Installation and Operation

# Universal Access System 613

## (UAS)

**General DataComm**

**Warning**

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

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

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

**Warranty**

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.*

## Deutschland

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

| Registration Status | Port ID | SOC | FIC | USOC |
|---|---|---|---|---|
| | | | | |
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# Preface

## Scope

This manual describes how to install and configure a General DataComm Universal Access System (UAS) 613 and explains how to monitor and manage network devices.  This documentation is written for operators and installers, and assumes a working knowledge of data communications equipment.

## Organization

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

- *Chapter 1 -System Description* introduces important concepts and features of the UAS 613.

- *Chapter 2 - Installation* tells you how to install the UAS 613. 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 613.

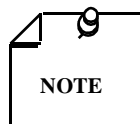- *Chapter 4 - Tests* describes front panel and external tests.

The *Index* contains the UAS 613 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.

**NOTE**

*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

- *Operating and Installation Instructions for*

  *SpectraComm Manager Card* GDC 048R303-000

- *Operating and Installation Instructions fo*r

  *SpectraComm Shelf* GDC 010R302-000

GDC publication numbers (e.g., *GDC 072R116-000*) 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

## Overview

Universal Access System 613, or UAS 613, is a network-managed, three-channel Line Termination Unit (LTU) housed in a GDC SpectraComm shelf. It supports three ANSI T1.601-1992 2B1Q U-interfaces and three modified ITU-T X.21 DTE interfaces, which may operate at either 64 or 128 Kbps data rates. Each 2B1Q U-interface is permanently assigned to a specific X.21 interface port. The UAS 613 passes software configuration and control commands over the 2B1Q Embedded Operation Channel (EOC) from the SpectraComm Manger (SCM) to a DC610 tail-circuit. Not only does the UAS 613 originate the standard ANSI EOC B1 and B2 loopback commands, it also responds to V.54 loopback control from the 2B1Q U-loop.

## Features

The UAS 613 gives you these outstanding features:

- Has three 2B1Q U-interfaces, compatible with ANSI T1.601-1992

- Has three modified X.21 DTE-interfaces through a single DB-25 connector

- Performs diagnostics and provides alarms by way of SNMP commands and responses

- Routes software configuration and control using the 2B1Q EOC to a DC610 tail-circuit

- Functions as an LTU (master) or NTU (slave) 2B1Q device (must be LTU when network-managed)

- Equipped with internal, external, and slave (network) signal timing

- Initiates ANSI B1 and B2 EOC loopbacks when operating as an LTU

- Responds to inband V.54 loopback control from the 2B1Q U-loop

- Contains a 511 and 2047 test pattern generator and checker

- Displays status from the front panel LEDs

- Does line loopback using the front pushbutton switches

- Complies with domestic and international safety requirements

- Generates sealing current for detecting 2B1Q U-loop continuity

## Technical Characteristics

| DTE Interface | |
|---|---|
| Data Rates | 64 kbps, 128 Kbps |
| Interface Types | ITU-T          X.21 |
| **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 |
| Line Requirements | 2-wire, non-loaded metallic circuit |
| Operating Range | 5.5 Km (18,000 ft.) — with 0.4mm ( 26 AWG)  wire |
| **Diagnostics** | |
| Network | Generates:<br>            B1 loopback<br>            B2 loopback |
| Customer | LL1, LL2, LL3 (front panel - no Network Manager)<br>DL and RDL (per loop - Network Manager initiated only) |
| **Physical Characteristics** | |
| Dimensions | Height: 0.8 in. (27 mm)<br>Width: 7.0 in. (178 mm)<br>Depth: 9.5 in. (241 mm)<br>Weight: 10 oz. (0.28 Kg)<br>Shipping Weight: 1 lb. 10 oz. (0.74 kg) |
| Power | +5 Vdc = 400 mA<br>+12 Vdc = 20mA<br>-12 Vdc = 20mA<br>Load Number = 0.4 |
| Sealing Current | 4.5 mA nominal |
| Temperature<br>  Card Assembly<br>  Card Assembly Storage | <br>Operating - 0 to 50 degrees Celsius<br>Non-Operating -40 to +85 degrees Celsius |
| Humidity | 5 to 95% non-condensing |
| Altitude | Operating - 0 to 10,000 feet<br>Non-Operating - 0 to 40,000 feet |

## Application

The UAS 613 LTUs are designed to fit the following application with a remote DataComm 610/NTU. In this application, the Network Manager can control both the UAS 613 and the DataComm 610 from the SCM.  *See Figure 1-1 for point-to-point application.*
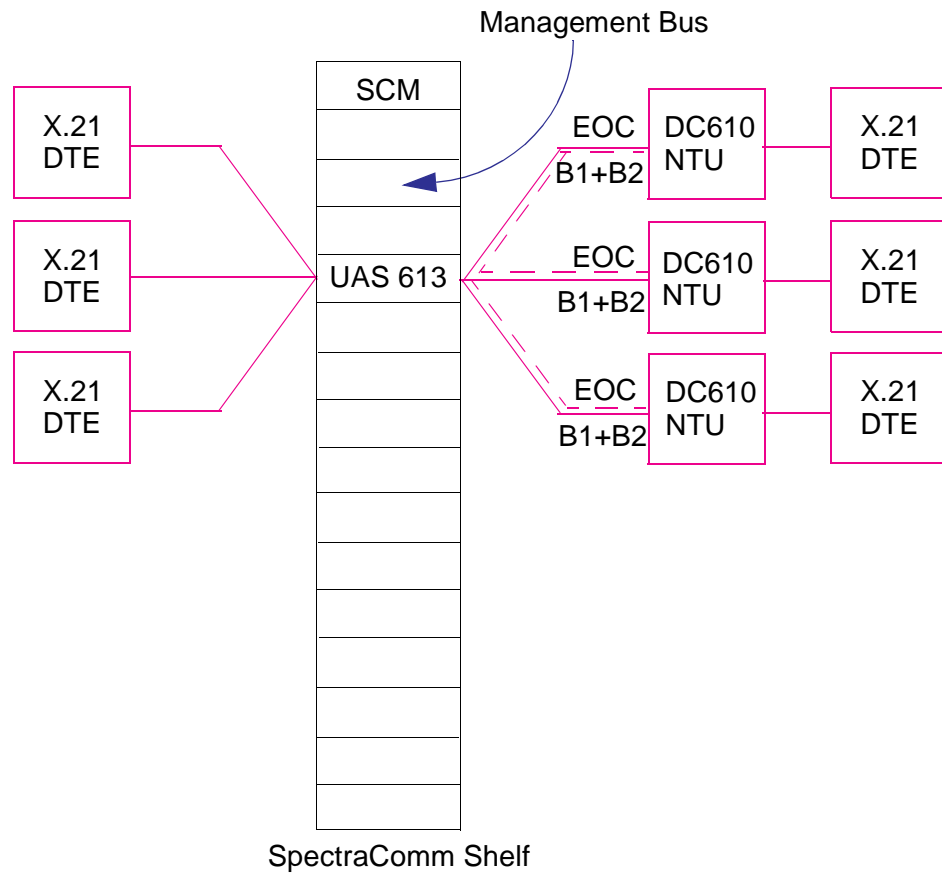
**Figure 1-1**   Point-to-Point Application

## Diagnostics

Built into the UAS 613 LTU are diagnostic circuits, furnishing you quick and thorough performance tests on a loop-by-loop basis. Diagnostic testing includes generating standard B1 and B2 remote loopbacks, Line Loopback (LL), and Self-Test. Self-Test has a pattern generator and checker so that you don't need external test equipment. Built-in remote loopback permits data to be looped back from a remote site to the originating UAS 613 LTU.

# Equipment List

*Refer to Table 1-1 for components that may be used in your UAS 613.*

**Table 1-1**   Equipment List

| Description | GDC Part No. |
|---|---|
| UAS 613 LTU | 048P086-001 |
| **Enclosures** | |
| NR Domestic | 010M043-001 |
| NR Export | 010M043-002 |
| **SpectraComm Shelf** | |
| For shelf and part number information, *refer to GDC Manual SpectraComm Shelf Publication Number 010R302-000.* | |
| **Cables** | |
| 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 |
| DB-25 to three DB-15 | 024H609-XXX |

# 2 Installation

## Overview

This chapter shows you how to install and use the UAS 613 LTU in your communications network. If this is your first time with the 613 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 613 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 SpectraComm Shelf manual. If you don't, there would be overheating and power supply shutdown.*

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

You install the UAS 613 LTU basecard in the SpectraComm 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 613 LTU module in any unused slot in the shelf having Zone 1 connectors needed for the network. To install the 613 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.

## Set Hard Options

Setting the hard options on the 613 LTU basecard means adjusting configuration switches and jumpers to match the operation of your network. *Table 2-1* explains the functions of the switches and jumpers, and *Figure 2-1* shows you their locations. You can choose hard configuration through Switch S1-1.  You have to make these adjustments only once when first installing the unit. You don't have to do these steps again, unless you change your network.

**Table 2-1**  Option Selection

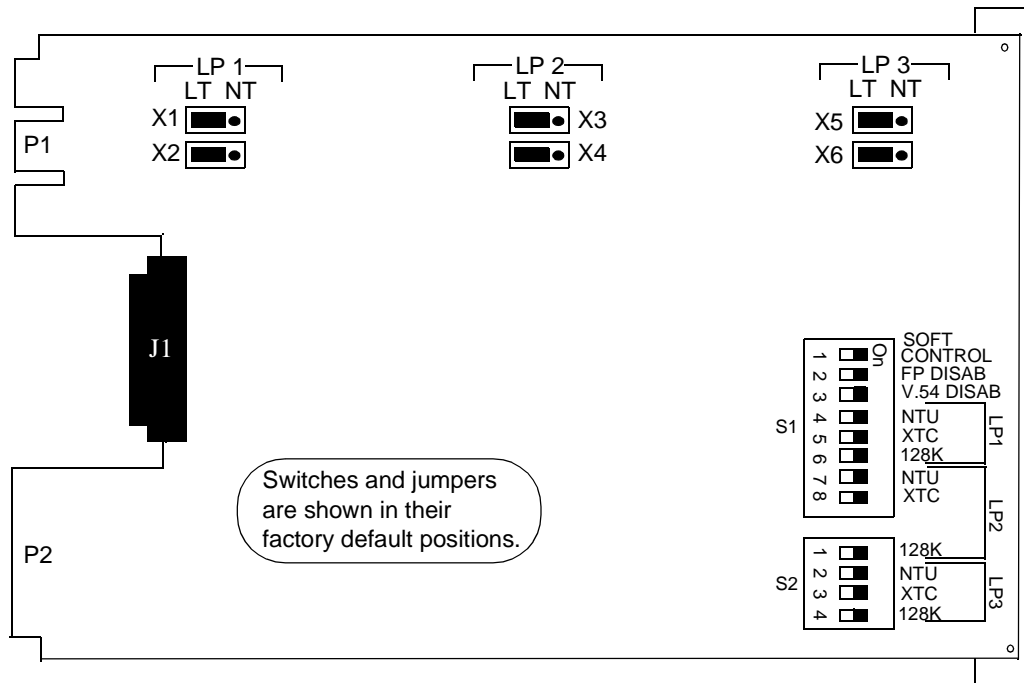| Switches | Description |
|---|---|
| S1-1 Soft Control | When On, the unit receives configuration instructions from the Network Manager. Soft options are stored in non-volatile memory while the other hard options are ignored.  If the soft control option is disabled, all configuration control is based on the hard switches and the Network Manager is ignored. Default is Off (soft control disabled). |
| S1-2 FP Disable | When On, the front panel LL switches are disabled. When Off, you can operate the front panel switches. Default is Off (front panel enable). |
| S1-3 V.54 Disable | When On, the 613 does not respond to V.54 loopback control from the 2B1Q U-loops. When Off, the 613 responds.  Default is Off (V.54 enabled). |
| S1-4 NTU-LP1 | When On, the 613 performs the NTU handshake for Loop 1. When Off, the 613 performs the LTU handshake. Default is LTU. The 613 always operates as a LTU when under soft control. You must select this option along with Jumpers X1 and X2. |
| S1-5 XTC-LP1 | When On, Loop 1 signal timing issues from the DTE. When Off, signal timing issues from the 613 (internal system clock when LTU/2-wire U-loop when NTU). Default is timing issues from the 613. |
| S1-6 128 Kbps -LP1 | When On, the Loop 1 DTE data rate is 128 Kbps.  When Off, the data rate is 64 Kbps. Default is Off (64 Kbps-LP1). |
| S1-7 NTU-LP2 | When On, the 613 performs the NTU handshake for Loop 2. When Off, the 613 performs the LTU handshake. Default is LTU. The 613 always operates as a LTU when under soft control. You must select this option along with Jumpers X3 and X4. |
| S1-8 XTC-LP2 | When On, Loop 2 signal timing issues from the DTE. When Off, signal timing issues from the 613 (internal system clock when LTU/2-wire U-loop when NTU). Default is timing issues from the 613. |
| S2-1 128 Kbps -LP2 | When On, the Loop 2 DTE data rate is 128 Kbps.  When Off, the data rate is 64 Kbps. Default is Off (64 Kbps-LP2). |
| S2-2 NTU-LP3 | When On, the 613 performs the NTU handshake for Loop 3. When Off, the 613 performs the LTU handshake. Default is LTU. The 613 always operates as a LTU when under soft control. You must select this option along with Jumpers X5 and X6. |
| S2-3 XTC-LP3 | When On, Loop 3 signal timing issues from the DTE. When Off, signal timing issues from the 613 (internal system clock when LTU/2-wire U-loop when NTU). Default is timing issues from the 613. |
| S2-4 128 Kbps -LP3 | When On, the Loop 1 DTE data rate is 128 Kbps.  When Off, the data rate is 64 Kbps. Default is Off (64 Kbps-LP3). |
| X1-X2 LP1 LT/NT | When you choose LT, the 613 is the source of sealing current for Loop 1. When you select NT, the 613 sinks current from the loop. Coordinate jumper choice with Switch S1-4. NT mode is available only when the unit is set for hard switch control (S1-1 is Off). |
| X3-X4 LP2 LT/NT | Same as above for Loop 2, but coordinate with S1-7. |
| X5-X6 LP3 LT/NT | Same as above for Loop 3, but coordinate with S2-2. |

**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 613.
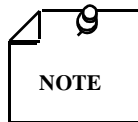
> **NOTE**
>
> *Before applying power to the unit, check that the edge connectors on the rear panel of the card are inserted firmly in their receptacles, which are mounted on the rear panel of the SpectraComm shelf.*

### Power Line

The 613 LTU gets its power directly from the SpectraComm Shelf.

### Communications Line for Network 66E Block, for Zones 1 and 3

#### Zone 1, Cable 024H608-002

*Figure 2-2* shows the cable connection from the 613 to the Network 66E Block (Zone 1), followed by *Figure 2-3*, which gives you the pin-outs for the 024H608-002 cable connections. Each cable can support six SC 613 LTUs.  Following *Figure 2-3* is an array of 50 pin-outs, paired with six 8-positioned modular jacks (*Table 2-2).*
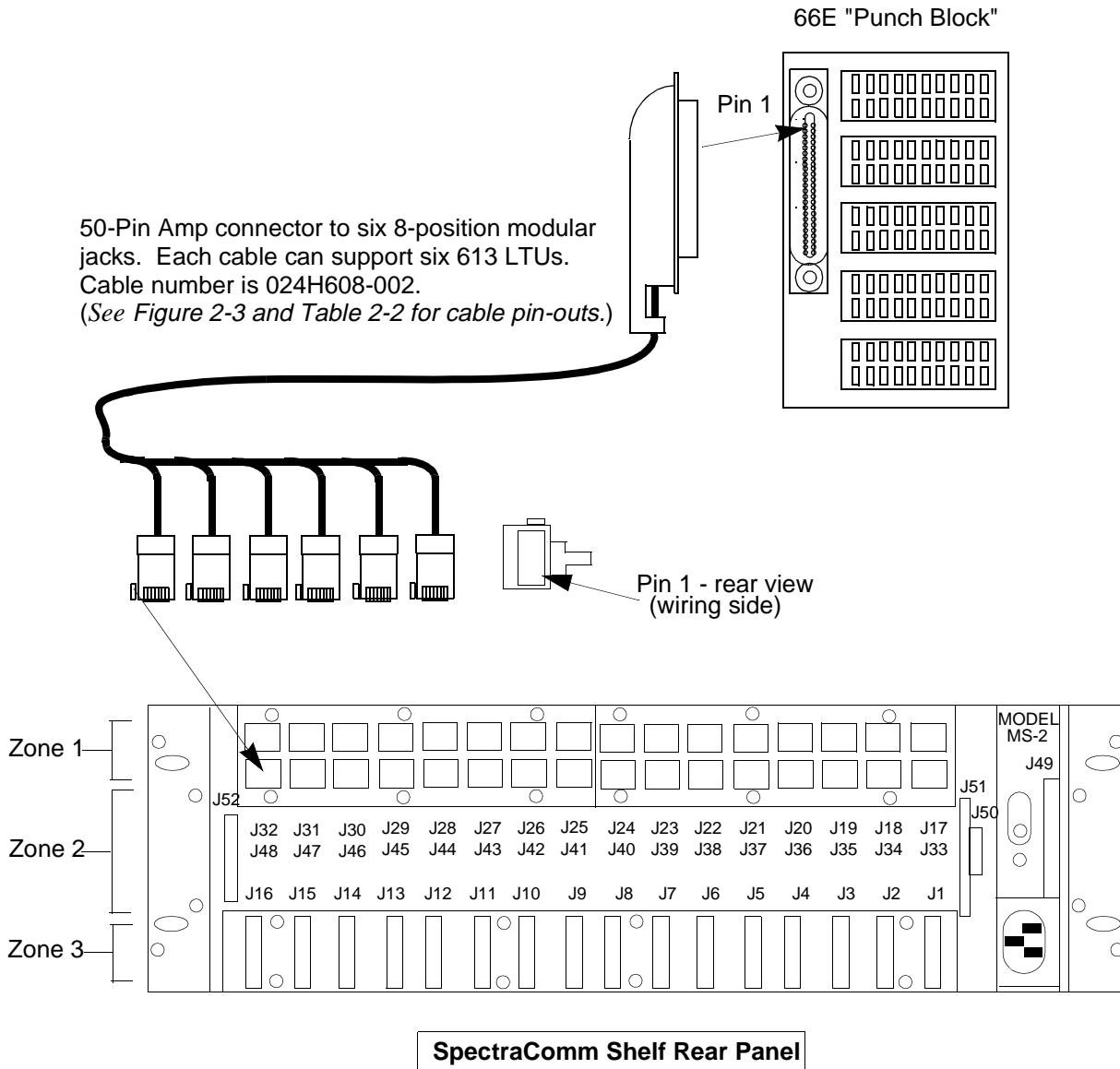
66E "Punch Block"

Pin 1

50-Pin Amp connector to six 8-position modular
jacks.  Each cable can support six 613 LTUs.
Cable number is 024H608-002.
(*See* Figure 2-3 and Table 2-2 for cable pin-outs.)

Pin 1 - rear view
(wiring side)

Zone 1

J52

MODEL
MS-2

J49

J51

J50

| J32 | J31 | J30 | J29 | J28 | J27 | J26 | J25 | J24 | J23 | J22 | J21 | J20 | J19 | J18 | J17 |
| J48 | J47 | J46 | J45 | J44 | J43 | J42 | J41 | J40 | J39 | J38 | J37 | J36 | J35 | J34 | J33 |

Zone 2

| J16 | J15 | J14 | J13 | J12 | J11 | J10 | J9 | J8 | J7 | J6 | J5 | J4 | J3 | J2 | J1 |

Zone 3

**SpectraComm Shelf Rear Panel**

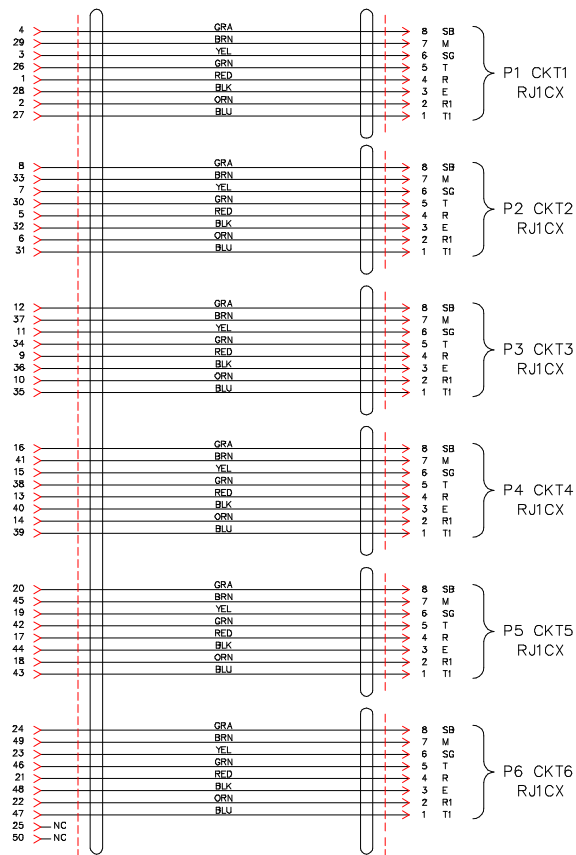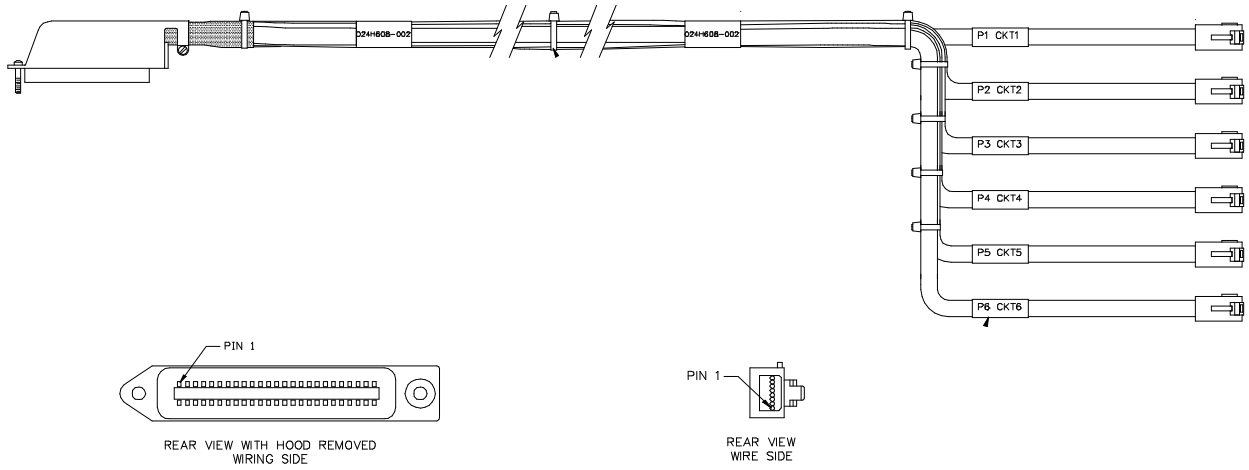**Figure 2-2**    UAS 613 to Network 66E Block (Zone 1)

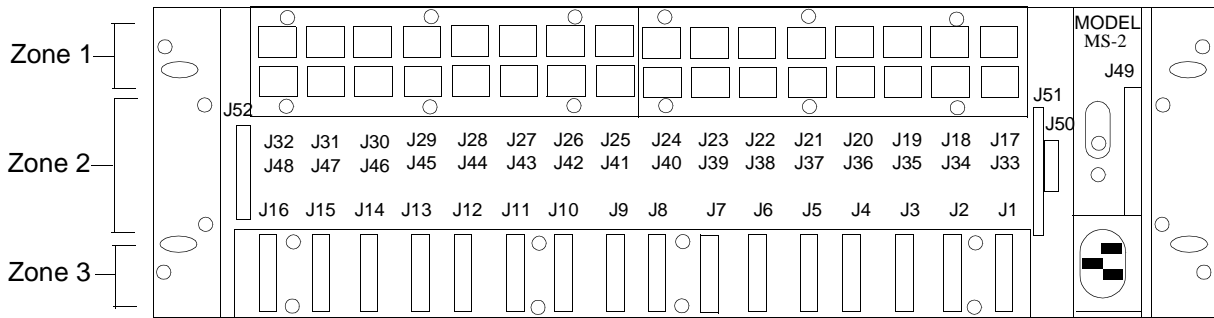**Figure 2-3** 50-Pin Amphenol to Six 8-Position Modular Jacks

(GDC Part No. 024H608-XXX)

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

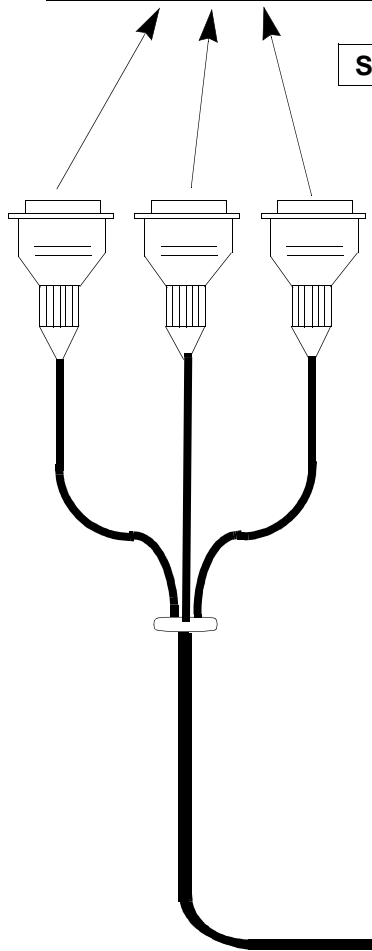| 50-Pin Amp | | 8-Position Modular | | |
|---|---|---|---|---|
| 3 | 28 | | | |
| 2 | 27 | P1 | Loop 1 | 1, 2 |
| 1 | 26 | P1 | Loop 2 | 4, 5 |
| 4 | 29 | P1 | Loop 3 | 7, 8 |
| 7 | 32 | | | |
| 6 | 31 | P2 | Loop 1 | 1, 2 |
| 5 | 30 | P2 | Loop 2 | 4, 5 |
| 8 | 33 | P2 | Loop 3 | 7, 8 |
| 11 | 36 | | | |
| 10 | 35 | P3 | Loop 1 | 1, 2 |
| 9 | 34 | P3 | Loop 2 | 4, 5 |
| 12 | 37 | P3 | Loop 3 | 7, 8 |
| 15 | 40 | | | |
| 14 | 39 | P4 | Loop 1 | 1, 2 |
| 13 | 38 | P4 | Loop 2 | 4, 5 |
| 16 | 41 | P4 | Loop 3 | 7, 8 |
| 19 | 44 | | | |
| 18 | 43 | P5 | Loop 1 | 1, 2 |
| 17 | 42 | P5 | Loop 2 | 4, 5 |
| 20 | 45 | P5 | Loop 3 | 7, 8 |
| 23 | 48 | | | |
| 22 | 47 | P6 | Loop 1 | 1, 2 |
| 21 | 46 | P6 | Loop 2 | 4, 5 |
| 24 | 49 | P6 | Loop 3 | 7, 8 |
| 25 | 50 | | | |

## Business Equipment

### Zone 3, Cable 024H609

*Figures 2-4* and *2-5* illustrate the 024H609 cable and pin connections. *Table 2-3* matches the DB-25 to DB-15 (x3) pin-outs .
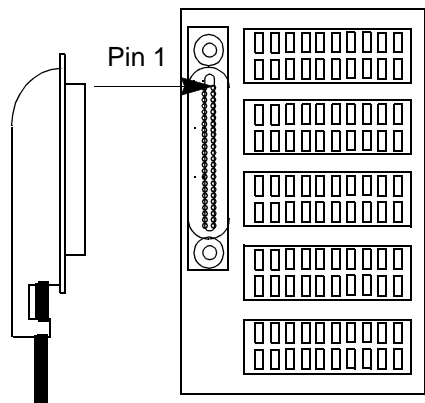
**Figure 2-4** UAS 613 to DTE

Graphic incomplete
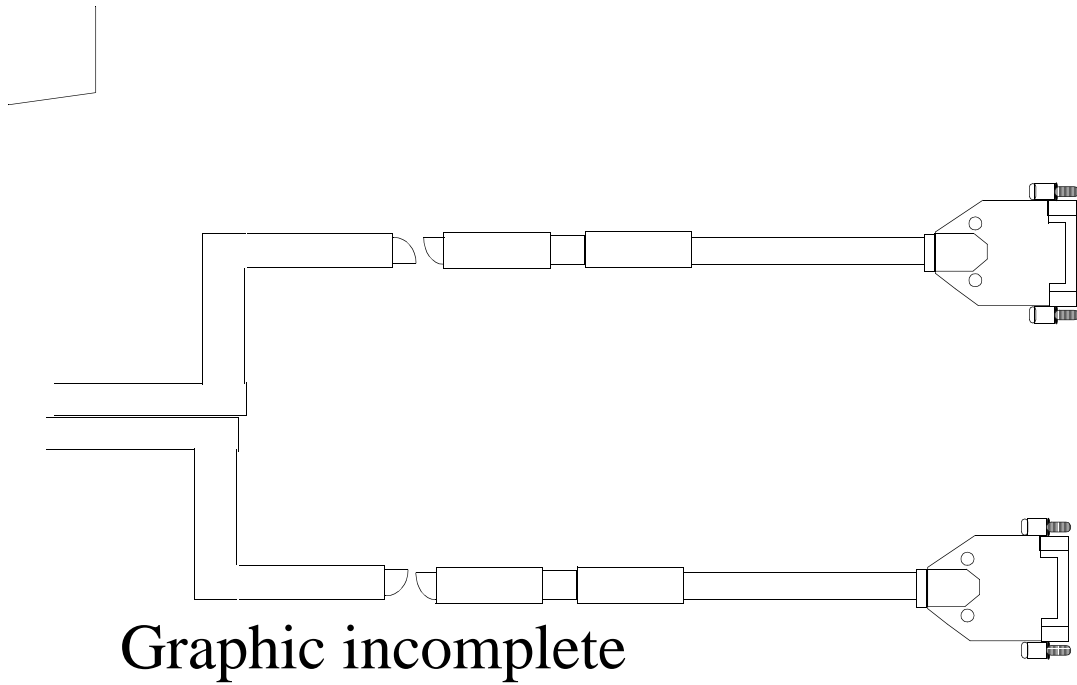
**Figure 2-5**     DB-25 to Three DB-15

(GDC Part No. 024H609)

**Table 2-3**  Pin-Outs for Cable No. 024H609

| DB-25 | | | DB-15 (x3) | | | ITU | | |
|-------|-------|--|------------|-------|--|-----|-----|-----|
| P1-1 | P1-1 | | P2-8 | P2-12 | | Loop 1 | SG | I-B |
| P1-2 | P1-14 | | P2-11 | P2-4 | | Loop 1 | R-B | R-A |
| P1-3 | P1-15 | | P2-9 | P2-2 | | Loop 1 | T-B | T-A |
| P1-4 | P1-16 | | P2-13 | P2-6 | | Loop 1 | S-B | S-A |
| P1-5 | P1-17 | | P2-5 | P2-3 | | Loop 1 | I-A | C-A |
| P1-1 | P1-1 | | P3-8 | P3-12 | | Loop 2 | SG | I-B |
| P1-6 | P1-18 | | P3-11 | P3-4 | | Loop 2 | R-B | R-A |
| P1-7 | P1-19 | | P3-9 | P3-2 | | Loop 2 | T-B | T-A |
| P1-8 | P1-20 | | P3-13 | P3-6 | | Loop 2 | S-B | S-A |
| P1-9 | P1-21 | | P3-5 | P3-3 | | Loop 2 | I-A | C-A |
| P1-1 | P1-1 | | P4-8 | P4-12 | | Loop 3 | SG | I-B |
| P1-10 | P1-22 | | P4-11 | P4-4 | | Loop 3 | R-B | R-A |
| P1-11 | P1-23 | | P4-9 | P4-2 | | Loop 3 | T-B | T-A |
| P1-12 | P1-24 | | P4-13 | P4-6 | | Loop 3 | S-B | S-A |
| P1-13 | P1-25 | | P4-5 | P4-3 | | Loop 3 | I-A | C-A |

# Make Pre-Operational Check

## Setup (Hard)

Configure hardware jumpers and switches as follows:

1.  Set S1-1 to Off.

2.  To set Loop 1 for LTU operation, place Jumpers X1 and X2 in the LT position and verify that S1-4 is Off.  If internal system clock of the 613 is the source of DTE signal timing, verify that S1-5 is Off. Place S1-5 On if the DTE is the source of signal timing.  If the DTE data rate is 64 Kbps, verify that S1-6 is Off.  Place S1-6 On if the DTE data rate is 128 Kbps.

3.  To set Loop 1 for NTU operation, place Jumpers X1 and X2 in the NT position and verify that S1-4 is On. If the clock derived from the 2-wire U-loop is the source of DTE signal timing, verify that S1-5 is Off.  Place S1-5 On, if the DTE is the source of DTE signal timing.  If the DTE data rate is 64 Kbps, verify that S1-6 is Off.  Place S1-6 On, if the DTE data rate is 128Kbps. (Note that with S1-4 On in NTU operation, short bursts of data errors may occur.)

4.  To set Loop 2 for LTU repeat Step 2 with Jumpers X3 and X4 and Switches S1-7, S1-8, and S2-1.

5.  To set Loop 2 for NN repeat Step 3 with Jumpers X3 and X4 and Switches S1-7, S1-8, and S2-1.

6.  To set Loop 3 fro LN repeat Step 2 with Jumpers X5 and X6 and Switches S2-2, S2-3, and S2-4.

7.  To set Loop 3 for NN repeat Step 3 with Jumpers X5 and X6 and Switches S2-2, S2-3, and S2-4.

## Setup (Soft)

1.    Set S1-1 to On and verify that all jumpers (X1, X2, X3, X4, X5, and X6) are in the LT position.

2.    Install the 613 in the desired location in the shelf and do a LL test on each of the three loops. Use an external BERT to verify the unit, and if desired, the entire loop.

3.    If the 613 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.

**NOTE**
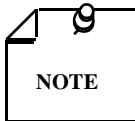
*If you ever change the 613 firmware, the **EPROM** containing the configuration of the unit is automatically erased and you have to reassign the unit, using the new serial number.*

# 3   Operation

## Overview

*Figure 3-1* depicts the UAS 613 front panel and explains the function of each control and indicator.  You may check the unit operation by monitoring the front panel indicators and using the test procedures covered in *Chapter 4*.
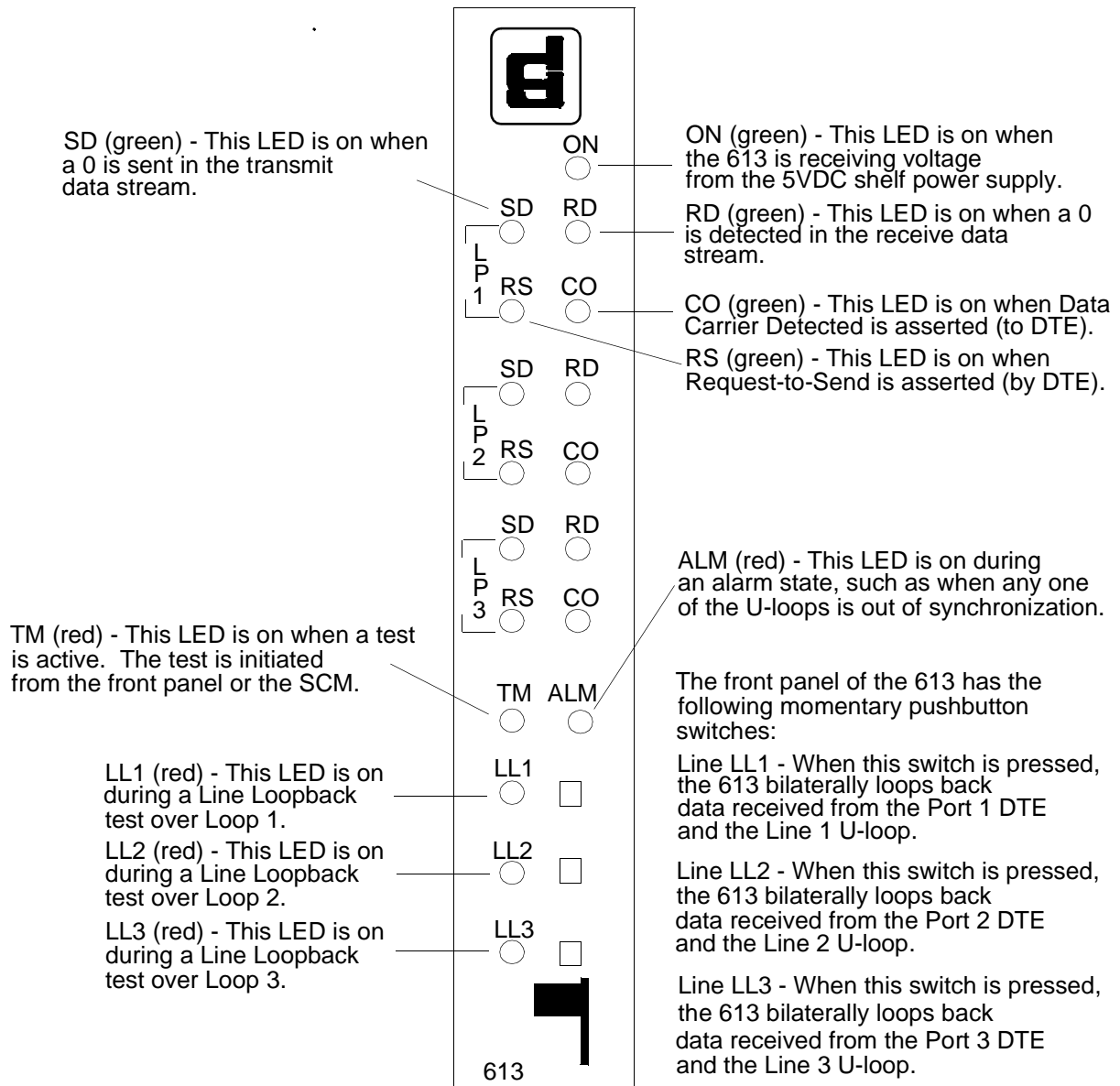
SD (green) - This LED is on when a 0 is sent in the transmit data stream.

ON (green) - This LED is on when the 613 is receiving voltage from the 5VDC shelf power supply.

RD (green) - This LED is on when a 0 is detected in the receive data stream.

CO (green) - This LED is on when Data Carrier Detected is asserted (to DTE).

RS (green) - This LED is on when Request-to-Send is asserted (by DTE).

ALM (red) - This LED is on during an alarm state, such as when any one of the U-loops is out of synchronization.

TM (red) - This LED is on when a test is active.  The test is initiated from the front panel or the SCM.

The front panel of the 613 has the following momentary pushbutton switches:

Line LL1 - When this switch is pressed, the 613 bilaterally loops back data received from the Port 1 DTE and the Line 1 U-loop.

LL1 (red) - This LED is on during a Line Loopback test over Loop 1.

Line LL2 - When this switch is pressed, the 613 bilaterally loops back data received from the Port 2 DTE and the Line 2 U-loop.

LL2 (red) - This LED is on during a Line Loopback test over Loop 2.

LL3 (red) - This LED is on during a Line Loopback test over Loop 3.

Line LL3 - When this switch is pressed, the 613 bilaterally loops back data received from the Port 3 DTE and the Line 3 U-loop.

**Figure 3-1**   Front Panel for the 613
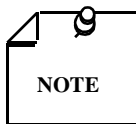
# Network Management

You can use the UAS 613 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 613.

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 613. What Are You Table. |
| Code Rev | Display String | Read-only | (SIZE (4)) | Returns the firmware cde level; for example: "A-,   B- " |
| Alarm Status | Octet String | Read-only | (Size (1-255)) | Current alarms of the unit without alarm masks. |

**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 | 64KBps (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. |

**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 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-only | 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)<br>reset (2) | Forces a soft reset of the unit |
| EraseConfig | Integer | Read-write | normal (1)<br>reset (2) | Erases stored configuration in unit |
| FrontPanel | Integer | Read-write | enable (1)<br>disable (2) | Enables or disables front panel switches |
| LedStatus | Octet String | Read-only | Size (3) | Front Panel LED enumeration; a value of 1 means ON, 0 is OFF.<br>1.7 - not used<br>1.6 - Test Mode<br>1.5 - Alarm<br>1.4 - LP 1 Line Loopback<br>1.3 - LP 1 Send Data transitions<br>1.2 - LP 1 Recv Data transitions<br>1.1 - LP 1 Request to Send<br>1.0 - LP 1 Data Carrier Detect<br><br>2.7 - not used<br>2.6 - not used<br>2.5 - not used<br>2.4 - LP 2 Line Loopbacks<br>2.3 - LP 2 Send Data Transitions<br>2.2 - LP 2 Recv Data Transitions<br>2.1 - LP 2 Request to Send<br>2.0 - LP 2 Data Carrier Detect<br><br>3.7 - not used<br>3.6 - not used<br>3.5 - not used<br>3.4 - LP 3 Line Loopback<br>3.3 - LP 3 Send Data Transitions<br>3.2 - LP 3 Recv Data Transitions<br>3.1 - LP 3 Request to Send<br>3.0 - LP 3 Data Carrier Detect |

**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)<br>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 |

# 4  Tests

## Overview

The UAS 613 supplies test loopbacks for testing its operation and identifying trouble areas. *Figure 4-1* shows these loopbacks.

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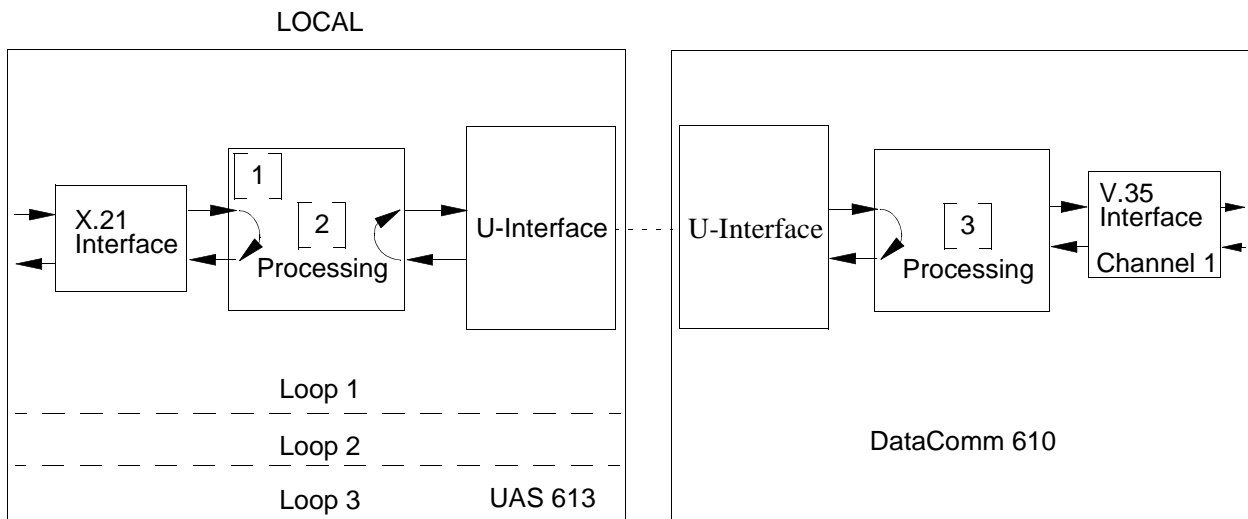


| Local Line loopback | [ 1 ]  &  [ 2 ] |
| Local Digital loopback | [ 2 ] |
| Remote Digital loopback | [ 3 ] |

**Figure 4-1**    Loopback Tests for 613 Loops, 1, 2, and 3

# Tests: Loopbacks and Bit Error Rate

Test loopbacks permit systematic testing of signal paths along the link, starting from one end of the link (the "local" 613 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.     Local digital loopback.

3.     Remote digital loopback.

4.     Bit error rate test.

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

## Local Line Loopback

Local Line Loopback (LL) checks the performance of the three 613 loops and their associated X.21 interfaces. You may perform this test on a loop-by-loop basis. 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 Local Line Loopback is done locally, you may send a Self-Test pattern from the remote site to the local 613, 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.

## Local Digital Loopback

Local Digital Loopback (DL) checks the performance of the local 613 and remote NTUs, and the communications line. As soon as the test is initiated from loopback [2]**,** the receiver output of the unit and the transmitters input are disconnected from the X.21 interface and connected together. Thus they form a circuit that loops back the transmit data of the remote unit. You can activate local digital loopback from the SCM Network Controller if operating under soft control.

## Remote Digital Loopback

Remote Digital Loopback (RDL) checks the performance of local and remote units, local X.21 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 SCM Network Controller if operating under soft control.

## Bit Error Rate Test

Under soft control, the 613 can generate and check a 511 PRS or a 2047 PRS (default). Moreover, you can administer a BER test independently to a remote external BERT connected to a remote DataComm 610, or concurrently with a remote digital loopback. Results are returned to the Network Manager in the form of bit errors. You can activate BER test from the SCM Network Controller if operating under soft control.

# Index