



NetVanta 4305 Hardware Installation Guide

1200890L1	NetVanta 4305 Chassis
1200861L1	NetVanta 56K/64K Network Interface Module
1200862L1	NetVanta T1/FT1 Network Interface Module
1200863L1	NetVanta T1/FT1+DSX-1 Network Interface Module
1200866L1	NetVanta Serial Network Interface Module
1200868L1	NetVanta E1/FE1 Network Interface Module
1200872L1	NetVanta Dual T1 Network Interface Module
1200864L1	NetVanta Analog Modem Dial Backup Interface Module
1200865L1	NetVanta ISDN BRI Dial Backup Interface Module
1200875L1	NetVanta ISDN S/T Dial Backup Interface Module
1200878L1	NetVanta E1/FE1 w/ G.703 Drop Network Interface Module
4202368L2	Enhanced Feature Pack (VPN Upgrade)
1202862L1	NetVanta T1/FT1 Network Interface Module 2nd, Gen
1202863L1	NetVanta T1/FT1+DSX-1 Network Interface Module, 2nd Gen
1200843L1	NetVanta Octal T1/E1 Wide Module

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Conventions

**NOTE**

Notes provide additional useful information.

**CAUTION**

Cautions signify information that could prevent service interruption.

WARNING

Warnings provide information that could prevent damage to the equipment 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/or 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.



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

Save These Important Safety Instructions

WARNING

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.

FCC-Required Information

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

1. This equipment complies with Part 68 of FCC rules and requirements adopted by 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 effect 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
1200861L1	US:HDCDENAN1200861L1	56 Kbps Digital Interface 64 Kbps Digital Interface	6.0F	04DU5-56 04DU5-64	RJ-48S
1200862L1	US: HDCDENAN1200863L1	1.544 Mbps - SF 1.544 Mbps - SF and B8ZS 1.544 Mbps - ESF 1.544 Mbps - ESF and B8ZS	6.0N	04DU9-BN 04DU9-DN 04DU9-1KN 04DU9-1SN	RJ-48C
1200863L1					
1202862L1	US: HDCDENAN1202863L1				
1202863L1					
1200872L1	US: HDCDENAN1200872L1				
1200864L1	US: HDCM504A1200864L1	Analog Loop Start	0.4A/9.0F	02LS2	RJ-11C
1200865L1	US: HDCDENAN1200865L1	Basic Rate ISDN	6.0F	021S5	RJ-49C

8. The 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.
- 10.

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 4305 (1200890L1)
1200861L1 56K/64K NIM	FCC Part 15, Class A EN55022 Class A
1200862L1 T1/FT1 NIM	FCC Part 15, Class A EN55022 Class A
1202862L1 T1/FT1 NIM, 2nd Gen	FCC Part 15, Class A EN55022 Class A
1200863L1 T1/FT1+DSX-1 NIM	FCC Part 15, Class A EN55022 Class A
1202863L1 T1/FT1+DSX-1 NIM, 2nd Gen	FCC Part 15, Class A EN55022 Class A
1200866L1 Serial NIM	FCC Part 15, Class A EN55022 Class A EN55024 EN61000-3-2 EN61000-3-3
1200843L1 Octal T1/E1 Wide Module	FCC Part 15, Class A EN55022 Class A
1200864L1 Analog Modem DIM	FCC Part 15, Class A EN55022 Class A
1200865L1 ISDN BRI DIM 1200875L1 ISDN S/T DIM	FCC Part 15, Class A EN55022 Class A
1200868L1 E1/FE1 NIM 1200872L1 Dual T1 NIM	FCC Part 15, Class A EN55022 Class A EN55024 EN61000-3-2 EN61000-3-3
1200878L1 E1/FE1 w/ G.703 Drop	FCC Part 15, Class A EN55022 Class A EN55024 EN61000-3-2 EN61000-3-3
1202368L1 VPN Encryption (Accelerator) Card	FCC Part 15, Class A EN55022 Class A EN55024 EN61000-3-2 EN61000-3-3

Industry Canada Compliance Information

Notice: The Industry Canada label applied to the product (identified by the Industry Canada logo or the “IC:” in front of the certification/registration number) signifies that the Industry Canada technical specifications were met.

Notice: The Ringer Equivalence Number (REN) for this terminal equipment is supplied in the documentation or on the product labeling/markings. The REN assigned to each terminal device indicates the maximum number of terminals that can be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices should not exceed five (5).

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 radioélectriques applicables aux appareils numériques de Class A prescrites dans la norme sur le matériel brouilleur: “Appareils Numériques,” NMB-003 édictée par le ministre des Communications.

Affidavits

Affidavit Requirements for Connection to Digital Services

- An affidavit is required to be given to the telephone company whenever digital terminal equipment without encoded analog content and billing protection is used to transmit digital signals containing encoded analog content which are intended for eventual conversion into voiceband analog signals and transmitted on the network.
- The affidavit shall affirm that either no encoded analog content or billing information is being transmitted or that the output of the device meets Part 68 encoded analog content or billing protection specifications.
- End user/customer will be responsible for filing an affidavit with the local exchange carrier when connecting unprotected customer premise equipment (CPE) to 1.544 Mbps or subrate digital services.
- Until such time as subrate digital terminal equipment is registered for voice applications, the affidavit requirement for subrate services is waived.

Affidavit for Connection Of Customer Premises Equipment to 1.544 Mbps And/or Subrate Digital Services

For the work to be performed in the certified territory of _____ (telco name)

State of _____

County of _____

I, _____ (name), _____ (business address),

_____ (telephone number) being duly sworn, state:

I have responsibility for the operation and maintenance of the terminal equipment to be connected to 1.544 Mbps and/or _____ subrate digital services. The terminal equipment to be connected complies with Part 68 of the FCC rules except for the encoded analog content and billing protection specifications. With respect to encoded analog content and billing protection:

- () I attest that all operations associated with the establishment, maintenance, and adjustment of the digital CPE with respect to analog content and encoded billing protection information continuously complies with Part 68 of the FCC Rules and Regulations.
- () The digital CPE does not transmit digital signals containing encoded analog content or billing information which is intended to be decoded within the telecommunications network.
- () The encoded analog content and billing protection is factory set and is not under the control of the customer.

I attest that the operator(s)/maintainer(s) of the digital CPE responsible for the establishment, maintenance, and adjustment of the encoded analog content and billing information has (have) been trained to perform these functions by successfully having completed one of the following (check appropriate blocks):

- () A training course provided by the manufacturer/grantee of the equipment used to encode analog signals; or
- () A training course provided by the customer or authorized representative, using training materials and instructions provided by the manufacturer/grantee of the equipment used to encode analog signals; or
- () An independent training course (e.g., trade school or technical institution) recognized by the manufacturer/grantee of the equipment used to encode analog signals; or
- () In lieu of the preceding training requirements, the operator(s)/maintainer(s) is (are) under the control of a supervisor trained in accordance with _____ (circle one) above.

I agree to provide _____ (telco's name) with proper documentation to demonstrate compliance with the information as provided in the preceding paragraph, if so requested.

_____ Signature

_____ Title

_____ Date

Transcribed and sworn to before me

This _____ day of _____, _____

Notary Public

My commission expires:

Warranty and Customer Service

ADTRAN will repair and return 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: <http://support.adtran.com> (Click on *Warranty and Repair Information*, under *Support*.)

Product Registration

Registering your product helps ensure complete customer satisfaction. Please take time to register your products on line at <http://support.adtran.com>. Click on *Service/Support* and then on *Product Registration* under *Support*.

Product Support Information

A return material authorization (RMA) is required prior to returning equipment to ADTRAN. For service, RMA requests, training, or more information, use the following contact information:.

Repair and Return

If you determine that a repair is needed, please contact our Customer and Product Service (CaPS) department to have an RMA number issued. CaPS should also be contacted to obtain information regarding equipment currently in house or possible fees associated with repair.

CaPS Department (256) 963-8722

Identify the RMA number clearly on the package (below address), and return to the following address:

ADTRAN Customer and Product Service
901 Explorer Blvd. (East Tower)
Huntsville, Alabama 35806

RMA # _____

Pre-Sales Inquiries and Applications Support

Your reseller should serve as the first point of contact for support. If additional pre-sales support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, latest product documentation, application briefs, case studies, and a link to submit a question to an Applications Engineer. All of this, and more, is available at:

<http://support.adtran.com>

When needed, further pre-sales assistance is available by calling our Applications Engineering Department.

Applications Engineering (800) 615-1176

Post-Sale Support

Your reseller should serve as the first point of contact for support. If additional support is needed, the ADTRAN Support web site provides a variety of support services such as a searchable knowledge base, updated firmware releases, latest product documentation, service request ticket generation and troubleshooting tools. All of this, and more, is available at:

<http://support.adtran.com>

When needed, further post-sales assistance is available by calling our Technical Support Center. Please have your unit serial number available when you call.

Technical Support	(888) 4ADTRAN
International Technical Support	1-256-963-8716

Installation and Maintenance Support

The ADTRAN Custom Extended Services (ACES) program offers multiple types and levels of installation and maintenance services which allow you to choose the kind of assistance you need. This support is available at:

<http://support.adtran.com>

For questions, call the ACES Help Desk.

ACES Help Desk	(888) 874-ACES (2237)
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Training

The Enterprise Network (EN) Technical Training Department offers training on our most popular products. These courses include overviews on product features and functions while covering applications of ADTRAN's product lines. ADTRAN provides a variety of training options, including customized training and courses taught at our facilities or at your site. For more information about training, please contact your Territory Manager or the Enterprise Training Coordinator.

Training Phone (800) 615-1176, ext. 7500

Training Fax (256) 963-6700

Training Email training@adtran.com

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1. INTRODUCTION TO THE NETVANTA 4305

The NetVanta 4305 is a mid-range IP router designed for medium-to-large office connectivity over Frame Relay or point-to-point (PPP) networks. This modular platform offers a complete solution for access routing and WAN connectivity in a single, compact package.

The main base unit supports a variety of interchangeable network interface modules (NIMs) and dial backup interface modules (DIMs).

The NetVanta 4305 base unit includes the following:

- 1U high housing, rack-mountable, metal enclosure
- Three modular (card) slots (two small, one wide)
- Two built-in Ethernet ports

The NIMs available in this series provide a variety of WAN connectivity options including the following:

- 56K/64K (DDS)
- T1/FT1
- T1/FT1 with DSX-1
- E1/FE1
- Dual T1
- E1/FE1 with G.703 Drop
- Serial (V.35/X.21)

If needed, an analog modem, ISDN BRI (U Interface) DIM, or ISDN S/T DIM can plug onto the NIM, providing dial backup capability. Refer to *Installing Dial Backup and Network Interface Modules* on page 41 for more details.

For VPN applications using the NetVanta 4305, the optional VPN Accelerator Card provides encryption / decryption and security acceleration services. Refer to *Installing the NetVanta VPN Accelerator Card (1202368L1)* on page 43.

Features and Specifications

The NetVanta 4305 has the following features:

- Modular network interface: 56K/64K, T1/FT1, T1/FT1+DSX-1, E1/FE1, Dual T1, E1/FE1+G.703 Drop, or Serial interface
- 1U high metal chassis with three slots for option modules
- Two integrated 10/100BaseT Ethernet ports (RJ-48C)
- WAN Protocol: Frame Relay or PPP
- Integrated IP router with bridging
- RIP Versions 1 and 2, and OSPF routing protocols
- IP encapsulation over Frame Relay (RFC 1490)
- ADTRAN Operating System Command Line Interface (CLI)
- SNMP management

- Integrated EIA-232 DCE configuration port (DB-9)
- Optional dial backup (ISDN BRI DIM, ISDN S/T DIM, or analog modem)
- Optional VPN Accelerator Card provides encryption/decryption and security acceleration services
- Front panel LEDs
- Dimensions: 17.22”W x 1.72”H x 10.990”D
- Mountable in a 19” rack
- Worldwide auto-ranging AC power supply

This hardware installation guide describes the NetVanta 4305, details basic functionality, gives installation instructions, and lists hardware specifications. For more information on router configuration for a specific application, refer to the quick start documents provided on your *ADTRAN OS Documentation CD*. For details on the command line interface, refer to the *AOS Command Reference Guide*, also on the CD.

Unpack and Inspect the System

Each NetVanta 4305 unit is shipped in its 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 (see *Affidavits* on page 8).

Contents of ADTRAN Shipments

NetVanta 4305 (AC version)

Shipments of the NetVanta 4305 include the following items:

- NetVanta 4305 base unit with attached mounting ears
- *ADTRAN OS Documentation CD*
- Support Card

NetVanta 56K/64K NIM (1200861L1)

Shipments of the 56K/64K NIM include the following items:

- 56K/64K Network Interface Module
- *Quick Start Guide*
- 6-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3127004)

NetVanta T1/FT1 NIM (1200862L1)

Shipments of the T1/FT1 NIM include the following items:

- T1/FT1 Network Interface Module
- *Quick Start Guide*
- 15-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3125M008@A)

NetVanta T1/FT1+ DSX-1 NIM (1200863L1)

Shipments of the T1/FT1 + DSX-1 NIM include the following items:

- T1/FT1 + DSX-1 Network Interface Module
- *Quick Start Guide*
- 15-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3125M008@A)

NetVanta E1/FE1 NIM (1200868L1)

Shipments of the E1/FE1 NIM include the following items:

- E1/FE1 Network Interface Module
- *Quick Start Guide*
- 15-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3125M008@A)

NetVanta Dual T1 NIM (1200872L1)

Shipments of the T1/E1 NIM include the following items:

- Two T1/E1 Network Interfaces
- *Quick Start Guide*
- Two 15-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3125M008@A)

NetVanta Serial NIM (1200866L1)

Shipments of the Serial NIM include the following items:

- Serial Network Interface Module
- *Quick Start Guide*

NetVanta E1/FE1+ G.703 Drop NIM (1200878L1)

Shipments of the E1/FE1+ G.703 NIM include the following items:

- E1/FE1+ G.703 Network Interface Module
- *Quick Start Guide*
- 15-foot RJ-45 to RJ-45 cable (ADTRAN P/N 3125M008@A)

NetVanta Octal T1 Wide NIM (1200843L1)

Shipments of the Octal T1 Wide Option Module include the following items:

- Octal T1 Wide Network Interface Module
- *Quick Start Guide*
- Eight 15-foot RJ-45 to RJ-45 cables (ADTRAN P/N 3125M008@A)

NetVanta Analog Modem DIM (1200864L1)

Shipments of the Analog Modem DIM include the following items:

- Analog Modem Dial Backup Interface Module
- *Quick Start Guide*
- RJ-45 to RJ-11 cable (ADTRAN P/N 3125M007@A)

NetVanta ISDN BRI DIM (1200865L1)

Shipments of the ISDN BRI DIM include the following items:

- ISDN BRI Dial Backup Interface Module
- *Quick Start Guide*

- RJ-45 to RJ-11 cable (ADTRAN P/N 3125M007@A)

NetVanta ISDN S/T DIM (1200875L1)

Shipments of the ISDN S/T DIM include the following items:

- ISDN S/T Dial Backup Interface Module
- *Quick Start Guide*
- RJ-45 to RJ-11 cable (ADTRAN P/N 3125M007@A)

NetVanta VPN Accelerator Card (1202368L1)

Shipments of the VPN Accelerator Card include the following items:

- VPN Accelerator Card
- *Quick Start Guide*

WARNING

Option modules are intended to be serviced by qualified service personnel only.



System bundles are shipped with a base unit, a network interface module, and other appropriate contents based on the system-level solution ordered.

2. PHYSICAL DESCRIPTION

Reviewing the Base Unit Front Panel Design

Figure 1 shows the NetVanta 4305 front panel.

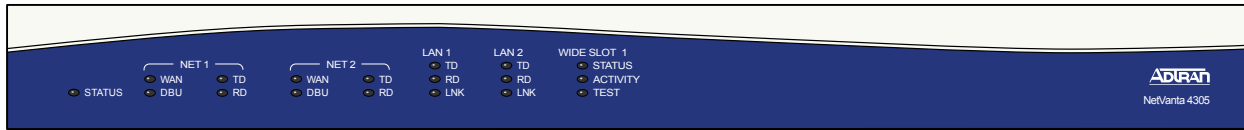


Figure 1. NetVanta 4305 Front Panel Layout

Front Panel LEDs

Table describes the front panel LEDs.

Table 1. NetVanta 4305 LEDs

For these LEDs...	This activity...	Indicates that...
STATUS	Green (blinking)	Unit is powering up. On power-up the STAT LED blinks rapidly for five seconds, during which time the user may escape to boot mode from the console port.
	Green (solid)	Power is on and self-test passed.
	Red (solid)	Power is on, but the self-test failed or the boot mode (if applicable) code could not be booted.
NET 1/ NET 2 WAN	Off	No NIM is installed or interface is administratively down.
	Green (solid)	Link is up and everything is operational.
	Red (solid)	An alarm condition is occurring on the WAN interface, or there is a self-test failure.
	Yellow (solid)	Unit is in test.
NET 1/ NET 2 DBU	Off	No DIM is installed.
	Green (solid)	DIM is ready. For the ISDN BRI DIM, green solid indicates that the negotiation with the switch is complete.
	Green (blinking)	Unit is in dial backup.
	Red (solid)	An alarm condition is occurring on the DBU interface, or there is a self-test failure.
	Yellow (solid)	Unit is in test.
NET 1/ NET 2 TD/RD	Green (blinking)	There is activity on the WAN or DBU port.
	Off	There is no activity on the WAN or DBU port.
LAN 1/ LAN 2 TD/RD	Green (blinking)	There is activity on the Ethernet port.
	Off	There is no activity on the Ethernet port.

Table 1. NetVanta 4305 LEDs (Continued)

For these LEDs...	This activity...	Indicates that...
LAN 1/ LAN 2 LNK	Green (solid)	The 10BaseT Ethernet link is up.
	Yellow (solid)	The 100BaseT Ethernet link is up.
WIDE SLOT 1 STATUS	Off	The card is not installed.
	Green (solid)	The card is recognized by the system.
	Red (solid)	Alarm condition with card.
WIDE SLOT 1 ACTIVITY	Green (blinking)	There is data activity on the card (e.g., for the Octal T1 module, this indicates TD/RD data).
	Off	There is no activity on card.
WIDE SLOT 1 TEST	Off	There is no test running.
	Yellow (solid)	The card is in test mode.

Reviewing the Rear Panel Design

Figure 2 shows the rear panel for the NetVanta 4305. The chassis is shown with the T1/FT1+DSX-1 NIM installed.

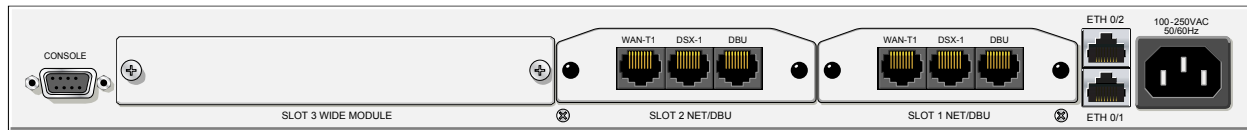


Figure 2. NetVanta 4305 Rear Panel Layout

Rear Panel Interfaces and LEDs

10/100BaseT Ethernet Interface and Activity LEDs

The Ethernet ports (**ETH 0/1**, **ETH 0/2**) are RJ-48C connectors with LEDs. The yellow activity LED flashes when data traffic is being sent or received on the Ethernet port. The green link LED is on when the router has a good connection to the LAN. See Table A-1 on page 45 for the Ethernet port pinout. The Ethernet port provides the following:

- 10BaseT or 100BaseT with a single connector
- Auto-negotiation
- CSMA/CD
- IEEE 802.3 compatibility

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). Table A-2 on page 45 shows the **CONSOLE** port pinouts.



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

NET/DBU Card Slots

The **SLOT 1 NET/DBU** and **SLOT 2 NET/DBU** card slots support various NIM plug-in cards. These card options are described in the section *Option Modules* on page 26.

Power Supply

The NetVanta 4305 has a worldwide auto-ranging AC power supply with an IEC connector. The appropriate 3-prong cable is included in the shipment. Please refer to *Supplying Power to the Unit* on page 40 for connection details.

3. OPTION MODULES

The NetVanta 4305 accepts several option modules designed to meet a variety of networking requirements. The option modules are of three types: plug-in Network Interface Modules (NIMs), plug-on Dial Backup Interface Modules (DIMs), and Wide NIMs.

NIMs are cards which plug directly into the option module slot (labeled **SLOT 1 NET/DBU** or **SLOT 2 NET/DBU**), located on the rear of the base unit. These cards provide the following types of interfaces:

- *NetVanta 56K/64K NIM (P/N 1200861L1) on page 27*
- *NetVanta T1/FT1 NIM (P/N 1200862L1 or P/N 1202862L1) on page 28*
- *NetVanta T1/FT1+DSX-1 NIM (P/N 1200863L1 or P/N 1202863L1) on page 29*
- *NetVanta Dual T1 NIM (P/N 1200872L1) on page 30*
- *NetVanta Serial NIM (P/N 1200866L1) on page 31*
- *NetVanta E1/FE1 NIM (P/N 1200868L1) on page 32*
- *NetVanta E1/FE1 NIM (P/N 1200868L1) on page 32*
- *NetVanta E1/FE1 with G.703 Drop NIM (P/N 1200878L1) on page 33*

Wide NIMs are cards which plug directly into **SLOT 3** (the Wide Interface Module slot) located on the rear of the base unit. These cards provide the following types of interfaces:

- *Octal T1/E1 Wide NIM (P/N 1200843L1)*

DIMs are plug-on cards which plug directly on to the NIM prior to installation into the base unit. A DIM must be plugged on to a NIM in order for the **DBU** port on the NIM to be active. The NetVanta 4305 supports three different DIMs (only two can be installed simultaneously):

- *NetVanta Analog Modem DIM (P/N 1200864L1) on page 35*
- *NetVanta ISDN BRI DIM (P/N 1200865L1) on page 36*
- *NetVanta ISDN S/T DIM (P/N 1200875L1) on page 37*

This section describes each module, providing individual card specifications and features. Refer to *Connector Pin Definitions* on page 45 for pinout information. *Installing Dial Backup and Network Interface Modules* on page 41 provides information on card installation.

Network Interface Modules

NetVanta 56K/64K NIM (P/N 1200861L1)

The 56K/64K NIM (shown in Figure 3) provides a **WAN-DDS** interface for the NetVanta 4305. Refer to Table A-3 on page 46 for the WAN-DDS connector pinout, and refer to Table A-9 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

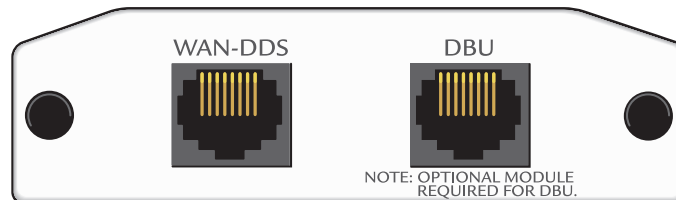


Figure 3. NetVanta 56K/64K NIM

Features and Specifications

Operating Modes

- Dedicated DDS (leased line)

DDS Interface

- RJ-48C
- 4-wire, full duplex
- -45 dB receiver sensitivity all rates
- Data Rates: 56K, 64K, and Auto

Clock Source

- Network
- Internal

Diagnostics

- CSU and DSU Loopbacks

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ACTA/FCC Part 68
- Industry Canada CS03
- UL and CUL
- AT&T TR 62310

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% non-condensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta T1/FT1 NIM (P/N 1200862L1 or P/N 1202862L1)

The T1/FT1 NIM (shown in Figure 4) provides a T1 (full T1 or fractional T1) WAN interface for the NetVanta 4305. Refer to Table A-4 on page 46 for the WAN-T1 connector pinout, and refer to Table A-9 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

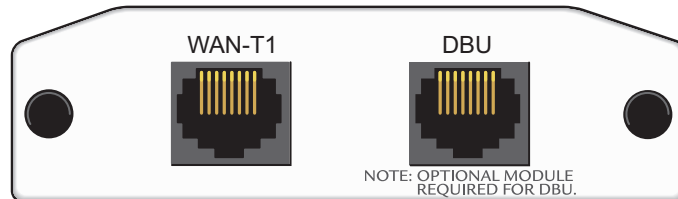


Figure 4. NetVanta T1/FT1 NIM

Features and Specifications**Operating Modes**

- T1/FT1 Frame Relay
- T1/FT1 PPP

T1/FT1 Interface

- Line Rate: 1.544 Mbps +/- 75 bps
- Line Code: AMI or B8ZS
- Framing: D4 (SF) or ESF
- FT1 Line Rate: DS0 Channelized (multiples of 56/64 kbps)
- Input Signal: 0 to -36 dB (DS-1)
- Line Build-Out: 0, -7.5, -15, -22.5 dB
- Connector: RJ-48C
- DS0 Assignment: Programmable

Clock Source

- Network
- Internal

Diagnostics

- Test pattern generation and detection: 511, QRSS (2nd Gen only)
- Network loopbacks (local and remote); responds to both INBAND and FDL loop codes
- Alarm generation and detection
- Network and user sets of performance data (15 minutes and 24 hours)

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ACTA/FCC Part 68
- Industry Canada CS03
- UL and CUL
- T1 Interface: Pub 62411
- ESF Format Interface: TR. 194
- ESF Performance Monitoring: TR. 54016 and T1.403

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta T1/FT1+DSX-1 NIM (P/N 1200863L1 or P/N 1202863L1)

The T1/FT1 + DSX-1 NIM (see Figure 5) provides a full T1 or fractional T1 network interface and a DSX-1 interface. Refer to Table A-4 on page 46 for the WAN-T1 connector pinout, Table A-6 on page 47 for the DSX-1 connector pinout, and Table A-9 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

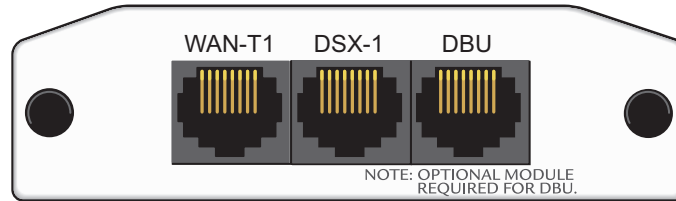


Figure 5. NetVanta T1/FT1+DSX-1 NIM

Features and Specifications**Operating Modes**

- T1/FT1 Frame Relay
- T1/FT1 PPP

T1/FT1 Interface

- Line Rate: 1.544 Mbps +/- 75 bps
- Line Code: AMI or B8ZS
- Framing: D4 (SF) or ESF
- FT1 Line Rate: DS0 Channelized (multiples of 56/64 kbps)
- Input Signal: 0 to -36 dB (DS-1)
- Line Build-Out: 0, -7.5, -15, -22.5 dB
- Connector: RJ-48C
- DS0 Assignment: Programmable

DSX-1 Interface

- Line Interface: DSX-1 per ANSI T1.102
- DSX Receiver Input Range: -10 dBdsx to +6 dBdsx
- Line Rate: 1.544 Mbps
- Capacity: 1 to 24 DS0s
- Line Codes: AMI, B8ZS
- Framing: D4 (SF) or ESF
- Line Length: 0 to 655 feet and -7.5 dB
- Connector: RJ-48C
- DSX-1 Interface to PBX

Clock Source

- Network
- Internal
- DSX-1

Diagnostics

- Test pattern generation and detection: 511
- Network loopbacks (local and remote); responds to inband loop codes (T1 interface only)
- Alarm generation and detection
- Network and user sets of performance data (15 minutes and 24 hours)

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ACTA/FCC Part 68
- Industry Canada CS03
- UL and CUL
- T1 Interface: Pub 62411
- ESF Format Interface: TR. 194
- ESF Performance Monitoring: TR. 54016 and T1.403

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta Dual T1 NIM (P/N 1200872L1)

The NetVanta Dual T1 NIM (see Figure 6) provides two WAN T1 interfaces for the NetVanta 4305. The module provides up to 2.048 Mbps on each network interface. Refer to Table A-5 on page 46 for the pinouts. Refer to Table A-10 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

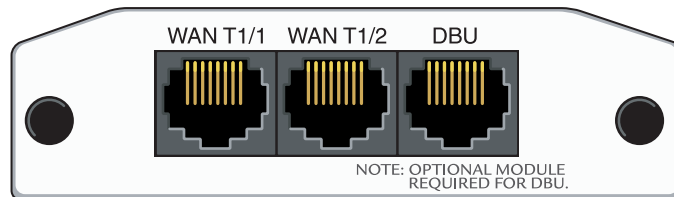


Figure 6. NetVanta Dual T1 NIM

Features and Specifications

Operating Modes

- T1/ FT1

T1/E1 Interface

- Line Rate: 1.544 Mbps +/- 75 bps
- Line Code: AMI or B8ZS
- Framing: D4 (SF) or ESF
- FT1 Line Rate: DS0 Channelized (multiples of 64 kbps)
- Input Signal: 0 to -36 dB (DS-1)
- Line Build-Out: 0, -7.5, -15, -22.5 dB
- Connector: RJ-48C
- DS0 Assignment: Programmable

Clock Source

- Network
- Internal
- Through

Diagnostics

- Test pattern generation and detection: QRSS, 511, $2^{15}-1$, $2^{20}-1$
- Network loopbacks (local and remote)
- Responds to inband loop codes (T1 interface only)
- Alarm generation and detection
- Network performance data (15 minutes and 24 hours)

Relevant Requirements/Standards

- ACIF S016
- ACA TS001
- ETSI TBR 12 / TBR 13
- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ITU G.703, ITU-T G.704 (CRC-4), ITU-T G.823, ITU-T G.797

Environmental

- Operating temperature: 0 ° to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta Serial NIM (P/N 1200866L1)

The NetVanta Serial NIM (shown in Figure 7) is user-configurable to be either a V.35 or X.21 (V.11) interface. This module supports rates up to a maximum of 10 Mbps. An additional V.35 (ADTRAN P/N 1200873L1) or X.21 (ADTRAN P/N 1200874L1) cable is required (see *Caution*, below). Refer to Table A-8 on page 48 for the Serial connector pinout, and refer to Table A-10 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

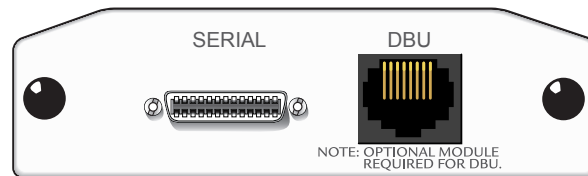
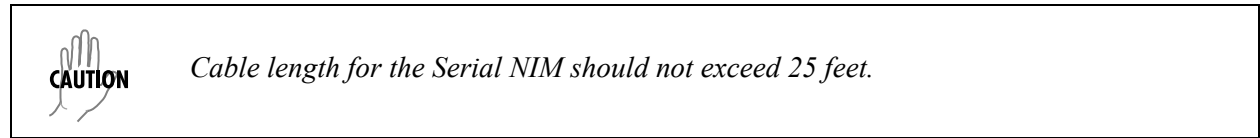


Figure 7. NetVanta Serial NIM

Features and Specifications**Operating Mode**

- DTE only

Serial Interface

- Provides V.35 or X.21 (V.11) electrical interface
- 26-pin smart serial (DTE) connector

Clock Source

- Network
- Internal

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- EN60950
- UL and CUL
- ISO 4903 (X.21)
- CCITT V.35 Synchronous (V.35)1

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta E1/FE1 NIM (P/N 1200868L1)

The NetVanta E1 NIM (see Figure 8) provides a **WAN-E1** interface for the NetVanta 4305 meeting the requirements of ITU-T G.703/G.704. The module provides a single 2.048 Mbps network interface. Refer to Table A-5 on page 46 for the pinouts. Refer to Table A-10 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

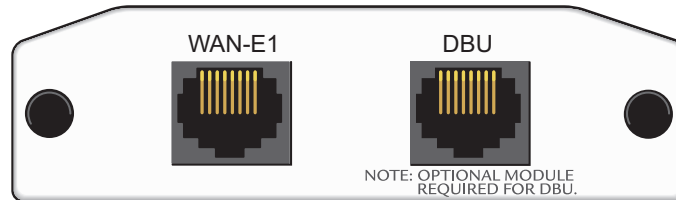


Figure 8. NetVanta E1/FE1 NIM

Features and Specifications

Operating Modes

- E1/FE1

WAN-E1 Interface

- Connector: RJ-48C
- Line Rate: 2.048 Mbps +/- 50 PPM
- Line Code: AMI or HDB3
- Framing: FAS with optional CRC-4
- FE1 Line Rate: Channelized Timeslot (in multiples of 64 kbps)
- Receiver Sensitivity: -30 dB

Clock Source

- Network
- Internal
- Through

Diagnostics

- Network loopbacks
- Network performance data (15 minutes and 24 hours)
- Test pattern generation and detection: QRSS, 511
- Alarm generation and detection

Relevant Requirements/Standards

- ACIF S016
- ACA TS001
- ETSI TBR 12 / TBR 13
- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ITU G.703, ITU-T G.704 (CRC-4), ITU-T G.823, ITU-T G.797

Environmental

- Operating temperature: 0 ° to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta E1/FE1 with G.703 Drop NIM (P/N 1200878L1)

The NetVanta E1/FE1 with G.703 Drop NIM (see Figure 9) provides a single **WAN-E1** interface (2.043 Mbps) with user-selectable TS0 assignment and a G.703 drop port which may be used to drop and insert traffic to an E1 PBX. Refer to Table A-7 on page 49 for the E1 pinouts. Refer to Table A-7 on page 47 for the G.703 pinouts. Refer to Table A-10 on page 49 for the DBU connector pinout. An optional DIM is required for dial backup applications.

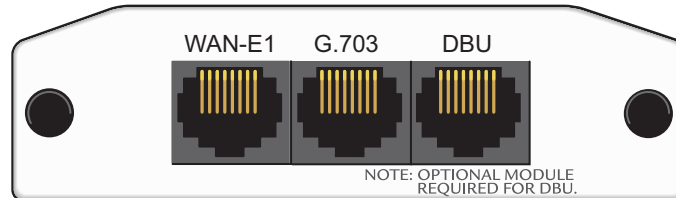


Figure 9. NetVanta E1/FE1 with G.703 Drop NIM

Features and Specifications

Operating Modes

- E1/FE1

WAN-E1 Interface

- Connector: RJ-48C
- Line Rate: 2.048 Mbps +/- 50 PPM
- Line Code: AMI or HDB3
- Framing: FAS with optional CRC-4
- FE1 Line Rate: Channelized Timeslot (in multiples of 64 kbps)
- Receiver Sensitivity: -30 dB

G.703 Interface

- Connector: RJ-48C
- Line Rate: 2.048 Mbps
- Line Code: AMI or HDB3
- Framing: FAS with optional CRC-4
- Capacity: 1 to 31 timeslots
- Receiver Sensitivity: -30 dB

Clock Source

- Network
- Internal
- Through

Diagnostics

- Network loopbacks

- Network performance data (15 minutes and 24 hours)
- Test pattern generation and detection: QRSS, 511
- Alarm generation and detection through SNMP

Relevant Requirements/Standards

- ACIF S016
- ACA TS001
- ETSI TBR 12 / TBR 13
- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ITU G.703, ITU-T G.704 (CRC-4), ITU-T G.823, ITU-T G.797

Environmental

- Operating temperature: 0 ° to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 4.25" x 2.75"

NetVanta Octal T1 Wide NIM (P/N 1200843L1)

The NetVanta Octal T1 Wide NIM (shown in Figure 10) provides eight T1 (full T1 or fractional T1) WAN interfaces. Refer to Table A-4 on page 46 for the T1 interface pinout.

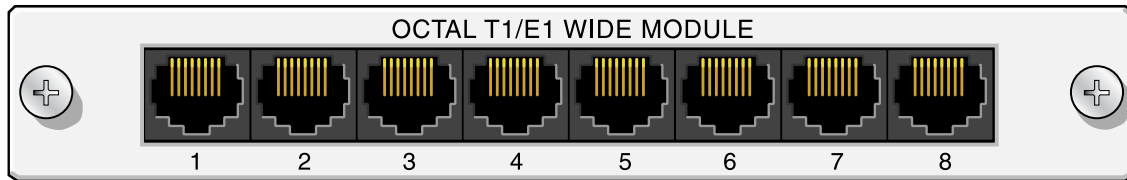


Figure 10. NetVanta Octal T1 Wide NIM

Features and Specifications

Operating Modes

- T1/FT1 Frame Relay
- T1/FT1 PPP

T1/FT1 Interface

- Line Rate: 1.544 Mbps +/- 75 bps
- Line Code: AMI or B8ZS
- Framing: D4 (SF) or ESF
- FT1 Line Rate: DS0 Channelized (multiples of 56/64 kbps)
- Input Signal: 0 to -36 dB (DS-1)
- Line Build-Out: 0, -7.5, -15, -22.5 dB
- DS0 Assignment: Programmable

Agency Approvals

- FCC Part 15, Class A
- UL/CUL 60950
- EN 60950/IEC 60950
- AS/NZS 60950
- EN 55022
- EN 55024

Environmental

- Operating Temperature: 0° to 50°C
- Storage Temperature: -20° to 70°C
- Relative Humidity: 95% non-condensing

Dial Backup Interface Modules

NetVanta Analog Modem DIM (P/N 1200864L1)

The Analog Modem DIM provides a modem with data rates up to 33.6 kbps for the NetVanta 4305. This DIM is a plug-on card that connects to the NIM. For installation instructions, see *Installing Dial Backup and Network Interface Modules* on page 41.

Features and Specifications

Features

- ITU V.90 compliant
- Async

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ACTA/FCC Part 68
- Industry Canada CS03
- UL and CUL

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% noncondensing

Physical

- Dimensions: 3.75" x 2.5"

NetVanta ISDN BRI DIM (P/N 1200865L1)

The NetVanta ISDN BRI DIM provides dial backup access to the public switched telephone network (PSTN) via Basic Rate ISDN for the NetVanta 4305. This DIM is a plug-on module that connects to the NIM. For installation instructions, see *Installing Dial Backup and Network Interface Modules* on page 41.

Features and Specifications**Features**

- Clear Channel and BONDING Mode 1 call protocols
- Network support for 64 kbps (1B channel) or 128 kbps (2B channels)
- D channel switch compatibility with AT&T 5ESS, Northern Telecom DMS-100, and National ISDN-1
- V.54 network loopback support

Relevant Requirements/Standards

- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- ACTA/FCC Part 68
- Industry Canada CS03
- UL and CUL

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% non-condensing

Physical

- Dimensions: 3.75" x 2.5"

NetVanta ISDN S/T DIM (P/N 1200875L1)

The NetVanta ISDN S/T DIM provides dial backup access to the public switched telephone network (PSTN) via Basic Rate ISDN for the NetVanta 4305. This DIM is a plug-on module that connects to the NIM. For installation instructions, see *Installing Dial Backup and Network Interface Modules* on page 41.

Features and Specifications**Features**

- Supports PPP dial backup
- Network support for 64 kbps (1B-channel)
- D-channel switch compatibility with AT&T 5ESS, Northern Telecom DMS-100, National ISDN-1, and Euro-ISDN

Relevant Requirements/Standards

- ACIF S031
- ACA TS001
- EMC - see *Electromagnetic Compatibility (EMC) Table* on page 6.
- EN 60950

Environmental

- Operating Temperature: 0 to 50 °C
- Storage Temperature: -40 to 85 °C
- Relative Humidity: Up to 95% non-condensing

Physical

- Dimensions: 3.75" x 2.5"

4. UNIT INSTALLATION

The instructions and guidelines provided in this section cover hardware installation topics such as wall mounting/rack mounting the unit and installing option cards. These instructions are presented as follows:

- *Mounting Options* on page 39
- *Supplying Power to the Unit* on page 40
- *Installing Dial Backup and Network Interface Modules* on page 41
- *Installing the NetVanta VPN Accelerator Card (1202368L1)* on page 43

For information on router configuration for a specific application, refer to the quick start documents provided on your *ADTRAN OS Documentation CD*. For details on the command line interface, refer to the *AOS Command Reference Guide* (also included on your CD).

WARNING

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



Electronic modules can be damaged by static electrical discharge. Before handling modules, wear 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 4305 are:

- Ethernet cable
- Network cable (module-dependent)
- DSX-1 cable (T1/FT1 + DSX-1 module only)
- DBU cable (dial backup functions require an optional DIM)
- Phillips-head screwdriver (rack mounting applications only)



To access the command line interface (CLI) of the NetVanta 4305, you will also need a VT100 terminal or PC with terminal emulation software and a console port cable. Instructions on how to access the CLI are given in the AOS Command Reference Guide (provided on the ADTRAN OS Documentation CD).

Mounting Options



If you have purchased the VPN Accelerator Card, install it first. See [Installing the NetVanta VPN Accelerator Card \(1202368L1\)](#) on page 43.

The NetVanta 4305 may be installed in a tabletop, wall mount, or 19-inch rack mount configuration. The following sections provide step-by-step instructions for rack mounting and wall mounting.

Rack Mounting NetVanta 4305

The NetVanta 4305 is housed in a 1U high, rack-mountable chassis which can be installed into 19-inch equipment racks. Follow these steps to mount the NetVanta 4305 into a rack:

Instructions for Rack Mounting NetVanta	
Step	Action
1	Position the NetVanta 4305 in a stationary equipment rack. This unit takes up 1U of space. To allow proper grounding, scrape the paint from the rack around the mounting holes where the NetVanta 4305 will be positioned.
2	Have someone else hold the unit in position as you install two mounting bolts through the unit's brackets and into the equipment rack using a #2 Phillip's screwdriver.
3	Proceed to the steps given in <i>Supplying Power to the Unit</i> on page 40.



Be careful not to upset the stability of the equipment mounting rack when installing this product.

Wall Mounting NetVanta 4305

Instructions for Wall Mounting NetVanta 4305	
Step	Action
1	Remove the mounting ears. Rotate them 90° so that the portion of the bracket with the mounting holes is flush with the bottom of the chassis, and reattach them to the chassis.
2	Decide on a location for the NetVanta 4305. Keep in mind that the unit needs to be mounted at or below eye-level so that the LEDs are viewable. Important! <i>Mount the chassis with LEDs facing to the side (not facing up or down).</i> Warning! <i>Do not mount the chassis with the right-side fans facing down.</i>
3	Prepare the mounting surface by attaching a board (typically plywood, 3/4" to 1" thick) to a wall stud. Important! <i>Mounting to a stud ensures stability. Using sheetrock anchors may not provide sufficient long-term stability.</i>

Instructions for Wall Mounting NetVanta 4305 (Continued)	
Step	Action
4	Have someone else hold the unit in position as you install two 3/32" to 1/8" (1 1/2" or greater in length) wood screws through the unit's brackets and into the mounted board.
5	Proceed to the steps given in <i>Supplying Power to the Unit</i> on page 40.

Supplying Power to the Unit

As shipped, each NetVanta 4305 is set to factory default conditions. After installing the base unit and any option modules, the NetVanta 4305 is ready for power-up. To power-up the unit, ensure that the unit is properly connected to an appropriate power source (as outlined in the sections below).

NetVanta 4305 (AC)

The AC-powered NetVanta 4305 comes equipped with an auto-sensing 100-250 VAC, 50-60 Hz power supply. The maximum power consumption is 75 Watts. A grounded, three-plug detachable cable is included with the shipment.



- *Use only copper conductors when making power connections.*
- *Install unit in accordance with Article 400 and 364.8 of the NEC NFPA 70.*
- *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*

Installing Dial Backup and Network Interface Modules

The DIMs plug on to the NIMs. The NIMs are then installed in the rear panel option module slot. The following tables list the installation steps. See Figure 11 below and Figure 12 on page 42.

CAUTION *Always remove power from the unit prior to removing or installing a module.*

CAUTION *Improper installation may result in damage to the modules.*

Instructions for Installing the DIMs	
Step	Action
1	Remove power from the unit.
2	If the NIM is already in the NetVanta chassis, release the pins at both edges of the NIM faceplate and slide the module out of the chassis.
3	Carefully align the P1 connector on the NIM with the J1 connector on the DIM. <i>Using only fingertip pressure</i> so that neither circuit board bends or flexes, ensure that the connectors are firmly seated. Secure the DIM to the NIM using the screws and standoff posts supplied. See Figure 11.
4	Slide the NIM with the DIM attached into the NetVanta chassis, continuing with the normal NIM installation (see <i>Instructions for Installing the NIMs and Wide NIMs</i> on page 42).

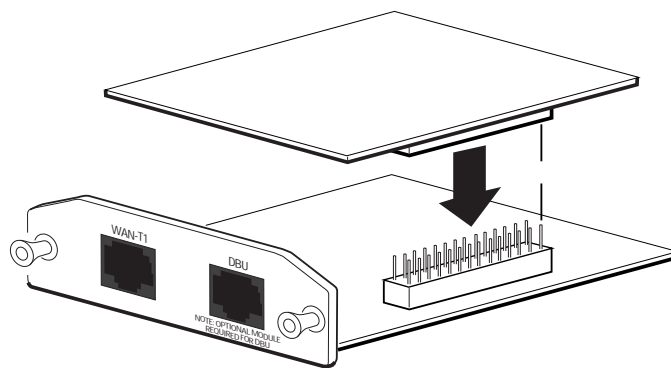


Figure 11. Installing DIMs

Instructions for Installing the NIMs and Wide NIMs	
Step	Action
1	Remove power from the unit.
2	Slide the option module into the option slot until the module is firmly seated against the front of the chassis.
3	Secure the pins at both edges of the module.
4	Connect the cables to the associated device(s).
5	Restore power to the unit.

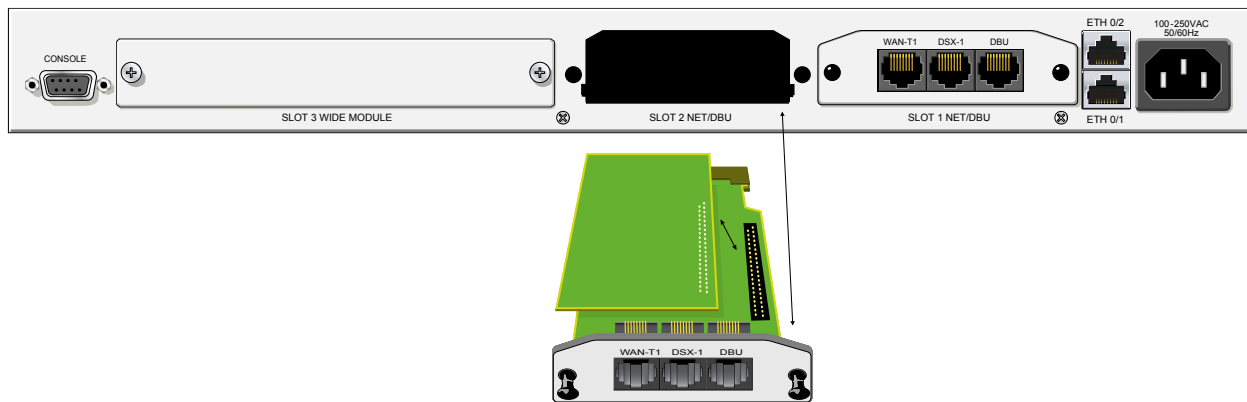


Figure 12. NIM and DIM Installation

Your NetVanta 4305 is now ready to be configured and connected to the network. For more information on configuration for a specific application, refer to the quick start documents provided on your *ADTRAN OS Documentation CD*. For details on the command line interface, refer to the *AOS Command Reference Guide* (also included on your CD).

Installing the NetVanta VPN Accelerator Card (1202368L1)

The optional VPN Accelerator Card plugs into a 32-bit PCI slot and is designed to be used in the NetVanta 4305 to provide encryption/decryption and security acceleration services. The card provides the following security services to the host processor: DES, Triple-DES, AES, SHA-1, MD5, and Random Number Generation. Performance metrics include 528 Mbps-DES, 176 Mbps-3DES, and 422 Mbps-AES. The power consumption of the card does not exceed 2 Watts.

Instructions for Installing the VPN Accelerator Card	
Step	Action
1	Remove power from the unit.
2	Remove the nine screws and, if necessary, two mounting brackets (see Figure 13).
3	Using a 3/16" hex driver, remove the two jack screws located on either side of the DB-9 port.
4	Carefully lift and remove the unit's cover to expose the circuit board.
5	Gently slide the accelerator card into the PC card slot as shown. The card is keyed to fit into the slot only one way. To avoid damaging the card pins, do not use excessive force.
6	Replace the unit cover, screws, and mounting brackets.
7	Restore power to the unit.

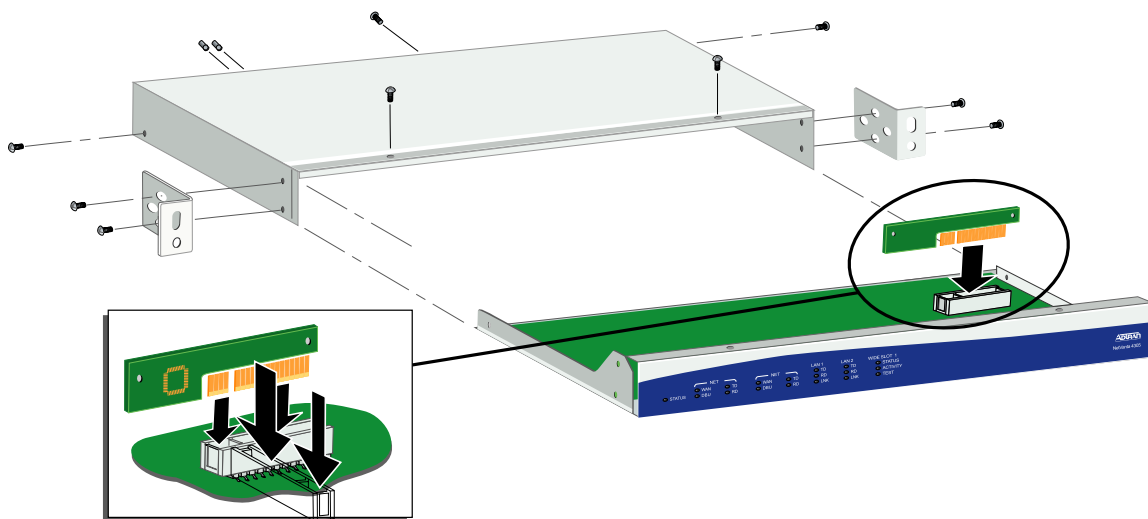


Figure 13. VPN Card Installation

APPENDIX A. CONNECTOR PIN DEFINITIONS

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

Base Unit Pinouts

Table A-1. 10/100BaseT Ethernet Port Pinouts

Pin	Name	Description
1	TX1	Transmit Positive
2	TX2	Transmit Negative
3	RX1	Receive Positive
4,5	—	Unused
6	RX2	Receive Negative
7,8	—	Unused

Table A-2. Console Port (DCE) Pinout for NetVanta 4305 (p/n 1200890L1)

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 Tied to pin 1 (output)
7	—	Not connected
8	CTS	Clear to Send Tied to pin 1 (output)
9	—	Not connected



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

Network Interface Module (NIM) and Wide NIM Pinouts

Table A-3. WAN-DDS Connector Pinouts

Pin	Name	Description
1	R1	Transmit data to the network—Ring 1
2	T1	Transmit data to the network—Tip 1
3-6	—	Unused
7	T	Receive data from the network—Tip
8	R	Receive data from the network—Ring

Table A-4. WAN-T1 Connector Pinouts

Pin	Name	Description
1	R1	Receive data from the network—Ring 1
2	T1	Receive data from the network—Tip 1
3	—	Unused
4	R	Transmit data toward the network—Ring
5	T	Transmit data toward the network—Tip
6-8	—	Unused

Table A-5. WAN-E1 Connector Pinouts

Pin	Name	Description
1	R1	Receive data from the network
2	T1	Receive data from the network
3	—	Unused
4	R	Transmit data toward the network
5	T	Transmit data toward the network
6-8	—	Unused

Table A-6. DSX-1 Connector Pinout

Pin	Name	Description
1	R	Transmit data toward the DTE—Ring
2	T	Transmit data toward the DTE—Tip
3	—	Unused
4	R1	Receive data from the DTE—Ring 1
5	T1	Receive data from the DTE—Tip 1
6-8	—	Unused

Table A-7. G.703 Connector Pinouts

Pin	Name	Description
1	R	Transmit data toward the DTE—Ring
2	T	Transmit data toward the DTE—Tip
3	—	Unused
4	R1	Receive data from the DTE—Ring 1
5	T1	Receive data from the DTE—Tip 1
6-8	—	Unused

Table A-8. Serial NIM Connector Pinouts

Pin	Name	Pin	Name
1	TD_A	14	TD_B
2	ETC_A	15	ETC_B
3	TCLK_A	16	TCLK_B
4	RCLK_A	17	RCLK_B
5	RD_A	18	RD_B
6	DCD_A	19	Unused
7	DTR_A	20	Unused
8	RTS_A	21	Unused
9	RTS_B (V.11 only)	22	Unused
10	CTS_B (V.11 only)	23	Unused
11	CTS_A	24	Unused
12	DSR_A	25	Unused
13	TM_A	26	Ground

Dial Backup (DBU) Connectors

Table A-9 describes the pinouts for the following modules: 56/64K, T1/FT1 (1st generation), and T1/FT1+DSX-1 (1st generation).

Table A-9. DBU Connector Pinouts

Pin	Name	Description
1	R1	Network–Ring 1
2	T1	Network—Tip 1
3	—	Unused
4	T	Network–Tip
5	R	Network–Ring
6-8	—	Unused

Table A-10 describes the pinouts for the following modules: Serial, E1/FE1, E1/FE1 with G.703 Drop, T1/FT1 (2nd generation), Dual T1 NIM, and T1/FT1+DSX-1 (2nd generation).

Table A-10. DBU Connector Pinouts

Pin	Name	Description
1-2	—	Unused
3	R1	Network–Ring 1
4	R	Network–Ring
5	T	Network—Tip
6	T1	Network—Tip 1
7-8	—	Unused



An optional DIM is required for dial backup applications.

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