

DS3 NIU3 12-Slot Housing Installation and Maintenance Practice

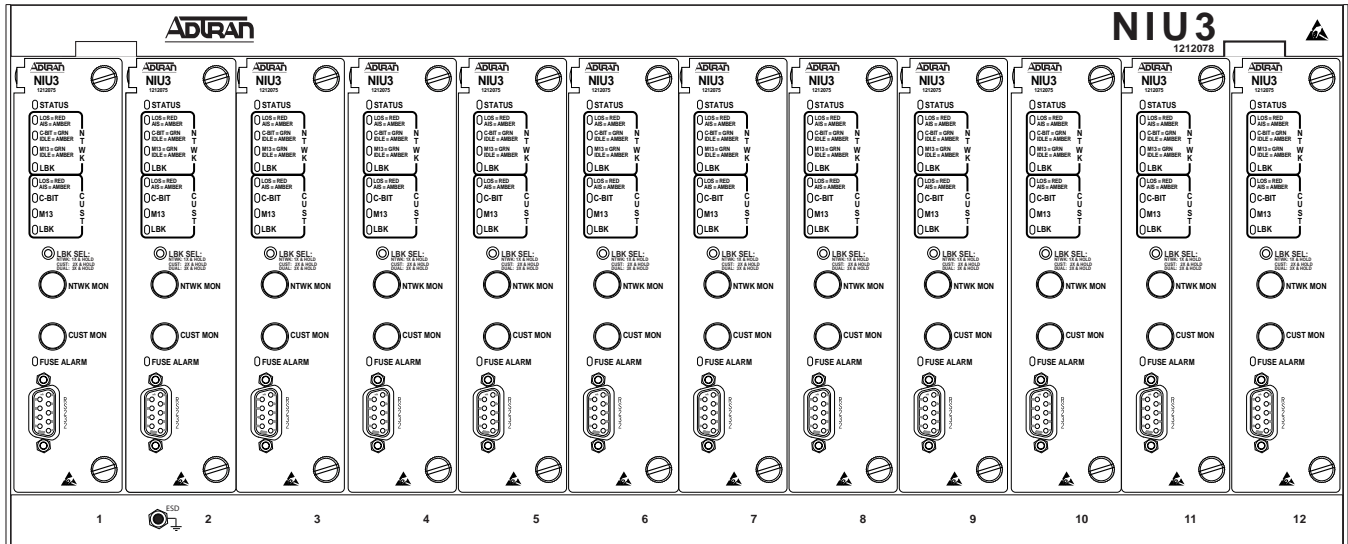


Figure 1. DS3 NIU3 12-Slot Housing

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1. GENERAL

This practice is an installation and maintenance guide for the ADTRAN® DS3 NIU3 12-Slot Housing (P/N 1212078L1), illustrated in **Figure 1**. This practice is used in association with the DS3 NIU3 module practice (P/N 61213075L2-5).

Revision History

Issue 6 of this document provides the inclusion of a Caution statement concerning the bypass relays in the *Installation* section on page 3.

Features

The basic features and functions of the DS3 NIU3 12-Slot Housing include the following:

- Field replaceable plug-in pass-through relays ensure virtually uninterrupted transmission during card replacement, failure, or power loss
- Field replaceable plug-in shelf alarm relay terminals provide alarm indication
- BNC transmit/receive jacks for each NIU3 card
- Dual -48 VDC or ±24 VDC power feeds
- Optional power supply available
- Load-share diode arrangement for redundant power capability
- Sturdy metal construction
- Transparent front panel access cover with lock
- Durable powder-coated enamel finish
- Cable management hardware
- Mounting and accessory hardware included

2. DESCRIPTION

The DS3 NIU3 12-Slot Housing is an all-metal construction housing with slots for 12 NIU3 modules. Guide grooves direct the card to the backplane edge connector and when properly inserted, thumbscrews on the NIU3 front panel align and fasten to threaded holes on the housing. Housing slots are numbered 1 to 12, left to right, looking at the front of the chassis. The backplane circuitry is protected by a metal cover with openings for BNC data jacks, pass-through relays, power terminal connections, and alarm pins. Removable covers provide security for power and alarm connections, and pass-through and alarm relays. A cable management bar and wire tie-down anchor points complete the assembly. All connections, terminals, and jacks are clearly labeled.

Compliance

Table 1 shows the compliance codes for the DS3 NIU3 12-Slot Housing. The DS3 NIU3 12-Slot Housing is NRTL listed to the applicable UL standards. The DS3 NIU3 12-Slot Housing is to be installed in a restricted access location and in a Type “B” or “E” enclosure only.

Table 1. Compliance Codes

Code	Input	Output
Power Code (PC)	F	C
Telecommunication Code (TC)	–	–
Installation Code (IC)	E	–

The DS3 NIU3 12-Slot Housing meets the following standards:

- NEBS: Level 3
- ANSI: T1.404
- UL: 60950
- FCC: Part 15, Class A

3. INSTALLATION



After unpacking the unit, inspect it for damage. If damage has occurred, file a claim with the carrier, then contact ADTRAN Customer Service. Refer to the [Warranty and Customer Service](#) section for further information. If possible, keep the original shipping

container for returning the DS3 NIU3 12-Slot Housing for repair or for verification of shipping damage.

Shipping Contents

The contents include the following items:

- DS3 NIU3 12-Slot Housing
- *DS3 NIU3 12-Slot Housing Job Aid*

Install per requirements of NEC NFPA 70. After installation, ensure equipment rack stability is not upset.

CAUTION

Electronic modules can be damaged by ESD. When handling modules, wear an antistatic discharge wrist strap to prevent damage to electronic components. Place modules in antistatic packing material when transporting or storing. When working on modules, always place them on an approved antistatic mat that is electrically grounded.

Location

The DS3 NIU3 12-Slot Housing installs at any location convenient to the customer as a demarcation and loopback point for DS3 circuits. The NIU3 can pass both network and customer signals up to 900 feet. During NIU3 bypass operations, if total transmission distance exceeds 900 feet, signal quality may degrade. **Figure 2** on page 3 illustrates the maximum recommended transmission distances.

Rackmount

NOTE

Install the unit per NEC NFPA 70 requirements. For more information, refer to the [Compliance](#) section.

The DS3 NIU3 12-Slot Housing can be bay mounted at any convenient location. Reversible mounting flanges adjust to desired position in the 19-inch rack. Also included are 23-inch flanges.

To install the DS3 NIU3 12-Slot Housing, perform the following steps:

1. Determine intended shelf extension from the rack.
2. Position the mounting flanges as necessary using the appropriate flanges for a 19-inch or 23-inch rack. Install using the supplied countersink screws.

3. Install the cable management bar to the rear cover of the housing using the supplied pan-head screws.
4. Mount the housing to the rack accordingly.

Wallmount

Two additional brackets, available separately from ADTRAN, allow the chassis to be mounted to a wall:

- With the DS3 NIU3 12-Slot Housing Swingarm Bracket (P/N 1212078L1WM) six ¼ by ¾ inch bladed hex-head screws and flat washers are provided with the wallmount bracket for attaching to the wall. In this configuration, the original flanges are removed, and the wallmount flanges are installed using the countersink screws from the originals. Install the chassis so the front panels of the circuit modules face outward on the front.

A 2-foot 16 AWG ground wire is also provided to be installed between the ground termination on the bracket and the ground termination on the housing. This allows the chassis to rotate without disturbing the main ground wire leaving the bracket.

CAUTION

When rotating the chassis, always do so with care to ensure that all wiring and connections are protected.

- With the DS3 NIU3 12-Slot Housing Vertical Mounting Bracket (P/N 1212078L1WMB) four ¼ by 1¾ inch hex-head screws are provided to mount the L-brackets to the wall (re-use the flange screws). Mount the chassis with the top toward the wall and the module slots to one side.

CAUTION

There are 24 removable bypass relays and 1 removable alarm relay located on the rear of the housing. After installation, remove the bypass relay cover and alarm relay cover and ensure that the relays are properly and firmly seated in their sockets. Replace the relay covers.

4. WIRING

Wiring consists of three elements: data, power/ground, and alarms. Use suitably-sized copper conductors only.

Data

Externally, the DS3 NIU3 12-Slot Housing backplane has four BNC connectors for each of the 12 NIU3 slots.

- Two upper (**IN/OUT**) for Network Receive/Transmit.
- Two lower (**IN/OUT**) for Customer Receive/Transmit (**Figure 3** on page 4).

Wiring Connections

Connect data wiring per the following procedure:

1. Connect the cables to the BNCs on the DS3 NIU3 12-Slot Housing backplane for those shelf slots that will be populated.
2. If not already accomplished, connect the opposite ends to their designated terminations.
3. Dress and lace the wire runs to the rack frames as necessary.

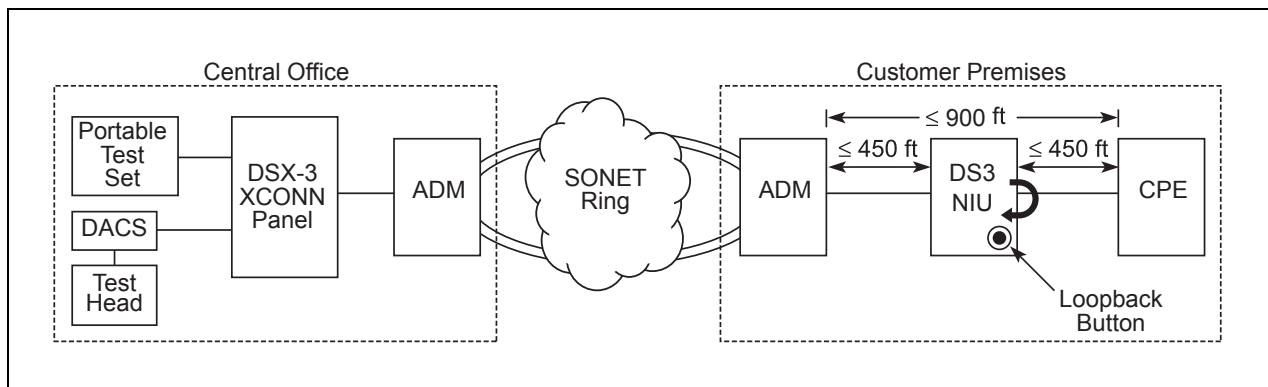
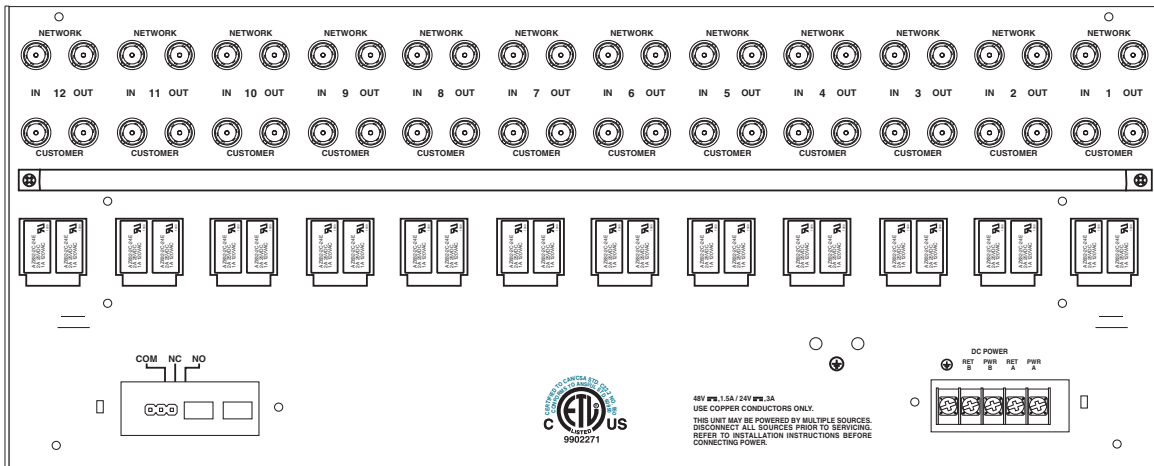


Figure 2. NIU3 Circuit Diagram



NOTE: Power and Alarm security covers removed for clarity.

Figure 3. DS3 NIU3 12-Slot Housing Rear Panel

Power

Fully populated, the DS3 NIU3 12-Slot Housing operates on local -48 VDC at 1.5 amps maximum, or ± 24 VDC at 3.0 amps maximum. The DS3 NIU3 12-Slot Housing backplane has spade lug terminal connections (**TB1**) for both an “A-side” and “B-side” independent DC source, plus Frame Ground (**Figure 4**). A diode arrangement adds reliability by allowing both DC supplies to load share with one side picking up the entire load should the other side fail.

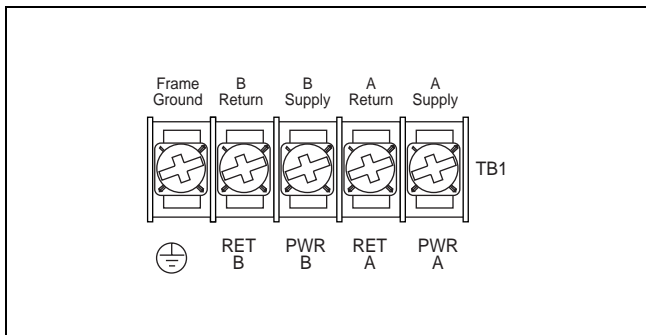


Figure 4. Local DC Power Connection

Adhere to one of the following requirements for powering the unit locally:

1. Connect to a grounded -48 VDC source, electrically isolated from the AC source. Provide branch circuit overcurrent protection with a fuse or circuit breaker, minimum 48 VDC, maximum 15 amps. Provide an easily-accessed, approved and rated disconnect device in the field wiring.
2. Connect to an approved Class 2 Type (LPS) power supply rated 48 VDC, maximum 240 VA.

For those slots not populated with an NIU3 circuit card, blank covers (P/N 1212076L1) are required.

CAUTION

Per GR-1089-CORE, October 2002, Section 9, this system is designed and intended for installation in a DC-C (common) bonding and grounding system only. It is not intended or designed for installation in a DC-I (isolated) bonding and grounding system.

WARNING

Ensure power is off and tagged out-of-service before making power wiring connections.

For local DC power application, the following terminal connections are made:

1. Connect -48 VDC or ± 24 VDC local supply to **PWR A**.
2. Connect the associated return wire to **RET A**.
3. If redundant power is intended, make similar connections to **PWR B** and **RET B**.

CAUTION

Terminate grounds to an approved ground source. Check metal-to-metal contact on all ground connections. Verify ground circuit continuity.

4. Connect the common frame ground terminal or ground lug (6 AWG maximum) to an approved ground location.

Independent AC Power Supply

An optional independent power supply/rectifier (PS/R) is available from ADTRAN. The PS/R (P/N 1212080L1) provides $-54\text{ V @ }2\text{ A}$.

The PS/R plugs into a standard 120 VAC outlet (**Figure 5**). The PS/R output wire terminates in a modular connector. An extension wire with a matching connector is included. The extension wire has ring terminals on the far end for connection to the NIU3 housing power terminals (**TB1**).

The red wire is -54 VDC and connects to the **PWR A** terminal; the black wire is the return and connects to the **RET A** terminal; the green wire connects to **FGND**.

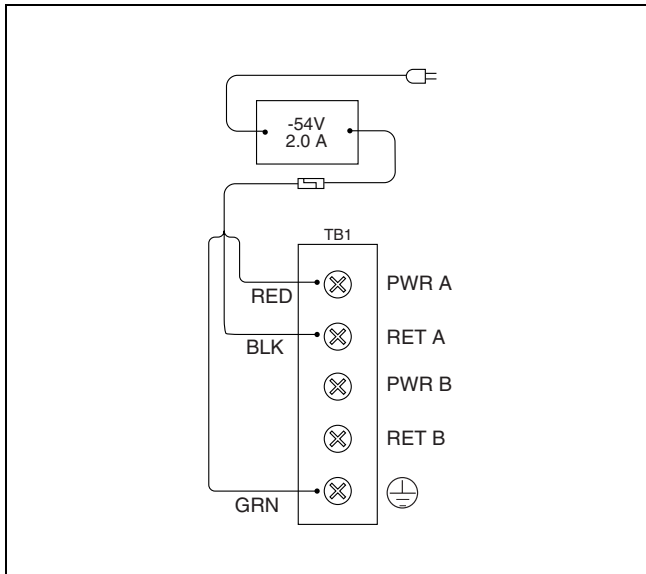


Figure 5. Power Supply/Rectifier Connection

Alarms

A 3-post wire-wrap terminal (**P1**) on the housing backplane selects either a normally closed (**COM/NC**) or a normally open (**COM/NO**) alarm relay. The alarm relay output responds to the card malfunction status on individual NIU3 cards.

1. Determine if the desired alarm output provides an NO or an NC response.
2. Make wire-wrap connections accordingly.
3. If not already done, connect alarm output to designated terminations.

CAUTION

After wiring connections are made, replace power and alarm security covers.

Options

Aside from mounting configuration, connecting redundant power, and alarm NO/NC selection, there are no options associated with the housing.

Final

After power and alarm wiring is connected and verified in accordance with local standards, codes, and this practice, perform the following tasks:

1. Dress and lace wiring to workmanship standards.
2. Install all protective shields and panels that were removed for wiring installation.
3. Provide power to the backplane.

5. TURNUP

When an NIU3 module is inserted into the housing with power applied to the backplane, the **STATUS LED** illuminates red while the NIU3 module performs a self-test. If the test passes, the **STATUS LED** illuminates green, and the other LEDs go through an on/off sequence, indicating the NIU3 module is online. If the test fails, the **STATUS LED** remains red, and the bypass relays (ADTRAN patent pending) maintain data flow around the NIU3 module.

6. OPERATION

The DS3 NIU3 12-Slot Housing exchanges data to and from the network loop and customer loop via the BNC connectors. If an NIU3 module fails or is removed from the circuit, the affected module relays on the backplane provide pass-through transmission so data flow is maintained.

During normal operation, NIU3 modules are 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. NIU3 troubleshooting tests are intrusive to data transmission.

LED Indication

There are no LEDs on the DS3 NIU3 12-Slot Housing. However, NIU3 module LEDs provide information for NIU3 module and shelf configuration and status.

7. MAINTENANCE

Aside from replacing failed relays, the DS3 NIU3 12-Slot Housing does not require maintenance for normal operation.

ADTRAN does not recommend that repairs be attempted in the field. Repair services may be obtained by returning the defective unit to ADTRAN. Refer to the *Warranty and Customer Service* section for further information.

Signal Relay Replacement

Each loop has a cut-through signal relay accessible on the backplane. The relay ensures data transfer in the event the NIU3 module fails, is removed, or loses power. Failure of the relay is determined by process of elimination. If a loss of signal occurs, and all other parameters are satisfactory, then a failed relay is indicated. A relay replacement kit (P/N 1212072L1) is available from ADTRAN.

CAUTION

Observe prong configuration on the removed relay. Relays are polarity sensitive, and replacement relays must be oriented correctly.

To replace a failed signal relay, perform the following steps:

1. Insert a jumper strap on the posts immediately adjacent to the suspect relay. This provides a signal path, bypassing the relay.
2. Using an appropriately sized IC extractor tool, lift the relay off its socket.
3. Align and insert the replacement relay, taking care not to bend prongs, and that relay orientation is the same as the removed relay.
4. Remove the jumper strap.
5. Monitor for normal operation.

Alarm Relay Replacement

The alarm relay is located adjacent to the alarm wire-wrap pins on the DS3 NIU3 12-Slot Housing backplane. The alarm relay output responds to the card malfunction status on individual NIU3 modules. If an alarm condition occurs, but an alarm signal is not present, then a failed alarm relay is indicated.

To replace a failed alarm relay, perform the following steps:

1. Using an appropriately sized IC extractor tool, lift the relay off its socket.
2. Align and insert the replacement relay, taking care not to bend prongs, and that relay orientation is the same as the removed relay.

8. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within the warranty period if it does not meet its published specifications or fails while in service. Warranty information can be found at www.adtran.com/warranty.

Refer to the following subsections for sales, support, CAPS requests, or further information.

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

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

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

9. SPECIFICATIONS

Specifications for the DS3 NIU3 12-Slot Housing are detailed in [Table 2](#).

Table 2. NIU3 12-Slot Shelf Specifications

Specification	Details
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)
Relative Humidity:	Per GR-63
Physical	
Dimensions:	17.5 in. W 9.8 in. D 7 in. H T400 density
Weight:	21 lb. with 12 NIU3 modules
Power	
Volts:	−48 VDC or ±24 VDC (nominal)
Max input current:	1.5 A or 3 A (fully loaded)
Compliance	
NEBS:	Level 3
UL:	60950
FCC:	Part 15, Class A
ANSI:	T1.404
Part Numbers	
DS3 NIU3 12-Slot Housing:	1212078L1 CLEI: NCM59Z0D__
NIU3:	1213075L2 CLEI: NCD3EGRA__
Blank Slot Cover:	1212076L1
Power Supply/Rectifier:	1212080L1
Relay Replacement Kit: (1 Alarm Relay, 2 Signal Relays, 2 Jumper Straps)	1212072L1
Wallmount Swingarm Bracket:	1212078L1WM
Wallmount Vertical Bracket:	1212078L1WMB

