



Cisco Bandwidth Quality Manager Installation Guide

Software Release 4.0

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Preface

About this Guide

Objective

This Installation Guide describes how to install the Cisco Bandwidth Quality Manager software and how to cable the device using passive taps to measure network data.

Audience

This document is targeted at the following types of users:

- Network Planners and Architects
- Traffic Engineers and Capacity Planners
- Network Operation and Maintenance Personnel
- IT Staff and Telco Product Managers

Related Documentation

For more information on using the BQM, see the following documents:

- Cisco Bandwidth Quality Manager 4.0 Getting Started Guide
- Cisco Bandwidth Quality Manager 4.0 User Guide
- Cisco Bandwidth Quality Manager 4.0 Release Notes

Conventions Used in This Guide

Command descriptions use these conventions:

`Monospace` indicates variable names, directory paths, file names, and configuration command examples.

Boldface indicates names of user interface elements, such as menu options, toolbar button, dialog box and window field names, and commands and keywords that are entered literally as shown.

Italics indicate terms and command arguments for which you supply values; in contexts that do not allow italics, arguments are enclosed in angle brackets (<>).



Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the manual.

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>



1 Installing the BQM Software

This guide describes how to install, set up and begin using the Cisco Bandwidth Quality Manager (BQM) Release 4.0 software on the following supported Cisco platforms:

- Cisco Application Deployment Engine (ADE) 1010
- Cisco Application Deployment Engine (ADE) 2120
- Cisco Application Deployment Engine (ADE) 2130
- Cisco Application Deployment Engine (ADE) 2140



Note BQM 4.0 also supports upgrades for the Cisco 1180 platform from 3.x to 4.0.

You can also refer to the following documents for important information about configuring and managing the BQM software:

- For release 3.x to release 4.0 upgrade information, and overview of new features and resolved and open issues, see the “Cisco Bandwidth Quality Manager 4.0 Release Notes” document.
- For information on initial post-installation system setup tasks, see the “Cisco Bandwidth Quality Manager 4.0 Getting Started Guide.”
- For details about configuring and managing BQM, including a complete CLI command reference, see the “Cisco Bandwidth Quality Manager 4.0 User Guide.”

This chapter describes steps required to install the BQM 4.0 release software:

- Powering up the Cisco application deployment engine
- Connecting to the console port
- Installing the BQM software



Note Performing a CD installation always wipes all stored data and configuration.

If a problem occurs during the installations procedure, the best course of action is to start again from the beginning. If it still fails, you can plug in a keyboard and monitor to the appliance to see the reported error. One potential source of a failed installation is incorrect BIOS or RAID settings for RAID support. For information on BIOS and RAID BIOS configuration for RAID support on the Cisco ADE 2120, 2130, and 2140 platforms, see the appendix “RAID Support Configuration”.

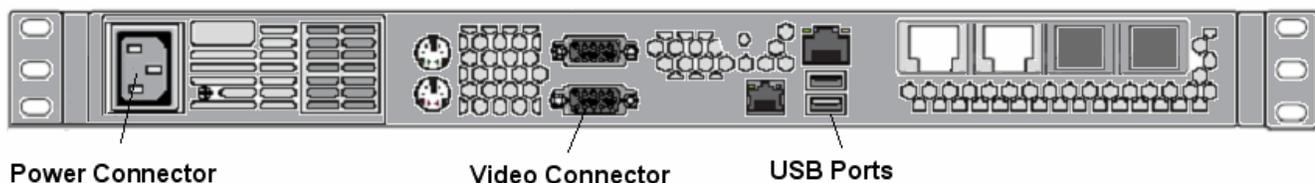
Powering Up the Cisco Application Deployment Engine

You begin by powering up the Cisco ADE:



WARNING Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 - 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Figure 1-1: Cisco ADE 2120 Back Panel



-
- Step 1** Connect a power supply to the device. Insert the power cord, switch on at the mains and press the power switch. The unit turns on, illuminating the Power On LED.
- Step 2** Verify that the device has power by checking that the power LED (PWR) on the front panel of the device is on.
-

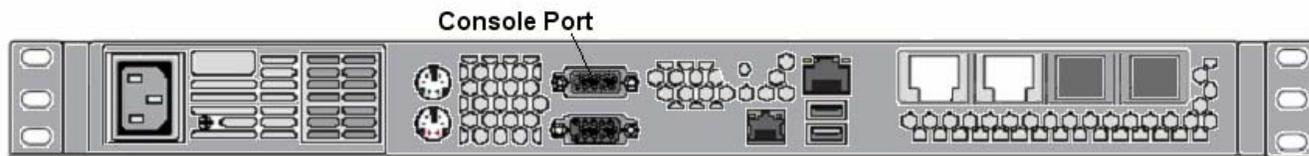


Note When you have connected a power supply to a Cisco ADE 2130 or 2140, you wait at least 15 seconds before powering on the device.

Connecting to the Console Port

To perform the software installation procedure, make a direct serial connection from a laptop to the Cisco ADE 2120 console port (DTE). You will need a null-modem cable (standard DB-9 PC serial connection with normal pin-out) to connect the laptop serial port and the console port.

Figure 1-2 Cisco ADE 2120 Rear Panel – Console Port



Note The diagram shows the two-port Cisco ADE 2120. The location of the serial console port is the same on all Cisco ADE 2120 models and on the Cisco ADE 1010.

The Cisco ADE 2130 and 2140 model console port supports an RJ-45 interface. See the appendix “Cisco Application Deployment Engine Specifications” for the location of the serial console port on the Cisco ADE 2130 and 2140 models.

Console Port Settings

The Cisco ADE 1010 and 2120 model console port supports a DB-9 interface. You use the following settings to connect to both console ports:

Bits per Second 9600
Data bits 8
Parity None
Stop bits 1
Flow control Hardware



Note The Cisco ADE 2130 and 2140 model console port supports an RJ-45 interface, but both use the same serial settings.

See the appendix “Cisco Application Deployment Engine Specifications” for the location of the serial console port on the Cisco ADE 2130 and 2140 models.

Examples of supported terminal emulation software include:

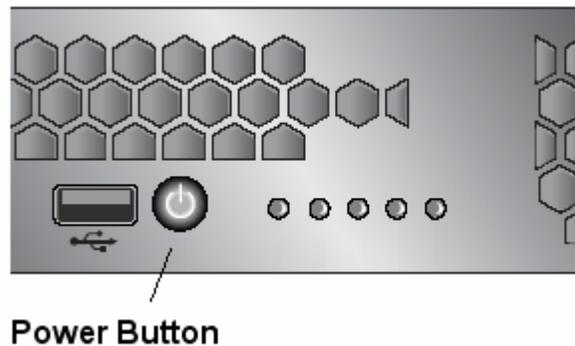
- tip (UNIX)
- minicom (Linux)
- HyperTerminal (Win32 with VT100 emulation)
- teraterm (Win32)

Installing the Software

To install the software on the Cisco Application Deployment Engine, perform the following steps:

-
- Step 1** Power on the appliance, and within 20 seconds, press the CD eject button, and remove the CD that is shipped with the appliance (if any).
- Step 2** Insert the BQM Installation CD in the CD drive and reboot the machine.

Figure 1-3 Cisco ADE 2120 Front Panel – Control Panel



To reboot the machine, press the power button on the front panel of the machine. The installation program starts automatically. There is a short wait until a prompt is displayed on the terminal.



Note The power button used to reset the appliance is in the same location on the front panel of the Cisco Application Deployment Engine 1010 and 2120 models.

If you are installing the software on the Cisco ADE 2130 or 2140 models, you can press the reset button to reboot the machine. See the appendix “Cisco Application Deployment Engine Specifications” for information on locating the reset button on the front panel.

- Step 3** When the introduction screen is displayed, you are prompted to start the installation by typing OK and pressing Enter.

Note that any existing system and measurement configurations from previous installations will be lost when you boot off the installation CD. Typing OK and pressing Enter confirms that an installation should take place.

```
ISOLINUX 2.11 2004-08-16 Copyright (C) 1994-2004 H. Peter
Anvin
Looking for CD-ROM
Type OK and then <ENTER> to continue installation, QUIT reboots
```

ok

```
Verifying installation image
Installing CBQM image to /dev/sda
image copied to hard disk
second disk nulled
Installation completed
Please remove the CD, and press <Enter> to reboot
```

- Step 4** Remove the BQM installation CD from the CD drive and press Enter. The installation program reboots the machine and then initializes the disk and sets up the file system (this can take a few minutes). The initialization process is shown and then the login prompt is displayed.

```
Booting...
/etc/init.d/rcS.d/S00-system_reset: OK
/etc/init.d/rcS.d/S01-ramdisk: OK
/etc/init.d/rcS.d/S02-console: O
Cisco Bandwidth Quality Manager software: Version 4.0 (4.0.0.4-
D2.2.26669 Wed 02 May 2007)
```

```
Booting...
/etc/init.d/rcS.d/S00-system_reset: OK
/etc/init.d/rcS.d/S01-ramdisk: OK
/etc/init.d/rcS.d/S02-console: OK
/etc/init.d/rcS.d/S10-defaults: OK
/etc/init.d/rcS.d/S15-sysid: OK
/etc/init.d/rcS.d/S20-watchdog-early: OK
/etc/init.d/rcS.d/S25-lcd: OK
/etc/init.d/rcS.d/S30-syslog: OK
/etc/init.d/rcS.d/S31-ipmi: OK
/etc/init.d/rcS.d/S35-xyratex1: OK
/etc/init.d/rcS.d/S40-iptables: OK
/etc/init.d/rcS.d/S41-interfaces: OK
/etc/init.d/rcS.d/S42-network: OK
/etc/init.d/rcS.d/S43-ntpd: OK
/etc/init.d/rcS.d/S44-xyratex2: OK
/etc/init.d/rcS.d/S45-watchdog: OK
/etc/init.d/rcS.d/S46-adjust-config: OK
/etc/init.d/rcS.d/S50-workdisk: disk0: creating partition P3
disk0: partition table changed, rebooting NOW ...
```

```
dis
Cisco Bandwidth Quality Manager software: Version 4.0 (4.0.0.4-
D2.2.26669 Wed 02 May 2007)

Booting...
/etc/init.d/rcS.d/S00-system_reset: OK
/etc/init.d/rcS.d/S01-ramdisk: OK
/etc/init.d/rcS.d/S02-console: OK
/etc/init.d/rcS.d/S10-defaults: OK
/etc/init.d/rcS.d/S15-sysid: OK
/etc/init.d/rcS.d/S20-watchdog-early: OK
/etc/init.d/rcS.d/S25-lcd: OK
/etc/init.d/rcS.d/S30-syslog: OK
/etc/init.d/rcS.d/S31-ipmi: OK
/etc/init.d/rcS.d/S35-xyratex1: OK
/etc/init.d/rcS.d/S40-iptables: OK
/etc/init.d/rcS.d/S41-interfaces: OK
/etc/init.d/rcS.d/S42-network: OK
/etc/init.d/rcS.d/S43-ntpd: OK
/etc/init.d/rcS.d/S44-xyratex2: OK
/etc/init.d/rcS.d/S45-watchdog: OK
/etc/init.d/rcS.d/S46-adjust-config: OK
/etc/init.d/rcS.d/S50-workdisk: disk0: creating filesystem ...
disk1: creating partition ...
disk1: creating filesystem ...
OK
/etc/init.d/rcS.d/S51-post-install: OK
/etc/init.d/rcS.d/S52-raid-install: OK
/etc/init.d/rcS.d/S60-postgresql: OK
/etc/init.d/rcS.d/S80-probe: OK
/etc/init.d/rcS.d/S81-services: OK
/etc/init.d/rcS.d/S82-sshd: OK
/etc/init.d/rcS.d/S83-resolver: OK
/etc/init.d/rcS.d/S84-crond: OK
/etc/init.d/rcS.d/S85-java: OK
/etc/init.d/rcS.d/S86-pyrest: OK
Waiting for system to come up ...
System is now UP

cbqm login:
```

The software installation process is complete. The next task is to log in to the appliance and perform the initial setup configuration.



Note You follow the same procedure when installing and setting up any of the Cisco ADE models.

Setting Up the Appliance

You need to get the correct network addresses from your system administrator or consult your network plan to determine correct addresses before you set up the appliance:

- **IP Address** - IP address to be assigned to the Cisco Application Deployment Engine, for example 10.1.2.3. Consult your network administrator to obtain an unassigned address. IP addresses may be added including a subnet prefix. For example, 192.18.5.4/16.
- **Net Mask** - Subnet mask for the subnet on which the Cisco Application Deployment Engine resides, for example 255.255.0.0
- **Gateway IP address** – IP address the Cisco Application Deployment Engine uses to reach other networks, for example 10.1.2.254. The gateway address is often the same as the site router address.
- **Domain Name Server** (optional) – IP address of the domain name server the Cisco Application Deployment Engine can use to resolve host names. DNS requests are only sent on user demand.

The following steps describe the procedure to set up the Cisco Application Deployment Engine on the first day of service:

Step 1 Log in as the admin user. The default admin password is ‘admin’. Only the admin user can configure the system for use.

Step 2 When you first log in, you are prompted for each piece of configuration information required by the Cisco Application Deployment Engine to complete the configuration process.

```
Please enter setup information ...
```

```

                                IP Address: 192.168.2.71/16
                                Netmask: 255.255.0.0
                                Router: 192.168.1.10
Domain-Name-Server [optional]:
                                Hostname: nyc_hq
                                current time and timezone :
14:39:37 03 May 2007 UTC (UTC)
```

Step 3 If you are setting up the single, two-port, four-port electrical Cisco ADE models, or the four-port optical Cisco ADE model, the initial set up is complete. If you are installing and setting up the two-port optical model of the Cisco ADE 2120 or Cisco ADE 2130, you need to specify that you will be using the two optical ports for traffic measurement. To do this you use the **media** command from the port context:

```

host(config)$ port portA
host(config-port)$ media sfp
host(config-port)$ end
host(config-)$ port portB
host(config-port)$ media sfp
host(config-port)$ end
```

The initial configuration is complete. For further instructions on initial configuration, such as licensing and setting the system time and time zone, see the “Cisco Bandwidth Quality Manager 4.0 Getting Started Guide.”



2 Installing the Cisco Application Deployment Engine with a Passive Tap

This chapter describes the hardware features of the Cisco Application Deployment Engine and the steps required to install the device:

- Cisco Application Deployment Engine rear panel features
- Installing the Cisco Application Deployment Engine with a passive tap
- Verifying the Cisco Application Deployment Engine installation
- Securing the Cisco Application Deployment Engine

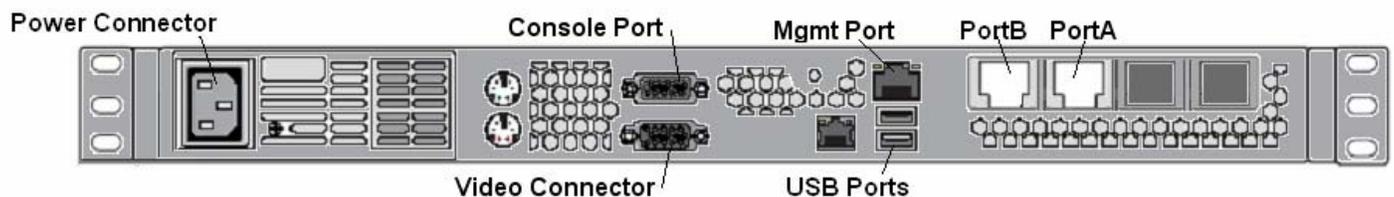
Overview

The Cisco Application Deployment Engine has the capability to monitor Fast Ethernet and Gigabit Ethernet links. For monitoring Gigabit Ethernet, the Cisco Application Deployment Engine supports optical interfaces (SX). The Cisco Application Deployment Engine monitors the links using passive taps.

Cisco Application Deployment Engine Rear Panel

The following figure shows the main features of the Cisco Application Deployment Engine rear panel.

Figure 2-1 Cisco ADE 2120 Two-Port Back Panel Features



The following table describes the main features of the two-port Cisco Application Deployment Engine 2120 back panel:

Table 2-1 Cisco ADE 2120 Two-Port Back Panel Features

Item	Description
Power connector	Connect the power cable to this connector.
Console port	The console port (DTE) supports a DB-9 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable when connecting to a laptop serial port to perform initial configuration.
Management port	Use the upper Ethernet (10/100/1000 Mb) connector as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
Measurement ports	Measurement ports (PortA, PortB): For FastE/GigE electrical deployments (10/100/1000 Mb Ethernet) connect these ports to a SPAN switch port or a passive tap to measure traffic. RJ-45 connectors. This diagram shows the two-port Cisco Application Deployment Engine 2120. For more information on the two-port optical, one-port and four-port 2120 models, and the Cisco Application Deployment Engine 1010, see the appendix.
USB ports	USB device connectors. Not used.
Video connector	Monitor connector. Not used.



Note See the appendix for more information on the back panel features and specifications of the Cisco Application Deployment Engine 1010, single-port, two-port and four-port 2120, two-port and four-port 2130, and two-port 2140 models.

Choosing a Location for the Unit

Choose a location for the Cisco Application Deployment Engine that complies with the environmental specifications listed at the end of this document. You must leave a minimum clearance of 3 inches at the front and rear of the unit to allow air to circulate. Air vents on the front and rear of the unit must be left clear to allow adequate air circulation to prevent excessive heat, which can damage the internal components. The following table lists the various locations where the unit must not be operated.

Table 2-2 **Unsuitable Locations**

Location	Explanation
Dirty or dusty locations	Dirt and dust can damage the module unit components and clog the air vents.
Locations exposed to direct heat or sunlight	Direct heat and sunlight can cause the module unit to overheat and fail.
Unstable locations	See the appendix for weight specifications for the Cisco Application Deployment Engine 1010 and 2120. If you are not placing the module unit on the floor, make sure that the location is steady and stable and can support the weight.



CAUTION

If the unit is mounted on a rack, then the system integrator is responsible for the mechanical stability of the rack configuration in both of the following situations:

- When the unit is in the fully home position
- When the unit is in the fully extended position

The system integrator is also responsible for the thermal design in the enclosure.

Installing the Cisco Application Deployment Engine with a Passive Tap

Using a passive tap allows you to connect and disconnect the Cisco Application Deployment Engine at any time, without disrupting the traffic on the network. Network traffic passes uninterrupted through the passive tap, even if power is lost.

Depending on the required deployment, you can install the Cisco Application Deployment Engine with a passive tap in the following ways:

- Fast Electrical (10/100 TX) Ethernet - Single-Homed
- Fast Electrical (10/100 TX) Ethernet - Dual-Homed
- Fast Electrical (10/100 TX) Ethernet – Router to Router Single-Homed
- Fast Electrical (10/100 TX) Ethernet – Router to Router Dual-Homed
- Gigabit Electrical (1000 TX) Ethernet - Single-Homed
- Gigabit Electrical (1000 TX) Ethernet - Dual-Homed
- Gigabit Multi-Mode Optical (1000 SX) Ethernet - Single-Homed
- Gigabit Multi-Mode Optical (1000 SX) Ethernet - Dual-Homed

When you install the Cisco Application Deployment Engine with a passive tap, you also need the appropriate tap model for the network segment to be monitored.



Note Working with the Cisco ADE 2140 10 Gb connectivity requires the use of 10 Gb taps.

The following sections describe the wiring scheme that you must use when installing the Cisco Application Deployment Engine with 10/100/1000 electrical and Gigabit optical taps. Whereas most combinations of cable types may appear to work, only the exact wiring described below will lead to predictable results. Failure to follow these recommendations may result in a link that doesn't work at all, or causes the function of the two tap analyzer ports to be effectively swapped.

Auto-negotiation between ports on the link to be tapped should be switched OFF on at least one end of the link. Otherwise attempted auto-negotiation between the ports could cause the function of the two tap analyzer ports to be swapped.

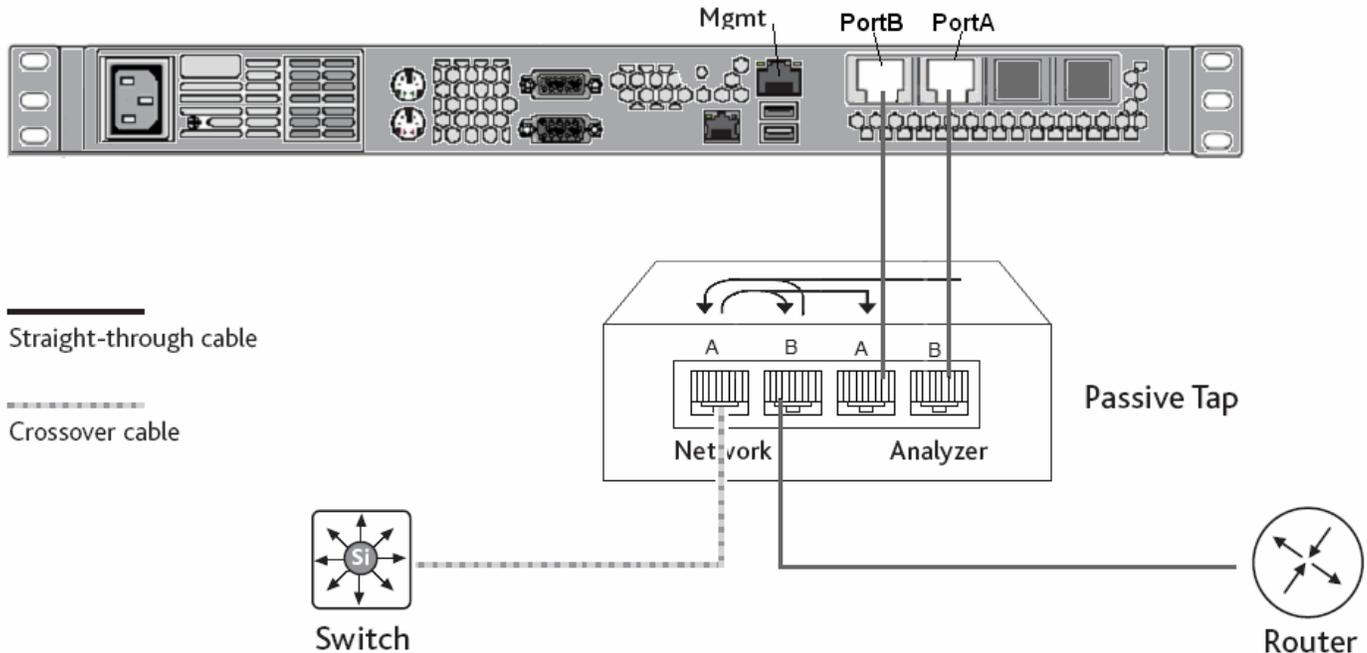
The remainder of this chapter is divided into sections describing the cabling requirements and installation steps when installing taps in each of the deployments listed above.

Consult the section below that is relevant to your installation.



Note The Cisco ADE 2120 is used as the example platform in the following sections. The same approach can be used when working with the two-port and four-port Cisco ADE 2130 and the Cisco ADE 2140 (two-port only).

Fast Electrical (10/100 TX) Ethernet - Single-Homed

Figure 2-3 Example Single-Homed Cisco ADE 2120 and Electrical Tap Deployment

The passive tap includes four shielded UTP connectors. The tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. All ports on the tap behave as network equipment (DCE), like an Ethernet switch port.

The following table identifies which cable connections to use.

Table 2-3 Tap Cable Connections

Connection	Cable
Network Port A	Crossover to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortB
Analyzer B	Straight-through to Cisco ADE 2120 PortA

Installing the Tap

To install the passive tap in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing CAT 5 cable and restore the link by connecting the switch and router to the tap:

- Connect Network Port A on the tap to the LAN/Service Provider core switch using a CAT5 RJ-45 crossover cable.
- Connect Network Port B on the tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Step 2 Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

Step 3 When you have verified connectivity on the link, you connect the Cisco ADE 2120 to the tap:

- Connect the Cisco ADE 2120 PortA interface to Analyzer Port B (inbound) on the tap using a CAT5 RJ-45 straight-through cable.
- Connect the Cisco ADE 2120 Port B interface to Analyzer Port A (outbound) on the tap using a CAT5 RJ-45 straight-through cable.

Step 4 Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LED.

Step 5 Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-4 **Management Port Cable Connections**

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default.

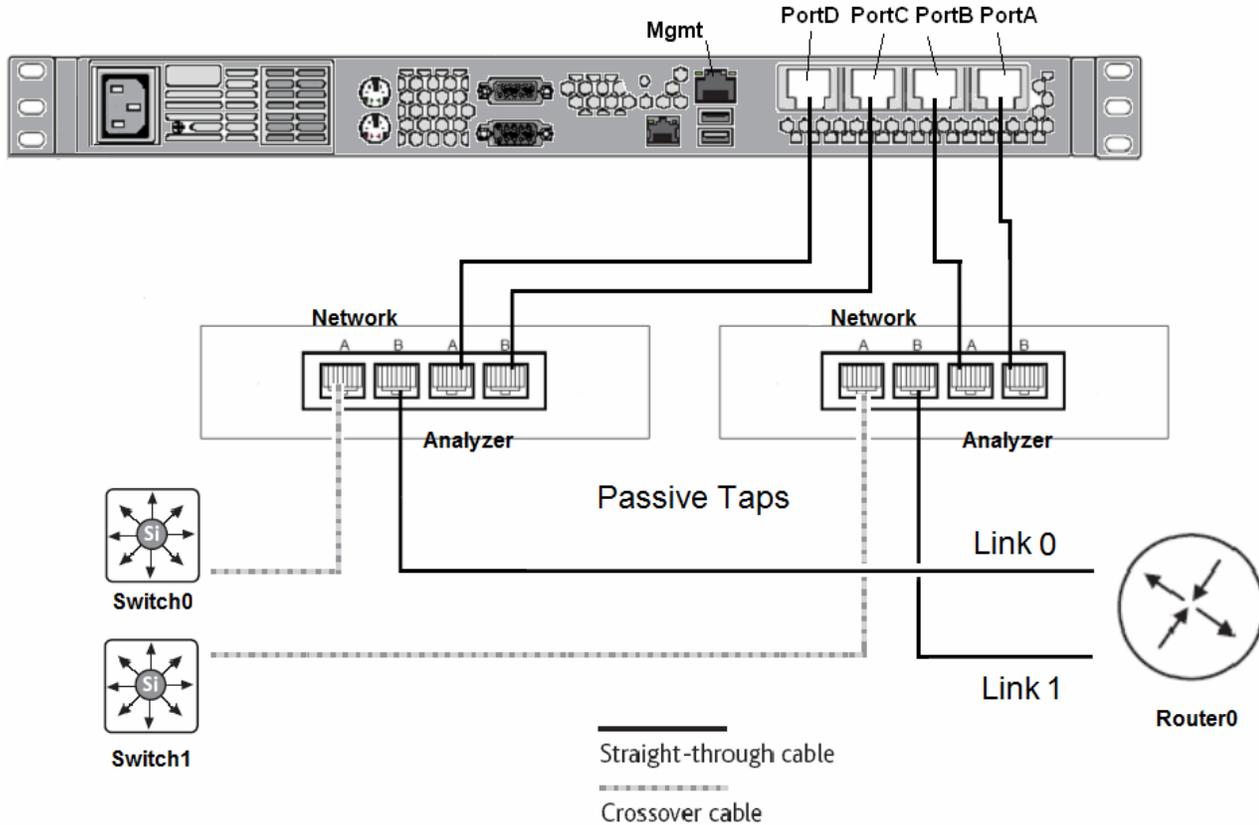
If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end.

There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

Fast Electrical (10/100 TX) Ethernet - Dual-Homed

Figure 2-4 Example Dual-Homed Cisco ADE 2120 and Electrical Tap Deployment



In the dual-homed deployment, two taps are required, one for each of the dual-homed links. Two measurement interfaces of the Cisco ADE 2120 connect to the Analyzer A interface on the two taps, and the other two measurement interfaces connect to the Analyzer B interface on the two taps. The passive taps each include four shielded UTP connectors. Each tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors.



Note The dual-homed installation requires the use of a four-port Cisco ADE 2120 appliance.

The following table identifies which cable connections to use.

Table 2-5 Tap Cable Connections

Connection	Cable
Network Port A	Crossover to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 ports
Analyzer B	Straight-through to Cisco ADE 2120 ports

Installing the Taps

To install the passive taps in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1

Replace the existing straight CAT5 cables and restore the link by connecting the switches and router through the taps:

- Connect Network Port A on the first tap to the first LAN/Service Provider core switch (switch0 in the preceding figure) using a CAT5 RJ-45 crossover cable.
- Connect Network Port A on the second tap to the other LAN/Service Provider core switch (switch1 in the preceding figure) using a CAT5 RJ-45 crossover cable.
- Connect Network Port B on the first tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the second tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable. The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

- Step 2** Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.
- Step 3** When you have verified connectivity on the link, connect the Cisco ADE 2120 to the taps.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the first tap to the Cisco ADE 2120 PortD interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the second tap to the Cisco ADE 2120 PortB interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the first tap to the Cisco ADE 2120 PortC interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the second tap to the Cisco ADE 2120 PortA interface.
- Step 4** Connect a power supply to the Cisco ADE 2120 appliance. Insert the power cord, switch on at the mains, and press the power switch on. The unit turns on, illuminating the Power On LEDs.
- Step 5** Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is on.
-

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-6 Management Port Cable Connections

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

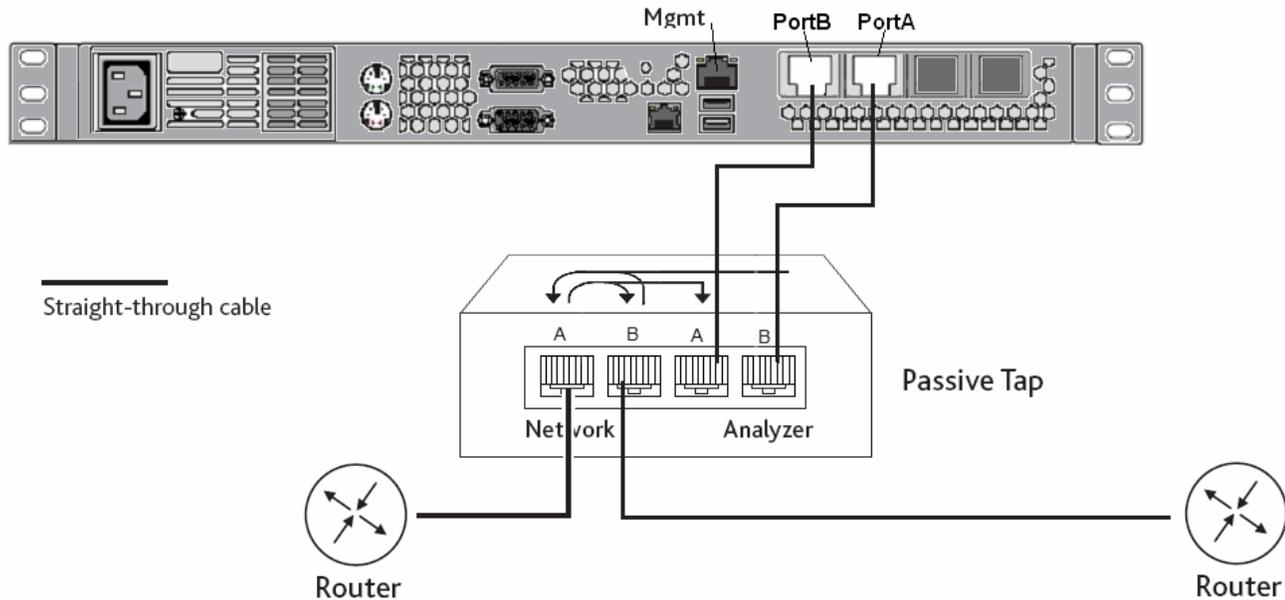
Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default. If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end. There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

Fast Electrical (10/100 TX) Ethernet Router to Router - Single-Homed

The following figure shows an example single-homed deployment of the Cisco ADE 2120 with a 10/100 Ethernet TX full duplex tap.

Figure 2-5 Example Single-Homed Cisco ADE 2120 and Electrical Tap Deployment



The passive tap includes four shielded UTP connectors. The tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. All ports on the tap behave as network equipment (DCE), like an Ethernet switch port. The table below identifies which cable connections to use.

Table 2-7 Tap Cable Connections

Connection	Cable
Network Port A	Straight-through to router
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortB
Analyzer B	Straight-through to Cisco ADE 2120 PortA

Installing the Tap

To install the passive tap (for example, NetOptics 10/100BaseT Tap Model 96430) in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing single crossover CAT5 cable and restore the link by connecting the two routers through the tap:

- Connect Network Port A on the tap to the LAN/Service Provider router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Step 2 Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

Step 3 When you have verified connectivity on the link, connect the Cisco ADE 2120 to the tap.

- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the tap to the Cisco ADE 2120 PortA interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the tap to the Cisco ADE 2120 PortB interface.

Step 4 Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LED.

Step 5 Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-8 *Management Port Cable Connections*

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

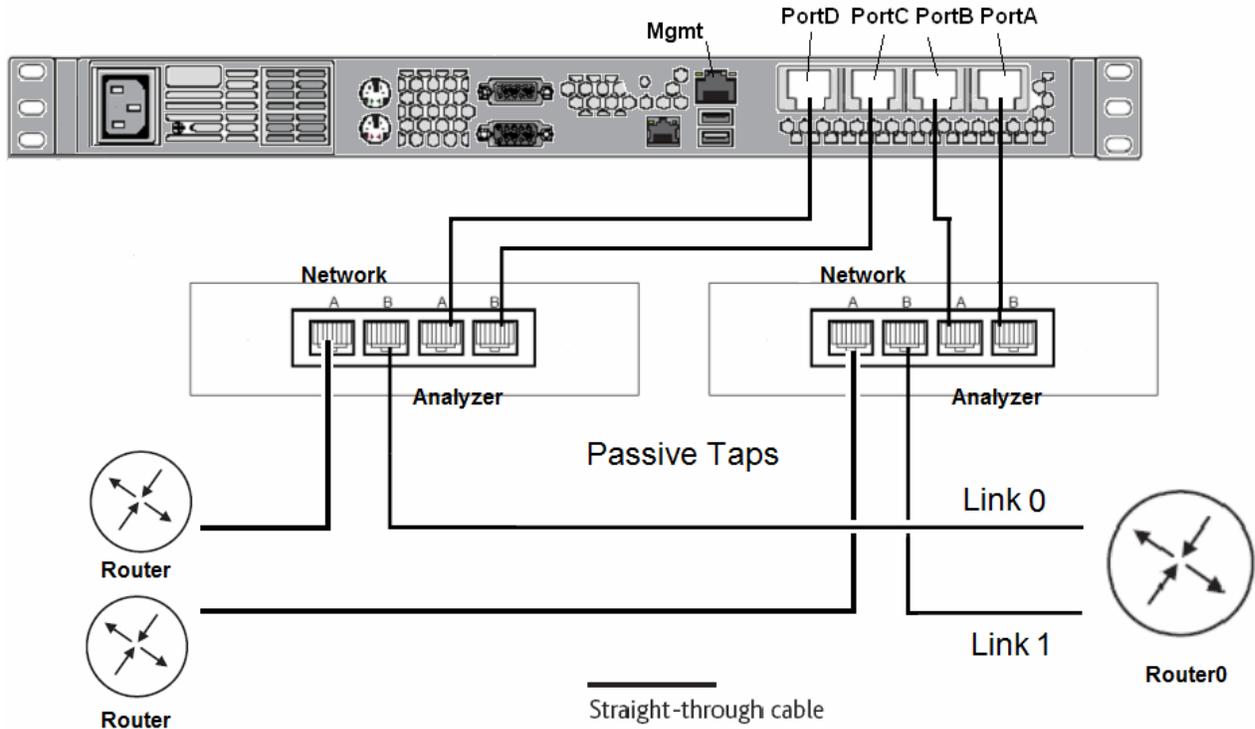
Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default. If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end. There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

Fast Electrical (10/100 TX) Ethernet Router to Router - Dual-Homed

The following figure shows an example dual-homed deployment of Cisco ADE 2120 appliances with two 10/100 Ethernet TX full duplex taps.

Figure 2-6 Example Dual-Homed Cisco ADE 2120 and 10/100 TX Electrical Tap Deployment



In the dual-homed deployment, two taps are required, one for each of the dual-homed links. Two measurement interfaces of the Cisco ADE 2120 connect to the Analyzer A interface on the two taps and the other two measurement interfaces connect to the Analyzer B interface on the two taps. The passive taps each include four shielded UTP connectors. Each tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors.



Note The dual-homed installation requires the use of a four-port Cisco ADE 2120 model appliance.

The table below identifies which cable connections to use.

Table 2-9 Tap Cable Connections

Connection	Cable
Network Port A	Straight-through to router
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortA
Analyzer B	Straight-through to Cisco ADE 2120 PortB

Installing the Taps

To install the passive taps (for example, two NetOptics 10/100BaseT Tap Model 96430) in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1

Replace the existing crossover CAT5 cable and restore the link by connecting the routers through the taps:

- Connect Network Port A on the first tap to the first LAN/Service Provider core router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port A on the second tap to the other LAN/Service Provider core router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the first tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the second tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

- Step 2** Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.
- Step 3** When you have verified connectivity on the link, connect the Cisco ADE 2120 to the taps.
- o Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the first tap to the Cisco ADE 2120 PortD interface.
 - o Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the second tap to the Cisco ADE 2120 PortB interface.
 - o Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the first tap to the Cisco ADE 2120 PortC interface.
 - o Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the second tap to the Cisco ADE 2120 PortA interface.
- Step 4** Connect a power supply to the Cisco ADE 2120 appliance. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LEDs.
- Step 5** Verify that the Cisco ADE 2120 appliance has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.
-

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-10 Management Port Cable Connections

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default. If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end. There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

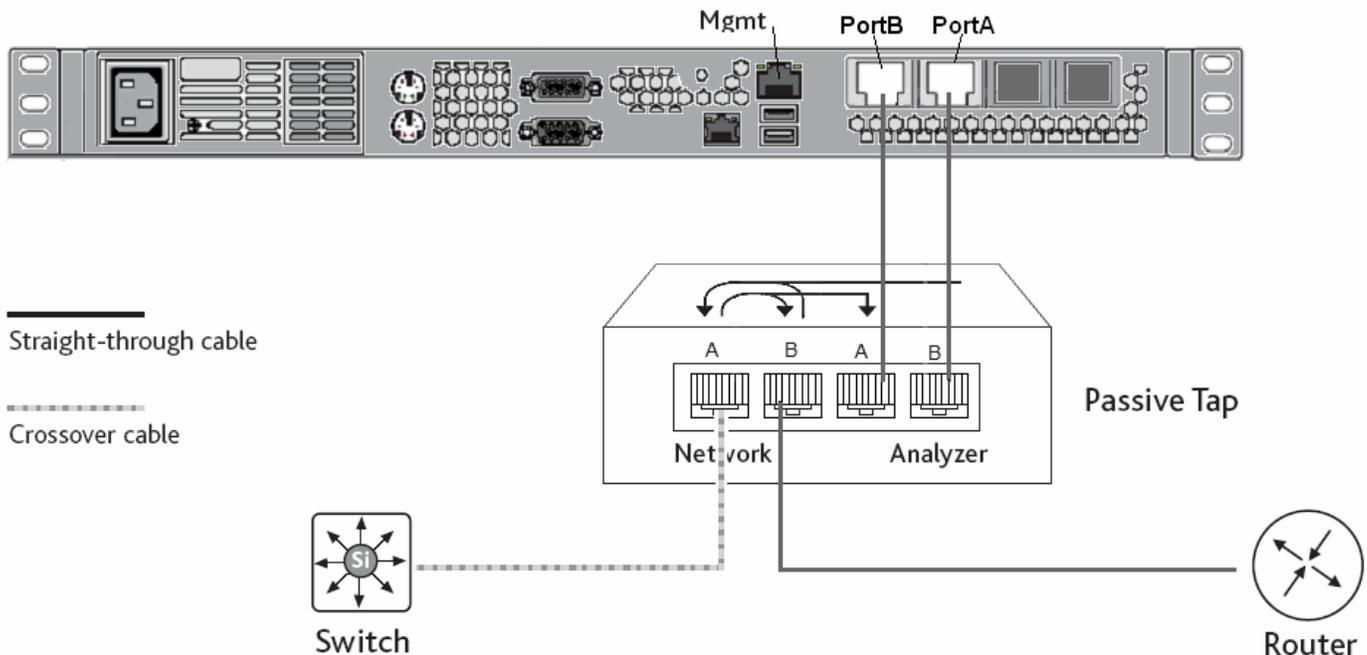
Gigabit Electrical (1000 TX) Ethernet - Single-Homed

There are two taps available, one from NetOptics and one from Datacom Systems. The major deployment distinction between the two taps is in the use of cross-over cables versus straight-through cables when connecting the tap to a switch port.

Datacom Systems Gigabit Electrical Tap

The following figure shows an example single-homed deployment of the Cisco ADE 2120 with a Datacom Systems Gigabit Ethernet electrical tap.

Figure 2-7 Example Single-Homed Cisco ADE 2120 and Datacom Systems Gigabit Electrical Tap Deployment



The passive tap includes four shielded UTP connectors. The tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. The table below identifies the cable connections to use with the Datacom Systems Gigabit tap.

Table 2-11 Tap Cable Connections

Connection	Cable
Network Port A	Crossover to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortB
Analyzer B	Straight-through to Cisco ADE 2120 PortA

Installing the Datacom Systems Gigabit Tap

To install the Datacom Systems Gigabit tap in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing single straight CAT5 cable and restore the link by connecting the switch and router through the tap:

- Connect Network Port A on the tap to the LAN/Service Provider core switch using a CAT5 RJ-45 crossover cable.
- Connect Network Port B on the tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Step 2 Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

Step 3 When you have verified connectivity on the link, connect the Cisco ADE 2120 to the tap.

- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the tap to the Cisco ADE 2120 PortB interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the tap to the Cisco ADE 2120 PortA interface.

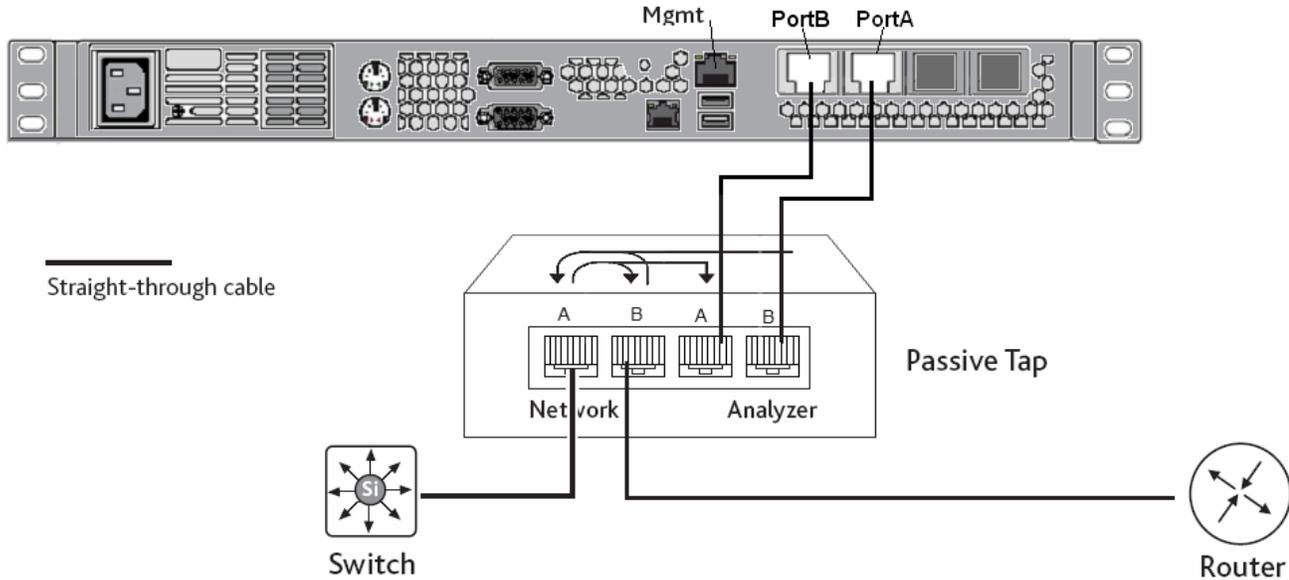
Step 4 Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LED.

Step 5 Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.

NetOptics Gigabit Tap

The following figure shows an example single-homed deployment of the Cisco ADE 2120 with a NetOptics Gigabit Ethernet tap.

Figure 2-8 Example Single-Homed Cisco ADE 2120 and NetOptics Gigabit Electrical Tap Deployment



The passive tap includes four shielded UTP connectors. The tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. The table below identifies which cable connections to use with the NetOptics tap.

Table 2-12 Tap Cable Connections

Connection	Cable
Network Port A	Straight-through to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortB
Analyzer B	Straight-through to Cisco ADE 2120 PortA

Installing the NetOptics Gigabit Tap

To install the NetOptics Gigabit tap in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing single straight CAT5 cable and restore the link by connecting the switch and router through the tap:

- Connect Network Port A on the tap to the LAN/Service Provider core switch using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Step 2 Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

Step 3 When you have verified connectivity on the link, connect the Cisco ADE 2120 to the tap.

- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the tap to the Cisco ADE 2120 PortB interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the tap to the Cisco ADE 2120 PortA interface.

Step 4 Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LED.

Step 5 Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-13 *Management Port Cable Connections*

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default. If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end. There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

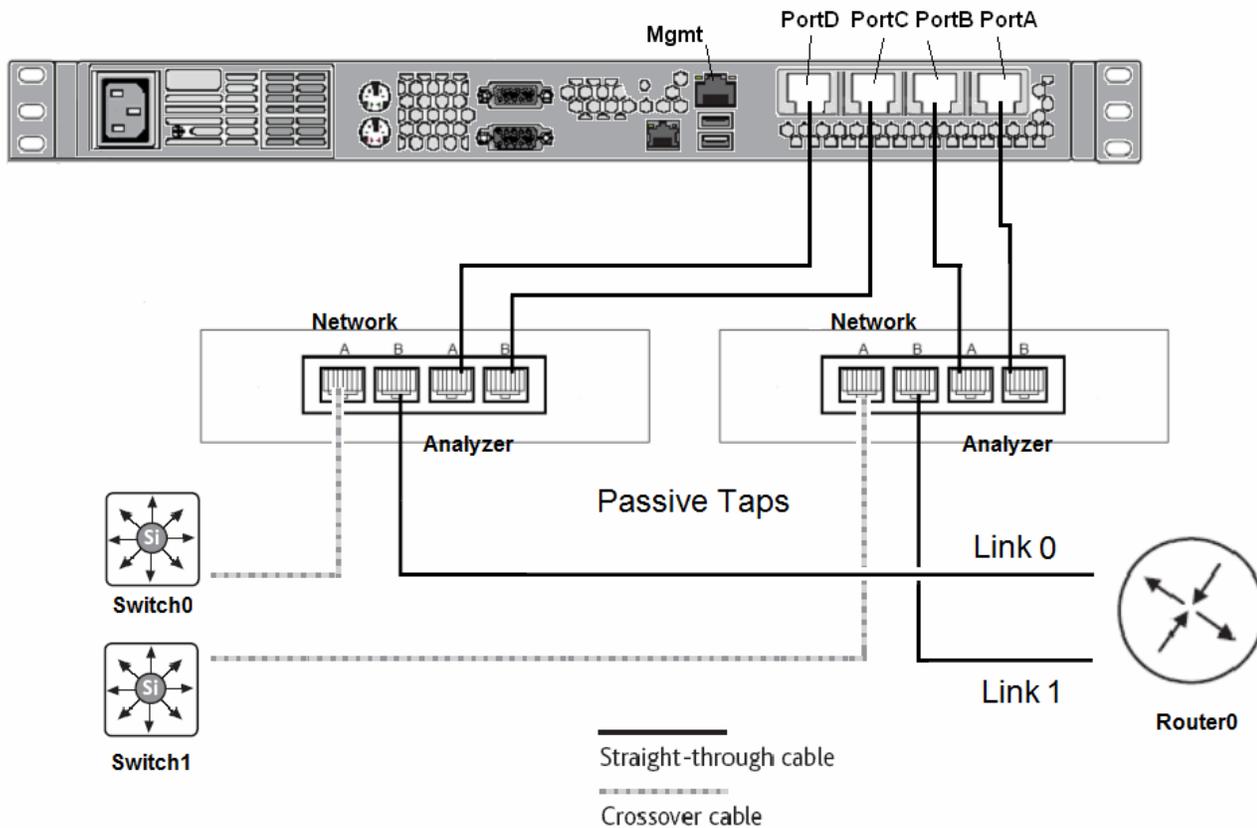
Gigabit Electrical (1000 TX) Ethernet - Dual-Homed

There are two candidate taps, one from NetOptics and one from Datacom Systems. The major deployment distinction between the two taps is in the use of cross-over cables versus straight-through cables when connecting the tap to a switch port.

Datacom Systems Gigabit Taps

The following figure shows an example dual-homed deployment of Cisco ADE 2120 appliances with two Datacom Systems Gigabit Ethernet TX full duplex taps.

Figure 2-9 Example Dual-Homed Cisco ADE 2120 and Datacom Systems Gigabit Electrical Tap Deployment



In the dual-homed deployment, two taps are required, one for each of the dual-homed links. Two measurement interfaces of the Cisco ADE 2120 connect to the Analyzer A interface on the two taps and the other two measurement interfaces connect to the Analyzer B interface on the two taps.



Note The dual-homed installation requires the use of a four-port Cisco ADE 2120 model appliance.

The passive taps each include four shielded UTP connectors. Each tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. The table below identifies which cable connections to use.

Table 2-14 Tap Cable Connections

Connection	Cable
Network Port A	Crossover to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortA
Analyzer B	Straight-through to Cisco ADE 2120 PortB

Installing the Datacom Systems Gigabit Taps

To install the two Datacom Systems Gigabit taps in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing straight CAT5 cables and restore the link by connecting the switches and router through the taps:

- Connect Network Port A on the first tap to the first LAN/Service Provider core switch (switch0 in the preceding figure) using a CAT5 RJ-45 crossover cable.
- Connect Network Port A on the second tap to the other LAN/Service Provider core switch (switch1 in the preceding figure) using a CAT5 RJ-45 crossover cable.
- Connect Network Port B on the first tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the second tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

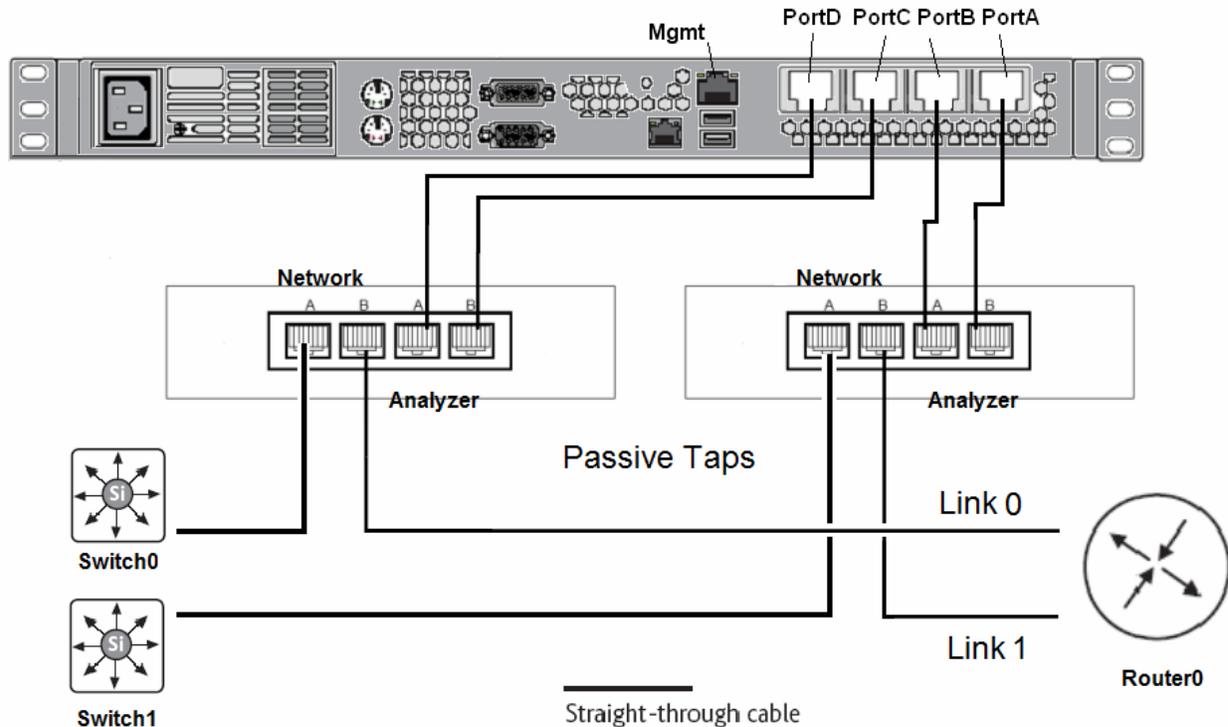
Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

- Step 2** Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.
- Step 3** When you have verified connectivity on the link, connect the Cisco ADE 2120 to the taps.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the first tap to the Cisco ADE 2120 PortD interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the second tap to the Cisco ADE 2120 PortB interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the first tap to the Cisco ADE 2120 PortC interface.
 - Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the second tap to the Cisco ADE 2120 PortA interface.
- Step 4** Connect a power supply to the Cisco ADE 2120 appliance. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LEDs.
- Step 5** Verify that the Cisco ADE 2120 appliance has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.
-

NetOptics Gigabit Taps

The following figure shows an example dual-homed deployment of Cisco ADE 2120 appliances with two NetOptics Gigabit Ethernet TX full duplex taps.

Figure 2-10 Example Dual-Homed Cisco ADE 2120 and NetOptics Gigabit Electrical Tap Deployment



In the dual-homed deployment, two taps are required, one for each of the dual-homed links. Two measurement interfaces of the Cisco ADE 2120 connect to the Analyzer A interface on the two taps the other two measurement interfaces connect to the Analyzer B interface on the two taps. The passive taps each include four shielded UTP connectors. Each tap has two network ports and two analyzer ports. All the tap ports use standard RJ-45 connectors. The table below identifies which cable connections to use.

Table 2-15 Tap Cable Connections

Connection	Cable
Network Port A	Straight-through to Switch
Network Port B	Straight-through to router
Analyzer A	Straight-through to Cisco ADE 2120 PortA
Analyzer B	Straight-through to Cisco ADE 2120 PortB

Installing the NetOptics Gigabit Taps

To install the two NetOptics Gigabit taps in the network segment to be monitored, perform the following steps:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

Step 1 Replace the existing straight CAT5 cables and restore the link by connecting the switches and router through the taps:

- Connect Network Port A on the first tap to the first LAN/Service Provider core switch (switch0 in the preceding figure) using a CAT5 RJ-45 straight-through cable.
- Connect Network Port A on the second tap to the other LAN/Service Provider core switch (switch1 in the preceding figure) using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the first tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.
- Connect Network Port B on the second tap to the WAN edge or Service Provider edge router using a CAT5 RJ-45 straight-through cable.

The link should now be restored. The next task is to verify link connectivity.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

Step 2 Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

Step 3 When you have verified connectivity on the link, connect the Cisco ADE 2120 to the taps.

- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the first tap to the Cisco ADE 2120 PortD interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port A on the second tap to the Cisco ADE 2120 PortB interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the first tap to the Cisco ADE 2120 PortC interface.
- Connect a CAT5 RJ-45 straight-through cable from Analyzer Port B on the second tap to the Cisco ADE 2120 PortA interface.

- Step 4** Connect a power supply to the Cisco ADE 2120 appliance. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LEDs.
- Step 5** Verify that the Cisco ADE 2120 appliance has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.
-

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-16 Management Port Cable Connections

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default.

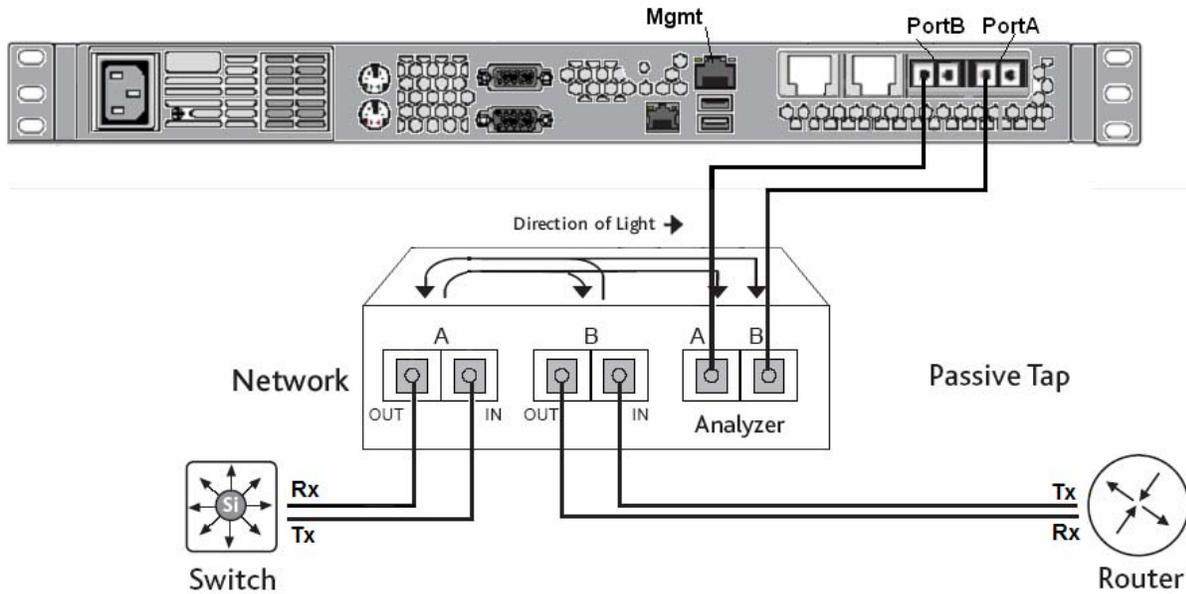
If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end.

There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

Gigabit Multi-Mode Optical (1000 SX) Ethernet - Single-Homed

Figure 2-11 Example Single-Homed Cisco ADE 2120 and Gigabit Optical Tap Deployment



The Cisco ADE 2120 optical card is present for optical installations only. The electrical ports are not enabled for optical installations.

The tap has network ports and analyzer ports. All the tap ports use standard SC fiber cable connectors.

The following table describes which cable connection to use.

Table 2-17 Tap Cable Connections

Connection	Cable Type
From switch to tap	Duplex SC on the tap side Duplex SC or LC on the switch side
From router to tap	Duplex SC on the tap side Duplex SC or LC on the router side
From tap to Cisco ADE 2120	Simplex SC to LC for both Analyzer ports

Installing the Tap

To install the Cisco ADE 2120 with a gigabit optical tap (for example, NetOptics Gigabit Tap Model 96042), perform the following procedure:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

-
- Step 1** Replace the existing single straight CAT5 cable and restore the link by connecting the switch and router through the tap:
- Connect Network Port A to the Enterprise LAN or Service Provider core switch using the appropriate duplex fiber cable as indicated in the above table.
 - Connect Network Port B to the WAN edge/Service Provider edge router using the appropriate duplex fiber cable as indicated in the above table

The link should now be restored. The next task is to verify link connectivity.

- Step 2** Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

- Step 3** When you have verified connectivity on the link, you connect the Cisco ADE 2120 to the tap:
- Connect one SC-LC simplex cable from tap Port A to the Cisco ADE 2120 PortB.
 - Connect one SC-LC simplex cable from tap Port B to the Cisco ADE 2120 PortA.

When you connect the simplex cables to the Cisco ADE 2120 measurement ports, you connect to the Receive (Rx) ports only. The Receive (Rx) ports are on the left of each pair of ports. The Transmit (Tx) ports are ignored.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

- Step 4** Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switch. The unit turns on, illuminating the Power On LED.

- Step 5** Verify that the Cisco ADE 2120 has power by checking that the power LED on the front panel of the Cisco ADE 2120 is illuminated.
-

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-18 Management Port Cable Connections

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default.

If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end.

There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the section at the end of this chapter on verifying the installation.

The following table identifies which cable connections to use.

Table 2-19 Tap Cable Connections

Connection	Cable Type
From switch to tap	Duplex SC on the tap side Duplex SC or LC on the switch side
From router to tap	Duplex SC on the tap side Duplex SC or LC on the router side
From tap to Cisco ADE 2120	Simplex SC to LC for both Analyzer ports

Installing the Taps

To install the optical taps (for example, two NetOptics Gigabit Tap Model 96042) in the network segment to be monitored, you use the following procedure:



Caution Only trained and qualified personnel should be allowed to install or replace this equipment.

Performing this installation will temporarily interrupt the data stream on the network.

- Step 1** Replace the existing cable and restore the link by connecting the switches and router through the tap:
- Connect Network Port A on the first tap to the first Enterprise LAN or Service Provider core switch (switch0 in the preceding figure) using the appropriate duplex fiber cable as indicated in the above table.
 - Connect Network Port A on the second tap to the other Enterprise LAN or Service Provider core switch (switch1 in the preceding figure) using the appropriate duplex fiber cable as indicated in the above table.
 - Connect Network Port B on the first tap to the WAN edge/Service Provider edge router using the appropriate duplex fiber cable as indicated in the above table.
 - Connect Network Port B on the second tap to the WAN edge/Service Provider edge router using the appropriate duplex fiber cable as indicated in the above table.

The link should now be restored. The next task is to verify link connectivity.

- Step 2** Verify network connectivity of the original appliances with the tap powered OFF and then with the tap powered ON.

- Step 3** When you have verified connectivity on the link, you can connect the Cisco ADE 2120 to the tap:
- Connect one SC-LC simplex cable from Analyzer Port A on the first tap to PortD on the Cisco ADE 2120.
 - Connect one SC-LC simplex cable from Analyzer Port B on the first tap to PortC on the Cisco ADE 2120.

- Connect one SC-LC simplex cable from Analyzer Port A on the second tap to PortB on the Cisco ADE 2120.
- Connect one SC-LC simplex cable from Analyzer Port B on the second tap to PortA on the Cisco ADE 2120.

When you connect the simplex cables to the Cisco ADE 2120 measurement ports, you connect to the Receive (Rx) ports only. The Receive (Rx) ports are on the left of each pair of ports. The Transmit (Tx) ports are ignored.



WARNING:

Before connecting a power source, ensure that the voltage supply is within the allowed ranges (100 – 240 VAC). Failure to observe these precautions will result in damage to the unit and may result in injury.

- Step 4** Connect a power supply to the Cisco ADE 2120. Insert the power cord, switch on at the mains, and press the power switches. The units turn on, illuminating the Power On LEDs.
- Step 5** Verify that the Cisco ADE 2120 has power by checking that the power LED (PWR) on the front panel of the Cisco ADE 2120 is illuminated.
-

Cisco ADE 2120 Management Port Configuration

The following table describes the cable connections to use when connecting to the Cisco ADE 2120 management port.

Table 2-20 Management Port Cable Connections

Connection	Cable Type
Cisco ADE 2120 Management Port	Straight-through to switch port

Autonegotiation of speed and duplex settings is often turned on by default, and enabled on all ports and devices. To work properly and reliably, autonegotiation needs to be enabled on both ends of an Ethernet link. It is worth checking that the other end of a link has autonegotiation enabled when plugging in a new device, such as a Cisco ADE 2120, that autonegotiates by default.

If for any reason autonegotiation is disabled on either end of the Ethernet link, then it **MUST** be disabled on the other end too, and both ends should be configured with the same speed and duplex settings. The most common cause of duplex mismatches is enabling autonegotiation at one end of a link but fixing the speed and duplex settings at the other end. There may be specific cases where autonegotiation does not work.

To complete the Cisco ADE 2120 installation process, see the following section on verifying the installation.

Verifying the Installation

To verify that the management interface is connected to the network, you ping the router from the Cisco ADE 2120, using the configured IP address (for example, 192.18.2.254). You press Ctrl+C to terminate the ping:

```
host(config)# ping 192.18.2.254
PING 192.18.2.254 (192.18.2.254) 56(84) bytes of data.
64 bytes from 192.18.2.254: icmp_seq=1 ttl=64 time=0.322 ms
64 bytes from 192.18.2.254: icmp_seq=2 ttl=64 time=0.109 ms
64 bytes from 192.18.2.254: icmp_seq=3 ttl=64 time=0.135 ms
64 bytes from 192.18.2.254: icmp_seq=4 ttl=64 time=0.168 ms
--- 192.18.2.254 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 2997ms
rtt min/avg/max/mdev = 0.109/0.183/0.322/0.083 ms
host(config)#
```

The Cisco ADE 2120 ships with a default measurement configuration. You can use the **status** command to check if you can see traffic on the measurement port(s). The following example shows the result of using the status command after installing the two-port Cisco ADE 2120 model:

```
host(config)# status
Cisco Bandwidth Quality Manager software: Version 4.0 (Wed 08 Aug 2
007)
CorvilMeter software: CDK_3_0_BUILD_44 (conf Aug 3 14:38:29 2007)
Application Recognition Module: ARM v4.1.2 (full)
Logging: <off>
Access control: unrestricted
uptime is 22 hours, 43 minutes, 52 seconds

License system id: 03b1f4e264bea34c1a
License status: valid

cpu #0: "Intel(R) Core(TM)2 CPU          6400 @ 2.13GHz", 2048 KB cache, 26%
cpu #1: "Intel(R) Core(TM)2 CPU          6400 @ 2.13GHz", 2048 KB cache, 43%
5-minute average load (all CPUs): 35%

logical disk #0: total=239347192 KB, used=1387756 KB (1%) "ST3250620NS"
logical disk #1: total=240365224 KB, used=32840 KB (0%) "ST3250620NS"

3 fan component(s), 0 alert(s)
1 power supply component(s), 0 alert(s)
3 temperature sensor component(s), 0 alert(s)
BIOS date: 07/11/06

Xyratex firmware revision: 0xf500330a

Last Backup/Restore operation 'no status available for the last backup/restore o
peration'
Memory: total=2072388 KB, cached=479696 KB, used=615680 KB (30%)
5-minute average usage: 29%

NIC buffer usage: 0%

Interface          Received          Sent
-----
mgmt:
    bytes          124710721          930738275
    packets        1566539            912623
    dropped pkts   0
    frame errors   0
    CRC errors     0
    protocol errors 0

PortA:
```

```
        bytes 108760917
        packets 137361
dropped pkts 0
frame errors 0
        CRC errors 0
protocol errors 0
```

```
PortB:
        bytes 108760917
        packets 137361
dropped pkts 0
frame errors 0
        CRC errors 0
protocol errors 0
```

```
Configuration totals:
        class-maps: 1
        matches: 1
        interfaces: 7
monitor-queuing-maps: 4
monitor-end2end-maps: 5
        peer-interfaces: 2
        policy-maps: 1
        routers: 3
        sites: 2
        configured classes: 1
        active classes: 9
        service policies: 9
```

```
Packets dropped during disk capture: 0
```

```
host (config)#
```

The example above from a two-port Cisco ADE 2120 appliance shows packets measured by the two active interfaces (PortA and PortB) in the interface statistics section near the end of the output. You can also see the configuration totals. The Cisco ADE 2120 ships with a default configuration with pre-configured policy-maps and class-maps. So this test is successful. The Cisco ADE 2120 is set up and measuring traffic based on the default configuration.



3 Appendix: RAID Support Configuration

This appendix describes how to verify and configure the correct BIOS and RAID BIOS settings for RAID support on the Cisco ADE 2120, 2130, and 2140 platforms:

- BIOS Setup for RAID Support on the Cisco ADE 2120
- RAID BIOS Configuration on the Cisco ADE 2130
- RAID BIOS Configuration on the Cisco ADE 2140

BIOS Setup for RAID Support on the Cisco ADE 2120

For BQM software installation to work successfully, the BIOS settings for the correct RAID support must be configured.

You will need the following to configure BIOS settings:

- Monitor and keyboard attached to the Cisco ADE 2120.



Note There are no BIOS settings for RAID support required for the Cisco ADE 1010.

To configure BIOS settings for RAID support on the Cisco ADE 2120, perform the following steps:

-
- Step 1** Press **F2** to enter BIOS setup screen.
- Step 2** Select **Advanced | IDE Controller**, and check that SATA RAID is enabled.
The SATA RAID OPROM setting is displayed.

- Step 3** There are two options in SATA RAID OPROM: **LSI** and **Intel Matrix Storage**. Check that **Intel Matrix Storage** is selected.
- Step 4** Exit BIOS and save changes by pressing **F10**.
- Step 5** Enter BIOS setup screen by pressing **F2** and verify that any changes made have been saved. If you find that the settings are not correctly saved, configure them again and verify the changes.
-

RAID BIOS Configuration on the Cisco ADE 2130

For BQM software installation to work successfully, the RAID BIOS settings for the correct RAID support must be configured.

You will need the following to configure RAID BIOS settings:

- Monitor, keyboard, and optionally a mouse attached to the Cisco ADE 2130.

To configure BIOS settings for RAID support on the Cisco ADE 2130, perform the following steps:

-
- Step 1** Press **<Ctrl+G>** during system boot to enter the RAID BIOS console.
- Step 2** Select **Start** to begin the configuration.
- Step 3** Ensure that there are two virtual drives on the machine and that they are initialized. For the Cisco ADE 2130 each virtual drive should have two disks. If this is the case, the RAID BIOS configuration is correct and you can quit the RAID BIOS console.
- Step 4** If there are not two virtual drives then select **Configuration Wizard**.
- Step 5** Select **New Configuration** and select **Next**.
- Step 6** Select **Custom Configuration** and select **Next**.
- Step 7** At the Disk Group Definition screen, hold down the **<Ctrl>** key, select two physical drives to go into the first logical disk group, select **Accept DG** and select **Next**.
- Step 8** On the VD Definition window, select RAID 0, enable **Disk Cache Policy**, enter the logical drive size (the actual size listed for RAID 0) in the **Select Size** field, and select **Accept**.
- Step 9** Repeat steps 7 and 8 to configure the other two physical drives in a second logical disk group.
- Step 10** The BIOS console displays a preview of the configuration. Select **Accept**.
- Step 11** Select **Next** and then **Accept** to complete the selection.
- Step 12** Confirm any additional prompts, exit the BIOS console and reboot the system.
-

RAID BIOS Configuration on the Cisco ADE 2140

Before you install the BQM software, you must configure RAID BIOS settings for the correct RAID support.

You will need the following to configure RAID BIOS settings:

- Monitor and keyboard attached to the Cisco ADE 2140.

To configure BIOS settings for RAID support on the Cisco ADE 2140, perform the following steps:

-
- Step 1** Press <Ctrl+G> during system boot to enter the RAID BIOS console.
 - Step 2** Select **Start** to begin the configuration.
 - Step 3** Ensure that there are two virtual drives on the machine and that they are initialized. For the Cisco ADE 2140 each virtual drive should have three disks. If this is the case, the RAID BIOS configuration is correct and you can quit the RAID BIOS console.
 - Step 4** If there are not two virtual drives then select **Configuration Wizard**.
 - Step 5** Select **New Configuration** and select **Next**.
 - Step 6** Select **Custom Configuration** and select **Next**.
 - Step 7** At the Disk Group Definition screen, hold down the <Ctrl> key, select three physical drives to go into the first logical disk group, select **Accept DG** and select **Next**.
 - Step 8** On the VD Definition window, select RAID 0, enable **Disk Cache Policy**, enter the logical drive size (the actual size listed for RAID 0) in the **Select Size** field, and select **Accept**.
 - Step 9** Repeat steps 7 and 8 to configure the other three physical drives in a second logical disk group.
 - Step 10** The BIOS console displays a preview of the configuration. Select **Accept**.
 - Step 11** Select **Next** and then **Accept** to complete the selection.
 - Step 12** Confirm any additional prompts, exit the BIOS console and reboot the system.
-



4 Appendix: Cisco Application Deployment Engine Specifications

This appendix provides diagrams and specifications for the range of appliances supported in this release:

- Cisco Application Deployment Engine 1010
- Cisco Application Deployment Engine 2120
- Cisco Application Deployment Engine 2130
- Cisco Application Deployment Engine 2140

The Cisco ADE 1010 supports the following connectivity options:

- single measurement port

The Cisco ADE 2120 supports the following connectivity options:

- single measurement port
- two measurement ports (electrical or optical)
- four measurement ports (electrical or optical)

The Cisco ADE 2130 supports the following connectivity options:

- two measurement ports (electrical or optical)
- four measurement ports (electrical or optical)

The Cisco ADE 2140 supports the following connectivity options:

- two measurement ports (10 Gb optical)

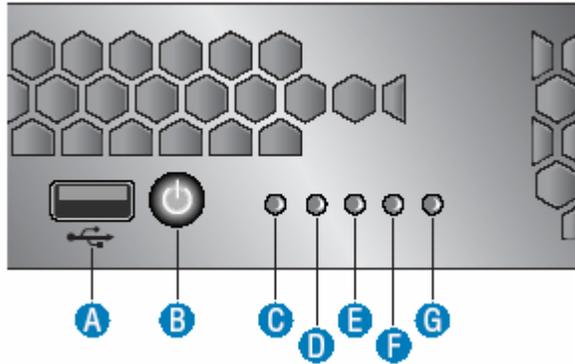


Note For information on the Cisco 1180, see the Cisco BQM 3.1 Installation Guide.

Cisco ADE 1010

The following diagram shows the main features of the Cisco ADE 1010 front panel:

Figure 4-1 Cisco ADE 1010 Front Panel Features



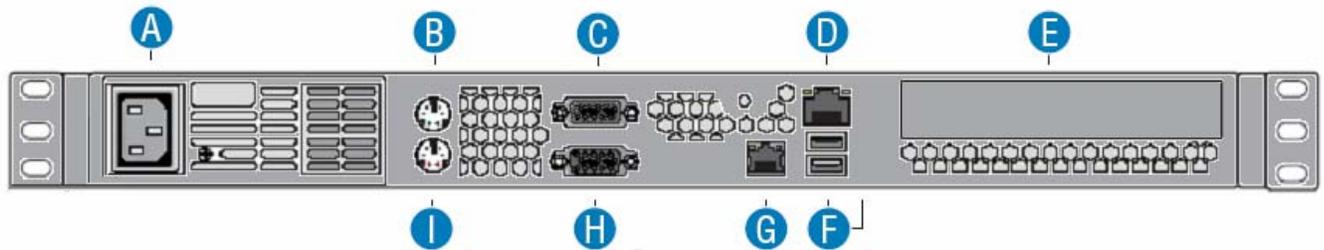
The following table describes the main features of the Cisco ADE 1010 front panel:

Table 4-2 Cisco ADE 1010 Front Panel Features

Item	Description
A	USB Port
B	Power Button
C	Not used.
D	System Power LED Green: Power On Green, blinking: Sleep state Off: Power Off
E	Hard Drive Activity LED Green, blinking: HDD access Off: No hard disk activity
F	Management Port LED Green: NIC Link/no access Green, blinking: LAN access
G	Measurement Port (PortA) LED Green: NIC Link/no access Green, blinking: LAN access

The following diagram shows the main features of the Cisco ADE 1010 back panel:

Figure 4-2 Cisco ADE 1010 Back Panel Features



The following table describes the main features of the Cisco ADE 1010 back panel:

Table 4-3 Cisco ADE 1010 Back Panel Features

Item	Description
A	Power connector
B	PS/2 mouse port
C	The console port (DTE) supports a DB-9 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) when connecting to a laptop serial port to perform initial configuration.
D	Management port (10/100/1000 Mb Ethernet) Use the upper Ethernet connector as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
E	PCI-X add-in card slot. Not used.
F	USB ports
G	Measurement port (PortA): For electrical Ethernet deployments (10/100/1000 Mb Ethernet) connect this port to a SPAN switch port to measure traffic. RJ-45 connector.
H	Video connector
I	PS/2 keyboard port

The following provides hardware specifications for the Cisco ADE 1010 platform.

Microprocessor

Intel Celeron D 352 @ 3.20 GHz, 512KB cache

Memory

Installed: 1 GB
Maximum: 8 GB

Hard Disk Configuration

Single 250GB SATA drive

Drives

DVD/CD-ROM drive

Power Supply

Single non-redundant 350 watt power supply standard The power supply operates within the following voltage ranges and ratings:

Parameter	Minimum	Rated	Maximum	Start up VAC	Power Off VAC
Voltage (110)	90 V _{rms}	100-127 V _{rms}	140 V _{rms}	85Vac +/-4Vac	75Vac +/-5Vac
Voltage (220)	180 V _{rms}	200-240 V _{rms}	264 V _{rms}		
Frequency	47 Hz		63 Hz		

Size

Height: 42.42 mm (1.67 in., 1U)
Depth: 508.00 mm (20 in.)
Width: 430 mm (16.93 in.)
Max. weight: 15 kg (33 lb)

Integrated Functions

Dual-port 10/100/1000 Ethernet controller
Two Universal Serial Bus (USB) 2.0 ports
One DB9 serial console port
Keyboard port
Mouse port
Video port

Acoustical Noise Emissions

Sound Power: 7.0 BA in an idle state at typical office ambient temperature. (23 +/- 2 degrees C)

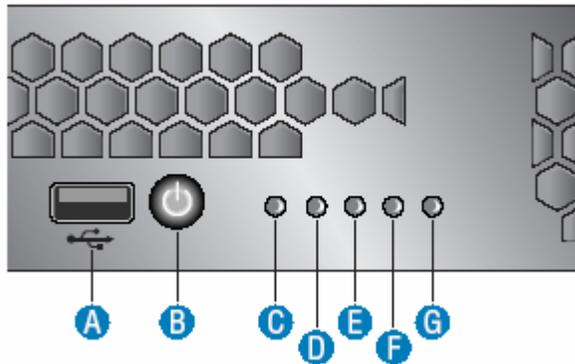
Environment

Air temperature: – Server on, normal mode: 0° to 45°C max at 5000 feet above sea level (At full load, with a maximum rate of change of 5°C/10 minutes, but no more than 10°C/hour) Server on, standby mode: 0° to 45°C max at 5000 feet above sea level Server off: -40° to 70°C (Maximum rate of change of 20°C/hour. Maximum operating altitude: 1500 meters. Humidity: – Non-operating: 90% relative humidity (non-condensing) at 30°C.

Cisco ADE 2120

The following diagram shows the main features of the Cisco ADE 2120 front panel:

Figure 4-3 Cisco ADE 2120 Front Panel Features



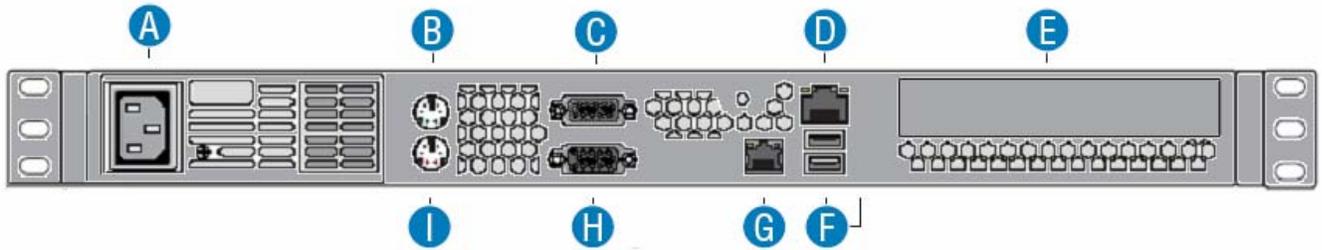
The following table describes the main features of the Cisco ADE 2120 front panel:

Table 4-4 Cisco ADE 2120 Front Panel Features

Item	Description
A	USB Port
B	Power Button
C	Not used.
D	System Power LED Green: Power On Green, blinking: Sleep state Off: Power Off
E	Hard Drive Activity LED Green, blinking: HDD access Off: No hard disk activity
F	Management Port LED Green: NIC Link/no access Green, blinking: LAN access
G	One-port model: Measurement Port (PortA) LED Green: NIC Link/no access Green, blinking: LAN access Two-port model: not used Four-port model: not used

The following diagram shows the main features of the single-port Cisco ADE 2120 back panel:

Figure 4-4 Cisco ADE 2120 Single-Port Back Panel Features



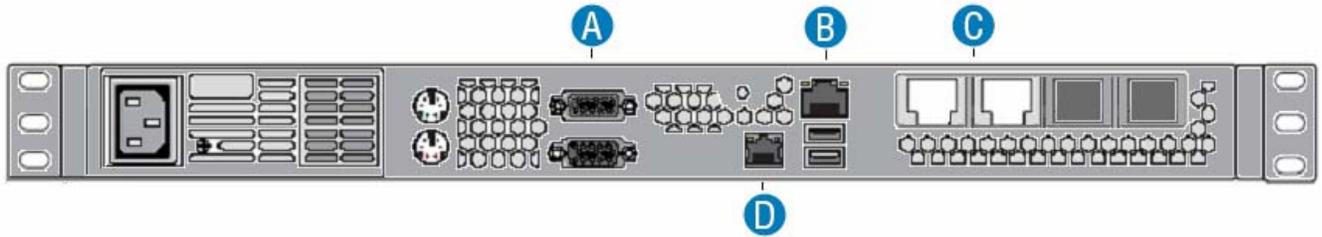
The following table describes the main features of the single-port Cisco ADE 2120 back panel:

Table 4-5 Cisco ADE 2120 Single-Port Back Panel Features

Item	Description
A	Power connector
B	PS/2 mouse port
C	The console port (DTE) supports a DB-9 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) when connecting to a laptop serial port to perform initial configuration.
D	Management port (10/100/1000 Mb Ethernet) Use the upper Ethernet connector as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
E	PCI-X add-in card slot. Not used.
F	USB ports
G	Measurement port (PortA): For electrical Ethernet deployments (10/100/1000 Mb Ethernet) connect this port to a SPAN switch port to measure traffic. RJ-45 connector.
H	Video connector
I	PS/2 keyboard port

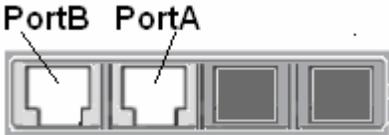
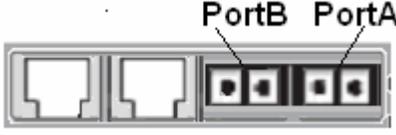
The following diagram shows the main features of the two-port Cisco ADE 2120 back panel:

Figure 4-5 Cisco ADE 2120 Two-Port Back Panel Features



The following table describes the main features of the two-port Cisco ADE 2120 back panel:

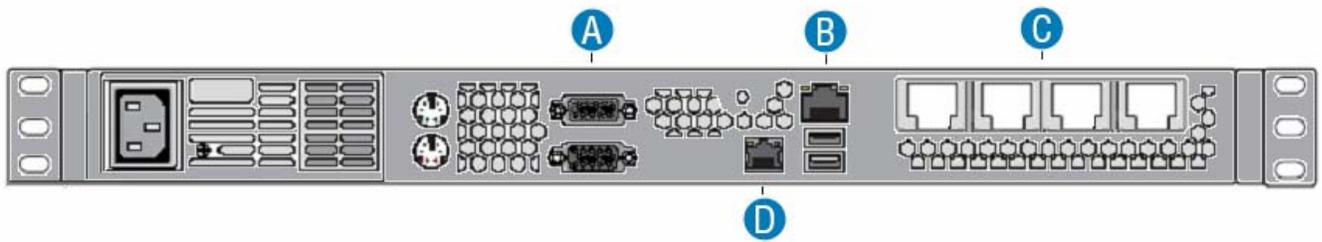
Table 4-6 Cisco ADE 2120 Two-Port Back Panel Features

Item	Description
A	The console port (DTE) supports a DB-9 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) when connecting to a laptop serial port to perform initial configuration.
B	Management port (10/100/1000 Mb Ethernet) Use the upper Ethernet connector as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
C	Measurement ports (PortA, PortB): For electrical Ethernet deployments (10/100/1000 Mb Ethernet): RJ-45 connector.  <p>PortB PortA</p> For optical deployments: LC connector and SX or LX/LH transceivers. SX and LX supported via different Small Form-factor Pluggable (SFP) modules. (Supports 1000 Mb rates only, no autonegotiation).  <p>PortB PortA</p> By default the system is configured to use the electrical

	<p>ports. To set the system to use the optical ports, you use the media command from the CLI.</p> <p>The firmware revision number for the four-port network card is 0xf500330a. A lower hexadecimal number here indicates an earlier and invalid firmware version.</p>
D	Not used.

The following diagram shows the main features of the four-port Cisco ADE 2120 back panel:

Figure 4-6 Cisco ADE 2120 Four-Port Back Panel Features



The following table describes the main features of the four-port Cisco ADE 2120 back panel:

Table 4-7 Cisco ADE 2120 Four-Port Back Panel Features

Item	Description
A	The console port (DTE) supports a DB-9 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) when connecting to a laptop serial port to perform initial configuration.
B	Management port (10/100/1000 Mb Ethernet) Use the upper Ethernet connector as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
C	Measurement ports (PortA, PortB, PortC, PortD): For electrical Ethernet deployments (10/100/1000 Mb Ethernet): RJ-45 connector.

	<p>For optical deployments: LC connector and SX or LX/LH transceivers. SX and LX supported via different Small Form-factor Pluggable (SFP) modules. (Supports 1000 Mb rates only, no autonegotiation).</p> <p>PortD PortC PortB PortA</p>  <p>The firmware revision number for the four-port network card is 0xf500329a. A lower hexadecimal number here indicates an earlier and invalid firmware version.</p>
D	Not used.

The following provides hardware specification for the Cisco ADE 2120 platform:

Microprocessor

Intel Core 2 Duo 6400 @ 2.13 GHz, 2048 KB cache

Memory

Installed: 4 GB
Maximum: 8 GB

Hard Disk Configuration

Two 250GB SATA drives

Drives

DVD/CD-ROM drive

Power Supply

Single non-redundant 350 watt power supply standard. The power supply operates within the following voltage ranges and ratings:

Parameter	Minimum	Rated	Maximum	Start up VAC	Power Off VAC
Voltage (110)	90 V _{rms}	100-127 V _{rms}	140 V _{rms}	85Vac +/-4Vac	75Vac +/-5Vac
Voltage (220)	180 V _{rms}	200-240 V _{rms}	264 V _{rms}		
Frequency	47 Hz		63 Hz		

Size

Height: 42.42 mm (1.67 in., 1U)
Depth: 508.00 mm (20 in.)

Width: 430 mm (16.93 in.)
Max. weight: 15 kg (33 lb)

Integrated Functions

Dual-port 10/100/1000 Ethernet controller
Two Universal Serial Bus (USB) 2.0 ports
One DB9 serial console port
Keyboard port
Mouse port
Video port

Acoustical Noise Emissions

Sound Power: 7.0 BA in an idle state at typical office ambient temperature. (23
+/- 2 degrees C)

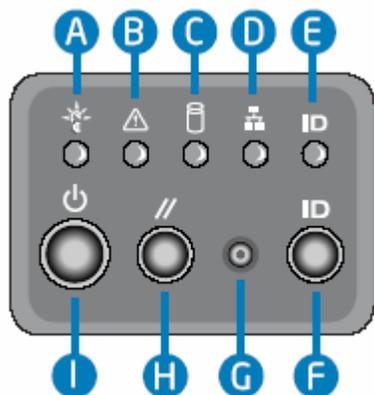
Environment

Air temperature: – Server on, normal mode: 0° to 45°C max at 5000 feet above sea level (At full load, with a maximum rate of change of 5°C/10 minutes, but no more than 10°C/hour)
Server on, standby mode: 0° to 45°C max at 5000 feet above sea level
Server off: -40° to 70°C (Maximum rate of change of 20°C/hour)
Maximum operating altitude: 1500 meters
Humidity: – Non-operating: 90% relative humidity (non-condensing) at 30°C.

Cisco ADE 2130

The following diagram shows the main features of the Cisco ADE 2130 front panel:

Figure 4-7 Cisco ADE 2130 Front Panel Features



The following table describes the main features of the Cisco ADE 2130 front panel:

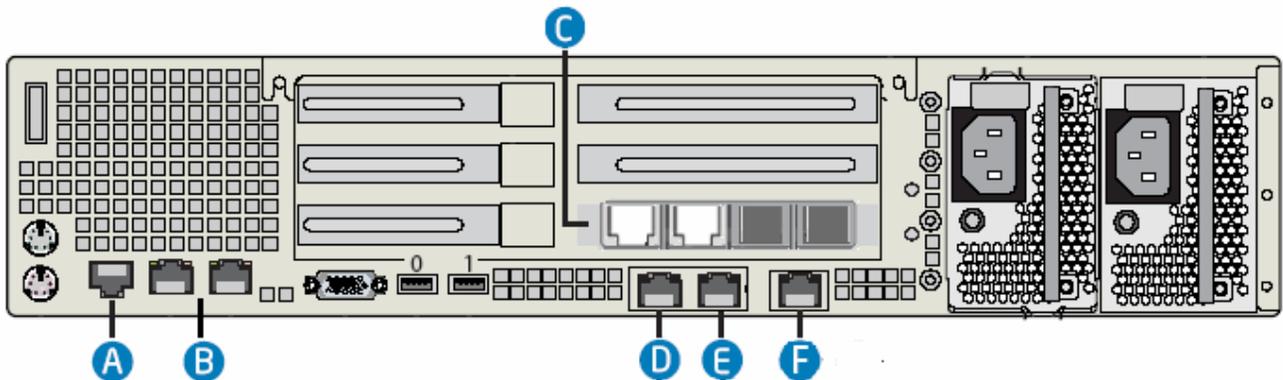
Table 4-9 Cisco ADE 2130 Front Panel Features

Item	Description
A	Main power LED (green) When continuously lit, indicates the presence of power supply DC output power in the server. The LED turns off when the main output power from the power supply is turned off or the power source is disrupted.
B	System Status (green/amber) Indicates system status as follows: <ul style="list-style-type: none"> • Steady green indicates system in standby or ready for operation. • Blinking green indicates degraded operation (for example, power supply non-redundancy part of system memory mapped out by BIOS). • Blinking amber indicates one or more non-critical fault conditions. • Steady amber indicates one or more critical fault conditions.
C	HDD Activity/Fault LED (green/amber) Indicates HDD activity when green, or an HDD fault when amber. This is an aggregated indication for all hard disk drives (up to six) in the system. Each hard disk contains its own activity and fault indicators.
D	NIC activity LED (green) Indicates NIC activity when lit.

E	System ID LED (blue) Indicates system identity. LED can be toggled remotely or by front-panel ID switch for identification purposes.
F	ID switch Toggles system ID LED.
G	Not used.
H	Reset switch Resets the system
I	Power switch Toggles the system power. The power switch does not turn off AC power. To remove AC power from the device, you must unplug the AC power cord from either the power supply or wall outlet.

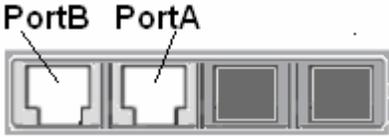
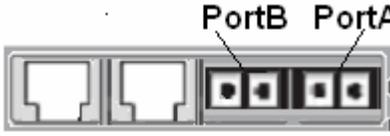
The following diagram shows the main features of the two-port Cisco ADE 2130 back panel:

Figure 4-8 Cisco ADE 2130 Two-Port Back Panel Features



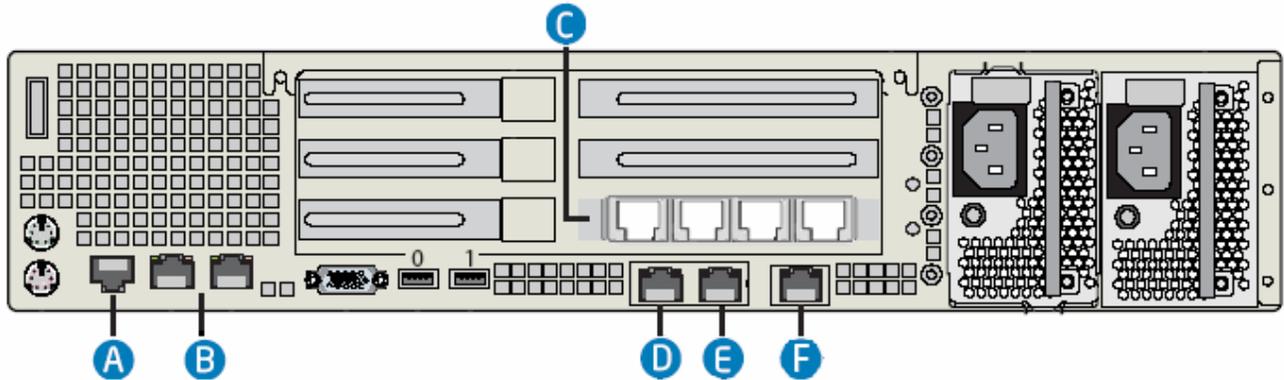
The following table describes the main features of the two-port Cisco ADE 2130 back panel:

Table 4-11 Cisco ADE 2130 Two-Port Back Panel Features

Item	Description
A	The console port (DTE) supports an RJ-45 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) with a DB-9 to RJ-45 adapter when connecting to a laptop serial port to perform initial configuration.
B	Dual-port Ethernet controller. Not used.
C	<p>Measurement ports (PortA, PortB): For electrical Ethernet deployments (10/100/1000 Mb Ethernet): RJ-45 connector.</p>  <p>For optical deployments: LC connector and SX or LX/LH transceivers. SX and LX supported via different Small Form-factor Pluggable (SFP) modules. (Supports 1000 Mb rates only, no autonegotiation).</p>  <p>By default the system is configured to use the electrical ports. To set the system to use the optical ports, you use the media command from the CLI.</p> <p>The firmware revision number for the two-port network card is 0xf500330a. A lower hexadecimal number here indicates an earlier and invalid firmware version.</p>
D	Not used.
E	Management port (10/100/1000 Mb Ethernet) Use the right-hand Ethernet connector from the pair below the measurement ports as a management port to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
F	Not used.

The following diagram shows the main features of the four-port Cisco ADE 2130 back panel:

Figure 4-9 Cisco ADE 2130 Four-Port Back Panel Features



The following table describes the main features of the four-port Cisco ADE 2130 back panel:

Table 4-13 Cisco ADE 2130 Four-Port Back Panel Features

Item	Description
A	The console port (DTE) supports an RJ-45 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) with a DB-9 to RJ-45 adapter when connecting to a laptop serial port to perform initial configuration.
B	Dual-port Ethernet controller. Not used.
C	Measurement ports (PortA, PortB, PortC, PortD): For electrical Ethernet deployments (10/100/1000 Mb Ethernet): RJ-45 connector. <div style="text-align: center;"> <p>PortD PortC PortB PortA</p> </div> For optical deployments: LC connector and SX or LX/LH transceivers. SX and LX supported via different Small Form-factor Pluggable (SFP) modules. (Supports 1000 Mb rates only, no autonegotiation). <div style="text-align: center;"> <p>PortD PortC PortB PortA</p> </div>

	The firmware revision number for the four-port network card is 0xf500329a. A lower hexadecimal number here indicates an earlier and invalid firmware version.
D	Not used.
E	Management port (10/100/1000 Mb Ethernet) Use the right-hand Ethernet connector from the pair below the measurement ports to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.
F	Not used.

Microprocessor

Xeon 5320 (Quad) CPU @ 1.86Ghz, 8 MB cache

Memory

Installed: 8 GB

Maximum: 32 GB

Hard Disk Configuration

Four 147GB SAS drives configured in two RAID-0 volumes

Drives

DVD/CD-ROM drive

Power Supply

Dual redundant 600 watt power supply standard.

Size

Height: 87.6 mm (3.45 in., 2U)

Depth: 508 mm (20 in.)

Width: 435.6 mm (17.14 in.)

Max. weight: 15.8 kg (35 lb)

Integrated Functions

One 10/100/1000 Ethernet controller

Four Universal Serial Bus (USB) 2.0 ports

One RJ-45 serial (COM2) console port

Keyboard port

Mouse port

Video port

Acoustical Noise Emissions

Sound Power: < 7.0 BA in an idle state at typical office ambient temperature. (23+/- 2 degrees C)

Environment

Air temperature: – Operating: 10° to 35°C

Non-operating: -40° to 70°C (Maximum rate of change of 20°C/hour

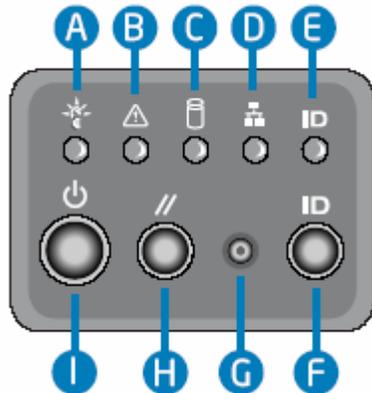
Altitude: 0 to 1800 meters (0 to 5900 feet) @ 40°C, temperature derated by 1°C for each additional 300m (985 feet). Humidity: – Operating: 5% to 85% – Non-operating: 50% - 90% non-condensing with a maximum wet bulb of 28°C (at temperatures from 25°C to 35°C).

Cisco ADE 2140

The Cisco ADE 2140 supports 10 Gigabit per second Ethernet connectivity.

The following diagram shows the main features of the Cisco ADE 2140 front panel:

Figure 4-14 Cisco ADE 2140 Front Panel Features



The following table describes the main features of the Cisco ADE 2140 front panel:

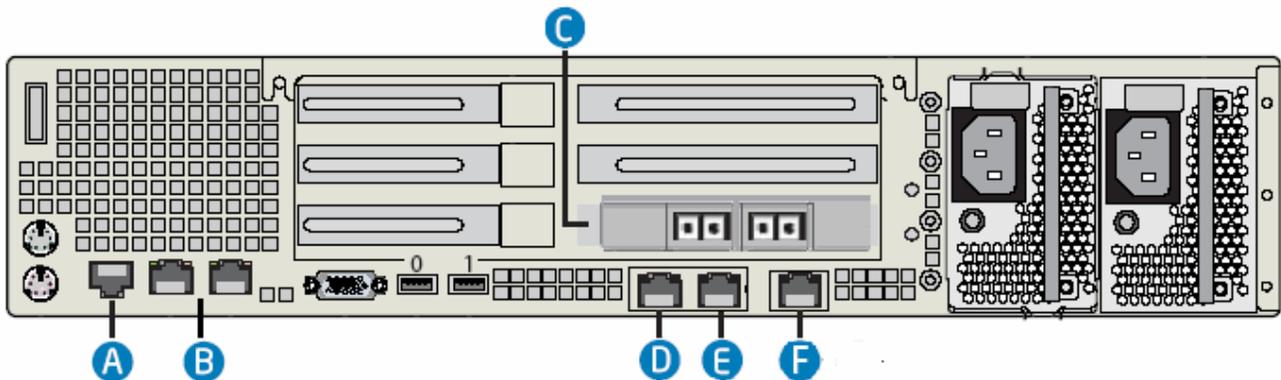
Table 4-4 Cisco ADE 2140 Front Panel Features

Item	Description
A	Main power LED (green) When continuously lit, indicates the presence of power supply DC output power in the server. The LED turns off when the main output power from the power supply is turned off or the power source is disrupted.
B	System Status (green/amber) Indicates system status as follows: <ul style="list-style-type: none"> • Steady green indicates system in standby or ready for operation. • Blinking green indicates degraded operation (for example, power supply non-redundancy part of system memory mapped out by BIOS). • Blinking amber indicates one or more non-critical fault conditions. • Steady amber indicates one or more critical fault conditions.
C	HDD Activity/Fault LED (green/amber) Indicates HDD activity when green, or an HDD fault when amber. This is an aggregated indication for all hard disk drives (up to six) in the system. Each hard disk contains its own activity and fault indicators.
D	NIC activity LED (green) Indicates NIC activity when lit.

E	System ID LED (blue) Indicates system identity. LED can be toggled remotely or by front-panel ID switch for identification purposes.
F	ID switch Toggles system ID LED.
G	Not used.
H	Reset switch Resets the system
I	Power switch Toggles the system power. The power switch does not turn off AC power. To remove AC power from the device, you must unplug the AC power cord from either the power supply or wall outlet.

The following diagram shows the main features of the Cisco ADE 2140 back panel:

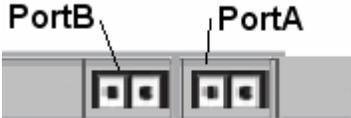
Figure 4-5 Cisco ADE 2140 Back Panel Features



The following table describes the main features of the Cisco ADE 2140 back panel:

Table 4-6 Cisco ADE 2140 Back Panel Features

Item	Description
A	The console port (DTE) supports an RJ-45 connector with the following settings: 8 data bits, no parity, 1 stop bit, and the speed is 9600 bps. Use a null-modem cable (standard DB-9 PC serial connection with normal pin-out) with a DB-9 to RJ-45 adapter when connecting to a laptop serial port to perform initial configuration.
B	Dual-port Ethernet controller. Not used.

C	<p>Measurement ports (PortA, PortB):</p> <p>For optical deployments: LC connector. Requires OM2 or OM3 grade 50/125 fiber cable.</p>  <p>The firmware revision number for the two-port 10 Gb network card is 0x23301e02. A lower hexadecimal number here indicates an earlier and invalid firmware version.</p>
D	Not used.
E	<p>Management port (10/100/1000 Mb Ethernet)</p> <p>Use the right-hand Ethernet connector from the pair below the measurement ports to connect the device to an Ethernet network. You can also use a CAT5 cable to connect a laptop to the management port to perform initial configuration.</p>
F	Not used.

The following provides hardware specification for the Cisco ADE 2140 platform:

Microprocessor

2x Xeon 5320 (Quad) CPU @ 1.86Ghz, 8 MB cache

Memory

Installed: 16 GB
Maximum: 32 GB

Hard Disk Configuration

Six 147GB SAS drives configured in two RAID-0 volumes

Drives

DVD/CD-ROM drive

Power Supply

Dual redundant 600 watt power supply standard.

Size

Height: 87.6 mm (3.45 in., 2U)
Depth: 508 mm (20 in.)
Width: 435.6 mm (17.14 in.)
Max. weight: 15.8 kg (35 lb)

Integrated Functions

- One 10/100/1000 Ethernet controller
- Four Universal Serial Bus (USB) 2.0 ports
- One RJ-45 serial (COM2) console port
- Keyboard port
- Mouse port
- Video port

Acoustical Noise Emissions

Sound Power: < 7.0 BA in an idle state at typical office ambient temperature. (23 +/- 2 degrees C)

Environment

Air temperature: – Operating: 10° to 35°C
Non-operating: -40° to 70°C (Maximum rate of change of 20°C/hour
Altitude: 0 to 1800 meters (0 to 5900 feet) @ 40°C, temperature derated by 1°C for each additional 300m (985 feet). Humidity: – Operating: 5% to 85% – Non-operating: 50% - 90% non-condensing with a maximum wet bulb of 28°C (at temperatures from 25°C to 35°C).



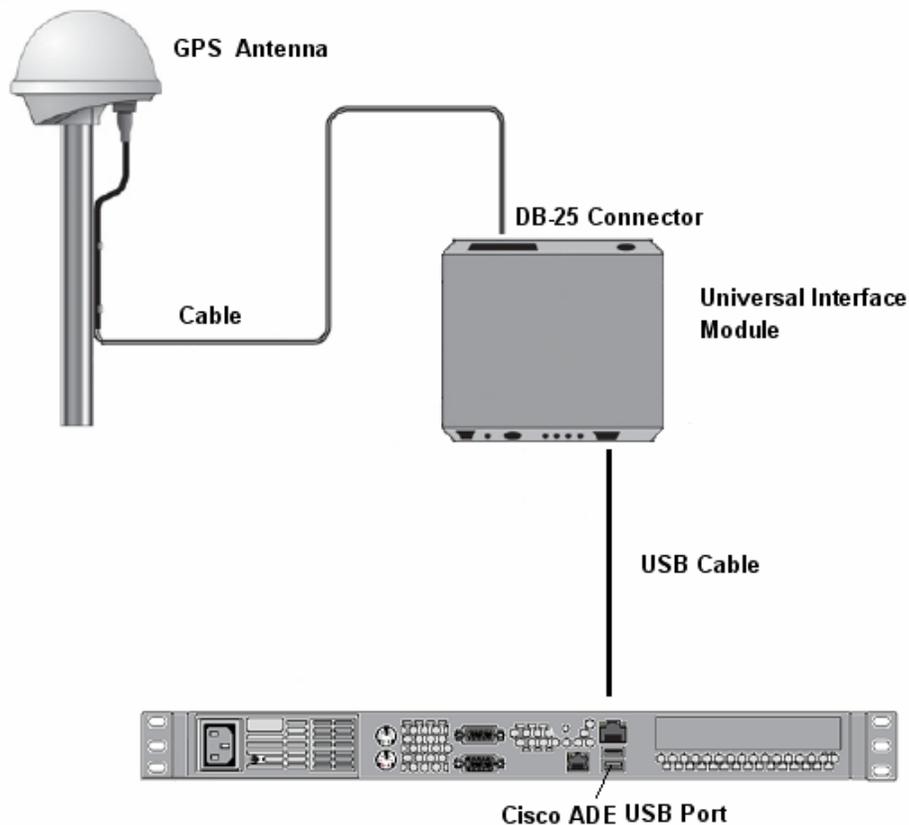
5 Appendix: GPS Installation

This appendix describes how to set up the Cisco ADE to work with a GPS system.

Installing a GPS System

To improve the accuracy of end-to-end PNQM latency measurements, you can optionally set up the Cisco ADE to work with a GPS system.

Figure 5-1 *GPS Hardware Installation*



To install the GPS antenna, connect it to the Cisco ADE, and set up the Cisco ADE to use the GPS system, you do the following:

-
- Step 1** Mount the GPS antenna on a 1" OD marine pipe or 3/4" ID pipe, with 14 threads per inch.
 - Step 2** Connect the antenna cable to the GPS antenna. Allow for the cable to maintain a "drip-loop" to prevent water intrusion and to allow for flex on the antenna to cable connector.
 - Step 3** Place the antenna so that it has the fullest possible view of the sky to ensure that the maximum number of satellites are available.
 - Step 4** Use the DB-25 connector to connect the antenna cable to the rear of the Universal Interface Module (UIM).



Caution Be careful not to damage the cable. Take care to avoid sharp bends or kinks in the cable, hot surfaces (for example, exhaust manifolds or stacks), rotating or reciprocating equipment, sharp or abrasive surfaces, door and window jambs, routing near high EMI / EMF (Electro-Magnetic Induction / Field) transformers or equipment, and corrosive fluids or gases.

- Step 5** Connect one end of the USB interface cable to the USB port of the interface unit. Connect the other end of the cable to one of the USB ports on the Cisco ADE.
 - Step 6** To connect the power connector to the UIM, do one of the following:
 - Use the DC power cable. Connect the terminated end of the power cable to the power connector on the UIM. Connect the red lead to DC positive voltage (+12 to +24 VDC) and the black power lead to DC ground. The yellow wire is not used.
 - Use the AC/DC power converter. Connect the output cable of the converter to the power connector on the UIM. Use the appropriate 3-pin power adapters to connect the converter to mains power (110 or 220 VAC)7. Switch on the DC power source or turn on the mains power.
 - Step 7** Switch on the DC power source or turn on the mains power.
 - Step 8** Log in to the Cisco ADE as an admin user and enable the system using the **gps** command:

```
host(config)$ gps enable
```
 - Step 9** Verify the operation of the GPS system using the **show gps** command:

```
host(config)$ show gps
```
-