Installation and Maintenance Guide

AVAYA C460

MULTILAYER MODULAR SWITCH

SOFTWARE VERSION 2.0

AVAYA

Before you Install the Avaya™ C460

Safety Information

⚠️ **Caution:** The Avaya C460 switch and modules contain components sensitive to electrostatic discharge. Do not touch the circuit boards unless instructed to do so.

⚠️ **Caution:** Do not leave any slots open. Use the the blanking plates supplied to cover empty slots.

⚠️ **Caution:** Do not insert any objects into the C460 chassis other than specifically designed Avaya products.

⚡ **Warning:** The fans are on whenever the power is on in the chassis, whether supervisor modules are installed or not.

⚡ **Warning:** Keep your fingers and other objects clear of the fans when removing the Fan module. The fans continue to turn briefly after you have removed the module.

Power Supplies

⚠️ **Caution:** Risk of electric shock. Disconnection of one power supply cord disconnects one power supply module only. To isolate unit completely from the mains disconnect all power supply cords.

⚠ **Caution:** Gafahr des elektrischen Schocks. Entfernen des Netzsteckers eines Netzteils legt nur dieses Netzteil spannungsfrei. Um alle Einheiten spannungsfrei zu machen. Sind die Netzstecker aller Netxteile zu entfernen

⚠ **Caution:** Risque d'électrocution. Le débranchement d'un câble d'alimentation ne déconnecte qu'un seul module d'alimentation. Pour isoler complètement l'unité du secteur, débranchez tous les câbles d'alimentation.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications to this equipment not expressly approved by Avaya Inc. could void the user's authority to operate the equipment.

Conventions Used in the Documentation

Documentation for this product uses the following conventions to convey instructions and information:

Notes, Cautions and Warnings

ⓘ Text with the ⓘ symbol contains helpful information or hints or reference to material in other documentation.

⚠ **Caution:** Take care. You could do something that may damage equipment or result in loss of data.

Warning: This means danger. Failure to follow the instructions or warnings might result in bodily injury. Ensure that you are qualified for this task and have read and understood *all* the instructions

CLI Conventions

- Mandatory keywords are in the **computer bold** font.
- Information displayed on screen is displayed in `computer` font.
- Variables that you supply are in pointed brackets <>.
- Optional keywords are in square brackets [].
- Alternative but mandatory keywords are grouped in braces {} and separated by a vertical bar |.
- Lists of parameters from which you can choose are enclosed in square brackets [ ] and separated by a vertical bar |.
- If you enter an alphanumeric string of two words or more, enclose the string in inverted commas"".

Warranty

Avaya Inc. provides a limited warranty on this product. Refer to your sales agreement or other applicable documentation to establish the terms of the limited warranty. In addition, Avaya's standard warranty language as well as information regarding support for this product, while under warranty, is available through the following website: http://www.avaya.com/support.

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

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Avaya C460 Overview

Introduction

The Avaya™ C460 is a flexible six-slot modular chassis, with two slots reserved for supervisor modules and the four remaining slots for switched I/O modules. It is ideal as a LAN edge and wiring closet switch or as an "all-in-one" solution for branch offices. You can also deploy the Avaya C460 in data centers or as a distribution switch.

Avaya C460 Key Features:

High Availability

- Redundant Supervisor modules and switching fabric
- Three power supply bays that support redundant (optional), load-sharing and fault-tolerant power supplies.
- Hot-swappable fan module
- Hot-swappable supervisor modules
- Hot-swappable I/O modules
- Meets requirements for device redundancy, link resiliency and network availability.
- Access to all components from the front of the chassis.

Flexibility

- Broad range of I/O modules, including
  - 48 10/100 Mbps ports
  - 48 10/100 Mbps ports + 2 Gigabit Ethernet ports
  - 12 Gigabit Ethernet ports
  - 48 10/100 Mbps PoE ports
  - 48 10/100 Mbps PoE ports + 2 Gigabit Ethernet ports
- Modular chassis flexibility with a variety of module/speed mixes.
- Upgradeable to Layer 3 switching with an optional license

Management and Monitoring

- Web-based embedded device manager
- Avaya™ Multiservice Network Manager suite (optional)
- Standards-based SMON Switch Monitoring (optional, requires license)
- AnyLayer SMON

Avaya C460 Chassis and Module Installation

Introduction

This chapter guides you through the basic hardware Installation process.

ⓘ If you purchased an Avaya C460ML-CFG (Material code 700255003) or C460ML PWR CONFIG (Material code 700281603) , then one Supervisor Module, PSU and the Fan Module are already installed.

Operating Safety

⚠ **Caution:** The Avaya C460 switch and modules contain components sensitive to electrostatic discharge. Do not touch the circuit boards unless instructed to do so. Use appropriate anti-static equipment when handling the switch and modules.

⚠ **Caution:** Do not leave any slots open. Use the the blanking plates supplied to cover empty slots.

⚠ **Caution:** Do not insert any objects into the C460 chassis other than specifically designed Avaya products.

⚠ **Warning:** Keep your fingers and other objects clear of the fans when removing the Fan module. The fans continue to turn briefly after you have removed the module.

⚠ **Danger:** Keep your fingers and other objects clear of the fans when removing the tray as the fans continue to turn briefly after you have removed it.

Required Tools

You require the following equipment in order to install the C460 chassis:

- Phillips (cross-blade) screwdriver

Environmental Prerequisites

⚠️ **Danger:** To avoid injury, Avaya recommends that two people lift the switch onto a table top. A fully loaded C460 switch weighs at least 100 lbs (45 kg).

You can position the Avaya C460 in free-standing mode on a suitable shelf or table, or mount it in a standard 19-inch equipment rack in a wiring closet or equipment room.

When deciding where to position the chassis, ensure that:

- It is accessible and cables can be connected easily and according to the configuration rule.
- Cables are away from sources of electrical noise such as:
  — radio transmitters
  — broadcast amplifiers
  — power lines
  — fluorescent lighting fixtures.
- Water or moisture cannot enter the case of the chassis.
- There is a free flow of air around all sides the chassis.
- The vents on the sides of the case are not blocked.
- The table or shelf can hold the weight of the chassis with the PSUs and modules.
- The environmental conditions match the requirements listed in Table 2.1.
- ⓘ See Chapter 14, "Specifications" for additional information.

Table 2.1   Environmental Requirements

Ambient temperature	23° to 122°F (-5° to 50°C)
Relative humidity	5% to 95%, non condensing
Minimum clearance for ventilation	2" (5 cm) on each side
Weight support	50 lb. (23 kg) to 100 lbs (45 kg)

• The power source matches the specifications shown in Table 2.2.

Table 2.2   AC Power Requirements

Voltage	100 to 240 VAC, 50/60 Hz
Current for one MPS4603-AC 300 W PSU	3.9 A@100 VAC 1.5 A@240 VAC
Current for one MPS4610-AC 1000 W PSU	11.5 A@100 VAC 5.6 A@240 VAC

Table 2.3   Dimensions

Height	10U (17.5", 444.5 mm)
Width	17.4" (442 mm)
Depth	15" (375 mm)

Chassis Component Location

Figure 2.1 shows the positions of the components in the C460 chassis.

Figure 2.1   The Avaya C460 Switch – Component Location
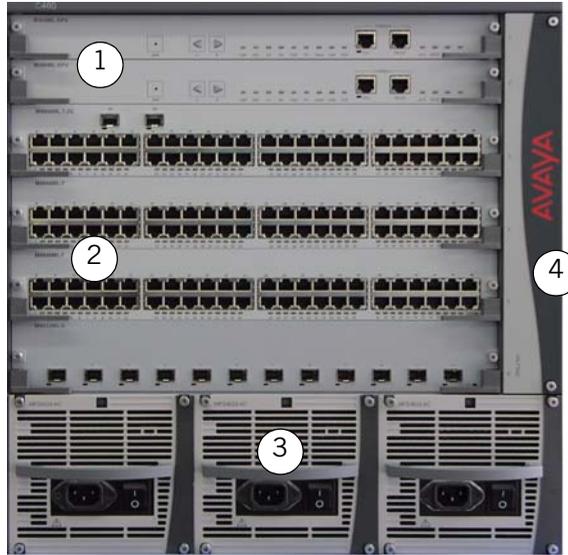
Key

1   Supervisor modules
2   I/O Modules
3   PSUs
4   Fan module

Installing the C460 on a Table Top

Place the system on a surface that supports at least 100 lbs (45 kg).

5   Install the supplied rubber feet to the bottom of the switch, placing the feet in the square recesses provided. See Figure 2.2.

Clean the surface of any oils or residue before applying the feet.

Figure 2.2   Table-Top Installation
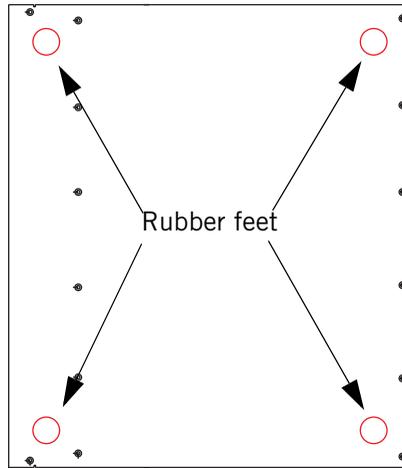
6   Ensure that all the pre-installed components are firmly installed in the chassis. These include:

— Supervisor modules

— Power supply

— Fan module

⚠ **Caution:** Do not place other equipment on top of the C460.

Rack Mounting

⚠ **Danger:** To avoid injury, Avaya recommends that two people to lift the switch onto a table top. A fully loaded C460 switch weighs at least 100 lbs (45 kg).

You can mount the Avaya C460 in a standard 19" rack either in "front-mount" or "mid-mount" positions with the brackets supplied with the chassis.

The brackets are symmetric: you can fix either bracket one either side.

Figure 2.3 shows the two mounting positions:

Figure 2.3   C460 Front-Mount and Mid-Mount Positions (side view)
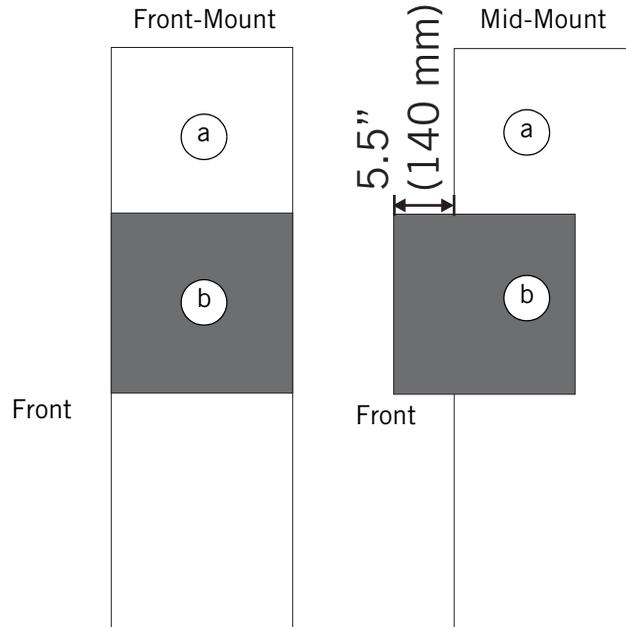
Key

a   Rack

b   C460 switch

ⓘ   The chassis height is 10U.

C460 Rack mounting procedure:

1   Position the brackets as shown in Figure 2.4

Figure 2.4   Positioning the rack-mounting brackets
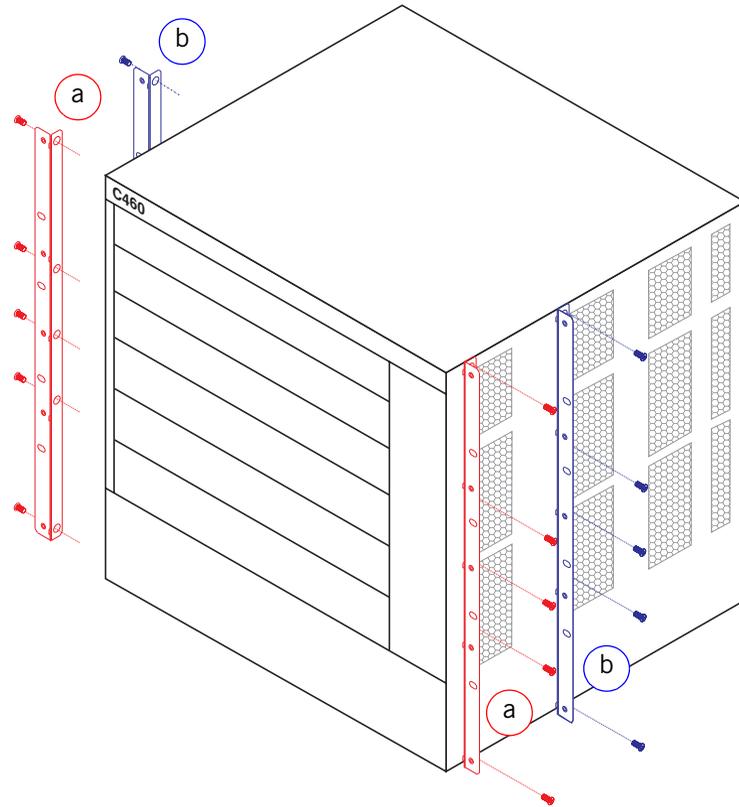
Key

a   Front-mount position

b   Mid-mount position

2   Firmly fix the brackets to the chassis with the screws provided. Use five screws for each bracket.

3   Position the switch in the rack.

4   Fasten the switch in the rack with the screws provided.

ⓘ   The screw size is 8-32x¼

⚠   **Caution:** Do not place other equipment on top of the C460

Cable Guide Installation

You can use the cable guide to tidy cables from the Supervisor and I/O modules. The cable guide is symmetric: you can install the bracket on either side of the switch.

- ⓘ Avaya recommends that you install the cable guide on the *left side* of the switch to allow easier access to the fan module.
- ⓘ You need to install the rack mounting brackets before you can install the cable guides.
- ⓘ Install the switch in the rack *before* installing the cable guide.
- • Secure the cable guide to the rack mounting bracket using the captive screws on the cable holder (see Figure 2.5).

Figure 2.5   Installing the Cable Guide
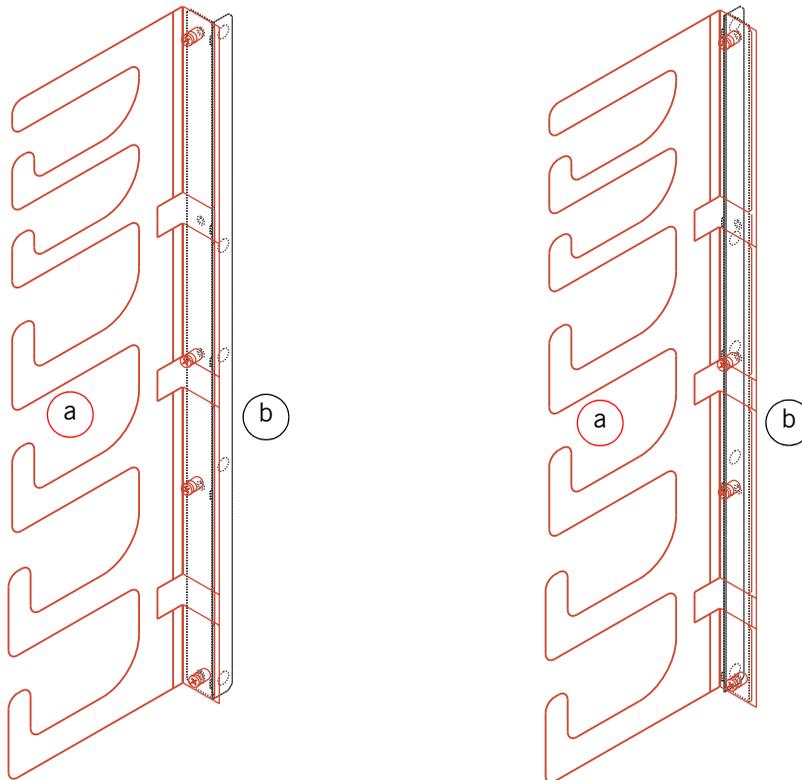
Key

a   Cable Guide
b   Rack-mounting bracket

PSU (Power Supply Unit) Installation

ⓘ If you purchased an Avaya C460ML-CFG (Material code 700255003) or C460ML PWR CONFIG (Material code 700281603) , then one Supervisor Module, PSU and the Fan Module are already installed.

For further information on Power Supply Installation, see Chapter 3, "Turning on the Avaya C460"

Fan Module Replacement or Installation

ⓘ   The C460 Chassis is always shipped with a fan module already installed.

⚠ **Danger:** Ensure that your fingers and other objects are clear of the fans when you insert or remove the fan module.

⚠ **Danger:** The fans rotate whenever the chassis is turned on.

Figure 2.6   The Avaya C460 Switch – Fan Module Location

Figure 2.7   Installing the Avaya C460 Fan Module
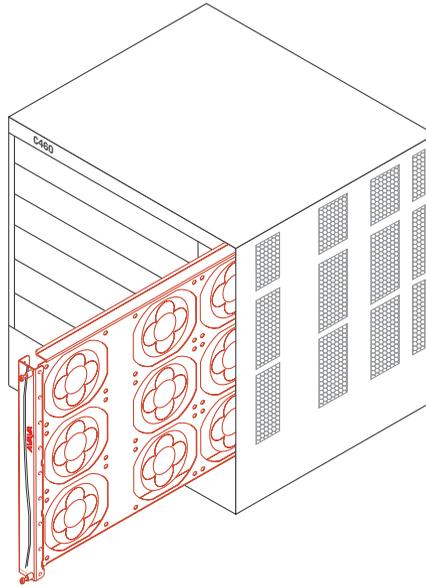
⚠ **Caution:** You need to replace the fan module within five minutes. If you do not, the I/O modules are shut down automatically to prevent overheating of the modules. If this occurs, turn off the chassis and turn it on again.

To install a fan module:

1   Remove the existing fan module.
    a   Loosen the fastening screws.
    b   Gently pull the module towards you.
2   Position the module in the slot with the screws to the right side of the chassis (see Figure 2.7).
3   Gently slide the module in.
4   Gently tighten the screws.

Supervisor Module Installation

ⓘ If you purchased an Avaya C460ML-CFG (Material code 700255003) or C460ML
   PWR CONFIG (Material code 700281603) , then one Supervisor Module, PSU
   and the Fan Module are already installed.

Figure 2.8 shows the positions of the SPV Supervisor installed in the C460 chassis.

Figure 2.8   Location of the Avaya C460 Supervisor Modules

ⓘ You can install Supervisor modules in the top two slots – 1 and 2 – only.

⚠ **Caution:** Do not leave any slots open. Use the the blanking plates supplied to cover
empty slots.

⚠ **Caution:** The Supervisor modules contain components that are sensitive to static
discharge. Handle the module by the edges only.
Use appropriate anti-static equipment when handling the modules.

Figure 2.9   Installing the C460 Supervisor Module

Key
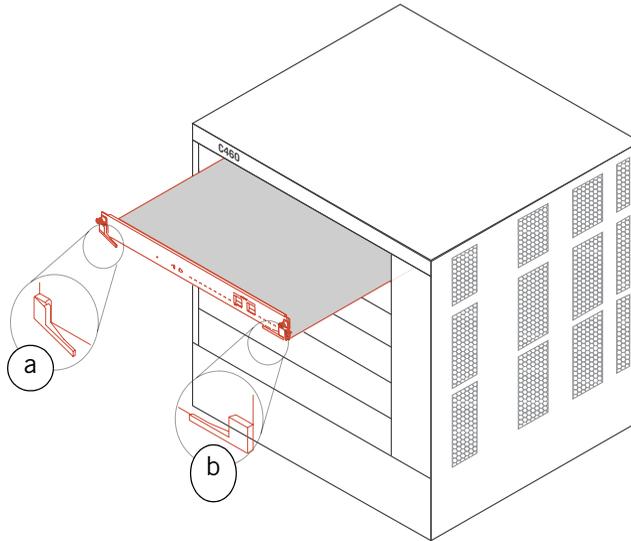
a   Open locking handle
b   Closed locking handle

To install a Supervisor module:

1   Remove the blanking plate or installed module as appropriate.
2   Open the locking handles at the edge of the front panel.
3   Position the module in the slot as shown in Figure 2.9.
4   Gently slide the module in.
ⓘ   Ensure the hooks on the locking handle are aligned with the matching holes on the chassis.
5   Close the locking handles.
▶   The module slides back and connects to the backplane.
6   Gently tighten the screws.
ⓘ   For information on configuring redundant supervisor modules, refer to "M460ML-SPV Supervisor Module Redundancy" on page 37.

I/O Module Installation

ⓘ If you purchased an Avaya C460ML-CFG (Material code 700255003) or C460ML
    PWR CONFIG (Material code 700281603) , then one Supervisor Module, PSU
    and the Fan Module are already installed.

Figure 2.10 shows the positions of I/O modules installed in the C460 chassis.

Figure 2.10   Location of Avaya C460 I/O Modules
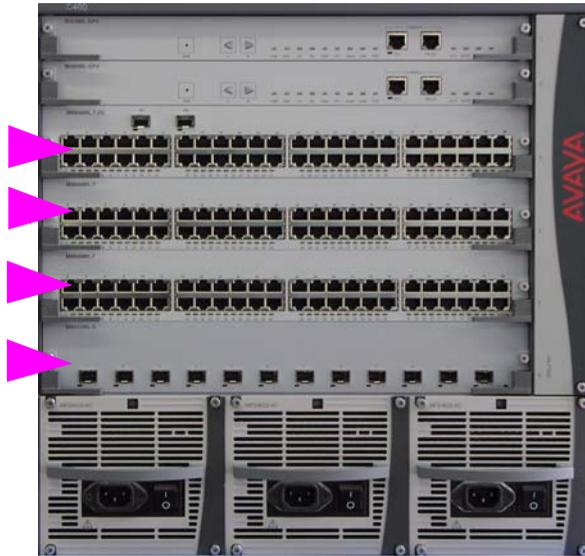
ⓘ You can install I/O modules in the bottom four slots – 3 to 6 – only.

⚠ **Caution:** Do not leave any slots open. Use the the blanking plates supplied to cover
    empty slots.

⚠ **Caution:** The I/O modules contain components that are sensitive to static discharge.
    Handle the module by the edges only.
    Use appropriate anti-static equipment when handling the switch and modules.

Figure 2.11   I/O Module Component Location

Key

1   Module label
2   Securing screws
3   Locking handles

I/O Module Installation Procedure

To install an I/O module:

1   Remove the blanking plate by unscrewing the captive screws and gently pulling the plate towards you.
2   Open the locking handles at the edge of the front panel. See Figure 2.12.
3   Position the module as shown in Figure 2.12.
4   Gently slide the module in.
ⓘ   Ensure the hooks on the locking handle are aligned with the matching holes on the chassis.
5   Close the locking handles.
▶   The module slides back and connects to the backplane.
6   Gently tighten the screws.
ⓘ   For module-specific information, refer to the Installation Guide shipped with the module.

Figure 2.12   Installing C460 I/O Modules

Key
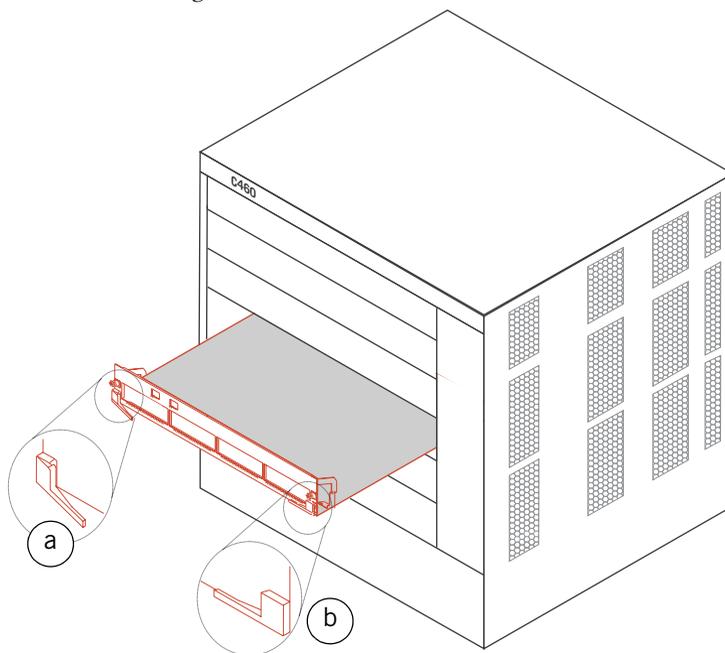
a   Open locking handle
b   Closed locking handle

Turning on the Avaya C460

Introduction

Once you have installed the Avaya C460 chassis and modules, you can turn the chassis on. The Avaya C460 chassis can accommodate one, two or three PSUs (Power Supply Units). The available power is divided among the modules by the Supervisor Module. See "Power Management" on page 22 further information.

This chapter describes three basic scenarios:

- Turning on the C460 chassis in various configurations.
- Adding a PSU to the C460 chassis.
- Removing a PSU from the chassis.
- ⓘ In order to support Power over Ethernet, you need to install MPS4610-AC 1000W PSUs.
- ⓘ If you need to install additional MPS4610-AC PSUs, do so *before* installing additional PoE I/O modules.

⚡ **Danger:** The fans are on whenever the power is on in the chassis.

⚠ **Caution:** Do not leave any PSU slots open. Use the the blanking plates supplied to cover empty slots.

Installing a PSU

- ⓘ Use the handle on the front panel of the PSU to lift it.
- ⓘ You can install the PSU in any of the three slots.
- 1 Remove the blanking plate by unscrewing the four retaining screws and gently tugging the plate towards you.
- 2 Position the PSU with the label facing up and to the right.
- 3 Gently slide the PSU back until the socket on the back of the PSU engages in the plug on the chassis.
- ⓘ Ensure the guiding pins on the front panel of the PSU align with the holes on the front panel of the C460 chassis.
- 4 Gently tighten the screws on the PSU.

Powering Up

In order to power I/O modules you need to install at least one PSU and at least one Supervisor Module.

⚡ **Danger:** The fans are on whenever the power is on in the chassis.

Turning on a Chassis with Supervisor and I/O Modules Already Inserted

ⓘ It is recommended to insert the PSU *before* inserting PoE I/O modules.

If you have inserted Supervisor module(s) and I/O module(s) into the chassis *before* turning on the PSUs, the power-up procedure is as follows:

1   The Supervisor module(s) and fans are turned on automatically when the PSUs are turned on.
2   The Supervisor module will turn on the modules one by one, verifying that there is enough power budget in the system first. If there are two Supervisor modules, the Active Supervisor Module preforms this procedure.

Turning on a Chassis with a Supervisor Module Only

ⓘ The fans are on whenever the power is on in the chassis, whether Supervisor Modules are installed or not.

If you turn on the PSU(s) in a chassis with a Supervisor Module, the power-up procedure is as follows:

1   The fans start.
2   The supervisor module is turned on.
▶   You can now insert I/O Modules

Turning on a Chassis with no Modules

If you turn on the PSU(s) in an empty chassis – no Supervisor modules – the fans will start up.

Inserting an Additional PSU

ⓘ Use only one type of PSU (300 W *or* 1000 W) in the chassis at a time.
1   The SPV adds the new PSU power budget and checks how many PSUs are present in the chassis
2   Modules not powered up because of an insufficient power budget are turned on. Otherwise the new PSU power is just added to the total available power.

Removing or Switching off a PSU

If there is one PSU

The entire chassis turns off

If there are two PSUs

When you remove a PSU from the chassis, the Supervisor Module recalculates the power budget. If the power requirement exceeds the capacity of one PSU, the I/O modules are then turned on according to the power budgeting scheme described below. See Figure 3.2.

1   The chassis is automatically turned on with only the Supervisor Modules and the fans getting power from the available PSU

2   If all the available I/O modules were operational before the PSU removal/failure, the Supervisor Module starts to apply power. The power is first applied to as many I/O modules as possible within the power budget limit of the single PSU. This can mean that an I/O module with a low power requirement and low priority is powered up rather than a high power requirement module with a higher priority.

3   Slots whose power is disabled are skipped.

ⓘ   Power may no longer be supplied to certain PoE ports, depending on the configuration.

If there are three PSUs

The chassis continues to run: two PSUs are sufficient to supply power to a fully populated chassis.

ⓘ   Power may no longer be supplied to certain PoE ports, if you have configured the PSUs to "no redundancy" mode.

Power Management

The Supervisor module checks the PSU status every three seconds by comparing the current state to the previously saved PSU state.

Figure 3.1   Power Management Priority

The Power Management Process

ⓘ The power management process is activated in the SPV only if there is a change in power requirements or supply caused by one of the following events:

- Power-up sequence
- PSU removal if there are two PSUs
- PSU insertion if there is only one PSU
- I/O module insertion
- I/O module removal
- Administratively enabling/disabling a slot
- Changing the power priority of a slot
- Recalculating the power budget using the `set powerinline budget` CLI command.
  — Modules that were not powered up due to lack of main power can be powered up if new budget allows it
  — The PoE budget for all modules will be totally re-initialized.

- ⓘ Removing both supervisors turns off the entire system.
- ⓘ In case of power failure in a module, the Supervisor module receives an indication from the failed module. The Supervisor module will turn off the I/O module and issues a warning.
- • You can also administratively enable/disable power supply to a specific I/O module slot with the **set slot power admin** CLI command.
- • You can set the priority of a slot with the **set slot power priority** CLI command.
- ⓘ The power allocation configuration is saved in NVRAM and treated as any other switch configuration.
- ⓘ If you want to view the power status of the C460 chassis and modules, you can use the **show environment power** CLI command.

Figure 3.2   I/O Module Power Management Process
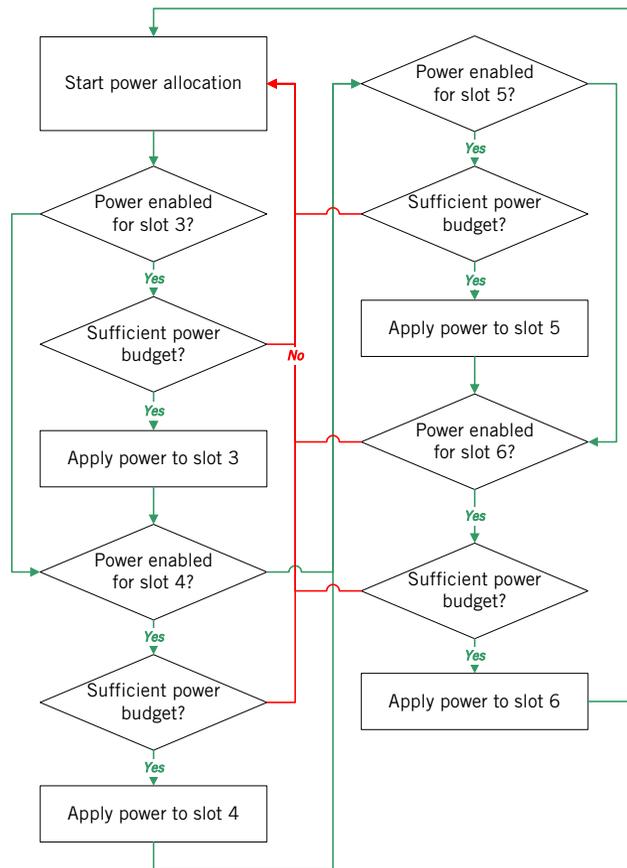
Slot Power Priority

The following three parameters determine whether an I/O module slot is powered:

1 If the slot already powered before the change in power requirements or supply
2 User-defined priority (see "User-Defined Priority" on page 24)
3 Default priority based on the slot number. The lower the slot number, the higher the default priority.

User-Defined Priority

Use the **slot power priority** CLI command to configure priorities for powering up IO modules in order to ensure that important IO modules are powered up first when there is insufficient power.

You can configure each slot as "Critical", "High" or "Low" priority.

ⓘ The user-defined and default priority does not over-ride the "History" parameter. In other words, inserting a new I/O module will never cause a previously operating, lower priority I/O module to lose power.

ⓘ Supervisor modules are always "Critical" priority and are always powered up before I/O modules.

Calculating the Power Budget

You can also calculate how many PSUs you need in order to provide redundancy for a specific configuration.

You need to add the power requirements for the I/O modules installed to the base requirement of *two* Supervisor modules and *one* Fan module. If the total is less than the power supplied by the number of PSUs installed, an additional PSU provides redundancy.

Table 3.1 shows a sample calculation:

Table 3.1   Sample Power Budget Calculation

Component	Requirement (W)
Fan module	45
2 x M460ML-SPV Supervisor Modules	136
2 x M4648ML-T I/O Modules	96
Total	277

Total power available: 300 W
Total power requirement: 277 W

Refer to "Power Requirements" on page 83 for power requirements for C460 components.

PoE Power Calculation

Table 3.2 shows PoE power consumption for powered devices with different power requirements (5 W, 10 W and 15 W.

Assumptions

- The PSUs work in "no redundancy" mode.
- If mode is set to "redundant", only two PSU are considered as available, while the 3rd PSU power is reserved for the case of PSU failure
- Chassis components power consumption:
  — SPV 1 – 68W
  — SPV 2 – 68W
  — Fans – 45W
  — Modules – 48 PoE Ports – 48W
- 1000 W Total power per PSU (in load-sharing mode)
  — up to 400 W main power
  — plus up to 800 W PoE power

Table 3.2   Powered Device Power Consumption

Number of modules	Number of PSUs (Total Power)						Watts per port
	1 (1000 W)		2 (2000 W)		3 (3000 W)		
	Main 400 W	PoE 800 W	Main 800 W	PoE 1600 W	Main 1200 W	PoE 2400 W	
1	229	48 (240 W) 48 (480 W) 48 (720 W)	229	48 (240 W) 48 (480 W) 48 (720 W)	229	48 (240 W) 48 (480 W) 48 (720 W)	5 10 15
2	277	96 (480 W) 72 (720 W) 48 (720 W)	277	96 (480 W) 96 (960 W) 96 (1440 W)	277	96 (480 W) 96 (960 W) 96 (1440 W)	5 10 15
3	325	135 (675 W) 67 (670 W) 45 (675 W)	325	144 (720 W) 144 (1440 W) 106 (1590 W)	325	144 (720 W) 144 (1440 W) 144 (2160 W)	5 10 15
4	373	125 (625 W) 62 (620 W) 41 (615 W)	373	192 (960 W) 160 (1600 W) 106 (1590 W)	373	192 (960 W) 192 (1920 W) 160 (2400 W)	5 10 15

ⓘ Refer to "Power Requirements" on page 83 for power requirements for C460 components.

Power CLI Commands

In order to...	Use the following command...
Enable power supply redundancy	set power redundancy enable
Disable power supply redundancy	set power redundancy disable
Enable power for an I/O slot	set slot power admin enable
Disable power for an I/O slot	set slot power admin disable
Set power priority for an I/O slot	set slot power priority
Display the current power configuration for the switch	show environment power

Avaya C460 Panels

Introduction

This chapter describes the front panels of the C460 switch modules, including the LEDs, ports and buttons.

M460ML-SPV Panel

M460ML-SPV modules can operate in three modes: Active, Standby and Halted. Each mode is reflected in the LEDs – further details are provided in Table 4.1.

M460ML-SPV LEDs

Figure 4.1   M460ML-SPV LEDs
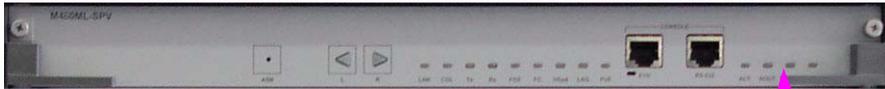
Table 4.1 summarizes the functions of the LEDs for an *active* M460ML-SPV supervisor module.

Table 4.1   Active M460ML-SPV LEDs

LED	Description	State	Meaning
ACT	Active SPV indication	ON	
ROUT	Device switching mode	ON	Layer 3
		OFF	Layer 2
OPR	CPU operation System status	ON	CPU boot and BIT (built-in test) completed
		Blinking	CPU booting or running BIT Fan module not installed.
		OFF	CPU cannot boot (see Chapter 11, "Troubleshooting the Installation")

Table 4.1   Active M460ML-SPV LEDs

LED	Description	State	Meaning
PWR	Power information	ON	Power is up
		Blinking	Power management error: the switch cannot supply power to at least one module
		OFF	Power is off

Table 4.2   Active M460ML-SPV FastETH LED

LED	Description	State	Meaning
Fast ETH	Management outband Ethernet link status	ON	Port enabled and link OK No data transmitted or received on the port
		Blinking	Port enabled and link OK Data transmitted or received on the port
		OFF	Link is not operating

Table 4.3 summarizes the functions of the LEDs for a standby or halted M460ML-SPV supervisor module.

Table 4.3   Standby/Halted M460ML-SPV LEDs

LED	Description	State	Meaning
ACT	Active SPV indication	OFF	
ROUT	Device switching mode	OFF	
OPR	CPU operation	ON	CPU boot and BIT completed *Module in Standby mode*
		Blinking	Module in Halted mode or CPU and BIT not completed
PWR	Power information	ON	Power is up
		OFF	Power is off

Table 4.3   Standby/Halted M460ML-SPV LEDs

LED	Description	State	Meaning
Fast ETH	Management outband Ethernet link status	OFF	

Table 4.4   Standby M460ML-SPV FastETH LED

LED	Description	State	Meaning
Fast ETH	Management outband Ethernet link status	ON	Port enabled and link OK No data transmitted or received on the port
		Blinking	Port enabled and link OK Data transmitted or received on the port
		OFF	Link is not operating

ACT LED and OPR LED Summary

Table 4.5 summarizes the states of the ACT and OPR LEDs

Table 4.5   ACT and OPR LED Summary

ACT LED is...	OPR LED is...	M460ML-SPV Module is...
ON	ON	Active
ON	Blinking	Active *Fan Module not inserted*
OFF	ON	Standby
OFF	Blinking	Halted or booting *Fan Module not inserted*

Function LEDs

Figure 4.2   M460ML-SPV Function LEDs
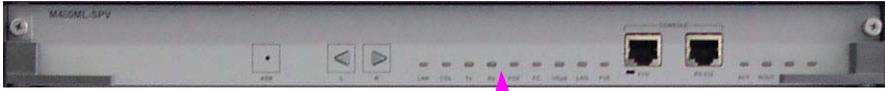
Use the L (Left) and R (Right) pushbuttons to select the information displayed for all the port LEDs on the installed I/O modules. Press the button to cycle through the options: the illuminated LED shows the option. See "M460ML-SPV Left and Right Pushbuttons" on page 33 for further information on the pushbuttons.

Figure 4.3 shows the cycle.

Figure 4.3   Function LEDs Cycle
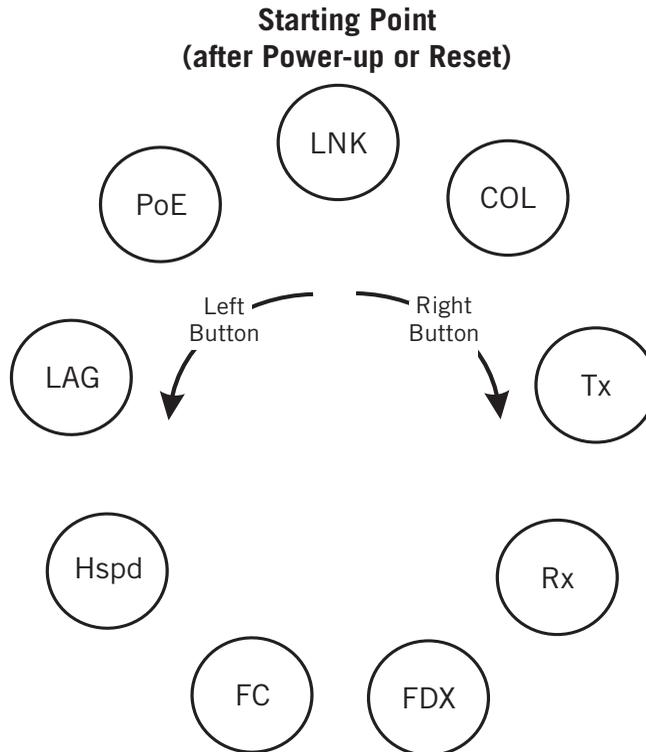
ⓘ The LEDs indicate which information is displayed on the port LEDs on I/O modules: check each I/O module to see the information.

ⓘ Press both buttons simultaneously for 1.5 seconds to reset the SPV supervisor module.
Press both switches simultaneously for five seconds to reset the entire switch.

Refer to "M460ML-SPV Left and Right Pushbuttons" on page 33 for full details of reset options.

Table 4.6 summarizes the meanings of the function LEDs. Certain indications depend on the specific I/O module port type:

Table 4.6   M460ML-SPV Function LEDs

LED	Description	State	Meaning
LNK	Port status	ON	Port enabled and link OK
		OFF	Port disabled or link is not operating
COL	Collision detection	ON	Collision occurred on line
		OFF	No collision or FDX port
Tx	Transmit to line	ON	Data transmitted to the line
		OFF	No transmit activity
Rx	Receive from line	ON	Data received from the line
		OFF	No receive activity
FDX	Full-/Half-duplex Indication	ON	Full-duplex mode For 10/100BASE-T ports when the link test fails with auto-negotiation enabled
		OFF	Half-duplex mode
FC	Flow Control	ON	Flow Control is active
		OFF	Flow Control is disabled
HSpd	Port speed indication	ON	Port *10/100 1000* 100 Mbps 1000 Mbps
		OFF	Port *10/100 1000* 10 Mbps N/A
LAG	Link Aggregation Group	ON	Port is a member of a LAG
		OFF	Port is not a member of a LAG

Table 4.6   M460ML-SPV Function LEDs

LED	Description	State	Meaning
PoE	Power over Ethernet	ON	PoE is enabled and power is being supplied to an end-station
		Blinking	• PoE enabled, but no powered device is detected, *or* • Power supply error, *or* • Not enough power
		OFF	PoE disabled for this port

M460ML-SPV Supervisor Module Ports

Figure 4.4   M460ML-SPV Supervisor Module Console Ports

Key

1   Eth (Ethernet) Port
2   RS-232 (Serial) port

Eth Port (Outband Connection)

A 10/100BASE-T port with an RJ-45 connector for managing the C460 by a dedicated LAN.

RS-232 Port (Sideband Connection)

An RJ-45 RS-232 serial port for connecting a modem or terminal for configuration with the CLI.

M460ML-SPV Left and Right Pushbuttons

Figure 4.5   C460 Supervisor Module Left and Right Pushbutton

Key

1   L (Left) pushbutton
2   R (Right) pushbutton

Table 4.7   M460ML-SPV Left and Right Pushbutton Functions

To...	Press...
Cycle between the Function LEDs. See "Function LEDs" on page 30 for further information	The Left *or* Right button briefly.
Reset the Supervisor Module	Both buttons at the same time for 1.5 seconds.
Reset the chassis	Both buttons at the same time for five seconds.

M460ML-SPV ASB (Alternate Software Bank) Pushbutton

Figure 4.6   C460 Supervisor Module ASB Pushbutton
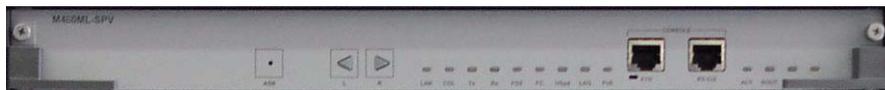
ⓘ See "Supervisor Module does not Boot" in "Troubleshooting the Installation" for information.

Power Supply Panel

C460 Power Supply Front Panel
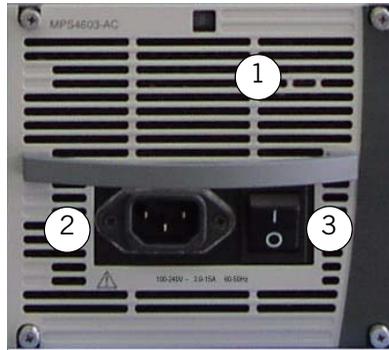
Key

1   Status LED
2   Power inlet
3   Power switch

Table 4.8   Power Supply Status LED

LED Description	State	Meaning
Power Supply Status	Green	Power supply functioning
	Orange	Power supply failure Power supply off

Maximizing Avaya C460 Availability

Introduction

In order to maximize availability of the Avaya C460 for applications such as VoIP, you can deploy a variety of redundancy mechanisms.

This chapter describes the Supervisor module and I/O module redundancy and power supply availability features.

M460ML-SPV Supervisor Module Redundancy

To enable supervisor redundancy, you need to install two M460ML-SPV Supervisor Modules in a C460 Chassis. Ensure that one Supervisor module is "Active" and that the second is "Standby".

M46OML-SPV Supervisor Module Modes:

- *Active* – The Supervisor Module is operating
- *Standby* – This Supervisor Module is fully synchronized with the Active one and can replace it in the case of failure.
- *Halted* – This Supervisor Module is not synchronized with the Active one and cannot act as a standby module.

You can verify the Supervisor Module mode by:

- the ACT and OPR LED status (refer to Table 5.1)
- the **show spv** CLI command, or
- the C460 Manager.

Table 5.1   ACT and OPR LED Summary

ACT LED is...	OPR LED is...	M460ML-SPV Module mode
ON	ON	Active
ON	Blinking	Active *No fan module present*
OFF	ON	Standby
OFF	Blinking	Halted or booting

Configuring the Supervisor Modules for Active/Standby Operation

In order to operate in an Active-Standby configuration, the two SPVs must be synchronized.

- If the Supervisor modules are not synchronized, one is Active and the other Halted.
  In this case you will need to synchronize them manually. See "Synchronizing the Supervisor Modules Manually" on page 38.
- Both Supervisor modules switching fabrics participate in switching/routing in Active-Standby configuration only
- A Supervisor module which was Active stays Active after a chassis reset

One of the SPVs can operate as Standby automatically only if both of the following conditions are fulfilled:

- The current chassis is the last one in which you inserted this SPV
- The current running SW images are the same version

Synchronizing the Supervisor Modules Manually

If the SPVs are not synchronized, you need to synchronize them manually using the Avaya C460 CLI.

ⓘ Synchronization can be required for a complete synchronization also if the SPVs are in an Active-Standby configuration. For example, when the SPVs boot with the same SW but from different banks

1   Access the CLI. See Chapter 6, "Establishing Switch Access"

2   Enter the **sync spv** command from the Active Supervisor Module.

ⓘ This command transfers the following information from the Active Supervisor module to the other Supervisor module:
   — Firmware images
   — Embedded Web image
   — Preferred boot bank
   — Chassis synchronization

ⓘ The transfer process can take up to 90 seconds.

ⓘ The following screen capture shows the process:

```
C460-1(super)# sync spv
This command may overwrite the neighbor SPV software and
reset both SPVs
*** Confirmation *** - do you want to continue (Y/N)? y
Copying Bank A to the neighbor SPV ...
Copying Bank A to the neighbor SPV done
Copying Bank B to the neighbor SPV ...
Copying Bank B to the neighbor SPV done
Copying Embedded Web image to the neighbor SPV ...
Copying Embedded Web image to the neighbor SPV done
Setting boot bank of the neighbor SPV ...
Setting boot bank of the neighbor SPV done
Setting chassis sync on for the neighbor SPV...
Setting chassis sync on for the neighbor SPV done
SPVs are resetting.
Please wait till the process is finished. The SPVs will be
synchronized after the reset is completed
```

ⓘ After the transfer is finished, the Supervisor modules are reset automatically.
— After the reset the configuration files of the Active Supervisor Module are copied to the Standby Supervisor Module.
ⓘ This process can take up to two minutes.

Configuration File Synchronization

Three configuration files are stored in the Supervisor module flash memory:
• Layer 2 configuration (L2-config)
• Layer 3 running configuration (running-config)
• Layer 3 startup configuration (startup-config)

If two Supervisor modules are present, the configuration is automatically synchronized between the Active and Standby Supervisor modules.

• *Initial configuration* synchronization takes place after the boot: this process can take up to thirty seconds.
• *Layer 2* configuration changes are saved in both Supervisor modules when you press Enter.
ⓘ The Supervisor module Ethernet outband interface configuration is *not* synchronized between the modules.
• *Layer 3 startup configuration* is saved in the Standby SPV when you execute the `copy running-config startup-config` CLI command. This configuration is also saved in the Active SPV
ⓘ The Layer 3 running configuration is not saved in the Standby SPV

Redundant Power Supplies

The Avaya C460 supports automatic Power Supply redundancy and load-sharing.

Power supply redundancy is activated when you install three PSUs. Ensure that power redundancy to on using the `set power redundancy` CLI command.

If the power budget requirement increases beyond the power available from the non-redundant power supplies, then the additional power supply reverts to regular mode.

In order to check whether power supply redundancy is operating, you can use the `show environment power` CLI command.

ⓘ   The "Total Power drawn from the system" always includes the power reserved for *two* supervisor modules and the fan module.

```
C460 > show environment power

 PSUs Configuration Admin: redundancy
 PSUs Configuration State: no redundancy (2 active PSU(s))

 Power   Available  Drawn  Remaining
 -----   ---------  -----  ---------
 Main        411W   406W        0W
 PoE        1589W   100W     1489W

                                              Main  PoE    PoE
 Slot  Module Type        Active Enabled Priority Draw Budget Draw Fault

 ----  ---------------     ------ ------- -------- ---- ------ ---- -----

    1 M460ML-SPV             Y       Y    critical 68W

    2 M460ML-SPV             Y       Y    critical 68W

    3 M4612ML-G              Y       Y    low       59W

    4 M4648ML-T-2G-PWR       Y       Y    high      48W    720W 100W

    5 M4648ML-T-PWR          Y       Y    low       48W    720W   0W

    6 M4648ML-T-2G           Y       Y    low       70W


* Fans power consumption: 45(W)
```

Establishing Switch Access

Introduction

This chapter describes how to access the Avaya C460 CLI from the following devices:

- A terminal to the serial port on the Supervisor Module
- A workstation running a Telnet session connected via an I/O module (Inband)
- A workstation running a Telnet session connected to the Console Fast Ethernet port on a Supervisor module (outband)
- A remote terminal/workstation attached via a modem (PPP connection) to the Supervisor Console Serial port. (Sideband)

Establishing a Console Connection with the C460

Figure 6.1   M460ML-SPV Supervisor Module Serial Console Port
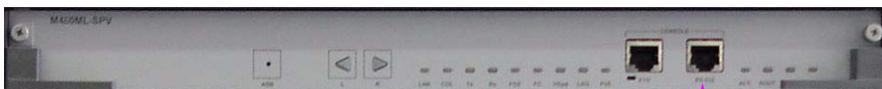
Perform the following steps to connect a terminal to the C460 Serial Console port for configuration of switch parameters:

1   Use the serial cable supplied to attach the RJ-45 console connector to the Console port of the active M460ML-SPV module. Connect the DB-9 connector to the serial (COM) port on your PC/terminal.

ⓘ   The active Supervisor module is indicated by the ACT and OPR LEDs being lit.

2   Ensure that the serial port settings on the terminal are:
   — 9600 baud
   — 8 bits
   — 1 stop bit
   — no parity.

▶   If you reset or powered up the switch after connecting and configuring the terminal, Welcome to C460 appears followed by the Login Name prompt.

ⓘ   If the login prompt does not appear, press a key on the terminal.

3   Enter the default login: **root**.

▶   The Password prompt appears

4   Enter the user level password: **root**.

🛈   If you connect your terminal to the Standby SPV, you can get access to all the CLI commands by opening a Session to the Active SPV. (See the Session command on page 63).

Establishing a Telnet Connection with the Switch (Inband)

Perform the following steps to establish a Telnet connection to the C460 for configuration:

🛈   You need to assign an inband interface IP address using a direct connection to the console serial port before you can establish the Telnet session.

1   Connect your station to the I/O module (directly or via the network).

2   Verify that you can communicate with the C460 using Ping to the inband interface IP of the C460. If there is no response using the Ping command, check the IP address and default gateway of both the C460 and the station.

🛈   The default subnet mask is 255.255.255.0.

3   Start a Telnet session:

— From the Microsoft Windows® taskbar of your PC click **Start** and then **Run** or access the command prompt

— Start the Telnet session by typing: **telnet** *<C460_IP_address>* For example: **telnet 149.49.35.214**

▶   The Login Name prompt is displayed

4   Enter the default name **root**

▶   The password prompt is displayed

5   Enter the password **root** in lower case letters.

🛈   You can now configure the C460.

Inband Interface Connection CLI Commands

In order to...	Use the following command...
Configure the management interface	set interface inband
Configure the management VLAN ID	set inband vlan
Enable the inband interface	enable interface inband
Disable the inband interface	disable interface inband
Display information on the device network interfaces	show interface

In order to...	Use the following command...
Send an ICMP echo request packets to another node on the network.	ping

- ⓘ For more detailed information on the CLI commands, refer to the *Avaya C460 Reference Guide*

Establishing a Telnet Connection with the Switch (Outband)

Figure 6.2   M460ML-SPV Supervisor Module Fast Ethernet Console Port

Perform the following steps to establish a Telnet connection to the C460 for configuration:

- ⓘ You need to assign an outband interface IP address using a direct connection to the console serial port before you can establish the Telnet session.
- ⓘ You can configure the Fast Ethernet console port parameters if necessary.
- ⓘ The outband interface should be on a different subnet from the inband interface.
1 Connect your station to the Fast Ethernet console port (directly or via the network).
2 Verify that you can communicate with the C460 using "ping" to the outband interface IP of the C460. If there is no response using the Ping command, check the IP address and default gateway of both the C460 and the station.
3 Start a Telnet session:
   — From the Microsoft Windows® taskbar of your PC click **Start** and then **Run** or access the command prompt
   — Start the Telnet session by typing: **telnet** *<C460_IP_address>*
     For example: **telnet 149.49.35.214**
▶ The Login Name prompt is displayed
4 Enter the default name **root**
▶ The password prompt is displayed
5 Enter the password **root** in lower case letters.
- ⓘ You can now configure the C460.
- ⓘ You can connect the Out-band interface to either of the Supervisor modules.

Outband Interface Connection CLI Commands

In order to...	Use the following command...
Configure the management interface	set interface outband
Enable the outband interface	enable interface outband
Disable the outband interface	disable interface outband
Enable or disable the link negotiation protocol on the Fast Ethernet console port	set outband negotiation
Set the speed of Fast Ethernet Console port	set outband speed
Set the duplex mode of the Ethernet Console port	set outband duplex
Display information on the device network interfaces	show interface
Display outband interface parameters	show outband
Send an ICMP echo request packets to another node on the network.	ping

Redundant Outband Connections

You can create a redundant outband management connection by connecting both Supervisor modules to the NMS via the Fast Ethernet interface by a switch (see Figure 6.3).

Figure 6.3   Redundant Outband Connections
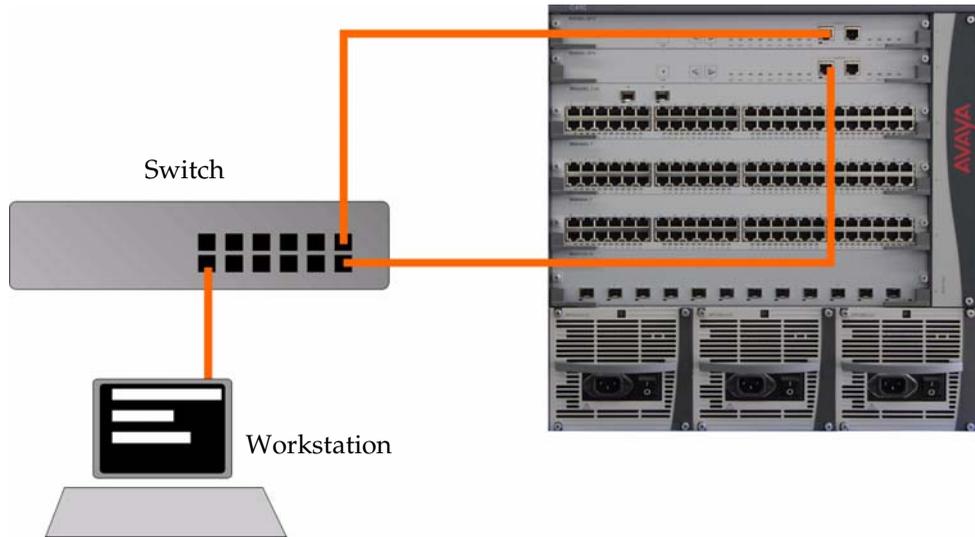
In this configuration, the Active SPV will respond to its Out-band port and the port of the other SPV will be ignored.

Establishing a PPP via Modem Connection with the C460 (Sideband)

Overview

The Point-to-Point Protocol (PPP) provides a Layer 2 method for transporting multi-protocol datagrams over point-to-point links. Here only IP datagrams will be exchanged, over a RS232 serial connection, between the C460 supervisor module and a remote peer (such as Ethernet) via a modem and the telephone lines. This provides remote access the sideband management interface of a C460 via a modem.

Sideband (PPP) Interface CLI Commands

In order to...	Use the following command...
Configure the device ppp interface and control a PPP session	set interface ppp
Configure the shared secret used in PPP sessions with CHAP authentication	set ppp chap-secret
Set the time after which the system automatically disconnects an idle PPP incoming session	set ppp incoming timeout
Define the PPP authentication method	set ppp authentication incoming
Set the baud rate used in PPP sessions	set ppp baud-rate
Display the PPP parameters of the active PPP session.	show ppp session
Display the authentication method used for PPP sessions	show ppp authentication
Display the time after which the system automatically disconnects an idle PPP incoming session	show ppp incoming timeout
Display the baud rate used in PPP sessions	show ppp baud-rate
Display the ppp configuration	show ppp configuration

Setting Up Sideband (PPP) Connection Configuration

ⓘ You need to configure an IP address and netmask for the sideband interface before you can establish a ppp link.

1   Connect a terminal to the Serial console port.

2   When you are prompted for a Login Name, enter the default name **root**.

3   When you are prompted for a password, enter the password **root**. You are now in Supervisor Level.

4   At the prompt, type:
    set interface ppp <ip_addr><net-mask>
    with an IP address and netmask to be used by the Avaya C460 Supervisor module to connect via its PPP interface.

ⓘ The PPP interface you configure with the set interface ppp command must be on a different subnet from the inband and outband interfaces.

5   Set the baud rate, ppp authentication, and ppp time out required to match your modem.

6   At the prompt, type:
    set interface ppp enable

▶ The following is displayed:
    Entering the Modem mode within 60 seconds...
    Please check that the proprietary modem cable is plugged
    into the console port

7   Use the DB-25 to RJ-45 connector to plug the console cable to the modem's DB-25 connector. Plug the other end of the cable RJ-45 connector to an Avaya C460 Supervisor module RJ-45 port.

8   The Avaya C460 Supervisor module enters modem mode.

9   You can now dial into the switch from a remote station, and open a Telnet, ping or SNMP management session to the PPP interface IP address.

ⓘ If you have two Supervisor modules installed, you can make a serial connection to one SPV and configure the PPP parameters through one session and deploy the PPP connection on the second Supervisor module.

Avaya C460 Embedded Device Manager

The C460 Manager provides the following features:

- Device Configuration - Viewing and modifying the different device configurations.
- Virtual LANs - Viewing and editing Virtual LAN information.
- Link Aggregation Groups (LAGs) - Viewing and editing LAG information.
- Port Redundancy - Setting redundancy for ports in a C460 Switch.
- Port Mirroring - Setting up port mirroring for ports in a C460 Switch.
- Trap Managers Configuration - Viewing and modifying the Trap Managers Table.
- Switch Connected Addresses - View devices connected to selected ports.
- Routing Manager - Viewing configurations of IP Routing protocols and general information.

PC System Requirements for Running the Avaya C460 Embedded Device Manager

Minimum hardware and operating system requirements are:

- Pentium II 400 Mhz-based computer with 128 Mb of RAM
- Screen resolution of 1024 x 768 pixels
- Microsoft Internet Explorer 5 or higher
- Microsoft Windows 2000 Workstation or Windows XP
- Sun Microsystems Java plug-in (supplied on the "Documentation and Utilities" CD)
- Refer to the Release Notes for the exact version of the Java plug-in

Running the Running the Avaya C460 Embedded Device Manager

ⓘ You should assign an inband or out-of-band interface IP address to the switch before beginning this procedure.

1   Open your browser.

2   Enter the URL of the switch in the format **http://aaa.bbb.ccc.ddd** where **aaa.bbb.ccc.ddd** is the inband or outband interface IP address of the switch.

ⓘ The user name is "root"
     The default password for read-only access is "root"
     The default passwords for read-write access is "root".

ⓘ The C460 Manager passwords are the same as those of the CLI. If you change the passwords of the CLI then those passwords become active for Web management as well. For further information on the passwords, please refer to Chapter 8.

▶ The welcome page is displayed.

Figure 7.1   The Welcome Page

▶ If you have the Java plug-in installed correctly, the C460 Embedded Device Manager opens in a new window (see Figure 7.2)

Figure 7.2   C460 Device Manager
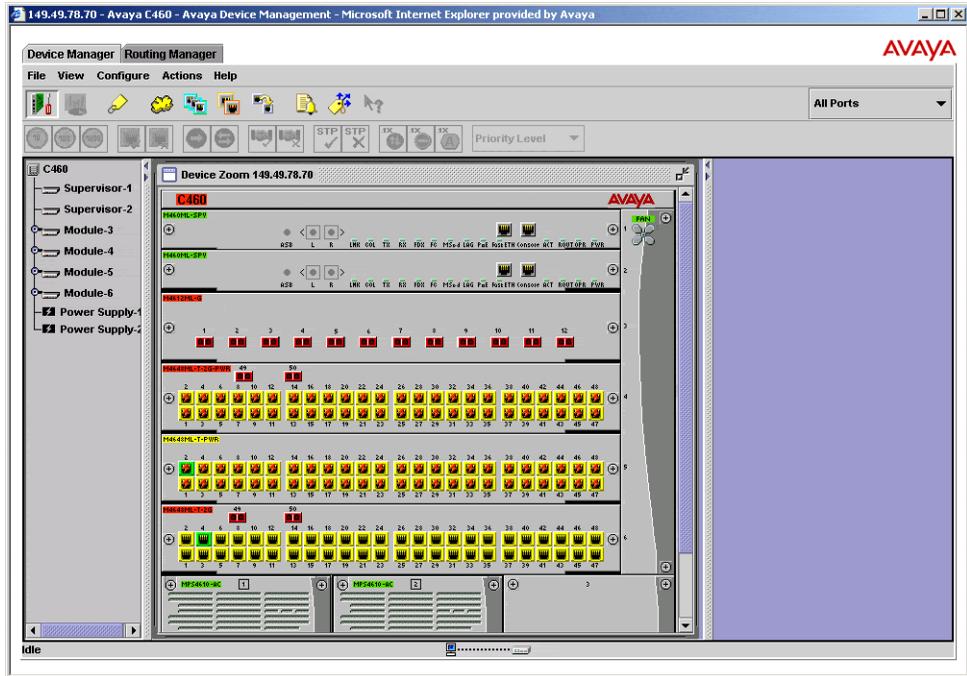
— If you do **not** have the Java plug-in installed, follow the instructions on the Welcome page that offers a variety of options to install the plug-in.

ⓘ You cannot configure Layer 3 parameters if you run the C460 Embedded Device Manager over the Outband interface.

Installing the Java Plug-in

If the network manager has configured the system, the plug-in should be installed automatically.

If the plug-in is not installed automatically, then you have three options for installing it manually:

1 Installing from the C460 Documentation and Utilities CD

1   Close all unnecessary applications on your PC.
2   Insert the "Avaya C460 Documentation and Utilities" CD in the CD drive.
3   Open Windows Explorer.
4   Open the embweb-aux-files\ folder on the CD
5   Double click on the plugin_a_b_c.exe file (a, b and c are the version numbers of the plug-in).
6   Follow the on-screen instructions.

2 Install from the Avaya Web Site

Click on the link in the Welcome page.

3 Install from your Local Web Site

Click on the link in the Welcome page.

ⓘ   This option is only available if the network manager has placed the files on the local Web server.

Installing the On-Line Help and Java Plug-In on your Web Site

ⓘ This procedure is optional

Copying the help files and Java plug-in to a local Web server allows users to access the on-line help for the Embedded Manager and enables automatic Installation and Maintenance of the Java plug-in the first time the users tries to manage the device.

1   Copy the `emweb-aux-files` directory from the "Avaya C460 Documentation and Utilities" CD to your local Web server. Please refer to your Web server documentation for full instructions.

2   Define the URL in the C460 using the following CLI command:
    set web aux-files-url `//IP address/directory name`
    where `//IP address/directory name` is the location of the directory from the previous step.

Documentation

The Device Manager comes with a detailed User's Guide including a Glossary of Terms and an overview of Data Communications concepts.

User Authentication

Introduction

User Authentication is an important element of maintaining secure networks. It prevents unauthorized network management and stops users from reconfiguring network devices.

Local User Accounts

The Local User Account feature allows you to define up to ten accounts that can manage a local (single) C460 switch. This simplifies administration on small networks or where users do not log in to more than one switch.

ⓘ If you wish to define more than ten users per switch, or accounts for a user on multiple switches, you should use RADIUS (Remote Authentication Dial-In User Service). Refer to "RADIUS" on page 57.

You need to define a user name, password and access level for each user.

Access Levels

In addition to the user name and password, you need to assign an access level for each user. There are three access levels, each of which allows the user only to perform certain actions. Refer to Table 8.1 for a brief description of each level.

Table 8.1   Access Level Descriptions

Level	Suitable for...	Allows...
Read-only	General users	Viewing of system parameter values.
Read-write	Site personnel	Access to configuration options.
Administrator	Network administrator	As "read-write" plus configuring Local User accounts and access to RADIUS authentication configuration commands

ⓘ If you wish to increase security, you can change the default user accounts and SNMP communities.

Local User Account CLI Commands

In order to...	Use the following command...
Add a local user account and configure a user (name, password and access level)	username
To remove a local user account	no username
Display the username, password and access type for all users on the switch	show username

ⓘ   The Web management passwords are the same as those of the CLI. If you change the passwords of the CLI then those passwords become active for Web management as well.

RADIUS

Introduction to RADIUS

Local user accounts (see "Local User Accounts" on page 55) are kept locally on the switch. Therefore, if a site contains multiple Avaya Switches, it is necessary to configure each switch with its own user accounts. Additionally, if for example a 'read-write' user has to be changed into a 'read-only' user, it will be necessary to change all the 'read-write' passwords configured locally in every switch, in order to prevent him to access this level anymore. This can be tedious at best, and at worst, unmanageable. A better solution is to have all of the user login information kept in a central location where all the switches can access it. Enter RADIUS (Remote Authentication Dial-In User Service).

RADIUS provides a mechanism for such consolidation. A RADIUS authentication server is installed on a central computer at the customer's site. On this server user authentication (account) information is configured that provides various degrees of access to the switch. The C460 will run as a RADIUS client. When a user attempts to log into the switch, if there is no local user account for the entered user name and password, then the switch will send an Authentication Request to the RADIUS server in an attempt to authenticate the user remotely. If the user name and password are authenticated, then the RADIUS server responds to the switch with an Authentication Acknowledgement that includes information on the user's privileges ('administrator', 'read-write', or 'read-only'), and the user is allowed to gain access to the switch. If the user is not authenticated, then an Authentication Reject is sent to the switch and the user is not allowed access to the switch's embedded management.

Figure 8.1 illustrates the RADIUS authentication procedure:

Figure 8.1   RADIUS Authentication Procedure
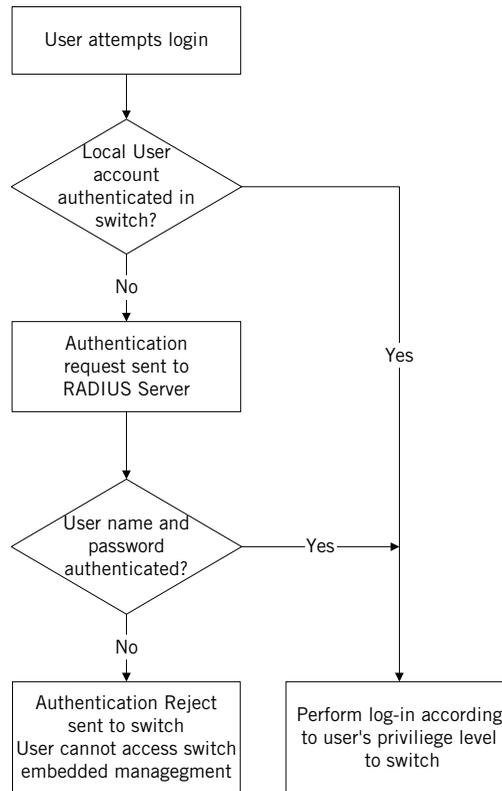
RADIUS CLI Commands

In order to...	Use the following command...
Enable or disable authentication for the C460 switch. RADIUS authentication is disabled by default	set radius authentication
Set a primary or secondary RADIUS server IP address	set radius authentication server
Configure a character string to be used as a "shared secret" between the switch and the RADIUS server.	set radius authentication secret

In order to...	Use the following command...
Set the RFC 2138 approved UDP port number.	set radius authentication udp-port
Set the number of times an access request is sent when there is no response	set radius authentication retry-number
Set the time to wait before re-sending an access request.	set radius authentication retry-time
Remove a primary or secondary RADIUS authentication server	clear radius authentication server
Display all RADIUS authentication configurations. The shared secrets will not be displayed	show radius authentication

Allowed Managers

With the Allowed Managers feature, the network manager can determine who may or may not gain management access to the switch. The feature can be enabled or disabled (default is disabled). When enabled, only those users that are configured in the Allowed Managers table are able to gain Telnet, HTTP, and SNMP management access to the switch.

You can configure up to 20 Allowed Mangers by adding or removing their IP address from the Allowed Managers List.

ⓘ The identification of an "Allowed Manager" is done by checking the Source IP address of the packets, thus if the Source IP address is modified on the way (NAT, Proxy, etc.), even an "Allowed Manager" will not be able to access the C460.

Allowed Manager CLI Commands

In order to...	Use the following command...
When set to enabled - only managers with ip address specified in the allowed table will be able to access the device	set allowed managers
Add/delete ip address of manager to/from the allowed table	set allowed managers ip
Show the IP addresses of the managers that are allowed to access the device	show allowed managers table
Show whether the status of allowed managers is enabled or disabled	show allowed managers status
Show the IP addresses of the managers that are currently connected	show secure current

Configuration Defaults

Introduction

This chapter defines the default parameters for the C460 switch.

Default System Parameters

Table 9.1   Default System Parameters

Parameter	Default Value
All IP addresses	N/A (0.0.0.0)
Default gateway	N/A (0.0.0.0)
CLI timeout	15 minutes
User name	root
Password	root
PPP interface	Disabled
Out-of-band interface	Disabled
In-band interface	Disabled
In-band ARP Tx interval	5 seconds
Out-of-band ARP Tx interval	5 seconds
VLANs	1 on all ports
Spanning Tree	Enabled
Bridge priority for Spanning Tree	32,768
NTP server IP address	N/A
Time zone offset	0 hours
Timezone	GMT
Read-only SNMP community string	public

Table 9.1   Default System Parameters

Parameter	Default Value
Read-write SNMP community string	public
Trap SNMP community string	public
Number of SNMP retries	3
SNMP timeout	2,000
Intelligent multicast	Disabled
Boot bank	B
Broadcast storm control	Disabled
PSU redundancy	Enabled
Slot priority	Low

Configuration Default CLI Commands

In order to...	Use the following command...
Restore all parameters to the default values	nvram init

Basic Switch Configuration

Introduction

This chapter describes the parameters you can define for the chassis, such as its name and location, time parameters, and so on.

Use the CLI commands briefly described below for configuring the display on your terminal or workstation.

In order to...	Use the following command...
Open a CLI session to the alternative SPV in the C460 chassis	session
Display or set the terminal width (in characters)	terminal width
Display or set the terminal length (in lines)	terminal length
Display or set the prompt	hostname
Return the prompt to its default value	no hostname
Clear the current terminal display	clear screen
Set the number of minutes before an inactive CLI session automatically logs out	set logout
Display the number of minutes before an inactive CLI session automatically times out	show logout
Access Layer 3 configuration if not logged in as supervisor (see "Access Levels" on page 55)	configure
Enter tech mode ⓘ This command is reserved for service personnel only	tech

In order to...	Use the following command...
Display the commands available at your current location in the CLI hierarchy	tree

System Parameter Configuration

Identifying the system

In order to make a C460 switch easier to identify, you can define a name for the switch, contact information for the switch technician and the location of the switch in the organization.

In order to...	Use the following command...
Configure the system name.	set system name
Configure the system contact person	set system contact
Configure the system location	set system location

Operating parameters

You can use the following commands to configure and display the mode of operation for the switch and display key parameters.

In order to...	Use the following command...
Configure the basic mode of operation to either Layer 2 or Routing	set device-mode
Display the mode of operation	show device-mode
Display system parameters	show system
Display module parameters	show module

Time Parameter Configuration

In order to...	Use the following command...
Restore the time zone to its default, UTC.	clear timezone
Configure the time zone for the system	set timezone
Configure the time protocol for use in the system	set time protocol
Enable or disable the time client	set time client
Configure the NTP server address	set time server
Display the current time	show time
Display the time status and parameters	show time parameters
Display the current time zone offset	show timezone
Get the time from the time server	get time

Feature License Configuration

Certain features, such as SMON, in the Avaya C460 are activated by "Feature Licenses." A sample activation procedure for one of these features, Routing, is described below:

Feature Activation

In order to benefit from the C460 routing capabilities, you need to purchase an Avaya L460L3-License Routing License Key Certificate (catalog number 700255060) for each C460 chassis.

Each Certificate is specific for:

- The module type.
- The required feature.
- The number of devices.

After you purchase a Feature Licence Key Certificate, you must obtain and activate a Feature License Key.

Obtaining a License Key

To obtain a License Key that enables routing features:

1   Go to http://license-lsg.avaya.com and click "request new license".

2   Enter the Certificate Key and Certificate Type.
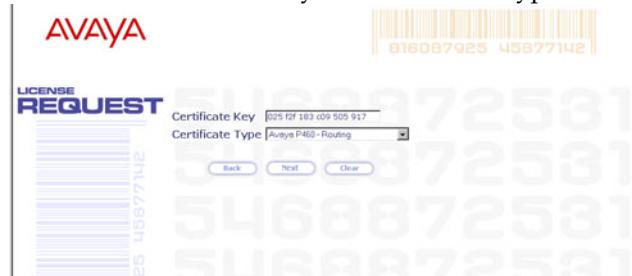
3   Click **Next**.

4   Enter contact information (once per certificate)

5   Click **Next**.

▶ View number of licenses left.

6   Enter the serial number of the switch. To identify serial numbers use the `show chassis-identity` CLI command: .

7   Click **Generate**.

▶ The feature-enabling license code is generated

Activating a Routing License Key

To activate a Routing License Key:

1   Enter the acquired Routing License Key into the C460 switch using the `set license` CLI command.

    set license [license] [featureName]

    where:

    license - license code

    featureName - routing

    and press Enter.

2   Check that the license is activated using the CLI.
    Use the `show license` CLI command.

Feature License CLI Commands

In order to...	Use the following command...
Configure the feature license	set license
Display the feature license	show license
Display the switch identity required for acquiring a license	show chassis-identity

Troubleshooting the Installation

Introduction

Powering up the Chassis

Problem	Possible Cause	Solution
Chassis does not power up	No PSU (Power Supply Unit) installed	Install PSU (see "PSU (Power Supply Unit) Installation" on page 11)
	PSU not connected to power source	Connect PSU to the power source
	PSU not turned on	Turn on the PSU using the power switch on the PSU front panel

Powering up the Supervisor Modules

Problem	Possible Cause	Solution
Supervisor modules do not power up	Supervisor module not installed correctly	Ensure that the module is installed correctly.

Powering up the Fan Module

Problem	Possible Cause	Solution
Fans do not start	Chassis not powered up	See "Chassis does not power up" on page 69
	Fan module not installed correctly	Check that Fan module is installed correctly

Powering up the I/O Modules

Problem	Possible Cause	Solution
I/O modules do not power up	No Supervisor module installed	Install supervisor module (see "Supervisor Module Installation" on page 14)
	Supervisor module not functioning	Replace supervisor module
	Insufficient Power Budget	Add PSUs
		Remove un-needed I/O modules *or* Disable power to the appropriate I/O slots. See the `set slot power admin` command
		Change the slot power priority. See the `set slot power priority` command.
	Power disabled to I/O slot	Enable power to slot. See the `set slot power admin` command.
I/O modules powered down automatically	Fan module removed for more than five minutes	Re-insert fan module Power down chassis Power up chassis

Supervisor Module does not Boot

Problem	Possible Cause	Solution
OPR LED does not light.	Supervisor Module has not booted.	Use the "ASB" (Alternate Software Bank) button to switch to the second firmware bank. • Press the ASB button by gently inserting a small object such as a bent paper clip into the hole. • Press and hold the "L" and "R" buttons to reset the switch. ▶ The switch will reset. • Keep the ASB button pressed for around two seconds. If a second software version is present, the SPV modules will then boot from the alternate software image bank.

PoE (Power over Ethernet)

Problem	Possible Cause	Solution
Power not supplied to port	Incorrect PSU installed	Install MPS4610-AC 1000 W PSUs
	Insufficient PoE budget	• Install an additional MPS4610-AC 1000 W PSU • Disconnect PoE devices • Reallocate port PoE priority
	Priority too low	Reallocate port PoE priority
	Module not powered	Refer to *Powering up the I/O Modules*
	Port power disabled	Enable port power using the `set port powerinline` command.

Maintenance

Introduction

This chapter provides some basic information for downloading firmware to the Avaya C460. For issues that are not covered in "Troubleshooting the Installation" or this chapter, please contact your Avaya representative.

⚠ **Caution:** Please refer to "Before you Install the Avaya™ C460" for safety information before proceeding.

Replacing I/O Modules

See "I/O Module Installation" on page 16.

Replacing Supervisor Modules

One Supervisor Module in the Switch

When you remove the Supervisor module, the switch is turned off. The switch is turned on after you insert a replacement Supervisor module.

Two Supervisor Modules in the Switch

If you remove the Active Supervisor module, the

Configuring the Supervisor Modules for Active/Standby Operation

In order to operate in an Active-Standby configuration, the two SPVs must be synchronized.

- If the Supervisor modules are not synchronized, one is Active and the other Halted.
  In this case you will need to synchronize them manually. See "Synchronizing the Supervisor Modules Manually" on page 38.
- Both Supervisor modules switching fabrics participate in switching/routing in Active-Standby configuration only
- A Supervisor module which was Active stays Active after a chassis reset

One of the SPVs can operate as Standby automatically only if both of the following conditions are fulfilled:

- The current chassis is the last one in which you inserted this SPV
- The current running SW images are the same version

Firmware Download

You can perform software download using the copy tftp command (see page 27 of the *Avaya C460 Reference Guide*) or the Avaya Software Update Manager (part of the Avaya™ Multiservice Network Manager Suite).

ⓘ You can obtain the latest firmware from the Avaya support site at
www.avaya.com/support

Introduction

Each C460 Supervisor module has two firmware image banks ("A" and "B") and one Device Manager (Embedded Web) bank.

The download is on a per-chassis basis and the firmware is automatically loaded into the standby Supervisor module (if configured) in addition to the active Supervisor module.

ⓘ Firmware is not downloaded to a halted Supervisor module.

You download the firmware to each bank separately via the CLI. The download progress is shown on the screen.

Preferred Bank

You can choose which firmware bank to boot from (preferred bank) using the set boot bank command.

ⓘ Changing the preferred bank affects both SPVs.

Booting from the Alternate Firmware Bank

Push the ASB button together with both function switches on the SPV front panel to boot from the alternate SW bank.

ⓘ If the SPVs were running in a Active-Standby configuration and ASB caused SW incompatibility between the SPVs, the Standby SPV will switch to Halted mode.

Firmware Download CLI Commands

In order to...	Use the following command...
Set the default boot bank	set boot bank
Download firmware to Bank A	copy tftp SW_imageA
Download firmware to Bank B	copy tftp SW_imageB
Copy Device Manager (Embedded Web) firmware	copy tftp EW_archive
Show the default boot bank	show boot bank

Configuration File Management

You can transfer the Layer 2 parameters to or from the current NVRAM running configuration file to a TFTP server.

This feature permits you to make a backup of the parameters. You can then use that file to configure other Avaya C460 switches without re-entering all the parameters manually.

ⓘ To use this feature, you need to have an active tftp server, and to create a file into which to download the data.
If Avaya MultiService Network Manager is running, you do not require an additional TFTP server.

Configuration Management CLI Commands

In order to...	Use the following command...
Upload the Layer 2 parameters from the current NVRAM running configuration to a file via TFTP	copy l2-config tftp
Update the Layer 2 parameters in the current NVRAM running configuration from a file via TFTP	copy tftp l2-config
Show the Layer 2 configuration file	show l2-config

Standards

Introduction

The Avaya C460 complies with the following standards:

IEEE

- 802.1D Bridges and STA
- 802.1p Priority Tagging compatible on all ports
- 802.1Q VLAN Tagging support on all ports
- 802.1w Rapid Spanning Tree Protocol
- 802.1x Port-Based Network Access Control
- 802.3af (the C460 is designed to comply to the specification of the latest draft)
- 802.3x Flow Control on all ports
- 802.3z Gigabit Ethernet

IETF

Layer 2
- RFC-0868 Time Protocol
- RFC-1155 Structure and identification of management information for TCP/IP-based internets
- RFC-1157 Simple Network Management Protocol (SNMP)
- RFC-1213 MIB-II
- RFC-1314 Bridge MIBs for STP, and for CAM contents
- RFC-1332 PPP Internet Protocol Control Protocol (IPCP)
- RFC-1334 PPP Authentication Protocols (PAP & CHAP)
- RFC-1493 Bridge MIB for Spanning Tree
- RFC-1661 Point-to-Point Protocol (PPP)
- RFC-1757 RMON (support for groups 1,2,3 and 9)
- RFC-1769 Simple Network Time Protocol (SNTP)
- RFC-2613 SMON
- RFC-2674 Bridge MIB Groups - dot1dbase and dot1dStp fully implemented.
- Support for relevant MIB objects: dot1q (dot1qBase, dot1qVlanCurrent)
- RFC-2863 Interfaces Group MIB
- RFC-2865 Remote Authentication Dial In User Service (RADIUS)
- MIB-II - RFC 1213

- Bridge MIB for Spanning Tree - RFC 1493
- RMON - RFC 1757
- SMON - RFC 2613
- Power over Ethernet – Internet draft-ietf-hubmib-power-ethernet-mib-05

Layer 3
- RFC-791 Internet Protocol
- RFC-792 Internet Control Message Protocol
- RFC-826 Ethernet Address Resolution Protocol
- RFC-894 Standard for the transmission of IP datagrams over Ethernet
- RFC-922 Broadcasting Internet datagrams in the presence of subnets
- RFC-950 Internet Standard Subnetting Procedure
- RFC-951 Bootstrap Protocol
- RFC-1027 Using ARP to implement transparent subnet gateways
- RFC-1058 Routing Information Protocol
- RFC-1112 Host Extensions for IP Multicasting
- RCF-1122 Requirements for Internet Hosts - Communication Layers
- RFC-1533 DHCP Options and BOOTP Vendor Extensions
- RFC-1534 Interoperation Between DHCP and BOOTP
- RFC-1541 Dynamic Host Configuration Protocol
- RFC-1542 Clarifications and Extensions for the Bootstrap Protocol Information
- RFC 1583 OSPF Version 2
- RFC-1624 Computation of the Internet Checksum via Incremental Update
- RFC 1723 RIP Version 2 Carrying Additional Information
- RFC 1724 RIP Version 2 MIB Extension
- RFC-1812 Requirements for IP Version 4 Routers
- RFC-1850 OSPF Version 2 Management Information Base
- RFC-2021 RMON 2
- RFC-2096 IP Forwarding Table MIB
- RFC-2338 Virtual Router Redundancy Protocol
- RFC-2474 Definition of the Differentiated Services Field (DS Field)
- Internet Draft - draft -ietf-vrrp-mib-08 Definitions of Managed Objects for the Virtual Router Redundancy Protocol

Network Monitoring
- RMON (RFC 1757) support for groups 1,2,3 and 9
  — Statistics
  — History
  — Alarms
  — Events

- SMON (RFC 2613) support for groups
  - Data Source Capabilities
  - Port Copy
  - VLAN and Priority Statistics
- Bridge MIB Groups - RFC 2674
  - dot1dbase and dot1dStp fully implemented.
- Support for relevant MIB objects: dot1q (dot1qBase, dot1qVlanCurrent)

Routing

- RIP1
- RIP2
- OSPF
- ARP
- ICMP
- DHCP/BOOTP Relay

Specifications

Physical

Height	10U (17.5", 444.5 mm)
Width	17.4" (442 mm)
Depth	15" (375 mm)
Weight	
Chassis + backplane	13 kg (28.6 lb.)
Fan module	2.3 kg (5.1 lb.)
Supervisor module	2.0 kg (4.4 lb.)
300W AC PSU	3.85 kg (8.5 lb.)
1000W AC PSU	4.32 kg (9.5 lb.)
PSU blanking panel	0.3 kg (0.7 lb.)

"Minimum Configuration" 22 kg (48 lb.)
- Chassis + backplane
- Two PSU blanking plates
- One 300W PSU
- One Supervisor Module
- Fan module

"Minimum PoE Configuration" 22.5 kg (50 lb.)
- Chassis + backplane
- Two PSU blanking plates
- One 1000W PSU
- One Supervisor Module
- Fan module

Fully populated chassis   at least 45 kg. (100 lb.)

- Chassis + backplane
- Three PSUs
- Two Supervisor Modules
- Fan module
- Four I/O Modules

Power Requirements

MPS4603-AC Power Supply

Input voltage	100 to 240 VAC, 50 or 60 Hz
Power dissipation	300 W max
Input current	3.9 A at 100 VAC 1.5 A at 240 VAC
Inrush current	15 A at 100 VAC (max.) 30 A at 240 VAC (max.)

MPS4610-AC Power Supply

Input voltage	100 to 240 VAC, 50 or 60 Hz
Power dissipation	1000 W max
Input current	11.5 A at 100 VAC 5.6 A at 240 VAC
Inrush current	10 A at 100 VAC (max.) 23 A at 240 VAC (max.)

Components

Fan Module	45 W
M460ML-SPV	68 W
Avaya M4648ML-T	48 W
Avaya M4648ML-T-2G	70 W
Avaya M4612ML-G	59 W
Avaya M4648ML-T-PWR	48 W (Main power)
Avaya M4648ML-T-2G-PWR	70 W (Main power)

Environmental

Operating Temp.	23 to 122°F (-5 to 50°C)
Rel. Humidity	5% to 95% non-condensing

Safety

- UL for US approved according to UL60950 Std.
- C-UL (UL for Canada) approved according to C22.2 No.950 Std.
- CE for Europe approved according to EN 60950 Std.
- EN60825-1
- Laser components are Laser Class I approved:
  — EN-60825-2/IEC-825 for Europe
  — FDA CFR 1040 for USA
- Overcurrent Protection: A readily accessible Listed safety-approved protective device with a 16A rating must be incorporated in series with building Installation and Maintenance AC power wiring for the equipment under protection.

EMC Emissions

Approved according to:
- US - FCC Part 15 sub part B, class A
- Europe - EN55022 class A and EN61000-3-2 and EN61000-3-3
- Japan - VCCI Class A
- NEBS GR-1089-CORE

Immunity

Approved according to:
- EN 55024

Transportation

- NEBS GR-63-CORE
- NTSB

Catalog Numbers

Table 14.1   Avaya C460 Catalog Numbers

Product	Description	Material Code
Avaya C460-CH	C460 chassis	700025498
Avaya M460ML-SPV	C460 multilayer supervisor module	700255011
Avaya M4648ML-T	C460 Multilayer 48 x 10/100BASE-T (RJ-45) module	700255029
Avaya M4648ML-T-2G	C460 Multilayer 48 x 10/100BASE-T (RJ-45) + 2 x GBIC (SFP) module	700255037
Avaya M4612ML-G	C460 Multilayer 12 x GBIC (SFP) module	700255045
Avaya M4648ML-T-PWR	C460 Multilayer 48 x 10/100BASE-T (RJ-45) PoE module	700281587
Avaya M4648ML-T-2G-PWR	C460 Multilayer 48 x 10/100BASE-T (RJ-45) PoE + 2 x GBIC (SFP) module	700281579
Avaya M460-FAN	C460 fan module	700255052
Avaya MPS4603-AC	C460 300W AC PSU	700255078
Avaya MPS4610-AC	C460 1000W AC PSU with PoE support	700281595
Avaya C460ML-CFG	C460 switch basic configuration (SPV, 300 W PSU, fan)	700255003
C460ML-PWR-CFG	C460 PoE switch basic configuration (SPV, 1000 W PSU, fan)	700281603
GBIC LX	GBIC SPF LX transceiver	108873258
GBIC SX	GBIC SFP SX transceiver	108873241
Avaya L460L3-License	C460 Layer 3 license	700255060
Avaya L460SMON-License	License to run SMON on one C460 switch	700261910