

Installing the BayStack 400-ST1 Cascade Module

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Bay Networks

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This is to certify that the Bay Networks BayStack 400-ST1 Cascade Module 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).

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Introduction

This guide provides procedures for installing the BayStack 400-ST1 Cascade Modules into supported Bay Networks BayStack 450 switches that are configured with BayStack 450 software version V1.1.0 or later. You can determine the software version of your switches by accessing the System Characteristics screen for each switch.



Note: The BayStack 400-ST1 Cascade Module *will not operate* with BayStack 450 switches that are configured with BayStack 450 software versions *earlier than* version V1.1.0.

If you need to upgrade your BayStack 450 switches, refer to [“Upgrading the BayStack 450 Switch Firmware”](#) on [page 36](#) of this guide. You must upgrade the switch *before installing* the BayStack 400-ST1 Cascade Module.

If you are upgrading your BayStack 450 switches, be sure to obtain the latest version of the *Using the BayStack 450 10/100/1000 Series Switch* guide. That guide provides instructions for setting up your stack configuration after you install the 400-ST1 Cascade Modules.

You can obtain the latest updates to your product documentation, including release notes, by visiting the Bay Networks Web site at the following location:

www.support.baynetworks.com/library/tpubs

Find the Bay Networks product for which you need documentation. Then locate the specific category and model or version for your hardware or software product.

Using Adobe Acrobat Reader, you can open the manuals and release notes, search for the sections you need, and print them on most standard printers. You can download Acrobat Reader free from the Adobe Systems Web site, *www.adobe.com*.

This guide also describes how to connect 400-ST1 Cascade Modules to create a stack of (up to eight) BayStack 450 switches, and how to modify existing stack configurations.

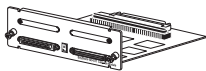
For information about:	Go to page:
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Contents of Shipment

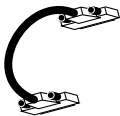
Each BayStack 400-ST1 shipment includes the following items ([Figure 1](#)):

- One BayStack 400-ST1 Cascade Module
- One .30 meter (12 inch) cascade cable; part number 303978-A.
- This guide (*Installing the BayStack 400-ST1 Cascade Module*).

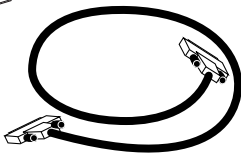
BayStack 400-ST1
cascade module



0.30 m (12 in.) cascade
cable (PN 303978-A)



Optional:
1 m (39.27 in.)
cascade max-return
cable (PN 303979-A)



*Installing the BayStack 400-ST1
Cascade Module*



BS0030A

Figure 1. Contents of Shipment

For stacking three or more units (maximum 8 units per stack), order the optional 1 meter (39.27 inch) cascade max-return cable (Bay Networks Order No. AL2018001).

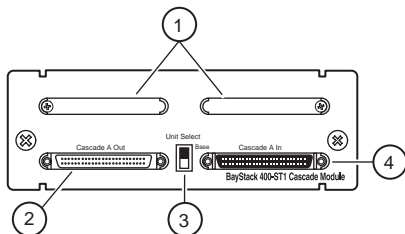
If any items are missing or damaged, contact the sales agent or the customer service representative from whom you purchased the BayStack 400-ST1 cascade module. You will need a Phillips screwdriver for the installation.



Note: Unless otherwise specified, the terms “switch” and “unit” are used interchangeably in this guide.

BayStack 400-ST1 Front Panel Components

The front-panel components of the BayStack 400-ST1 Cascade Module are shown in [Figure 2](#). Component descriptions follow the figure.



- 1 = Blank connectors (unused)
- 2 = Cascade A Out connector
- 3 = Unit Select switch
- 4 = Cascade A In connector

BS0031A

Figure 2. Front Panel Components

Cascade A Out Connector

Provides an attachment point for connecting this unit to another unit via the cascade cable. A *return* cable from another unit's Cascade A Out connector to this unit's Cascade A In connector completes the stack connection (see the example shown in [Figure 3](#)).



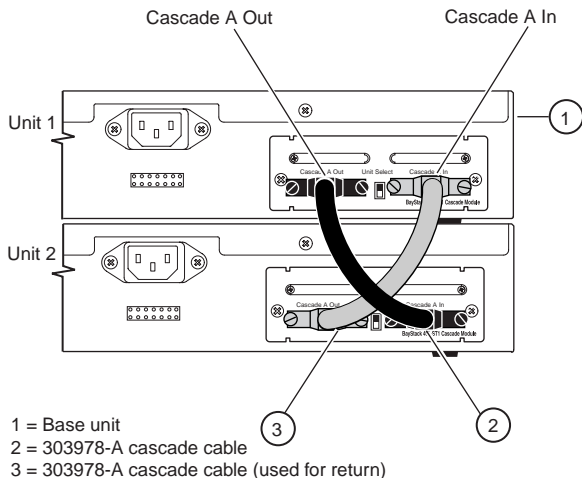
Note: For stacking three or more units (maximum 8 units per stack), order the optional 1 meter (39.27 inch) cascade max-return cable (Bay Networks Order No. AL2018001).

Unit Select Switch

The Unit Select switch (up = Base) determines the *base unit* for the stack configuration (see [“Base Unit Description”](#) on [page 7](#)). The Unit Select switch status is displayed on the BayStack 450 LED display panel (see the *Using the BayStack 450 10/100/1000 Series Switch* guide for details). When in the Base (up) position, all other Unit Select switches in the stack configuration must be set to Off (down).

Cascade A In Connector

Provides an attachment point for accepting a cascade cable connection from an adjacent unit in the stack. A *return* cable from this unit's Cascade A Out connector to the adjacent unit's Cascade A In connector completes the stack connection (see the example shown in [Figure 3](#)).



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Figure 3. Connecting Cascade Cables

Base Unit Description

The base unit is a unique stack unit that can be selected by the Unit Select switch on the front-panel of the 400-ST1 cascade module. One unit in the stack configuration *must* be assigned as the base unit; all other units in the stack must have their Unit Select switch set to Off (see [“Unit Select Switch”](#) on [page 5](#)). Any single unit in the stack can be assigned as the base unit.

The physical ordering of all of the other units in the stack are determined by the position of the base unit within the stack. This is important for management applications that view the physical ordering of the units within the stack.

Some characteristics of the base unit are:

- **Initial installation** --- during the initial installation of the stack, the software automatically determines the physical order of all units in the stack according to the position of the base unit within the stack.

For example, when the stack is powered up, the base unit becomes unit 1 and the unit that the base unit connects to (via the Cascade A Out cable) becomes unit 2 (and the next unit is unit 3 and so on), until the maximum stack configuration (up to 8 units) is reached.

If the base unit is changed to another unit in the stack, the new base unit keeps its original unit number in the stack.



Note: You can renumber the units when you perform the initial setup of the stack as described in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

- **Stack IP MAC address** --- The *stack IP MAC address* is automatically assigned during the stack initialization:

The base unit's MAC address, with a software offset, is used for the stack IP MAC address.

For example, if the base unit's MAC address is:

00-00-82-99-44-00

and the Stack software offset is: 1F

then the Stack IP MAC address becomes:

00-00-82-99-44-1F

If another unit in the stack is assigned as the base unit, the MAC address of the *new* base unit (with offset) now applies to the stack configuration. The original stack IP address still applies to the new base unit.

- **Temporary Base Unit** --- If an assigned base unit fails, the next unit in the stack order automatically becomes the new *temporary base unit*. This change is indicated by the Base LED on the temporary base unit's LED display panel turning on (yellow).

The automatic base unit change to the next unit in the stack order is a *temporary safeguard* which allows you time to replace the failed unit, or reassign the temporary base unit as the new base unit.



Note: If you do not reassign the temporary base unit as the new base unit, and the temporary base unit fails, the automatic failover to another temporary base unit will not occur.

Set the Unit Select switch on the temporary base unit to Base (up =Base) to reassign it as the new base unit.

- **Removing a unit from the stack**--- if a unit is removed from the stack (therefore operating in standalone mode), the following switch configuration settings revert back to the settings configured before the unit became a member of the stack:
 - IP address
 - console password
 - TELNET password
 - SNMP community strings

Stack Configurations

As shown in [Figure 4](#), the cascade connectors and cables on the 400-ST1 front-panel provide the ability to stack up to eight BayStack switches. With 400-4TX MDAs installed in each switch, the stack can accommodate a maximum of 224 switch ports.

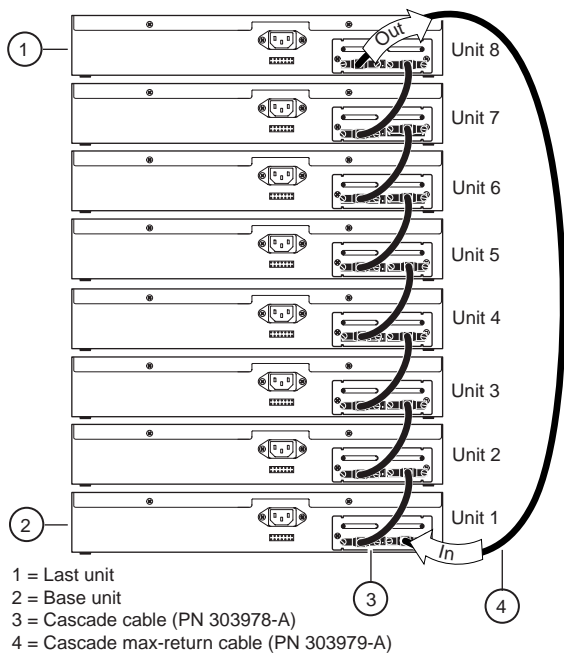
Because stack parameters are associated with the base unit (see [“Base Unit Description”](#) on [page 7](#)), the physical stack order depends on the base unit’s position and whether the stack is configured *stack up* or *stack down*.

Stack Up Configurations

In [Figure 4](#), data flows from the base unit (unit 1) to the next switch, which is assigned as unit 2, and continues until the last switch in the stack is assigned as unit 8. The physical order of the switches is *from bottom to top* (unit 1 to unit 8).

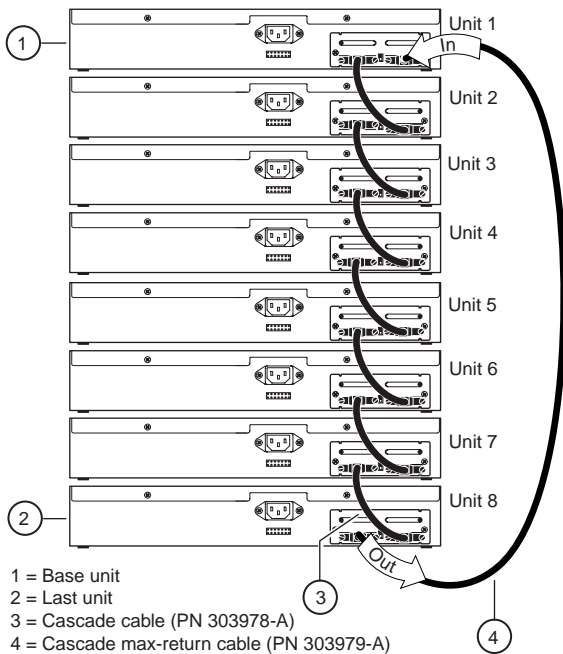
Stack Down Configurations

In [Figure 5](#), data flows from the base unit (unit 1) to the next switch, which is assigned as unit 2, and continues until the last switch in the stack is assigned as unit 8. The physical order of the switches is *from top to bottom* (unit 1 to unit 8).



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Figure 4. Stack Up Configuration Example



BS0034A

Figure 5. Stack Down Configuration Example

Certain network management station (NMS) applications assume a stack down configuration for the graphical user interface (GUI) that represents the stack (see [Figure 5](#) on [page 12](#)). For this reason, Bay Networks recommends that you always configure the top unit in the stack as the base unit.

In any stack configuration, the following applies:

- The entire stack powers up as a single logical unit within 30 seconds after the base unit initialization.
- You can attach an RS-232 communications cable to the Console/Comm port of any switch in the stack.
- You can downline upgrade the entire stack from any switch in the stack.
- You can access and manage the stack using a TELNET connection or any generic SNMP management tool through any switch port that is part of the stack configuration.
- When stacking three or more switches, the longer (1-meter) cascade max-return cable (PN 303979-A) is used to complete the link from the last unit in the stack to the base unit.

Redundant Cascade Stacking Feature

BayStack 400-ST1 Cascade Modules allow you to connect up to 8 units into a redundant cascade stack. If any single unit fails or if a cable is accidentally disconnected, other units in the stack remain operational, without interruption.

[Figure 6](#) shows an example of how a stack configuration reacts to a failed or powered down unit in the stack configuration:

- a. **As shown in [Figure 6](#) unit 3 becomes nonoperational.**

This can be the result of a failed unit, or simply because the unit was powered down.

- b. **Unit 2 and unit 4, directly upstream and downstream from unit 3, sense the loss of link signals from unit 3.**
- c. **Unit 2 and unit 4 automatically loop their internal stack signals (A and B).**

The Cas Up LED for unit 2 and the Cas Dwn LED for unit 4 turn on (yellow) to indicate the stack signals are looped.

- d. **The remaining stack units remain connected.**

Although the example shown in [Figure 6](#) shows a failed unit causing the stack to loop signals at the points of failure (A and B), the system reacts the same way if a cable is removed (either deliberately or accidentally).

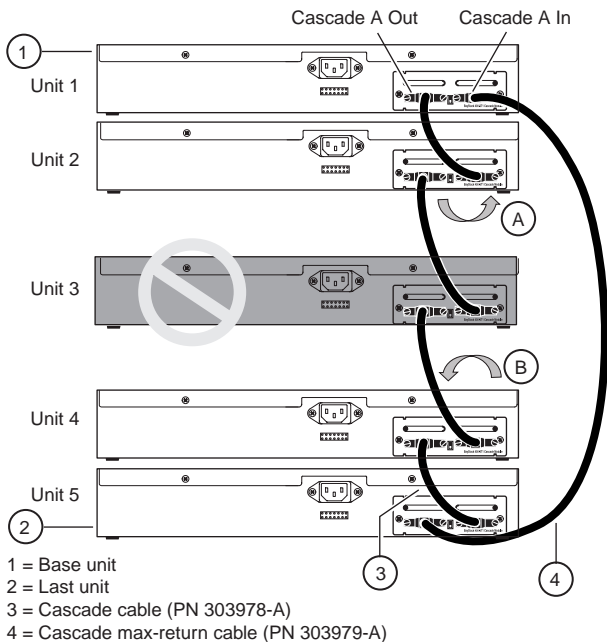


Figure 6. Redundant Cascade Stacking Feature

Installation

This section describes how to connect up to eight BayStack 10/100/1000 Series switches into a redundant stack. The switch stack can consist of any combination of BayStack 450-24T and BayStack 450-12T switch models.

Before installing your equipment, review the previous sections of this guide.



Note: For stacking three or more units (maximum 8 units per stack), order the optional 1 meter (39.27 inch) cascade max-return cable (Bay Networks Order No. AL2018001).

This section includes the following topics:

- Installing the 400-ST1 Cascade Module
- Installing and connecting multiple switches
- Connecting power
- Verifying the installation

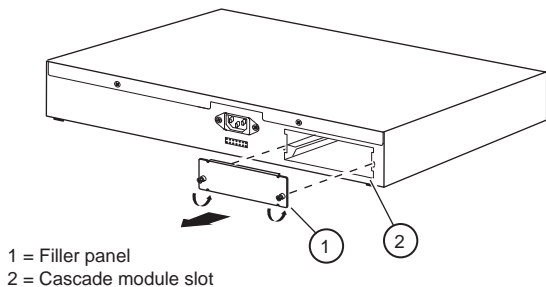
After verifying the installation as described in [“Verifying the Installation”](#) on [page 24](#) of this guide, refer to the *Using the BayStack 450 10/100/1000 Series Switch* guide to set up the stack and customize the stack configuration according to your system requirements.

Installing the 400-ST1 Cascade Module

The Cascade Module slot on the BayStack 450 switch can accommodate a single 400-ST1 Cascade Module.

To install a 400-ST1 Cascade Module into the Cascade Module slot, follow these steps:

1. **Unplug the AC power cord from the back of the switch.**
2. **Loosen the thumbscrews and remove the filler panel from the Cascade Module slot ([Figure 7](#)).**



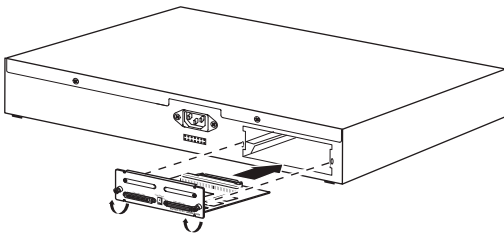
BS0036A

Figure 7. Removing the Filler Panel

3. **Insert the 400-ST1 Cascade Module into the chassis slot taking care to slide the module into the guides provided on the chassis ([Figure 8](#)).**



Caution: Be sure that the module slides in on the guides provided. Failure to align the guides could result in bent and broken pins



BS0037A

Figure 8. Installing a 400-ST1 Cascade Module

4. Press the module *firmly* into the chassis slot. Be sure that the module is fully seated into the mating connector.
5. Secure the module in the chassis by tightening the thumb screws on the module front panel.
6. Repeat Steps 1 to 5 for each switch that is to be configured with the 400-ST1 Cascade Module.
7. Proceed to the next section [“Installing and Connecting Multiple Switches”](#) on [page 19](#).

Installing and Connecting Multiple Switches

The procedure to install and connect multiple switches is similar for tabletop, shelf, or standard 19-inch utility rack installations.

To install multiple switches, follow these steps:

- 1. Install one unit at a time in the rack or on the shelf or tabletop.**

Refer to the *Using the BayStack 450 10/100/1000 Series Switch* guide for requirements and instructions for installing the BayStack 450 switch on a tabletop, shelf, or in a standard 19-inch utility rack.

- 2. Disconnect the AC power cords (if previously connected) from the units you are configuring in the stack.**
- 3. Determine the stack order configuration, *stack up* or *stack down*, you are installing (refer to [“Stack Configurations”](#) on [page 10](#)).**
- 4. Position the unit you want to be the *base unit* at the top (or bottom) of the stack.**



Note: Bay Networks recommends that you always configure the top unit in the stack as the base unit.

5. Set the Unit Select switch for the base unit to the Base (up = Base) position ([Figure 9](#)).
6. Set the Unit Select switch for all other units in the stack to the Off (down = Off) position

Only one unit in the stack can be the base unit.

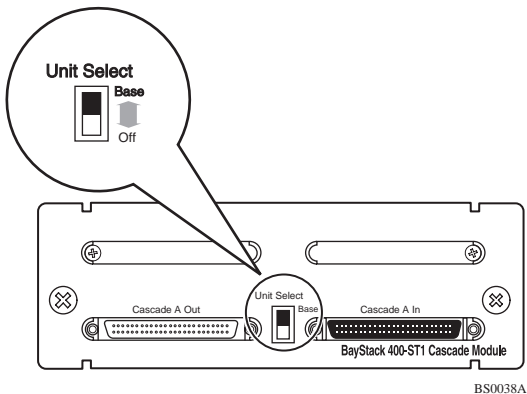
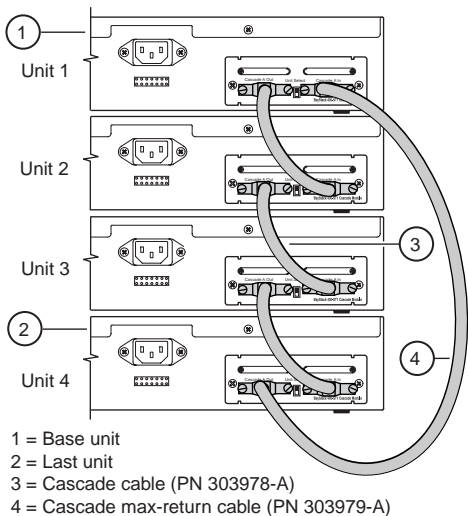


Figure 9. Setting the Unit Select Switch

7. Connect the units using the supplied cascade cables ([Figure 10](#)).
- a. Connect one end of a cascade cable to the Cascade A Out connector on the Base Unit (unit 1).



BS0039A

Figure 10. Installing Cascade Cables

- b. Connect the other end of the cascade cable to the cascade A In connector on the unit just below the base unit (unit 2), or just above the base unit if cascading up the stack.**
- c. Continue attaching the cascade cables until the last unit is configured.**

A maximum of eight units can be configured per stack.

- d. At the last unit in the stack, connect one end of a *cascade max-return cable* to the Cascade A Out connector. Connect the other end of the cascade max-return cable to the cascade A In connector on the base unit.**

When stacking 3 or more units, the (optional) 1 meter (39.27 inch) cascade max-return cable is required (Bay Networks Part Number 303979-A).

- 8. Be sure all cable connections to the cascade connectors are secured firmly by the thumb screws on the cascade cable plugs.**
- 9. Proceed to [“Connecting Power”](#) on [page 23](#).**

Connecting Power

When the stack is initially powered up, the software automatically assigns unit numbers to the units (the individual switches in the stack). The unit numbers correspond to the physical stack power up/initialization sequence, beginning with the base unit as unit 1.

The stack initialization sequence takes approximately 30 seconds for completion. If any switch in the stack configuration does not power up or initialize within 15 seconds, it is assigned a unit number that may be out of sequence with the stacking order.

If this happens, you can renumber the units when you perform the initial setup of the stack as described in the *Using the BayStack 450 10/100/1000 Series Switch* guide.



Note: Bay Networks recommends that you connect all of the switch AC power cords to one or two AC power strips that can apply power to all of the switches simultaneously.

Power up the stack configuration as follows:

- 1. Plug the AC power cord, for each switch in the stack configuration, into the AC power receptacle on each switch back panel.**
- 2. Plug the other ends of the AC power cords into a grounded AC power strip.**

One or two AC power strips may be required to accommodate the quantity of switches in the stack.

3. Apply power to the AC power strip.

Set the AC power strip On/Off switch to On (or connect the AC power strip to a grounded AC power outlet).

4. Proceed to [“Verifying the Installation”](#) following this section.

Verifying the Installation

When installation is complete and power is applied to the stack configuration, check to see that the following LED indications are displayed on the switch LED display panels for all units configured in the stack ([Figure 11](#)):

- The Pwr LED and Status LED for *all units* in the stack are all on (green).

If the Pwr or Status LED for any unit in the stack is off, or blinking, refer to the troubleshooting chapter in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

- The Cas Up/Dwn LEDs for *all units* in the stack are all on (green).

If the Cas Up/Dwn LED for any unit in the stack is off, or yellow, check the cable connections to and from the 400-ST1 cascade connectors.

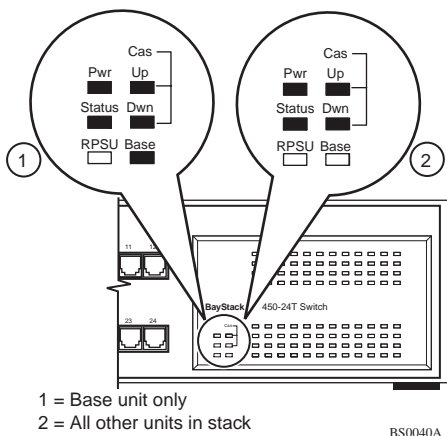


Figure 11. Verifying the Installation

- The Base LED for the *base unit only* is on.

If one (or more) Base LEDs are blinking, no unit (or more than one unit) is configured as the base unit.

If the LEDs on any of the units in the stack are not as shown in [Figure 11](#), cycle the power to the stack and verify the LEDs. Refer to *Using the BayStack 450 10/100/1000 Series Switch* guide to set up the stack and for detailed information about stacking, including troubleshooting.

Modifying an Existing Stack Configuration

This section provides examples of how to modify an existing stack configuration. The examples assume the stack configuration is operational with connected stations. Always notify the attached stations that there may be a temporary disruption of the network services before you begin the modification.

To maintain the unit numbering within the stack, Bay Networks recommends that you renumber the entire stack after any modification involving configuration changes.



Note: Renumbering causes the entire stack to be reset with the current configuration settings. The Reset can take up to 30 seconds for completion. Notify the connected stations that there will be a short disruption of network services before renumbering the stack.

See the *Using the BayStack 450 10/100/1000 Series Switch* guide for more information about renumbering.

This section includes the following topics:

- Assigning a new base unit to the stack
- Adding units to the stack
- Removing/replacing units from the stack

Assigning a New Base Unit to the Stack

To assign a new base unit to the stack, complete the following steps:



Note: Bay Networks recommends that you always configure the top unit in the stack as the base unit.

- 1. Set the Unit Select switch on the *original* base unit to the Off position.**

See [Figure 9](#) on [page 20](#) for details about the Unit Select switch.

- 2. Set the Unit Select switch on the *new* base unit to the Base position.**
- 3. Renumber the Stack.**

See the *Using the BayStack 450 10/100/1000 Series Switch* guide for detailed information on how to renumber the stack configuration.

Adding Units to the Stack

This section describes how to add one or more units to the *middle* of a stack or to the *end* of a stack.



Note: Refer to *Using the BayStack 450 10/100/1000 Series Switch* for information about installing units on a tabletop or in a standard 19-inch utility rack.

Adding Units to the Middle of a Stack

To add one or more units to the middle of a stack, complete the following steps:

- 1. Determine the position of the new units in the existing stack ([Figure 12](#)).**

For example, the shaded units (units 5 and 6) in [Figure 12](#) show two new units to be added to the stack. The new units are numbered as unit 5 and unit 6 because they are additions to an existing 4 unit stack.

- 2. Disconnect the cascade cable from the Cascade A In connector at unit 3.**

Leave the other end of the cascade cable connected to the Cascade A Out connector at unit 2.

- 3. For 19-inch rack configurations, move the units two spaces lower in the rack.**

For tabletop configurations, temporarily move units 1 and 2 to allow space for units 5 and 6.

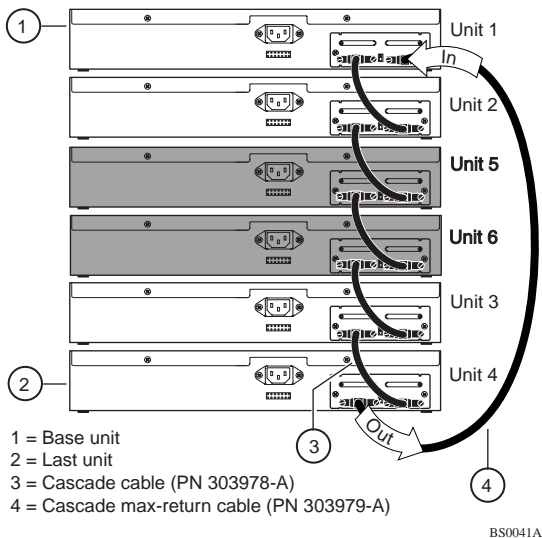


Figure 12. Adding to Middle of Stack

4. Add the new units to the desired location.

For tabletop configurations, replace units 1 and 2 (temporarily moved in Step 4).

5. **Reconnect the cascade cable from unit 2 to the Cascade A In connector of (new) unit 5.**
6. **Connect a cascade cable from the Cascade A Out connector of unit 5 to the Cascade A In connector of unit 6.**
7. **Connect a cascade cable from the Cascade A Out connector of unit 6 to the Cascade A In connector of unit 3.**
8. **Renumber the order of the units for the new stack configuration (if desired).**

You can renumber the unit numbers as described in “Setting Up the Stack Configuration” in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

Adding Units to the End of a Stack

To add one or more units to the end of a stack, complete the following steps:

1. **Determine the position of the new units in the existing stack ([Figure 13](#)).**

For example, the shaded units (units 5 and 6) in [Figure 13](#) show the two new units to be added to the stack. The new units are numbered as unit 5 and unit 6 because they are additions to the end of an existing 4 unit stack.

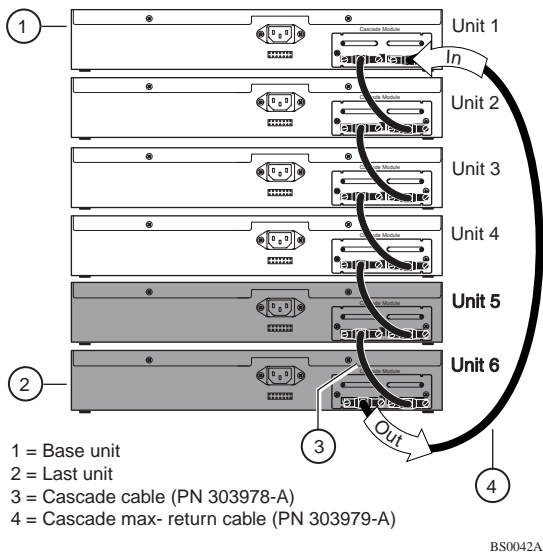


Figure 13. Adding to End of Stack

- 2. Disconnect the cascade max-return cable (item 4) from the Cascade A Out connector at unit 4.**

Leave the other end of the cascade max-return cable connected to the Cascade A In connector at unit 1.

- 3. Add the new units (units 5 and 6) to the end of the stack configuration.**

- 4. Connect a cascade cable from the Cascade A Out connector of unit 4 to the Cascade A In connector of unit 5.**
- 5. Connect a cascade cable from the Cascade A Out connector of unit 5 to the Cascade A In connector of unit 6.**
- 6. Reconnect the cascade max-return cable from unit 1 to the Cascade A Out connector of unit 6.**
- 7. Renumber the order of the units for the new stack configuration (if desired).**

You can renumber the unit numbers as described in “Setting Up the Stack Configuration” in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

Removing/Replacing Units from the Stack

This section describes how to remove and/or replace units in an operating stack.

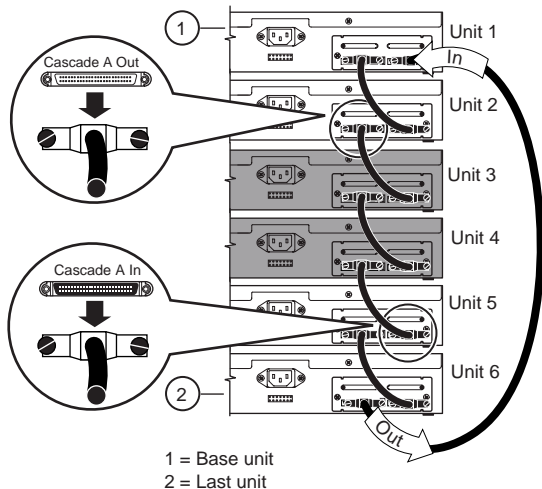
Because the Redundant Cascade Stacking feature allows signals to loopback at a single point of failure, adjacent contiguous cabled units can be removed and replaced as a single unit from the stack.

For more information about the Redundant Cascade Stacking feature see [“Redundant Cascade Stacking Feature”](#) on [page 14](#).

Removing/Replacing Adjacent Units

To remove/replace adjacent units from an operating stack, complete the following steps (see [Figure 14](#)):

1. Remove the cascade cable from the Cascade A Out connector at unit 2.



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Figure 14. Removing Adjacent Units

2. **Remove the cascade cable from the Cascade A In connector at unit 5.**
3. **Remove the units (units 3 and 4) and install replacement units as required.**
4. **Renumber the order of the units for the new stack configuration (if desired).**

You can renumber the unit numbers as described in “Setting Up the Stack Configuration” in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

Removing/Replacing Nonadjacent Units

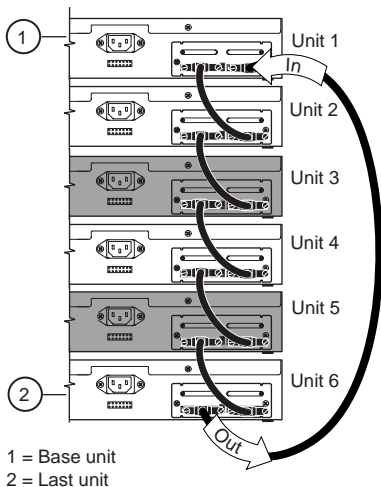


Note: Remove and replace the units individually to avoid segmenting the stack configuration.

To remove/replace nonadjacent units from an operating stack, complete the following steps (see [Figure 15](#)):

1. **Remove the cascade cable from the Cascade A In connector at unit 3.**
2. **Remove the cascade cable from the Cascade A Out connector at unit 3.**
3. **Remove the unit (unit 3) and install the replacement unit as required.**
4. **Reconnect the cascade cables (removed in Steps 1 and 2) to unit 3.**

5. Repeat Steps 1 to 4 for unit 5.



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Figure 15. Removing Nonadjacent Units

6. Renumber the order of the units for the new stack configuration (if desired).

You can renumber the unit numbers as described in “Setting Up the Stack Configuration” in the *Using the BayStack 450 10/100/1000 Series Switch* guide.

Upgrading the BayStack 450 Switch Firmware

The BayStack 450 switch firmware provides a code load facility that allows you to upgrade the firmware image over any switch port, including any MDA ports.

You must upgrade the BayStack 450 switch firmware image before you install the BayStack 400-ST1 Cascade Module.



Note: When upgrading the firmware image to software version V1.1.0, you must download *two images* (the *boot code image* and the *agent image*) for proper operation of the switch. The new boot code image must be downloaded *before* the agent image is downloaded.

Accessing the Firmware Images

You can access the firmware image files directly on the World Wide Web, as follows:

1. **Go to *support.baynetworks.com/software/ethernet/baystack_450.html***
2. **Under the Operational Software heading, click on Version 1.1.0 at the BayStack 450 boot code link.**

Follow the prompts to download the BayStack 450 boot code image. The boot code image filename is *b4501101.img*

3. After the BayStack 450 boot code image is downloaded, click on Version 1.1.0 at the BayStack 450 agent link.

Follow the prompts to download the BayStack 450 agent image. The agent image filename is *b4501102.img*

Be sure to download the BayStack 450 boot code image *first*, then download the BayStack 450 agent image.

Accessing the Latest Documentation

If you are upgrading your BayStack 450 switches, be sure to obtain the latest version of the *Using the BayStack 450 10/100/1000 Series Switch* guide. This guide provides instructions for setting up your stack configuration after you install the 400-ST1 Cascade Modules.

You can obtain the latest updates to your product documentation, including release notes, by visiting the Bay Networks Web site at the following location:

www.support.baynetworks.com/library/tpubs

Upgrade Restrictions

The following restrictions apply when upgrading the switch firmware:

- The firmware cannot be upgraded through a port that is configured for *tagged* traffic.

- The port connection to the load host cannot be through a MultiLink Trunk.
- During the load process, the ports are configured as follows:
 - Twisted-pair ports: autonegotiation enabled.
 - Fiber optic ports: 100 Mb/s, half-duplex.
 - Gigabit MDA ports: autonegotiation disabled, Preferred Phy set to Right.

For detailed information about downloading a new software image, see “Chapter 3, “Using the Console Interface,” in the *Using the BayStack 450 10/100/1000 Series Switch* guide.