Installation and Operation

UAS™ 7000

Network/Dropside Interface Unit
Model NIU/DIU 7624

g **General DataComm**

Manual Revision History

Shown below is a chronological listing of revisions to this manual. The issue number, date, and synopsis of revised materials are included to provide the reader with a comprehensive manual history.

| Issue	Date	Description
1	May '98	First issue.

NIU/DIU 7624

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The UAS NIU/DIU 7624 multiplexes 12 IDSL (ISDN DSL) interfaces into a single T1. This dual-slot card provides the same function as one NIU 7001 and four DIU 7616ML's, and increases the capacity of a dual UAS 7000 shelf nearly four times. For example: a dual UAS 7000 shelf can accommodate fourteen managed T1s. Four shelves accomodate 28 T1s or 1 DS-3 worth of bandwidth in 28" of rack space. A 7-foot high rack can accomodate 2 DS-3 payloads or 56 T1s. It allows service providers to utilize the entire T1 bandwidth when offering IDSL (128k) service. The UAS 7624 fits into the UAS 7000 shelf and is controlled by the TEAM 7624 for UNIX Manager, by Local Management VT-100 or Telnet, or by hard configuration via DIP switches.

Features

NIU:

- DSX-1 (per ANSI T1.102) or DS1 (per ANSI T1.403) operation.

- ESF or SF framing.

- B8ZS or AMI Line Coding.

- DSX-1 Pre-Equalization: 0-655 ft. in 130 ft. increments.

- DS1 Line Build Out: 0, -7.5, -15, or -22 dB.

- FDL messaging: ANSI T1.403 or Bellcore TR54016.

- Configuration via SNMP commands using the SNMP GDC SCM card, via Telnet using VT100 connected to craft port of SCM card, or via hardware DIP switch settings.

- Fixed DSL to T1 DS0 mapping (for example: DSL 1 to DS0 1 and 2, DSL 2 to DS0 3 and 4, etc.)

- Selectable Payload or Line Loopbacks

- Performance monitoring per ANSI T1.403 and Bellcore TR54016.

- Selectable Recovered or Internal Transmit Timing.

- Selectable AIS Loop Down: Inhibit or 5-60 seconds in 1 second increments.
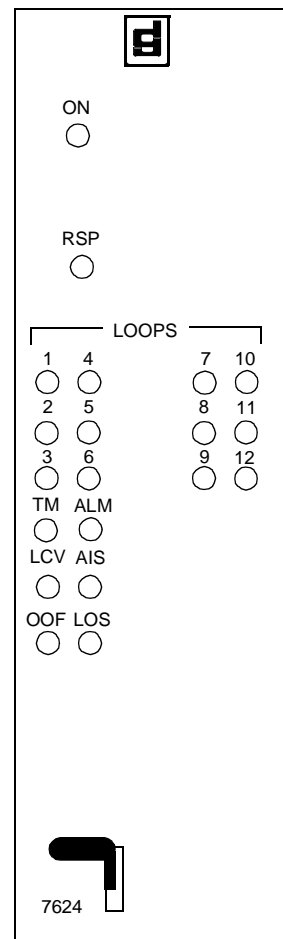
DIU:

- Twelve (2B1Q U-Interface) IDSL's per ANSI T1.601.

- Management of GDC's DataComm 610/612/621 modems using the EOC (Embedded Operations Channel).

- LAP-D (Link Access Procedure - D channel) signaling to establish 64 kbps PPP (Point-to-Point Protocol) or 128 kbps PPP-ML (Point-to-Point Protocol - Multilink) sessions between Terminal Adapter (TA) and Internet Protocol (IP) router devices.

- Provides loop current to detect continuity.

- Initiation of ANSI T1.601 2B+D loopback from DIU to any remote.

- 2047 test pattern generator and checker for each DSL (GDC 600 series NTU products)

- Performance monitoring, such as Maintenance, Alarms, Programmable Alarm Thresholds, and Diagnostics.

Options

The NIU/DIU 7624 consists of three printed circuit cards, a basecard (not shown in Figure 1), a daughter card and a plug-in card. *Figure 1* shows the daughter card and the plug-in card where DIP switch S1 is mounted. *Table 1* describes the hard options selected by S1 that can be set Up or Down with a small screwdriver. *Table 2* describes the soft options selected by Telnet - Operation UAS 7624 Local Management GDC Pub. No. 087R710-000, or the TEAM 7624 for UNIX GDC Pub. No. 087R708-V100. You need to check these settings when you first install the card. You need not repeat the procedure unless you change the network.
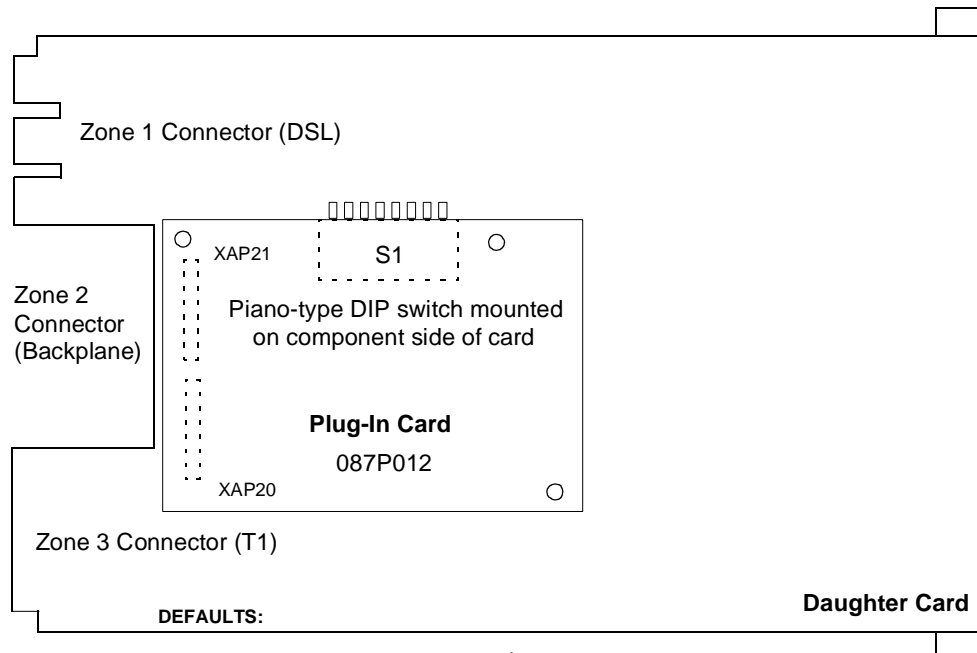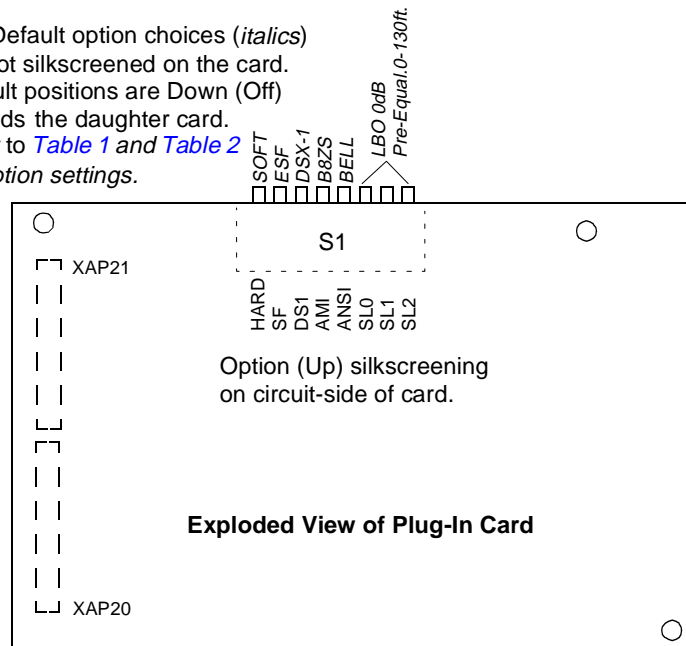

Figure 1   NIU/DIU 7624 Option Selection

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Table 1   NIIU/DIU 7624 Hard Configuration Option Settings

Options	Default Position of S1 (Down = Off)	Description
*SOFT/*HARD	*SOFT*	You may select hard or soft configuration.
ESF/SF	*ESF*	Framing Mode: ESF - Extended Super Frame: consists of twenty four consecutive frames. SF - Superframe: consists of twelve consecutive frames.
DSX-1/DS1	*DSX-1*	Network Interface Type: DSX-1 - configures the interface to operate as a standard cross-connect DSX-1. DS-1 - configures the interface to operate as a standard DS-1.
B8ZS/AMI	*B8ZS*	One of two types of network interface Line Coding may be selected: B8ZS - Bipolar with 8 Zero Substitution encoding. AMI - Alternate Mark Inversion encoding.
BELL/ANSI (DS-1)	*BELL*	Selects FDL mode: ANSI T1-403 - bit oriented. Bellcore - TR54016 - byte oriented (HDLC).
SL0 - SL2		Allows you to select Line Buildout (LBO) for a DS-1 Network Interface Type or Pre-Equalization for a DSX Interface Type. Refer to "SL0/SL2 Option Settings" table below.
LBO	*0 dB*	Line Build Out is the line build out value of the DS-1 interface. The selections are: 0, -7.5, -15, and -22 dB.
Pre-Equalization	*0-130 ft.*	Pre-Equalization is the pre-equalization of the transmitter of the DSX-1 interface. The selections are: 0-130, 130-260, 260-390, 390-530, and 530-655 feet.

SL0/SL2 Option Settings

SL2	SL1	SL0	LBO (DS-1)	Pre-Equalization (*DSX-1*)
Off	Off	Off	0 dB	0-130 ft.
Off	Off	On	-7.5 dB	130-260 ft.
Off	On	Off	-15 dB	260-390 ft.
Off	On	On	-22 dB	390-530 ft.
On	X	X	do not use	530-655 ft.
Off = Down (toward daughter card) On = Up X = Don't Care				

Table 2   NIU/DIU Soft Configuration Option Settings

Options	Default	Description
ESF/SF	ESF	*Same as S1 switch setting in Table 1.*
DSX-1/DS1	DSX-1	*Same as S1 switch setting in Table.*
B8ZS/AMI	B8ZS	*Same as S1 switch setting in Table 1.*
Line Build-Out	n/a	*n/a.*
Pre-Equalization	0-130	*Same as S1 switch setting in Table 1.*
Extra options available when soft configured		
BELL/ANSI/None	None	Selects either BELL, ANSI or None.
Recovered/Internal Transmit Timing	Recovered	Allows you to select the Transmit Clock source: Recovered - Slave timing from the T1 network. When Recovered is selected and there is no timing source, transmit timing defaults to Internal. Internal - Internal clock source.
Inhibit/	Inhibit	Allows you to select or inhibit the Loopback Configuration: Inhibit - When you select this option, inband codes are ignored. Payload - When selected, the recovered T1 is looped back toward the network. Line Loop - When selected, the Telco received signal is looped back toward the network. Both Payload and Line loopbacks are initiated upon recognition of inband loop-up codes or by using UAS 7624 Local Management or UAS TEAM 7624 for UNIX Manager.
AIS Loop-Down Inhibit/5-60 seconds in 1 second Increments	Inhibit	You can select or inhibit the AIS Loopdown time - The time in seconds when receiving a continuous AIS before a network- initiated loopback is terminated. This time-out can be 5 to 60 seconds, or inhibited.
Framing Mode	Manual	Allows you to select automatic or manual Framing Mode.
LBO Control	Manual	Allows you to select automatic or manual Line Build-Out for DS-1.

Installing the NIU/DIU 7624

When you are satisfied that the option settings on the plug-in card are correct, install the 7624 card in the shelf following the directions below:

1.   Insert the card into its slot with the GDC logo on top, then slide it in until it makes contact with the rear panel connectors.

2.   Pull down the insertion/extraction tab on the front panel and firmly push the card in until it seats in the rear connectors.

To remove a card, pull down the insertion/extraction tab to unseat the card, then pull back on the tab.

Cabling the 7624

50-pin Telco connectors J17 and J20 provide the DSL connections to the 7624 cards installed in slots 1-6. Likewise, J18 and J21 provides the DSL connection for slots 7-12. J19 provides the connections for slots 13-16   Refer to *Table 3* for connector pinouts. The shelf also provides 16 DB-25 connectors in Zone 3. Refer to *Table 4* for connector pinouts.

Mixing Cards in The UAS Shelf

When you mix NIU/DIU 7624s with NIU 7001s and DIU 7616s in the same UAS Shelf we recommend that you install the 7001 cards in slots 13 to 16 (shaded areas) and the 7616 and 7624 cards in slots 1 to 12. You can then cable the T1 and DSL connections as shown in *Figure 2*. This avoids mixing T1 and DSL signals in the same 50-pin connector. The lower-numbered DB-25 connector of the pair of slots occupied by the 7624 provides the T1 signals. Use wire-wrap adapter (048P068-001) at this connector for connection to a RJ48H E-Block.
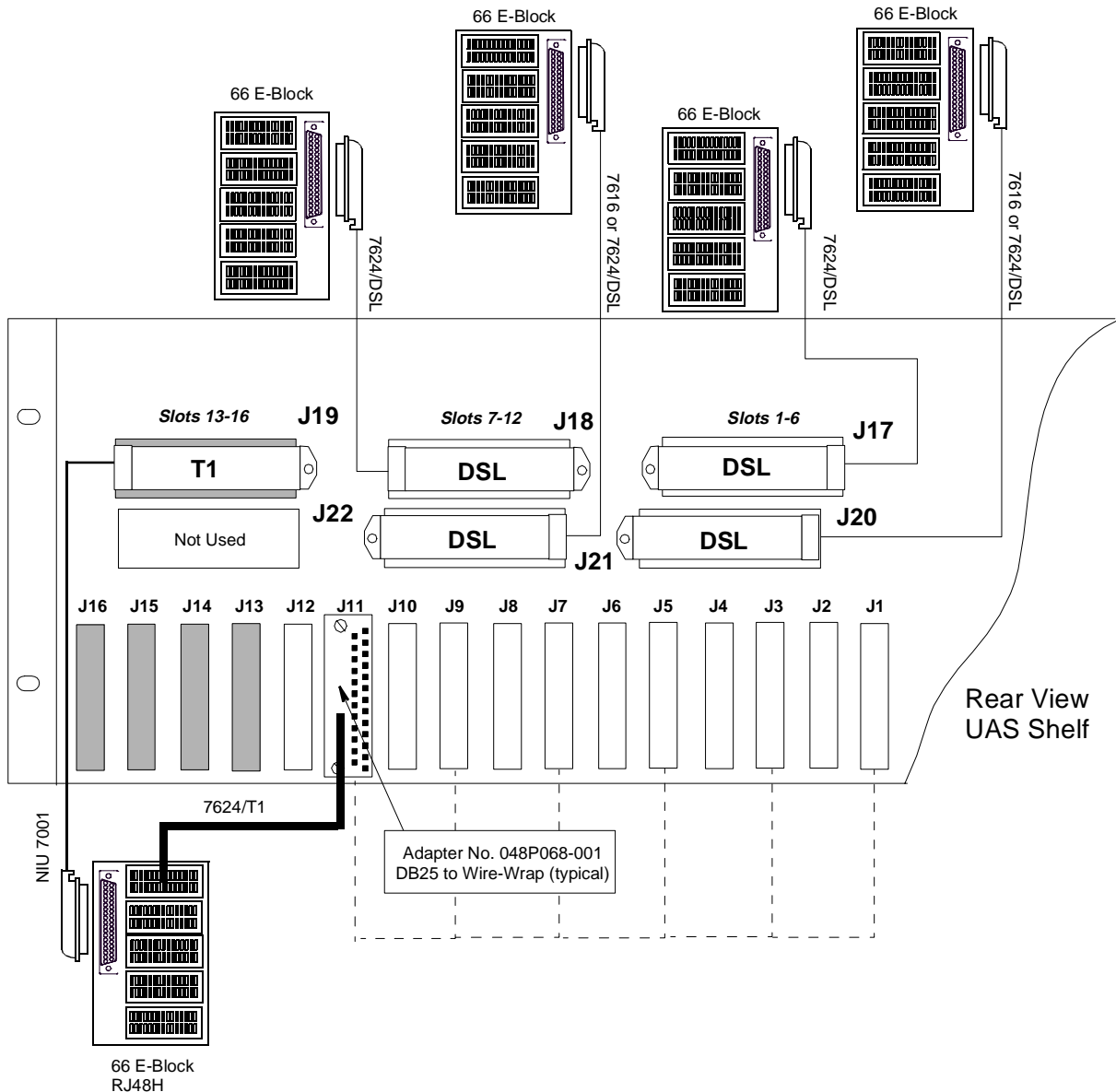
Figure 2   A Mixed UAS Shelf

50-Pin Telco Mapping

Refer to *Table 3* for the pin mapping of the 50-pin Telco connector.

Table 3   50-Pin Telco Mapping (UAS Shelf Rear Panel "J" Nos.)

Slot No.	"J" No.	DSL		DSL		DSL	
		Tip	Ring	Tip	Ring	Tip	Ring
7624 in slots 1 & 2 1	20	DSL1 1	DSL1 26	DSL2 28	DSL2 3	DSL3 4	DSL3 29
1	17	DSL4 1	DSL4 26	DSL5 28	DSL5 3	DSL6 4	DSL6 29
2	20	DSL7 5	DSL7 30	DSL8 32	DSL8 7	DSL9 8	DSL9 33
2	17	DSL10 5	DSL10 30	DSL11 32	DSL11 7	DSL12 8	DSL12 33
7624 in slots 3 & 4 3	20	DSL1 9	DSL1 34	DSL2 36	DSL2 11	DSL3 12	DSL3 37
3	17	DSL4 9	DSL4 34	DSL5 36	DSL5 11	DSL6 12	DSL6 37
4	20	DSL7 13	DSL7 38	DSL8 40	DSL8 15	DSL9 16	DSL9 41
4	17	DSL10 13	DSL10 38	DSL11 40	DSL11 15	DSL12 16	DSL12 41
7624 in slots 5 & 6 5	20	17	42	44	19	20	45
5	17	17	42	44	19	20	45
6	20	21	46	48	23	24	49
6	17	21	46	48	23	24	49
7624 in slots 7 & 8 7	21	1	26	28	3	4	29
7	18	1	26	28	3	4	29
8	21	5	30	32	7	8	33
8	18	5	30	32	7	8	33
7624 in slots 9 & 10 9	21	9	34	36	11	12	37
9	18	9	34	36	11	12	37
10	21	13	38	40	15	16	41
10	18	13	38	40	15	16	41
7624 in slots 11 & 12 11	21	17	42	44	19	20	45
11	18	17	42	44	19	20	45
12	21	21	46	48	23	24	49
12	18	21	46	48	23	24	49
7624 in slots 13 & 14 13	22	1	26	28	3	4	29
13	19	1	26	28	3	4	29
14	22	5	30	32	7	8	33
14	19	5	30	32	7	8	33
7624 in slots 15 & 16 15	22	9	34	36	11	12	37
15	19	9	34	36	11	12	37
16	22	13	38	40	15	16	41
16	19	13	38	40	15	16	41

When mixing cards, refer to "Mixing Cards in The UAS Shelf" on page 6.

Note: This table assumes you install a 7624 starting with slots 1 & 2. If the 7624 is placed in another pair of slots, the DSL numbers will change accordingly.

DB-25 Zone 3 Pinouts

Refer to *Table 4* for the pin mapping of the Zone 3 DB-25 connector.

**Table 4**   Zone 3 UAS Shelf DB-25 Pinouts

Zone 3 (P2)		
DB-25 Pin No.	**Description**	**Direction**
3	Transmit Tip	From 7624
16	Transmit Ring	From 7624
1	Receive Tip	To 7624
14	Receive Ring	To 7624

Front Panel Indicators

Table 5 describes the front panel indicators.

Table 5   Front Panel Indicators

Indicators	
LED	**Use**
ON	Power applied Green - Lights when power is applied.
RSP	Response Green - Lights upon transmission of a backplane management response.
LOOPS	Loop LEDs Red/Green (Bi-color) - Solid green = Good connection and in sync; Flashing green = Loop in test; Red = Alarm state (no current or sync.)
TM	Test Mode Red - Lights when the test mode is entered by NIU.
ALM	Alarm Red - Flashes during LCV, AIS, OOF, or LOS states.
LCV	Line Code Violation Red - Lights upon reception of bipolar violations in the received T1 AMI signal.
AIS	Alarm Indication Signal Red - Lights upon reception of a signal from the network Terminal Element (TE) that it cannot send a framed DS1 signal.
LOS	Loss Of Signal Red - Lights upon absence of received T1 signal.
OOF	Out Of Frame Red - Lights upon detection of severely errored seconds or wrong T1 framing pattern.
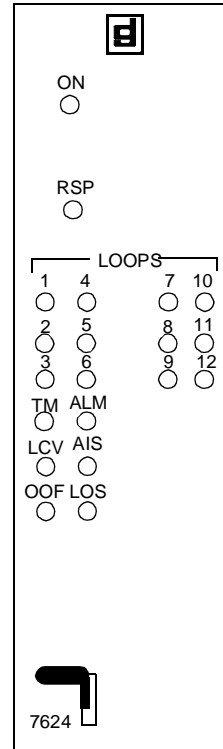
Tests

The NIU/DIU 7624 performs the following diagnostic loopbacks: See *Figure 3* through *Figure 11*. UAS 7624 Local Management (VT-100 or Telnet) may initiate, T1 Line Loopback, T1 Payload Loopback, Digital Loop, Self Test, and Remote Digital Loop. TEAM 7624 for UNIX Manager, can control all tests.

T1 Line Loopback

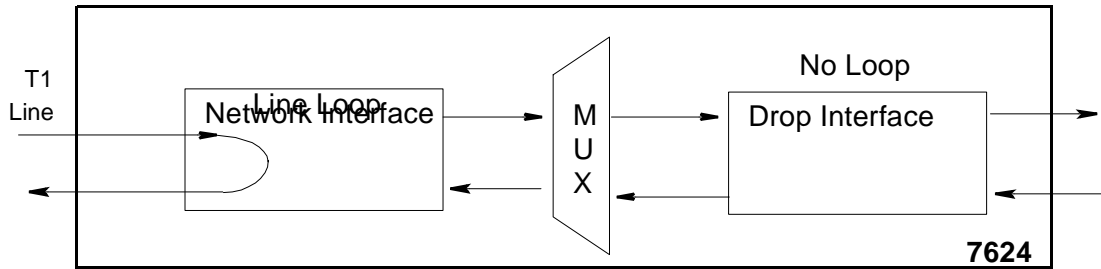T1 Line Loopback loops the Telco receive path to the transmit path, back towards the T1 network.

Figure 3   T1 Line Loopback

T1 Payload Loopback

T1 Payload Loopback loops the recovered T1 receive path to the transmit path, back towards the T1 network and corrects bipolar violations.
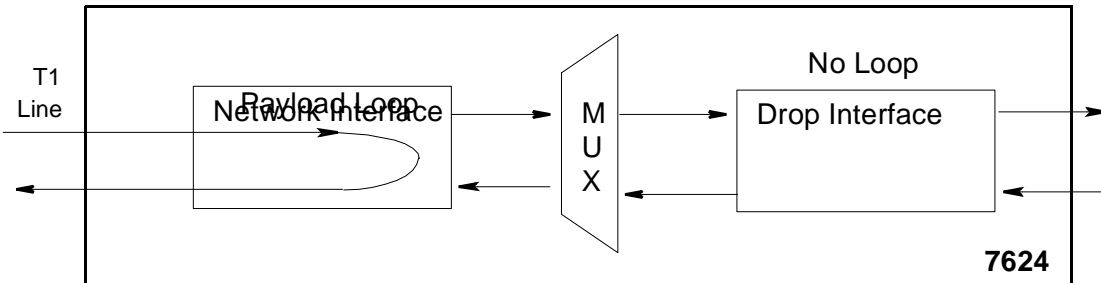
Figure 4   T1 Payload Loopback

Self Test

Self Test transmits a 2047 bit pattern and tests the receiver for bit errors.
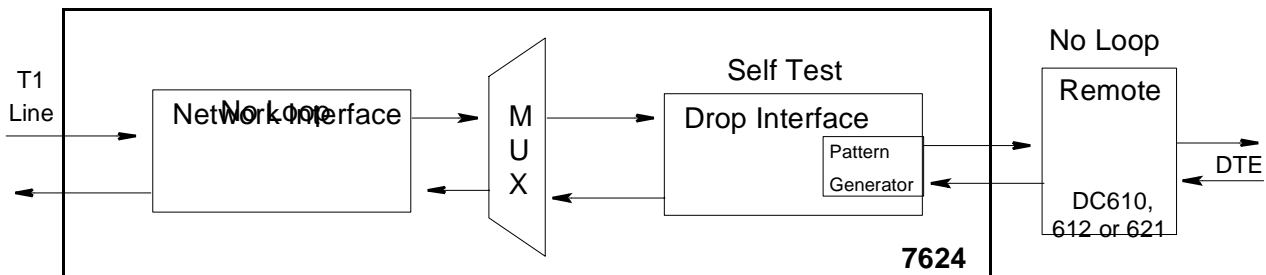
Figure 5   Self Test

Digital Loopback

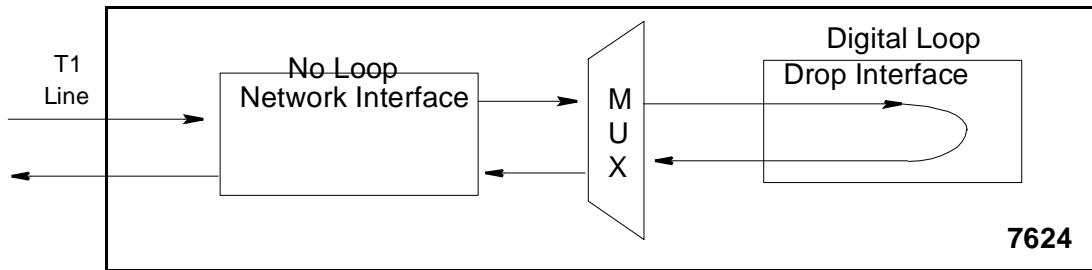Digital Loopback loops 128 kbps (two DSOs) received path to transmits path back towards the T1 network.

Figure 6   Digital Loopback

Remote Digital Loopback

Remote Digital Loopback commands a remote unit to go into loopback.
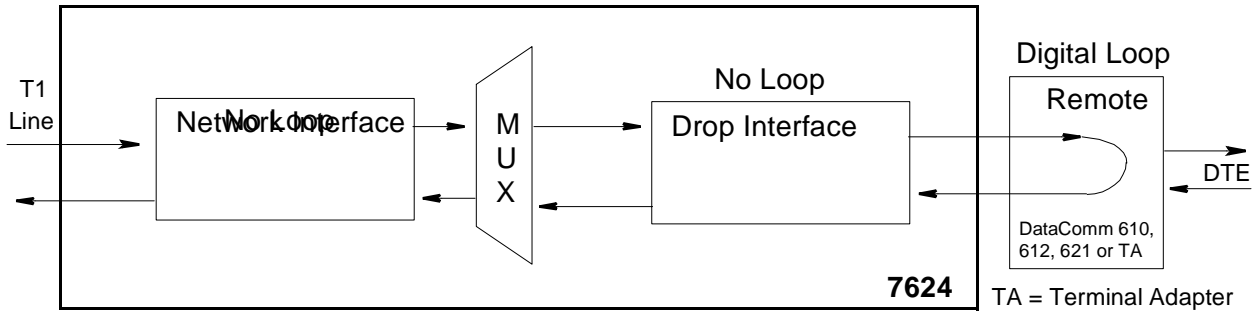

Figure 7   Remote Digital Loopback

Remote Digital Loopback with Self Test

Remote Digital Loopback with Self Test commands a remote device to go into loopback, and the 7624 transmits a 2047-bit pattern and tests the receiver for bit errors.
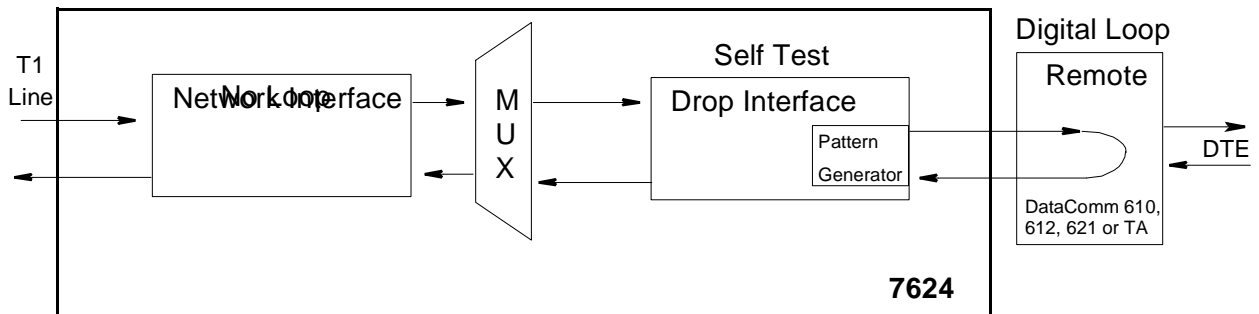

Figure 8   Remote Digital Loopback with Self Test

Remote Bilateral Loopback

Remote Bilateral Loopback is performed at a remote unit.
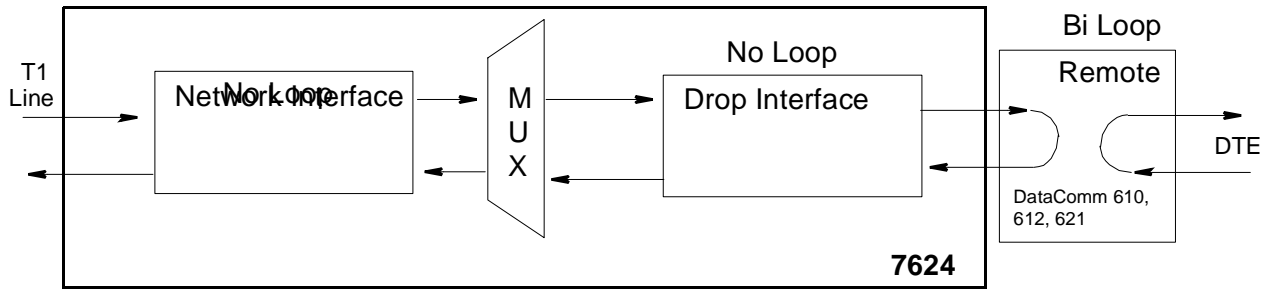

Figure 9   Remote Bilateral Loopback

Remote Bilateral Loopback with Self Test

Remote Bilateral Loopback with Self Test is performed at a remote unit, and the 7624 master is generating the 2047 self-test pattern.
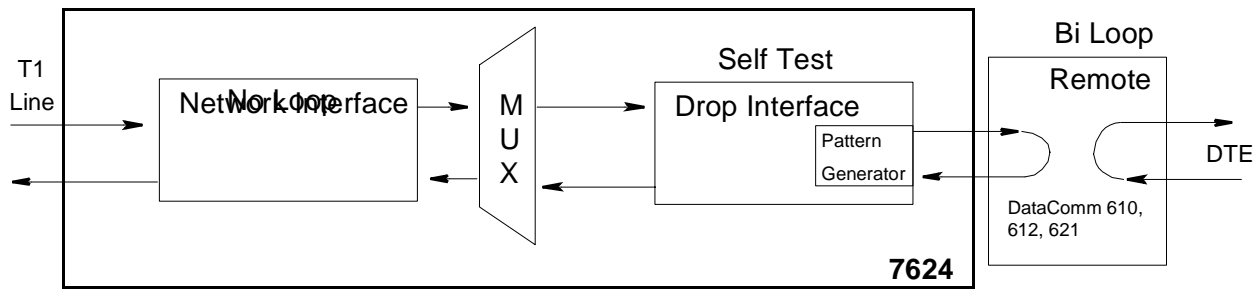

Figure 10   Remote Bilateral Loopback with Self Test

Master to Remote Self Test

Master to Remote Self Test puts the 7624 and the remote into a self-test (2047 test pattern only).
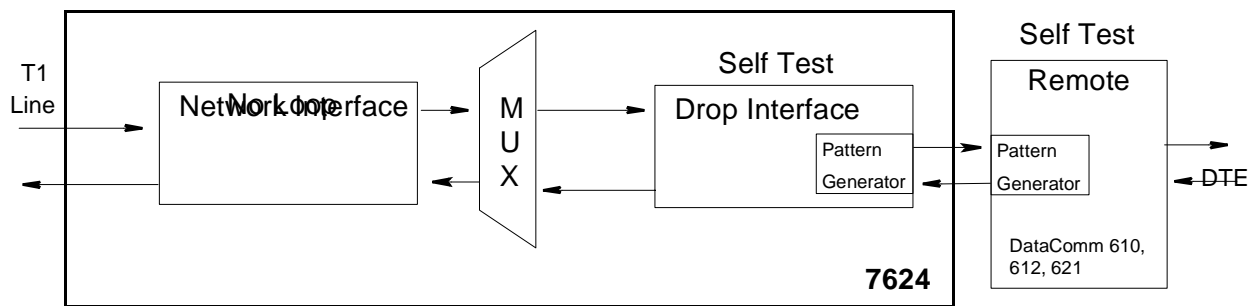

Figure 11   Master to Remote Self Test

Remote to Remote Self Test

Remote to Remote Self Test puts the remote unit into self-test (master is transparent). (2047 or 511 test pattern).
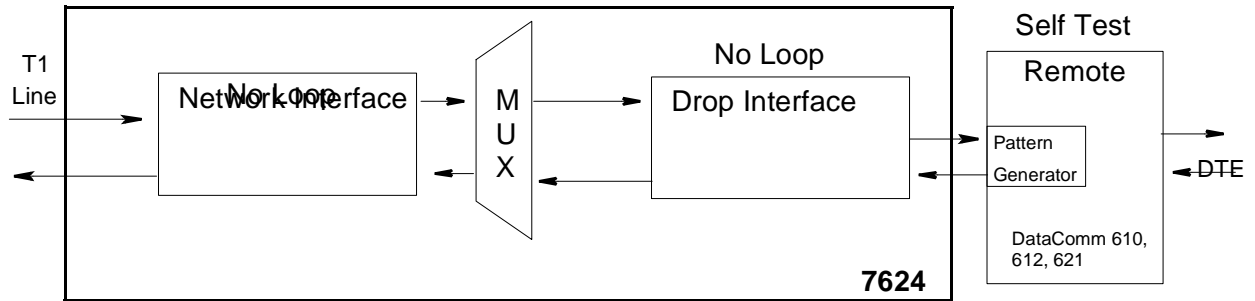

Figure 12   Remote to Remote Self Test

Parts List and Specifications

The parts list and specifications for the NIU/DIU 7624 are found in *Table 6*.

Table 6   Parts List and Specifications

Parts List	
087M010-001	NIU/DIU 7624 module (base card, daughter card and plug-in card)
048P068-001	DB-25 to Wire-Wrap Adapter
830-002S-xxx	Amphenol 50-pin male- to-male cable (xxx= 5, 10, 25 and 50 ft. lengths)
Specifications	
Dimensions Height Width Depth Weight	 7.0 in. (178 mm) 1.75 in. (44.5 mm) 9.5 in. (241 mm) 1.9 lbs. (0.85 kg)
Power	+ 5 Vdc at 2A (max.) +12 Vdc at 50 mA (max.) -12 Vdc at 50 mA (max.)
Load Number	2.0 (for 2 slots)
Network Management Protocol	SNMP
Ambient Temperature operating non-operating	 0 to 50° C -40 to 85° C
Humidity (operating)	5% to 95% (non condensation)
Altitude operating non-operating	 0 to 10,000 feet 0 to 40,000 feet
NIU Interface	
Diagnostics	Line Loopback, Payload Loopback, Digital Loopback.
Communication line	T1 digital carrier
Line Impedance	100 ohm
Frequency	1.544 Mbps ±50 bps
Line Build-Out	0, 7.5, 15, or 22.5 dB at 772 kHz
Pre Equalization	0-130, 130-260, 260-390, 390-530, 530-655 feet.
DIU Interface	
Sealing Current	4.5 mA nominal
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	18 kft. of 26 ga.wire
Performance	10^{-7} BER on 15 ANSI T10601 test lamps.

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