

# Installing Media Dependent Adapters (MDA)s

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### **EN 55 022 Declaration of Conformance**

This is to certify that the Nortel Networks MDAs are shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22).

**Warning:** This device is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

These products conform to the provisions of Council Directive 89/336/EEC and 72/23/EEC. The Declaration of Conformity is available on the Nortel Networks World Wide Web site at [www.nortelnetworks.com](http://www.nortelnetworks.com).

# Introduction

This guide shows how to install media dependent adapters (MDAs) into supported Nortel Networks products.

Table 1 lists the available MDA models.

**Table 1. MDA Models**

| Interface Type                           | Model   | Refer to: |
|--|---|-----------|
| 10/100BASE-TX (UTP)                      | <ul style="list-style-type: none"><li>• 400-4TX MDA</li><li>• 8100-4TX MDA</li></ul>  | page 3    |
| 100BASE-FX (Fiber)                       | <ul style="list-style-type: none"><li>• 400-2FX MDA</li><li>• 8100-2FX MDA</li><li>• 400-4FX MDA</li><li>• 8100-4FX MDA</li></ul> | page 6    |
| 1000BASE-SX<br>(Shortwave gigabit fiber) | <ul style="list-style-type: none"><li>• 450-1SR MDA</li><li>• 450-1SX MDA</li></ul>   | page 12   |
| 1000BASE-LX<br>(Longwave gigabit fiber)  | <ul style="list-style-type: none"><li>• 450-1LR MDA</li><li>• 450-1LX MDA</li></ul>   | page 17   |

Nortel Networks is constantly adding new models and features to existing product lines; for a full range of MDAs that are available from Nortel Networks, see your Nortel Networks sales representative.

For more details, see your switch product user's guide.

Table 2 on page 2 lists the supported Nortel Networks products.

**Table 2. Supported Products**

| <b>Model</b> | <b>BayStack<br/>350<sup>1</sup>/450</b> | <b>BayStack<br/>410</b> | <b>Accelar<br/>8132TX</b> |
|--------------|---|-------------------------|---------------------------|
| 400-4TX MDA  | Yes                                     | Yes                     | No                        |
| 400-2FX MDA  | Yes                                     | Yes                     | No                        |
| 400-4FX MDA  | Yes                                     | Yes                     | No                        |
| 450-1SR MDA  | Yes                                     | No                      | Yes                       |
| 450-1SX MDA  | Yes                                     | No                      | Yes                       |
| 450-1LR MDA  | Yes                                     | No                      | Yes                       |
| 450-1LX MDA  | Yes                                     | No                      | Yes                       |
| 8100-4TX MDA | Yes                                     | Yes                     | Yes                       |
| 8100-2FX MDA | Yes                                     | Yes                     | Yes                       |
| 8100-4FX MDA | Yes                                     | Yes                     | Yes                       |

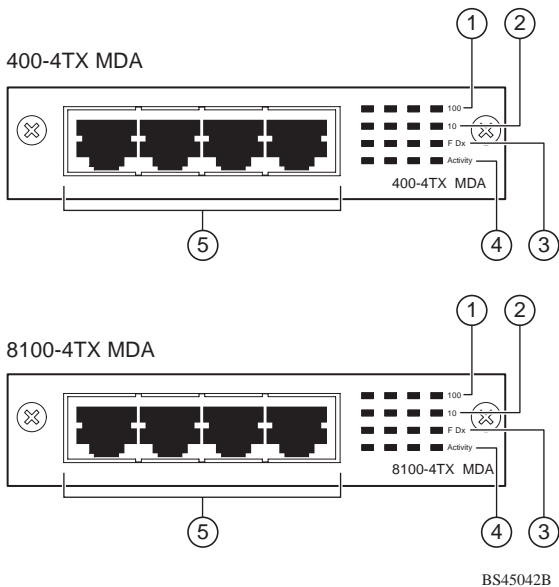
<sup>1</sup>BayStack 350 10/100/1000 Series switches only.



**Note:** The MDAs are *not* hot-swappable. Power down the BayStack switch or disconnect the Accelar module from the switch backplane before installing or removing an MDA.

# 10/100BASE-TX MDAs

There are two 10/100BASE-TX MDA models (Figure 1):



**Figure 1. 10/100BASE-TX Models**

- 400-4TX MDA  
Not supported on the Accelar Series Modules (see Table 2 on page 2)
- 8100-4TX MDA  
Supports BayStack 350/450, BayStack 410, and Accelar Series Modules (see Table 2 on page 2)

Both models use four 10/100BASE-TX RJ-45 (8-pin modular) port connectors to attach Ethernet devices.

The RJ-45 ports are configured as media-dependent interface-crossover (MDI-X) connectors. These ports connect over straight cables to the network interface controller (NIC) card in a node or server, similar to a conventional Ethernet repeater hub. If you are connecting to another Ethernet hub or Ethernet switch, you need a crossover cable unless an MDI connection exists on the associated port of the attached device.

The 10/100BASE-TX MDA ports can operate at either 10 Mb/s or 100 Mb/s. The port speed is determined through autonegotiation with its connecting device.

Table 3 describes the 10/100BASE-TX MDA components and LEDs.

**Table 3. 10/100BASE-TX MDA**

| <b>Item</b> | <b>Label</b> | <b>Description</b>   |
|-------------|--------------|--|
| 1           | 100          | 100BASE-TX port status LEDs (green):<br><br>On: The corresponding port is set to operate at 100 Mb/s.<br><br>Off: The link connection is bad or there is no connection to this port.<br><br>Blinking: The corresponding port is management disabled. |
| 2           | 10           | 10BASE-T port status LEDs (green):<br><br>On: The corresponding port is set to operate at 10 Mb/s.<br><br>Off: The link connection is bad or there is no connection to this port.<br><br>Blinking: The corresponding port is management disabled.    |
| 3           | F Dx         | Full-duplex port status LEDs (green):<br><br>On: The corresponding port is in full-duplex mode.<br><br>Off: The corresponding port is in half-duplex mode.   |

*(continued)*

**Table 3. 10/100BASE-TX MDA** (continued)

| Item | Label    | Description  |
|------|----------|--|
| 4    | Activity | Port activity LEDs (green):<br><br>Blinking: Indicates the network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously. |
| 5    |          | 10/100BASE-TX RJ-45 (8-pin modular) port connectors.   |

For installation instructions, see “Installing an MDA” on page 22.

## 100BASE-FX MDAs



**Warning:** Fiber optic equipment can emit laser or infrared light that can injure your eyes. Never look into an optical fiber or connector port. Always assume that fiber optic cables are connected to a light source.



**Vorsicht:** Glasfaserkomponenten können Laserlicht bzw. Infrarotlicht abstrahlen, wodurch Ihre Augen geschädigt werden können. Schauen Sie niemals in einen Glasfaser-LWL oder ein Anschlußteil. Gehen Sie stets davon aus, daß das Glasfaserkabel an eine Lichtquelle angeschlossen ist.





**Avertissement:** L'équipement à fibre optique peut émettre des rayons laser ou infrarouges qui risquent d'entraîner des lésions oculaires. Ne jamais regarder dans le port d'un connecteur ou d'un câble à fibre optique. Toujours supposer que les câbles à fibre optique sont raccordés à une source lumineuse.

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**Advertencia:** Los equipos de fibra óptica pueden emitir radiaciones de láser o infrarrojas que pueden dañar los ojos. No mire nunca en el interior de una fibra óptica ni de un puerto de conexión. Suponga siempre que los cables de fibra óptica están conectados a una fuente luminosa.

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**Avvertenza:** Le apparecchiature a fibre ottiche emettono raggi laser o infrarossi che possono risultare dannosi per gli occhi. Non guardare mai direttamente le fibre ottiche o le porte di collegamento. Tenere in considerazione il fatto che i cavi a fibre ottiche sono collegati a una sorgente luminosa.

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**警告:** 光ファイバ装置は目に有害なレーザー光や赤外線を放射することがあります。光ファイバやコネクタ・ポートを覗き込まないでください。光ファイバ・ケーブルは光源に接続されているものと思ってください。

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There are four 100BASE-FX MDA models:

- 400-2FX MDA

Not supported on the Accelar Series Modules (see Table 2 on page 2)

- 8100-2FX MDA

Supports BayStack 350/450, BayStack 410, and Accelar Series Modules (see Table 2 on page 2)

The 400-2FX MDA and the 8100-2FX MDA (Figure 2) each use two longwave 1300 nm SC connectors to attach devices over 62.5/125 micron multimode fiber optic cable.

- 400-4FX MDA

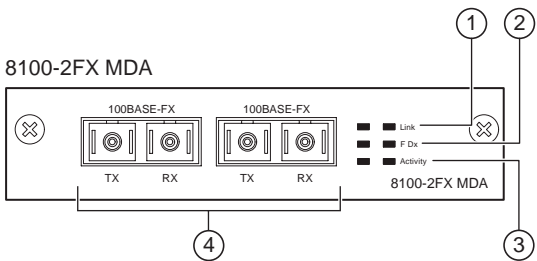
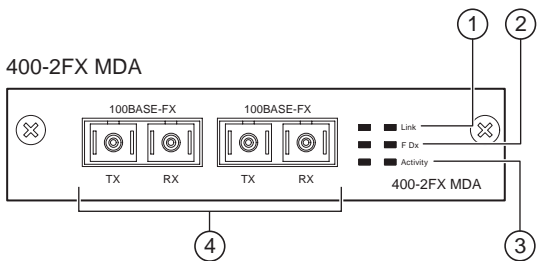
Not supported on the Accelar Series Modules (see Table 2 on page 2)

- 8100-4FX MDA

Supports BayStack 350/450, BayStack 410, and Accelar Series Modules (see Table 2 on page 2)

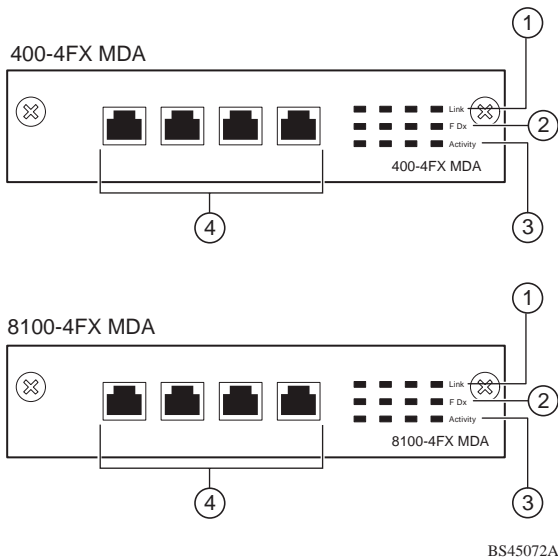
The 400-4FX MDA and the 8100-4FX MDA (Figure 3) each use four longwave 1300 nm MT-RJ connectors to attach devices over 62.5/125 micron multimode fiber optic cable.

The 100BASE-FX MDA models conform to the IEEE 802.3u 100BASE-FX standard and can be used to attach fiber-based 100 Mb/s connections to other compatible Fast Ethernet devices. Single-mode fiber cable is not supported.



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**Figure 2. 100BASE-FX MDA Models (1 of 2)**



**Figure 3. 100BASE-FX MDA Models (2 of 2)**

Table 4 describes the 100BASE-FX MDA components and LEDs.

**Table 4. 100BASE-FX MDA Description**

| Item | Label    | Description  |
|------|----------|--|
| 1    | Link     | Communications link LEDs (green):<br><br>On: Valid communications link.<br><br>Off: Invalid communications link or no connection to this port.<br><br>Blinking: The corresponding port is management disabled. |
| 2    | F Dx     | Full-duplex port status LEDs (green):<br><br>On: The corresponding port is in full-duplex mode.<br><br>Off: The corresponding port is in half-duplex mode.   |
| 3    | Activity | Port activity LEDs (green):<br><br>Blinking: Indicates the network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.                 |
| 4    |          | 100BASE-FX port connectors: <ul style="list-style-type: none"><li>• Models 400-2FX and 8100-2FX use SC connectors.</li><li>• Models 400-4FX and 8100-4FX use MT-RJ connectors.</li></ul>                       |

For installation instructions, see “Installing an MDA” on page 22.

## 1000BASE-SX MDAs

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**Warning:** This is a Class 1 Laser/LED product. It contains a laser light source that can injure your eyes. Never look into an optical fiber or connector port. Always assume that the fiber optic cable or connector is connected to a laser light source.

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**Vorsicht:** Dieses Laser/LED-Produkt der Klasse 1 enthält eine Laserlichtquelle, die zu Augenverletzungen führen kann. Sehen Sie nie in einen Lichtwellenleiter oder Glasfaserstecker-Port. Gehen Sie immer davon aus, daß das Glasfaserkabel oder der Glasfaserstecker an eine Laserlichtquelle angeschlossen ist.

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**Avertissement:** Ceci est un appareil Laser/DEL de Classe 1. Cet appareil contient une source lumineuse à rayons laser dangereuse pour les yeux. Ne regardez jamais directement une fibre optique ou un port de connexion. Agissez toujours comme si le câble de fibres optiques ou le connecteur était relié à une source lumineuse à rayons laser.

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**Advertencia:** Éste es un producto láser/LED de Clase 1. Contiene una fuente de luz láser que puede causar lesiones en los ojos. Nunca mire dentro de un cable o de un puerto de conexión de fibra óptica. Asuma siempre que el cable o el conector de fibra óptica está conectado a una fuente de luz láser.

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**Avvertenza:** Questo è un prodotto laser/LED di Classe 1 e contiene una sorgente luminosa a laser che può danneggiare gli occhi. Non guardare mai all'interno di una port a fibra ottica o di una porta connettore. Dare sempre per scontato che il cavo di fibra ottica o il connettore siano collegati ad una sorgente luminosa a laser.

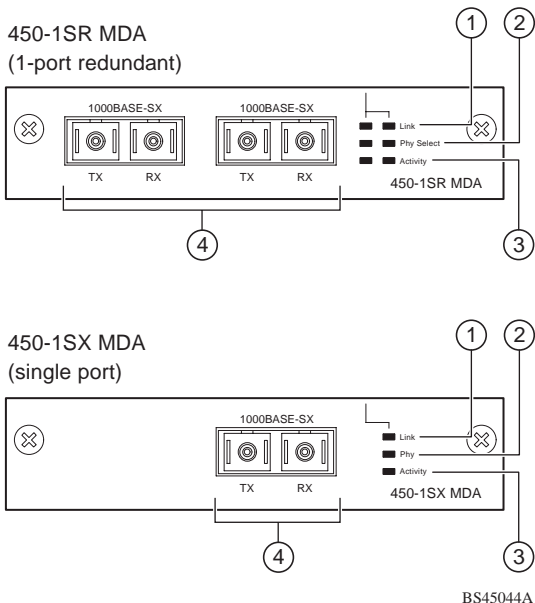
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警告:これはクラスIレーザー/LED製品です。目に障害を与える恐れのあるレーザー光源が含まれています。光ファイバおよびコネクタ・ポートは、のぞき込まないようにしてください。光ファイバ・ケーブルまたはコネクタは、常にレーザー光源に接続されているものと想定してください。

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There are two 1000BASE-SX (shortwave gigabit) MDA models (Figure 4):



**Figure 4. 1000BASE-SX MDA Front Panels**



- The 450-1SR MDA is a single MAC MDA with a separate redundant Phy (backup Phy port). Only one Phy port can be active at any time. If the active Phy port fails, the redundant Phy port automatically becomes the active port.
- The 450-1SX MDA is a single PHY MDA.

Both models conform to the IEEE 802.3z 1000BASE-SX standard and use shortwave 850 nm fiber optic connectors to connect devices over multimode (550 meter) fiber optic cable.

Table 5 describes the 1000BASE-SX components and LEDs.

**Table 5. 1000BASE-SX MDA Description**

| <b>Item</b> | <b>Label</b> | <b>Description</b>  |
|-------------|--------------|---|
| 1           | Link         | <p>Communication link LEDs (green):</p> <p>On: Valid communications link.</p> <p>Off: The communications link connection is bad or there is no connection to this port.</p> <p>Blinking: The corresponding port is management disabled.</p> |

*(continued)*

**Table 5. 1000BASE-SX MDA Description**

| <b>Item</b> | <b>Label</b>              | <b>Description</b>   |
|-------------|---------------------------|--|
| 2           | Phy<br>(or)<br>Phy Select | Phy status LEDs (green):<br><br>On: The corresponding Phy port is active.<br><br>Off: The corresponding Phy port is in backup mode or there is no connection to this port.                 |
| 3           | Activity                  | Port activity LEDs (green):<br><br>Blinking: Indicates network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously. |
| 4           |                           | 1000BASE-X SC port connectors.   |

For installation instructions, see “Installing an MDA” on page 22

## 1000BASE-LX MDAs

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**Warning:** This is a Class 1 Laser/LED product. It contains a laser light source that can injure your eyes. Never look into an optical fiber or connector port. Always assume that the fiber optic cable or connector is connected to a laser light source.

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**Vorsicht:** Dieses Laser/LED-Produkt der Klasse 1 enthält eine Laserlichtquelle, die zu Augenverletzungen führen kann. Sehen Sie nie in einen Lichtwellenleiter oder Glasfaserstecker-Port. Gehen Sie immer davon aus, daß das Glasfaserkabel oder der Glasfaserstecker an eine Laserlichtquelle angeschlossen ist.

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**Avertissement:** Ceci est un appareil Laser/DEL de Classe 1. Cet appareil contient une source lumineuse à rayons laser dangereuse pour les yeux. Ne regardez jamais directement une fibre optique ou un port de connexion. Agissez toujours comme si le câble de fibres optiques ou le connecteur était relié à une source lumineuse à rayons laser.

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**Advertencia:** Éste es un producto láser/LED de Clase 1. Contiene una fuente de luz láser que puede causar lesiones en los ojos. Nunca mire dentro de un cable o de un puerto de conexión de fibra óptica. Asuma siempre que el cable o el conector de fibra óptica está conectado a una fuente de luz láser.

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**Avvertenza:** Questo è un prodotto laser/LED di Classe 1 e contiene una sorgente luminosa a laser che può danneggiare gli occhi. Non guardare mai all'interno di una port a fibra ottica o di una porta connettore. Dare sempre per scontato che il cavo di fibra ottica o il connettore siano collegati ad una sorgente luminosa a laser.

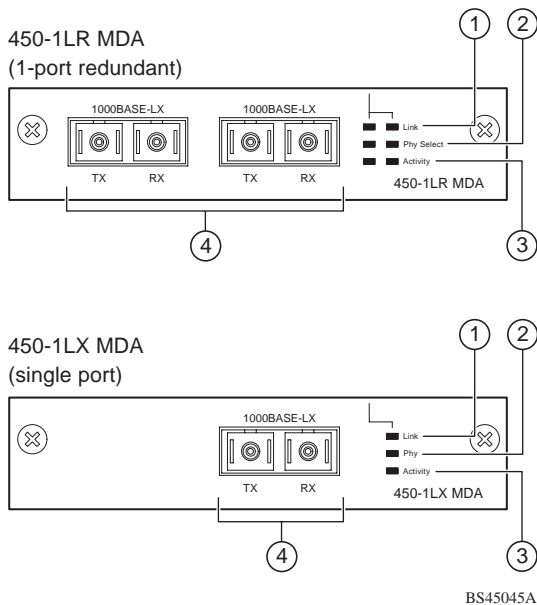
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警告:これはクラスIレーザー/LED製品です。目に障害を与える恐れのあるレーザー光源が含まれています。光ファイバおよびコネクタ・ポートは、のぞき込まないようにしてください。光ファイバ・ケーブルまたはコネクタは、常にレーザー光源に接続されているものと想定してください。

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There are two 1000BASE-LX (longwave gigabit) MDA models:



**Figure 5. 1000BASE-LX MDA Front Panels**

- The 450-1LR MDA is a single MAC MDA with a separate redundant Phy (backup Phy port). Only one Phy port can be active at any time. If the active Phy port fails, the redundant Phy port automatically becomes the active port.
- The 450-1LX MDA is a single Phy MDA.

Both models conform to the IEEE 802.3z 1000BASE-LX standard and use longwave 1300 nm fiber optic connectors to connect devices over single mode (3 kilometer) or multimode (550 meters) fiber optic cable.



**Note:** The optical performance of this transceiver cannot be guaranteed when connected to a multimode fiber plant without the use of the special offset SMF/MMF mode conditioning patch cord (see “1000BASE-LX Multimode Applications” on page 25).

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Table 6 describes the 1000BASE-LX MDA components and LEDs.

For installation instructions, see “Installing an MDA” on page 22.

**Table 6. 1000BASE-LX MDA Description**

| <b>Item</b> | <b>Label</b>              | <b>Description</b>   |
|-------------|---------------------------|--|
| 1           | Link                      | Communication link LEDs (green):<br><br>On: Valid communications link.<br><br>Off: The communications link connection is bad or there is no connection to this port.<br><br>Blinking: The corresponding port is management disabled. |
| 2           | PHY<br>(or)<br>Phy Select | Phy status LEDs (green):<br><br>On: The corresponding Phy port is active.<br><br>Off: The corresponding Phy port is in backup mode or there is no connection to this port.   |
| 3           | Activity                  | Port activity LEDs (green):<br><br>Blinking: Indicates network activity level for the corresponding port. A high level of network activity can cause LEDs to appear to be on continuously.   |
| 4           |                           | 1000BASE-X SC port connectors (see “1000BASE-LX Multimode Applications” on page 25 for special requirements).  |

## Installing an MDA

The Uplink Module slot on supported BayStack and Accelar switches can accommodate a single MDA. The connection can be either an RJ-45 10/100BASE-TX MDA or a fiber (100BASE-FX or 1000BASE-SX/LX) MDA with an SC or MT-RJ connector.



**Note:** The MDAs are *not* hot-swappable. Power down the BayStack switch or disconnect the Accelar module from the switch backplane before installing or removing an MDA.

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To install an MDA into the Uplink Module slots:

1. **Unplug the AC power cord from the back of the switch.**
  2. **Loosen the thumb screws and remove the filler panel (or previously installed MDA) from the Uplink Module slot.**
- 



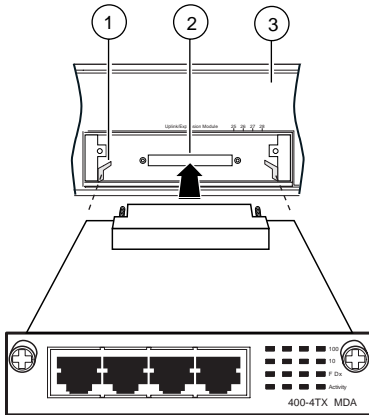
**Note:** If you are replacing an installed MDA with another type of MDA, see “Replacing an MDA with a Different Model” on page 24.

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3. **Insert the MDA into the Uplink Module card guides (Figure 6).**

Make sure the MDA slides in on the card guides. Failure to align the MDA to the card guides could damage the pins.





- 1 = Card guides
- 2 = Uplink module slot
- 3 = BayStack or Accelar switch

BS45059B

## Figure 6. Installing an MDA

### 4. Press the MDA *firmly* into the Uplink Module slot.

Be sure that the MDA is fully seated into the mating connector.

### 5. Secure the MDA by tightening the thumb screws on the MDA front panel.

### 6. Attach devices to the MDA ports.

Refer to your device user guide for instructions on attaching devices to the MDA ports.

After connecting the port cables, follow the instructions in that guide to connect power and verify the installation.

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**Note:** The IEEE 802.3u specification requires that all ports operating at 100 Mb/s use only Category 5 unshielded twisted pair (UTP) cabling.

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## Replacing an MDA with a Different Model

When replacing an installed MDA in a BayStack switch with another type of MDA, clear the switch NVRAM:

**1. Power down the switch.**

Remove the AC power cord from the power source.

**2. Remove the installed MDA.**

Loosen the thumbscrews and remove the MDA.

**3. Cycle the switch power.**

Power up the switch and wait for the Nortel Networks logo screen to appear (approximately 20 seconds); then power down the switch.

**4. Install the replacement MDA.**

Be sure to *firmly* tighten the two thumbscrews on the MDA front panel.

**5. Power up the switch.**

## 1000BASE-LX Multimode Applications

For 1000BASE-LX multimode applications, the longwave gigabit transceivers must be mode conditioned *externally* via a special offset SMF/MMF patch cord. The offset SMF/MMF patch cord allows the same transceiver to be used for both multimode and single-mode fiber. See your Nortel Networks sales representative for more information about the SMF/MMF patch cord.

The 1000BASE-LX transceiver is designed to mechanically accommodate the *single-mode ferrules* used on one end of the special offset SMF/MMF patch cord. *Multimode ferrules* must not be used because they can bind and cause damage to the transceiver. Do not connect multimode cables *directly* into the 1000BASE-LX MDA transceiver. Instead, connect a special offset SMF/MMF patch cord into the transceiver, and then connect the multimode cable into the SMF/MMF patch cord.

For more information about gigabit transmission over fiber optic cable and mode conditioning, refer to the following publication:

*Reference Note: Gigabit Ethernet Physical Layer Considerations* (Nortel Networks part number 201540-B)

The publication is available on the World Wide Web at [support.baynetworks.com/library/tpubs/](http://support.baynetworks.com/library/tpubs/)

At the Web site, click on Accelar under the Routing Switches heading.