

DS3 Network Interface Unit NIU3 Installation and Maintenance

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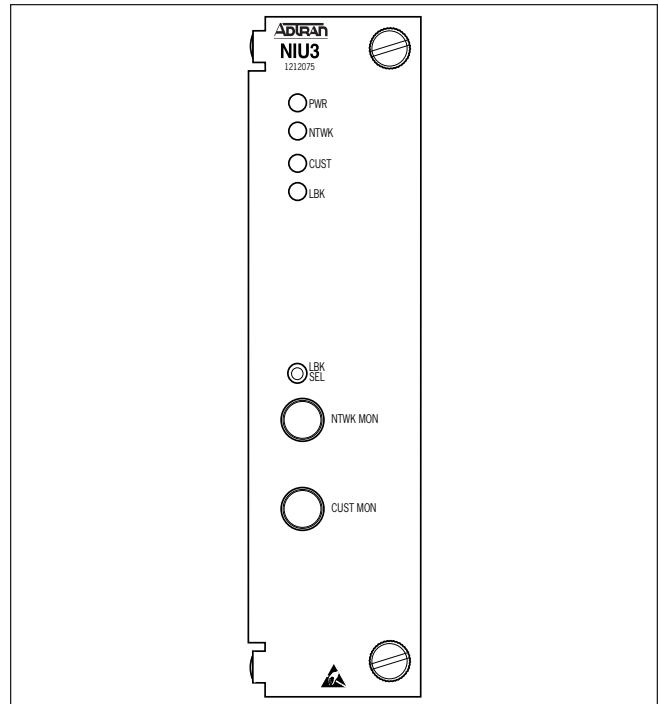


Figure 1. NIU3

1. GENERAL

This I&M Practice is used in association with the Standalone Housing, 12-Slot Shelf, or 3-Slot Shelf. Refer to *Specifications* for part numbers.

The ADTRAN DS3 Network Interface Unit (NIU3) resides at the customer location as a demarcation and loopback point for DS3 circuits. When used in a DS3 circuit, the unit provides a troubleshooting advantage by supplying information that will eliminate a customer premises dispatch. The unit performs a loopback at the customer interface toward the network when initiated either remotely from the CO, or locally from the unit's front panel pushbutton. The NIU3 is transparent to data transmission during normal operation. **Figure 1** shows the NIU3, P/N 1212075L1.

Revision History

This document has been reissued to incorporate administrative revisions.

Features

The NIU3 provides the following features and functions:

- Standalone enclosure, 12-slot, or 3-slot shelf installation.
- DS3 C-bit and M13 framing or unframed.
- Bypass relays on the host circuit board ensure virtually uninterrupted data transmission during card failure, removal, or power loss.
- Loopback in response to FEAC codes.
- Recessed front panel pushbutton loopback control.
- Nonintrusive front panel monitor jacks for both network and customer directions.
- Notification on loss of signal detection.
- 120-minute loopback time out.
- -48 VDC power for standalone or shelf enclosures.
- 120 VAC adapter option for standalone.
- Dual power feeds in shelf configuration.

Description

The NIU3 resides at the remote location next to customer premises equipment and is housed in either a standalone or shelf enclosure.

The NIU3 is designed to loopback test data originating at the CO and responds to commands inserted into the data stream by a test head or portable test set. The loopback can isolate problems located on the customer side of the demarcation point, thus eliminating the need for an immediate trouble-call dispatch. The NIU3 is transparent to data transmission during normal operation. If the NIU3 fails or is removed from its host circuit board, bypass relays on the host ensure circuit continuity to maintain data flow between the network and the customer. A front panel LED on the NIU3 provides notification of failure. See **Figure 2** for a circuit diagram of the NIU3 in a DS3 network delivered via SONET.

2. INSTALLATION



After unpacking the unit inspect it for damage. If damage is noted, file a claim with the carrier, then contact ADTRAN. See *Warranty and Customer Service*.

This product is intended for use in a restricted access area in a Type “B” or “E” enclosure only.

Location

In either housing configuration, the NIU3 installs at any location convenient to the customer. The NIU3 can pass both network and customer signals up to 900 feet. However, if either distance exceeds 450 feet, the respective front panel monitoring signal begins to degrade. Also, during NIU3 bypass operations, if total transmission distance exceeds 900 feet, signal quality may degrade. See Figure 2 for maximum recommended transmission distances.

The NIU3 inserts into the host circuit board of either the standalone housing or the shelf. The unit is secured with the two front panel thumbscrews.

Jack Connections

Both housings have four rear panel BNC connectors for each NIU3: two (IN/OUT) for customer receive/transmit, and two (IN/OUT) for network receive/transmit. Two additional jacks on the NIU3 front panel provide a nonintrusive network and customer monitoring point. The standalone housing or shelf security panel must be opened to access the monitoring jacks.

Standalone Power

The NIU3 operates on local -48 VDC. The standalone housing has a power wire portal on the rear panel for termination on the host circuit board at TB1, which has terminals for 48V(-), 48V(+)/GND, and Frame Ground (see **Figure 3**).

Standalone Power Option

An optional standalone unit power source is from a standard 120 VAC wall outlet via a separately purchased transformer with 48 VDC @ 200 mA output.

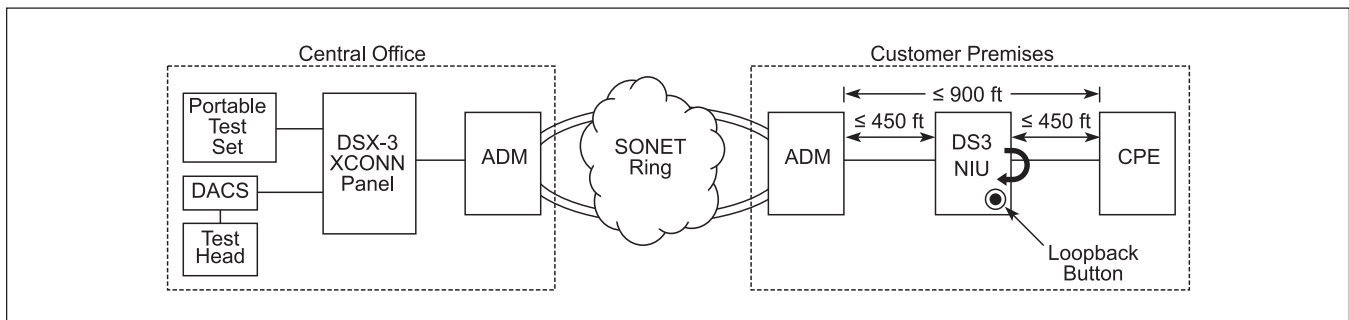


Figure 2. DS3 NIU Loopback Diagram

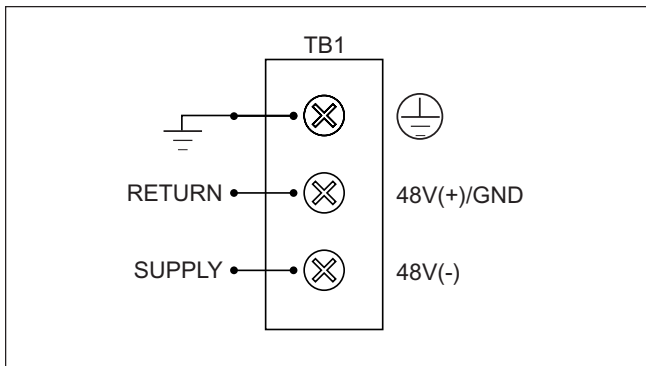


Figure 3. Standalone Power Connection

In this case the (red) power wire is connected to the 48V(+)/GND terminal and the (black) return wire to the 48V(-) terminal. The green wire connects to the Frame Ground terminal (see **Figure 4**).

CAUTION

Terminate grounds to an approved ground location. Check metal to metal contact on all ground connections, ensure ground circuit continuity.

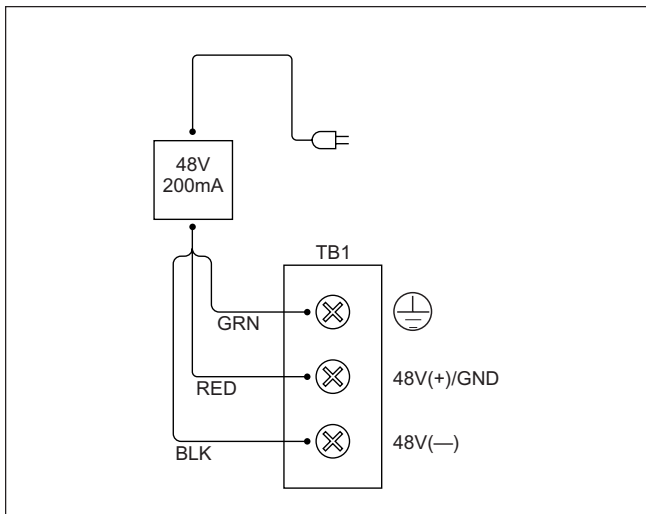


Figure 4. AC/DC Transformer Power Connection

Standalone Ground Option

Optionally, frame ground is provided by a ground lug on the standalone motherboard (J1). J1 and TB1 are electrically connected. A ground wire portal on the rear panel of the housing provides access for this ground wire. J1 is a screw compression terminal requiring a solid copper wire connection.

Shelf Power

The 12-slot shelf backplane has a dual power terminal (TB1) with connections for -48V A, -48V RET A, -48V B, and -48V RET B, plus a common Frame Ground connection (see **Figure 5**). A backplane diode arrangement allows both DC supplies to load-share with one side picking up the entire load should the other side fail.

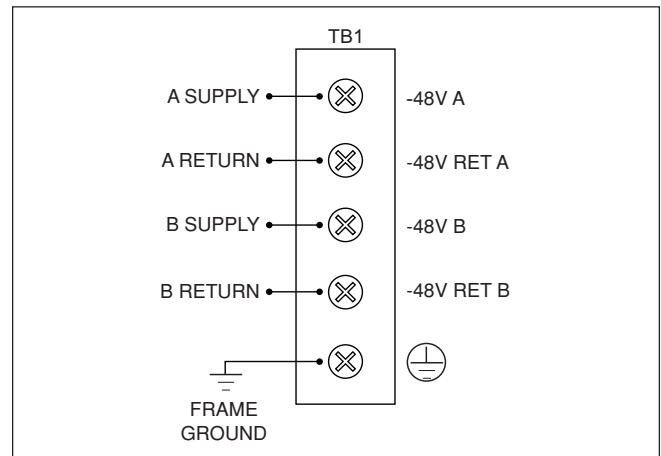


Figure 5. Shelf Power Connection

Fuse

The -48 VDC is fused on each NIU3 card.

Options

Line Build Out

A 2-position DIP switch (SW2) on the NIU3 enables signal attenuation towards both the network and the customer. DIP switch option selection must be made prior to inserting the NIU3 into the host circuit board.

If network equipment (e.g. ADM) is within 225 line feet of the NIU3, enable LBO on SW2-1.

- SW2 Position 1 – ON, LBO toward network enabled
- SW2 Position 1 – OFF, LBO toward network disabled

If CPE, (e.g. DS3 multiplexer), is within 225 line feet of the NIU3, enable LBO on SW2-2.

- SW2 Position 2 – ON, LBO toward customer enabled
- SW2 Position 2 – OFF, LBO toward customer disabled

LED Indication

Four LEDs on the NIU3 front panel show status during normal, problem, and test operation. **Table 1** describes LED indication.

Initiating Loopback with SW1

Front panel LBK SEL pushbutton (SW1) controls loopback mode as described here:

- To initiate a loopback, depress SW1 for 5 seconds. During this time the LBK LED flashes indicating the loopback is “arming.” After 5 seconds the loopback enables, the LED turns ON solid, and SW1 can be released.

If SW1 is released before the arming period expires the loopback does not initiate. This process decreases the chance of an inadvertent loopback.

- If a loopback is in affect, depressing SW1 will disable the loopback regardless of initiation point.

Loopback priority is in response to the most recent local or remote input. The LBK LED shows status.

3. TURNUP

When inserted into a host with power, the PWR LED turns ON red while the NIU3 performs a self-test

during which the remaining LEDs go through an ON/OFF sequence. If the self-test passes, the PWR LED turns ON green indicating the NIU3 is online. If the test fails, the LED remains red and the host bypass relays will maintain data flow around the NIU3.

4. OPERATION

During normal operation the NIU3 is transparent to the network. In the event of circuit trouble, test equipment at the central office can monitor the loop. When a loopback is initiated, the transmit/receive paths can be tested to the customer interface. The NIU3 troubleshooting tests are intrusive to data transmission.

Monitoring

Front panel mid-size monitoring jacks provide nonintrusive monitoring access through a high-impedance bridging circuit. The monitor level is nominally 21.5 dB below the signal power. The signal from the network is monitored via the NTKW MON jack; the signal from the customer is monitored via the CUST MON jack.

Loss of Signal

In the event of a loss of signal, the NIU3 provides both a “keep alive” signal and LED notification.

- If there is no signal present from the network, the NTKW LED turns ON red and the NIU3 will transmit an unframed all ones signal toward the customer.
- If there is no signal present from the customer, the CUST LED turns ON red and the NIU3 will transmit a framed DS3 idle signal toward the network.

Table 1. LED Indication

LED	Color	Status	Description
PWR	Green Red	ON ON OFF	Normal operation. Card Malfunction. No power.
NTWK	Red	ON OFF	No DS3 signal at network interface. DS3 signal present at network interface.
CUST	Red	ON OFF	No DS3 signal at customer interface. DS3 signal present at customer interface.
LBK	Yellow	Flashing ON OFF	Loopback arming. Loopback toward network enabled. Loopback toward network disabled.
Note: All LEDs OFF indicates no power, or other system malfunction.			

5. TESTING

The NIU3 is compatible with standard test equipment. Digital testing is accomplished with the T-BERD 310 or equivalent. The test device at the CO inserts a DS3 NIU FEAC loop up code (C-bit parity framing only) toward the NIU3. The NIU3 then performs a network loopback. The loopback is terminated by a DS3 NIU FEAC loop down code. The loopback command can also be enabled or terminated with the front panel LBK pushbutton.

Timeout

After a loopback is initiated, unless terminated manually, a time out returns the loop to normal operation after 120 minutes. The timer is reset at any point by sending the FEAC loop up code.

6. MAINTENANCE

The DS3 NIU does not require routine maintenance for normal operation.

7. SPECIFICATIONS

See **Table 2** for specifications and part numbers.

8. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within ten (10) years from the date of shipment if it does not meet its published specifications or fails while in service. Refer to *ADTRAN U.S. and Canada Carrier Networks Equipment Warranty*, document 60000087-10.

Contact Customer And Product Service (CAPS) prior to returning equipment to ADTRAN.

For service, CAPS requests, or further information, contact one of the following numbers:

ADTRAN Sales

Pricing/Availability
(800) 827-0807

ADTRAN Technical Support

Pre-sales Applications/Post-sales Technical Assistance
(800) 726-8663

Standard hours: Monday-Friday, 7 a.m. - 7 p.m. CST
Emergency hours: 7 days/week, 24 hours/day

ADTRAN Repair/CAPS

Return for Repair/Upgrade
(256) 963-8722

Repair and Return Address

ADTRAN, Inc.
CAPS Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807

Table 2. NIU3 Specifications

Environmental			
Operating Temperature	-40° C to 70° C (-40° F to 158° F)		
Storage Temperature	-40° C to 85° C (-40° F to 185° F)		
Max Humidity	Per GR 63		
Physical			
Dimensions	1 7/8 in. W, 5 5/8 in. H, 5 1/2 in. D, T400 density		
Weight	NIU3 circuit board: 8 Ounces Standalone Housing: 2 Pounds 12-Slot Shelf: 12 Pounds		
Power			
Volts	-48 VDC nominal		
Max input current	125 mA		
Compliance			
NEBS	Level 3		
UL	1950		
ANSI	T1.404		
Compliance Codes			
Code	Input	Output	
Power Code (PC)	F	C	
Telecommunication Code (TC)	–	–	
Installation Code (IC)	A	–	
Part Numbers			
NIU3	1212075L1, CLEI: NCD3EEDA - -		
12-Slot Shelf	1212078L1, CLEI: NCM5RZ0D - -		
Standalone Housing	1212070L1, CLEI: NCM5KWVD - -		
AC/DC Transformer	3360DSK48V03 (separately purchased)		
3-Slot Shelf	1212073L1		
Shelf empty slot blank cover	1212076L1		