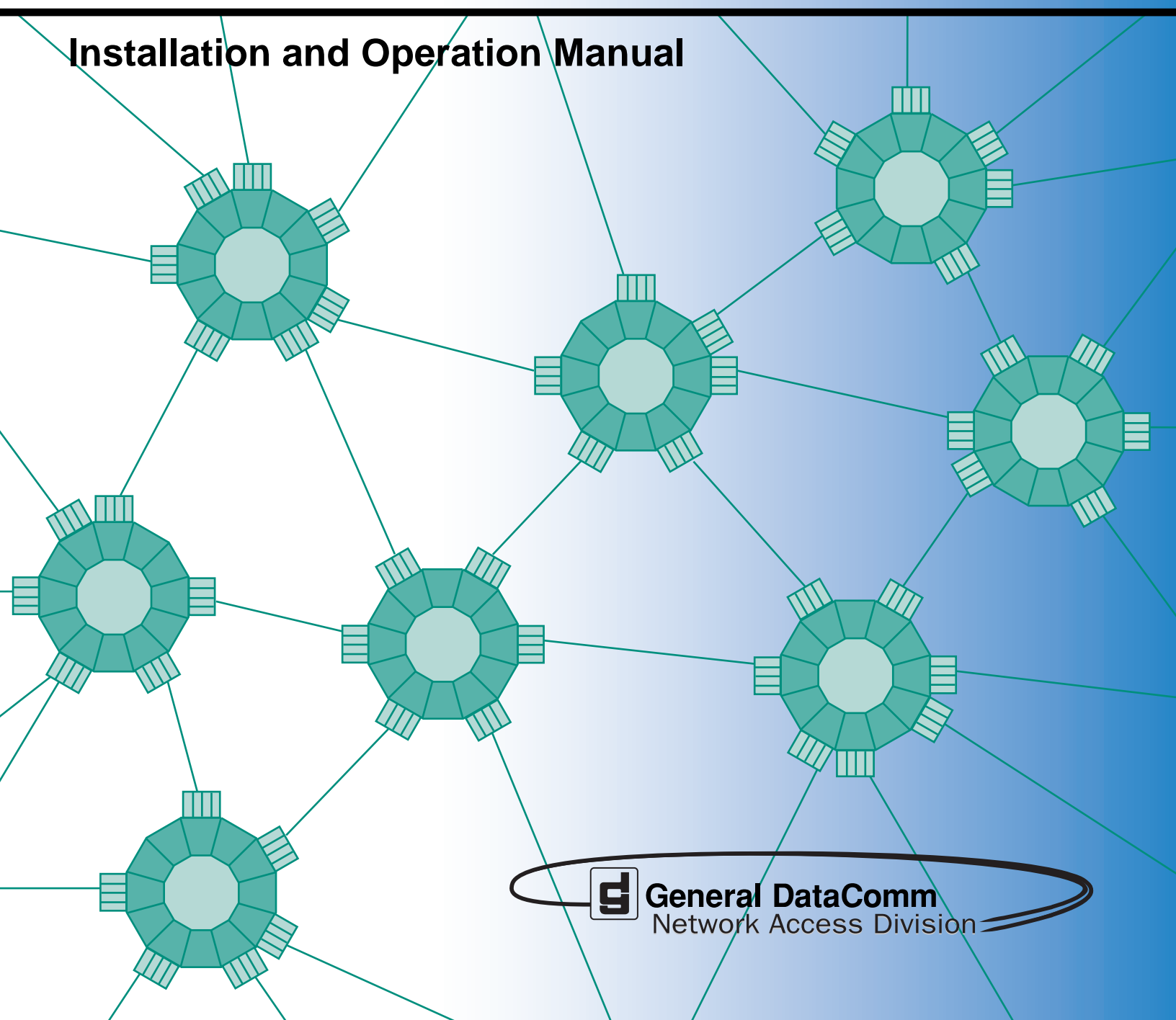


GT 128[®] LTU/NTU

Installation and Operation Manual



072R117-000
Issue 1
March 2000

GT 128[®] LTU/NTU

Installation and Operation Manual

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General DataComm, Inc.
Network Access Division
Technical Publications Department
Park Road Extension
Middlebury, Connecticut USA 06762-1299

Telephone: 1 203 758 1811

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Documentation

Revision History

Issue Number	Date	Description of Change
1	March 2000	Initial Issue

Related Publications

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

Publication Name	Publication Number*
TEAM 600 for UNIX Operation Manual	058R731-V300

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

Preface

Scope

This manual describes how to install and operate the GT 128 Line Terminating Unit/Network Terminating Unit (referred to in this manual as GT 128). The information contained in this manual has been carefully checked and is believed to be entirely reliable. However, as General DataComm improves the reliability, function, and design of their products, it is possible that information may not be current. Contact General DataComm if you require updated information for this or other General DataComm products.

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

Manual Organization

This manual is divided into the following chapters:

[Chapter 1, Introduction and Specifications](#)

[Chapter 2, Installation and Operation](#)

[Chapter 3, Tests](#)

Safety Information

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

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

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

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



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



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



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

Safety Guidelines

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

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

Antistatic Precautions

Electrostatic discharge (ESD) results from the buildup of static electricity and can cause computer components to fail. Electrostatic discharge occurs when a person whose body contains a static buildup touches a computer component. This product may contain static-sensitive devices that are easily damaged. Proper handling, grounding and precautionary ESD measures are essential when installing parts or cards. Keep parts and cards in antistatic packaging when not in use or during transport. If possible, use antistatic floorpads and workbench pads.

When handling components, always use an antistatic wrist strap connected to a grounded equipment frame or chassis. *If a wrist strap is not available, periodically touch an unpainted metal surface on the equipment.* Never use a conductive tool, like a screwdriver or a paper clip, to set switches.

FCC Part 68 Compliance

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

All connections to the telephone network must be made using standard plugs and telephone company provided jacks or equivalent. Connection of this equipment to party lines and coin telephones is prohibited. A label on the component side of the unit's printed circuit board provides the FCC Registration number for the unit. If requested, give this information to the telephone company. To connect the product to the Public Telephone Network, you are required to give the following information to the telephone company:

- FCC Registration Number: TBD
- Facility Interface Codes: 04DU9-BN, 04DU9-DN, 04DU9-1KN, 04DU9-1SN
- Service Order Code: 6.0Y
- Telephone Company jack type: RJ48C

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

Part 15 Compliance

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

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

Industry Canada 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.

Electromagnetic Compatibility

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

Avis D'industrie Canada

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

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

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

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

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

Preface

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

La Compatibilité d'Électro-magnétique

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

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.

EC Declaration of Conformity

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

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

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

Electromagnetic Compatibility

EN 55022: 1994

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

EN 50082-1: 1992

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

Safety

EN 60950: 1995 A1 through A3

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

Service Support and Training

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

VITAL Network Services World Headquarters

6 Rubber Avenue
Naugatuck, Connecticut 06770 USA

Telephones:
1 800 243 1030
1 888 248 4825
1 203 729 2461

Faxes:
1 203 723 5012
1 203 729 7611

<http://www.vitalnetsvc.com>

VITAL Network Services Regional Sales and Service Offices:	
<p>North American Region Office 6 Rubber Avenue Naugatuck, Connecticut 06770 USA Telephones: 1 800 243 1030 1 888 248 4825 1 203 729 2461 1 800 361 2552 (French Canadian) Training: 1 203 729 2461 Faxes: 1 203 723 5012 1 203 729 7611</p>	<p>Central America, Latin America VITAL Network Services Periferico Sur 4225, Desp. 306 C.P. 14210, Mexico D.F., Mexico Telephone: 52 5 645 2238 Training: 52 5 645 2238 Fax: 52 5 645 5976</p>
<p>Europe, Middle East, Africa VITAL Network Services Molly Millars Close Molly Millars Lane Wokingham, Berkshire RG41 2QF UK Telephone: 44 1189 657200 Training: 44 1189 657240 Fax: 44 1189 657279</p>	<p>Asia Pacific VITAL Network Services 501 Orchard Road 05-05 Wheelock Place, Singapore 238880 Telephone: 65 735 2123 Training: 65 735 2123 Fax: 65 735 6889</p>

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Chapter 1: Introduction and Specifications

Introduction to the GT 128 LTU/NTU

The GT 128 Line Terminating Unit/Network Terminating Unit (referred to as GT 128 throughout this manual) is a single channel line terminating unit/network terminating unit that uses 2B1Q signalling (defined in ANSI T1.601-1992) for its line coding scheme. It supports one channel of user data at 64 kbps or 128 kbps, and has an operating range of up to 18,000 feet over a two-wire, 26 gauge line. A Berg type jumper configures the DTE interface to be either V.35 (default) or X.21.

The GT 128 can be optioned locally from on-board switches and jumpers or remotely when it operates in conjunction with a managed UAS system. It responds to messages sent over the Embedded Operations Channel (EOC) from either a Network Manager or the network.

The GT 128 (see [Figure 1-1](#)) is an improved version of the earlier DC610, featuring a more compact enclosure, a universal power supply, lower cost and easier installation.

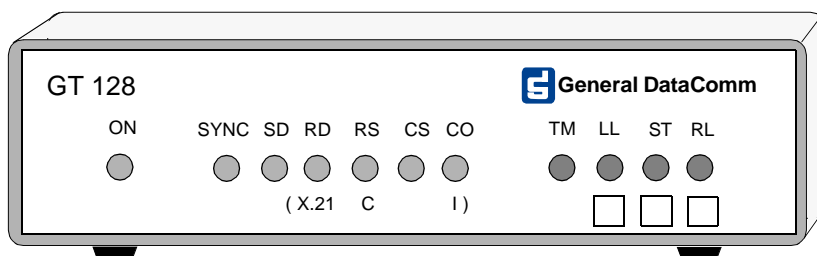


Figure 1-1 GT 128 LTU/NTU Front Panel

Features

- May be configured as a LTU or NTU for point-to-point applications.
- Supports a single channel (64 kbps or 128 kbps) of customer data on a two-wire 2B1Q loop circuit.
- Hardware configurable for point to point applications via on-board switches and jumpers.
- May be used as a Managed Network Element when connected to a unit under the control of a GDC Network Management System.
- Supports the Embedded Operations Channel (EOC) for network management communications.
- Supports Autodiscovery on Power-up when connected to a UAS 7626.
- Provides selectable V.35 or X.21 interface.

- Responds to ANSI 2B+D, B1, and B2 loopback commands from a network test center.
- Supports both V.54 and PN127 remote loopback codes.
- Able to terminate sealing current.
- End-to-end compatible with GT 128, DC 610, DC 612, NTUs and DC 621.
- Compatible as a remote to UAS 611, UAS 613, UAS 7616, UAS 7624, or UAS 7626.
- Occupies a compact Mini Standalone Enclosure that measures approximately 9" x 7" x 3" (23 cm x 18 cm x 7.6 cm).
- Operates from a Universal AC power supply.

Applications

Tail Circuit (UAS Shelf) - The following figure shows GT 128's being used to support tail circuits of a UAS Shelf. The network manager, running the SNMP protocol, has soft control for configuration and monitoring functions in this application. The SCM (SpectraComm Manager) acts as the SNMP agent for the components installed in the shelf and, through them, for the GT 128's connected to the tail circuits.

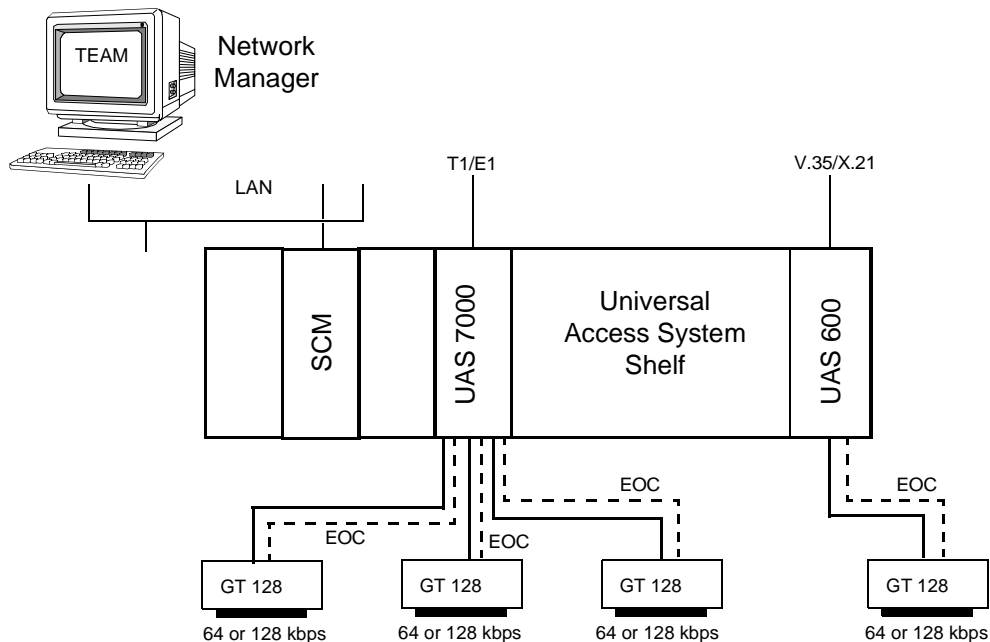


Figure 1-2 Tail Circuit Application (UAS Shelf)

Point-to-Point (hard optioning only) - [Figure 1-3](#) shows GT 128 is being used in a point-to-point application. Soft optioning is not allowed. You may generate diagnostic tests from the front panel switches or DTE interfaces.

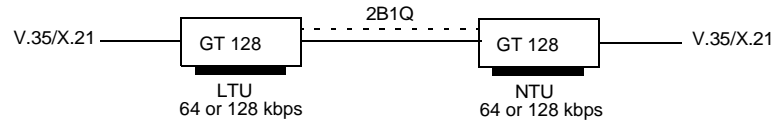


Figure 1-3 Point-to-Point Application (UAS Shelf)

Diagnostics

The GT 128 incorporates built-in diagnostic circuits to allow quick and thorough performance tests. Diagnostic testing capabilities include power-up self test, bi-lateral Line Loopback (LL), V.54 and PN127 compliant Remote Loopback (RL), Self Test, and ANSI B1, B2 and 2B+D loopbacks.

The unit performs its power-up self test each time it is connected to ac power. During the test all LED indicators except ON illuminate briefly, then go off. If the test detects a failure, the LEDs will flash five times.

The built-in RL capability supports transmission and recognition of selectable V.54 and PN127 loopback codes. By transmitting the loopback code when its front panel RL switch is activated, the unit can command the corresponding remote unit, at the far end of the network, to loop data back onto the network. The remote unit can be either another GT 128 or a DC 600 NTU. Front panel-activated loopback codes are transmitted in-band, along with user data. The unit can also be commanded to perform loopbacks by network manager commands sent over the EOC.

The Self-Test feature reduces the need for external test equipment by providing a built-in test pattern generator and receiver.

Technical Characteristics

[Table 1-1](#) contains the technical specifications for the GT 128. Conforming to these specifications ensures maximum system performance and reduces the chances of mechanical breakdown and personnel hazard.

Table 1-1 Technical Specifications for the GT 128

Business Equipment Interface	
Data Rates	64 kbps or 128 kbps.
Interface Types	ITU-T V.35 or X.21. Can be used as an LDM in Metropolitan Area Network (MAN) or campus networks
Network Interface	
Operating Mode	Full duplex with adaptive echo cancellation.
Data Rate	160 kbps total: 128 kbps user data, 16 kbps internal control, 16 kbps for timing and synchronization.
Data Format	Synchronous, serial binary
Line Coding	2B1Q, compatible with ANSI T1.601-1992
Line Requirements	2-wire, non-loaded metallic circuit
Operating Range	5.5 to 7 km (18,000 to 22,967 ft) — varies with wire size and bridged taps
Diagnostics	
Front Panel Switch Controlled	Diagnostic Data (ST) - 2047 Remote Loop - V.54 (default) and PN127 methods, network management selectable Remote Loop with Diagnostic Data (ST) Local Loopback
Network Manager (SNMP) Controlled	Channel Loopback Data Loopback Bi-lateral Loopback Diagnostic Data (ST) selectable 2047 or 511
Network Test Center Controlled	2B+D loopback B1 loopback B2 loopback
Power Requirements	
Voltage Range	100 – 240 V AC, nominal, 50/60 Hz
Input Power	3 W maximum
Fusing	F1, 0.5A, 250V SB
Physical Characteristics	
Enclosure	
Height	56 mm (2.2 in.)
Width	206 mm (8.1 in.)
Depth	163 mm (6.4 in.)
Weight	0.7 kg (1.5 lbs.)
Temperature	0° to 50°C (32° to 122°F) operating –40° to 70°C (–40° to 158°F) non-operating
Humidity	Up to 95% without condensation
Safety Protection	UL 1950 listed and CSA approved
EMC	EN55022 Class B
CE Mark	

Equipment List

[Table 1-2](#) lists the GT 128 part numbers. Please note that all the cables listed may not be included with your unit.

Remove each component from the box and perform a thorough inspection. If any component appears damaged, contact the shipper immediately. All damaged components must be retained until an inspection by the shipper has been completed. If it is necessary to re-package and return the unit, use the original box and packaging materials.

Table 1-2 Equipment List

Description	Part No.
GT 128 Standalone, 100 to 240 V AC, 50/60 Hz	048A090-003
Interface Cables	
<i>Note: The three digits following the dash in cable part numbers represent cable length in feet.</i>	
DB-25 Male to V.35 Male (ISO 2593) adapter cable	027H579-005 -015 -025 -050
DB-25 Male to V.35 Female (ISO 2593) adapter cable	027H572-001
DB-25 Male to DB-15 Male (ISO 4903) adapter cable for X.21	027H448-005 -010 -025
Line cable	022H024-001 -002 -005 -010 -015 -025 -050
Power Cords (IEC320)	
Domestic	830-024-003
Europe	830-061-002
Italy	830-002-008
Japan	830-002-009
Australia	830-002-010
Taiwan	830-002-011
U.K.	830-060-102
Switzerland	830-061-003

Chapter 2: Installation and Operation

Installation Procedures

Place the GT 128 in a ventilated area where the ambient temperature does not exceed 122°F (50°C). Do not install the unit directly above equipment that generates a large amount of heat (such as power supplies).

Option Selections

Dip switches and jumpers on the GT 128 select the field options. The location of each option and the manner of selection are illustrated in [Figure 2-1](#). See [Figure 2-2](#) for a functional view of the rear panel connectors.

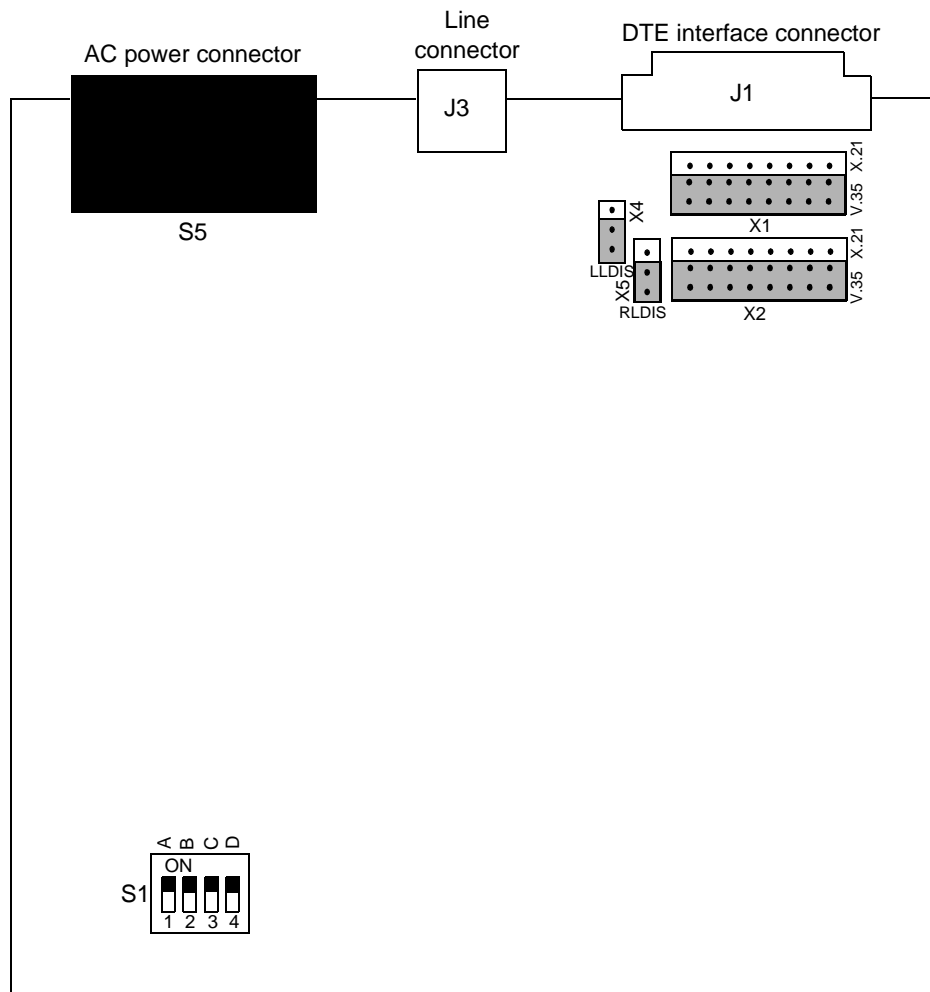


Figure 2-1 Option Location

Table 2-1 Switch and Jumper Options

Switch or Jumper	Application	Option	Description
S1-1	Soft/Hard Control	ON	When ON the unit is optioned by using the remaining S1 switches.
		OFF(default)	When OFF the unit is configured and controlled from GDC Network Management Controller. (Disables all other S-1 switches.)
S1-2	LTU/NTU	ON	Selects LTU (Master) operation providing loop timing and handshake initiation. (S1-1 must be ON to enable this switch.)
		OFF (default)	Selects NTU (Slave) operation which recovers timing from the loop.
S1-3	Data Rate	ON	Selects 128 kbps data rate. (S1-1 must be ON to enable this switch.)
		OFF (default)	Selects 64 kbps data rate.
S1-4	Front Panel Switch Inhibit	ON	Front Panel test switches (LL, ST, RL) are inhibited. (S1-1 must be ON to enable this switch.)
		OFF (default)	Front Panel test switches are enabled.
X1, X2	DTE Interface	X.21	Configures the interface for X.21 operation.
		V.35 (default)	Configures the interface for V.35 interface.
X4	Line Loopback from DTE	LLENA	Line Loopback is enabled and controlled by the DTE using Pin 18 (X.21) or Pin J (V.35).
		LLDIS (default)	Line Loopback is disabled not under the control of the DTE.
X5	Remote Loopback from DTE	RLENA	Remote Loopback is enabled and controlled by the DTE using Pin 21 (X.21) or Pin BB (V.35).
		RLDIS (default)	Remote Loopback is disabled and not under the control of the DTE.

Using the Hard Configuration Options

When the GT 128 is hard configured (S1-1 switch is ON), the unit enables the following features:

1. RTS is normal.
2. RTS-to-CTS delay is 5 msec.
3. Diagnostic Data Pattern is 2047.
4. Front Panel Remote Loopback will use V.54 method.
5. Transmit Data Timing is supplied by the GT 128. Any DTE connected to a GT 128 must accept and use Transmit Data Timing from the GT 128.
6. Respond to an in-band V.54 loop-up pattern is enabled.
7. There is no automatic time-out for a Remote Loopback test.

Note After powering up in Hard Mode, the dip switch options for Data Rate and Front Panel (ENA/DIS) and the Hard Default features may be over-written by network management commands, but these changes will not be stored in NVRAM.

Electrical Connections

Power

Attach the appropriate power cord to the rear panel IEC 320 connector and to the wall receptacle. The front panel ON LED lights to indicate the presence of power to the unit.

The ac outlet that powers the GT 128 should not be under switch control. If possible, it should be part of the same ac circuit that powers the DTE that is connected to the product. Having the GT 128 and the DTE on the same ac circuit prevents large circulating currents caused by differences in ground potential. If you cannot determine whether both devices are connected to the same circuit, verify that the potential difference between the grounding circuits of the respective power outlets is no more than 0.25 V rms.

Business Equipment Connection

The rear panel universal DTE DB-25 connector, labeled Business Equipment (see Figure 2-2), supports either X.21 or V.35 interface connection as selected by the X1 and X2 jumpers. The connector pinouts for the two applications are detailed below.

Table 2-2 Business Equipment (DTE) Interface Signals (ITU-T V.35)

J1 (DB-25) Pin (See Note 1)	V.35 (ISO 2593) Pin (See Note 2)	ITU-T (See Note 3)	NTU	Signal	Description
1	A	101		No Connection	
7	B	102		Signal ground	Establishes a common ground reference for all interface circuits.
4	C	105	RS	Request-to-send	Indicates to GT 128 that DTE is prepared to transmit.
5	D	106	CS	Clear-to-send	Indicates to DTE that GT 128 is prepared to transmit.
6	E	107	DM	Data Set Ready	Indicates to DTE that GT 128 is operational.
8	F	109	CO	Received line signal detector (Carrier On)	Indicates to DTE that GT 128 is receiving data (not idle or OOS codes).
25	NN	142	TM	Test mode	Indicates to DTE that GT 128 is in a test mode.
18	J	141	LLE	Line loopback enable	Transfers signal from DTE to control Line Loopback test mode if option switch S18-1 is ON.
2 14	P S	103 103	SD-A SD-B	Transmitted data	Transfers data signals from DTE to GT 128 for transmission over communications line.
3 16	R T	104 104	RD-A RD-B	Received data	Transfers data signals received over communication line by GT 128 to DTE.
17 9	V X	115 115	RT-A RT-B	Receiver timing	Transfers receiver signal timing information from GT 128 to DTE.
15 12	Y AA/a	114 114	ST-A ST-B	Transmitter timing	Transfers transmitter signal timing information from GT 128 to DTE.

(Sheet 1 of 2)

Table 2-2 Business Equipment (DTE) Interface Signals (ITU-T V.35) (Continued)

21	BB/b	140		Remote Digital Loopback test enable	Transfers signal from DTE to control Remote Loop-back test mode if option Switch S18-1 is ON and the LTU is an RDL-version.
20	H	108/2	TR	Data Terminal Ready	Indicates to GT 128 that DTE is prepared for data communication.

(Sheet 2 of 2)

- Notes**
1. Unlisted DB-25 pins are not used.
 2. V.35 interface requires use of adapter cable 027H579 or 027H572.
 3. ITU-T designations are shown for reference only.

Table 2-3 Business Equipment (DTE) Interface Signals (X.21)

J1 DB-25 Pin	15-Pin X.21 Connector*	ITU-T Circuit Designation	Signal	Description
2 14	2 9	T(A) T(B)	Transmitted data	Data from DTE.
3 16	4 11	R(A) R(B)	Received data	Data to DTE.
4 20	3 10	C(A) C(B)	Control	Indicates to DSU that DTE is prepared to transmit.
5 6	5 12	I(A) I(B)	Indication	Indicates to DTE that DSU is receiving data.
15 12	6 13	S(A) S(B)	Signal element timing	Transmit and receive signal timing information from DSU to DTE.
7	8	G	Ground	Common electrical reference

* DB25 to DB15 adapter cable, part # 027H448-005, -010, or -025 needed for X.21 compatibility.

Line Connection

The rear panel 8-position modular jack, labeled Line (see Figure 2-2), supports network connection. The jack conforms to the ISO 8877 standard. Its connector pinouts are detailed below.

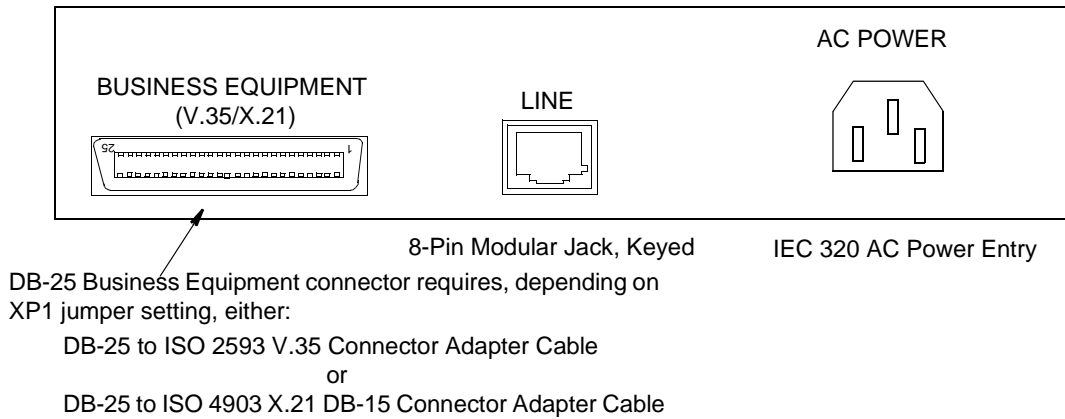


Figure 2-2 GT 128 Rear Panel

Table 2-4 Line Interface Signals

8-Position Modular Jack Pin No.	Signal
1	Not Used
2	Not Used
3	Not Used
4	Tip or Ring
5	Ring or Tip
6	Not Used
7	Not Used
8	Not Used

Operation

When the GT 128 is properly installed, control is automatic. It has no operating instructions (except for test procedures given in [Chapter 3, Tests](#)). This chapter describes the controls and indicators of the unit that are used to check the operation of the GT 128.

This chapter also lists options that are set by means of a GDC Network Manager. When the GT 128 is used in an unmanaged system, those options remain at their default settings.

Indicators and Controls

[Table 2-5](#) illustrates the GT 128 front panel and explains the function of each indicator and control.

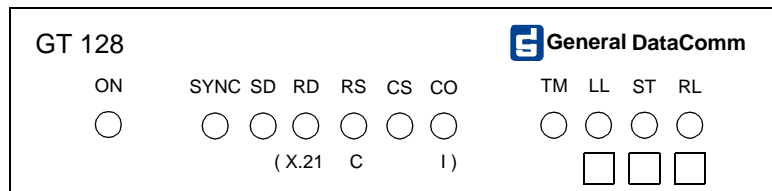


Table 2-5 GT 128 indicators and Controls

Indicators		Controls	
ON	Lit while the on-board power supply is functioning and providing +5 Vdc.	LL	Local Loop momentary pushbutton and LED. Loops the channel's received data back toward the network; loops the channel's transmit data back toward the DTE.
SYNC	Lit while the 2B1Q link is established and in sync.	ST	Self Test momentary pushbutton and LED. When this function is active the GT128 generates and checks a 2047 diagnostic data pattern. The GT 128 indicates detected errors by causing the TM LED to blink off.
SD	Send Data. Blinks on each time a 0 is sent to the network in the transmit data stream.	RL	Remote Loop momentary pushbutton and LED. Causes the GT 128 to send a loopback code to its remote, commanding the remote to loop received data back to the GT 128. The loopback code is selectable by means of a network manager to be either PN127 (default) or V.54.
RD	Received Data. Blinks on each time a 0 is detected in the receive data stream from the network.		
RS/C	Request to Send/Control. Lit while RS/C to the GT128 is active (either received from the DTE or forced on by option selection).	TM	Test Mode LED is lit while any test function is active.
CS	Clear to Send. Lit while CS to the DTE is on.		
CO/I	Carrier On/Indicator. Lit while CO/I to the DTE is on. Off during self test.		

Note Pressing a switch once activates the mode and lights the LED. Pressing it a second time turns the function off and the LED goes off.

Options

[Table 2-6](#) outlines the GT 128 options that are set by a SNMP network manager such as GDC's TEAM 600. The default settings shown in the table are in effect when the unit is installed and operated without network management. *Operation TEAM 600 for UNIX* (GDC Part No. 058R731-V300) contains instructions for using the TEAM 600 network manager.

Table 2-6 GT 128 Options

Options	Default	Description
Configuration		
DTE Rate	64000 bps	When 128 kbps is selected, 128 kbps data rate is configured for the channel. When 64 kbps is selected, the channel data rate is 64 kbps.
RTS Normal or Forced	Normal	When Forced, the RTS signal is forced On. When Normal, the RTS/CTS delay is determined by the RTS/CTS Delay option.
RTS CTS Delay	No Delay	Selects RTS to CTS delay in 5 ms increments, from 0 to 75 ms.
V.54 RDL	Enable	Enables or disables responding to an in-band loop-up pattern.
RDL Timeout	None	Selects 10 minute RL timeout. Timeout ends loopback initiated in response to received V.54 or PN127 code.
FP RDL Method	V.54	Selects the in-band code the unit can transmit to initiate a remote loopback. The selection also determines which code the unit recognizes as the command to go into loopback itself. (V.54/PN127 loop-up pattern)
Diagnostics (from Network Test Center)		
Operate 2B+D Loopback		This function directs the GT 128 to loopback the user-data (2B+D) bit stream toward the network.
Operate B1 or B2 Channel Loopback		This function directs the GT 128 to loopback an individual B-channel toward the network.
Diagnostics (from TEAM 600 Network Manager)		
B1 or B2 Channel Loopback		This function directs the GT 128 to loop back an individual B-channel toward the DTE interface.
B1 or B2 Digital Loopback		This function directs the GT 128 to loop back an individual B-channel toward the network.
B1 or B2 Remote Bi-lateral Loopback		This function directs the GT 128 to perform simultaneous Channel and Digital Loopbacks.
B1 or B2 Channel Self-Test		The channel has the ability to generate and check either a 2047 or a 511 test pattern. Errors are reported to the network manager and by flashing the front panel TM LED.

Overview

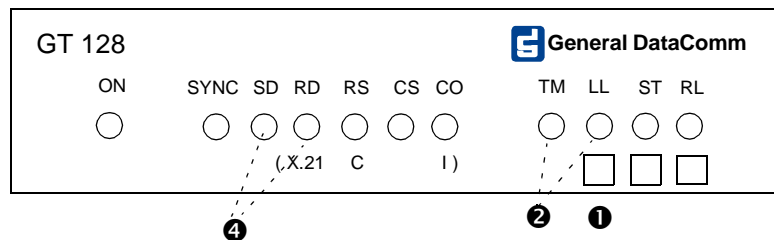
This chapter describes tests that can be performed from the front panel to isolate problems in the data communications system.

Point-to-Point Testing

Local Loopback Test

Local Loopback (LL) checks the performance of the GT 128 and its associated DTE (see [Figure 3-1](#)). The test disconnects the GT 128 transmitter output and receiver input from the communications line and connects them together. The resulting circuit, which is similar to an analog loopback, loops signals from the transmitter back through the receiver. The test signal sent through the Local Loopback can be supplied from the DTE or from test equipment connected to the DTE interface.

When a Local Loopback is initiated, received signals are also directed back over the communications line to the originating station where they can be checked for errors. This test checks the performance of the remote site's GT 128 and the communications line. To perform this test, arrange with the remote site personnel before initiating the Local Loopback test.



1. Press pushbutton LL.
2. TM and LL should light.
3. Initiate a test message from the DTE.
4. SD and RD LEDs light with transmit/receive data.
5. An exact copy of test message should be received at the DTE.

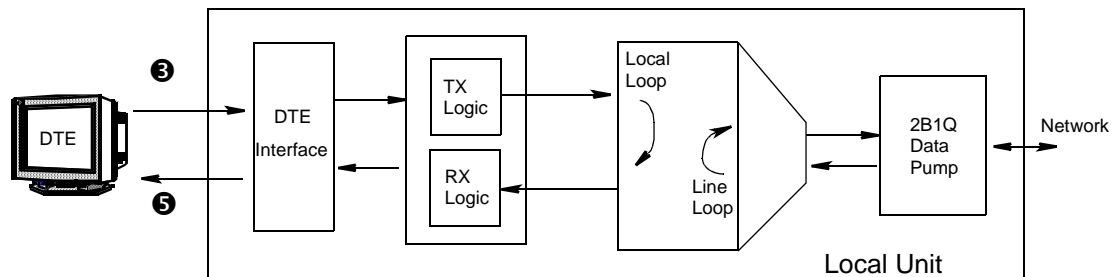


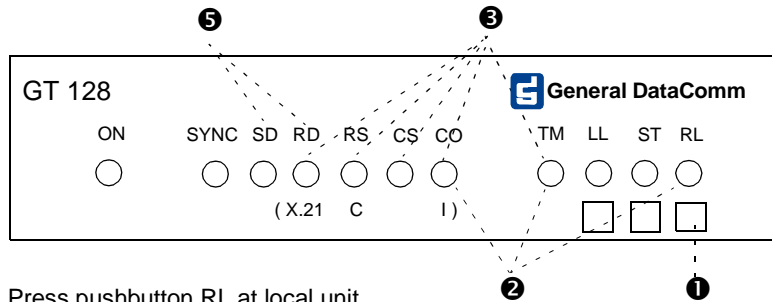
Figure 3-1 Local Loopback (LL) Test

Remote Loopback

Remote Loopback (RL) checks the performance of the local and remote units, the local DTE, and the communications path through the network (see [Figure 3-2](#)). When you initiate this test, the local unit transmits a loopback code that causes the remote unit to go into a Digital Loopback (DL) condition.

In Digital Loopback the remote unit's transmitter and receiver are disconnected from the DTE interface and connected together. The resulting circuit loops the receiver's digital output signals to the transmitter's input so that signals are returned to their source at the local unit where they can be checked for errors.

The test signal sent through the Remote Loopback can be supplied from the local DTE or from test equipment connected to the DTE interface of the local unit.



1. Press pushbutton RL at local unit.
2. At the local unit RL, CO and TM light.
3. At the remote unit RD, RS, CS and CO are OFF and TM is lit.
4. Initiate a test message from the DTE.
5. SD and RD blink at the local unit.
6. An exact copy of the test message should be received at the originating DTE.

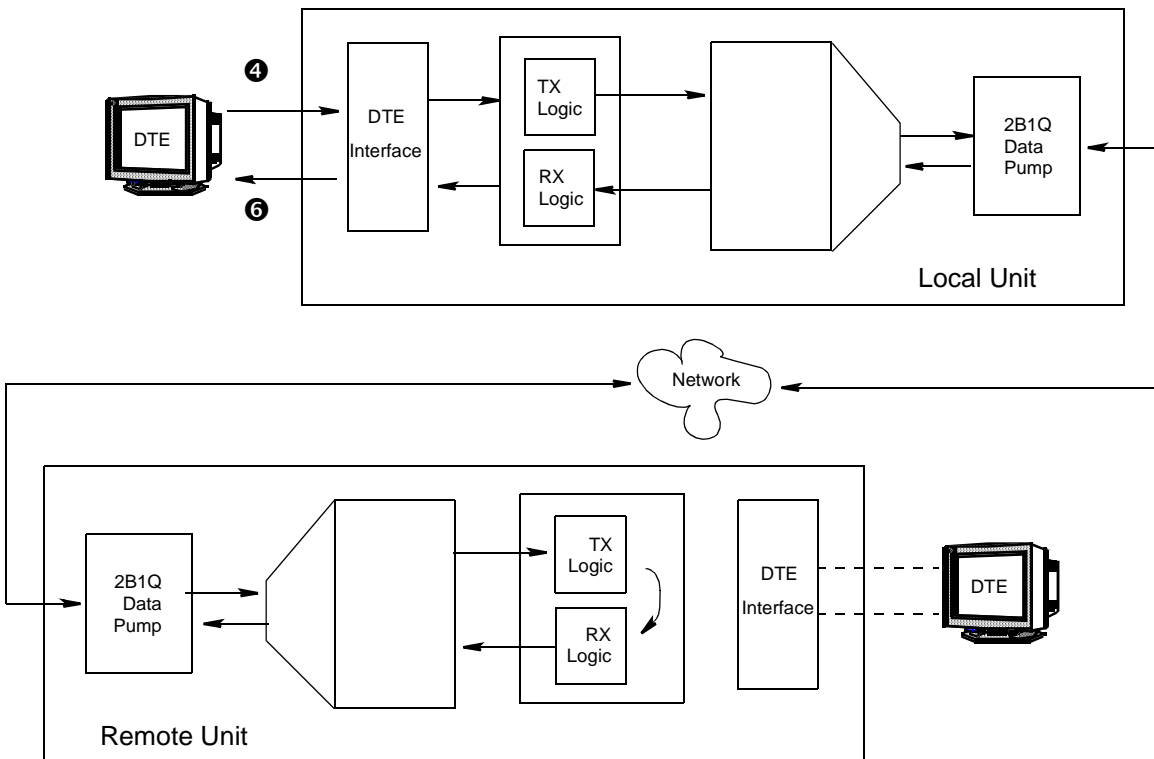


Figure 3-2 Remote Loopback Test

Keep in mind when performing GT 128 Remote Loopback tests that the code is interpreted, and the loopback is performed, by the GT 128 at the far end of the network (See [Figure 3-3](#)). The line interface and drop-side interface units at each site pass the loopback code through without taking action in response to it.

The GT 128 can be configured to send either a PN127 or a V.54 Remote Loopback code.

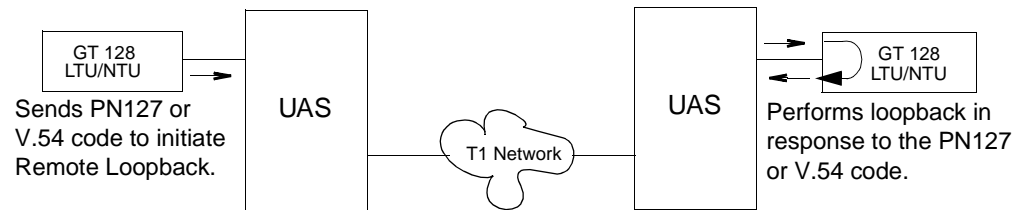
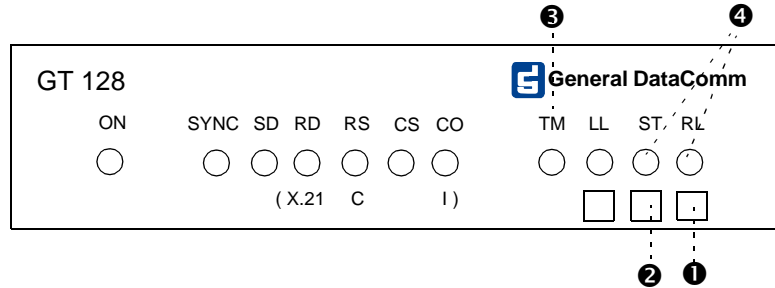


Figure 3-3 Remote Loopback Code Interpretation

Remote Loopback Self Test

In a Remote Loopback Self Test the diagnostic data directed through the remote digital loopback is generated and checked by the GT 128 rather than by an external device (see [Figure 3-4](#)).



1. Press pushbutton RL at local unit.
2. After TM lights, press ST on local unit.
3. TM should be lit during the test; it blinks OFF each time an error is detected in the Self Test signal. If the local TM turns OFF frequently, there may be a problem in the local unit, the remote unit or the communications line.
4. End the test by disengaging ST then RL at the local unit.

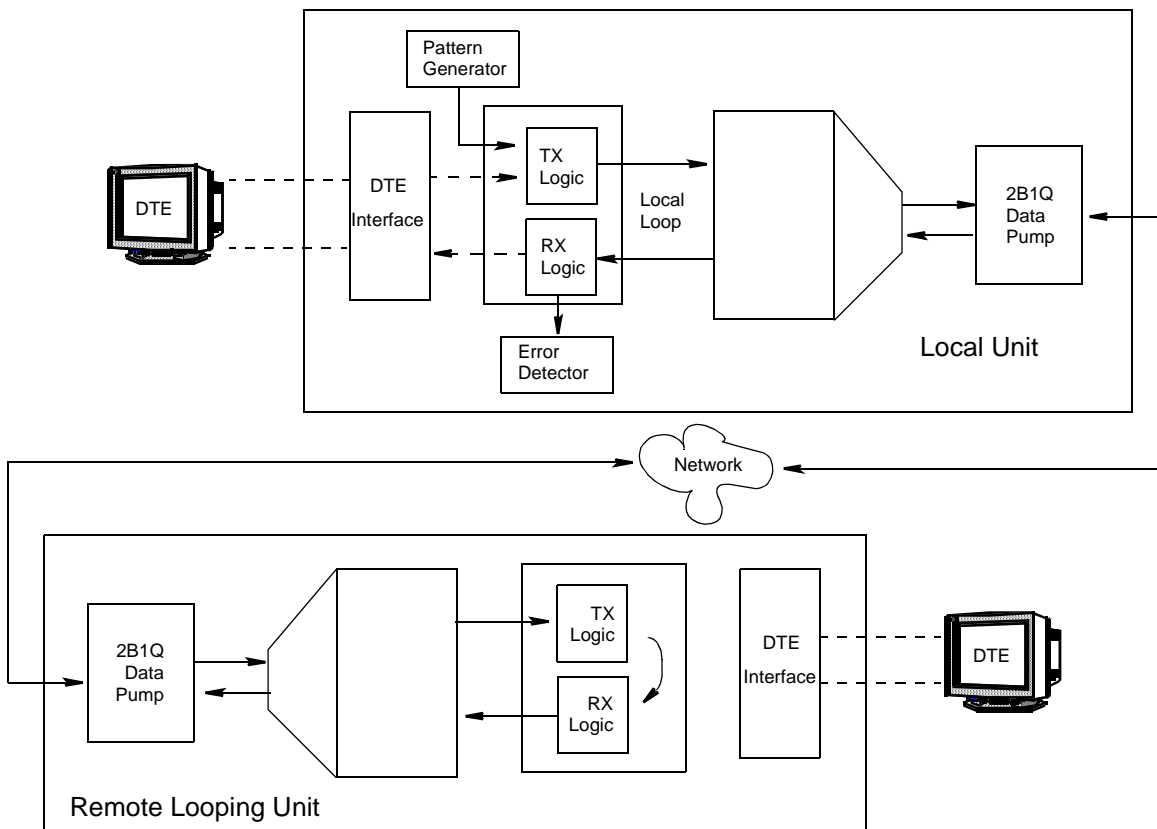
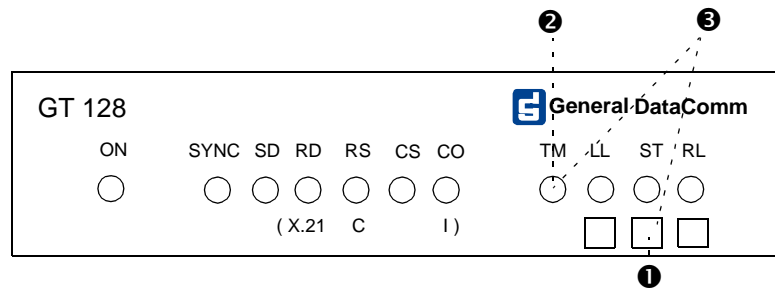


Figure 3-4 Remote Loopback Self Test

End-to-End Self Test

In addition to using the Self-Test function in conjunction with other test features, Self-Test may be used independently. In this test, the local and remote units exchange diagnostic data between their respective test circuits to check the performance of the communications line and the local and remote units (not including the DTE interfaces). To perform End-To-End Self-Test, proceed as shown in *Figure 3-5*.



1. Press pushbutton ST at local unit. Ask attendant at the remote unit to press ST.
2. TM should be on during the test. If the local TM turns OFF frequently, there may be a problem in the local unit, the remote unit or the communications line.
3. End the test by disengaging ST at both the local and remote units. The TM LED should be OFF.

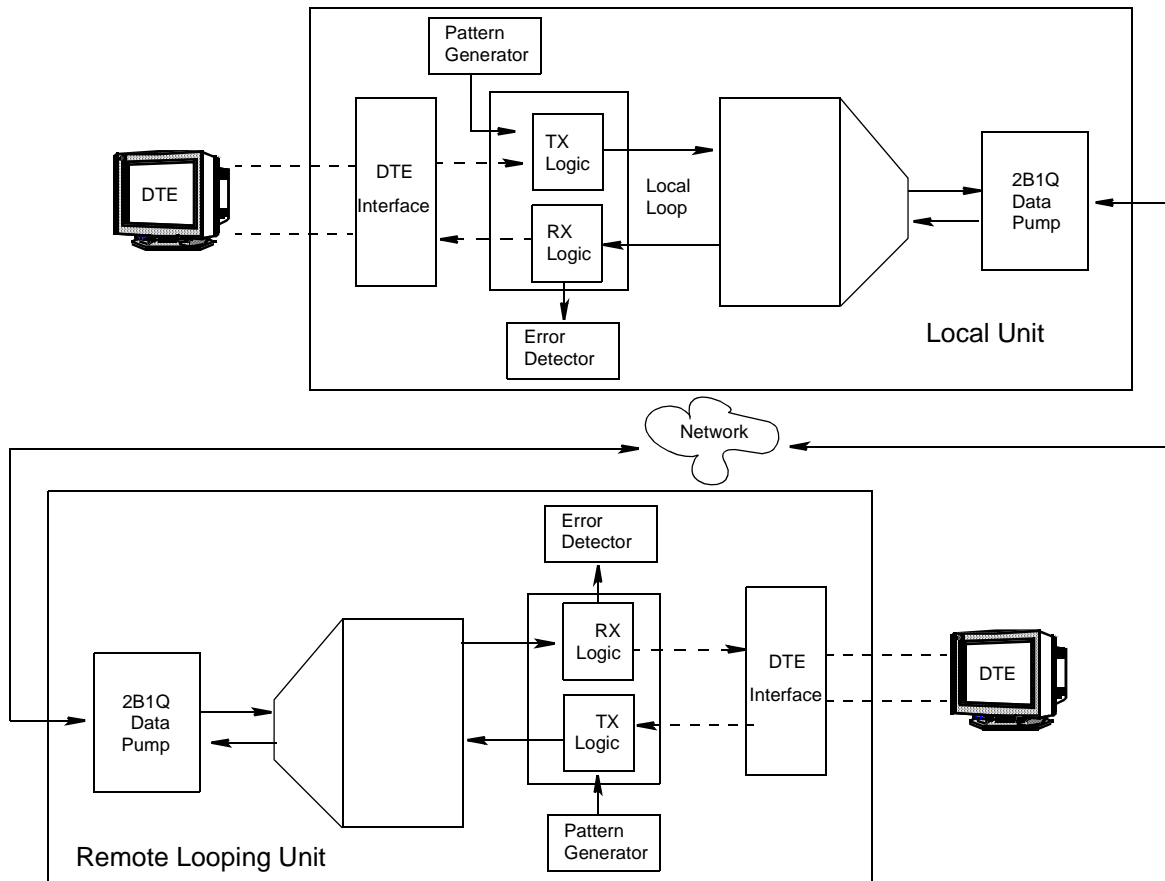


Figure 3-5 End-to-End Self Test

