



Cisco Catalyst 9800-40 Wireless Controller Hardware Installation Guide

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CONTENTS

PREFACE

Preface	vii
Document Revision History	vii
Document Objectives	vii
Audience	vii
Conventions	viii
Related Documentation	ix
Obtaining Documentation and Submitting a Service Request	ix

CHAPTER 1

Overview	1
Summary of Cisco Catalyst 9800-40 Wireless Controller	1
Front View	2
Built-In SFP and SFP+ Ports	3
Management and Storage Connections	4
LEDs	4
Rear View	6
Cisco Product Identification Standard	7
Unique Device Identifier	7
Serial Number and PID/VID Label Location	9

CHAPTER 2

Supported Hardware Components	11
Supported EPA	11
Supported Transceivers	11
Supported Crypto Module	12
Power Supplies	12
Power Supply LEDs	12
Power Supply Fans	13

CHAPTER 3	Preparing Your Site for Installation	15
	Prerequisites and Preparation	15
	Site Planning Checklist	16
	Safety Guidelines	16
	Safety Warnings	16
	Safety Recommendations	17
	Cautions and Regulatory Compliance Statements for NEBS	17
	Standard Warning Statements	18
	General Safety Warnings	19
	Site Planning	22
	General Precautions	22
	Site Selection Guidelines	22
	Site Environmental Requirements	23
	Physical Characteristics	23
	Site Power Guidelines	24
	Electrical Circuit Requirements	25
	Site Cabling Guidelines	25
	Console Port Connections	26
	Interference Considerations	26
	Rack-Mounting Guidelines	28
	Precautions for Rack-Mounting	28
	General Rack-Selection Guidelines	28
	Guidelines for 23-in. (Telco) Racks	29
	Equipment Rack Guidelines	29
	Preventing Electrostatic Discharge Damage	30
	Electrical Safety	31
	Chassis-Lifting Guidelines	32
	Tools and Equipment	32
	Unpacking and Verifying Shipping Contents	32
	Checking the Shipping Container Contents	33
	Installation Checklist	33

CHAPTER 4	Installing the Controller	37
------------------	----------------------------------	-----------

Installation Methods	37
Guidelines for a Standalone Equipment Shelf or Tabletop Installation	38
Installing the Controller on a Standalone Equipment Shelf or Tabletop	38
Guidelines for Rack Installation	39
Verifying Rack Dimensions	40
Attaching Front Rack-Mount Brackets	41
Attaching Rear Rack-Mount Brackets	42
Mounting the Controller in the Rack	43
Two-Post Rack Installation	43
Four-Post Rack Installation	45
Attaching the Cable Management Bracket	46
Chassis Ground Connection	48
Recommended Tools and Supplies	49
Attaching a Chassis Ground Connection	49
Connecting Cables	50
Connecting the Console Port Cable	50
Procedure for Connecting the Console Port Cable	51
Connecting to the Mini USB Console Port	51
Management Ethernet Port Cable Connection	52

CHAPTER 5

Power Up and Initial Configuration	53
Checking Conditions Prior to System Startup	53
Powering Up the Controller	54
Performing the Initial Configuration on the Controller	57
Using the Cisco Setup Command Facility	57
Completing the Configuration	59
Using the Cisco IOS-XE CLI—Manual Configuration	60
Configuring the Controller Hostname	61
Configuring the Enable and Enable Secret Passwords	61
Configuring the Console Idle Privileged EXEC Timeout	62
Gigabit Ethernet Management Interface Overview	63
Default Gigabit Ethernet Configuration	64
Configuring Gigabit Ethernet Interfaces	64
Saving Your Controller Configuration	65

- Verifying the Initial Configuration 66
- Powering Off the Controller Safely 66
- Environmental Monitoring and Reporting Functions 67
 - Alarm Monitoring 67
 - Environmental Monitoring 68
 - Fan Failures 69
 - Reporting Functions 69

CHAPTER 6

License Verification 75

- Viewing the Cisco IOS License Level 75
- Viewing License Information 76
- Evaluation License Features 76

CHAPTER 7

Removing and Replacing FRUs 77

- Removing AC Power Supplies 77
- Installing AC Power Supplies 77
- Removing and Replacing USB Flash Memory Stick 78
- Repacking the Controller 78

CHAPTER 8

Instructions for Addressing the Cisco Secure Boot Hardware Tampering Vulnerability on Cisco Catalyst 9800-40 Wireless Controller 79

- Prerequisites for Upgrading FPGA 79
- Upgrading FPGA 79
- Verifying FPGA Upgrade 83

APPENDIX A

Technical Specifications 85

- Cisco Catalyst 9800-40 Wireless Controller Specifications 85

APPENDIX B

Port Signals and Pinouts 87

- Management Ethernet Port Signals and Pinouts 87
- Console Port Signals and Pinouts 87



Preface

This preface describes this guide and provides information about the conventions used in this guide, along with details about related documentation. It includes the following sections:

- [Document Revision History, on page vii](#)
- [Document Objectives, on page vii](#)
- [Audience, on page vii](#)
- [Conventions, on page viii](#)
- [Related Documentation, on page ix](#)
- [Obtaining Documentation and Submitting a Service Request, on page ix](#)

Document Revision History

The following table shows the changes made to this document:

Date	Change Summary
November 2018	First version of the document.

Document Objectives

This publication describes the installation of the Cisco Catalyst 9800-40 Wireless Controller.

Audience

This publication is primarily designed for persons responsible for installing, maintaining, and troubleshooting the Cisco Catalyst 9800-40 Wireless Controller. The users of this guide should:

- Be familiar with electronic circuitry and wiring practices.
- Have experience working as electronic or electromechanical technicians.
- Have experience in installing high-end networking equipment.



Note Some procedures described in this guide require a certified electrician.

Conventions

Text Type	Indication
User input	Text the user should enter exactly as shown or keys a user should press appear in this font.
Document titles	Document titles appear in <i>this font</i> .
System output	Terminal sessions and information that the system displays appear in this font .
CLI commands	CLI command keywords appear in this font . Variables in a CLI command appear in <i>this font</i> .
[]	Elements in square brackets are optional.
{x y z}	Required alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
String	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.
< >	Nonprinting characters such as passwords are in angle brackets.
[]	Default responses to system prompts are in square brackets.
! #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.



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



Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.



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

Timesaver: Means *the described action saves time*. You can save time by performing the action described in the paragraph.



Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

Related Documentation

See the following documentation for more information about the Cisco Catalyst 9800 Wireless ControllerCisco Catalyst 9800-40 Wireless Controller:

- *Release Notes for Cisco Catalyst 9800 Wireless Controller Cisco Catalyst 9800-40 Wireless Controller*
- *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide*
- *Cisco Catalyst 9800 Series Wireless Controller Command Reference*
- *Cisco Wireless Solutions Software Compatibility Matrix*

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see [What's New in Cisco Product Documentation](#).

To receive new and revised Cisco technical content directly to your desktop, you can subscribe to the [What's New in Cisco Product Documentation RSS feed](#). RSS feeds are a free service.



CHAPTER 1

Overview

The Cisco Catalyst 9800-40 Wireless Controller is a 40-G wireless controller that occupies one rack unit space and populates four ports. The Cisco Catalyst 9800-40 Wireless Controller portfolio comes with a modular Crypto Coprocessor that aggregates services at scale.

The Cisco Catalyst 9800-40 Wireless Controller offers a compact form factor that consumes less rack space and power while offering 40 Gbps forwarding throughput.

- [Summary of Cisco Catalyst 9800-40 Wireless Controller, on page 1](#)
- [Cisco Product Identification Standard, on page 7](#)
- [Serial Number and PID/VID Label Location, on page 9](#)

Summary of Cisco Catalyst 9800-40 Wireless Controller

The Cisco Catalyst 9800-40 Wireless Controller supports:

- Up to 16 GB (8 GB in the base configuration) of DDR3 error-correcting code-protected field-replaceable memory, with single-bit error correction and multi-bit error detection.
- A fixed forwarding processor with up to 60 Gbps sustained forwarding data traffic through the chassis.
- Up to 20 Gbps security and crypto processing through a dedicated security processor.
- RJ-45 console ports and a mini USB console port.
- 32 GB internal bootflash storage.
- One copper Ethernet 10/100/1000 Mbps network management port.
- An embedded USB (eUSB) flash module that supports 32 GB of nonvolatile Flash storage.
- Two USB 3.0 ports that are backward compatible with USB 2.0.
- SATA hard disk.
- Four built-in 10 GE SFP+ ports (capable of SyncE and MACsec).
- Stratum 3E network clocking per GR-1244-CORE, using 10 GE, or 1 GE interfaces as timing sources
- LED indicators for Ethernet and console status, as well as visual system state indications.
- Command-line interface (CLI), alarm, network management, logging, statistics aggregation, and on-board failure logging (OBFL).

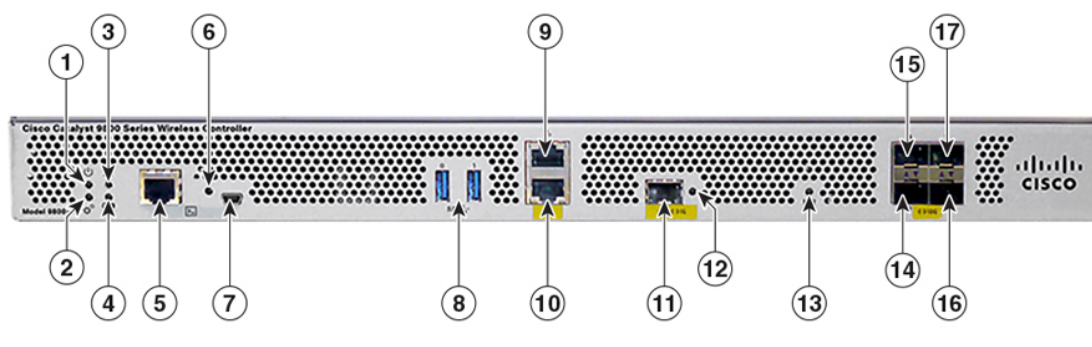
- Environmental chassis management.
- 80 Mb ternary content-addressable memory (TCAM).
- Field-replaceable units (FRU).

See Chapter 2, **Supported Hardware Components** for information on supported FRUs.

Front View

The following figure shows the front of the Cisco Catalyst 9800-40 Wireless Controller.

Figure 1: Cisco Catalyst 9800-40 Wireless Controller Front View



1	PWR—Power LED	11	RP—1-GE SFP port
2	SYS—System LED	12	LINK—RJ-45 connector LED
3	ALM—Alarm LED	13	SSD—SSD activity LED
4	HA—High-Availability LED	14	TE0—1-GE SFP/ 10-GE SFP+ Port 0
5	RJ-45 compatible console port	15	TE1—1-GE SFP/ 10-GE SFP+ Port 1
6	EN—USB console-enabled LED	16	TE2—1-GE SFP/ 10-GE SFP+ Port 2
7	Mini USB console port	17	TE3—1-GE SFP/ 10-GE SFP+ Port 3
8	USB ports 0 and 1		
9	SP—RJ-45 10/100/1000 management Ethernet port		
10	RP—RJ-45 10/100/1000 redundancy Ethernet port		

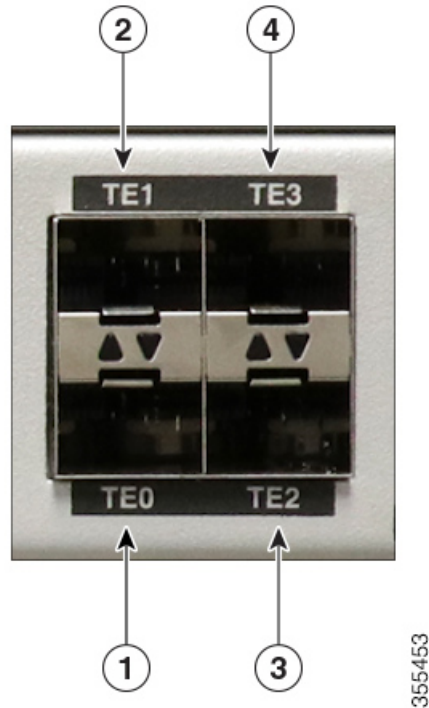


Note For the Cisco Catalyst 9800-40 Wireless Controller, the power supplies (PEM 0 and PEM1), are located in the rear of the chassis. See the **Rear View** section.

Built-In SFP and SFP+ Ports

The following figure shows the port numbering for the built-in ports.

Figure 2: Cisco Catalyst 9800-40 Wireless Controller Port Numbering



1	TE0—10GE SFP+ transceiver
2	TE1—10GE SFP+ transceiver
3	TE2—10GE SFP+ transceiver
4	TE3—10GE SFP+ transceiver



Note By default, the interfaces from 0 - 3 in the Cisco Catalyst 9800-40 Wireless Controller are enabled.

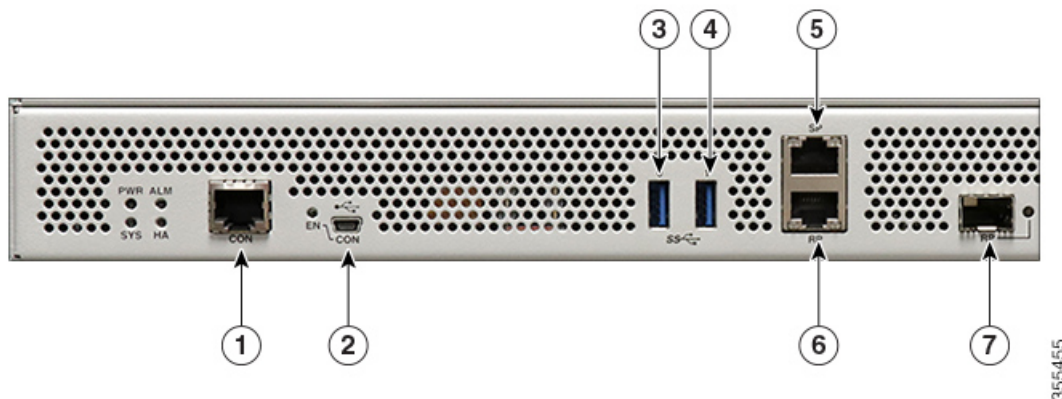
The port LEDs behave as follows:

- Off—Indicates the port is not enabled by software.
- Amber—Indicates the port is enabled by software but there is a problem with the link.
- Green—Indicates the port is enabled by software and there is valid link.

Management and Storage Connections

The following figure shows the management and storage connections for the Cisco Catalyst 9800-40 Wireless Controller:

Figure 3: Management and Storage Connections for the Cisco Catalyst 9800-40 Wireless Controller












1	CON—RJ-45 compatible console port	5	SP—RJ-45 10/100/1000 management Ethernet port
2	CON—Mini USB connector console port	6	RP—RJ-45 10/100/1000 redundancy Ethernet port
3	USB port 0	7	RP—1-GE SFP+ port
4	USB port 1		











LEDs

The following figure shows the LEDs on the front panel of the Cisco Catalyst 9800-40 Wireless Controller:

Figure 4: Cisco Catalyst 9800-40 Wireless Controller LEDs



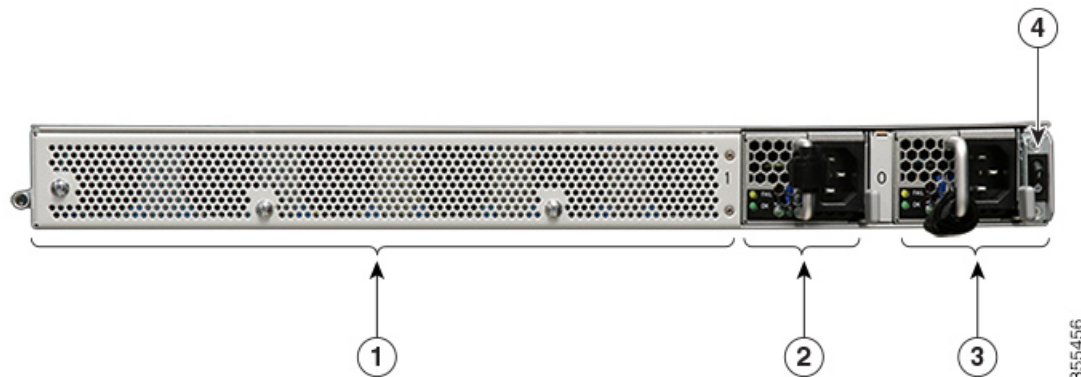
No.	LED Label	Description	LED Color	Behavior
1	PWR	Power	Green 	If all the power rails are based on the specification.
2	SYS	System	On 	Remains ON during IOS boot complete.
			Blinking Green 	Remains blinking when IOS booting is in progress.
			Amber 	Remains ON during system crash.
			Blinking Amber 	Remains blinking during secure boot failure.
			Off	Remains OFF during ROMMON boot.
3	ALM	Alarm	Green 	Remains ON during ROMMON boot complete.
			Blinking Green 	Remains blinking when system upgrade is in progress.
			Amber 	Remains ON during ROMMON and SYSTEM boot ups.
			Blinking Amber 	Remains blinking during temperature error and secure boot failure.
			Off	Remains OFF during IOS boot.

No.	LED Label	Description	LED Color	Behavior
4	HA	High Availability	Green 	Remains ON when HA is active.
			Blinking Green 	Remains blinking when HA Standby Hot.
			Amber 	Blinks slowly when booted or HA Standby Cold.
			Blinks Fast 	Blinks fast during HA maintenance.
5	EN	USB console enabled	Green 	Indicates that the mini USB connector is used as the console.
6	LINK	Management	Solid Green 	Indicates that the RJ-45 connector is not used as the console.
			Flash Green 	Indicates that the RJ-45 connector is being used as the console.
		Built-in EPA (1 SFP + Port Status of 4 LEDs with 1 per SFP)	Off	No link.
		Built-in EPA (1 SFP + Port Status of 4 LEDs with 1 per SFP)	Off	Indicates that the port is not enabled.
			Amber 	Port enabled with a problem in the Ethernet link.
			Green 	Port enabled with a valid Ethernet link.
7	SSD	SSD Activity	Green 	Remains ON during the SSD activity.

Rear View

The following figure shows the rear of the Cisco Catalyst 9800-40 Wireless Controller:

Figure 5: Cisco Catalyst 9800-40 Wireless Controller Rear View



1	Fans	3	Power supply (PEM 0)
2	Power supply (PEM 1)	4	Power/standby switch

The chassis has a front-to-rear airflow. Six internal fans draw cooling air into the chassis and across internal components to maintain an acceptable operating temperature. The fans are numbered from 0 to 5, right to left.

Two power supplies (AC) are accessed from the rear of the controller and are hot-swappable.



Caution The Cisco Catalyst 9800-40 Wireless Controller can support two AC power supplies.

Cisco Product Identification Standard

This section describes the Cisco products and services product identification standard. This feature provides you with the ability to effectively integrate and manage Cisco products in your network and business operations.

Unique Device Identifier

The Unique Device Identifier (UDI) is the Cisco product identification standard for hardware products. A product identification standard removes barriers to enterprise automation and can help you reduce operating expenses.

The UDI provides a consistent electronic, physical, and associated business-to-business information product identification standard.

The UDI is a combination of five data elements. The following table lists the UDI elements:

Table 1: UDI Elements

UDI Data Element	Electronic Visibility	Physical Visibility	Description
PID	Yes	Yes	Product ID, also known as product name, model name, product number

UDI Data Element	Electronic Visibility	Physical Visibility	Description
VID	Yes	Yes	Version ID
SN	Yes	Yes	Serial number, the unique instance of the PID
Entity Name	Yes	—	Type, such as chassis, slot, or power supply
Product Description	Yes	—	Additional product information

The combination of serial number and product ID (PID) is unique and consistent across all Cisco products. The PID that is coded on hardware is called a base product identifier.

Additional orderable PIDs can be associated to a base PID. For instance, an orderable PID may describe a packaging configuration for a product or a bundled group of products sold, tested, and shipped together. Specific unique device identifier (UDI) benefits include the following:

- Identifies:
 - Individual Cisco products in your networks
 - PIDs and serial numbers for service and replaceable products
 - Version IDs (VIDs) for product version visibility
- Facilitates discovery of products subject to recall or upgrade
- Enhances inventory automation of Cisco products

The Cisco product identification standard provides the following features:

show diag chassis eeprom Command

The **show diag chassis eeprom** command displays the PID, VID, PCB serial number, hardware revision, and other such information.

The following is sample output from the show diag chassis eeprom command:

```
WLC# show diag chassis eeprom
MIDPLANE EEPROM data:
Product Identifier (PID) : C9800-40-K9
Version Identifier (VID) : V01
PCB Serial Number : xxxxxxxxxxxx Top Assy. Part Number : xx-xxxx-xx Hardware Revision : 0.1
Asset ID :
CLEI Code : XXXXXXXXXXXX
```



Note Common Language Equipment Identification (CLEI) code is a ten-digit character code that identifies a specific product. A CLEI code is applied to each part within a Cisco Catalyst 9800-40 Wireless Controller as they are programmed in manufacturing for shipment to customers.

show license udi Command

The **show license udi** command displays UDI information.

The following is sample output from the **show license udi** command:

```
WLC# show license udi
SlotID      PID              SN              UDI
-----
*           C9800-40-K9     xxxxxxxxxxxx    C9800-40-K9:xxxxxxxxxx
```

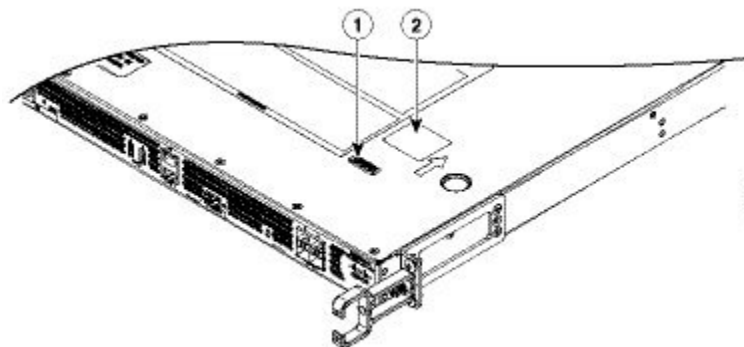


Note For complete information on the product identification standard, see <https://www.cisco.com/c/en/us/products/unique-device-identifier-udi.html>.

Serial Number and PID/VID Label Location

The following figures show the location of the serial number and the PID/VID label on the Cisco Catalyst 9800-40 Wireless Controller:

Figure 6: Cisco Catalyst 9800-40 Wireless Controller Serial Number and PID/VID Label Location



1	Serial Number	2	PID/VID Label
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CHAPTER 2

Supported Hardware Components

This chapter contains information about the supported hardware components on the Cisco Catalyst 9800-40 Wireless Controller.

- [Supported EPA, on page 11](#)
- [Supported Transceivers, on page 11](#)
- [Supported Crypto Module, on page 12](#)
- [Power Supplies, on page 12](#)

Supported EPA

The following table lists the supported EPA on the Cisco Catalyst 9800-40 Wireless Controller:

PID	Description
EPA-4X10GE	Fixed four built-in 10GE-ports that support small form-factor pluggable (SFP+) optical transceivers to provide network connectivity. Ports are numbered 0 – 3. See the Supported SFP Transceivers section for supported transceivers.

Supported Transceivers

The Cisco Catalyst 9800-40 Wireless Controller supports the following small form-factor pluggable (SFP) and CPAK optical transceiver types:

Ports	Cisco Catalyst 9800-40 Wireless Controller
Ports TE0 - TE3 use 10GE SFP+ EPA-4X10GE — Ports 0 – 3	SFP+

Table 2: Supported SFP+ Transceiver

PID	Description
SFP-10G-KR	10GBASE-KR SFP

Supported Crypto Module

The Cisco Catalyst 9800-40 Wireless Controller supports the following crypto module:

PID	Description
Octeon-II CN6870-800	Is a 24-core network processor running at 800 MHz which allows 20G of Crypto performance.

Power Supplies

The Cisco Catalyst 9800-40 Wireless Controller supports AC power supply. The modular chassis configurations support the installation of two power supplies for redundancy. When an external power supply fails or is removed, the other power supply provides power requirements for the chassis. This allows you to hot-swap the power supply without impacting the functionality of the controller.



Note A Cisco Catalyst 9800-40 Wireless Controller can support two AC power supplies.

The power supplies are used in a 1 + 1 redundant configuration. There is no input switch on the faceplate of the power supplies. A power supply is switched from Standby to On by way of a system chassis power switch.

The following table lists the power supplies that you can order:

Part Number	Power Supply
C9800-AC-750W-R	Cisco Catalyst 9800-40 Wireless Controller power supply module with plug-side intake airflow, AC, 750W



Caution The chassis has a front-to-rear airflow. All the power supplies and fan modules in the chassis must use the same airflow direction or an error will occur with possible overheating and shut down of the controller. If you power up the controller with more than one airflow direction, you must power down the controller and replace the modules with the wrong airflow direction before powering up the controller.

Power Supply LEDs

The following table describes the power supply LEDs:

Table 3: AC Power Supply LEDs

Power Supply Condition	Green (OK) LED Status	Amber (FAIL) LED Status
No AC power to all power supplies	OFF	OFF
Power Supply Failure (includes over voltage, over current, over temperature and fan failure)	OFF	ON

Power Supply Condition	Green (OK) LED Status	Amber (FAIL) LED Status
Power Supply Warning events where the power supply continues to operate (high temperature, high power and slow fan)	OFF	1Hz Blinking
AC Present/3.3VSB on (PSU OFF)	1Hz Blinking	OFF
Power Supply ON and OK	ON	OFF

Power Supply Fans

The fans in the power supply module are used for cooling the power supply module itself while a system-level cooling is provided by fans within the chassis. The power supplies do not depend on the system-level fans for cooling. Fan-rotation sensors determine the fan failures



Note The fans in the Cisco Catalyst 9800-40 Wireless Controller power supplies have plug-side exhaust airflow.



Caution The chassis has a front-to-rear airflow. All power supplies and fan modules in the same chassis must use the same airflow direction or an error will occur with possible overheating and shut down of the controller.

If you power up the controller with more than one airflow direction, you must power down the controller and replace the modules with the wrong airflow direction before powering up the controller.



Note The fans in the power supply modules run when the power supply is plugged in, even if the power switch is in the standby position.



CHAPTER 3

Preparing Your Site for Installation

This chapter contains important safety information you should know before working with the Cisco Catalyst 9800-40 Wireless Controller, and guides you through the process of preparing your site for wireless controller installation.

- [Prerequisites and Preparation, on page 15](#)
- [Safety Guidelines, on page 16](#)
- [Cautions and Regulatory Compliance Statements for NEBS, on page 17](#)
- [Standard Warning Statements, on page 18](#)
- [Site Planning, on page 22](#)
- [Site Cabling Guidelines, on page 25](#)
- [Rack-Mounting Guidelines, on page 28](#)
- [Preventing Electrostatic Discharge Damage, on page 30](#)
- [Electrical Safety, on page 31](#)
- [Chassis-Lifting Guidelines, on page 32](#)
- [Tools and Equipment, on page 32](#)
- [Unpacking and Verifying Shipping Contents, on page 32](#)
- [Installation Checklist, on page 33](#)

Prerequisites and Preparation

Before you perform the procedures in this guide, we recommend that you:

- Read the safety guidelines in the next section and review the electrical safety and ESD-prevention guidelines in this guide.
- Ensure that you have all of the necessary tools and equipment (see the **Tools and Equipment** section).
- Ensure that you have access to the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide* (an online document that is available for viewing or download at Cisco.com) during the installation.
- Ensure that the power and cabling requirements are in place at your installation site.
- Ensure that the equipment required to install the controller is available.
- Ensure that your installation site meets the environmental conditions to maintain normal operation.

Before installing the controller, you must consider power and cabling requirements that must be in place at your installation site, special equipment for installing the controller, and the environmental conditions your installation site must meet to maintain normal operation.

The shipping package for the controller is engineered to reduce the chances of product damage associated with routine material handling experienced during shipment:

- Controller should always be transported or stored in its shipping package in the upright position.
- Keep the controller in the shipping container until you have determined the installation site.



Note Inspect all items for shipping damage. If an item appears damaged, contact a Cisco customer service representative immediately

Site Planning Checklist

Use the following checklist to perform and account for all the site-planning tasks described in this chapter:

- The site air conditioning system can compensate for the heat dissipation of the controller.
- Electrical service to the site complies with the requirements.
- The electrical circuit servicing the controller complies with the requirements.
- Consideration has been given to console port wiring and limitations of the cabling involved, according to TIA/EIA-232F.
- The Ethernet cabling distances are within limitations.
- The equipment rack in which you plan to install the controller chassis complies with requirements. Careful consideration has been given for safety, ease of maintenance, and proper airflow in selecting the location of the rack.

Safety Guidelines

Before you begin the installation or replacement procedure, review the safety guidelines in this section to avoid injuring yourself or damaging the equipment.



Note This section contains guidelines, and do not include every potentially hazardous situation. When you install a controller, always use common sense and caution.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement.

Before you install, configure, or perform maintenance on the controller, review the documentation for the procedure you are about to perform, paying special attention to the safety warnings.



Note Do not unpack the system until you are ready to install it. Keep the chassis in the shipping container to prevent accidental damage until you determine an installation site. Use the appropriate unpacking documentation included with the system.

Read the installation instructions in this document before you connect the system to its power source. Failure to read and follow these guidelines could lead to an unsuccessful installation and possibly damage the system and components.

Safety Recommendations

The following guidelines will help to ensure your own safety and protect your Cisco equipment. This list does not cover all potentially hazardous situations, so *be alert*.

- Cisco safety policy mandates that all its controllers must conform to the requirements of IEC 60950, with appropriate national deviations, as a minimum. In addition, Cisco controllers must also meet the requirements of any other normative documents, for example, standards, technical specifications, laws or regulations.
- Review the safety warnings listed in *Regulatory Compliance and Safety Information - Cisco Catalyst 9800-40 Wireless Controller* (available online at Cisco.com) before installing, configuring, or maintaining the controller.
- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always turn all power supplies off and unplug all power cables before opening the chassis.
- Always unplug the power cable before installing or removing a chassis.
- Keep the chassis area clear and dust free during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- The controller operates safely when it is used in accordance with its marked electrical ratings and product-usage instructions.

Cautions and Regulatory Compliance Statements for NEBS

The following table lists cautions, regulatory compliance statements, and requirements for the Network Equipment Building System (NEBS) certification from the Telcordia Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment (A Module of LSSGR, FR-64; TSGR, FR-440; and NEBSFR, FR-2063) Telcordia Technologies Generic Requirements, GR-1089-CORE.

Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Caution	The intrabuilding ports of the equipment or subassembly are only suitable for connection to intrabuilding or unexposed wiring or cabling. The intrabuilding ports of the equipment or subassembly must not be metalically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use only as intrabuilding interfaces (Type 2 or Type 4 ports as described in GR-1089-CORE), and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metalically to OSP wiring.
	Products that have an AC power connection are intended for deployments where an external surge protective device (SPD) is used at the AC power service equipment as defined by the National Electric Code (NEC).
	This product is designed for a common bonding network (CBN) installation.
	This product can be installed in a network telecommunication facility or location where the NEC applies.
	An electrical conducting path shall exist between the product chassis and the metal surface of the enclosure or rack in which it is mounted or to a grounding conductor. Electrical continuity shall be provided by using thread-forming type mounting screws that remove any paint or nonconductive coatings and establish a metal-to-metal contact. Any paint or other nonconductive coatings shall be removed on the surfaces between the mounting hardware and the enclosure or rack. The surfaces shall be cleaned and an antioxidant applied before installation.
	The grounding architecture of this product is DC-isolated (DC-I).

Standard Warning Statements



Note The English warnings in this document are preceded by a statement number. To see the translations of a warning in other languages, look up its statement number in the *Regulatory Compliance and Safety Information - Cisco Catalyst 9800-40 Wireless Controller*.

This section describes the warning definition and then lists core safety warnings grouped by topic.



Warning Statement 1071—Warning Definition IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS

General Safety Warnings



Warning **Statement 1004**—Installation Instructions

Read the installation instructions before connecting the system to the power source



Warning **Statement 1040**—Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations



Warning **Statement 1073**—No User-Serviceable Parts

No user-serviceable parts inside. Do not open.



Warning **Statement 1074**—Comply with Local and National Electrical Codes

Installation of the equipment must comply with local and national electrical codes.



Warning **Statement 1030**—Equipment Installation

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



Warning **Statement 1005**—Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than:

AC:

- 20 A U.S. maximum
-



Warning **Statement 1045**—Short-circuit Protection

This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.



Warning Statement 1028—More Than One Power Supply

This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.



Warning Statement 1017—Restricted Area

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.



Warning Statement 1019—Main Disconnecting Device

The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.



Warning Statement 1086—Power Terminals, Replace Cover

Hazardous voltage or energy may be present on power terminals. Always replace cover when terminals are not in service. Be sure uninsulated conductors are not accessible when cover is in place.



Warning Statement 1025—Use Copper Conductors Only

Use copper conductors only.



Warning Statement 1024—Ground Conductor

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.



Warning Statement 1034—Backplane Voltage

Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.



Warning Statement 1008—Class 1 Laser Product

Class 1 laser product.



Warning Statement 1027—Class 1 LED Product

Class 1 LED product.



Warning Statement 1009—Laser Radiation

Laser radiation is present when the system is open



Warning Statement 1010—Staring into Laser Beam

Do not stare into the laser beam



Warning Statement 1055—Class I and Class 1M Laser

Class I (CDRH) and Class 1M (IEC) laser products



Warning Statement 1056—Unterminated Fiber Cable

Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.



Warning Statement 1015—Battery Handling

There is the danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions



Warning Statement 341—Metal Contacts on the Battery

Do not touch or bridge the metal contacts on the battery. Unintentional discharge of the batteries can cause serious burns



Warning Statement 1032—Lifting the Chassis

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules (such as power supplies, fans, or cards); these types of handles are not designed to support the weight of the unit.



Warning Statement 1047—Overheating Prevention

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of:

104° F (40° C)



Warning Statement 1029—Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place

Site Planning

This section contains site-planning information, and will help you plan for the installation of the controller.

General Precautions

Observe the following general precautions when using and working with the controller:

- Keep your system components away from radiators and heat sources and do not block cooling vents.
- Do not spill food or liquids on your system components and never operate the product in a wet environment.
- Do not push any objects into the openings of your system components. Doing so can cause fire or electric shock by shorting out interior components.
- Position system cables and power supply cable carefully. Route system cables and power supply cable and plug such that they cannot be stepped on or tripped over. Be sure that nothing else rests on your system component cables or power cable.
- Do not modify power cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local and national wiring rules.
- If you turn off your system, wait at least 30 seconds before turning it on again to avoid system component damage.

Site Selection Guidelines

The Cisco Catalyst 9800-40 Wireless Controller requires specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the controller. The following sections provide specific information to help you plan for a proper operating environment.

The Cisco Catalyst 9800-40 Wireless Controller are designed to meet the industry EMC, safety, and environmental standards described in the *Regulatory Compliance and Safety Information - Cisco Catalyst 9800-40 Wireless Controller* document.

Site Environmental Requirements

Environmental monitoring protects the system and components from damage caused by excessive voltage and temperature conditions. To ensure normal operation and avoid unnecessary maintenance, plan and prepare your site configuration before installation. After installation, make sure the site maintains the environmental characteristics, as shown in the following table.

Table 4: Cisco Catalyst 9800-40 Wireless Controller Environmental Tolerance

Environmental Characteristic	Minimum	Maximum
Operating temperature (nominal)	32° F (0° C)	104° F (40° C) (40° C up to 10,000 feet)
Operating temperature (short term)	32° F (0° C)	122° F (50° C)
Storage temperature	-4° F (-20° C)	158° F (70° C)
Operative humidity (nominal) (relative humidity)	10%	90%
Operative humidity (short term)	5%	90%
Storage humidity (relative humidity)	5%	95%
Altitude, operating: over allowable temperature range (0° to 50° C)	-500 feet (-152.4 meters)	6,000 feet (1829 meters)
Altitude, nonoperating: over allowable temperature range	-1000 feet (-304.8 meters)	50,000 feet (15240 meters)
Thermal shock nonoperating with change over time of 3 minutes	-13° F (-25° C)	158° F (70° C)
Thermal Shock - Operating at 2.5° C per minute	32° F (0° C)	122° F (50° C)

Physical Characteristics

Be familiar with the physical characteristics of the Cisco Catalyst 9800-40 Wireless Controller to assist you in placing the system at a proper location.



Note For information regarding rack widths supported for the controller, see the following sections:

- **General Rack-Selection Guidelines**
- **Guidelines for 23-in. (Telco) Racks**

The following table shows the weight and dimensions of the Cisco Catalyst 9800-40 Wireless Controller:

Table 5: Physical Characteristics of the Cisco Catalyst 9800-40 Wireless Controller

Characteristic	Cisco Catalyst 9800-40 Wireless Controller
Height	1.72 in. (43.69 mm)—1RU; rack-mount per EIA RS-310
Width	17.3 in. (439.42 mm)
Depth	21.78 in. (553.2 mm) Depth includes card handles, cable-management brackets, and power-supply handles
Weight	23 lb (10.43 kg) fully loaded

The following list describes additional characteristics:

- Chassis height meets EIA-310 rack spacing, universal rack mount
 - Cisco Catalyst 9800-40 Wireless Controller—1RU (1.75 in. or 44.45 mm)
- Chassis width meets EIA-310 19 in. (17.3 in. or 439.42 mm) wide with rack brackets
- Cable-management brackets allow a bend radius of 1.5 in. (38.1 mm) for cables
- Ships with forward rack-mount brackets installed and an extra set included in the accessory kit

Site Power Guidelines

The Cisco Catalyst 9800-40 Wireless Controller has specific power and electrical wiring requirements. Adhering to these requirements ensures reliable operation of the system. Follow these precautions and recommendations when planning your site for the controller:

- The redundant power option provides a second, identical power supply to ensure that power to the chassis continues uninterrupted if one power supply fails or input power on one line fails.
- In systems configured with the redundant power option, connect each of the two power supplies to a separate input power source. If you fail to do this, your system might be susceptible to total power failure due to a fault in the external wiring or a tripped circuit breaker.
- To prevent a loss of input power, be sure the total maximum load on each circuit supplying the power supplies is within the current ratings of the wiring and breakers.
- Check the power at your site before installation, and periodically after installation, to ensure that you are receiving clean power. Install a power conditioner if necessary.
- Provide proper grounding to avoid personal injury and damage to the equipment due to lightning striking power lines or due to power surges. The chassis ground must be attached to a central office or other interior ground system.



Caution This product requires short-circuit (overcurrent) protection to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.



Note The Cisco Catalyst 9800-40 Wireless Controller installation must comply with all applicable codes and is approved for use with copper conductors only. The ground bond fastening hardware should be of compatible material and preclude loosening, deterioration, and electrochemical corrosion of hardware and joined material. Attachment of the chassis ground to a central office or other interior ground system must be made with an AWG #6 gauge wire, copper ground conductor at a minimum.

Electrical Circuit Requirements

The Cisco Catalyst 9800-40 Wireless Controller requires a dedicated electrical circuit. If you equip it with dual-power feeds, you must provide a separate circuit for each power supply to avoid compromising the power redundancy feature.

The Cisco Catalyst 9800-40 Wireless Controller can only be powered by an AC source. Ensure that equipment grounding is present and observe power-strip ratings. Make sure that the total ampere rating of all the products plugged into the power strip does not exceed 80 percent of the rating.



Note The Cisco Catalyst 9800-40 Wireless Controller can support two AC power supplies. The AC power supply requires a 20 A circuit breaker.

The following table lists the power supply system rating requirements for the Cisco Catalyst 9800-40 Wireless Controller.

Table 6: AC Power Supply System Rating Specifications for the Cisco Catalyst 9800-40 Wireless Controller

Description	Specification
Power supply declared ratings	AC = 85–264 VAC
Line frequency rating	50/60 Hz for AC power supplies

Site Cabling Guidelines

This section contains guidelines for wiring and cabling at your site. When preparing your site for network connections to the Cisco Catalyst 9800-40 Wireless Controller, consider the type of cable required for each component, and the cable limitations. Consider the distance limitations for signaling, EMI, and connector compatibility. Possible cable types are fiber, thick or thin coaxial, foil twisted-pair cabling, or unshielded twisted-pair cabling.

Also consider any additional interface equipment you need, such as transceivers, hubs, switches, modems, channel service units (CSUs), or data service units (DSUs).

Before you install the controller, have all the additional external equipment and cables at hand. For ordering information, contact a Cisco customer service representative.

The extent of your network and the distances between network interface connections depend in part on the following factors:

- Signal type
- Signal speed
- Transmission medium

The distance and rate limits referenced in the following sections are the IEEE-recommended maximum speeds and distances for signaling purposes. Use this information as guidelines when planning your network connections prior to installing the Cisco Catalyst 9800-40 Wireless Controller.

If wires exceed recommended distances, or if wires pass between buildings, give special consideration to the effect of a lightning strike in your vicinity. The electromagnetic pulse caused by lightning or other high-energy phenomena can easily couple enough energy into unshielded conductors to destroy electronic devices. If you have had problems of this sort in the past, you may want to consult experts in electrical surge suppression and shielding.

Console Port Connections

The Cisco Catalyst 9800-40 Wireless Controller provides console ports to connect a terminal or computer for local console access.

Both ports have RJ-45 connectors, support RS-232 asynchronous data, and have distance recommendations specified in the IEEE RS-232 standard.

USB Serial Console

The USB serial console port connects directly to the USB connector of a PC using a USB Type A to 5-pin mini USB Type-B cable. The USB Console supports full speed (12Mbps) operation. The console port does not support hardware flow control.



Note

- Always use shielded USB cables with a properly terminated shield. The USB serial console interface cable must not exceed 3 meters in length.
 - Only one console port can be active at a time. When a cable is plugged into the USB console port, the RJ-45 port becomes inactive. Conversely, when the USB cable is removed from the USB port, the RJ-45 port becomes active.
 - 4-pin mini USB Type-B connectors are easily confused with 5-pin mini USB Type-B connectors. Only 5-pin mini USB Type-B is supported.
-

Interference Considerations

When wires are run for a significant distance, there is a risk that stray signals will be induced on the wires as interference. If interference signals are strong, they can cause data errors or damage to the equipment.

The following sections describe sources of interference and how to minimize its effects on Cisco Catalyst 9800-40 Wireless Controller.

Electromagnetic Interference

All the equipment powered by AC current can propagate electrical energy that can cause electromagnetic interference (EMI) and possibly affect the operation of other equipment. The typical sources of EMI are equipment power cords and power service cables from electric utility companies.

Strong EMI can destroy the signal drivers and receivers in the controller and even create an electrical hazard by causing power surges through power lines into installed equipment. These problems are rare, but could be catastrophic.

To resolve these problems, you need specialized knowledge and equipment, which could consume substantial time and money. However, you should ensure that you have a properly grounded and shielded electrical environment, paying special attention to the need for electrical surge suppression.

The following table lists electrode magnetic compliance standards for the controller.

Table 7: EMC and Safety Standards

EMC Standards	FCC 47 CFR Part 15 Class A VCCI Class A AS/NSZ Class A ICES-003 Class A EN55022/CISPR 22 Information Technology Equipment (Emissions) EN55024/CISPR 24 Information Technology Equipment (Immunity) EN300 386 Telecommunications Network Equipment (EMC) EN50082-1/EN61000-6-1 Generic Immunity Standard
Safety Standards	UL60950-1 CSA C22.2 No. 60950-1-03 EN 60950-1 IEC 60950-1 AS/NZS 60950.1

Radio Frequency Interference

When electromagnetic fields act over a long distance, radio frequency interference (RFI) can be propagated. Building wiring can often act as an antenna, receiving the RFI signals and creating more EMI on the wiring.

If you use twisted-pair cable in your plant wiring with a good distribution of grounding conductors, the plant wiring is unlikely to emit radio interference. If you exceed the recommended distances, use a high-quality twisted-pair cable with one ground conductor for each data signal.

Lightning and AC Power Fault Interference

If signal wires exceed recommended cabling distances, or if signal wires pass between buildings, you should consider the effect that a lightning strike in your vicinity might have on the controller.

The electromagnetic pulse (EMP) generated by lightning or other high-energy phenomena can couple enough energy into unshielded conductors to damage or destroy electronic equipment. If you have previously experienced such problems, you should consult with RFI/EMI experts to ensure that you have adequate electrical surge suppression and shielding of signal cables in your controller operating environment.

Rack-Mounting Guidelines

This section describes guidelines on rack-mounting.

Precautions for Rack-Mounting

The following rack-mounting guidelines are provided to ensure your safety:

- Do not move large racks by yourself. Due to the height and weight of a rack, a minimum of two people are required to accomplish this task.
- Ensure that the rack is level and stable before extending a component from the rack.
- Ensure that proper airflow is provided to the components in the rack.
- Do not step or stand on any component or system when servicing other systems or components in a rack.
- When mounting the controller in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

General Rack-Selection Guidelines

The Cisco Catalyst 9800-40 Wireless Controller can be mounted in most two-post or four-post, 19-in. equipment racks that comply with the Electronics Industries Association (EIA) standard for equipment racks (EIA-310-D 19-in.). The rack must have at least two posts with mounting flanges to mount the chassis.



Caution

When mounting a chassis in any type of rack equipment, ensure that the inlet air to the chassis does not exceed 131°F (55°C).

The distance between the center lines of the mounting holes on the two mounting posts must be 18.31 in. ± 0.06 in. (46.50 cm ± 0.15 cm). The rack-mounting hardware included with the chassis is suitable for most 19-in. (48.3-cm) equipment racks.

Consider installing the Cisco Catalyst 9800-40 Wireless Controller in a rack with the following features:

- NEBS-compliant, 19-in. (48.3-cm) wide rack.

- EIA or ETSI hole patterns in the mounting rails. Required mounting hardware is shipped with the controller. If the rack that you plan to install the system in has metric-threaded rails, you must provide your own metric-mounting hardware.
- Perforated top and open bottom for ventilation to prevent overheating.
- Leveling feet for stability.



Note The controller must not be installed in an enclosed rack because the chassis requires an unobstructed flow of cooling air to maintain acceptable operating temperatures for its internal components. Installing the controller in any type of enclosed rack—even with the front and back doors removed—could disrupt the air flow, trap heat next to the chassis, and cause an over temperature condition inside the controller. If you use an enclosed rack, make certain that there are air vents on all sides of the rack and there is proper ventilation.

Guidelines for 23-in. (Telco) Racks

If needed, you can also install the Cisco Catalyst 9800-40 Wireless Controller in 23-in. (Telco) racks. For information on the adapters needed for 23 in. racks, contact the Newton Instrument Company:

<http://www.eneutron.com>
111 East A Street, Butner NC, USA, 27509
919 575-6426

Equipment Rack Guidelines

The placement of racks can affect personnel safety, system maintenance, and the system's ability to operate within the environmental characteristics described in **Table: Cisco Catalyst 9800-40 Wireless Controller Environmental Tolerance**. Choose a proper location for the controller by following the guidelines below.

Locating for Safety

If the Cisco Catalyst 9800-40 Wireless Controller is the heaviest or the only piece of equipment in the rack, consider installing it at or near the bottom to ensure that the rack's center of gravity is as low as possible.

For additional information about the proper placement of electronic equipment, see the document *GR-63-CORE, Network Equipment Building System (NEBS) Requirements: Physical Protection*.

Locating for Easy Maintenance

Keep at least 3 feet of clear space in front of and behind the rack. This space ensures that you can remove the Cisco Catalyst 9800-40 Wireless Controller components and perform routine maintenance and upgrades easily.

Avoid installing the controller in a congested rack and consider how the routing of cables from other pieces of equipment in the same rack might affect access to the controller's cards.

The front and top of the chassis must remain unobstructed to ensure adequate airflow and prevent overheating inside the chassis.

Allow the following clearances for normal system maintenance:

- At the top of the chassis—At least 3 in. (7.6 cm)
- In front of the chassis—3 to 4 ft (91.44 cm to 121.92 cm)

To avoid problems during installation and ongoing operation, follow these general precautions when you plan the equipment locations and connections:

- Use the **show environment all** and the **show facility-alarm status** commands regularly to check the internal system status. The environmental monitor continually checks the interior chassis environment; it provides warnings for high temperature and creates reports on any occurrences. If warning messages are displayed, take immediate action to identify the cause and correct the problem. For more information on these commands, see the **Environmental Monitoring and Reporting Functions** section.
- Keep the Cisco Catalyst 9800-40 Wireless Controller off the floor and out of the areas that collect dust.
- Follow ESD-prevention procedures to avoid damage to equipment. Damage from static discharge can cause immediate or intermittent equipment failure.

Locating for Proper Airflow

Ensure that the location of the Cisco Catalyst 9800-40 Wireless Controller has enough airflow to keep the system operating within the environmental characteristics, and the air temperature is sufficient to compensate for the heat dissipated by the system.

Avoid locating the Cisco Catalyst 9800-40 Wireless Controller in a location in which the chassis air intake vents could draw in the exhaust air from adjacent equipment. Consider how the air flows through the controller. The airflow direction is front to back with ambient air drawn in from the venting located on the chassis' front sides.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage occurs when electronic cards or components are improperly handled resulting in complete or intermittent failures. Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of your system components, such as a microprocessor. As you continue to work on your system, periodically touch an unpainted metal surface on the computer chassis.

The following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to the ESD plug at the bottom of the chassis below the power entry modules.
- Handle line cards by faceplates and carrier edges only; avoid touching the card components or connector pins.
- When removing a module, place the removed module component-side-up on an antistatic surface or in a static-shielding bag. If the module is to be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages only on the body; ESD voltages on clothing can still cause damage.
- When transporting a sensitive component, place it in an antistatic container or packaging.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.



Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 ohms.



Caution Always tighten the captive installation screws on all the system components when you are installing them. These screws prevent accidental removal of the module, provide proper grounding for the system, and help ensure that the bus connectors are properly seated in the backplane.

Electrical Safety

All the system components are hot-swappable. They are designed to be removed and replaced while the system is operating, without presenting an electrical hazard or damage to the system.

Follow these basic guidelines when you are working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but is still connected to telephone wiring or other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.



Warning **Statement 1001**—Work During Lightning Activity

Do not work on the system or connect or disconnect cables during periods of lightning activity.

Chassis-Lifting Guidelines

The chassis is not intended to be moved frequently. Before you install the system, ensure that your site is properly prepared so that you can avoid having to move the chassis later to accommodate power sources and network connections.

Each time you lift the chassis or any heavy object, follow these guidelines:

- Ensure that your footing is solid, and balance the weight of the chassis between your feet.
- Lift the chassis slowly; never move suddenly or twist your body as you lift.
- Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your back muscles.
- Do not remove installed components from the chassis.
- Always disconnect all external cables before lifting or moving the chassis.

Tools and Equipment

The following tools and equipment are recommended as the minimum necessary equipment to install the Cisco Catalyst 9800-40 Wireless Controller. You may need additional tools and equipment to install associated equipment and cables. You may also require test equipment to check electronic and optical signal levels, power levels, and communications links.

- Philips hand screwdriver
- 3.5-mm flat-blade screwdriver
- Tape measure (optional)
- Level (optional)
- Power drill
- 8-gauge wire
- Rack-mount brackets
- Cable-management brackets

Unpacking and Verifying Shipping Contents

When you receive your chassis, perform the following steps and use the shipping contents checklist in the following section.

-
- Step 1** Inspect the box for any shipping damage. (If there is damage, contact your Cisco service representative).
- Step 2** Unpack the Cisco Catalyst 9800-40 Wireless Controller.
- Step 3** Perform a visual inspection of the chassis.

Step 4 After you have unpacked the system, verify that you have received all of the required components, including all the accessory items. Using the packing list as a guide, verify that you have received all the equipment listed in your order, and ensure that the configuration matches the packing list.

Checking the Shipping Container Contents

Use the components list shown in the following table to check the contents of the Cisco Catalyst 9800-40 Wireless Controller shipping container. Do not discard the shipping container. You need the container, if you move or have to ship the controller in the future.

Table 8: Cisco Catalyst 9800-40 Wireless Controller Shipping Container Contents

Component	Description
Chassis	Cisco Catalyst 9800-40 Wireless Controller are configured with dual AC power supplies and an EPA and NIM blank panel if an EPA or NIM has not been ordered.
Accessories Kit	Front and rear chassis rack-mount brackets that you will attach to the chassis with the respective screws.
Note You must order the Accessories Kit separately if you order the Cisco Catalyst 9800-40 Wireless Controller chassis as a spare.	Three sets of screws, one each for: <ul style="list-style-type: none"> • Front rack-mount brackets (use the black screws) • Rear rack-mount brackets (use the package with the 5 screws) • Cable-management brackets (use the package with the 4 screws)
	Two cable-management brackets with U-feature design devices attached.
	1 RJ-45 to RJ-45 crossover cable
	1 RJ-45 to DB-9 (female) adapter
ESD, Wrist Strap (disposable)	One disposable wrist strap
Documentation	Pointer Doc
Optional Equipment	Powercord if an AC power supply was shipped.

Installation Checklist

To assist you with your installation and to provide a historical record of what was done by whom, print or photocopy the installation checklist below. Use this to record when each procedure or verification is completed. When the checklist is completed, place it in your site log along with the other records for your new controller.

Table 9: Installation Checklist

Task	Verified By	Date
Date chassis received		
Chassis and all accessories unpacked		
Types and numbers of interfaces verified		
Safety recommendations and guidelines reviewed		
Installation Checklist copied		
Site log established and background information entered		
Site power voltages verified		
Site environmental specifications verified		
Required passwords, IP addresses, device names, and so on, available		
Required tools available		
Network connection equipment available		
Cable-management brackets installed (optional, but recommended)		
AC power cable(s) connected to AC source(s) and controller		
Network interface cables and devices connected		
System power turned on		
System boot complete (STATUS LED is on)		
Ethernet port adapters and NIMs (where applicable) are operational		
Correct hardware configuration displayed after system banner appears		

Task	Verified By	Date
Correct licenses installed on the controller		



CHAPTER 4

Installing the Controller

This chapter provides procedures for installing the Cisco Catalyst 9800-40 Wireless Controller on an equipment shelf, tabletop, or in an equipment rack.

- [Installation Methods, on page 37](#)
- [Guidelines for a Standalone Equipment Shelf or Tabletop Installation, on page 38](#)
- [Installing the Controller on a Standalone Equipment Shelf or Tabletop, on page 38](#)
- [Guidelines for Rack Installation, on page 39](#)
- [Attaching Front Rack-Mount Brackets, on page 41](#)
- [Attaching Rear Rack-Mount Brackets, on page 42](#)
- [Mounting the Controller in the Rack, on page 43](#)
- [Attaching the Cable Management Bracket, on page 46](#)
- [Chassis Ground Connection, on page 48](#)
- [Connecting Cables, on page 50](#)
- [Management Ethernet Port Cable Connection, on page 52](#)

Installation Methods

The Cisco Catalyst 9800-40 Wireless Controllers are designed for standalone, 2-rail 19-inch rack-mount (front rail only), and 4-rail 19-inch rack-mount (front and rear rail) installations.

Although rack-mounting is the preferred method of installation, you can mount the chassis on an equipment shelf or tabletop.



Warning

Statement 1071—Warning Definition IMPORTANT SAFETY INSTRUCTIONS.

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS



Warning **Warning: Statement 1004**—Installation Instructions

Read the installation instructions before connecting the system to the power source

SAVE THESE INSTRUCTIONS



Note Proceed with the installation, if you have already unpacked your chassis and read all the site requirements for your new equipment.

Guidelines for a Standalone Equipment Shelf or Tabletop Installation

The chassis should already be in the area where you want to install it. If you have not determined where to install your chassis, see the **Preparing Your Site for Installation** section for information about site considerations.

When installing the Cisco Catalyst 9800-40 Wireless Controller on a sturdy equipment shelf or tabletop, ensure that the surface is clean and that you have considered the following:

- The Cisco Catalyst 9800-40 Wireless Controller requires at least 3 inches (7.62 cm) of clearance at the inlet and exhaust vents (the front and rear sides of the chassis).
- The chassis should be installed off the floor. Dust that accumulates on the floor is drawn into the interior of the controller by the cooling fans. Excessive dust inside the controller can cause over temperature conditions and component failures.
- There must be approximately 19 inches (48.3 cm) of clearance at the front and rear of the chassis to install and replace FRUs, or to access network cables and equipment.
- The chassis needs adequate ventilation. Do not install it in an enclosed cabinet where ventilation is inadequate.
- Keep the cable-management bracket ready, if you plan to install it on the front of the chassis.
- Ensure that an adequate chassis ground (earth) connection exists for your controller chassis (see the **Attaching a Chassis Ground Connection** section).

Installing the Controller on a Standalone Equipment Shelf or Tabletop

-
- Step 1** Remove any debris and dust from the tabletop or platform, as well as the surrounding area.
- Step 2** Lift the chassis into position on the equipment shelf or tabletop.

Note **Step 3** to **Step 9** are optional, if you are installing the Cisco Catalyst 9800-40 Wireless Controller on a rack shelf. The chassis rack-mount brackets must be installed prior to installing the cable-management brackets. See the **Attaching the Front Rack-Mount Brackets** section.

- Step 3** Attach the front rack-mount brackets. Locate the threaded holes in the front sides of the chassis (first holes beyond the vent holes) and use the package of black screws that is shipped with the chassis.
- Step 4** Align the front rack-mount bracket to one side of the chassis.
- Step 5** Insert and tighten the screws on one side.
- Step 6** Repeat **Step 3** to **Step 5** on the other side of the chassis. Use all the screws to secure the rack-mount brackets to the chassis.
- Step 7** Gather the two cable-management brackets and screws shipped with your chassis. See the **Attaching Cable Management Bracket** section.
- Step 8** Screw a cable-management bracket to each side of the rack-mount brackets that are attached to the chassis. Use two screws for each cable-management bracket. Use a screw from the package of four screws.
- Note** Ensure that the cable-management U feature device has the open end pointing outwards when you attach it to the chassis.
- Step 9** Check that all the screws are securely tightened.

What to do next

Go to the **Attaching a Chassis Ground Connection** section for instructions about continuing the installation.

Guidelines for Rack Installation

The Cisco Catalyst 9800-40 Wireless Controller can be installed in the following rack types:

- Two-post rack, either 19 inch or 23 inch. Inner clearance (the width between the inner sides of the two posts or rails) must be at least 19 inches (48.26 cm). Airflow through the chassis is from front to back.
- Four-post, 19-inch equipment rack. Inner clearance (the width between the inner sides of the two posts or rails) must be at least 19 inches (48.26 cm). Airflow through the chassis is from front to back.

The Cisco Catalyst 9800-40 Wireless Controller can be installed with both front or rear rack-mount brackets.

When planning your rack installation, consider the following guidelines:

- The Cisco Catalyst 9800-40 Wireless Controller requires a minimum of 1.75 inches or 4.45 cm rack units of vertical rack space. Measure the proposed rack location before mounting the chassis in the rack.
- Before using a particular rack, check for obstructions (such as a power strip) that could impair the rack-mount installation. If a power strip does impair a rack-mount installation, remove the power strip before installing the chassis, and then replace it after the chassis is installed.
- Allow sufficient clearance around the rack for maintenance. If the rack is mobile, you can push it back near a wall or cabinet for normal operation and pull it out for maintenance (installing or moving cards, connecting cables, or replacing or upgrading components). Otherwise, allow 19 inches (48.3 cm) of clearance to remove field-replaceable units.

- Maintain a minimum clearance of 3 inches on the front and back sides of the chassis for the cooling air inlet and exhaust ports, respectively. Avoid placing the chassis in an overly congested rack or directly next to another equipment rack; the heated exhaust air from other equipment can enter the inlet air vents and cause an over temperature condition inside the controller.

**Caution**

To prevent chassis overheating, never install a Cisco Catalyst 9800-40 Wireless Controller in an enclosed space that is not properly ventilated or air conditioned.

- Always install heavier equipment in the lower half of a rack to maintain a low center of gravity to prevent the rack from falling over.
- Install and use the cable-management brackets included with the controller to keep cables organized and out of the way of cards and processors. Ensure that cables from other equipment already installed in the rack do not impair access to the cards or require you to disconnect cables unnecessarily to perform equipment maintenance or upgrades.
- Provide an adequate chassis ground (earth) connection for your controller chassis.

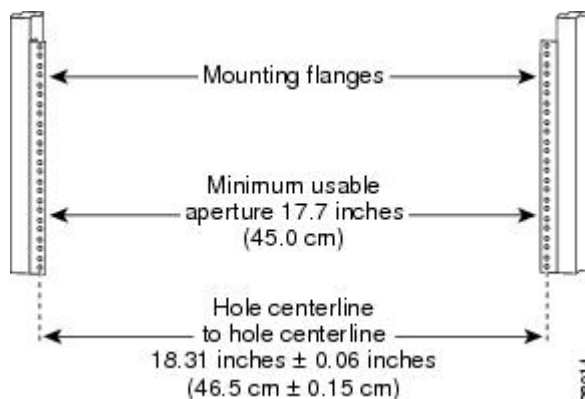
In addition to the preceding guidelines, review the precautions for avoiding excessive temperature conditions in the **Physical Characteristics** section and the **Site Environmental Requirements** section.

Verifying Rack Dimensions

Before you begin

Before you install the chassis, measure the space between the vertical mounting flanges (rails) on your equipment rack to verify that the rack conforms to the measurements shown in the following figure.

Figure 7: Verifying Equipment Rack Dimensions



Step 1

Mark and measure the distance between two holes on the left and right mounting rails. The distance should measure 18.31 inches \pm 0.06 inches (46.5 cm \pm 0.15 cm)

Note Measure for pairs of holes near the bottom, middle, and top of the equipment rack to ensure that the rack posts are parallel.

- Step 2** Measure the space between the inner edges of the left front and right front mounting flanges on the equipment rack. The space must be at least 17.7 inches (45 cm) to accommodate the chassis that is 17.25 inches (43.8 cm) wide and fits between the mounting posts on the rack.

Attaching Front Rack-Mount Brackets

Before you begin

Before installing the chassis in the rack, you must install the rack-mount brackets on each side of the chassis.

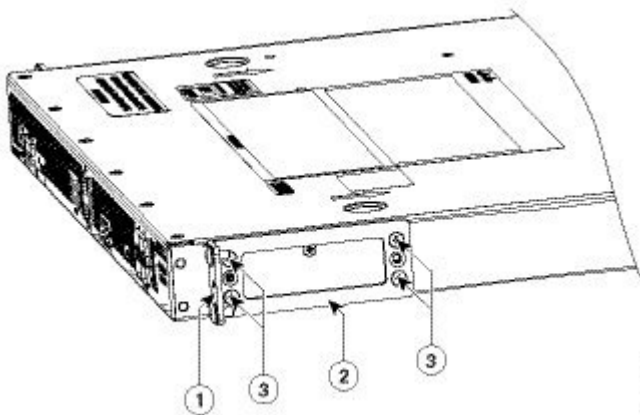
Determine where in the rack you want the chassis to be mounted. If you are mounting more than one chassis in the rack, then start from the bottom up or the center of the rack. The following figure shows the brackets attached to the chassis. Depending on the bracket holes you use, the chassis may protrude in the rack.



- Note** The cable-management brackets are attached to the chassis after you install the chassis rack-mount brackets on the chassis and mount the chassis in the rack.

- Step 1** Locate the threaded holes on the side of the chassis. Ensure that you hold the front rack-mount bracket with the ear and holes facing outward and towards the front of the chassis. The following figure shows where to attach the front rack-mount brackets to the Cisco Catalyst 9800-40 Wireless Controller.

Figure 8: Attaching the Front Rack-Mount Brackets to the Cisco Catalyst 9800-40 Wireless Controller



1	Front rack-mount bracket ear and holes	3	Front rack-mount bracket screws
2	Front rack-mount bracket		

- Step 2** Position the front rack-mount bracket top hole with the chassis, first top hole behind the side vent holes.

- Step 3** Insert and tighten the black screws on one side.

Step 4 Repeat **Step 1** to **Step 3** on the other side of the chassis. Use black screws to secure the rack-mount brackets to the chassis.

Attaching Rear Rack-Mount Brackets

Before you begin



Note This procedure is not required if you are installing the chassis in a two-post rack.

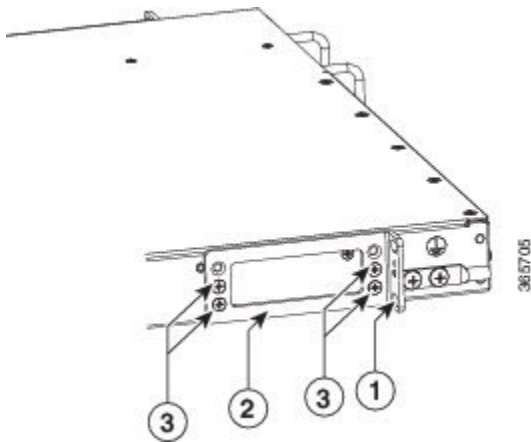
Before installing the chassis in a four-post rack, you must install the rear rack-mount brackets on each side of the chassis.

Determine where in the rack you want the chassis to be mounted. If you are mounting more than one chassis in the rack, then start from the bottom up or the center of the rack. The following figure shows the brackets attached to the chassis

Step 1 Locate the threaded holes on the side of the chassis. Ensure that you hold the rear rack-mount bracket with the ear and holes facing outward and towards the rear of the chassis.

The following figure shows where to attach the rear rack-mount brackets to the Cisco Catalyst 9800-40 Wireless Controller.

Figure 9: Attaching the Rear Rack-Mount Brackets to the Cisco Catalyst 9800-40 Wireless Controller



1	Rear rack-mount bracket ear and holes	3	Rear rack-mount bracket screws
2	Rear rack-mount bracket		

Step 2 Position the rear rack-mount bracket with the chassis.

Step 3 Insert the black screws on one side. Do not fully tighten the screws. The rear bracket holes are slotted to allow for adjustment. Do not fully tighten the screws until the chassis is installed in the four-post rack.

Step 4 Repeat **Step 1** to **Step 3** on the other side of the chassis. Use black screws to secure the rack-mount brackets to the chassis.

Mounting the Controller in the Rack

After installing the rack-mount brackets on the chassis, mount the chassis by securing the rack-mount brackets to two posts or mounting strips in the rack using the screws provided. Because the rack-mount brackets support the weight of the entire chassis, ensure that you use all the screws to fasten the two rack-mount brackets to the rack posts.

Two-Post Rack Installation

Before you begin



Warning **Statement 1006**—Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable.

The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

The Cisco Catalyst 9800-40 Wireless Controller can be installed on a two-post rack, either 19 inch or 23 inch. We recommend that you allow at least 1 or 2 inches (2.54 or 5.08 cm) of vertical clearance between the controller and any equipment directly above and below it.

-
- Step 1** On the chassis, ensure that all the screw fasteners on the installed components are securely tightened.
- Step 2** Make sure that your path to the rack is unobstructed. If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized
- Step 3** (Optional) Install a shelf in the rack to support the Cisco Catalyst 9800-40 Wireless Controller. If you use a shelf, it helps support the chassis while you secure it to the rack.
- Note** If you are using a shelf, place the chassis on the shelf and slightly raise the front of the chassis to align the mounting bracket holes with the rack post holes while allowing the bottom of the chassis to rest on the shelf.
- Step 4** With two people, lift the chassis into position between the rack posts.
- Step 5** Align the mounting bracket holes with the rack post holes and attach the chassis to the rack.
- Step 6** Position the chassis until the rack-mounting flanges are flush against the mounting rails on the rack.
- Tip** To allow space to attach the cable-management brackets to the chassis in the rack easily, use the rack-mount bracket ear holes mentioned in Steps 7 and 8.
- Step 7** Hold the chassis in position against the mounting rails in the equipment rack and follow these steps:

1. Insert the bottom screw into the second hole up from the bottom of the rack-mount ear and use a hand-held screwdriver to tighten the screw to the rack rail.

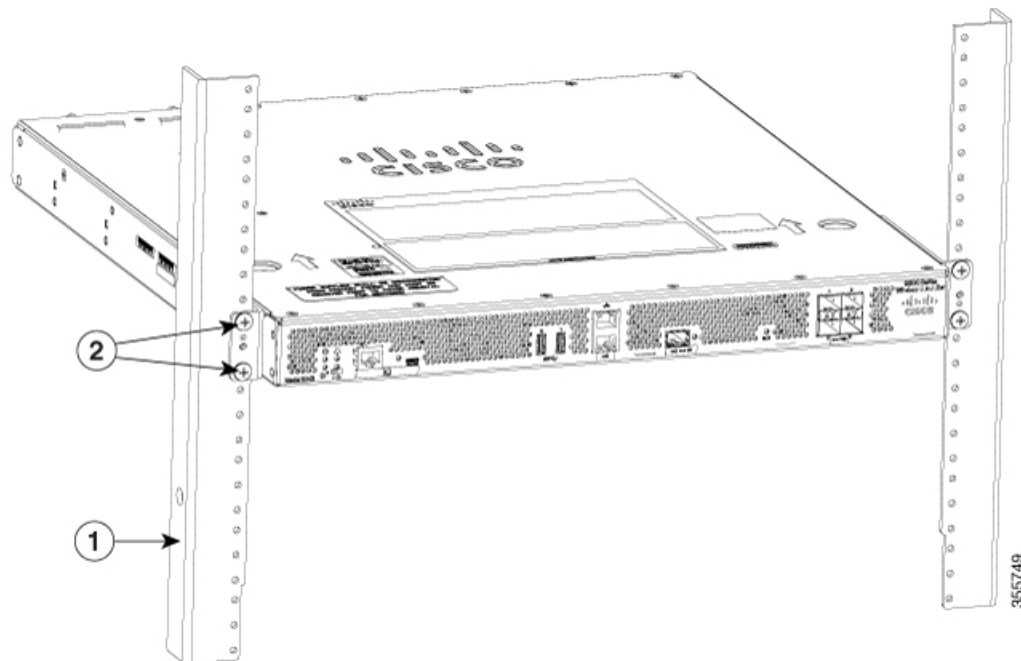
Tip To make installation easier, insert one screw at the bottom of the chassis and the next screw at the top of the chassis diagonally from the first screw

2. Insert the top screw into the second hole from the top of the rack-mount ear diagonally from the bottom screw and tighten the screw to the rack rail.
3. Insert the rest of the screws to secure the chassis to the rack equipment.

Step 8 Tighten all the screws on each side to secure the chassis to the equipment rack.

The following figure shows the Cisco Catalyst 9800-40 Wireless Controller on a two-post equipment rack.

Figure 10: Cisco Catalyst 9800-40 Wireless Controller Installed on a Two-Post Equipment Rack



1	Rack equipment rail	2	Rack mount bracket ear and screws
---	---------------------	---	-----------------------------------

What to do next

This completes the procedure for installing the chassis on a two-post rack. Proceed to the **Attaching a Chassis Ground Connection** section to continue with the installation.

Four-Post Rack Installation

Step 1 (Optional) Install a shelf in the rack to support the Cisco Catalyst 9800-40 Wireless Controller. If you use a shelf, it helps support the chassis while you secure it to the rack.

Note If you are using a shelf, place the chassis on the shelf and slightly raise the front of the chassis to align the mounting bracket holes with the rack post holes while allowing the bottom of the chassis to rest on the shelf.

Step 2 With two people, lift the chassis into position between the rack posts.

Step 3 Position the chassis until the rack-mounting flanges are flush against the mounting rails on the rack.

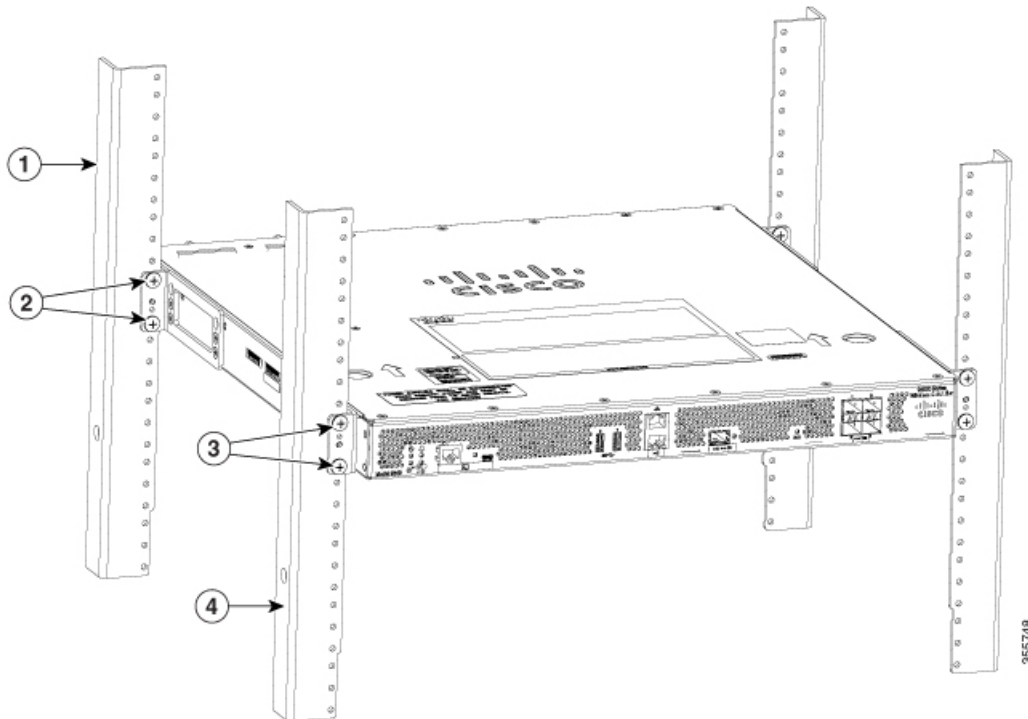
Note Use the second hole up from the bottom of the rack-mount bracket and the second hole down from the top of the rack-mount bracket. This will make it easier to attach the cable-management bracket to the chassis in the equipment rack.

Step 4 Hold the chassis in position against the mounting rails while the second person finger-tightens a screw to the rack rails on each side of the chassis.

Step 5 Finger-tighten screws to the rack rails on each side of the chassis.

Step 6 Tighten all the screws on each side to secure the chassis to the equipment rack. The following figure shows the Cisco Catalyst 9800-40 Wireless Controller on a four-post equipment rack.

Figure 11: Cisco Catalyst 9800-40 Wireless Controller in a Four-Post Rack—Front and Rear Rack-Mounting



1	Rear rack equipment rail	3	Front rack mount bracket ear and screws
2	Rear rack mount bracket ear and screws	4	Front rack equipment rail

- Step 7** Use a level to verify that the tops of the two brackets are level, or use a measuring tape to verify that both brackets are the same distance from the top of the rack rails.
-

What to do next

This completes the procedure for installing the chassis in the rack. Proceed to the **Attaching a Chassis Ground Connection** section to continue the installation.

Attaching the Cable Management Bracket

Before you begin

The cable management brackets should be mounted to each rack-mount bracket on the chassis to provide cable management to both sides of the chassis. These brackets are screw-mounted to the rack-mount brackets to allow easy installation and removal of cables.

The cable-management brackets for the Cisco Catalyst 9800-40 Wireless Controller contains one independent cable-management U-type feature with two screws for each bracket.



Note Make certain that the cable-management bracket "U" feature is facing upwards when you attach it to the chassis.

- Step 1** Align the cable-management bracket to the rack-mount bracket on one side of the Cisco Catalyst 9800-40 Wireless Controller.

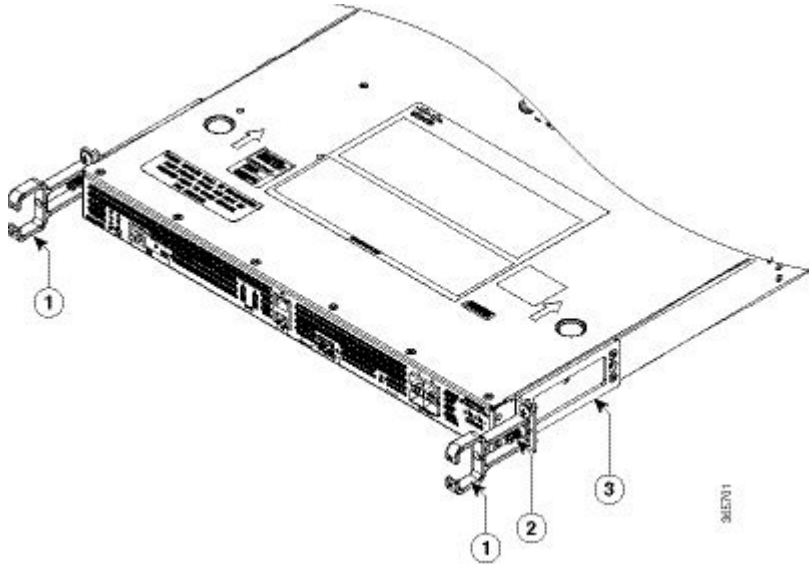
The cable-management bracket aligns to the top hole of the chassis rack-mount bracket.

- Step 2** Using a Phillips screwdriver, insert one screw through the top screw hole of the cable-management bracket and into the chassis rack-mount bracket and tighten the screw

Note Use the package of screws that came with your chassis containing four screws.

The following figure shows where to attach the cable-management brackets to the Cisco Catalyst 9800-40 Wireless Controller.

Figure 12: Attaching the Cable-Management Brackets to the Cisco Catalyst 9800-40 Wireless Controller

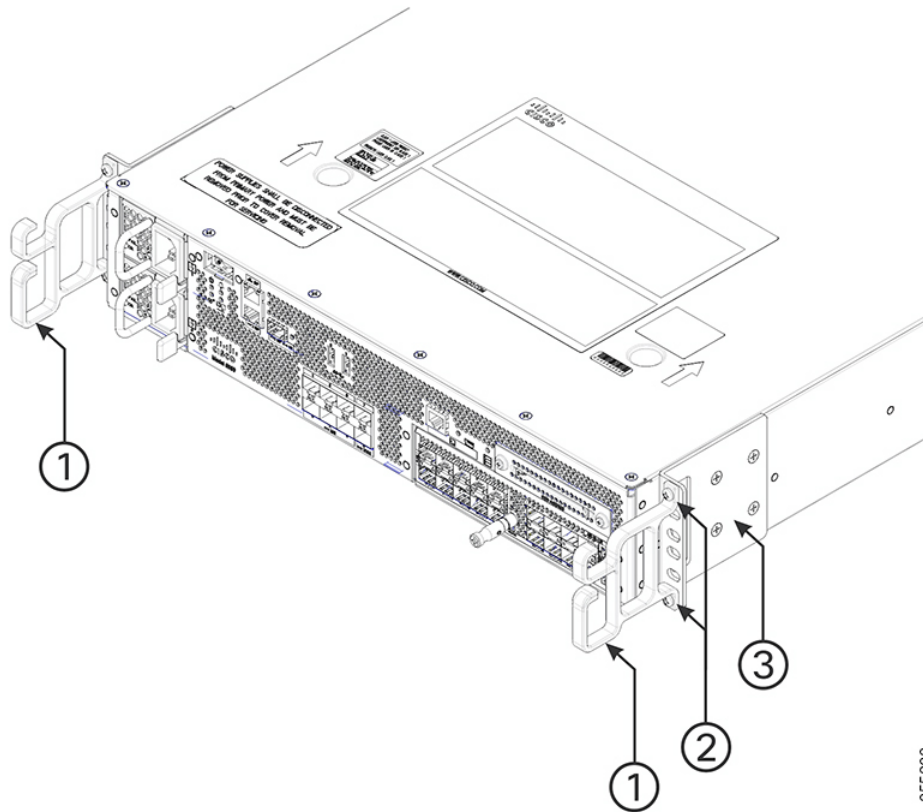


1	Cable-management bracket "RU" feature	3	Chassis front rack-mount bracket
2	Cable-management bracket screw		

Note Use the package of screws that came with your chassis containing four screws.

The following figure shows where to attach the cable-management brackets to the .

Figure 13: Attaching the Cable-Management Brackets to the



955863

1	Cable-management bracket "U" feature	3	Chassis front rack-mount bracket
2	Cable-management bracket screw holes		

Step 3 Insert the cable management screw into the screw hole of the cable-management bracket and into the chassis rack-mount bracket and tighten the screw using a Philips screwdriver.

Step 4 Repeat **step 1** to **step 3** for the other side of the chassis.

Chassis Ground Connection

Connecting the Cisco Catalyst 9800-40 Wireless Controller chassis to ground is required for any AC powered installation where compliance with Telcordia grounding requirements is necessary.



Warning Statement 1024—Ground Conductor

This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available

Before you connect power or turn on power to your chassis, you must provide an adequate chassis ground (earth) connection for the chassis. A chassis ground connector is provided on each Cisco Catalyst 9800-40 Wireless Controller. There is a stud on the rear left side of the chassis.



Caution The grounding wire should always be the first to be installed or connected and the last to be removed or disconnected.

Have the recommended tools and supplies available before you begin this procedure.

Recommended Tools and Supplies

The following tools, equipment, and supplies are necessary to connect the system ground to the chassis:

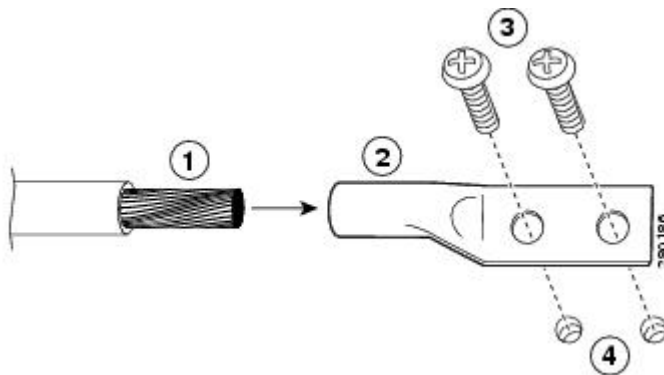
- Philips screwdriver
- 3.5-mm flat blade screwdriver (Phoenix # 1205053 or equivalent 3.5-mm flat blade)
- Dual-lug chassis ground component
- Grounding wire

Attaching a Chassis Ground Connection

Step 1 Use the wire stripper to strip one end of the AWG #6 wire approximately 0.75 inches (19.05 mm).

Step 2 Insert the AWG #6 wire into the open end of the grounding lug.

Figure 14: Attaching a Grounding Lug to the Chassis Ground Connector



1	Chassis ground lead wire	3	Ground screws
2	Grounding lug	4	Chassis ground connector holes

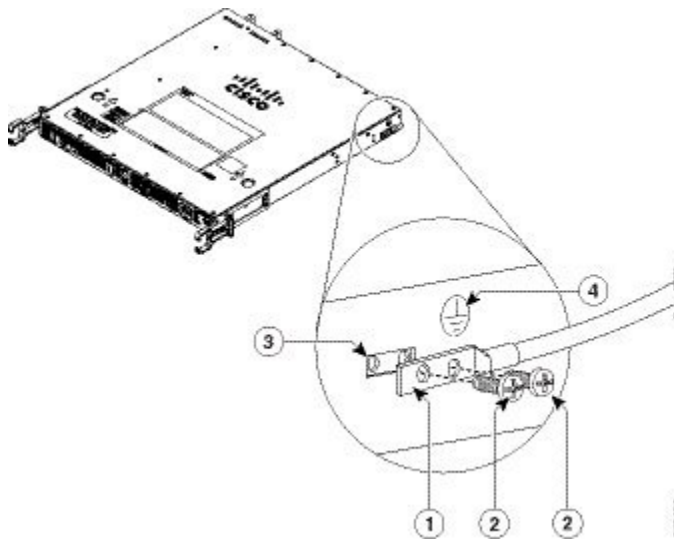
Step 3 Use the crimping tool to carefully crimp the wire receptacle around the wire. This step is required to ensure a proper mechanical connection.

Step 4 Locate the chassis ground connector on the side of your chassis.

Step 5 Insert the two screws through the holes in the grounding lug.

The following figure shows how to attach a grounding lug to the chassis ground connector.

Figure 15: Attaching the Grounding Lug to the Ground Connector of the Cisco Catalyst 9800-40 Wireless Controller



1	Chassis ground lug	3	Ground connector on the chassis
2	Grounding screws	4	Ground symbol

Step 6 Use the Number 2 Philips screwdriver to carefully tighten the screws until the grounding lug is held firmly to the chassis. Do not over tighten the screws.

Step 7 Connect the opposite end of the grounding wire to the appropriate grounding point at your site to ensure an adequate chassis ground.

Connecting Cables

Keep the following guidelines in mind when connecting any external cable to the Cisco Catalyst 9800-40 Wireless Controller:

- To reduce the chance of interference, avoid crossing high-power lines with any interface cables.
- Verify all the cabling limitations (particularly distance) before powering on the system.

Connecting the Console Port Cable

The controller uses RJ-45 ports for console port to attach a console terminal. The controller has an asynchronous serial (EIA/TIA-232) RJ-45 console port labeled CON on its front panel. You can connect this port to most types of video terminals with a console cable kit that is included with your controller. The console cable kit contains:

- One RJ-45-to-RJ-45 crossover cable
- One RJ-45-to-DB-9 (female) adapter

The crossover cable reverses pin connections from one end to the other. In other words, it connects pin 1 (at one end) to pin 8 (at the other end), pin 2 to pin 7, pin 3 to pin 6, and so on. You can identify a crossover cable by comparing the two modular ends of the cable. Hold the cable ends in your hand, side-by-side, with the tabs at the back. Ensure that the wire connected to the outside (left) pin of the left plug (pin 1) is the same color as the wire connected to the outside (right) pin of the right plug (pin 8).

The console port is an asynchronous serial port; devices connected to this port must be capable of asynchronous transmission.

Procedure for Connecting the Console Port Cable

Before you begin

Before connecting to the console interface on the controller using a terminal or PC, perform the following steps:

-
- Step 1** Before connecting a terminal to the console port, configure the terminal to match the chassis console port as follows: 9600 baud, 8 data bits, no parity, 1 stop bits (9600 8N1).
- Step 2** Connect one end of the RJ-45 cable to the serial RJ-45 console port (CON) on the Cisco Catalyst 9800-40 Wireless Controller using the RJ-45 to DB-9 cable. Connect the DB-9 end to your terminal equipment.
- Note** For information about how to change the default settings to meet the requirements of your terminal or host, see the *Cisco IOS Terminal Services Configuration Guide*.
- Step 3** After you establish normal controller operation, you can disconnect the terminal. Follow the same procedure to connect a video terminal to the console port.
-

What to do next

Go to the [Connecting to the Mini USB Console Port](#) section to continue the installation.

Connecting to the Mini USB Console Port

The USB serial console port connects directly to the USB connector of a PC using a USB Type A to 5-pin mini USB Type-B cable. The USB Console supports full speed (12Mbps) operation. The console port does not support hardware flow control.



- Note**
- Always use shielded USB cables with a properly terminated shield. The USB serial console interface cable must not exceed 3 meters in length.
 - Only one console port can be active at a time. When a cable is plugged into the USB console port, the RJ-45 port becomes inactive. Conversely, when the USB cable is removed from the USB port, the RJ-45 port becomes active.
 - 4-pin mini USB Type-B connectors are easily confused with 5-pin mini USB Type-B connectors. Note that only the 5-pin mini USB Type-B is supported
-

The default parameters for the console port are 9600 baud, 8 data bits, no parity, and 1 stop bit.

For operation with a Microsoft Windows OS version older than Windows 7, the Cisco Windows USB Console Driver must be installed on any PC connected to the console port. If the driver is not installed, the prompts guide you through a simple installation process.

The Cisco Windows USB Console Driver allows plugging and unplugging the USB cable from the console port without affecting Windows HyperTerminal operations. No special drivers are needed for Mac OS X or Linux.

Baud rates for the USB console port are 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 bps.

Management Ethernet Port Cable Connection

Before you begin

**Caution**

To comply with Class A emission requirements, a shielded Ethernet cable must be used for the connection

Step 1 Insert an Ethernet RJ-45 cable into the MGMT port.

Step 2 Insert the other end of the RJ-45 cable to your management device or network.



CHAPTER 5

Power Up and Initial Configuration

This chapter guides you through a basic controller configuration, which is sufficient for you to access your network. Complex configuration procedures are beyond the scope of this publication and can be found in the modular configuration and command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware.

- [Checking Conditions Prior to System Startup, on page 53](#)
- [Powering Up the Controller, on page 54](#)
- [Performing the Initial Configuration on the Controller, on page 57](#)
- [Saving Your Controller Configuration, on page 65](#)
- [Verifying the Initial Configuration, on page 66](#)
- [Powering Off the Controller Safely, on page 66](#)
- [Environmental Monitoring and Reporting Functions, on page 67](#)

Checking Conditions Prior to System Startup

Ensure that all the card slots and compartments are closed. Install blank faceplates on empty slots. Always have power supply slots filled. If you leave a power supply slot uncovered, then you risk exposure to hazardous voltages on the power pins on the midplane.



Warning

Statement 1029—Blank Faceplates and Cover Panels.

Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.



Note

To view the boot sequence, you must have a console connection to the Cisco Catalyst 9800-40 Wireless Controller before it powers up.

Ensure that the following conditions are addressed before starting up the controller:

- The network interface cable or the optional Management port cable is connected.

- The chassis is securely mounted and grounded.
- The power and interface cables are connected.
- Your PC with terminal emulation program (hyperTerminal or equivalent) is connected to the console port, powered up, and is configured for 9600 baud, 8 data bits, 1 stop bit, no parity, with flow control set to none.
- You have selected passwords for access control.
- Captive installation screws are tight on all removable components.
- The console terminal is turned on.
- You have determined the IP addresses for the network interfaces.
- The EPA and the NIM are inserted in their slots, if applicable.



Note The EPA and NIM must be defined.

- Empty card slots are filled with card blanks. This ensures proper air flow through the chassis and electromagnetic compatibility (EMC).

Powering Up the Controller

Before you begin

Before you power on, make sure that:

- The power supply cord is plugged into the power supply inlet.
- All cables are connected.
- Your computer is powered up and connected.

You are now ready to power on the system for the first time.

Step 1 Move the chassis power switch to the ON position.

Listen for the fans; you should immediately hear them operating. Ensure that the power supply LED OK is green and the FAIL LED is not illuminated. The front-panel indicator LEDs provide power, activity, and status information useful during bootup. For more detailed information about the LEDs, see the **LEDs** section.

Step 2 Observe the initialization process.

When the system boot is complete (the process takes a few seconds), the controller begins to initialize.

Loading from ROMMON with a System Image in Bootflash

The following is an example of what is displayed during the system boot process:

```
Initializing Hardware ...
```


System integrity status: 90170200 12030117

System Bootstrap, Version 16.10(2r), RELEASE SOFTWARE
Copyright (c) 1994-2018 by cisco Systems, Inc.

Current image running: Boot ROM1
Last reset cause: PowerOn

C9800-40-K9 platform with 33554432 Kbytes of main memory

Warning: filesystem is not clean

File size is 0x2ae586e3

Located C9800-40-universalk9_wlc.16.10.01.SPA.bin

Image size 719685347 inode num 15, bks cnt 175705 blk size 8*512

```
#####
#####
#####
#####
#####
```

Boot image size = 719685347 (0x2ae586e3) bytes

ROM:RSA Self Test Passed
ROM:Sha512 Self Test Passed

Package header rev 3 structure detected

Calculating SHA-1 hash...done

validate_package_cs: SHA-1 hash:

calculated fdf6e062:e7a16041:b642e191:16a8f2b2:a98397f4

expected fdf6e062:e7a16041:b642e191:16a8f2b2:a98397f4

Validating main package signatures

RSA Signed RELEASE Image Signature Verification Successful.

Validating subpackage signatures

Image validated

Nov 14 21:21:26.350: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

Nov 14 21:21:29.175: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

Both links down, not waiting for other chassis

Chassis number is 1

Nov 14 21:21:29.956: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

Nov 14 21:21:31.877: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

Nov 14 21:21:38.272: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

Nov 14 21:21:41.387: %PMAN-3-PROC_EMPTY_EXEC_FILE: R0/0: pvp: Empty executable used for process
bt_logger

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cisco C9800-40-K9 (1GL) processor (revision 1GL) with 7866661K/6147K bytes of memory.
FIPS: Flash Key Check : Found Key , FIPS Mode Enabled

Processor board ID TKM21130895
1 Virtual Ethernet interface
4 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
33554432K bytes of physical memory.
26910719K bytes of eUSB flash at bootflash:.
234365527K bytes of SATA hard disk at harddisk:.
0K bytes of WebUI ODM Files at webui:.

Base Ethernet MAC Address : 00:A3:8E:23:7F:40

Installation mode is BUNDLE

%INIT: waited 0 seconds for NVRAM to be available

Press RETURN to get started!

Performing the Initial Configuration on the Controller

Using the Cisco Setup Command Facility

The **setup** command facility prompts you to enter the information that is needed to configure a controller quickly. The facility takes you through an initial configuration, including LAN and WAN interfaces.



Note The setup command facility is entered automatically if there is no configuration on the controller when it is booted into Cisco IOS-XE.

For information on modifying the configuration after you create it, see the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide* and the *Cisco Catalyst 9800 Series Wireless Controller Command Reference Guide*.

This section explains how to configure a host name for the controller, set passwords, and configure an interface to communicate with the management network.



Note If you make a mistake while using the setup command facility, you can exit and run the setup command facility again. Press **Ctrl-C**, and enter the **setup** command in privileged **EXEC** mode (**WLC#**).

Step 1 From the Cisco IOS-XE CLI, enter the setup command in privileged EXEC mode:

```
WLC> enable
Password: cisco123
WLC# setup
--- System Configuration Dialog ---
Continue with configuration dialog? [yes/no]:
```

The prompts in the **setup** command facility vary depending on the controller, installed interface modules, and software image.

The following steps and the user entries (in bold) are shown as examples only.

Step 2 To proceed using the setup command facility, enter **yes**

```
Continue with configuration dialog? [yes/no]: yes
```

At any point you may enter a question mark '?' for help.

Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['']

Step 3 Basic management setup configures only enough connectivity

```
Would you like to enter basic management setup? [yes/no]: yes
```

Step 4 Enter a hostname for the controller (this example uses myWLC):

```
Configuring global parameters:
Enter host name [WLC]: myWLC
```

Step 5 Enter an enable secret password. This password is encrypted (for more security) and cannot be seen when viewing the configuration.

The enable secret is a password used to protect access to privileged EXEC and configuration modes.

This password, after entered, becomes encrypted in the configuration.

Enter enable secret: `9.3E/eKj7KQhfik$6HKawMLMqDjcbKpVUzJ0/I3PwyBnHbIq17OitMW4T.s`

Step 6 Enter an enable password that is different from the enable secret password. This password is not encrypted (and is less secure) and can be seen when viewing the configuration.

The enable password is used when you do not specify an enable secret password, with some older software versions, and some boot images.

Enter enable password: `cisco123`

Step 7 Enter the virtual terminal password, which prevents unauthenticated access to the controller through ports other than the console port:

The virtual terminal password is used to protect access to the router over a network interface.

Enter virtual terminal password: `cisco123`

Step 8 Respond to the following prompts as appropriate for your network:

Configure SNMP Network Management? [no]: `yes`

Community string [public]:

A summary of the available interfaces is displayed. The interface summary includes interface numbering, which is dependent on the controller, installed modules, and interface cards.

Current interface summary

Interface	IP-Address	OK?	Method	Status	Protocol
Te0/0/0	unassigned	YES	unset	down	down
Te0/0/1	unassigned	YES	unset	down	down
Te0/0/2	unassigned	YES	unset	down	down
Te0/0/3	unassigned	YES	unset	down	down
GigabitEthernet0	unassigned	YES	unset	up	up
Vlan1	unassigned	YES	unset	down	down

Enter interface name used to connect to the management network from the above interface summary: `GigabitEthernet0`

Step 9 Respond to the following prompts as appropriate for your network:

Configuring interface GigabitEthernet0:

Configure IP on this interface? [yes]: `yes`

IP address for this interface: `10.104.33.77`

Subnet mask for this interface [255.0.0.0] : `255.255.255.0`

Class A network is 10.0.0.0, 24 subnet bits; mask is /24

The following configuration command script is created:

```
hostname myWLC
enable secret 9 $9$.3E/eKj7KQhfik$6HKawMLMqDjcbKpVUzJ0/I3PwyBnHbIq17OitMW4T.s
enable password cisco123
line vty 0 15
password cisco
username admin privilege 15 password cisco
snmp-server community public
!
!
interface TenGigabitEthernet0/0/0
!
```

```

interface TenGigabitEthernet0/0/1
!
interface TenGigabitEthernet0/0/2
!
interface TenGigabitEthernet0/0/3
!
interface GigabitEthernet0
no shutdown
ip address 10.104.33.77 255.255.255.0
no mop enabled
!
interface Vlan1
shutdown
no ip address
!
end

```

Note To ensure that the correct subnet is allotted by the user, see the **Gigabit Ethernet Management Interface Overview** section.

Step 10 Respond to the following prompts. Select [2] to save the initial configuration.

```

[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.
Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

```

The following user prompt is displayed:

```
myWLC#
```

Completing the Configuration

When using the Cisco setup command facility, and after you have provided all the information requested by the facility as described in **Using the Cisco setup Command Facility** section, the final configuration appears.

To complete your controller configuration, follow these steps.

Step 1 The facility prompts you to save the configuration.

- If you answer no, the configuration information you entered is not saved, and you return to the controller enable prompt (WLC#). Enter **setup** to return to the System Configuration dialog box.
- If you answer yes, the configuration is saved, and you are returned to the user EXEC prompt (WLC>).

```

Use this configuration? {yes/no} : yes
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

```

```

%LINK-3-UPDOWN: Interface GigabitEthernet0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1/0, changed state to up

```

```
<Additional messages omitted.>
```

Step 2 When messages stop appearing on your screen, press Return to get the `WLC>` prompt.

Step 3 The `WLC>` prompt indicates that you are now at the command-line interface (CLI).

You have just completed an initial controller configuration. Note that this is not a complete configuration. At this point, you have two choices:

- Run the setup command facility again, and create another configuration:

```
WLC> enable
Password: password
WLC# setup
```

- Modify the existing configuration or configure additional features by using the CLI:

```
WLC> enable
Password: password
WLC# configure terminal WLC(config)#
```

Using the Cisco IOS-XE CLI—Manual Configuration

This section shows you how to access the CLI to perform the initial configuration on the controller

If the system configuration message does not appear, it means a default configuration file was installed on the controller prior to shipping.

Follow these steps to configure the controller.

Step 1 Enter **no** when the following system message appears on the controller.

```
--- System Configuration Dialog ---
```

```
Would you like to enter the initial configuration dialog? [yes/no]: no
```

Step 2 Press **Return** and continue with the manual configuration:

Several log messages are displayed.

Step 3 Press **Return** to bring up the `WLC>` prompt

Step 4 Type **enable** to enter privileged EXEC mode.

```
WLC> enable
WLC#
```

The following table covers details about the auto boot, boot file mentioned, and message displayed.

Auto Boot (Set/Not Set)	Boot File Mentioned	Message displayed
Set	No	You get to view a warning message and require confirmation to proceed with the reload without mentioning a file to boot with. You get to view this message apart from the regular confirmation on the usual reload.

Auto Boot (Set/Not Set)	Boot File Mentioned	Message displayed
Set	Yes	No extra warning or confirmation is required at reload. The boot file mentioned is loaded.
Not set	Yes	No extra warning or confirmation is required at reload.

Configuring the Controller Hostname

The hostname used in CLI prompts the default configuration filenames. If you do not configure the controller hostname, the controller uses the factory-assigned default hostname **WLC**.

Procedure

	Command or Action	Purpose
Step 1	enable Example: WLC> enable	Enables privileged EXEC mode. Note Enter your password if prompted.
Step 2	configure terminal Example: WLC# configure terminal	Enters global configuration mode.
Step 3	hostname name Example: WLC(config)# hostname myWLC	Specifies or modifies the hostname for the network server.
Step 4	end Example: myWLC(config)# end	(Optional) Returns to privileged EXEC mode.

Configuring the Enable and Enable Secret Passwords

To provide an additional layer of security, particularly for passwords that cross the network or are stored on a TFTP server, you can use either the **enable password** command or **enable secret** command. Both commands accomplish the same thing—they allow you to establish an encrypted password that users must enter to access privileged EXEC (enable) mode.

We recommend that you use the **enable secret** command because it uses an improved encryption algorithm.



Note If you configure the enable secret command, it takes precedence over the enable password command; the two commands cannot be in effect simultaneously.

For more information, see the **Configuring Passwords and Privileges** chapter in the *Cisco IOS Security Configuration Guide*. Also see the **Cisco IOS Password Encryption Facts** tech note and the **Cisco Guide to Harden Cisco IOS Devices** tech note.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Note Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	enable secret password Example: Device(config)# enable secret greentree	Specifies an additional layer of security over the enable password command.
Step 4	end Example: Device(config)# end	Returns to privileged EXEC mode.
Step 5	enable Example: Device> enable	Enables privileged EXEC mode. Verify that your new enable or enable secret password works.
Step 6	end Example: Device(config)# end	(Optional) Returns to privileged EXEC mode.

Configuring the Console Idle Privileged EXEC Timeout

By default, the privileged EXEC command interpreter waits 10 minutes to detect user input before timing out.

When you configure the console line, you can also set communication parameters, specify autobaud connections, and configure terminal operating parameters for the terminal that you are using. For more information on configuring the console line, see the *Cisco IOS Configuration Fundamentals and Network Management Configuration Guide*. In particular, see the *Configuring Operating Characteristics for Terminals* and *Troubleshooting and Fault Management* chapters.

Procedure

	Command or Action	Purpose
Step 1	enable Example:	Enables privileged EXEC mode. Note Enter your password if prompted.

	Command or Action	Purpose
	<code>Device> enable</code>	
Step 2	configure terminal Example: <code>Device# configure terminal</code>	Enters global configuration mode.
Step 3	line console 0 Example: <code>Device(config)# line console 0</code>	Configures the console line and starts the line configuration command collection mode.
Step 4	exec-timeout <i>minutes [seconds]</i> Example: <code>Device(config)# exec-timeout 0 0</code>	Sets the idle privileged EXEC timeout, which is the interval that the privileged EXEC command interpreter waits until user input is detected. The example shows how to specify no timeout. Setting the exec-timeout value to 0 will cause the controller to never log out once logged in. This could have security implications if you leave the console without manually logging out using the disable command.
Step 5	end Example: <code>Device(config)# end</code>	Returns to privileged EXEC mode.
Step 6	show running-config Example: <code>Device# show running-config</code>	Displays the running configuration file. Verify that you have configured the idle privileged EXEC timeout correctly.

Example

The following example shows how to set the console idle privileged EXEC timeout to 2 minutes 30 seconds:

```
line console
exec-timeout 2 30
```

The following example shows how to set the console idle privileged EXEC timeout to 30 seconds:

```
line console
exec-timeout 0 30
```

Gigabit Ethernet Management Interface Overview

The controller provides an Ethernet management port named GigabitEthernet0.

The purpose of this interface is to allow users to perform management tasks on the controller; it is an interface that should not, and often cannot, forward network traffic, but can be used to access the controller through Telnet and SSH to perform management tasks on the controller. The interface is most useful in troubleshooting scenarios when other forwarding interfaces are inactive.

The following aspects of the management Ethernet interface should be noted:

- The controller has one management Ethernet interface named GigabitEthernet0.
- IPv4, IPv6, and ARP are the only routed protocols supported for the interface.
- The interface provides a way to access the controller even if forwarding interfaces are not functional, or the Cisco IOS is down.
- The management Ethernet interface is part of its own VRF. See the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide* for more details.

Default Gigabit Ethernet Configuration

By default, a forwarding VRF is configured for the interface with a special group named Mgmt-intf. This cannot be changed. This isolates the traffic on the management interface away from the forwarding plane. Otherwise, the interface can be configured like other Gigabit Ethernet interfaces for most functions.

For example, the default configuration is as follows:

```
interface GigabitEthernet0
vrf forwarding Mgmt-intf
ip address 200.165.200.225 255.255.255.224
negotiation auto
```

Configuring Gigabit Ethernet Interfaces

This section shows how to assign an IP address and interface description to an Ethernet interface on your controller.

For comprehensive configuration information on Gigabit Ethernet interfaces, see the **Configuring LAN Interfaces** chapter of the *Cisco IOS Interface and Hardware Component Configuration Guide*.

For information on the interface numbering, see the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide*.



Note For comprehensive configuration information about IP routing and IP routing protocols, see the **Configuring IP Routing Protocol-Independent Feature** on cisco.com.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Note Enter your password if prompted.
Step 2	show ip interface brief Example: Device> show ip interface brief	Displays a brief status of the interfaces that are configured for IP. Learn which type of Ethernet interface is on your controller.

	Command or Action	Purpose
Step 3	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 4	interface gigabitethernet 0 Example: Device(config)# interface gigabitethernet 0	Specifies the Ethernet interface and enters the interface configuration mode.
Step 5	ip address ip-address mask Example: Device(config-if)# ip address 209.165.200.240 255.255.255.224	Sets a primary IP address for an interface.
Step 6	no shutdown Example: Device(config-if)# no shutdown	Enables an interface.
Step 7	end Example: Device(config-if)# end	Returns to privileged EXEC mode.
Step 8	show ip interface brief Example: Device# show ip interface brief	Displays a brief status of the interfaces that are configured for IP. Verify that the interfaces are up and configured correctly.

Saving Your Controller Configuration

This section describes how to avoid losing your configuration at the next system reload or power cycle by saving the running configuration to the startup configuration in NVRAM. The NVRAM provides 32 MB of storage on the controller.



Note To aid file recovery and minimize downtime in case of file corruption, we recommend that you save backup copies of the startup configuration file and the Cisco IOS-XE software system image file on a server



Note To avoid losing work you have completed, be sure to save your configuration occasionally as you proceed. Use the **copy running-config startup-config** command to save the configuration to NVRAM.

Procedure

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. Note Enter your password if prompted.
Step 2	copy running-config startup-config Example: Device# copy running-config startup-config	Saves the running configuration to the startup configuration.

Verifying the Initial Configuration

Enter the following commands in Cisco IOS-XE to verify the initial configuration on the controller:

- **show version**—Displays the system hardware version, the installed software version, the names and sources of configuration files, the boot images, and the amount of installed DRAM, NVRAM, and flash memory.
- **show diag**—Lists and displays the chassis, slot location, and subslot location details.
- **show interfaces**— Shows if interfaces are operating correctly and if interfaces and line protocols are in the correct state, either up or down.
- **show ip interface brief**—Displays a summary of the interfaces configured for IP protocol.
- **show configuration**—Helps verify if you have configured the correct hostname and password.

After you have completed and verified the initial configuration, the specific features and functions are ready to be configured. See the *Cisco Catalyst 9800 Series Wireless Controller Software Configuration Guide*.

Powering Off the Controller Safely

Before you begin

We recommend that before turning off all power to the chassis, you issue the reload command. This ensures that the operating system cleans up all the file systems.

-
- Step 1** Slip on the ESD-preventive wrist strap included in the accessory kit.
- Step 2** Change the controller **config-register** by issuing the following commands:
- ```
wlc#
wlc# conf t
wlc(config)# config-register 0x2100
```
- Step 3** Save the controller configuration using the following command:
- ```
wlc# write memory
```
- Step 4** Enter the **reload** command.

Step 5 Confirm the reload command:

```
wlc# reload
```

```
Reload command is being issued on Active unit, this will reload the whole stack
Proceed with reload? [confirm]
Chassis 1 reloading, reason - Reload command
Feb 6 19:50:38.556: %PMAN-5-EXITACTION: F0/0: pvp: Process manager is exiting:
Feb 6 19:5
Initializing Hardware ...
System integrity status: 90170200 21030107
```

Step 6 After confirming the reload command, wait until the system bootstrap message is displayed before powering off the system:

```
System Bootstrap, Version 12.2(20170919:091604)
[pand16_7 v2 101], DEVELOPMENT SOFTWARE
Copyright (c) 1994-2017 by cisco Systems, Inc.
Compiled Tue 09/19/2017 2:21:10.32 by pand
Current image running: Boot ROM0
Last reset cause: LocalSoft
QWLC-1GL platform with 33554432 Kbytes of main memory
rommon 1 >
```

Step 7 Move the chassis power switch to the Standby position.

Note The fans in the power supply modules will continue to run even if the chassis power switch is in the Standby position.

Note After powering off the controller, wait for a minimum of 30 seconds before powering it on again.

Environmental Monitoring and Reporting Functions

Environmental monitoring and reporting functions allow you to maintain normal system operation by identifying and resolving adverse conditions prior to loss of operation.



Caution To prevent overheating of the chassis, ensure that your system is drawing cool inlet air. Over temperature conditions may occur if the system is drawing in the exhaust air of other equipment. Ensure adequate clearance around the sides of the chassis so that cooling air can flow through the chassis interior unimpeded and exhaust air exits the chassis and is not drawn into the inlet vent of another device.

Alarm Monitoring

The Cisco Catalyst 9800-40 Wireless Controller displays the CRIT, MAJ, and MIN alarm indicator LEDs. These LEDs indicate controller status at all times, but you must directly observe these LEDs to become aware of a controller alarm condition. Additionally, you can use the **show facility-alarm status** command to view the alarms.

```
wlc# show facility-alarm status
System Totals Critical: 1 Major: 0 Minor: 0
Source          Time          Severity      Description [Index]
-----
Power Supply Bay 1 Feb 09 2018 20:52:48 CRITICAL Power Supply/FAN Module Missing
```

```

xcvr container 0/0/0      Feb 09 2018  20:53:09  INFO  Transceiver Missing [0]
TenGigabitEthernet0/0/1  Feb 09 2018  20:53:11  INFO  Physical Port Administrative State
Down [67]
TenGigaEthernet0/0/2     Feb 09 2018  20:53:12  INFO  Physical Port Administrative State
Down [67]

```

To clear a visual alarm, you must resolve the alarm condition. The **clear facility-alarm** command does not clear an alarm LED on the Cisco Catalyst 9800-40 Wireless Controller.

Environmental Monitoring

The environmental monitoring functions use sensors to monitor the temperature of the cooling air as it moves through the chassis.

The local power supplies provide the ability to monitor:

- Input and output voltage
- Output current
- Outlet temperature

The **Cisco Catalyst 9800-40 Wireless Controllers** are expected to meet the following environmental operating conditions:

- Operating Temperature Nominal: 32° to 104° F (0° to 40°C)
- Operating Temperature Short Term: 32° to 131° F (0° to 50°C)
- Operating Humidity Nominal (relative humidity): 10 to 90% relative
- Operating Humidity Short Term: 5 to 90% relative
- Operating Altitude: –500 to 10,000 feet (–152.4 to 3048 meters)
- AC Input Range: 85 to 264 VAC

In addition, the power supplies monitor internal power supply temperatures and voltages. A power supply is either within tolerance (normal) or out of tolerance (critical). If an internal power supply temperature or voltage reaches a critical level, the power supply shuts down without any interaction with the system processor.

The environmental monitoring functions use the following levels of status conditions to monitor the system:

- **Normal**—All monitored parameters are within normal tolerances.
- **Warning**—The system has exceeded a specified threshold. The system continues to operate, but operator action is recommended to bring the system back to a normal state.
- **Critical**—An out-of-tolerance temperature or voltage condition exists. The system continues to operate, but the system is approaching shutdown. Immediate operator action is required.
- **Shutdown**—Before any shutdown, the system logs the status of monitored parameters in NVRAM so that you can retrieve it later to help determine the cause of the problem.
- **Power supply shutdown**—The power supply detected an internal out-of-tolerance overvoltage, overcurrent, or temperature condition and shut itself down.

Fan Failures

Four internal fans draw cooling air in through the front of the chassis and across internal components to maintain an acceptable operating temperature. The fans are located at the rear of the chassis. The fans in the Cisco Catalyst 9800-40 Wireless Controller are numbered from 0 to 5, right to left.

When the system power is on, all fans should be operational. However, the system continues to operate even if a fan fails.

Use the **show platform hardware slot chassis 1 P2 fan status** command to view the status of the fans, for example:

```
WLC# show platform hardware slot chassis 1 P2 fan status
Fan group 1 speed: 40%
Fan 0: Normal
Fan 1: Normal
Fan 2: Normal
Fan 3: Normal
Fan 4: Normal
Fan 5: Normal
```

Reporting Functions

The chassis manager on the forwarding engine control processor manages the local resources of the forwarding processor. The Cisco Catalyst 9800-40 Wireless Controller displays warning messages on the console, if the chassis interface-monitored parameters exceed a threshold. You can also retrieve and display environmental status reports with the following commands:

- **show environment all**
- **show version**
- **show inventory**
- **show platform**
- **show platform software status control-processor**
- **show diag**

Parameters are measured and reporting functions are updated every 60 seconds. A brief description of each of these commands follows.

show environment all Command

The **show environment all** command displays temperature, voltage, fan, and power supply information.

The following is sample output from the **show environment all** command:

```
WLC# show environment all
Sensor List: Environmental Monitoring
Sensor      Location    State      Reading
Vin         P0         Normal    228 V AC
Iin         P0         Normal    1 A
Vout        P0         Normal    12 V DC
Iout        P0         Normal    18 A
Temp1       P0         Normal    36 Celsius
Temp2       P0         Normal    49 Celsius
Temp3       P0         Normal    47 Celsius
VRRX1: VX1  R0         Normal    752 mV
VRRX1: VX2  R0         Normal    7021 mV
```

show version Command

```

VRRX1: VX3      R0      Normal      1217 mV
VRRX1: VX5      R0      Normal      1217 mV
VRRX1: VP1      R0      Normal      1699 mV
VRRX1: VP2      R0      Normal      2505 mV
VRRX1: VP3      R0      Normal      1305 mV
VRRX1: VP4      R0      Normal      5094 mV
VRRX1: VH       R0      Normal      12008 mV
VRRX2: VX1      R0      Normal      852 mV
VRRX2: VX4      R0      Normal      1018 mV
VRRX2: VX5      R0      Normal      1017 mV
VRRX2: VP1      R0      Normal      3325 mV
VRRX2: VP3      R0      Normal      1815 mV
VRRX2: VP4      R0      Normal      1052 mV
VRRX2: VH       R0      Normal      12008 mV
VRRX3: VX1      R0      Normal      986 mV
VRRX3: VX2      R0      Normal      1006 mV
VRRX3: VX4      R0      Normal      752 mV
VRRX3: VX5      R0      Normal      749 mV
VRRX3: VP1      R0      Normal      2497 mV
VRRX3: VP2      R0      Normal      1193 mV
VRRX3: VP3      R0      Normal      1515 mV
VRRX3: VP4      R0      Normal      11998 mV
Temp: RCRX IN   R0      Normal      29 Celsius
Temp: RCRX OUT  R0      Normal      34 Celsius
Temp: Yoda      R0      Normal      37 Celsius
Temp: XEPhy     R0      Normal      29 Celsius
Temp: CPU Die   R0      Minor       55 Celsius
Temp: FC FANS   R0      Fan Speed 60% 29 Celsius

```

show version Command

The **show version** command displays the system hardware configuration, software version, and names and sources of configuration files and boot images.

The following is sample output from the **show version** command:

```

WLC# show version
Cisco IOS XE Software, Version BLD_POLARIS_DEV_LATEST_20180204_164931
Cisco IOS Software [Fuji], WLC9000 Software (X86_64_LINUX_IOSD-UNIVERSALK9_WLC-M),
Experimental Version 16.9.20180204:170500
[polaris_dev-/nobackup/mcpre/BLD-BLD_POLARIS_DEV_LATEST_20180204_164931 150]
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Sun 04-Feb-18 14:54 by mcpre
Cisco IOS-XE software, Copyright (c) 2005-2018 by cisco Systems, Inc.
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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.

ROM: IOS-XE ROMMON

myWLC uptime is 4 minutes
Uptime for this control processor is 7 minutes
System returned to ROM by Reload reason not captured
System image file is
"bootflash:qwlc-universalk9_wlc.BLD_POLARIS_DEV_LATEST_20180204_164931.SSA.bin"
Last reload reason: Reload reason not captured
This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply

```


third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at: <http://www.cisco.com/wl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

License Type: Default. No valid license found.
License Level: advenenterprise
Next reload license Level: advenenterprise

cisco C9800-40-K9 (1GL) processor (revision 1GL) with 1637390K/6147K bytes of memory.
Processor board ID TKM20480022
1 Virtual Ethernet interface
4 Ten Gigabit Ethernet interfaces
32768K bytes of non-volatile configuration memory.
33554432K bytes of physical memory.
30056447K bytes of eUSB flash at bootflash:.
0K bytes of WebUI ODM Files at webui:.

Base Ethernet MAC Address : 00:2C:C8:A5:31:80

Installation mode is BUNDLE

Configuration register is 0x0

WLC#

show inventory Command

The **show inventory** command displays an extended report that includes the product inventory listing of all the Cisco products installed in the networking device.

The following is sample output from the **show inventory** command:

```
WLC# show inventory
NAME: "Chassis", DESCR: "Cisco C9800-40-K9 Chassis"
PID: C9800-40-K9 , VID: V01 , SN: TKM20480022

NAME: "Power Supply Module 0", DESCR: "Cisco 750 Watt reverse-airflow AC power supply"
PID: C9800-AC-750W-R , VID: V01 , SN: ART203511UA

NAME: "Fan Tray", DESCR: "Cisco C9800-40-K9 Fan Tray"
PID: C9800-40-K9-FAN , VID: , SN:

NAME: "module 0", DESCR: "Cisco C9800-40-K9 Modular Interface Processor"
PID: C9800-40-K9 , VID: , SN:

NAME: "SPA subslot 0/0", DESCR: "4-port 10G/1G multirate Ethernet Port Adapter"
PID: BUILT-IN-4X10G/1G , VID: N/A , SN: JAE87654321

NAME: "module R0", DESCR: "Cisco C9800-40-K9 Route Processor"
PID: C9800-40-K9 , VID: V01 , SN: TKM20480022

NAME: "module F0", DESCR: "Cisco C9800-40-K9 Embedded Services Processor"
PID: C9800-40-K9 , VID: , SN:

WLC#
```

show platform Command

The **show platform** command displays platform information.

The following is sample output from the **show platform** command:

```
WLC# show platform
Chassis type: C9800-40-K9
Slot          Type                      State          Insert time (ago)
-----
0             C9800-40-K9                    ok             00:06:38
0/0          BUILT-IN-4X10G/1G             ok             00:05:16
R0           C9800-40-K9                    ok, active     00:06:38
F0           C9800-40-K9                    ok, active     00:06:38
P0           C9800-AC-750W-R                ok             00:06:10
P1           Unknown                         ps, fail       never
P2           C9800-40-K9-FAN                ok             00:06:11

Slot          CPLD Version          Firmware Version
-----
0             17083013              12.2(20180122:130204) [pand-1GL_imag...
R0           N/A                    N/A
F0           17083013              12.2(20180122:130204) [pand-1GL_imag...
WLC#
```

show platform software status control-processor Command

The **show platform software status control-processor** command displays the average load, memory usage, and CPU utilization levels at which the controller is running. The output also specifies whether the levels of these system health parameters are within defined thresholds.

The following is sample output from the **show platform software status control-processor** command:

```
WLC# show platform software status control-processor
1-RP0: online, statistics updated 4 seconds ago
Load Average: healthy
  1-Min: 1.27, status: healthy, under 8.00
  5-Min: 1.31, status: healthy, under 8.00
 15-Min: 0.76, status: healthy, under 10.00
Memory (kb): healthy
  Total: 32516344
  Used: 3871416 (12%), status: healthy
  Free: 28644928 (88%)
  Committed: 4101932 (13%), under 95%
Per-core Statistics
CPU0: CPU Utilization (percentage of time spent)
User: 2.30, System: 5.40, Nice: 0.00, Idle: 92.30
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU1: CPU Utilization (percentage of time spent)
User: 5.60, System: 18.70, Nice: 0.00, Idle: 75.70
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU2: CPU Utilization (percentage of time spent)
User: 4.00, System: 11.71, Nice: 0.00, Idle: 84.28
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU3: CPU Utilization (percentage of time spent)
User: 3.19, System: 5.69, Nice: 0.00, Idle: 91.10
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU4: CPU Utilization (percentage of time spent)
User: 1.90, System: 5.40, Nice: 0.00, Idle: 92.69
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU5: CPU Utilization (percentage of time spent)
User: 4.60, System: 11.41, Nice: 0.00, Idle: 83.98
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
```

```

CPU6: CPU Utilization (percentage of time spent)
User: 1.30, System: 3.40, Nice: 0.00, Idle: 95.29
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU7: CPU Utilization (percentage of time spent)
User: 6.10, System: 14.60, Nice: 0.00, Idle: 79.30
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU8: CPU Utilization (percentage of time spent)
User: 0.30, System: 1.40, Nice: 0.00, Idle: 98.30
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU9: CPU Utilization (percentage of time spent)
User: 0.30, System: 1.30, Nice: 0.00, Idle: 98.40
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU10: CPU Utilization (percentage of time spent)
User: 0.20, System: 0.20, Nice: 0.00, Idle: 99.60
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU11: CPU Utilization (percentage of time spent)
User: 0.10, System: 0.40, Nice: 0.00, Idle: 99.50
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU12: CPU Utilization (percentage of time spent)
User: 0.40, System: 0.90, Nice: 0.00, Idle: 98.70
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU13: CPU Utilization (percentage of time spent)
User: 0.10, System: 0.30, Nice: 0.00, Idle: 99.59
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU14: CPU Utilization (percentage of time spent)
User: 0.19, System: 0.99, Nice: 0.00, Idle: 98.80
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00
CPU15: CPU Utilization (percentage of time spent)
User: 0.10, System: 0.30, Nice: 0.00, Idle: 99.60
IRQ: 0.00, SIRQ: 0.00, IOWait: 0.00

```

show diag chassis eeprom detail Command

The **show diag chassis eeprom detail** command displays the configuration hardware information, including power or fan module P0 and P1 EEPROM data.



Note If you have access to Telnet or CLI, you can issue the **factory-reset all** command to reset the device to its factory defaults.

If you do not have access to Telnet or CLI, perform the following:

1. Open the controller console on PUTTY and reload the controller.
2. When you get ##### while the image loads, right-click on the top ribbon and select **special command** and **break** to get the ROMMON prompt.
3. Issue the following command:

```
rommon 1 > confreg 0x8000
```
4. Boot the image.

You will be able to view the write erased configuration and load the image thereafter.
5. After the image loads, you get to view the configuration back to 0x2102.

The following is sample output from the **show diag chassis eeprom detail** command:

```

WLC#: show diag chassis eeprom detail
MIDPLANE EEPROM data:

```

show diag chassis eeprom detail Command

```

EEPROM version: 4
Compatible Type: 0xFF
Controller Type: 4103
Hardware Revision: 0.1
PCB Part Number: XX-XXXX-XX
Board Revision: 01
Deviation Number: 0-0
Fab Version: 03
PCB Serial Number: XXXXXXXXXXXX
RMA Test History: 00
RMA Number: 0-0-0-0
RMA History: 00
Top Assy. Part Number: XX-XXXX-XX
CLEI Code: XXXXXXXXXXXX
Product Identifier (PID): C9800-40-K9
Version Identifier (VID): V01
Manufacturing Test Data:      00 00 00 00 00 00 00 00 00
Field Diagnostics Data:      00 00 00 00 00 00 00 00 00
Chassis MAC Address: 002c.c8a5.3180
MAC Address block size: 32
Chassis Serial Number: XXXXXXXXXXXX
Environment Monitor Data: 00 06 00 FA
Asset ID:
Power/Fan Module P0 EEPROM data:

```

```

EEPROM version: 4
Compatible Type: 0xFF
Hardware Revision: 1.0
Version Identifier (VID): V01
Product Identifier (PID): C9800-AC-750W-R
PCB Serial Number: XXXXXXXXXXXX
Top Assy. Part Number: 3XX-XXXX-XX
Board Revision: A0
Deviation Number: 0-0
RMA Test History: 00
RMA Number: 0-0-0-0
RMA History: 00
CLEI Code: XXXXXXXXXXXX
Manufacturing Test Data:      00 00 00 00 00 00 00 00 00
Field Diagnostics Data:      00 00 00 00 00 00 00 00 00
Unknown Field (type 00DA):    00 00 00 00 00 00 00 00 00
                             00 00 00 00 00 00 00 00 00
Asset ID:
Power Supply Type: AC
Environment Monitor Data:    00 08 00 F8
Environment Monitor Data:    02 A5 2E E2 EE 00 5B
Environment Monitor Data:    05 02 03 50 03 58 00 4B
Platform features:          00 00 03 56 1E 53 0F 2A
                             00 00 00 00 00 00 00 00
                             FD
Power/Fan Module P1 EEPROM data is not initialized

```



CHAPTER 6

License Verification

This chapter provides information about verifying the Cisco IOS license level and viewing the Cisco Catalyst 9800-40 Wireless Controller license.

- [Viewing the Cisco IOS License Level, on page 75](#)
- [Viewing License Information, on page 76](#)
- [Evaluation License Features, on page 76](#)

Viewing the Cisco IOS License Level

Use the **show version** command to determine the Cisco IOS license level in the controller.

Example:

```
WLC# show version | section License
```

```
licensed under the GNU General Public License ("GPL") Version 2.0. The
documentation or "License Notice" file accompanying the IOS-XE software,
License Type: Smart License is permanent
License Level: adventerprise
AIR License Level: AIR DNA Advantage
```

Table 10: Show version Command Output Description

Field Name	Description
License Level: adventerprise	Indicates the current Cisco IOS license code level.
License Type: Smart License is permanent	Indicates the type of license that is used. This example shows that the Cisco Smart license is used that provides floating licenses for your user account. Other license types could be: Permanent (purchased) license or an Evaluation 60-day license.
AIR License Level: AIR DNA Advantage	Indicates the AIR network advantage license level.

Use the **show running-config** command or the **show startup-config** command to view the license-level information. The following example displays sample output from the **show running-config** command:

```
WLC# show running-config
.
.
.
license boot level adventerprise
```

Table 11: show running-config Command Output Description

Field Name	Description
license boot level adventerprise	Indicates the current requested Cisco IOS license level to boot.

Viewing License Information

Use the **show license udi** command to determine the Universal Device Identifier (UDI) information of your chassis. This may be required at the time of purchasing a new license.

The following example displays sample output from the **show license udi** command:

```
WLC# show license udi
SlotID      PID          SN          UDI
-----
*           C9800-40-K9  xxxxxxxxxxxx C9800-40-K9:xxxxxxxxxxxx
```

Evaluation License Features

The following are the features of the 1GE and 10GE Interface Evaluation license:

- There is only one 60-Day Evaluation Period countdown timer for the 10GE port pairs. The timer is initiated as soon as the first of the port pairs is enabled.
- A EULA will be presented, and must be accepted, the first time you enable any of the ports in order to utilize the requested port.
- When the 60-Day Evaluation Period expires, the license automatically changes to an RTU license. As with all other RTU licenses, there is no functionality disruption or accessibility concerns following this transition.
- There can be only one active interface_1g license and one active interface_10g license. Either the Permanent License or the EvalRTU License can be Active, but not both.
- As with past license implementations, the Permanent license is of higher precedence than the built-in EvalRTU license. However, when the Permanent license does not have enough port-count (that is, when the user requests both port pairs but the Permanent License only allows for one port pair), the license priority changes between the Permanent and Evaluation licenses. In this case, the Evaluation License becomes Active since it can accommodate both port pairs. The Permanent License will automatically become Active if and when its port-count meets the user's desired configuration.



CHAPTER 7

Removing and Replacing FRUs

This chapter describes procedures for removing and replacing field-replaceable units (FRUs) from Cisco Catalyst 9800-40 Wireless Controller.

- [Removing AC Power Supplies, on page 77](#)
- [Installing AC Power Supplies, on page 77](#)
- [Removing and Replacing USB Flash Memory Stick, on page 78](#)
- [Repacking the Controller, on page 78](#)

Removing AC Power Supplies

Step 1 Ensure that the chassis power switch is in the Standby position.

Note It is not required to place the chassis power switch in the Standby position, if you want to hot-swap a single power supply.

Step 2 Unplug the power cable from the power supply.

Step 3 Press the retaining latch toward the pull handle.

Grasp the handle with one hand, and pull the power supply out of the slot while supporting the weight of the power supply with the other hand.

Step 4 Repeat **step 1** to **step 3**, to remove the other AC power supply.

Installing AC Power Supplies



Note Do not install the power supplies with the chassis cover off.

Step 1 Ensure that the chassis power switch on the chassis is in the Standby position.

It is not required to place the chassis power switch in the Standby position, if you want to hot-swap a single power supply.

- Step 2** Insert the power supply module into the appropriate slot(s).
- Note** Make sure that the retention latch is firmly placed. You can verify that the power supply module is firmly latched by gently pulling the power supply handle.
- Step 3** Insert the power supply cables firmly into the power supplies.
- Note** Ensure that both power supplies are inserted firmly and the power cords are in place.
- Step 4** If you have changed the chassis power switch to the Standby position in **Step 1**, press the power switch to the **On** position. The power supply LEDs are illuminated (green).
-

Removing and Replacing USB Flash Memory Stick

The Cisco Catalyst 9800-40 Wireless Controller contains the USB ports for a flash memory stick to store configurations or Cisco IOS XE consolidated packages.



Caution Do not remove a USB flash memory stick when issuing a file access command or a read/write operation to the flash memory stick when it is processing. The controller might reload or the USB flash memory stick may get damaged. Before removing the USB device, check to see if the USB activity LED on the front panel is flashing.

To remove and then replace a USB flash memory stick, follow these steps:

- Step 1** Pull the flash memory stick from the USB port.
- Step 2** To replace a Cisco USB flash memory stick, insert the module into USB port 0 or 1.
- The flash memory stick can be inserted only in one way, and can be inserted or removed regardless of whether the controller is powered up or not.
-

Repacking the Controller

If your system is damaged, you must repack it for return shipment.

Before you return the controller or move it to a different location, repack the system using the original packaging material.



CHAPTER 8

Instructions for Addressing the Cisco Secure Boot Hardware Tampering Vulnerability on Cisco Catalyst 9800-40 Wireless Controller

This chapter provides instructions on how to address the Cisco Secure Boot Hardware Tampering Vulnerability on Cisco Catalyst 9800-40 Wireless Controller.



Note Cisco recommends upgrading Field Programmable Gate Arrays (FPGA) as a solution for the Cisco Secure Boot Hardware Tampering Vulnerability. For more details of the vulnerability and affected products, refer <https://tools.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20190513-secureboot>.

- [Prerequisites for Upgrading FPGA, on page 79](#)
- [Upgrading FPGA, on page 79](#)
- [Verifying FPGA Upgrade, on page 83](#)

Prerequisites for Upgrading FPGA

Download the image from the CCO website and copy it to USB or bootflash of the controller which is scheduled for the upgrade.



Note Do not perform any power cycle or remove the power cable during the FPGA upgrade. If there is a power loss during the upgrade, it may result in corruption of the boot image and it may require RMA of the equipment.

Upgrading FPGA

To upgrade FPGA, run the upgrade utility image:

- Step 1** Copy the utility to USB or to bootflash: using FTP or TFTP.
- Step 2** Save the current running configurations and backup it to bootflash.

Upgrading FPGA

```

WLC#copy running-config bootflash:running-config_15may2019
Destination filename [running-config_15may2019]?
6222 bytes copied in 0.536 secs (11608 bytes/sec)
WLC#

WLC#write memory
Building configuration...
[OK]
WLC#

```

Step 3 Change the configuration register to 0x0.

```

WLC#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
WLC(config)#config-register 0x0
WLC(config)#end
WLC#write

```

Step 4 Issue the controller reload command and ensure that the Rommon prompt is displayed on the controller.

```

WLC#reload

System configuration has been modified. Save? [yes/no]: yes
Building configuration...
[OK]

```

Step 5 Initiate the upgrade using the following CLI.

Note If the image is copied in USB, execute the following command:

```
boot usb0:C9800-40_fpga_prog.16.0.0.xe.bin
```

If the image is copied in Bootflash, execute the following command:

```
boot bootflash:C9800-40_fpga_prog.16.0.0.xe.bin
```

```

rommon 2 > boot bootflash:C9800-40_fpga_prog.16.0.0.xe.bin
File size is 0x015a3814
Located C9800-40_fpga_prog.16.0.0.xe.bin
Image size 22689808 inode num 32, bks cnt 5540 blk size 8*512
=====

```

```
Boot image size = 22689808 (0x15a3810) bytes
```

```

ROM:RSA Self Test Passed
ROM:Sha512 Self Test Passed

Package header rev 1 structure detected
Calculating SHA-1 hash...done
validate_package_cs: SHA-1 hash:
    calculated 9b991366:34fd025f:987b920f:934aa266:fc2e0d08
    expected   9b991366:34fd025f:987b920f:934aa266:fc2e0d08
Validating main package signatures

RSA Signed RELEASE Image Signature Verification Successful.
Image validated

```

```
Cisco ASR1K FPGA Programming Utility
```

```

*****
**                                     **
**   DO NOT TURN OFF THE POWER OR   **
**   RESET THE BOX DURING THE UPGRADE **
**                                     **
*****

Press 'Y' or 'y' to upgrade
or any other key to reboot

Detected Board Type: CE9800-40

SPI Flash Device ID: 009d6016

Programming Flash ...
|.....|.....|.....|.....|.....|.....|.....|.....|
#####
Verifying Flash ...
|.....|.....|.....|.....|.....|.....|.....|.....|
#####
FPGA image verified correctly !!

Router Power Cycle is needed for the changes to take effect

Press a key to Power cycle ...

Power cycling the box ...

à

Initializing Hardware ...

System integrity status: 90170400 12030106
U

System Bootstrap, Version 16.9(4r), RELEASE SOFTWARE
Copyright (c) 1994-2018 by cisco Systems, Inc.

Current image running: Boot ROM1
Last reset cause: PowerOn

```

Important *****

The following message confirms the upgrade is successful:

FPGA image verified correctly !!

In this case, skip **Step 6** and **Step 7**, and proceed to **Step 8** for verification.

Step 6 If the Upgrade is not successful, the following message appears: *FPGA image failed to verify correctly !!*

Retry the upgrade by issuing **Yes**.

Use can issue "y" or "Y" to retry.

```

Detected Board Type: CE9800-40
SPI Flash Device ID: 00202015

```

```

Programming Flash ...

```

Upgrading FPGA

```
|.....|.....|.....|.....|.....|.....|.....|.....|
#####
Verifying Flash ...
|.....|.....|.....|.....|.....|.....|.....|.....|
```

```
FPGA image failed to verify correctly !!
```

```
Upgrade failed. Retrying ...
```

```
Cisco ASR1K FPGA Programming Utility
```

```
*****
**
**      DO NOT TURN OFF THE POWER OR      **
**  RESET THE BOX DURING THE UPGRADE    **
**
**
*****
```

```
Press 'Y' or 'y' to upgrade
or any other key to reboot
```

```
Detected Board Type: CE9800-40
```

```
SPI Flash Device ID: 00202015
```

```
Programming Flash ...
```

```
|.....|.....|.....|.....|.....|.....|.....|.....|
#####
Verifying Flash ...
|.....|.....|.....|.....|.....|.....|.....|.....|
#####
FPGA image verified correctly !!
```

```
Router Power Cycle is needed for the changes to take effect
```

```
Press a key to Power cycle ...
```

```
Power cycling the box ...
```

```
ýü
```

```
Initializing Hardware ...
```

```
System integrity status: 90170400 12030106
```

```
U
```

```
System Bootstrap, Version 16.3(2r), RELEASE SOFTWARE
Copyright (c) 1994-2016 by cisco Systems, Inc.
```

```
Current image running: Boot ROM0
```

```
Last reset cause: CPU-ResetRequest
```

```
rommon 1 >
```

Step 7 After the retry, if the upgrade still fails, reach out to Cisco TAC for further assistance.

Step 8 Once the upgrade is complete, device power cycles automatically, and the rommon prompt is displayed to boot the IOS image.

Sample IOS boot steps are:

```
rommon 1 > dir bootflash:
File System: EXT2/EXT3

15          526240224 -rw-r--r--      C9800-universalk9_wlc.2019-04-25_13.46_vgothe.SSA.bin

rommon 2 > boot bootflash: C9800-universalk9_wlc.2019-04-25_13.46_vgothe.SSA.bin
```

Verifying FPGA Upgrade

To verify the FPGA upgrade, use the following command:

```
WLC# show hw-programmable 0
Hw-programmable versions
```

Slot	CPLD version	FPGA version
0	19030712	N/A

Verifying FPGA Upgrade



APPENDIX **A**

Technical Specifications

This appendix provides technical specifications for the Cisco Catalyst 9800-40 Wireless Controller.

- [Cisco Catalyst 9800-40 Wireless Controller Specifications, on page 85](#)

Cisco Catalyst 9800-40 Wireless Controller Specifications

Description	Specification
Dimensions (H x W x D)	Height—1.72 in. (43.69 mm) Width—17.3 in. (439.42 mm) Depth—21.78 in. (553.2 mm) including card handles, cable-management brackets, and power supply handles
Weight	23 lb (10.43 kg) fully loaded
Nominal operating temperature	32° to 104° F (0° to 40° C)
Short-term operating temperature	32° to 122° F (0° to 50° C)
Nominal operating humidity	10 to 90% relative humidity
Short-term operating humidity	5 to 90%
Storage temperature	–4° to 158° F (–20° to +70° C)
Power consumption	Maximum (AC): 400 W



APPENDIX **B**

Port Signals and Pinouts

This appendix provides the port signals and pinout specifications.

- [Management Ethernet Port Signals and Pinouts, on page 87](#)
- [Console Port Signals and Pinouts, on page 87](#)

Management Ethernet Port Signals and Pinouts

The following table lists the Management Ethernet 10/100/1000 RJ-45 port pinouts.

Pin	Signal	Direction	Description
1	TX/RX AData +	I/O	T/R data +
2	TX/RX AData -	I/O	T/R data -
3	TX/RX BData +	I/O	T/R Data +
4	TX/RX CData +	I/O	T/R Data + (Unused for 10/100)
5	TX/RX CData -	I/O	T/R Data - (Unused for 10/100)
6	TX/RX BData -	I/O	T/R data -
7	TX/RX DData +	I/O	T/R Data + (Unused for 10/100)
8	TX/RX DData -	I/O	T/R Data - (Unused for 10/100)

Console Port Signals and Pinouts

The following table lists the pinouts of the RJ-45 console port.

Pin	Signal	Direction	Description
1	RTS	Output	Request to Send (tied directly to CTS)
2	DTR	Output	Data Terminal Ready (always On)
3	TXD	Output	Transmit Data
4	GND	—	—
5	GND	—	—
6	RXD	Input	Receive Data
7	DSR	Input	Unused
8	CTS	Input	Clear to Send (tied to RTS)