

GDC 072R120-000  
Issue 2, April 1997

Installation and Operation

# Universal Access System 611

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## **Warning**

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

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

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

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General DataComm warrants that its equipment is free from defects in materials and workmanship. The warranty period is one year from the date of shipment. GDC's sole obligation under its warranty is limited to the repair or replacement of the defective equipment provided it is returned to GDC, transportation prepaid, within a reasonable period. This warranty will not extend to equipment subjected to accident, misuse, or alterations or repair not made by GDC or authorized by GDC in writing. *The foregoing warranty is exclusive and in lieu of all other warranties, express or implied, including but not limited to, warranties of merchantability and fitness for purpose.*

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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 state-ments 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 Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. 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. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). 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 made by an authorized Canadian maintenance facility 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. *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.

Registration Status	Port ID	SOC	FIC	USOC

# Preface

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## Scope

This manual describes how to install and configure a General DataComm Universal Access System (UAS) 611 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 four appendices. The information is arranged as follows:

- *Chapter 1 - System Description* introduces important concepts and features of the UAS 611.
- *Chapter 2 - Installation* tells you how to install the UAS 611. Only typical or fundamental applications are given because of the variety of specific customer system choices.
- *Chapter 3 - Operation* describes the front panels of the UAS 611.
- *Chapter 4 - Tests* describes front panel and external tests.
- *Appendices A, B, C, and D* - Cover four types of interface signals.

The *Index* contains the UAS 611 subject and page number.

## 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 DataComm 610/612 (NTU)*

GDC 072R114-000

**GDC 072R120-000**

- *Operating and Installation Instructions for SpectraComm Manager Card* GDC 048R303-000
- *Operating and Installation Instructions for SpectraComm Shelf* GDC 010R302-000

GDC publication numbers (e.g., *GDC 032R163-000*) are used to track and order technical manuals. Publication numbers use the following format:

**GDC NNNRnnn-000 or GDC NNNRnnn-Vnnn**

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

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

## 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.

### **BERT**

Bit Error Rate Test, or tester.

A Binary Synchronous Communications protocol (BISYNC) that uses special characters to define the various fields of a message and for control functions. Typically used for transmission between a CPU and a CRT or batch-type processor. BISYNC accommodates a variety of transmission codes including ASCII, EBCDIC, and SBT (Six-Bit Transcode).

### **Bit**

A binary digit, the representation of a signal, wave, or state, as either a binary zero or a one.

### **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; basic unit of measure for serial data transmission capacity; also kbps (kilobits) for thousands of bits per second; Mbps (megabits), for millions of bits per second; Gbps (gigabits) for billions of bits per second; Tbps (terabits) for trillions of bits per second.

**Channel**

Part of a circuit path through several entities in a communication system. A channel runs between two nodes.

**Data**

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

**Data Communications**

Transmitting and receiving coded digital signals between computers or other digital devices or systems according to agreed upon specifications or standards.

**Data Terminal Equipment (DTE)**

Generally end-user devices, such as terminals and computers that connect to DCE, which either generate or receive the data carried by the network; in ITU-T V.24/V.28 connections, designation as either DTE or DCE determines signaling role in handshaking; in a ITU-T X.25 interface, the device or equipment that manages the interface at the user premises.

**Diagnostics**

Tests used to detect malfunctions in a system or component.

**EPROM**

Erasable Program Read-Only Memory. Memory chip for storing programs or applications software that you can erase and reload with new software.

**Link**

The combination of communications devices, media and software intelligence that is required to effect data communications.

**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.

**LTU**

Line Terminating Unit. The equipment that terminates the access line at the network end.

**MIB**

Management Information Base.

**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.

**NTU**

Network Terminating Unit. The equipment that terminates the access line at the customer end.

**Point-to-Point**

A circuit that connects two points directly, with generally no intermediate processing nodes or computers, although there could be switching facilities; a type of connection, such as a phone-line circuit, that links two, and only two, logical entities.

**RD**

Receive Data.

**SD**

Send Data.

**Self-Test**

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

**SNMP**

Simple Network Management Protocol. The Internet standard protocol, defined in RFC 1157 developed to manage nodes on an IP network.



# 1 System Description

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## UAS 611 LTU Features

If you have training and/or experience installing and operating network or communications products and are interested in learning about the UAS 611 Line Terminating Unit, this manual is for you. Here are the things that the 611 can do:

- Supports a single channel (2.4 Kbps to 128 Kbps) of customer data on a two-wire 2B1Q loop circuit.
- May be optioned via on-board hardware switches or software commands as a Network Managed Element in a GDC Network Management System.
- Supplies on-board ITU-T V.35 and ITU-T V.24/V.28 DTE interfaces.
- Performs ANSI B1, B2, and ITU-T V.54 loopbacks.
- Supports internal, external, and slave (network) timing.
- Routes configuration and control commands from a SCM to a DC 600 series tail-circuit.

## Product Description

The UAS 611 is a single channel line terminating unit. It is compatible with ANSI T1.601-1992 line coding requirements and has an operating range of up to 18,000 feet (5.5 Km) over two-wire, 26 gauge (0.4 mm) line. You can choose on-board V.35 or V.24/V.28 interfaces through berg-style jumpers. Also available to you are optional EIA-530 and ITU-T X.21 interface cards. You can configure the 611 by base card option switches, or by remote control using SNMP commands in a GDC network management system with an HP OPENVIEW/PC Manager.

## Applications

*Figure 1-1* shows a typical point-to-point application. In this application, the 611 and 621 network elements are configured and controlled by a SCM.

## Technical Characteristics

<b>CPE Interface</b>	
Data Rates	2400 - 128 Kbps Synchronous, 2400-19200 Asynchronous.
Interface Types	EIA - 530                      ITU-T V.35, V.24/V.28, X.21
<b>Network Interface</b>	
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
Line Requirements	2-wire, non-loaded metallic circuit
Operating Range	5.5 Km (18,000 ft.) — with 0.4 mm (26 AWG) wire
<b>Diagnostics with 26 AWG Wire</b>	
Network	Generates: B1 loopback B2 loopback
Customer	ST, LL, RL (front panel or Network Manager)
<b>Physical Characteristics</b>	
Dimensions	Height: 0.8 in. (27 mm) Width: 7.0 in. (178 mm) Depth: 9.5 in. (241 mm) Weight: 10 oz. (0.28 Kg) Shipping Weight: 1 lb. 10 oz. (0.74 kg)
Power	+5 Vdc - 500 mA (700 mA w/EIA 530) +12 Vdc - 20 mA -12 Vdc - 20 mA Load Number = 0.5 (0.7 w/EIA 530)
Sealing Current	4.5 mA nominal
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

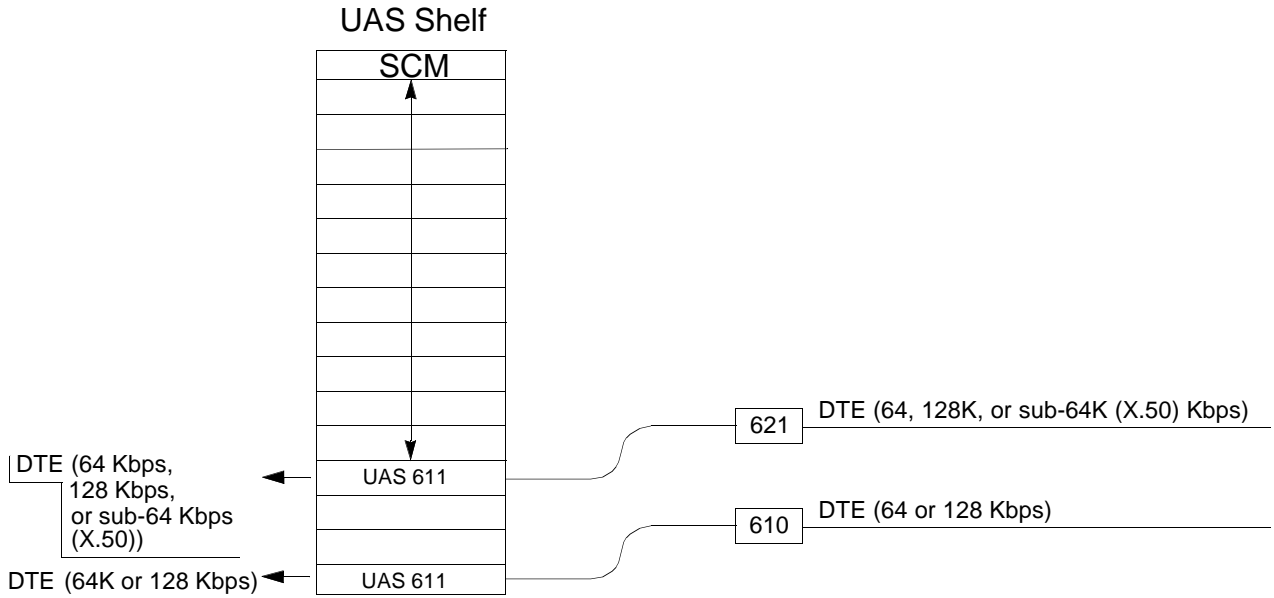


Figure 1-1 Point-to-Point Applications

### Diagnostics

Built-in diagnostic circuits of the 611 LTUs allow quick and thorough performance tests: standard ANSI loopbacks, V.54 compliant Remote Loopback (RL) and Self-Test. Self-Test has a pattern generator and receiver, and eliminates the need for external test equipment. Built-in RL allows looping of data from a remote site to the place of origin.

## Equipment List

Refer to Table 1-1 for components that may be used in your UAS 611.

**Table 1-1** Equipment List

Description	GDC Part No.
UAS 611 LTU	048P124-001
<b>Enclosures</b>	
NR Domestic	010M043-001
NR Export	010M043-002
<b>UAS Shelf</b>	
For shelf and part number information, refer to <i>GDC Manual UAS Shelf Publication Number 010R302-000</i> .	
<b>Cables</b>	
You can order GDC cables in a variety of lengths, including custom lengths. When ordering cables, be sure to include the basic numbers and also the desired lengths.	
50-Pin Amp to six 8-position modular connectors	024H608-xxx*
Male DB-25 to Male DB-25 (ITU-T V.24/V.28)	028H502-xxx*
34-pin male to 34-pin male (ITU-T V.35)	027H516-xxx*
*Refer to Chapter 2 for figures and cable pin-outs	
<b>Optional Equipment</b>	
X.21 Interface Card	048P085-001
EIA-530 interface Card	048P042-001
Male DB-25 to Female DB-15 adapter cable (ITU-T X.21)	027H436-001
Male DB-25 to male V.35 adapter cable	027H572-001

# 2 Installation

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## Overview

This chapter shows you how to install and use the UAS 611 LTU in your communications network. If this is your first time with the 611 LTU, *refer to Chapter 1* so that you understand the key features of the unit and how to install and work with the module in your network.

## Unpack and Inspect Unit

Inspect the UAS 611 LTU for damage; if you see any, notify the shipper immediately. Save the box and packing material for future use.

## Install Shelf and Unit



*Be sure to install shelves and power supplies as described in the UAS Shelf manual. If you don't, there would be overheating and power supply shutdown.*

To install the UAS Shelf, *refer to Installation and Operation Instructions for UAS Shelf, GDC Pub. No. 010R302-000.*

You install the UAS 611 LTU basecard in the UAS Shelf, where all electrical connections are made through backplane interface. Place unit 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).

## Install Module

You can install the 611 LTU module in any unused slot in the shelf having Zone 1 connectors needed for the network. To install the 611 LTU in the shelf:

1. With the GDC logo on top, insert the module into its slot, then slide it in until it makes contact.
2. Pull down the ejector tab and firmly push the module in until it seats in the rear connectors.

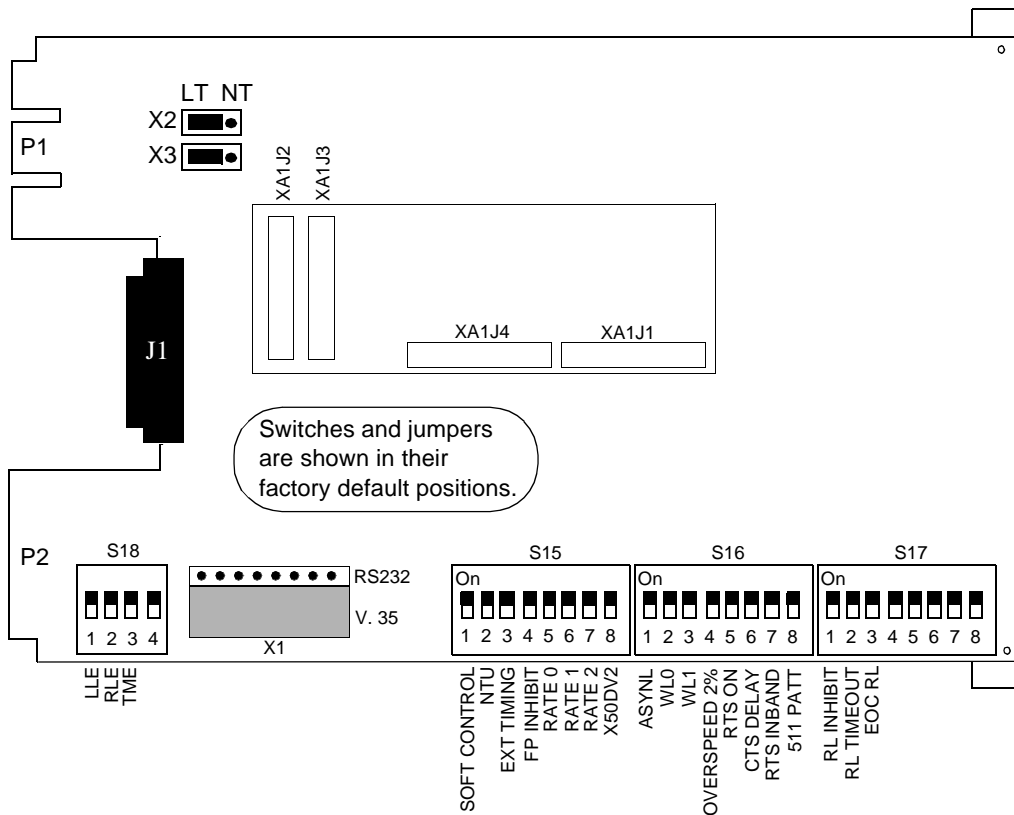
*Table 2-1* gives you switch selections and *Figure 2-1* shows the location of those switches and jumpers on the basecard.

**Table 2-1** Option Selection

S15	1	SOFT CNTRL	HARD/SOFT CONTROL: When set for hard control, the unit is configured from the hard switches. When set for soft control, the unit is configured by software commands from a network manager. Default is HARD.																																				
	2	NTU	LTU/NTU MODE: Puts unit into Line or Network Termination handshake and operation mode. Default is LTU.																																				
	3	EXT TIMING	INT/EXT TRANSMIT CLOCK: Selects master transmit clock source as INTERNAL or EXTERNAL. When set for internal, unit generates the transmit clock timing from an on-board crystal. When set for external, the unit uses the XTC from the local DTE as the timing source. Default is INT.																																				
	4	FP INHIBIT	INHIBIT/ENABLE FRONT PANEL: When set for FP inhibit, the front panel switches are disabled and no front panel diagnostics can be conducted until FP is enabled again. Default is FP enabled.																																				
	5	RATE 0	RATE 0-2 (3-bits): These bits set the DTE data rate. Rates below 64 Kbps automatically enable X.50 rate adaption. Default is 64 Kbps.																																				
	6	RATE 1																																					
	7	RATE 2																																					
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On	Off	Off	128.0																																				
Off	Off	Off	64.0																																				
8	X50 DV2	DIV2/DIV3 X.50: Valid when DTE rate is below 64Kbps. Selects between X.50 DIVision 2 and X.50 DIVision 3 standards. Default is DIV3.																																					
S16	1	ASYNCR	ASYNCR/SYNCR MODE: Set to ASYNCRonous for async DTE or SYNCRonous for synchronous DTE. Default is SYNCR.																																				
	2	WL0	ASYNCR WORD LENGTH 0-1 (2-bits): Valid for ASYNCR mode only. These bits set the word length including start and stop bits. Default is 10 bits.																																				
	3	WL1																																					
				<table border="0"> <thead> <tr> <th><u>0</u></th> <th><u>1</u></th> <th><u>LENGTH</u></th> </tr> </thead> <tbody> <tr> <td>On</td> <td>On</td> <td>8 bits</td> </tr> <tr> <td>Off</td> <td>On</td> <td>9</td> </tr> <tr> <td>On</td> <td>Off</td> <td>11</td> </tr> <tr> <td>Off</td> <td>Off</td> <td>10</td> </tr> </tbody> </table>	<u>0</u>	<u>1</u>	<u>LENGTH</u>	On	On	8 bits	Off	On	9	On	Off	11	Off	Off	10																				
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Off	On	9																																					
On	Off	11																																					
Off	Off	10																																					
4	OVERSPD 2%	ASYNCR 1%/2.3% OVERSPEED: Valid for ASYNCR mode only. Selects the amount of overspeed for 1% (1 bit in 8 characters max.) or 2.3% (1 bit in 4 characters max.). Default is 1%.																																					

**Table 2-1** Option Selection (Cont.)

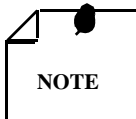
<b>S16</b>	5	RTS ON	NORM/FORCED RTS: When set to forced, the unit forces RTS on regardless of the state of the RTS lead from DTE. When set to NORMal the RTS lead from the DTE is monitored by the unit. Default is NORM.
	6	CTS DELAY	DELAY/NO DELAY CTS: When set to delay, the unit delays CTS ON to DTE by 45 ms. When no delay is set, CTS follows RTS. Default is NO DELAY.
	7	RTS INBAND	INBAND/NORM RTS: When set to inband, the unit sends the RTS signal from the local DTE to the far-end over the D-channel to be used as DCD. When set to NORMal, the RTS is not sent to the far-end and DCD follows carrier. Default is NORM.
	8	511 PATT	511/2047 TEST PATTERN: Selects between 511 and 2047 self-test patterns for pattern generation and detection. Default is 2047.
<b>S17</b>	1	RL INHIBIT	V.54 RL respond Inh/Ena: When set to inhibit the unit does not respond to V.54 loopback codes receive over the 2B1Q network. When set to one, the unit responds: Default is V.54 RL. Respond enabled.
	2	RL TIMEOUT	TIMEOUT/NO TIMEOUT REMOTE LOOP: When set to timeout, the unit breaks the data loop 10 minutes later. When set to no timeout, the unit maintains the data loop until it is terminated by the master end. Default is NO TIMEOUT.
	3	EOC RL	V.54/EOC REMOTE LOOP PATTERN: Selects between V.54 or EOC type, remote-loop generation and detection patterns. Default is V.54.
<b>S18</b>	1	Local Loopback Enable	When ON, a local loopback may be controlled by the DTE (Pin 18 of the ITU-T V.24/V.28 interface or Pin J of the V.35 interface). When OFF, the LL test is not under DTE control.
	2	Remote Loopback Enable	When ON, a remote loopback (towards the DTE) may be controlled by the DTE (Pin 21 of the ITU-T V.24/V.28 interface or Pin BB of the V.35 interface). When OFF, the RL test is not under DTE control.
	3	Test Mode Enable	When ON, the NTU signals a test condition to the DTE (Pin 25 of the ITU-T V.24/V.28 interface or Pin K of the V.35 interface). When OFF, no test mode indication is given to the DTE.
<b>X1</b>		V.35/232	When V.35, the on-board DTE interface is configured for V.35 operation. When RS-232, the on-board DTE interface is configured for V.24/V.28 operation.
<b>X2, X3</b>		LTU/NTU	When LTU, the UAS 613 sources sealing current to the U-loop. When NTU, the UAS 613 sinks sealing current from the U-loop.



**Figure 2-1** Option Switch and Jumper Locations, Basecard

## Electrical Connections

The following paragraphs describe the power line and communications line connections to the UAS 611.



*Before applying power to the unit, check that the edge connectors on the rear panel of the card are inserted firmly in their receptacles, which are mounted on the rear panel of the UAS shelf.*

### Power Line

The 611 LTU gets its power directly from the UAS Shelf.

### Communications Line

Each cable can support six UAS 611 LTUs. See Figures 2-2 and 2-3, and refer to Table 2-2 for cable connectors and cable pin-outs.



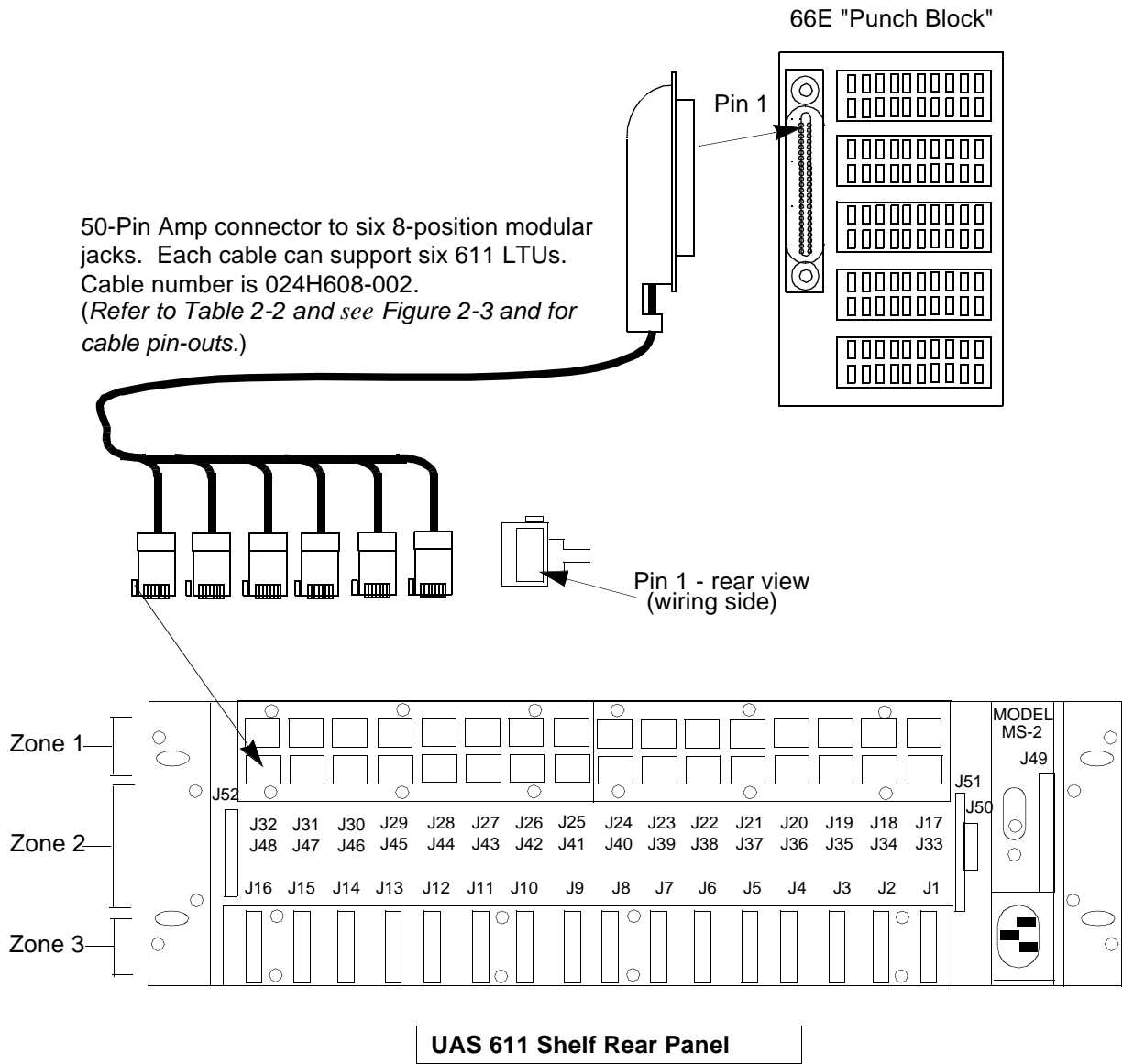


Figure 2-2 UAS 611 to Network 66E Block (Zone 1)

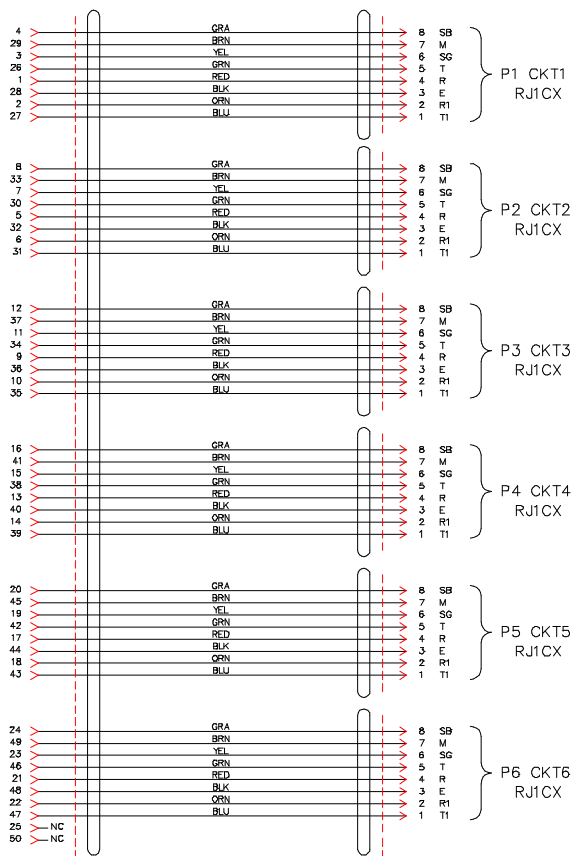
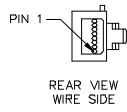
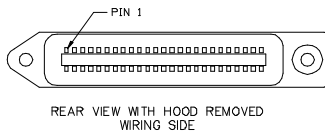
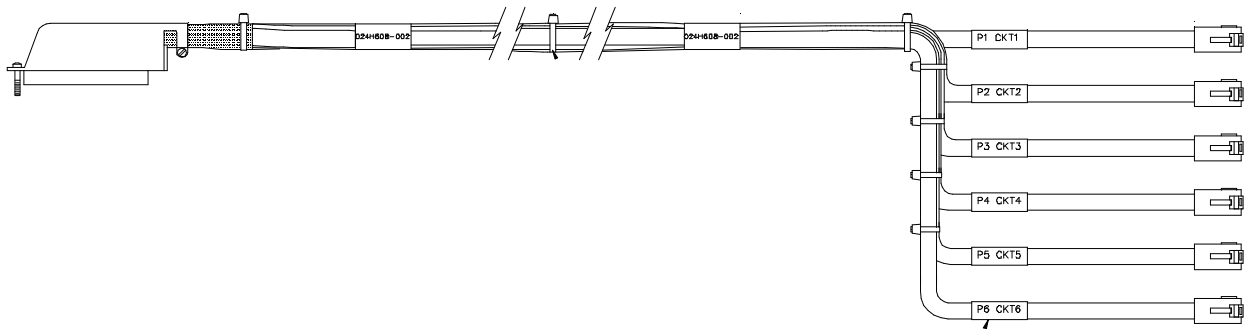


Figure 2-3 50-Pin Amphenol to Six 8-Position Modular Jacks

(GDC Part No. 024H608-002)

**Table 2-2** Pin-Outs for Cable No. 024H608-002

50-Pin Amp		8-Position Modular		
3	28			
2	27			
1	26	P1	Loop 1	4, 5
4	29			
7	32			
6	31			
5	30	P2	Loop 2	4, 5
8	33			
11	36			
10	35			
9	34	P3	Loop 3	4, 5
12	37			
15	40			
14	39			
13	38	P4	Loop 4	4, 5
16	41			
17	44			
18	43			
17	42	P5	Loop 5	4, 5
20	45			
23	48			
22	47			
21	46	P6	Loop 6	4, 5
24	49			
25	50			

## Business Equipment

You can make business equipment connections to the UAS 611 using cables shown in *Table 1-1, Chapter 1, System Description*. Cable selection depends on the shelf that you ordered.

## 530 or X.21 Interface Card Connections

Optional 530 or X.21 interface cards provide these interfaces for the DTE and can be factory installed, or you can get them as a field upgrade kit. They plug into the base card as illustrated in *Figure 2-2*. (You can also remove the card(s) and place jumpers on XA1J2 and XA1J3 to make the base card interface active.) When you install the optional 530 or X.21 interface card in the active position, DTE control of Remote Terminal Test and Local Loopback are not supported.

*Appendixes A through C* describe the signals exchanged through each of the business equipment interfaces.

## Make Pre-Operational Check

### Setup (Hard)

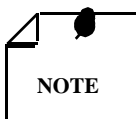
Configure hardware jumpers and switches as follows:

1. Start with all switches (S15, S16, and S17) in the Off position.
2. To set LTU operation, place Jumpers X2 and X3 in the LT position and verify that S15-2 is Off. If internal system clock of the 611 is the source of DTE signal timing, verify that S15-3 is Off. Place S15-3 On, if the DTE is the source of signal timing. If the DTE data rate is 64 Kbps, verify that S15-5, S15-6, and S15-7 are Off. Place S15-5 On and place S15-6 and S15-7 Off if the DTE data rate is 128 Kbps.
3. To set NTU operation, place Jumpers X2 and X3 in the NT position and verify that S15-2 is On. If the clock derived from the 2-wire U-loop is the source of DTE signal timing, verify that S15-3 is Off. Place S15-3 On, if the DTE is the source of DTE signal timing. If the DTE data rate is 64 Kbps, verify that S15-5, S15-6, and S15-7 are Off. Place S15-5 On and place S15-6 and S15-7 Off, if the DTE data rate is 128 Kbps. (Note that with S15-3 On in NTU operation, short bursts of data errors may occur.)

### Setup (Soft)

1. Set S1-1 to On and verify that all jumpers (X2 and X3) are in the LT position.
2. Install the 611 in the desired location in the shelf and do a LL test on the loop. Use an external BERT to verify the unit, and if desired, the entire loop.
3. If the 611 does not test properly, replace it with a spare if available. Repeat test.
4. Do not attempt to repair the unit. Contact service for repair authorization.

The Network Management system employs a slot-line-drop method for addressing. Slot address is determined by the position of the unit in the shelf.



*If you ever change the 611 firmware, the EPROM containing the configuration of the unit is automatically erased and you have to reassign the unit, using the new serial number.*

# 3 Operation

## Overview

Figure 3-1 depicts the UAS 611 front panel and explains the function of each control and indicator. You may check unit operation by monitoring the front panel indicators and using the test procedures covered in Chapter 4.

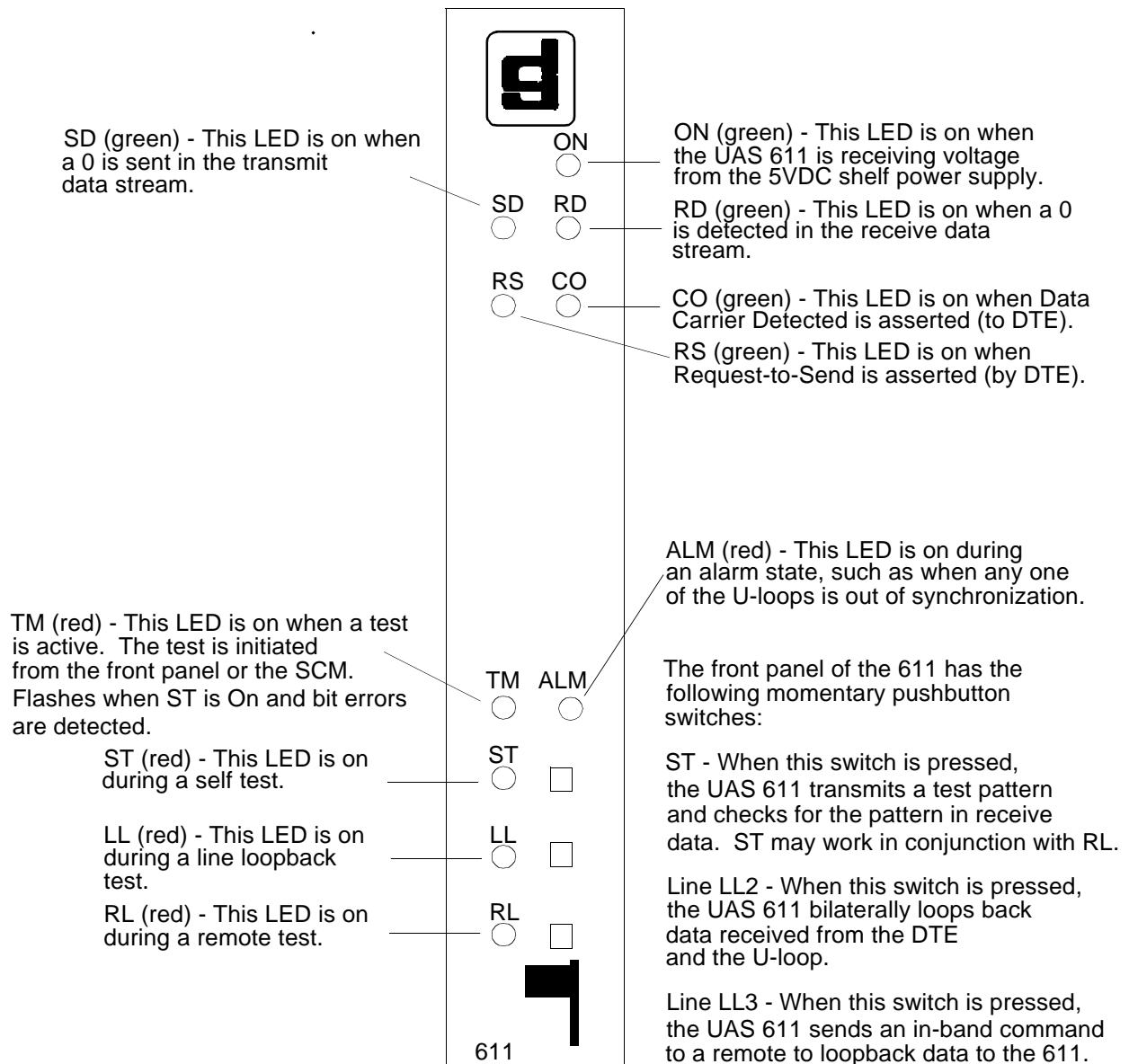


Figure 3-1 Front Panel for the 611

## Network Management

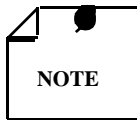
You can use the UAS 611 as a Network Managed element when set up in a GDC Network Management System. *Refer to SpectraComm Manger Card publication listed in the Preface.*

Tables 3-1 through 3-9 list and describe the MIB objects so that an SNMP network manager can configure, control, and monitor UAS 611.

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 depends on the network manager or MIB browser. Information in these tables is therefore intended to accompany the operating instructions for the manager or browser.



**NOTE**

*Many SNMP network managers and MIB browsers automatically perform a Get-operation immediately following a Set-to-an-object to let you have read-write access, thus, confirming write operation success. If your manager or browser does not handle this function automatically, then command a Get for each object you Set.*

**Table 3-1** What Are You

MIB Object	Syntax	Access	Enumeration	Description
What Are You Index	SCInstance	Read-only		Identifies UAS 611. What Are You Table.
Code Rev	Display String	Read-only	(SIZE (4))	Returns the firmware code level; for example: "A-, B- "
Alarm Status	Octet String	Read-only	(Size (1-255))	Current alarms of the unit without alarm masks.
DTE Card Type	Integer	Read-only		Returns the plug-in DTE card type.

**Table 3-2** Configuration

MIB Object	Syntax	Access	Enumeration	Description
Config Index	SC instance	Read-only		Unique index for Configuration Table.
Test Pattern	Integer	Read-write	Pattern 2047 (1) Pattern 511 (2)	Selects loop test pattern.
RDL Time-out	Integer	Read-write	No time-out (1) Time-out after 10 minutes (2)	Selects loop remote loopback time-out.
Resp RL	Integer	Read-write	Enable (1) Disable (2)	Selects loop remote loopback response.
DTE Data Rate	Integer	Read-write	2.4 KBps (1) 4.8 KBps (2) 9.6 KBps (3) 19.2 KBps (4) Future use (5) 48 KBps (6) Future use (7) Future use (8) 64 KBps (9) 128 KBps (10)	Options the DTE interface to a K-bit per second rate.
Master TXC Clock SRC	Integer	Read-write	Internal (1) External (2)	Option for the loop master transmit clock source.
Rate Adaption	Integer	Read-write	X50D/V 3(1) X50D/V 2(2)	Selects DTE rate adaption scheme.
DTE Operation	Integer	Read-write	Sync (1) Async (2)	Selects DTE mode of operation.
Word Length	Integer	Read-write	bitword 8(1) bitword 9(2) bitword 10(3) bitword 11(4)	Selects the word length for async operation.
Overspeed	Integer	Read-write	1 % (1) 2 % (2)	Selects overspeed for async operation.
RTS	Integer	Read-write	normal (1) forced (2)	Selects source of RTS.
RTSCTS Delay	Integer	Read-write	nodelay (1) 45msdelay (2)	Selects RTS-to-CTS delay.
DCD	Integer	Read-write	normal (1) inband RTS (2)	Selects source of DCD.
RDL Method	Integer	Read-write	V.54 (1) EOC (2)	Selects RDL method.

**Table 3-3** Diagnostics

MIB Object	Syntax	Access	Enumeration	Description
Diagnostics Index	SCInstance	Read-only		Unique index for Diagnostic Table.
Diagnostic Test	Integer	Read-write	(0..63)	Function chooses or reads the test. 0 = No test currently operating 1 = Remote loopback test 2 = Channel loopback test 4 = Data loopback test 8 = Self-test 16 = Line loopback test 32 = Terminate test All other values are test combinations, like 9 = Self-test and remote loopback.
Diagnostic Active	Integer	Read-only	Not Active (1) Active (2)	Represents test condition.
Diagnostic Results	Integer	Read-only	(0....16383)	Reads self-test results in bit errors.
Diagnostic Reset Error Count	Integer	Read-write	Normal (1) Reset (2)	Resets the self-test error count.

**Table 3-4** Alarm Config

MIB Object	Syntax	Access	Enumeration	Description
AlarmConfigIndex	SCInstance	Read-only		Unique index for Alarm Config Table
AlarmConfigIdentifier	Object Identifier	Read-only		Unique alarm identifier assigned to an alarm type
AlarmConfigIdentifier	Integer	Read-write	thresh1E-03 (1) thresh1E-04 (2) thresh1E-05 (3) thresh1E-06 (4)	Sets/reads the Major and Minor BER alarm thresholds



**Table 3-5** Control

MIB Object	Syntax	Access	Enumeration	Description
Control Index	SCInstance	Read-only		Unique index for Control Table
SoftReset	Integer	Read-write	normal (1) reset (2)	Forces a soft reset of the unit
EraseConfig	Integer	Read-write	normal (1) reset (2)	Erases stored configuration in unit
FrontPanel	Integer	Read-write	enable (1) disable (2)	Enables or disables front panel switches
LedStatus	Octet String	Read-only	Size (3)	<p>Front Panel LED enumeration; a value of 1 means ON, 0 is OFF.</p> <p>1.7 - not used 1.6 - not used 1.5 - not used 1.4 - Test mode 1.3 - Alarm transitions 1.2 - Self-test 1.1 - Line Loopback 1.0 - Remote Loopback</p> <p>2.7 - not used 2.6 - not used 2.5 - not used 2.4 - not used 2.3 - Send Data Transitions 2.2 - Recv Data Transitions 2.1 - Request to Send 2.0 - Data Carrier Detect</p> <p>3.7 - not used 3.6 - not used 3.5 - not used 3.4 - not used 3.3 - not used 3.2 - not used 3.1 - not used 3.0 - not used</p>

**Table 3-6** Current 15-Minute Interval Statistics

MIB Object	Syntax	Access	Enumeration	Description
CurrentIndex	SCInstance	Read-only		Unique index for Current 15-Minute Interval Table
CurrentStats	Octet String	Read-only	Size (12)	The number of Errored, Severely Errored, and Unavailable Seconds in the current 15-minute interval

**Table 3-7** 15-Minute Interval Statistics

MIB Object	Syntax	Access	Enumeration	Description
IntervalIndex	SCInstance	Read-only		Unique index for the 15-Minute Intervals Table
IntervalNumber	Integer	Read-only	(1...96)	The interval between 1 and 96, where 1 is the most recently completed interval
IntervalStats	Octet String	Read-only	Size (12)	The number of Errored, Severely Errored, and Unavailable Seconds in the specified 15-minute interval

**Table 3-8** Total of 15-Minute Intervals Statistics

MIB Object	Syntax	Access	Enumeration	Description
TotalIndex	SCInstance	Read-only		Unique index for the Total of 15-Minute Intervals Table
TotalStats	Octet String	Read-only	Size (12)	The number of Errored, Severely Errored, and Unavailable Seconds in the previous 24-hour period (96 15-minute intervals)

**Table 3-9** Loop Performance Interval Maintenance

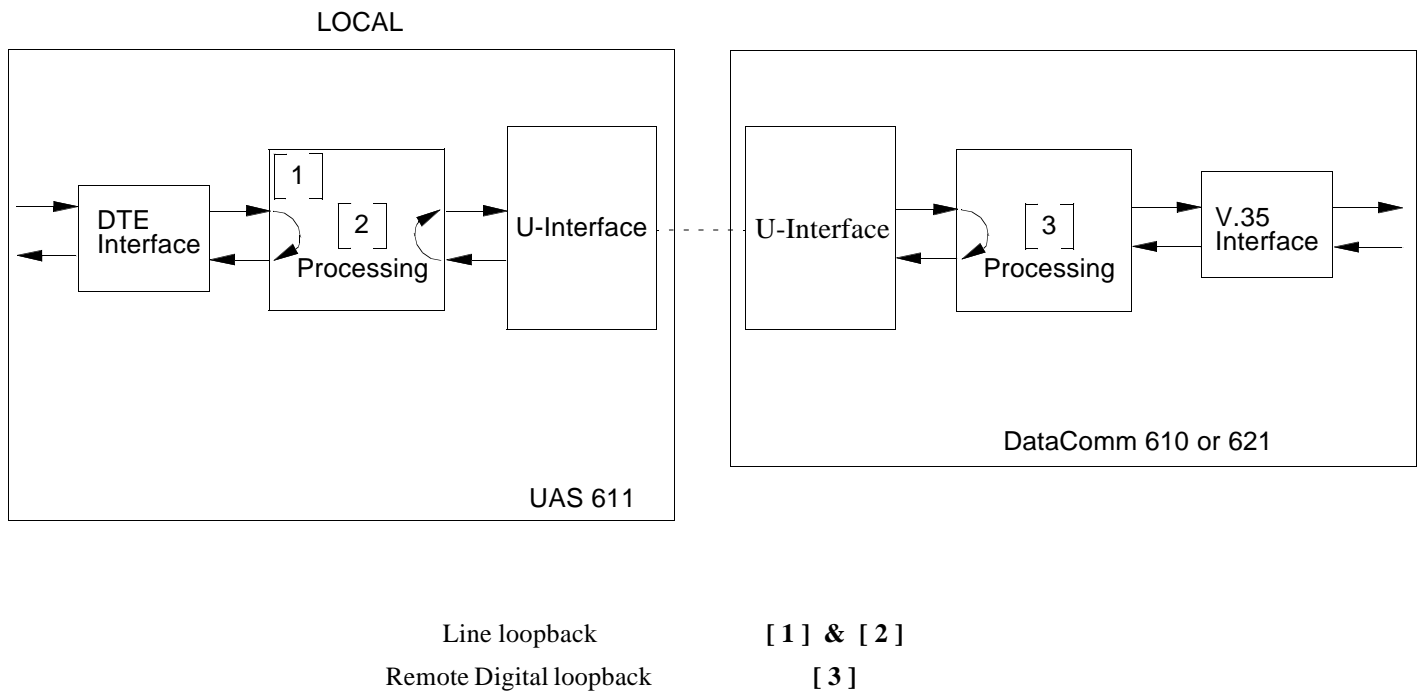
MIB Object	Syntax	Access	Enumeration	Description
Interval MaintenanceIndex	SCInstance	Read-only		Unique index for the Loop Performance Interval Maintenance Table
ResetIntervals	Integer	Read-write	Normal (1) Reset (2)	Resets loop performance intervals to zero (0).
NumberOfValidIntervals	Integer	Read-only	(0...96)	Reads the number of intervals collected up to 96 intervals
Reset Major Alarm	Integer	Read-write	Reset (1) Normal (2)	Resets major BER Alarm.
Reset Minor Alarm	Integer	Read-write	Reset (1) Normal (2)	Resets minor BER Alarm.

# 4 Tests

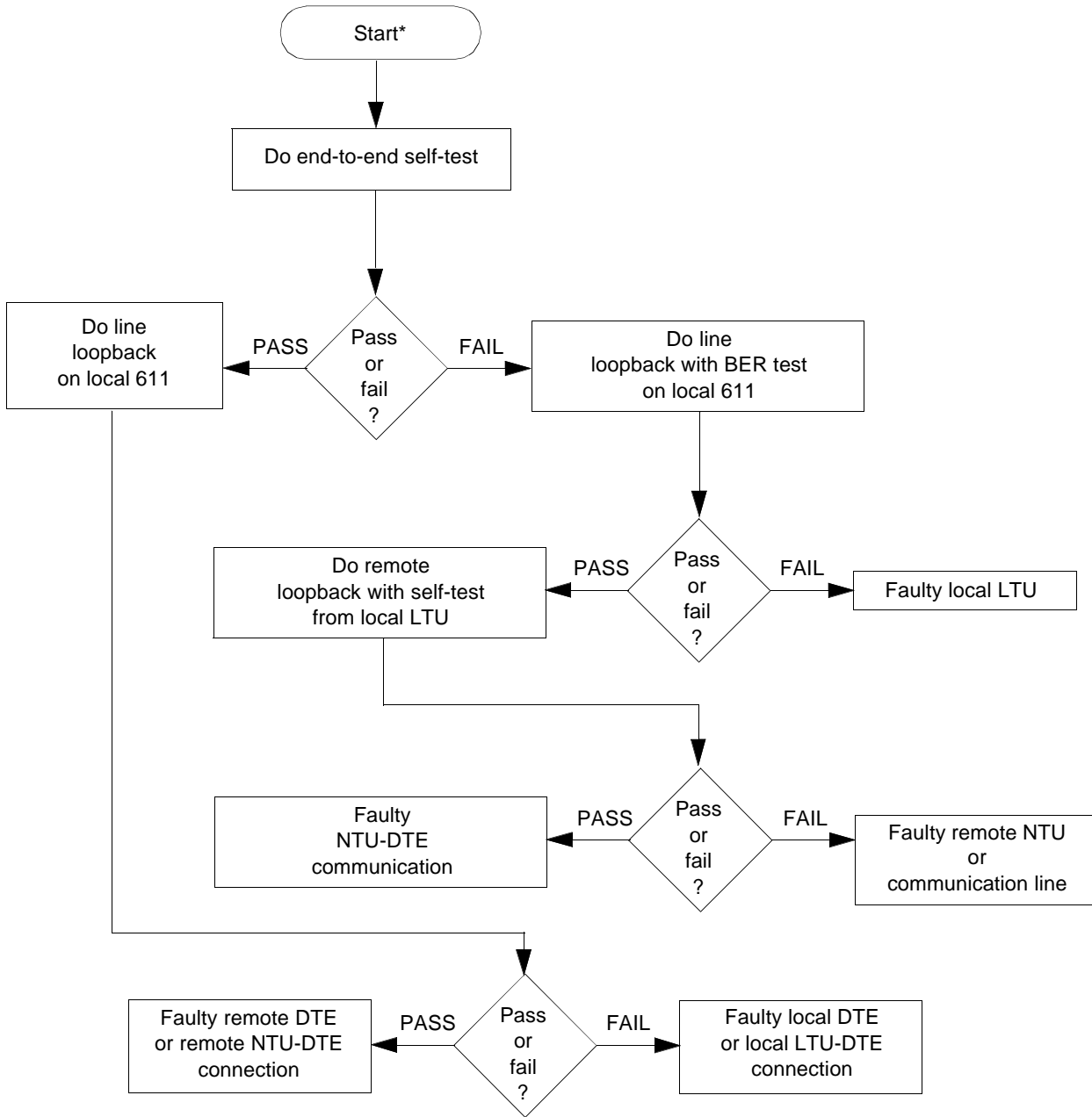
## Overview

The UAS 611 supplies test loopbacks for testing its operation and identifying trouble areas. *Figure 4-1* shows these loopbacks. See *Figure 4-2* for fault isolation.

Internal functions are checked when you first turn on power and during operation. Connecting line quality is also checked continuously during operation.



**Figure 4-1** Loopbacks



\*Assuming a problem exists.

**Figure 4-2** Fault Isolation Sequence

## Considerations in Using Loopbacks

Test loopbacks permit systematic testing of signal paths along the link, starting from one end of the link (the “local” UAS 611 module). In most situations, begin loopbacks from the LTU, since this lets you follow the signal path starting from the office and continuing toward the end-users. Test in this order:

1. Local line loopback.
2. Remote digital loopback.
3. Bit error rate self-test.

In general, do only one loopback test at a time; however, some tests handle multiple loopbacks simultaneously.

### Line Loopback

Line Loopback (LL) checks the performance of the U-loop and the DTE interfaces. Initiating this test, the transmitter output and receiver input disconnects from the communications line and connects, making a circuit that loops signals from the transmitter back through the receiver [1]. Also, the disconnected transmitter and receiver communications lines connect, making a circuit that loops received signals back over the communications line to the originating station [2].

While Line Loopback is done locally, you may send a Self-Test pattern from the remote site to the local 611, which loops the test pattern back to the remote site for verification. This test checks the performance of the NTU of the remote site and the communications line. Do this test by conferring with remote site personnel before issuing a Local Line Loopback. You can activate local line loopback from the front panel, or SCM Network Controller if operating under soft control.

### Remote Digital Loopback

Remote Digital Loopback (RDL) checks the performance of local and remote units, local DTE interface, and the communications line. When you start this test, the remote unit goes into Digital Loopback (DL). The remote transmitter and receiver of the unit are disconnected from the DTE interface and reconnected to form a circuit that loops the digital output signals from the receiver to the input [3] of the transmitter. You can activate remote digital loopback from the front panel or SCM Network Controller if operating under soft control.

### End-to-End Bit Error Test

The 611 can generate and check a 511 PRS or a 2047 PRS (default). You can administer this test using a remote external BERT connected to a remote unit, or in conjunction with remote digital loopback. Results are returned to the Network Manager in the form of bit errors and are displayed by flashing the TM LED. You can activate BER test from the front panel or SCM Network Controller if operating under soft control.



# A Business Equipment (DTE) Interface Signals (ITU-T V.24/V.28)

---

P1, P2, Pin	ITU-T No.	Circuit	Function
1	101	AA	Shield
2	103	BA	Transmitted Data
3	104	BB	Received Data
4	105/133	CA/CJ (Note 1)	Request to Send/Read for Receiving
5	106	CB	Ready for Receiving
6	107	CC	DCE Ready
7	102	AB	Signal Common
8	109	CF	Received Line Signal Detector
9	-	-	(Reserved for Testing) (+12V)
10	-	-	(Reserved for Testing) (-12V)
11	126	(Note 2)	Unassigned
12 *	122/112	SCF/CI (Note 3)	Secondary Received Line Signal Detector/Data Signal Rate Selector (DCE Source)
13*	121	SCB	Secondary Clear to Send
14*	118	SBA	Secondary Transmitted Data
15	114	DB	Transmitter Signal Element Timing (DCE Source)
16*	119	SBB	Secondary Received Data
17	115	DD	Receiver Signal Element Timing (DCE Source)
18	141	LL	Local Loopback
19*	120	SCA	Secondary Request to Send
20	108/1, /2	CD	DTE Ready
21	140/110	RL/CG	Remote Loopback/Signal Quality Detector (RL for 621)
22*	125	CE	Ring Detector
23*	111/112	CH/CI (Note 3)	Data Signal Rate Selector (DTE/DCE Source)
24	113	DA	Transmit Signal Element Timing (DTE Source)
25	142	TM	Test Mode

\* Not supported in 611

Notes Pertaining to ITU-T V.24/V.28 Table

- 1: When hardware flow control is required, Circuit CA may take on the characteristics of Circuit CJ. (CA is used for 611).
- 2: Pin 11 is unassigned. It will not be assigned in future versions of ITU-T V.24/V.28. However, in international standard ISO 2110, this pin is assigned to ITU-T Circuit 126, Select Transmit Frequency.
- 3: ITU-T designations are shown for reference only.





# B Business Equipment (DTE) Interface Signals (ITU-T V.35)

---

P2 Pin	V.35 Pin	ITU-T (See Note)	NTU	Signal	Description
1	A	101		Protective ground	
7	B	102		Signal ground	Establishes a common ground reference for all interface circuits except protective ground, pin A.
4	C	105	RS	Request-to-send	Indicates to LTU that DTE is prepared to transmit.
5	D	106	CS	Clear-to-send	Indicates to DTE that LTU is prepared to transmit.
6	E	107	DM	Data-set-ready	Indicates to DTE that LTU is operational.
8	F	109	CO	Received line signal detector	Indicates to DTE that LTU is receiving data (not idle or OOS codes).
25	K	142	TM	Test mode	Indicates to DTE that NTU in a test mode if option switch S18-1.
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 for modulation and transmission over communications line.
3 16	R T	104 104	RD-A RD-B	Received data	Transfers data signals received over communication line and demodulated by LTU to DTE.
24 11	U W	113 113	TT-A TT-B	Transmitter timing (DTE source)	Transfers transmitter signal timing information from DTE to LTU.
17 9	V X	115 115	RT-A RT-B	Receiver timing	Transfers receiver signal timing information from LTU to DTE.
15 12	Y AA/a	114 114	ST-A ST-B	Transmitter timing	Transfers transmitter signal timing information from LTU to DTE.
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 LTU that DTE is prepared for data communication.
9	H	108/2	TR	Data Terminal +12V	Provided to Interface
10				-12V	Provided to Interface

Note: ITU-T designations are shown for reference only. M, N, CC, DD, FF, HH, JJ, KK, LL, MM, NN, Z, and Pins 23, 26 are not used.



# C Business Equipment (DTE) Interface Signals (X.21)

---

<b>P1/P2 Pin</b>	<b>* 15-Pin X.21 Connector</b>	<b>ITU-T Circuit Designation</b>	<b>Signal</b>	<b>Description</b>
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 19	3 10	C(A) C(B)	Control	Indicates to LTU that DTE is prepared to transmit.
8 10	5 12	I(A) I(B)	Indication	Indicates to DTE that LTU is receiving data.
17 9	6 13	S(A) S(B)	Signal element timing	Transmit and receive signal timing information from DSU to DTE.
24 12	7 14	X(A) X(B)  B(A) B(B)	DTE signal element timing (X) or Byte timing (B)	Optional transmit signal timing information from DTE to LTU if X.21 adapter module is configured for XT. Byte timing information from LTU to DTE if X.21 adapter module is configured for BT.
* DB25 to DB15 adapter cable, part # 027H436-001, needed for X.21 mechanical compatibility				



# D Business Equipment (DTE) Interface Signals (530)

---

<b>P1/P2 Pin</b>	<b>Circuit Designation</b>	<b>Signal</b>	<b>Description</b>
1	---	Shield	Allows shield connections.
2 14	BA(A) BA(B)	Transmitted data	Transfers data signals from DTE for transmission over communications line.
3 16	BB(A) BB(B)	Received data	Transfers data signals to DTE that were received over communications line by LTU.
4 19	CA(A) CA(B)	Request to send	Indicates to LTU that DTE is prepared to transmit.
5 13	CB(A) CB(B)	Clear to send	Indicates to DTE that LTU is prepared to transmit.
6 22	CC(A) CC(B)	Data set ready	Indicates to DTE that LTU is prepared for data communications.
20 23	CD(A) CD(B)	Data terminal ready	Indicates to DSU that DTE is prepared for data communications.
7	AB	Signal ground	Establishes a common ground reference for all interface circuits except protective ground.
8 10	CF(A) CF(B)	Received line signal detector	Indicates to DTE that LTU is receiving data.
15 12	DB(A) DB(B)	Transmitter signal element timing	Transfers transmitter signal timing information from LTU to DTE.
17 9	DD(A) DD(B)	Receiver signal element timing	Transfers receiver signal timing information from LTU to DTE.
18	LL	Line Loopback enable	Transfers signal from DTE to control line loopback test.
21	RL	Remote Loopback enable	Transfers signal from DTE to control Remote Loopback test mode.
24 11	DA(A) DA(B)	Transmitter signal element timing (External Clock)	Transfers transmitter signal timing information from DTE to LTU.
25	TM	Test mode indicator	Indicates to DTE that LTU is in a test mode.



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