ADTRAN

NetVanta 160 Series
Wireless Access Point
Hardware Installation Guide

1700416F1	NetVanta 160
1700417F1	NetVanta 161
1700922F1	Optional External DC Power Adapter
1700939F1	Optional Set of Six Antennas (three 2.4 GHz, three 5 GHz)

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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.*

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Conventions

NOTE   *Notes provide additional useful information.*

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

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

Safety Instructions

When using your 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. 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.

3. 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**
> *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

Federal Communication Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

•   Reorient or relocate the receiving antenna.

•   Increase the separation between the equipment and receiver.

•   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

•   Consult the dealer or an experienced radio/TV technician for help.

FCC Compliance Notice: Radio Frequency Notice

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

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

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

Canadian Radiation Exposure Statement

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

If this device is going to be operated in 5.15 ~ 5.25 GHz frequency range, then it is restricted in indoor environment only.

This radio transmitter (IC: 2250A-1700417F1) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Antenna Specifications

The following table shows antenna specification for the NetVanta 160 and NetVanta 161

Table 1. NetVanta 160/161 Antenna Specifications

	NetVanta 160 WAP	**NetVanta 161 WAP**	
Antenna Type	PIFA Antenna	Monopole Antenna	Monopole Antenna
Model Name	TFF-Z016MPXX-361	IWX-145XRSCX-361	KWX-145XRSDX-361
Product Description	Integrated PIFA Antenna	2 dBi 2.4 GHz Single-Band Antenna	2 dBi 5 GHz Single-Band Antenna
Gain	4.98/5.08 dBi	2 dBi	2 dBi
Tx/Rx Mode	2T3R Concurrent	2T3R Concurrent	2T3R Concurrent
Remark	Main Antenna for Test	N/A	N/A

Canadian Emissions Requirements

This digital apparatus does not exceed the Class B 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 B prescrites dans la norme sur le materiel brouilleur: "Appareils Numériques," NMB-003 edictee par le ministre des Communications.

Canadian RSS Standard

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

> **NOTE**   *The Country Code Selection feature is disabled for products marketed in the U.S.A. and Canada.*

Taiwan NCC Statement

802.11b/802.11g

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802.11a

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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

List of Figures

List of Tables

1.   INTRODUCTION

The NetVanta 160 Series consists of the NetVanta 160 and NetVanta 161.

> **NOTE** *In this document, the term NetVanta 160 Series means all of the units collectively. If a statement only applies to one particular router, the text refers to the router individually.*

This hardware installation guide lists the NetVanta 160 Series units' physical characteristics and product specifications, introduces basic functionality, and provides installation instructions.

- *Physical Description on page 16*
- *Unit Installation on page 20*

For additional information on mounting options, suppling power, and connecting to the AP refer to the following sections:

- *Mounting Options on page 20*
- *Supplying Power to the AP on page 25*
- *Connecting to the AP on page 25*

For information on switch 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 160 Series Wireless Access Point (AP) is an 802.11n-based thin wireless AP that works in conjunction with an AOS access controller (AC) for enterprise wireless local area network (WLAN) deployments. It can provide a secure gateway for wireless clients to connect to the wired network provided by NetVanta switch and router products. The NetVanta 160 Series AP features dual radios supporting 802.11a/n and 802.11b/g/n.

The NetVanta 160 has a high-performance internal antenna (no external antenna is required). The NetVanta 161 has six external reverse subminiature version A (SMA) connectors for wireless communications.There are three connectors for each band which are marked **2.4G 1** through **3** or **5G 1** through **3** on the chassis. The antennas can be ordered from ADTRAN in a set of six (three 2.4 GHz and three 5 GHz, P/N 1700939F1).

Features and Specifications

The following list highlights the major features of the NetVanta 160 Series AP.

Features

- Power from a Power over Ethernet (PoE) enabled RJ-45 Ethernet connection or from an ADTRAN external 12 VDC converter supply
- IEEE 802.11a, 802.11b, 802.11g, and 802.11n wireless access support (supports concurrent 802.11a/n and 802.11b/g/n connections)
- One high-performance internal antenna (no external antenna is required)
- Six external RP-SMA connectors for connecting standard dual-band antennas (NetVanta 161 only)
- Optional set of six dual-band antennas; three 2.4 GHz and three 5 GHz (P/N 1700939F1)
- A single 10/100/1000Base-T Ethernet port for connection to the NetVanta switch/router product
- Four LEDs to indicate status, WAN/LAN activity, and radio activity information
- Reset switch for restoring default configuration

Compliance

- FCC Part 15 Class B, C, E
- UL/CUL 60950-1, Second Edition
- IEC 60950-1, CB Certified
- EN 300 328, EN 301 893 V1.5.1, EN 301 489-1 V1.8.1 /-17, EN 55022, EN 55024, R&TTE Art 6.4
- IC-RSS-210
- AS/NZS 4268
- EN 60601-1-2

Wireless Communications

Wireless Speeds
- 802.11b: 1, 2, 5.5, 11 Mbps
- 802.11g: 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11n: 6.5, 13, 13.5, 19.5, 26, 27, 39, 40.5, 52, 54, 58.5, 65, 78, 81, 104, 108, 117, 121.5, 130, 135, 162, 216, 243, 270, 300 Mbps

Modulation Type
- DSSS (DBPSK, DQPSK, CCK), OFDM (BPSK, QPSK, 16QAM, 64QAM)

Operating Frequency
- 2.400~2.4835 GHz, 5.15~5.25 GHz, and 5.725~5.850 GHz

Channel Number
- 2.4 GHz (b/g/n-20): 3 non-overlapping
- 5.15~5.25 GHz (a/n-20): 4
- 5.15~5.25 GHz (n-40): 2
- 5.725~5.850 GHz (n-20): 4
- 5.725~5.850 GHz (n-40): 2

Power
- Universal Adapter Input Voltage: 12 VDC, 1.25 A
- PoE (DC) Input Voltage: 48 VDC, 0.32 A

Physical
- Dimensions: 2.13-inch H x 7.8-inch D x 7.8-inch W (54 mm H x 200 mm D x 200 mm W)
- Weight: 2 lb (0.907 kilograms)

Environmental
- Operating Temperature: 40°F to 113°F (4°C to 45°C)
- Humidity: Up to 90 percent, noncondensing

NetVanta 160 Series Shipping Contents

Each NetVanta 160 Series 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 (refer to the *Support* page on the ADTRAN website at http://www.adtran.com/support).

Shipments of the NetVanta 160 Series include the following items:

- NetVanta 160 or NetVanta 161 Wireless AP
- One plastic mounting bracket/vertical table top stand, four drywall anchors, four screws
- Eight adhesive rubber feet
- One metal ceiling bracket, one metal slider, two screws
- Quick start guide

Familiarize Yourself with the AP Hardware

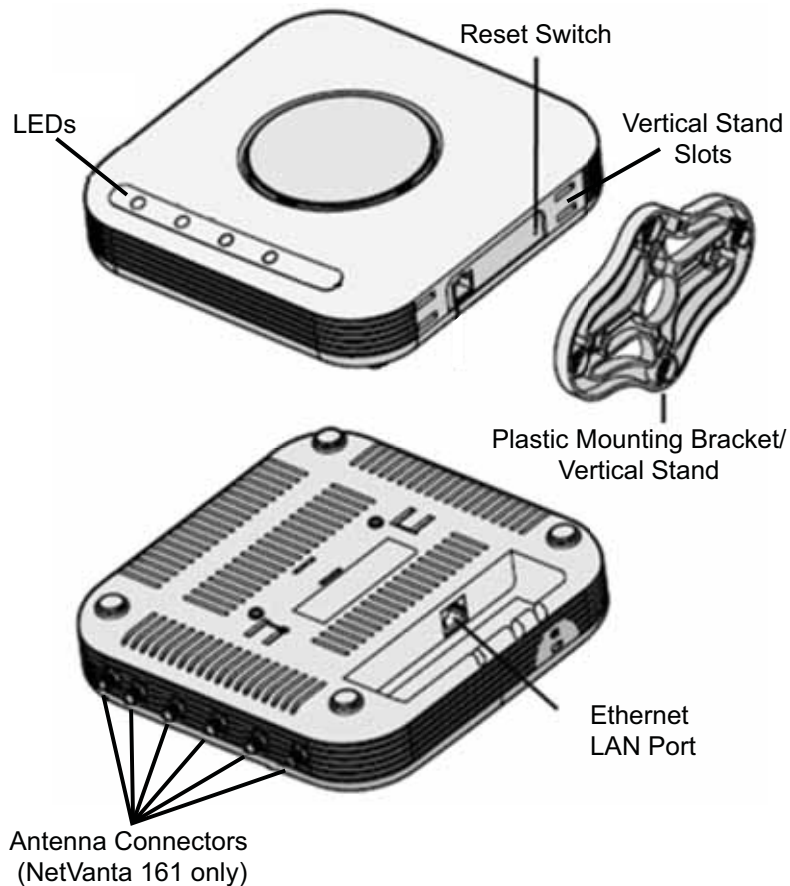*Figure 1* shows the NetVanta 160 Series and the plastic wall mounting bracket.

Figure 1. NetVanta 160/161 AP and Plastic Mounting Bracket

Ethernet LAN Port

The NetVanta 160/161 AP has one auto-sensing 10BASE-T/100BASE-TX/1000BaseT RJ-45 connector that can be attached directly to 10BASE-T/100BASE-TX/1000BaseT switches to provide a full-duplex link. These segments must conform to the IEEE 802.3 or 802.3u specifications. See *Table A-1 on page 27* for Ethernet port pinouts.

This connector uses an MDI (i.e., internal straight-through) pin configuration. You can use straight-through twisted-pair cable to connect this port to most network interconnection devices such as a switch or router that provide MDI-X ports. This connector will sense the correct wiring polarity, so no crossover cable is required.

The AP appears as an Ethernet node and performs a bridging function by moving packets from the wired LAN to remote workstations on the wireless infrastructure.

Power over Ethernet

The Ethernet/PoE RJ-45 connector also supports Power over Ethernet (PoE) based on the IEEE 802.3af standard.

802.3af specifies Power over Ethernet for mid-span, where a PoE injector is located in the path between the network and the AP, as well as PSE, where the power is supplied by the network switch to which the AP is attached. Mid-span devices typically provide power on the unused pairs (4+5 and 7+8) and only provide 100 Mbps maximum throughput. To realize the full benefit of 802.11n, the NetVanta 160/161 AP should be should be connected to a Gigabit Ethernet PoE switch, such as the NetVanta 1534P (P/N 1702591G1), or a PoE injector, such as the ADTRAN Single Port PoE Injector (P/N 1700920F1).

Reset Switch

Your NetVanta 160/161 AP can be reset by inserting a small pointed object into the hole in the side of the unit labeled **RESET**. Press the **RESET** switch once to reboot the unit.

Kensington Security Slot

The AP includes a Kensington security slot on the side panel. You can prevent unauthorized removal of the AP by wrapping a Kensington security cable (not provided) around an unmovable object, inserting the lock into the slot, and turning the key.

Front Panel LEDs

LED indicators are located on the top of the NetVanta 160/161 AP unit. The following table lists the LEDs and their behaviors.

Table 1. Status and Radio LED Definitions

Status LED	2.4Ghz LED	5Ghz LED	Description
Amber Solid	Off	Off	The unit is powering up.
Green Solid	Off	Off	The unit is initializing software and acquiring an IP address.
Green Solid ⊹	Green Solid/ Flashing	Green Solid/ Flashing	The radios are activated and passing traffic.

Table 2. Network LED Definitions

Network LED	Description
Off	No Link Detected.
Amber Solid	A 10/100Base-T link is detected with no activity.
Amber Flashing	A 10/100Base-T link is detected with activity.
Green Solid	A 1000Base-T link is detected with no activity.
Green Solid	A 1000Base-T link is detected with activity.

3.   UNIT INSTALLATION

The instructions and guidelines provided in this section cover hardware installation topics, such as wall mounting and supplying power to the unit.

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

CAUTION *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.*

NOTE *The NetVanta 160/161 is suitable for use in environmental air space in accordance with Section 300.22.C of the National Electrical Code, and Sections 2-128, 12-010(3) and 12-100 of the Canadian Electrical Code, Part 1, C22.1.*

NOTE *If the AP is used in a medical environment, it must use an IEC/EN 60601-1 compliant power adapter.*

Mounting Options

The NetVanta 160 Series AP can be installed in a tabletop, wall mounted, or ceiling mounted configuration. If the AP is used in a tabletop configuration, proceed to *Supplying Power to the AP on page 25*.

Selecting an Installation Location

NetVanta APs should be positioned for maximum throughput and range between other APs and wireless client devices. Normally, you should locate the AP on the ceiling away from obstructions.

Range and performance are dictated by the distance between the AP and client radios and by obstacles that may be present in a specific building or office environment. The following positioning guidelines are suggested:

• Document all the APs and client devices you wish to include in your wireless network. Record the MAC address, serial number, and placement of each AP.
• Wired LAN and power connections must be available for each AP at the desired installation location. If a power outlet is not available near the access point, mid-span power inserters are recommended.
• If building blueprints or floor plans are available, use them to define potential client device locations and likely roaming areas.
• Identify possible obstacles or sources of interference that could affect signal strength (for example, walls, metal objects).
• Install the AP in an area where large steel structures such as beams, pillars, shelving units, bookcases, and filing cabinets do not obstruct radio signals to and from the AP.

- Once APs have been installed and configured, use site survey and monitoring utilities supplied with the client adapters to test signal strength at various locations. Modify the positioning of the APs and client stations as required for optimum performance.

> **NOTE** *Make a note of the 12-character MAC address and serial number listed on the back of the NetVanta 160/161 before mounting the AP to a wall or other surface. This information will be required during configuration.*

Mounting the AP on a Desktop

NetVanta APs should be positioned for maximum throughput and range between other APs and wireless client devices. Follow these instructions to mount the AP on top of a shelf or table:

	Mounting the AP on a Table or Shelf
Step	**Action**
1	Optional. For greater stability, drill holes in the table or shelf using the holes in the plastic mounting bracket as a template. (See *Figure 2 on page 21* for a detailed view of the plastic mounting bracket.) Insert the four supplied screws through the plastic mounting bracket into the table or shelf.
2	For the NetVanta 161 only: Install the antennas (sold separately) onto an appropriate antenna port on the AP. The antenna ports are labeled **2.4G 1** through **3** or **5G 1** through **3**.
3	With the top of the AP facing you (LEDs will be on your left), orient the plastic mounting bracket/ vertical stand with the hooks pointing to the right. (See *Figure 2 on page 21* for the a detailed view of the plastic mounting bracket.)
4	Insert the hooks into the vertical stand slots on the edge of the unit (see *Figure 2*) and press firmly until the hooks engage. You will hear a click.
5	The unit can now be set on a table or shelf.

LEDs

Vertical Stand Slots

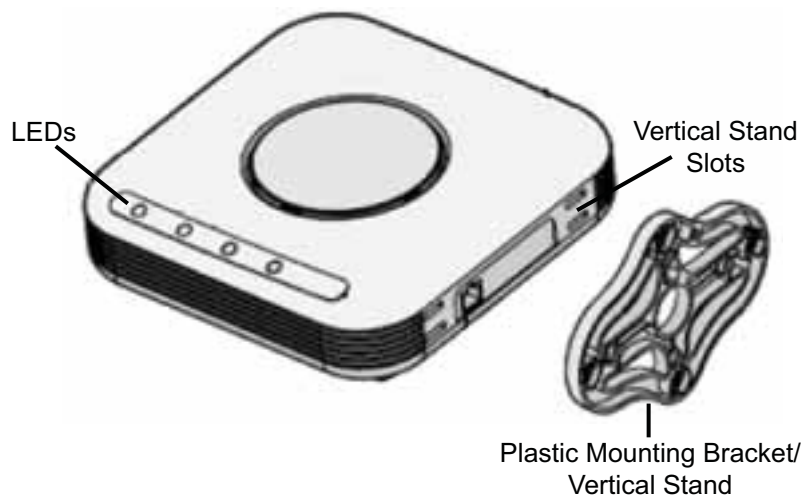Plastic Mounting Bracket/ Vertical Stand

Figure 2. Attaching the Vertical Stand

Mounting the AP to Drywall or Electrical Box

NetVanta APs should be positioned for maximum throughput and range between other APs and wireless client devices. Follow these instructions to mount the NetVanta 160/161 AP on drywall or an electrical box. Follow these instructions to mount the AP to drywall or an electrical box:

| Mounting the AP to Drywall or Electrical Box	
Step	**Action**
1	For the NetVanta 161 only: Install the antennas (sold separately) onto an appropriate antenna port on the AP. The antenna ports are labeled **2.4G 1** through **3** or **5G 1** through **3**.
2	Using the thumb screws only, carefully thread the antenna onto the appropriate connector until it is secure. Repeat Steps 1 and 2 with the each antenna.
3	Mounting to drywall: Install the four supplied drywall anchors into the wall or ceiling in the **A** and **B** positions, using the holes in the plastic mounting bracket as a template.
4	Insert the four supplied screws through the plastic mounting bracket (in the **A** and **B** positions) into the drywall anchors and tighten.
5	Mounting to a U.S. electrical box: Insert two of the four supplied screws through the plastic mounting bracket (in the **B** positions) into the electrical box and tighten.
6	Engaging the slots on the back of the AP with the hooks, slide the AP onto the plastic mounting bracket until it clicks.
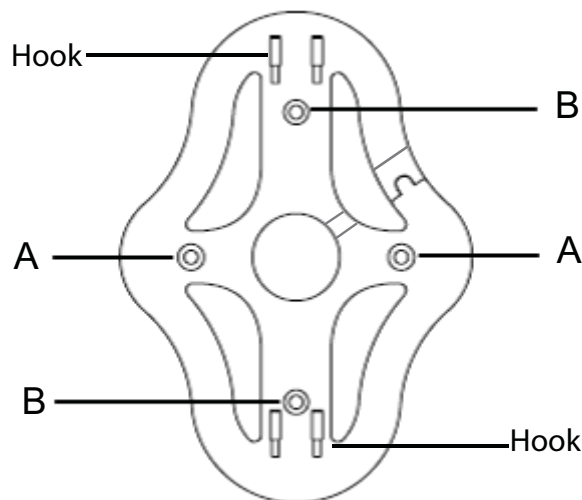
Figure 3. Plastic Mounting Bracket

Mounting the AP to a Dropped Ceiling

The NetVanta 160/161 AP is shipped with a metal ceiling mounting kit to mount the AP on the ceiling tile separators of standard dropped ceilings. The plastic mounting bracket can be used to mount the AP to a drywall ceiling or ceiling electrical box. Refer to *Mounting the AP on a Desktop on page 21* for instructions. NetVanta APs should be positioned for maximum throughput and range between other APs and wireless client devices. Follow these instructions to mount the AP to a dropped ceiling:

|	Mounting the AP to a Dropped Ceiling
Step	**Action**
1	For the NetVanta 161 only: Install the antennas (sold separately) onto an appropriate antenna port on the AP. The antenna ports are labeled **2.4G 1** through **3** or **5G 1** through **3**.
2	Using the thumb screws only, carefully thread the antenna onto the appropriate connector until it is secure. Repeat Steps 1 and 2 with the each antenna.
3	Lay the metal slider on the back of the AP in the orientation shown in *Figure 4 on page 23*. Attach the slider to the back of the AP using the two small screws provided. After the screws are tightened, the slider should slide back and forth clicking into each position.
4	In a suitable location away from obstructions, slide the tabs on the metal ceiling bracket over one edge of a ceiling tile separator as shown in *Figure 5 on page 24*.
5	Slide the moveable section into place and tighten the screw to secure it.
6	Position the AP so that the two tabs on the ceiling bracket locate in the slots in the AP (**A**). Push the slider mounted on the AP across until it snaps, locking the AP to the bracket (**B**) as shown in *Figure 6 on page 24*.
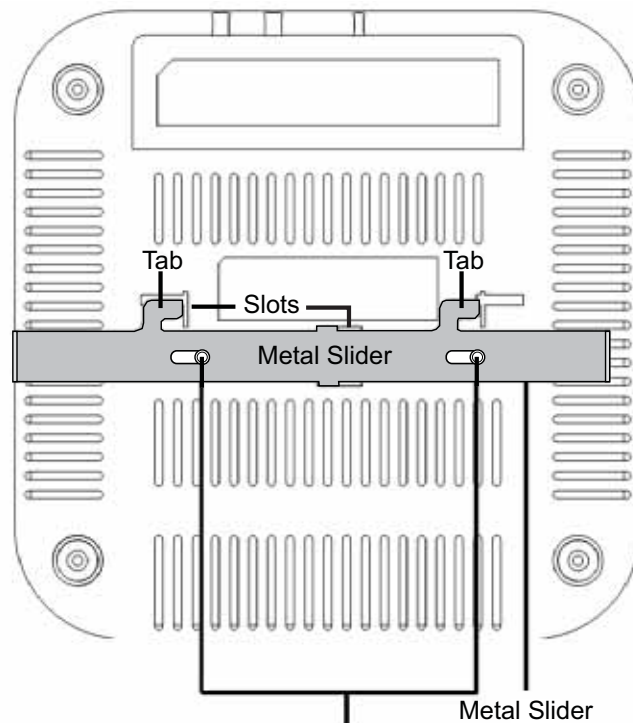
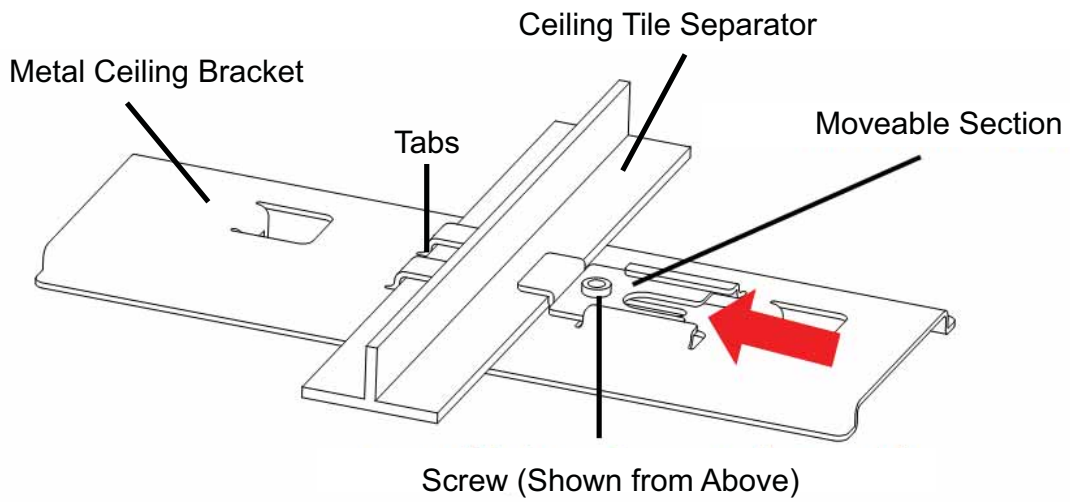**Figure 4. Attaching the Metal Slider to the AP**

Metal Ceiling Bracket

Ceiling Tile Separator

Tabs

Moveable Section

Screw (Shown from Above)

Figure 5. Securing the Metal Ceiling Bracket to the Ceiling Tile Separator
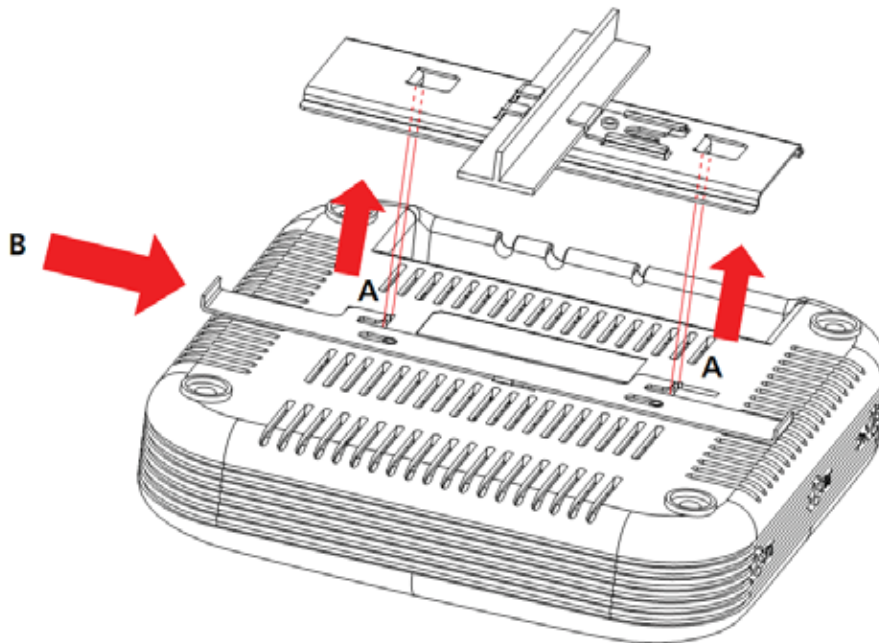
B

A

A

Figure 6. Attaching the AP to the Ceiling Bracket

Supplying Power to the AP

The NetVanta 160/161 AP does not have a power switch. It is powered when connected to ADTRAN's Single Port Power over Ethernet (PoE) Injector (P/N 1700920F1) or an access controller (AC) that supplies PoE based on the IEEE 802.3af standard. The NetVanta 160/161 can be powered by an optional external DC power adapter (P/N 1700922F1) connected to an AC power source. The DC power adapter automatically adjusts to any voltage between 100 and 240 VAC at 50 or 60 Hz. No voltage range settings are required. The external DC power adapter is not automatically shipped with the NetVanta 160/161 AP but can be requested from ADTRAN or your reseller.

Connecting to the AP

Connect the NetVanta 160/161 AP to the Ethernet port of the AC or to an Ethernet port on a unit that can be accessed by the AC. Connect the RJ-45 Ethernet connector on the AP's back panel (labeled **LAN**) to your network using a CAT 5 Ethernet cable. When the AP and the AC are powered on, the AP's network LED will light indicating a valid network connection.

The NetVanta 160/161 AP is managed by the AC over ADTRAN Wireless Control Protocol (AWCP) using the Ethernet LAN port of the AP rather than the console port. Because the console port is only necessary for purposes of debugging beyond the typical case, a typical user will have no need of console access to the AP.

Configuring the Application

More detailed documentation for configuring the NetVanta AP is provided in the *NetVanta 160 Series Wireless Configuration Guide*. For more detail on configuring the NetVanta controlling system, refer to the *AOS Command Reference Guide*, configuration guides, and technical support notes. Documentation is available online at https://supportforums.adtran.com.

APPENDIX A. CONNECTOR PIN DEFINITIONS

The following table provides the pin assignments for the NetVanta 160 Series.

Table A-1. 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