ADTRAN

NetVanta 6360
Hardware Installation Guide

47006362F1	NetVanta 6360, 8 FXS Chassis
47006364F1	NetVanta 6360, 16 FXS Chassis
47006366F1	NetVanta 6360, 24 FXS Chassis
17406368F1	NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A
17406368F3	NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B
17806368F1	NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A
17806368F3	NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B
17406369F1	NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex A
17406369F3	NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B

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> **CAUTION**
>
> *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.*

Conventions

NOTE	*Notes provide additional useful information.*

CAUTION	*Cautions signify information that could prevent service interruption or damage to the equipment.*

WARNING	*Warnings provide information that could prevent injury or endangerment to human life.*

Safety Instructions

When using your telephone equipment, please follow these basic safety precautions to reduce the risk of fire, electrical shock, or personal injury:

1. Do not use this product near water, such as a bathtub, wash bowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There is a remote risk of shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord, power supply, and batteries indicated in the manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for special disposal instructions.
5. The socket-outlet shall be installed near the equipment and shall be easily accessible.

If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your qualified service personnel:

1. The power cable, extension cable, or plug is damaged.
2. An object has fallen into the product.
3. The product has been exposed to water.
4. The product has been dropped or damaged.
5. The product does not operate correctly when you follow the operating instructions.

CAUTION	*This equipment incorporates double pole/neutral fusing. If the neutral fuse opens and the line fuse does not open, voltage could still be present in the unit.*

CAUTION	*These units contain no user-serviceable parts. They should only be serviced by qualified service personnel.*

NOTE	*Additional safety guidelines, such as Waste Electrical and Electronic Equipment (WEEE), are given in the document NetVanta Safety and Regulatory Information available online at http://supportforums.adtran.com.*

Save These Important Safety Instructions

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FCC-Required Information

FCC regulations require that the following information be provided in this manual:

1. This equipment complies with Part 68 of Federal Communications Commission (FCC) rules and requirements adopted by America's Carriers Telecommunications Association (ACTA). Each registered interface has a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. If requested, provide this information to the telephone company.

2. If this equipment causes harm to the telephone network, the telephone company may temporarily discontinue service. If possible, advance notification is given; otherwise, notification is given as soon as possible. The telephone company will advise the customer of the right to file a complaint with the FCC.

3. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of this equipment. Advance notification and the opportunity to maintain uninterrupted service are given.

4. If experiencing difficulty with this equipment, please contact ADTRAN for repair and warranty information. The telephone company may require this equipment to be disconnected from the network until the problem is corrected, or it is certain the equipment is not malfunctioning.

5. This unit contains no user-serviceable parts.

6. This equipment is designed to connect to the telephone network or premises wiring using an FCC-compatible modular jack, which is compliant with Part 68 and requirements adopted by ACTA.

7. The following information may be required when applying to the local telephone company for leased line facilities:

Part Number	Registration Number	Service Type	REN/SOC	FIC	USOC
4700636xF1	US: HDCIS00B7006364F1	1.544 Mbps - SF 1.544 Mbps - SF and B8ZS 1.544 Mbps - ESF 1.544 Mbps - ESF and B8ZS	N/A / 6.0N	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN	RJ-48C
		Analog Loop Start	0.0B / 9.0N	02LS2	RJ-21X
17406368F1 17806368F1	US: HDCDLNAN7806268F1	xDSL	N/A / 9.0F	02LS2	RJ-48C
17406369F1	US: HDCDL01B7406369F1	xDSL	0.1B / 9.0Y	9.0Y	RJ-11

8. The ringer equivalence number (REN) is useful in determining the quantity of devices you may connect to your telephone line and still have all of those devices ring when your number is called. In most areas, the sum of the RENs of all devices should not exceed five. To be certain of the number of devices you may connect to your line as determined by the REN, call your telephone company to determine the maximum REN for your calling area.

9. This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio frequencies. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Electromagnetic Compatibility (EMC) Table

NetVanta Module P/N and Name		NetVanta 6360
17406368F1	Carrier Ethernet Quad SHDSL EFM Module, Annex A	FCC Part 15 Class A EN 300 386
17406368F3	Carrier Ethernet Quad SHDSL EFM Module, Annex B	FCC Part 15 Class A EN 300 386
17806368F1	Carrier Ethernet Octal SHDSL EFM Module, Annex A	FCC Part 15 Class A EN 300 386
17806368F3	Carrier Ethernet Octal SHDSL EFM Module, Annex B	FCC Part 15 Class A EN 300 386
17406369F1	Carrier Ethernet Quad VDSL2 EFM Module, Annex A	FCC Part 15 Class A EN 300 386
17406369F3	Carrier Ethernet Quad VDSL2 EFM Module, Annex B	FCC Part 15 Class A EN 300 386

Industry Canada Compliance Information

This product meets the applicable Industry Canada technical specifications.

The Ringer Equivalence Number (REN) is an indication of the maximum number of devices allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices not exceed five.

Le présent matériel est conforme aux specifications techniques applicables d'Industrie Canada.

L'indice d'équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas cinq.

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioelectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le materiel brouilleur: "Appareils Numériques," NMB-003 edictee par le ministre des Communications.

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Third-Party Software

The software included in this product contains copyrighted software that is licensed under the GNU General Public License (GPL). For a list of third-party software and their licenses, go to http://www.adtran.com/software/EULA. You can obtain the complete corresponding source code of such software components from ADTRAN for a period of three years after our last shipment of this product by sending a money order or check for $5 to:

ADTRAN, Inc, P.O. Box 933638, Atlanta, GA 31193-3638
Please write **GPL Source for product NetVanta 6360** in the memo line of your payment.

This offer is valid to anyone in receipt of this information.

Service and Warranty

For information on the service and warranty of ADTRAN products, visit the *Support* section of the ADTRAN website at http://www.adtran.com.

Table of Contents

                                   617006364F1-34A

List of Figures

List of Tables

1. INTRODUCTION

This hardware installation guide describes the NetVanta 6360 units' physical characteristics, lists their features and specifications, introduces basic functionality, and provides installation instructions in the following sections:

For additional information on shipping contents, mounting options, network module installation, and power the unit, refer to the following sections:

For information on NetVanta 6360 configuration for a specific application, refer to the configuration guides provided on the ADTRAN Support Community. For details on the command line interface (CLI), refer to the *AOS Command Reference Guide*. All other related documents are also available online at http://supportforums.adtran.com.

2.   PHYSICAL DESCRIPTION

The NetVanta 6360 is an integrated Layer 2 and Layer 3 carrier Ethernet services IP business gateway providing a universal edge device supporting any mix of Layer 3 IP Virtual Private Network (VPN), Layer 2 VPN (E-LINE/E-LAN), and Internet access services. The NetVanta 6360 eases the transition from Layer 3 IP VPN services delivered over TDM-based Point-to-Point Protocol (PPP) or Frame Relay circuits to Ethernet-based services delivered over broadband access networks (EoX, VDSL2, GPON, PPP over Ethernet (PPPoE)).

All NetVanta 6360s include an option module slot for a variety of network modules. There is one routed/bridged 10/100/1000Base-T small form factor pluggable (SFP only), one routed/bridged 10/100/1000Base-T combination (copper or SFP), and three routed/bridged 10/100/1000Base-T (copper only) local area network (LAN) interfaces.

In the event that a single EFM loop fails, the NetVanta 6360 will continue to operate on the remaining loop, providing redundancy. Once the failed loop is operational again, the NetVanta 6360 will automatically detect its availability and will automatically recover to the original configuration.

Network Modules Supported

The main base unit supports interchangeable network modules. The network modules currently available in this series include the following:

- Carrier Ethernet Quad SHDSL EFM Module, Annex A
- Carrier Ethernet Quad SHDSL EFM Module, Annex B
- Carrier Ethernet Octal SHDSL EFM Module, Annex A
- Carrier Ethernet Octal SHDSL EFM Module, Annex B
- Carrier Ethernet Quad VDSL2 EFM Module, Annex A
- Carrier Ethernet Quad VDSL2 EFM Module, Annex B

SFP Module Slots

The NetVanta 6360 has two small form-factor pluggable (SFP) slots that accept a number of industry standard SFP modules. The SFP modules provide Gigabit Ethernet fiber connectivity for high-speed uplinks. For a list of supported SFP modules, visit the ADTRAN website at http://www.adtran.com.

USB Interface

The NetVanta 6360 has a Universal Serial Bus (USB) interface designed to for 3G/4G backup and storage of configuration files.

Life Line Connection

The NetVanta 6360 provides support for a life line analog connection. The life line option provides assured voice for port 1. If the unit loses power or goes into alarm, the network voice service is inhibited and the onboard relay opens. The first port of the **VOICE** connector is provided with analog voice from the life line analog connection. Pair 25 on the **VOICE** connector is dedicated to an FXO/POTS input to support the life line option. The *Figure 1 on page 17* provides the life line port pinout.

CAUTION	*When using the life line option, the device connected to port 1 of the **VOICE** connector must be suitably rated and approved for direct connection to outside plant POTS service.*
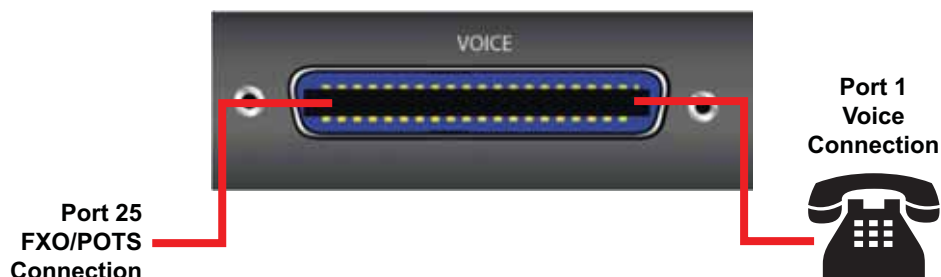
Figure 1. Optional Life Line Connection

Shipping Contents

Each NetVanta 6360 unit is shipped in their own cardboard shipping carton. Open each carton carefully, and avoid deep penetration into the carton with sharp objects.

After unpacking the unit, inspect it for possible shipping damage. If the equipment has been damaged in transit, immediately file a claim with the carrier and contact ADTRAN Customer Service (refer to the *Support* page on the ADTRAN website at http://www.adtran.com/support).

NetVanta 6360 Domestic Shipping Contents

Domestic shipments of the NetVanta 6360 include the following items:

- NetVanta 6360 base unit
- Set of two 19-inch rack mounting brackets
- Set of two ETSI/23-inch rack mounting brackets
- Set of 4 rubber mounting feet
- Six mounting screws
- Quick start guide

NetVanta 6360 International Shipping Contents

International shipments of the NetVanta 6360 include the following items:

- NetVanta 6360 base unit
- Set of two 19-inch rack mounting brackets
- Set of two ETSI/23-inch rack mounting brackets
- Set of 4 rubber mounting feet
- Six mounting screws
- Quick start guide

NetVanta 6360 Front Panel Design

The NetVanta 6360 front panel is shown below along with a description of all connectors and interfaces.

Figure 2. NetVanta 6360 Front Panel Layout

10/100/1000Base-T Ethernet Interfaces

The **GIG 0/1** port consists of one SFP slot for connectivity over fiber. The status LED is located above the interface.

The **GIG 0/2** ports consist of one RJ-45 and one SFP slot for connectivity over fiber. (Use either the RJ-45 connector *or* the SFP slot. The fiber slot has precedence.) The status LED is located above the SFP slot.

The **GIG 0/3** through **GIG 0/5** ports are RJ-45 for connectivity over copper. See *Table A-3 on page 42* for the Ethernet interface pinouts.

CONSOLE Interface

The **CONSOLE** interface is an EIA-232 serial port (DCE), which provides for local management and configuration (via a DB-9 female connector). See *Table A-1 on page 41* for the **CONSOLE** interface pinouts.

NOTE   *Connection directly to an external modem requires a cross-over cable.*

USB Interface

The **USB** interface is Type A USB host connector and is provided for use with 3G/4G modems or flash drives. The status LED, labeled **USB**, is located on the right front panel.

Status LEDs

The **STATUS** LED indicates the unit's status; the **MODULE** LED indicates the status of the installed network module; the **EFM** LED indicates the status of the EFM groups; the **USB** LED indicates the status of the USB interface; the **VOICE** LED indicates the status of the voice connector, and the **T1/E1 1** and **T1/E1 2** LEDs reflect the status of the T1/E1 interfaces. See the table below for LED behaviors. See *Table 1 on page 19* for LED behaviors.

Table 1. Front Panel Status LED Behaviors

LED	Color	Indication
GIG 0/1/GIG 0/2 (SFP)	Off	The link is down, shut, or not connected.
	Green (solid)	The link is up.
	Amber (flashing)	There is transmit or receiver activity on the link.
GIG 0/2 through GIG 0/5 (RJ-45)	Off	The link is down, shut, or not connected.
	Green (solid)	The link is up.
	Amber (flashing)	There is transmit or receiver activity on the link.
STATUS	Off	Unit is not receiving power.
	Green (flashing)	The unit is powering up. On power up the **STAT** LED flashes rapidly for five seconds, during which time the user can escape to boot mode from the **CONSOLE** port.
	Green (solid)	The power is on and self-test passed.
	Amber (solid)	The unit has booted and is powered by battery backup.
	Red (solid)	The power is on, but the self-test failed or the application code could not be booted.
MODULE	Off	No loop is present.
	Green (solid)	The DSL loop is trained and the EFM group is established.
	Green (slow flash)	The DSL loop is in the training process.
	Amber (solid)	The unit is in test.
	Red (solid)	The DSL connection has failed.
EFM	Green (solid)	All in-service EFM groups are functioning normally.
	Amber (solid)	At least one EFM group is in test.
	Red (solid)	At least one EFM group is in a failed state.
USB	Off	The interface is shut down or is not connected to a supported device.
	Green (solid)	A supported device is connected.
	Amber (flashing)	There is transmit or receive activity.
VOICE	Green (solid)	An analog voice port is off hook.
	Green (flashing)	An analog voice port is ringing.
	Amber (solid)	An analog voice port is in test mode.
	Red (solid)	An analog voice port is in fault mode.
T1/E1 1, T1/E1 2	Off	No loop is present.
	Green (solid)	The T1/E1 loop is up.
	Green (flashing)	The Data T1 loop is up with Layer 2 down, the PRI T1 loop is up with D-channel down.
	Amber (solid)	The loop is in test.
	Red (solid)	The T1/E1 loop is in alarm.

NetVanta 6360 Rear Panel Design

The NetVanta 6360 rear panel is shown below along with a description of all connectors and interfaces.

Figure 3. NetVanta 6360 Rear Panel Layout

VOICE Connection

A single 50-pin female amphenol connector, labeled **VOICE**, provides the interconnect wiring for the analog FXS/FXO circuits. See *Table A-1 on page 33* for voice connector pinouts. The status LED, labeled **VOICE**, is located on the front panel.

Network Interfaces

The **T1/E1 0/1** and **T1/E1 0/2** interfaces are RJ-48C pin connections. See *Table A-4 on page 35* for the network interface pinouts. The status LEDs are located on the right front panel.

Option Slot

The option slot accepts a variety of network modules (refer to *Option Modules on page 25*).

DC Power Connection

A DC input connector, labeled **DC IN**, is provided to power the unit from a -48 VDC power source. Refer to *Supplying Power to the Unit on page 34* for connection details.

Grounding Point

A grounding point is provided to connect the unit to a protective earth ground. Refer to *Supplying Power to the Unit on page 34* for connection details.

Battery Backup Connection

An optional battery backup unit (P/N 1175044L1/L2) is available for use in case of power outages. The battery backup unit connects to the **BBU** port, which also charges the unit during operation. Refer to *Optional Battery Backup Unit (P/N 1175044L1) on page 36* for connection details.

Power Connection

The rear panel has a power input to a universal 110 to 240 VAC power supply with an IEC connector, labeled **AC INPUT**. The appropriate three-prong cable is included in the shipment. Refer to *Supplying AC Power to the Unit on page 34* or *Supplying Power to the Unit on page 34* as appropriated for connection details.

                                       617006364F1-34A

3.   FEATURES AND SPECIFICATIONS

Physical Interfaces

Modular WAN Options
- Carrier Ethernet Quad SHDSL, Annex A and B
- Carrier Ethernet Octal SHDSL, Annex A and B
- Carrier Ethernet Quad VDSL2, Annex A and B

Gigabit Ethernet
- One routed/bridged 10/100/1000Base-T small form factor pluggable (SFP only)
- One routed/bridged 10/100/1000Base-T combination (copper or SFP)
- Three routed/bridged 10/100/1000Base-T (copper only)
- All ports included in chassis
- All Ethernet interfaces include carrier Ethernet functionality
- Full duplex
- RJ-45 connectors
- Can also be used as the WAN interface
- Supports 802.1q VLAN trunking

Processor and Memory
- RAM: 512 MB
- Flash: 256 MB

Protocols
- EFM
- SIP
- eBGP/iBGP
- Open Shortest Path First (OSPF)
- RIP (v1 and v2)
- GRE
- IGMP v2
- Layer 3 Backup
- Multi-VRF CE
- PPPoE
- Multihoming
- VRRP

Management and Utilities
- AOS command line interface (CLI)
- ADTRAN n-Command® Managed Service Platform (MSP)
- Simple Network Management Protocol version 3 (SNMPv3)
- SYSLOG logging
- Telnet, craft/console port, SSH, ping, trace route, NTP
- TCL scripting
- Policy statistics
- Email alerts (SMTP)

LEDs

- Status
- Module
- EFM
- USB
- Voice
- T1/E1 1
- T1/E1 2

Layer 3 Quality of Service (QoS)

- Low Latency Queuing, Weighted Fair Queuing (WFQ), and Class-based WFQ
- DiffServ packet marking and recognition
- Frame Relay fragmentation
- Traffic monitoring (NetFlow 9)

Security

Firewall

- Stateful inspection firewall
- Denial of service (DoS) protection
- Access control lists (ACLs)
- Application level gateways (ALGs)

Network Address Translation

- Network address translation (NAT) (1:1, many:1) and 1:1 port translation
- NAT-compatible SIP ALG

Secure Management

- Multi-level access control
- TACACS+
- RADIUS AAA
- SSH CLI and SSL GUI

Content Filtering

- Inherent URL filter
- Top website reports
- Integration with Websense®

Virtual Private Network (VPN) (Optional)

- IPSec Tunnel Mode: Tunnels 1,000
- Encryption: DES, 3DES, and AES
- Authentication Mechanisms:
    - XAUTH Secure ID
    - X.509 digital certificates
    - DSS Signatures
    - Preshared keys

DSL Features

- Variable rate bonding for the SHDSL loops
- Automatic failover and recovery
- Plug-and-play automatic line detection
- ITU-G.991.2-2003, SHDSL Annex B

Ethernet Features

- IEEE 802.1p priority marking
- IEEE 802.1d dynamic/transparent bridging
- IEEE 802.1Q virtual local area network (VLAN) tagging
- IEEE 802.3u Ethernet
- MEF 9/14 certified EPL, EVPL

Ethernet Services Support

- Priority queuing of traffic based on VLAN priority
  - Supports eight class of service (CoS) queues
  - Per UNI port, CE VLAN ID (C-Tag) and/or CE VLAN P-bits, DSCP fields
- Single stack VLAN and double stack VLANs (Q-in-Q)
  - Manipulation based on 802.1p and DSCP fields
  - STAG TPID provisioning supports 802.1ad and802.1Q standards
  - Port-based service support
- Services Scale and Flexibility
  - Configurable EtherType and TPID for service flexibility
  - VLAN IDs 2 to 4090; EVC configurable in the range of 1 to 4090
  - Ingress policers (tr3CM), CIR and EIR settings to 64 kbps granularity, configurable burst through EBS, CBS settings
  - Egress shaping per port

Fault and Performance Management

- IEEE 802.3ah EFM standard
- ITU-T Y.1731 CFM, PM
- Supports OAM management status and loopback messaging

Environment

- Operating Temperature: 0°C to 50°C (32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical and Power

- Chassis: 1U high, 19-inch or 23-inch rack mountable metal enclosure
- Dimensions: 1.72-inch H x 17.22-inch W x 13.4-inch D
- Power: 110 to 240 VAC, 50/60 Hz
- Power: 48 VDC

Agency Approvals

- FCC Part 15, Class A
- UL 60950-1, Second Edition
- EN 60950, Second Edition, A1, A11, A12
- IEC 60950-1, Second Edition
- AS/NZS 60950.1
- CSA C22.2 No. 60950-1, Second Edition
- CE Mark
- ETSI 300
- ACTA/TIA 968/FCC Part 68
- Industry Canada CS-03
- AS/ACIF S002, S003, S016, S038
- RoHS

4.   OPTION MODULES

The NetVanta 6360 supports several option modules designed to meet a variety of networking requirements. The option modules include plug-in carrier Ethernet network modules.

Carrier Ethernet network modules are cards that plug directly into the option module slot located on the front of the base unit. These cards provide the following types of interfaces:

- *NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A (P/N 17406368F1) on page 26*
- *NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B (P/N 17406368F3) on page 27*
- *NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A (P/N 17806368F1) on page 28*
- *NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B (P/N 17806368F3) on page 29*
- *NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex A (P/N 17406369F1) on page 30*
- *NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B (P/N 17406369F3) on page 31*

This section describes each module, providing individual card specifications and features. Refer to *Appendix A on page 41* for pinout information. *Installing Network Modules on page 38* provides information on card installation.

Network Modules

NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A (P/N 17406368F1)

The NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A (shown in *Figure 4*) provides a WAN-SHDSL EFM interface. See *Table A-6 on page 44* for the Quad SHDSL EFM connector pinouts.

Figure 4. NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A

Features and Specifications

Operating Mode
• Line termination (CO)
• Network termination (CPE)

SHDSL Interface
• Four 2-wire eSHDSL loops
• Supported Standards: ITU-T G.991.2 Annex A
• IEEE 802.3ah EFM bonding
• MEF compliant

Clock Source
• CPE Operating Mode: Network
• CO Operating Mode: Internal

Compliance
• EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
• UL/CUL 60950-1
• ACTA/TIA 968/FCC Part 68
• IC CS-03
• RoHS compliant

Environmental
• Operating Temperature: 0°C to 50°C (-32°F to 122°F)
• Storage Temperature: -20°C to 70°C (-4°F to 158°F)
• Relative Humidity: Up to 95 percent, noncondensing

Physical
• Dimensions: 6.75-inch W x 6.59-inch D

Table 2. NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex A LED Behaviors

LED	Color	Indication
SHDSL 1 through **4**	Off	SHDSL loop is administratively shut down.
	Green (flashing)	SHDSL loop is training.
	Green (solid)	SHDSL loop is trained and EFM group is established.
	Amber (flashing)	SHDSL loop is trained but EFM group is not established.
	Amber (solid)	SHDSL loop is in test.
	Red (flashing)	SHDSL loop is in handshake process.
	Red (solid)	SHDSL loop connection failure.

NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B (P/N 17406368F3)

The NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B (shown in *Figure 5*) provides a WAN-SHDSL EFM interface. See *Table A-6 on page 44* for the Quad SHDSL EFM connector pinouts.
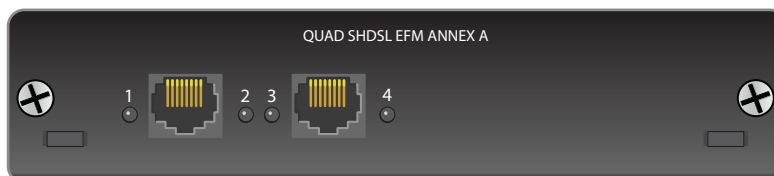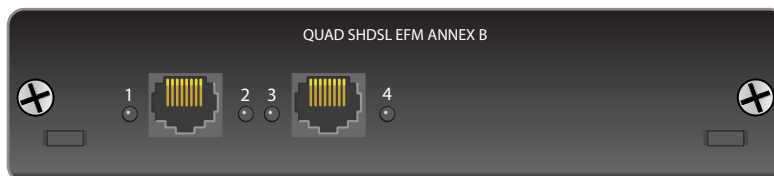

Figure 5. NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B

Features and Specifications

Operating Mode
- Line termination (CO)
- Network termination (CPE)

SHDSL Interface
- Four 2-wire eSHDSL loops
- Supported Standards: ITU-T G.991.2 Annex B
- IEEE 802.3ah EFM bonding
- MEF compliant

Clock Source
- CPE Operating Mode: Network
- CO Operating Mode: Internal

Compliance
- EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
- AS/ACIF S043
- IEC 60950-1, Second Edition
- EN 60950-1, Second Edition
- AS/NZS 60950.1
- RoHS compliant

Environmental
- Operating Temperature: 0°C to 50°C (-32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical
- Dimensions: 6.75-inch W x 6.59-inch D

Table 3. NetVanta Carrier Ethernet Quad SHDSL EFM Module, Annex B LED Behaviors

LED	Color	Indication
SHDSL 1 through **4**	Off	SHDSL loop is administratively shut down.
	Green (flashing)	SHDSL loop is training.
	Green (solid)	SHDSL loop is trained and EFM group is established.
	Amber (flashing)	SHDSL loop is trained but EFM group is not established.
	Amber (solid)	SHDSL loop is in test.
	Red (flashing)	SHDSL loop is in handshake process.
	Red (solid)	SHDSL loop connection failure.

NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A (P/N 17806368F1)

The NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A (shown in *Figure 6*) provides a WAN-SHDSL EFM interface. See *Table A-7 on page 44* and *Table A-8 on page 44* for the Octal SHDSL EFM connector pinouts.

Figure 6. NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A

Features and Specifications

Operating Mode
- Line termination (CO)
- Network termination (CPE)

SHDSL Interface
- Eight 2-wire eSHDSL loops
- Supported Standards: ITU-T G.991.2 Annex A
- IEEE 802.3ah EFM bonding
- MEF compliant

Clock Source
- CPE Operating Mode: Network
- CO Operating Mode: Internal

Compliance
- EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
- UL/CUL 60950-1
- ACTA/TIA 968/FCC Part 68
- IC CS-03
- RoHS compliant

Environmental
- Operating Temperature: 0°C to 50°C (-32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical
- Dimensions: 6.75-inch W x 6.59-inch D

Table 4. NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex A LED Behaviors

LED	Color	Indication
SHDSL 1 through **8**	Off	SHDSL loop is administratively shut down.
	Green (flashing)	SHDSL loop is training.
	Green (solid)	SHDSL loop is trained and EFM group is established.
	Amber (flashing)	SHDSL loop is trained but EFM group is not established.
	Amber (solid)	SHDSL loop is in test.
	Red (flashing)	SHDSL loop is in handshake process.
	Red (solid)	SHDSL loop connection failure.

NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B (P/N 17806368F3)

The NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B (shown in *Figure 7*) provides a WAN-SHDSL EFM interface. See *Table A-7 on page 44* and *Table A-8 on page 44* for the Octal SHDSL EFM connector pinouts.
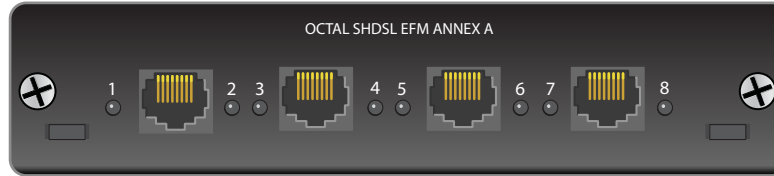

Figure 7. NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B

Features and Specifications

Operating Mode
- Line termination (CO)
- Network termination (CPE)

SHDSL Interface
- Eight 2-wire eSHDSL loops
- Supported Standards: ITU-T G.991.2 Annex B
- IEEE 802.3ah EFM bonding
- MEF compliant

Clock Source
- CPE Operating Mode: Network
- CO Operating Mode: Internal

Compliance
- EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
- AS/ACIF S043
- IEC 60950-1, Second Edition
- EN 60950-1, Second Edition
- AS/NZS 60950.1
- RoHS compliant

Environmental
- Operating Temperature: 0°C to 50°C (-32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical
- Dimensions: 6.75-inch W x 6.59-inch D

Table 5. NetVanta Carrier Ethernet Octal SHDSL EFM Module, Annex B LED Behaviors

LED	Color	Indication
SHDSL 1 through **8**	Off	SHDSL loop is administratively shut down.
	Green (flashing)	SHDSL loop is training.
	Green (solid)	SHDSL loop is trained and EFM group is established.
	Amber (flashing)	SHDSL loop is trained but EFM group is not established.
	Amber (solid)	SHDSL loop is in test.
	Red (flashing)	SHDSL loop is in handshake process.
	Red (solid)	SHDSL loop connection failure.

NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex A (P/N 17406369F1)

The NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex A (shown in *Figure 8*) provides a WAN-VDSL interface. See *Table A-9 on page 45* for the Quad VDSL2 connector pinouts.

Figure 8. NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex A

Features and Specifications

VDSL Interface
- Four 2-wire VDSL loops
- ADSL, ADSL2, ADSL2+ fall back compatibility
- IEEE 802.3ah EFM bonding
- MEF compliant

Clock Source
- CPE Operating Mode: Network
- CO Operating Mode: Internal

Compliance
- EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
- UL/CUL 60950-1
- ACTA/TIA 968/FCC Part 68
- IC CS-03
- RoHS compliant

Environmental
- Operating Temperature: 0°C to 50°C (-32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical
- Dimensions: 6.75-inch W x 6.59-inch D

Table 6. NetVanta Carrier Ethernet Quad VDSL EFM Module, Annex A LED Behaviors

LED	Color	Indication
SHDSL 1 through **4**	Off	VDSL loop is administratively shut down.
	Green (flashing)	VDSL loop is training.
	Green (solid)	VDSL loop is trained and EFM group is established.
	Amber (flashing)	VDSL loop is trained but EFM group is not established.
	Amber (solid)	VDSL loop is in test.
	Red (flashing)	VDSL loop is in handshake process.
	Red (solid)	VDSL loop connection failure.

                                617006364F1-34A

NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B (P/N 17406369F3)

The NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B (shown in *Figure 9*) provides a WAN-VDSL interface. See *Table A-9 on page 45* for the Quad VDSL2 connector pinouts.
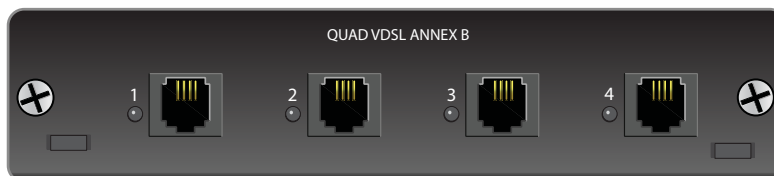
Figure 9. NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B

Features and Specifications

VDSL Interface
- Four 2-wire VDSL loops
- ADSL, ADSL2, ADSL2+ fallout compatibility
- IEEE 802.3ah EFM bonding
- MEF compliant

Clock Source
- CPE Operating Mode: Network
- CO Operating Mode: Internal

Compliance
- EMC - see *Electromagnetic Compatibility (EMC) Table on page 6*.
- AS/ACIF S043
- 60950-1, Second Edition
- AS/NZS 60950.1
- RoHS compliant

Environmental
- Operating Temperature: 0°C to 50°C (-32°F to 122°F)
- Storage Temperature: -20°C to 70°C (-4°F to 158°F)
- Relative Humidity: Up to 95 percent, noncondensing

Physical
- Dimensions: 6.75-inch W x 6.59-inch D

Table 7. NetVanta Carrier Ethernet Quad VDSL2 EFM Module, Annex B LED Behaviors

LED	Color	Indication
SHDSL 1 through **4**	Off	VDSL loop is administratively shut down.
	Green (flashing)	VDSL loop is training.
	Green (solid)	VDSL loop is trained and EFM group is established.
	Amber (flashing)	VDSL loop is trained but EFM group is not established.
	Amber (solid)	VDSL loop is in test.
	Red (flashing)	VDSL loop is in handshake process.
	Red (solid)	VDSL loop connection failure.

5.   UNIT INSTALLATION

The instructions and guidelines provided in this section cover hardware installation topics, such as mounting options, supplying power to the unit, and installing option cards. These instructions are presented as follows:

For information on configuring a specific application, refer to the configuration guides provided on the ADTRAN's Support Forum or the *AOS Command Reference Guide*.

WARNING

To prevent electrical shock, do not install equipment in a wet location or during a lightning storm.

CAUTION

- *The NetVanta 6360 is intended to be installed, maintained, and serviced by qualified service personnel only and should be installed in a restricted access location as described in UL/IEC 60950-1.*

- *Ethernet cables are intended for intrabuilding use only. Connecting an ADTRAN unit directly to Ethernet cables that run outside the building in which the unit is housed will void the user's warranty and could create a fire or shock hazard. To connect an ADTRAN unit to Ethernet cables that run outside the building, ADTRAN's Ethernet Port Protection Device (EPPD) (P/N 1700502G1) must be connected between the unit and the outside plant cable. Use of any Ethernet protector other than ADTRAN's for this purpose will void the user's warranty.*

CAUTION

Electronic modules can be damaged by static electrical discharge. Before handling modules, put on an antistatic discharge wrist strap to prevent damage to electrical 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.

Tools Required

The customer-provided tools required for the hardware installation of the NetVanta are:

- Ethernet cables
- Network cables (module dependent)
- Phillips-head screwdriver (rackmount applications only)
- Drill and drill bit set (wallmount applications only)

NOTE

To access the CLI of the NetVanta, you will also need a PC with terminal emulation software and a console port cable. Instructions on how to access the CLI are available in the quick start guide shipped with your unit or online at ADTRAN's Support Forum.

Mounting Options

The unit may be installed in rackmount or tabletop configurations. The following sections provide step-by-step instructions for rack mounting and wall mounting.

Rack Mounting the NetVanta

The NetVanta is a 1U-high, rack-mountable unit that can be installed in a 19-inch, 23-inch, or ETSI equipment rack. The following steps guide you in mounting the NetVanta into a rack.

> CAUTION
> - *If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer.*
> - *Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.*
> - *Be careful not to compromise the stability of the equipment mounting rack when installing this product.*
> - *Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading the circuit might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.*
> - *Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).*

Instructions for Rack Mounting the NetVanta	
Step	**Action**
1	Attach the appropriate rackmount brackets in the appropriate (either 19-inch, 23-inch, or ETSI) position using the supplied screws.
2	To allow proper grounding, scrape the paint from the rack around the mounting holes where the NetVanta will be positioned.
3	Position the NetVanta in a stationary equipment rack allowing 1U space above the unit for ventilation.
4	Have an assistant hold the unit in position as you install two mounting bolts through the unit's brackets and into the equipment rack using a #2 Phillips-head screwdriver.
5	Apply power to the unit (refer to *Supplying Power to the Unit on page 34*).

Connecting Ground to the Unit

Connect the supplemental ground before connecting the power and signal connectors. Connect the unit to a reliable ground point using a minimum 12 AWG (2.5 mm sq.) ground wire and a closed loop connector that is appropriately certified for the country of use and suitable for the ground stud and wire size.

Supplying Power to the Unit

The NetVanta 6360 can be powered with either a 110 to 240 VAC or a 48 VDC power source. Instructions for AC and DC powering are provided in the following sections.

> **CAUTION** *The NetVanta 6360 cannot be powered by both an AC and a DC power source at the same time.*

Supplying AC Power to the Unit

The NetVanta 6360 units come equipped with a 110 to 240 VAC, 50/60 Hz universal power supply for connecting to a properly grounded power receptacle. (A detachable power cable with a grounded, three-prong plug comes with the shipment.) To power this unit, connect the power cable to an appropriate AC power source.

> **CAUTION**
> - *This equipment incorporates double pole/neutral fusing. If the neutral fuse opens and the line fuse does not open, voltage could still be present in the unit.*
> - *In addition to the equipment earthing conductor in the power supply cord, a supplementary equipment earthing conductor is to be installed between the system and earth.*
> - *The supplemental earthing conductor shall be connected to the equipment using a number 8 ring terminal and should be fastened to the grounding lug provided on the rear panel of the equipment. The ring terminal should be installed using the appropriate crimping tool (AMP P/N 59250 T-EAD Crimping Tool or equivalent).*
> - *The supplementary equipment earthing conductor must not be smaller in size than cross-sectional area of not less than 2.5 mm^2, if mechanically protected. The supplementary equipment earthing conductor is to be connected to the product at the terminal provided, and connected to earth in a manner that will retain the earth connection when the power supply cord is unplugged. The connection to earth of the supplementary earthing conductor must be in compliance with the appropriate rules for terminating bonding jumpers in Part K of Article 250 of the National Electrical Code, ANSI/NFPA 70, and Article 10 of Part 1 of the Canadian Electrical Code, Part 1, C22.1. Termination of the supplementary earthing conductor is permitted to be made to building steel, to a metal electrical raceway system, or to any earthed item that is permanently and reliably connected to the electrical service equipment earthed.*
> - *Bare, covered, or insulated earthing conductors are acceptable. A covered or insulated conductor must have a continuous outer finish that is either green, or green with one or more yellow stripes.*
> - *A readily accessible disconnect device, that is suitably approved and rated, shall be incorporated in the field wiring.*
> - *Maximum recommended ambient operating temperature is 50°C.*

Supplying DC Power to the Unit

The NetVanta 6360 can also be connected to a centralized DC power source via the two-position terminal block connector (**DC IN**) located on the rear of the chassis (see *Figure 10 on page 35*). Power and ground connections require copper conductors and a ring lug.

> **CAUTION**
> - *Power to the NetVanta 6360 system must be from a reliably grounded 48 VDC.*
> - *Use only copper conductors when making power connections.*
> - *Install unit in accordance with the requirements of NEC NFPA 70.*
> - *The branch circuit overcurrent protection shall be a fuse or circuit breaker rated minimum -48 VDC, maximum 10 A.*
> - *A readily accessible disconnect device, that is suitably approved and rated, shall be incorporated in the field wiring.*
> - *Maximum recommended ambient operating temperature is 50°C.*

Instructions for Connecting DC Power Source to the NetVanta 6360	
Step	**Action**
1	Insert the positive terminal of the DC power source into left position of the two-position terminal block (labeled **RTN**). Tighten the screw.
2	Insert the negative terminal of the DC power source into the right position of the two-position terminal block (labeled **-48V**). Tighten the screw.
3	With the power disconnected, insert the terminal block into the receptacle labeled **DC IN** until it is firmly seated against the chassis. Tighten the two screws.
4	Connect a ground wire (fitted with an appropriate ring terminal for the stud and wire size and suitable certified for the country of use) to the grounding stud using the nut provided and the appropriate crimping tool. Connect the other end of the ground wire to a protective earth ground. See *Figure 10* below.
5	Supply DC power to the unit.

Figure 10. Supplying DC Power and Grounding the NetVanta 6360

Optional Battery Backup Unit (P/N 1175044L1)

The ADTRAN battery backup unit (BBU) is an optional device designed as a backup DC power supply for the NetVanta 6360. The BBU connects to the NetVanta 6360 through a 6-foot charge/discharge, 2-conductor wire with a keyed modular plug (included with the BBU). The 1175044L1 BBU is a low profile wallmount configuration. It can be rack mounted with the appropriate 19-inch or 23-inch rackmount adapter brackets. The 19-inch rackmount adapter bracket part number is P/N 1175047L1. The 23-inch rackmount adapter bracket part number is P/N 1175048L1.

> NOTE
> *ADTRAN does not recommend using the optional battery backup unit when the NetVanta 6360 is being powered from a DC source.*

Features of the BBU, P/N 1175044L1, include the following:

- No-spill battery design
- Compact wallmount or rackmount box
- Double BBU rack mounting available
- 7 AHR battery (up to 8 hours of backup, depending on load)
- Modular plug (provides quick and easy installation)
- All mounting hardware included

Unpack and Inspect the BBU

After unpacking the BBU unit, inspect it for damage. If damage is noted, file a claim with the carrier; then contact ADTRAN Customer Service.

Batteries are retained and prewired in the BBU in a specific pattern. Battery position is maintained by foam spacers press fitted against the housing walls. Removing batteries or disconnecting wires compromises correct reassembly and should not be attempted.

BBU Safety and EMC Notices

> CAUTION
> - *Removing the BBU covers could allow batteries to fall out.*
> - *The BBU should only be used in specified ADTRAN applications.*
> - *The BBU weighs in excess of 30 pounds. Arrange for assistance when handling the BBU for mounting.*

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including that which may cause undesired operation.

Wall Mounting the BBU

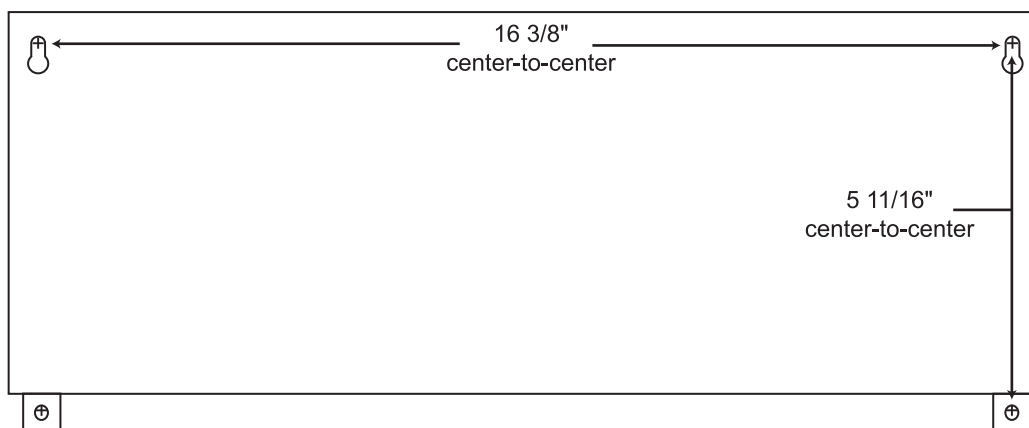*Figure 11* shows the BBU (P/N 1175044L1) mounting dimensions for the NetVanta 6360.

Figure 11. Wall Mounting the BBU

Install the BBU as follows:

Instructions for Wall Mounting the BBU	
Step	**Action**
1	Decide on a location for the BBU, keeping in mind that the cable plugs must be able to reach their designated sockets in the NetVanta unit.
2	Prepare the mounting surface by attaching a board (typically plywood, 3/4-inch to 1-inch thick) to a wall stud using #6 to #10 (2.5-inch or greater in length) wood screws. *Important! Mounting to a stud ensures stability. Using sheet rock anchors may not provide sufficient long-term stability.*
3	Ensuring a plumb measurement, mark where the pilot holes are to be drilled according to the dimensions given in *Figure 11 on page 37*.
4	Drill all four pilot holes using a size 1/16-inch drill bit.
5	Screw two #10 x 3/4-inch pan-head screws into the top two previously drilled holes. Let the head of each screw protrude 1/16 inch from the plywood to engage the keyhole slot.

CAUTION	*Do not let the weight of the BBU rest on the two keyhole screws. Maintain support until the lower two screws are fully inserted.*

6	With an assistant, lift the BBU and position to engage the screw heads into the top two keyholes. Allow the unit to slide down until the slot end rests against the screws.
7	Insert the two lower screws through the tabs and tighten securely.
8	Use cable ties as appropriate. The battery connection from the BBU should be directly connected to the **BATT** port on the rear of the chassis.

BBU Maintenance

- The BBU does not require routine maintenance for normal operation. The life expectancy of the BBU is 3 to 5 years on standby when used at room temperature.

- Excessive heat decreases battery power and life. Extreme low temperature also decreases battery capacity. Ideal ambient temperature for battery life and capacity is 20°C.

- Battery shelf life is extended in cooler temperatures.

- To order replacement batteries, reference the following part number: 1975044L1 (12 VDC replacement batteries).

ADTRAN is an environmentally friendly company. Therefore, we encourage the proper recycling and handling of the batteries. Federal and state laws prohibit the improper disposal of all lead acid batteries. The customer is responsible for the handling of their batteries from the day of purchase through their ultimate disposal. For more information on battery replacement and recycling, refer to the manufacturer's documentation.

BBU Specifications

Table 8 provides BBU specifications.

Table 8. BBU Specifications

Battery	
Part Number: Suppliers: Batteries: Voltage: Backup Time: Wire Gauge:	311212V02 YUASA and Panasonic 7 AHR per battery -12 VDC per battery Up to 8 hours 18 AWG
Environmental	
Operating Temperatures: Preferred:	Charge: -15°C to 50°C Discharge: -20°C to 60°C 20°C
Physical Dimensions	
P/N 1175044L1: Weight:	17-inch W x 6.5-inch H x 3.5-inch D 30 lb

Installing Network Modules

The network modules are installed into the rear panel option module slot. The following table lists the installation steps. Also, see *Figure 12 on page 39*.

> **CAUTION**
>
> *All unused option module slots on the front panel of the unit must remain covered with the supplied cover plates.*

> **WARNING**
>
> *For NetVanta modules with outside plant connections, ensure that all cables are removed from the module before installing or removing it from the NetVanta chassis.*

> **CAUTION**
>
> - *Electronic modules can be damaged by static electrical discharge. Before handling modules, put on an antistatic discharge wrist strap to prevent damage to electrical 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.*
> - *Always remove power from the unit prior to removing or installing a module.*
> - *Improper installation could result in damage to the modules.*

	Instructions for Installing the Network Modules
Step	**Action**
1	Remove power from the unit.
2	Use a screwdriver to remove the cover plate from the option slot in the NetVanta base unit.
3	Slide the option module into the option slot until the module is firmly seated against the chassis (see *Figure 12*).
4	Secure the screws at both edges of the module using a screwdriver.
5	Connect the cables to the associated device(s).
6	Restore power to the unit.

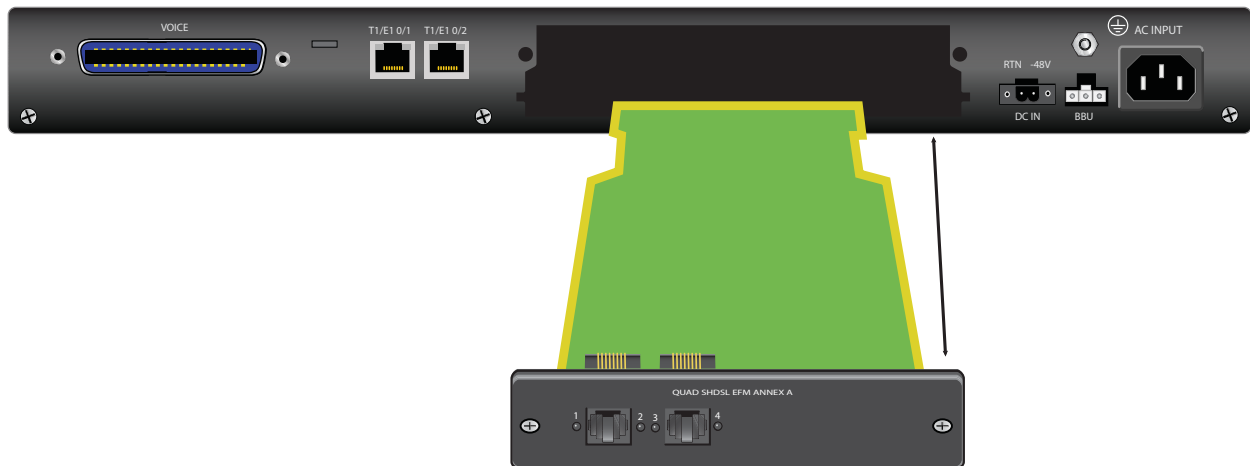**Figure 12. Network Module Installation**

Your NetVanta unit is now ready to be configured and connected to the network. For information on configuration for a specific application, refer to the configuration guides provided online on ADTRAN's Support Forum For details on the CLI, refer to the *AOS Command Reference Guide*. All other related documents are also available online on ADTRAN's Support Forum.

APPENDIX A.   CONNECTOR PIN DEFINITIONS

The following tables provide the pin assignments for the base unit and network interface modules (NIMs).

Base Unit Pinouts

Table A-1. CONSOLE Port Pinouts

Pin	Name	Description
1	DCD	Data Carrier Detect (output)
2	RD	Receive Data (output)
3	TD	Transmit Data (input)
4	DTR	Data Terminal Ready (input)
5	SG	Signal Ground
6	DSR	Data Set Ready (output)
7	RTS	Request to Send (input)
8	CTS	Clear to Send (output)
9	—	Unused

Table A-2. SFP Slot Pinouts

Pin	Name	Pin	Name
1	TGND	11	RGND
2	TX FAULT	12	RX-
3	TX DISABLE	13	RX+
4	MOD DEF(2)	14	RGND
5	MOD DEF(1)	15	VccR
6	MOD DEF(0)	16	VccT
7	RATE SELECT	17	TGND
8	LOS	18	TX+
9	RGND	19	TX-
10	RGND	20	TGND

Table A-3. 1000Base-T Gigabit Ethernet Port Pinouts

Pin	Name	Description
1	TRD0+	Transmit/Receive Positive
2	TRD0-	Transmit/Receive Negative
3	TRD1+	Transmit/Receive Positive
4	TRD2+	Transmit/Receive Positive
5	TRD2-	Transmit/Receive Negative
6	TRD1-	Transmit/Receive Negative
7	TRD3+	Transmit/Receive Positive
8	TRD3-	Transmit/Receive Negative

Table A-4. T1/E1 Port Pinouts

Pin	Name	Description
1	RX	Receive data from the network–Ring
2	RX	Receive data from the network–Tip
3	—	Unused
4	TX	Transmit data toward the network–Ring
5	TX	Transmit data toward the network–Tip
6-8	—	Unused

Table A-5. Voice Connector Pinouts

Pins	50-pin Amphenol Connector	Description
1, 26	Circuit 1	FXS 0/1 Ring, Tip
2, 27	Circuit 2	FXS 0/2 Ring, Tip
3, 28	Circuit 3	FXS 0/3 Ring, Tip
4, 29	Circuit 4	FXS 0/4 Ring, Tip
5, 30	Circuit 5	FXS 0/5 Ring, Tip
6, 31	Circuit 6	FXS 0/6 Ring, Tip
7, 32	Circuit 7	FXS 0/7 Ring, Tip
8, 33	Circuit 8	FXS 0/8 Ring, Tip
9, 34	Circuit 9	FXS 0/9 Ring, Tip
10, 35	Circuit 10	FXS 0/10 Ring, Tip
11, 36	Circuit 11	FXS 0/11 Ring, Tip
12, 37	Circuit 12	FXS 0/12 Ring, Tip
13, 38	Circuit 13	FXS 0/13 Ring, Tip
14, 39	Circuit 14	FXS 0/14 Ring, Tip
15, 40	Circuit 15	FXS 0/15 Ring, Tip
16, 41	Circuit 16	FXS 0/16 Ring, Tip
17, 42	Circuit 17	FXS 0/17 Ring, Tip or FXO 0/1 Ring, Tip
18, 43	Circuit 18	FXS 0/18 Ring, Tip or FXO 0/2 Ring, Tip
19, 44	Circuit 19	FXS 0/19 Ring, Tip or FXO 0/3 Ring, Tip
20, 45	Circuit 20	FXS 0/20 Ring, Tip or FXO 0/4 Ring, Tip
21, 46	Circuit 21	FXS 0/21 Ring, Tip or FXO 0/5 Ring, Tip
22, 47	Circuit 22	FXS 0/22 Ring, Tip or FXO 0/6 Ring, Tip
23, 48	Circuit 23	FXS 0/23 Ring, Tip or FXO 0/7 Ring, Tip
24, 49	Circuit 24	FXS 0/24 Ring, Tip or FXO 0/8 Ring, Tip
25, 50	FXO 0/0	FXO 0/0 Ring, Tip

Network Module Pinouts

Table A-6. Carrier Ethernet Quad SHDSL EFM Pinouts

Ports 1 and 2			Ports 3 and 4		
Pin	Name	Description	Pin	Name	Description
1	T02	Loop 2 - Tip	1	T04	Loop 4 - Tip
2	R02	Loop 2 - Ring	2	R04	Loop 4 - Ring
3	—	Unused	3	—	Unused
4	T01	Loop 1 - Tip	4	T03	Loop 3 - Tip
5	R01	Loop 1 - Ring	5	R03	Loop 3 - Ring
6-8	—	Unused	6-8	—	Unused

Table A-7. Carrier Ethernet Octal SHDSL EFM (Ports 1 through 4) Pinouts

Ports 1 and 2			Ports 3 and 4		
Pin	Name	Description	Pin	Name	Description
1	T02	Loop 2 - Tip	1	T04	Loop 4 - Tip
2	R02	Loop 2 - Ring	2	R04	Loop 4 - Ring
3	—	Unused	3	—	Unused
4	T01	Loop 1 - Tip	4	T03	Loop 3 - Tip
5	R01	Loop 1 - Ring	5	R03	Loop 3 - Ring
6-8	—	Unused	6-8	—	Unused

Table A-8. Carrier Ethernet Octal SHDSL EFM (Ports 5 through 8) Pinouts

Ports 5 and 6			Ports 7 and 8		
Pin	Name	Description	Pin	Name	Description
1	T06	Loop 6 - Tip	1	T08	Loop 8 - Tip
2	R06	Loop 6 - Ring	2	R08	Loop 8 - Ring
3	—	Unused	3	—	Unused
4	T05	Loop 5 - Tip	4	T07	Loop 7 - Tip
5	R05	Loop 5 - Ring	5	R07	Loop 7 - Ring
6-8	—	Unused	6-8	—	Unused

Table A-9. Carrier Ethernet Quad VDSL2 EFM Pinouts

Pin	Name	Description
1, 2	—	Unused
3	Ring	Ring lead of the 2-wire interface
4	Tip	Tip lead of the 2-wire interface
5, 6	—	Unused