

USER MANUAL

EMS100G32-R2

EMERALD 100-GIGABIT ETHERNET NETWORK SWITCH, 32-PORT

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This guide provides site preparation recommendations, step-by-step procedures for rack mounting and desk mounting your switch, inserting modules, and connecting to a power source.

CAUTION

To avoid electrostatic discharge (ESD) damage, wear grounding wrist straps when handling this equipment.

NOTE:

- Only trained and qualified personnel can install this equipment. Read this guide before you install and power up this equipment. This equipment contains two power cords. Disconnect both power cords before servicing.
- This equipment contains optical transceivers, which comply with the limits of Class 1 laser radiation.



Figure 1. Class 1 laser product tag

NOTE:

- When no cable is connected, visible and invisible laser radiation may emit from the aperture of the optical transceiver ports. Avoid exposure to laser radiation. Do not stare into open apertures.

REGULATORY

EMS100G32-R2 is represented by the regulatory model E21W and the regulatory type E21W005.

EMS100G32-R2 SWITCH

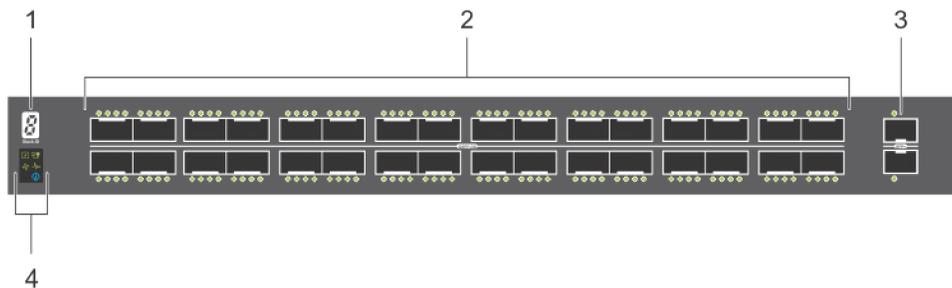
INTRODUCTION

The EMS100G32-R2 switch is a full-featured, fixed form-factor top-of-rack (ToR) compact 10/25/40/50/100/200GbE switch for data center networks with small form-factor pluggable plus (SFP+), small form-factor pluggable 28 (SFP28), quad small form-factor pluggable 28 (QSFP28), and quad small form-factor pluggable double density (QSFP-DD) ports. In addition, the switch is a 10/25/40/50/100/200GbE switch with 10/25GbE links for server connections and 40/50/100GbE links for clustering—virtual link trunking (VLT) and stacking—and uplinks to aggregation and core switches. The switch includes two hot-swappable AC or DC power supply units (PSUs) and four hot-swappable fan units.

- ◆ EMS100G32-R2 is a one-rack unit that includes (32) 100GbE QSFP28 ports and (2) 10GbE SFP+ ports.

It supports the following configurations:

- ◆ 96 x 10GbE + 8 x 100GbE
- ◆ 96 x 25GbE + 8 x 100GbE
- ◆ 128 x 10GbE
- ◆ 128 x 25GbE
- ◆ 64 x 50GbE
- ◆ 32 x 40GbE
- ◆ 32 x 100GbE

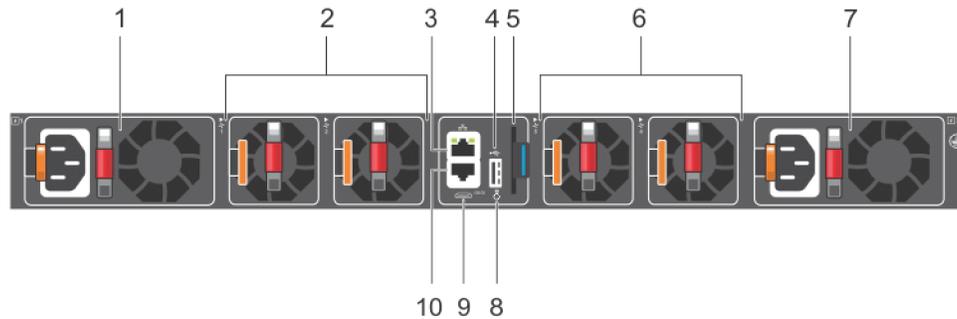


The EMS100G32-R2 switch I/O-side view:

1. Stack ID
2. (32) 100GbE QSFP28 ports
3. (2) 10GbE SFP+ ports
4. LED Status Icons

EMS100G32-R2 SWITCH

The EMS100G32-R2 switch has one RJ-45 serial console port, one Micro-USB Type A console port, one 10/100/1000 Base-T Ethernet management port, and one USB Type A port for the external storage. Management ports are located on the PSU-side of the switch.



The EMS100G32-R2 switch PSU-side view:

- | | |
|----------------------------|------------------------|
| 1. AC PSU1 | 2. Fan modules |
| 3. RJ-45 Ethernet port | 4. USB Type A |
| 5. Luggage tag | 6. Fan modules |
| 7. AC PSU2 | 8. Reset button |
| 9. MicroUSB-B console port | 10. RJ-45 console port |

FEATURES

The EMS100G32-R2 switch offers the following features:

- ◆ (32) 100GbE QSFP28 ports and (2) 10GbE SFP+ ports
- ◆ One MicroUSB-B console port
- ◆ One RJ-45 console port
- ◆ One USB Type A port for more file storage
- ◆ Four-core Intel Denverton central processing unit (CPU) system with 16 GB SDRAM and 64 GB SSD.
- ◆ (1) 10/100/1000BaseT Ethernet management port
- ◆ Temperature monitoring
- ◆ Software-readable thermal monitor
- ◆ Real time clock (RTC) support
- ◆ (2) hot-pluggable redundant PSUs
- ◆ (4) hot-pluggable replaceable fan modules
- ◆ Power management monitoring
- ◆ Mounting holes to accommodate two-hole ground lug
- ◆ Switch (Standard one rack unit)

EMS100G32-R2 SWITCH

PHYSICAL DIMENSIONS

The EMS100G32-R2 switch has the following physical dimensions:

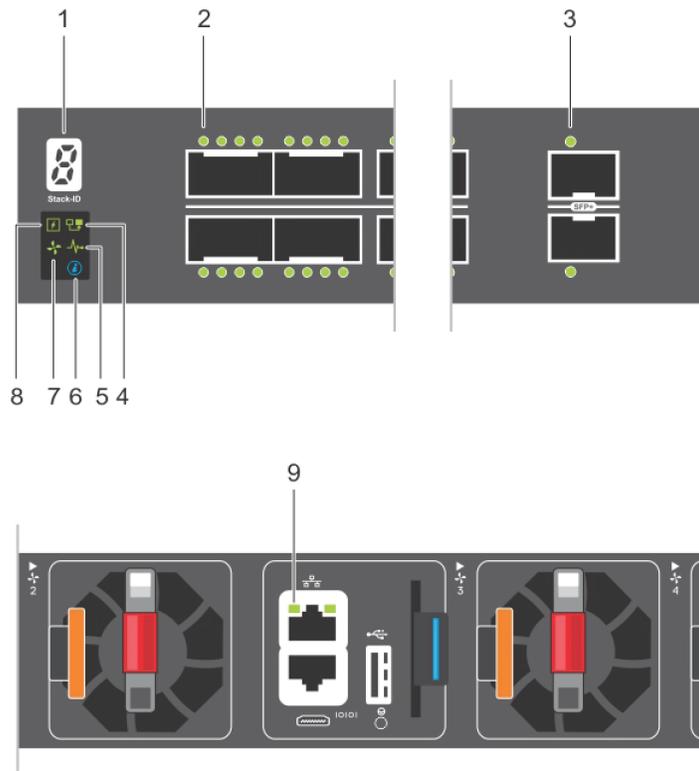
- ♦ 17.1 x 18.1 x 1.72 inches (434 x 460 x 43.6 mm) (W x D x H)

LED DISPLAY

The EMS100G32-R2 switch includes LED displays on the I/O side of the switch. This section describes open networking installation environment (ONIE) LED behaviors. Some LED behaviors may change after you install your software.

LED BEHAVIOR

The EMS100G32-R2 switch LED behavior is seen during ONIE operations.



Switch LEDs:

- | | |
|----------------------------|-----------------------|
| 1. Stack ID LED | 2. Port Activity LEDs |
| 3. Port Activity LED | 4. Master LED |
| 5. System LED | 6. Locator LED |
| 7. Fan LED | 8. Power LED |
| 9. RJ-45 Ethernet Port LED | |

TABLE-1 EMS100G32-R2 SWITCH LED BEHAVIOR

LED	DESCRIPTION
System Status/Health LED	<ul style="list-style-type: none">◆ Solid green—Normal operation◆ Flashing green—Booting◆ Solid yellow—Critical system error◆ Flashing yellow—Noncritical system error, fan failure, or power supply failure
Power LED	<ul style="list-style-type: none">◆ Off—No power◆ Solid Green—Normal operation◆ Solid yellow—POST is in process◆ Flashing yellow—Power supply failed
Master LED	<ul style="list-style-type: none">◆ Off—Switch is in Stacking Slave mode◆ Solid green—Switch is in Stacking Master or Standalone mode
FAN LED	<ul style="list-style-type: none">◆ Off—No power◆ Solid green—Normal operation; fan powered and running at the expected RPM◆ Flashing yellow—Fan fault—including incompatible airflow direction when you insert the PSU or fan trays with differing airflows
PSU LED	<ul style="list-style-type: none">◆ Off—No power◆ Solid green—Normal operation◆ Flashing yellow—PSU warning event; power continues to operate◆ Flashing green—4Hz with five times on and off: Mismatch◆ Flashing green—Firmware update
LOCATOR LED/System Beacon	<ul style="list-style-type: none">◆ Off—Locator function disabled◆ Flashing blue—Locator function enabled
7-Segment LED for stacking	<ul style="list-style-type: none">◆ Off—No power◆ Solid green—Hex digit representing the stack unit ID

TABLE-2 SYSTEM MANAGEMENT ETHERNET PORT LEDS

LED	DESCRIPTION
Link LED	<ul style="list-style-type: none">◆ Off—No link◆ Solid green—Link operating at a maximum speed, autonegotiated/forced to 1000MBase-T mode◆ Solid yellow—Link operating at a lower speed, autonegotiated/forced or 10/100MBase-T mode
Activity LED	<ul style="list-style-type: none">◆ Off—No activity◆ Flashing green—Port activity

TABLE-3 SFP28 PORT LEDS

LED	DESCRIPTION
Link LED	<ul style="list-style-type: none">◆ Off—No link◆ Solid green—Link operating at maximum speed, 25G◆ Solid yellow—Link operating at a lower speed, 10G or 1G◆ Flashing green, ~30ms—Port activity operating at maximum speed, 25G port◆ Flashing yellow, ~30ms—Port activity operating at lower speed, 10G or 1G port◆ Flashing yellow, 1 second on/off—port beacon
Activity LED	<ul style="list-style-type: none">◆ Off—No activity◆ Flashing green—port activity at maximum speed◆ Flashing yellow—port activity at lower speed



TABLE-4 SFP+ PORT LEDS

LED	DESCRIPTION
Link LED	<p>All four LEDs:</p> <ul style="list-style-type: none"> ♦ Off—No link ♦ Solid green—Link operating at maximum speed, 10G ♦ Solid yellow—Link operating at a lower speed, 1G ♦ Flashing green, ~30ms—Port activity operating at maximum speed, 10G port ♦ Flashing yellow, ~30ms—Port activity operating at lower speed, 1G port ♦ Flashing yellow, 1 second on/off—port beacon
Activity LED	<ul style="list-style-type: none"> ♦ Off—No activity ♦ Flashing green—port activity at maximum speed ♦ Flashing yellow—port activity at lower speed

NOTE:

- ♦ The first QSFP-DD port LED shows 200GbE, 100GbE, 40GbE, and 10GbE mode. All eight QSFP-DD port LEDs show 8x25GbE or 8x10GbE mode. The first and fifth QSFP-DD port LEDs show 2x100GbE mode. The first, second, fifth, and sixth QSFP-DD port LEDs show 2x50GbE mode. The first and second LEDs for the first 2x50GbE port and the fifth and sixth LEDs for the second 2x50GbE port.

TABLE-5 QSFP28 PORT LEDS

LED	DESCRIPTION
Link/Activity LED—100GbE, 40GbE, or 10GbE mode	<p>First LED:</p> <ul style="list-style-type: none"> ♦ Off—No link/activity ♦ Solid green—Port link operating at maximum speed, 100G ♦ Flashing green—Port activity operating at maximum speed, 100G ♦ Solid yellow—Port link operating at a lower speed, 40G or 10G port ♦ Flashing yellow, ~30ms—Port activity operating at lower speed, 40G or 10G port ♦ Flashing yellow, ~1 second on/off—Port beacon
Link/Activity LED—4x25GbE or 4x10GbE mode	<p>All four LEDs:</p> <ul style="list-style-type: none"> ♦ Off—No link/activity ♦ Solid green—Link operating at maximum speed, 4x25G port ♦ Flashing green—Link activity operating at maximum speed, 4x25G port ♦ Solid yellow—Link operating at a lower speed, 4x10G port ♦ Flashing yellow, ~30ms—Port activity operating at lower speed, 4x10G port ♦ Flashing yellow, 1 second on/off—Port beacon
LINK/ACTIVITY LED—2X50G MODE	FIRST AND THIRD LEDS:

TABLE-6 QSFP28 PORT LEDS (CONTINUED)

LED	DESCRIPTION
Link LED	<ul style="list-style-type: none"> ♦ Off—No link/activity ♦ Solid green—Port link operating 2x50G ♦ Flashing yellow—Port activity at 2x50G port ♦ Flashing yellow, 1 second on/off—Port beacon
Link/Activity LED—2x50GbE mode	<p>First, second, fifth, and sixth LEDs"</p> <ul style="list-style-type: none"> ♦ Off—No link/activity ♦ Solid green—Port link operating 2x50G ♦ Flashing yellow—Port activity at 2x50G port ♦ Flashing yellow, 1 second on/off—Port beacon

PREREQUISITES

The following is a list of components that are required for a successful switch installation:

NOTE: For detailed installation instructions, see Site preparations and Switch installation.

- ♦ Switch or multiple switches, if stacking
- ♦ AC or DC country- and regional-specific cables to connect the AC or DC power source to each switch AC or DC power supplies
- ♦ ReadyRail mounting brackets for rack installation, included
- ♦ Screws for rack installation, not included
- ♦ #1 and #2 Phillips screw drivers, not included
- ♦ Torx screwdriver, not included
- ♦ Ground cable screws for L-bracket, included
- ♦ Copper/fiber cables

Other optional components are:

- ♦ User-supplied ground cable and separately ordered ground lug for the frame-end of the ground cable
- ♦ Extra mounting brackets
- ♦ Extra power supply unit

NOTE:

- ♦ The DC ground lug kit ships with the other accessories inside the shipping box.



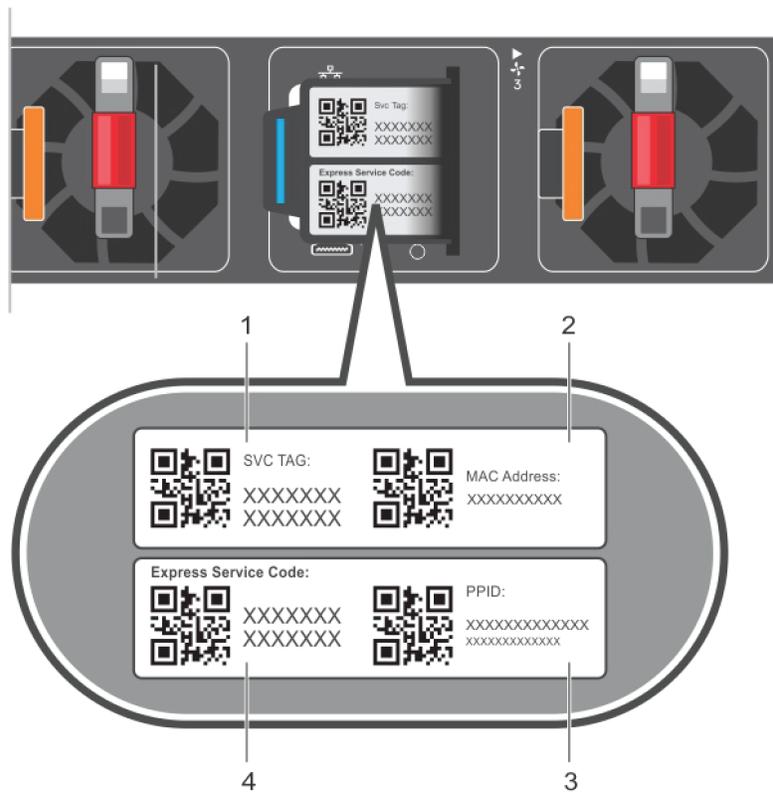
MS100G32-R2 SWITCH CONFIGURATIONS

You can order the EMS100G32-R2 switch in several different configurations.

- ♦ AC or DC Normal Airflow switch:
 - ♦ One U, 32 x 100GbE ports, two AC or DC power supplies, and four fan subsystems with airflow from the I/O side to the power supply side
 - ♦ One U, 32 x 100GbE ports, two AC or DC power supplies, and four fan subsystems with airflow from the power supply side to the I/O
- ♦ Fan with airflow from the I/O side to the PSU side—normal airflow
- ♦ Fan with airflow from the PSU side to the I/O side—reverse airflow
- ♦ AC or DC power supply with airflow from the I/O side to the PSU side—normal airflow
- ♦ AC or DC power supply with airflow from the PSU side to the I/O side—reverse airflow

LUGGAGE TAG

The switch has a pull-out tag, known as a luggage tag, on the PSU-side of the switch. The front of the luggage tag includes switch ID information. The back of the luggage tag includes a QRL that takes you to a How-To site where you can watch videos about racking the switch, replacing components, configuring port channels, and so on.



The EMS100G32-R2 luggage tag:

1. Service tag
2. MAC address
3. PPID
4. Express service code

SITE PREPARATIONS

The EMS100G32-R2 switch is suitable for installation as part of a common bond network (CBN).

You can install the switch in:

- ♦ Network telecommunication facilities
- ♦ Data centers
- ♦ Other locations where the National Electric Code (NEC) applies

NOTE:

Install the switch into a rack or cabinet before installing any additional components such as cables or optics.

SITE SELECTION

Install the switch equipment in restricted access areas.

A restricted access area is one in which service personnel can only gain access using a special tool, lock, key or other means of security. The authority responsible for the location controls access to the restricted area.

Ensure that the area where you install your switch meets the following safety requirements:

- ♦ Install the switch near an adequate power source. Connect the switch to the appropriate branch circuit protection according to your local electrical codes.
- ♦ The switch's environmental temperature range is from 32 to 113°F (0 to 45°C).
- ♦ The relative humidity is from 5 to 90 percent noncondensing.
- ♦ Install the switch in a dry, clean, well-ventilated, and temperature-controlled room, away from heat sources such as hot air vents or direct sunlight.
- ♦ Install the switch away from sources of severe electromagnetic noise.
- ♦ Install the switch inside of the restricted access area, positioned in a rack or cabinet, or on a desktop with adequate space in the front, back, and sides for proper ventilation and access.
- ♦ Install the switch in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

For more information about switch storage and environmental temperatures, see "Specifications."

CABINET PLACEMENT

Install the switch only in indoor cabinets designed for use in a controlled environment.

Do not install the switch in outside cabinets. For cabinet placement requirements, see "Site selection."

The cabinet must meet minimum size requirements. Airflow must be in accordance with the Electronic Industries Alliance (EIA) standard. Ensure that there is a minimum of 5 inches (12.7 cm) between the intake and exhaust vents and the cabinet wall.



RACK MOUNTING

When you prepare your equipment rack, ensure that the rack is grounded.

Ground the equipment rack to the same ground point the power service in your area uses. The ground path must be permanent.

SWITCH GROUND

Black Box recommends that you ground your switch. Use the switch in a common bond network (CBN). Connect the grounding cables as described in Switch installation.

NOTE:

For an AC-powered switch, although the third conductor of the AC power cable provides a ground path, Black Box recommends grounding your switch with a dedicated ground wire. You can order an AC ground lug separately.

NOTE:

For a DC-powered switch, the only way to safely ground your switch is to attach a dedicated ground wire. The ground lug kit ships in a plastic bag placed with the other accessories inside the shipping box. The ground lug bracket screws ship attached to the switch. Before you install the DC switch in the dual-tray, attach the ground lug and bracket to the switch using the included screws and then attach the DC ground wire to the ground lug. The DC-powered switch ships with the DC ground lug, bracket, and screws.

FANS AND AIRFLOW

The switch fans support two airflow options: normal and reverse.

FAN COMBINATIONS

Fan installation is done as part of the factory install based on stock keeping unit (SKU) type. The switch has SKUs that support the following configurations:

- AC or DC PSU with fan airflow from the I/O to the PSU—the red indicator is the normal airflow direction
- AC or DC PSU with fan airflow from the PSU to the I/O—the blue indicator is the reverse airflow direction

Order the fans suitable to support your site's ventilation. Use a single type of airflow fan in your switch. Do not mix reverse and normal airflows in a single switch.

For proper ventilation, position the switch in an equipment rack or cabinet with a minimum of 5 inches (12.7 cm) of clearance around the exhaust vents. When you install two EMS100G32-R2 switches near each other, to permit proper airflow, position the two switches at least 5 inches (12.7 cm) apart. The fan speed varies based on internal temperature monitoring. The EMS100G32-R2 switch never intentionally turns off the fans.

For more information, see "Fans."

POWER

To connect the switch to the applicable power source, use the appropriate power cord. An AC power cord is included with each PSU.

When installing AC or DC switches, follow the requirements of the National Electrical Code, ANSI/NFPA 70, where applicable.

The switch is powered-up when you connect the power cord between the switch and the power source. For more information, see Power supplies.

CAUTION:

Always disconnect the power cable before you service the power supply slots. The switch has multiple power cords. Before servicing, ensure all power cords are disconnected.

CAUTION:

On an AC switch, use the power supply cord as the main disconnect device. Ensure that the socket outlet is located and installed near the equipment and is easily accessible.

NOTE:

Module power is software controlled. You do not see module LEDs when the switch powers up in ONIE.

STORING COMPONENTS

If you do not install your EMS100G32-R2 switch and components immediately, properly store the switch and all components using these guidelines:

- Storage location temperature must remain constant. The storage range is from -40 to +158°F (-40 to +70°C).
- Store on a dry surface or floor, away from direct sunlight, heat, and air conditioning ducts.
- Store in a dust-free environment.

NOTE:

ESD damage can occur when components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the EMS100G32-R2 switch and accessories. After you remove the original packaging, place the switch and components on an anti-static surface.

To install the EMS100G32-R2 switch, complete the installation procedures in the order presented in this chapter.

Always handle the switch and components with care. Avoid dropping the switch or its field replaceable units (FRUs).

For the EMS100G320-R2 switch, you can install the ReadyRails system.

NOTE:

ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the EMS100G32-R2 switch and components. As with all electrical devices of this type, take all the necessary safety precautions to prevent injury when installing this switch.

EMS100G32-R2 NEBS COMPLIANCE

The EMS100G32-R2 switch qualifies as network equipment building system-3 (NEBS-3) compliant.

To be NEBS-compliant, orient your switch in the rack so that the air inlet is from the front aisle and the air exhaust is to the back aisle.

IMPORTANT INFORMATION

WARNING : To be NEBS-compliant:

- ♦ Locate your switch in a restricted-access area where only trained personnel are allowed access.
- ♦ Install and connect your switch to the common bonding network (CBN).
- ♦ You can also install and connect your switch to the central office.
- ♦ Connect the battery returns of your switch as DC-I.
- ♦ Use a shielded and grounded cable at both ends of the management port.
- ♦ Ground your switch using a copper ground conductor.
- ♦ Clean and coat all bare grounding connection points on your switch with an antioxidant solution before making connections.
- ♦ Bring all unplated ground connection surfaces on your switch to a bright finish and treat them with an antioxidant solution before making connections.
- ♦ To ensure electrical continuity, remove any nonconductive surfaces from the ground connection points and threaded holes that are used to secure the ground lugs.
- ♦ Use the two-hole, Listed, compression-type lug with an AWG 14 gauge wire for switch grounding.
- ♦ Black Box recommends changing the front air filter every three months, depending on the switch environment (if applicable).

NOTE:

If you install and connect the switches to a commercial AC power source, you must connect the switch to an external surge protection device (SPD).

NOTE:

The intrabuilding ports of the equipment or subassembly are suitable for connection to intrabuilding or unexposed wiring or cabling-only of the intrabuilding port(s) of the equipment or subassembly. The intrabuilding ports must not be metallically connected to interfaces that connect to the OSP or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 4 or 4a ports as described in GR-1089: Electromagnetic Compatibility and Electrical Safety) and require isolation from the exposed OSP cabling with the addition of primary protectors.

NOTE:

The EMS100G32-R2 switch can operate at -40 to -60 VDC at a maximum current level of 15A.

NOTE:

The EMS100G32-R2 switch is Earthquake Z4-compliant when you attach the rails to the frame using threaded hardware.

GROUND CABLE

To attach a ground cable to the switch, use the included M4 screws.

NOTE:

For an AC-powered switch, although the third conductor of the AC power cord provides a ground path, Black Box recommends grounding your switch with a dedicated ground wire. You can order an AC ground lug separately.

NOTE:

For a DC-powered switch, the only way to safely ground your switch is to attach a dedicated ground wire. The ground lug kit ships in a plastic bag placed with the other accessories inside the shipping box. The ground lug bracket screws ship attached to the switch. Before you install the DC switch in the dual-tray, attach the ground lug and bracket to the switch using the included screws and then attach the DC ground wire to the ground lug.

The ground cable is not included. The grounding lugs must be a UL-recognized, crimp-type lug.

CAUTION : Grounding conductors must be made of copper. Do not use aluminum conductors.

NOTE:

Coat the one-hole lug with an anti-oxidant compound before crimping. Also, bring any unplated mating surfaces to a shiny finish and coat with an anti-oxidant before mating. Plated mating surfaces must be clean and free from contamination.

NOTE:

The rack installation ears are not suitable for grounding.

To connect the ground cable to the switch:

- ♦ Cut your user-supplied ground cable to the desired length.
- ♦ The cable length must facilitate proper operation of the fault interrupt circuits. Use the shortest cable route allowable.
- ♦ Crimp the ground cable inside the pre-installed ground lug.
- ♦ Attach the other end of the ground cable to a suitable ground point such as the rack or cabinet.
The rack installation ears are not a suitable grounding point.

RACK OR CABINET HARDWARE INSTALLATION

You may either place the switch on a rack shelf or mount the switch directly into a 19" wide, EIA-310- E-compliant rack. Rack mounting for the EMS100G32-R2 switch includes four-post, two-post, round threaded holes, or square holes. The ReadyRails system is provided for 1U front-rack and two-post installations.

The ReadyRails system includes separately packaged rail assemblies.

WARNING : This document is a condensed reference. Read the safety instructions in your Safety, Environmental, and Regulatory information booklet before you begin.

NOTE:

The illustrations in this document are not intended to represent a specific switch.

NOTE:

Do not use the mounted ReadyRails as a shelf or a workplace.

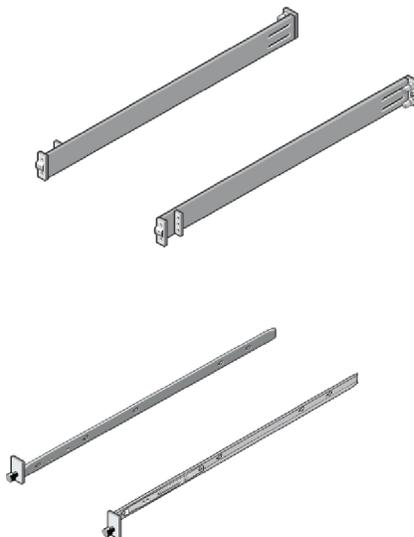
RACK MOUNT SAFETY CONSIDERATIONS

- ♦ Rack loading—Overloading or uneven loading of racks may result in shelf or rack failure, possibly damaging the equipment and causing personal injury. Stabilize racks in a permanent location before loading begins. Mount the components starting at the bottom of the rack, then work to the top. Do not exceed your rack's load rating.
- ♦ Power considerations—Connect only to the power source specified on the unit. When you install multiple electrical components in a rack, ensure that the total component power ratings do not exceed the circuit capabilities. Overloaded power sources and extension cords present fire and shock hazards.
- ♦ Elevated ambient temperature—If installed in a closed rack assembly, the operating temperature of the rack environment may be greater than the room ambient temperature. Use care not to exceed the 113°F (45°C) maximum ambient temperature of the switch.
- ♦ Reduced air flow—Install the equipment in the rack so that the amount of airflow required for safe operation of the equipment is not compromised.
- ♦ Reliable earthing—Maintain reliable earthing of rack-mounted equipment. Pay particular attention to the supply connections other than the direct connections to the branch circuit, for example, use of power strips.
- ♦ Do not mount the equipment with the back panel facing downward.

ONE U READYRAILS INSTALLATION

You can install the ReadyRails system using the 1U tool-less square-hole method or one of three possible 1U threaded round-hole methods. The tooled installation methods include two-post flush mount, two-post center mount, or four-post threaded mount.

To begin installation, separate each rail assembly by sliding the inside rail out of the outside rail.



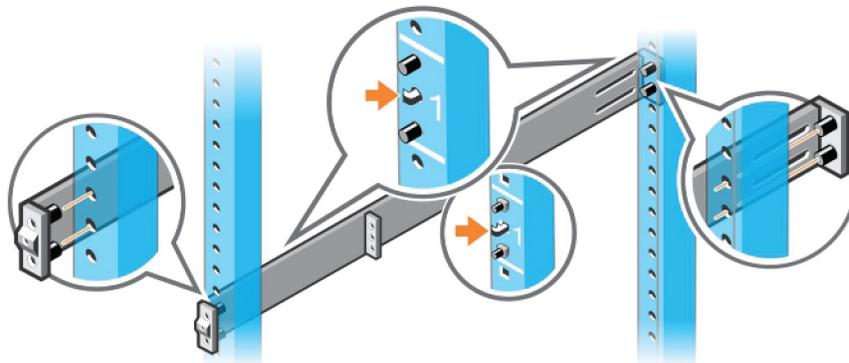
1U TOOL-LESS MOUNT INSTALLATION

NOTE:

For more installation instructions, see the installation labels attached to the rail assembly.

1. Face the ReadyRails flange ears facing outward. Place one rail between the left and right vertical posts. Align and seat the back flange rail pegs in the back vertical post flange.

The center extractions show how the pegs appear in both the square and nonthreaded round holes.



2. Align and seat the front flange pegs in the holes on the front side of the vertical post.

NOTE:

Be sure that the rails click into place and are secure.

3. Repeat this procedure for the second rail.

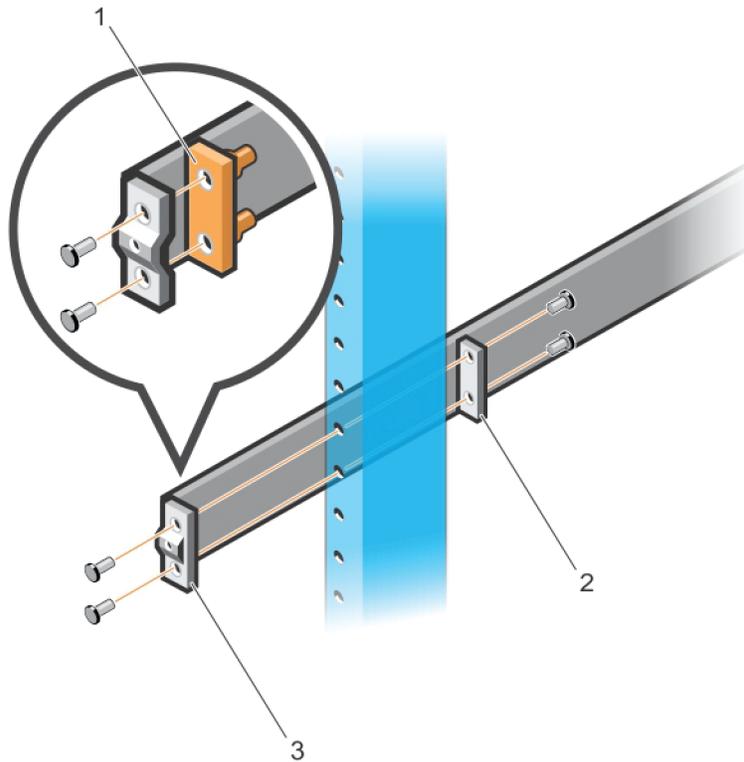
To remove each rail, pull on the latch release on each flange ear and unseat each rail.

TWO-POST FLUSH-MOUNT INSTALLATION

NOTE:

For more installation instructions, see the installation labels attached to the rail assembly.

1. Remove the latch castings from the front side of each ReadyRails assembly, item 1.
To remove the two screws from each front flange ear on the switch side of the rail and remove each latch casting, use a Torx screwdriver. Retain the latch castings for future rack requirements. It is not necessary to remove the back flange castings.



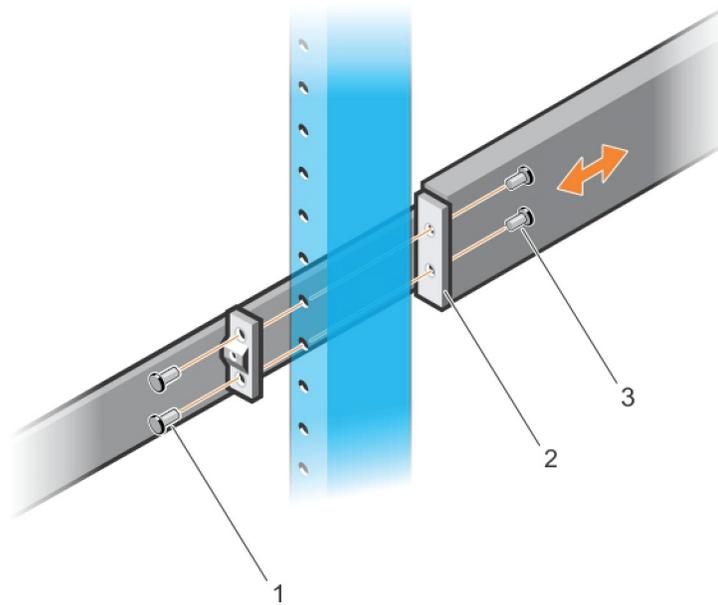
2. Attach one rail to the front post flange with two user-supplied screws, item 2.
3. Slide the plunger bracket forward against the vertical post and secure the plunger bracket to the post flange with two user-supplied screws, item 3.
4. Repeat this procedure for the second rail.

TWO-POST CENTER-MOUNT INSTALLATION

NOTE:

For more installation instructions, see the installation labels attached to the rail assembly.

1. Slide the plunger bracket rearward until it clicks into place and secure the bracket to the front post flange with two user-supplied screws, item 1.



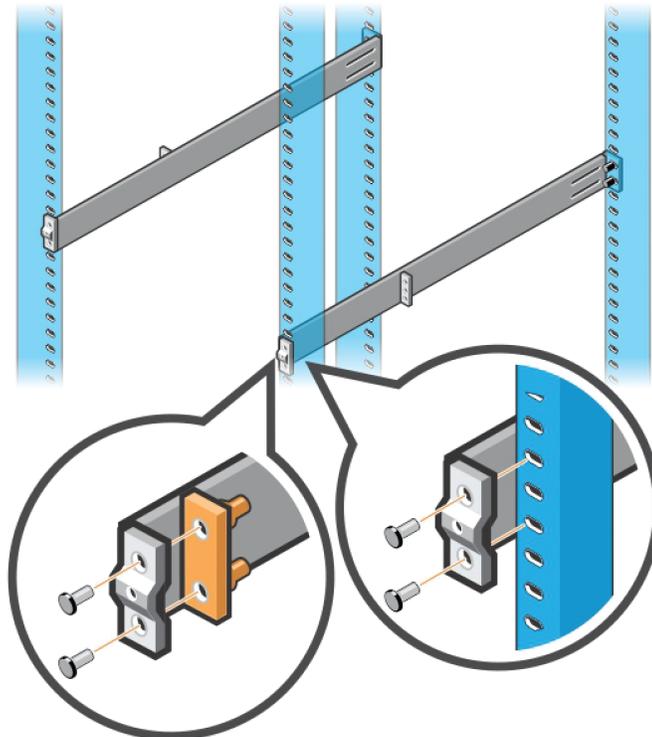
2. Slide the back bracket towards the post. Secure it to the post flange with two user-supplied screws, items 2 and 3.
3. Repeat this procedure for the second rail.

FOUR-POST THREADED INSTALLATION

NOTE:

For more installation instructions, see the installation labels attached to the rail assembly.

1. Remove the latch castings from each end of the ReadyRails assemblies. To remove the two screws each latch casting, use a Torx driver.
Retain the latch castings for future rack requirements.



2. For each rail, attach the front and back flanges to the post flanges with two user-supplied screws at each end.

SWITCH INSTALLATION

For the 1U two-post configurations for the EMS100G32-R2, slide the switch into the rails in the same manner as the four-post configurations.

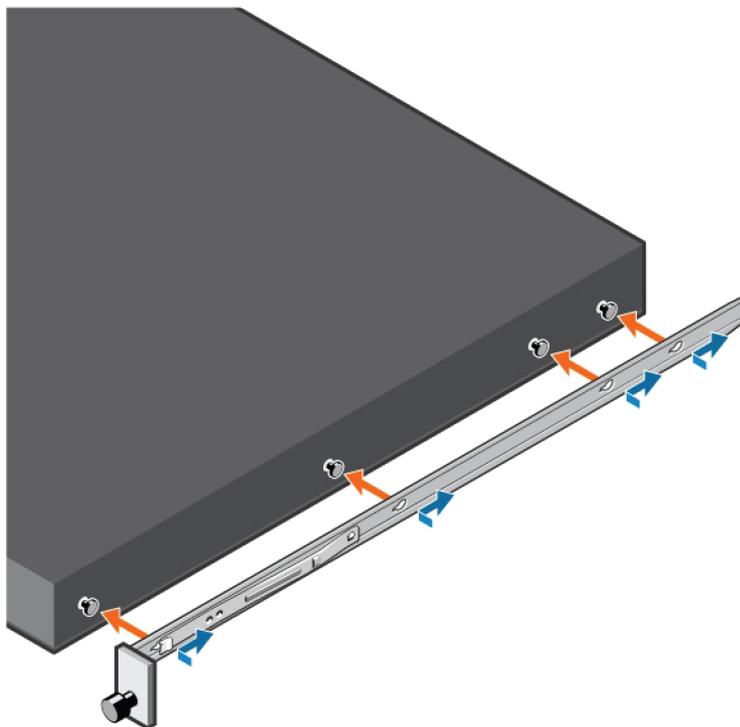
1U FRONT-RACK INSTALLATION

Configure the rails that are attached to the switch.

NOTE:

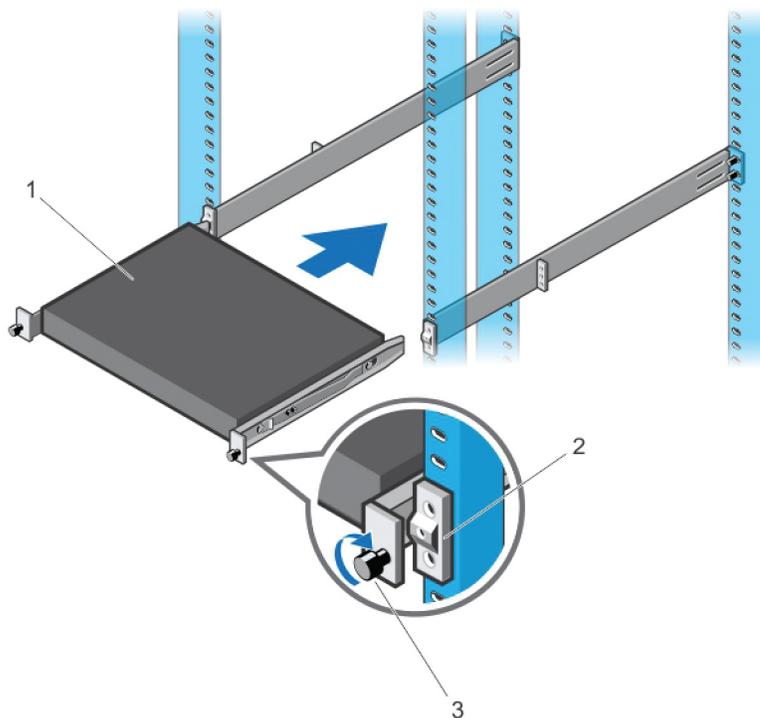
For more instructions, see the installation instruction labels on the rail.

1. Attach the inner switch rails to the EMS100G32-R2 switch.
Line up the rail with the mounting heads and attach the rail to the switch.
Slide the rail back until it locks into place. The following shows the detail of the front standoff with the locking tab:



2. Line up both switch rails with the previously mounted rack ReadyRails and slide the switch in until it is flush with front of rack.

To keep the switch from inadvertently sliding out of the rack and falling, about 3 inches before you fully insert your switch, the rail locking feature engages.



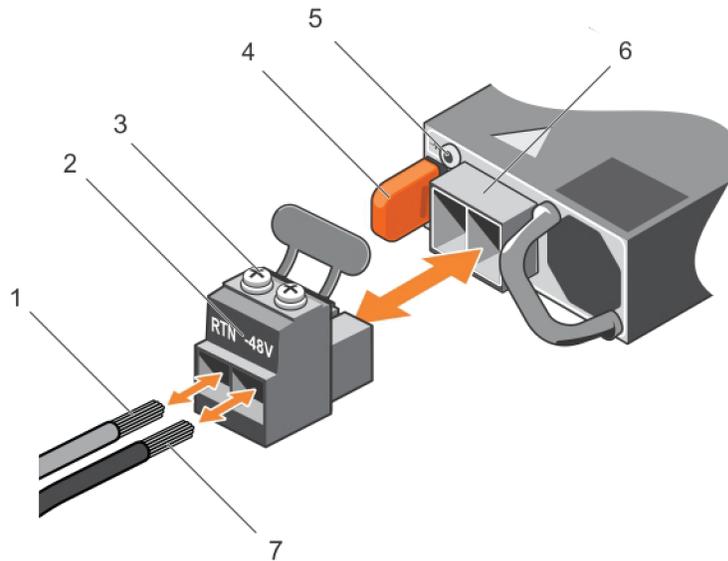
NOTE:

Do not use the mounted ReadyRails as a shelf or a workplace.

3. Tighten the two thumbscrews and rack screws.
To remove the switch from the rack or cabinet, press in the two side-release bars on the switch simultaneously and slide the switch forward.

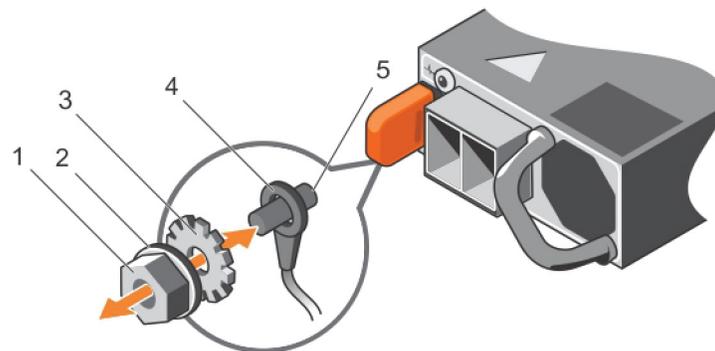
DC POWER CONNECTIONS

Each DC powered system comes with a set containing a prewired (3-inch 8AWG) power supply connector and a four-screw wiring block, as shown. One set is provided for each DC PSU.



1. SDC wire RTN
2. DC power connector
3. Captive screws (2)
4. Orange tab
5. PSU status LED
6. DC power socket
7. DC wire -48V

The DC power connector ground:



1. Ground nut
2. Washer
3. Lock washer
4. Ground cable
5. Device grounding rod

To connect a DC PSU to the site's DC power source:

1. Strip 1/2 inches of insulation from each of the power connector's wires, as shown.
2. Insert each of the power connector's bare wire lengths into the wiring block, as shown.
3. Use a flat-blade screwdriver to tighten the screws that secures the bare wires into the wiring block.
4. Secure the site's DC power source wires to the other side of the wiring block (See steps 1 and 3).
5. Insert the DC power connector into the power socket of the DC PSU. Ensure that the connector pins firmly seat and you hear the click of the power connector's left and right levered clamps lock into place.

NOTE:

Never try to force the power connector into or out of the DC PSU power socket.

NOTE:

To remove the power connector from a DC PSU, squeeze the levers on both sides of the connector. Doing so disengages the power connector's clamps. While continuing to squeeze, pull the power connector from the DC PSU socket.

OPTICS INSTALLATION

The EMS100G32-R2 switch has SFP+, SFP28, QSFP-DD, and QSFP28 optical ports.

CAUTION: ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the EMS100G32-R2 switch and components.

WARNING: When working with optical fibers, follow all warning labels and always wear eye protection. Never look directly into the end of a terminated or unterminated fiber or connector as it may cause eye damage.

1. Position the optic to enter the port correctly.
The optic has a key that prevents it from being inserted incorrectly.
2. Insert the optic into the port until it gently snaps into place.

NOTE :

When you cable the ports, be sure not to interfere with the airflow from the small vent holes above and below the ports.

OPTICS REMOVAL

Remove an optic by pushing the tab on the optic and sliding the optic from the port.

When removing optics with direct attach cables (DACs) from the port, pull the release tab firmly and steadily. Before pulling the release tab, you may need to gently push the optic into the port to ensure that it is seated properly. Do not jerk or tug repeatedly on the tab.

SWITCH START UP

Supply power to the EMS100G32-R2 switch after it is mounted in a rack or cabinet.

Black Box recommends reinspecting your switch before powering it up. Verify the following:

- Optional: The equipment is properly secured to the rack and properly grounded.
- Optional: The equipment rack is properly mounted and grounded.
- The ambient temperature around the unit, which may be higher than the room temperature, is within the limits that are specified for the EMS100G32-R2 switch.
- There is sufficient airflow around the unit.
- The input circuits are correctly sized for the loads and that you use sufficient overcurrent protection devices.

CAUTION: Do not start up the switch if a fan module is not installed.

NOTE :

A US AC or DC power cable is included for powering up an AC or DC power supply. You must order all other power cables separately.

NOTE:

ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the EMS100G32-R2 switch and components.

START UP SEQUENCE

When the switch powers up, the fans immediately come on at high speed. The fan speed slows as the switch continues to boot up.

AFTER SWITCH PLACEMENT

After you have securely installed and powered on the EMS100G32-R2 switch:

For ONIE documentation and resources, see ONIE information at www.onie.org.

SWITCH REPLACEMENT

The following steps describe removing and replacing a switch with an identical replacement switch. For further assistance when replacing a switch, contact your Black Box support representative.

NOTE :

Some steps do not apply if you are replacing a different switch or non-Black Box EMC switch.

NOTE :

ESD damage can occur when components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the switch and accessories. After you remove the original packaging, place the switch and components on an anti-static surface.

1. Back up the switch configuration to your back-up computer or laptop TFTP server.
copy running-config tftp://<hostip>/<filepath>
2. Disconnect the power source.
3. Label and remove all cables.
4. Remove the switch from the rack.
At the same time, press in the two side-release bars on the switch and slide the switch forward.
If you are using the fan trays or PSUs in the replacement switch, remove them from the switch.
5. Unpack the new switch.
6. Install the new switch in your rack or cabinet.
For detailed installation instructions, see "Switch Installation."
If you are using the fan trays or PSUs from the removed switch, reinsert them in the replacement switch.
7. Power on the switch.
For more information, see "Switch Start Up."
8. Establish a connection to the switch CLI.
9. Confirm that the software version of the replacement switch is the same as the previously installed switch.
show os-version If the software versions do not match, upgrade the replacement switch software using the procedure included with the firmware download.
10. Copy the backed-up switch configuration to the new switch.
copy tftp://hostip/filepath running-config
11. Connect all the cables.

The EMS100G32-R2 switch ships with two AC or DC power supplies. The two power supplies have two air-flow directions—from the I/O to the PSU and from the PSU to the I/O.

Two PSUs are required for full redundancy, but the switch can operate with a single PSU.

The PSUs are field replaceable. When running with full redundancy—two power supplies installed and running—you can remove and replace one PSU without disrupting traffic.

CAUTION : To prevent electrical shock, ensure that the EMS100G32-R2 switch is grounded properly. If you do not ground your equipment correctly, excessive emissions may result. Use a qualified electrician to ensure that the power cables meet your local electrical requirements.

NOTE :

Connect the power supply to the appropriate branch circuit protection as defined by your local electrical codes. Verify that the remote power source complies with the switch input power specifications.

NOTE :

If you use a single PSU, install a blank plate in the other PSU slot. Use power supply 2 (PSU2) as the blank plate slot. To install the blank plate, use a #1 Philips screw driver.

NOTE :

ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the EMS100G32-R2 switch and components

COMPONENTS

The following power supply options are available for the EMS100G32-R2 switch:

- ♦ AC or DC power supply with integrated fan
- ♦ AC or DC power supply with integrated reverse flow fan

Power supply 1 (PSU1) is on the left side of the switch; power supply 2 (PSU2) is on the right side of the switch.



The EMS100G32-R2 PSUs:

- PSUs

WARNING : Prevent exposure and contact with hazardous voltages. Do not attempt to operate this switch with the safety cover removed.

CAUTION : Remove the power cable from the PSU before removing the PSU. Also, do not connect the power cable before you insert the PSU in the switch.

NOTE :

To comply with the GR-1089 Lightning Criteria for Equipment Interfacing with AC or DC Power Ports, use an external surge protection device (SPD) at the AC or DC input of the router.

PSU LEDS

- ♦ Solid green—Input is OK.
- ♦ Flashing yellow—There is a fault with the PSU.
- ♦ Flashing green blink at 1Hz—Switch is in a standby/CR state.
- ♦ Off—PSU is off.

AC OR DC POWER SUPPLY INSTALLATION

NOTE :

The PSU slides into the slot smoothly. Do not force a PSU into a slot as this action may damage the PSU or the switch.

NOTE :

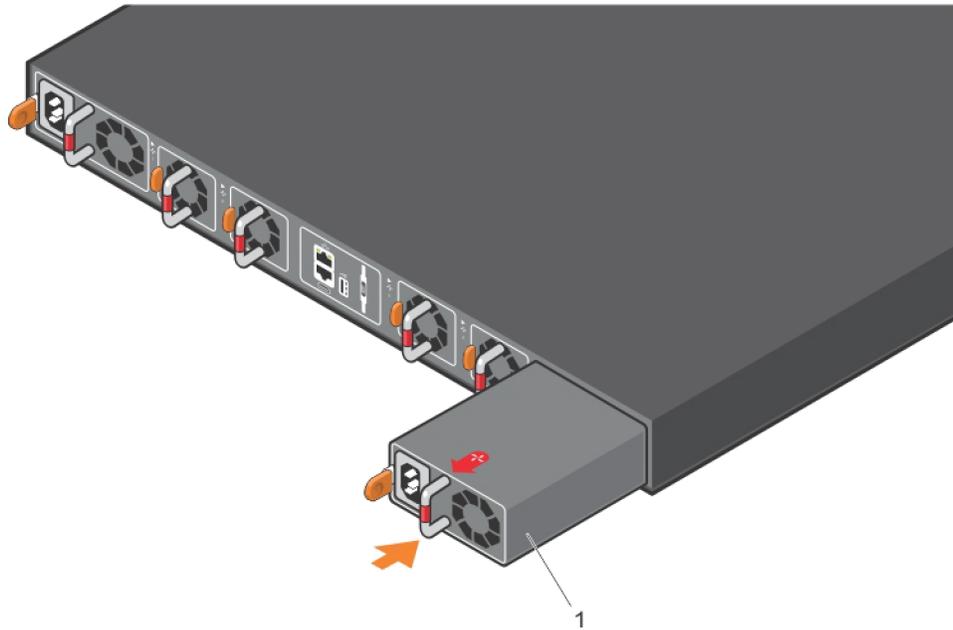
Ensure that you correctly install the PSU. When you install the PSU correctly, the power connector is on the left side of the PSU.

NOTE :

If you use a single PSU, install a blank plate in the other PSU slot. If you are only using one power supply, install the power supply in the first slot, PSU1. Install a blank plate in the second slot, PSU2.

1. Remove the PSU slot cover from the EMS100G32-R2 switch using a small #1 Phillips screwdriver.
2. Remove the PSU from the electro-static bag.
3. Insert the PSU into the switch PSU slot—insert the exposed PSU connector first.
The PSU slot is keyed so that you can only fully insert the PSU in one orientation. When you install the PSU correctly, it snaps into place and is flushed with the back of the switch.

4. Plug in the appropriate AC 3-prongs cable from the switch PSU to the external power source.
5. Repeat steps 1 through 4 if you have a redundant PSU using the second PSU slot on the EMS100G32-R2 switch.



EMS100G320-R2 switch PSU:

1--PSU1 is on the right side of the switch. PSU2 is on the left side of the switch.

NOTE :

The EMS100G32-R2 switch starts up when you connect the cables between the power supply and the power source.

AC OR DC POWER SUPPLY REPLACEMENT

CAUTION : Disconnect the power cable before removing the power supplies. Also, disconnect all power cables before servicing.

NOTE :

The PSU slides into the slot smoothly. Do not force a PSU into a slot as this action may damage the PSU or the switch.

NOTE :

If a PSU fails, you must replace the entire unit. There are no field serviceable components in the PSU.

NOTE :

If you use a single PSU, install a blank plate in the other PSU slot. If you are only using one power supply, install the power supply in the first slot, PSU1. Install a blank plate in the second slot, PSU2.

1. Disconnect the power cable from the PSU.
2. Use the grab handle to slide the PSU out of the power supply bay.
3. Use the grab handle on the replacement PSU to slide it into the power supply bay.
4. Attach the power cables to the replacement PSU.

NOTE :

The switch powers up when the cables are connected between the power supply and the power source.

POWER CABLE CLIP INSTALLATION

Your switch ships with two wire power cable clips. The following describes how to install the power cable clips that secure the power cables in place.

There are two loop holes above each power outlet on the switch. Connect the power cable clip above the right-most power outlet first.

1. Insert the right side of one of the power cable clips into the right hole above the right-most power outlet.
2. Twist the power cable clip to insert the left side of the power cable clip into the left hole above of the same power outlet.

You may need to twist the power cable clip slightly to get the power cable clip fully inserted into the holes above the power outlet.



3. Repeat the installation procedure with the second power cable clip on the second power outlet.
4. Insert the power cords into the power outlets.
5. Push the power cable clips over the power cables to secure them into place.



The EMS100G32-R2 switch comes from the factory with two PSUs and four fan modules installed in the switch. □□□ fan modules and the power supplies, which have integrated fans, are hot-swappable.

In addition to the power supply modules, you can order and install fan modules separately.

The switch supports two airflow direction options. Do not mix airflow types in a switch; you can use only a single airflow direction in a switch. If the airflow directions are mismatched, you must correct the mismatched airflow direction.

- ♦ Airflow is from the I/O panel to the PSU—the red indicator is the normal airflow direction.
- ♦ Airflow is from the PSU to the I/O panel—the blue indicator is the reverse airflow direction.

All fans and PSUs in a configuration must be in the same airflow direction.

Environmental factors can decrease the amount of time required between fan replacements. Check the environmental factors regularly. An increase in temperature and/or particulate matter in the air might affect performance—for example, new equipment installation).

CAUTIONS : Check the fans at six-month intervals and replace them as necessary. Regularly monitor the speeds of the fans to accurately determine replacement intervals.

COMPONENTS

The following are the EMS100G32-R2 switch fan components:

- ♦ EMS100G32-R2 switch fan module
- ♦ EMS100G32-R2 switch fan module—reverse flow



The EMS100G32-R2 switch fan modules

1. Fans

FAN LEDS

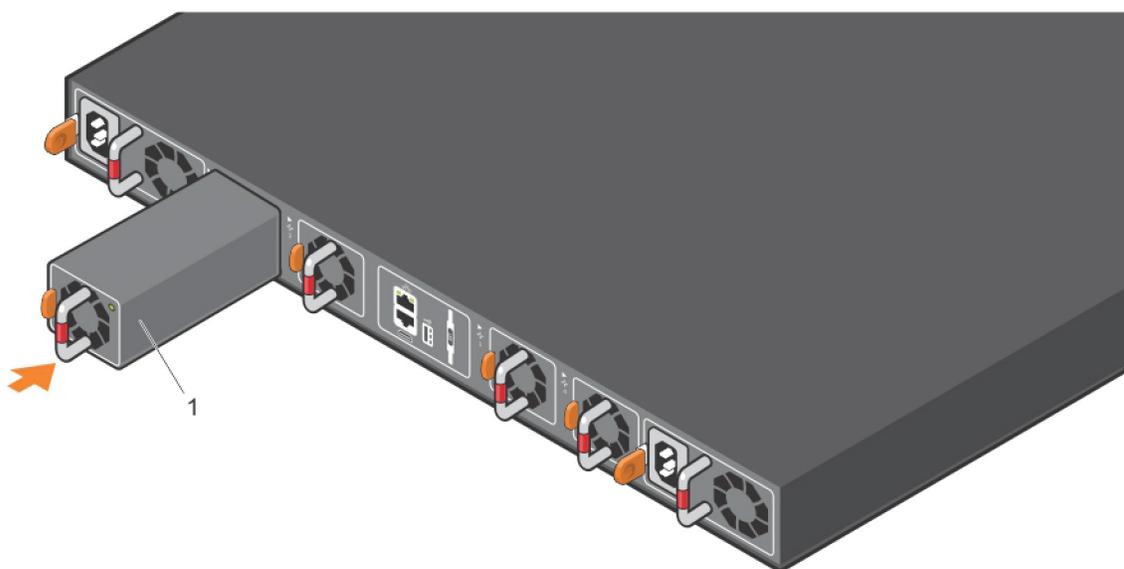
- ♦ Solid green—Fan function is normal.
- ♦ Flashing yellow—There is a fan fault.
- ♦ Off—Fan is off.

FAN MODULE INSTALLATION

The fan modules in the EMS100G32-R2 switch are field replaceable. Fan module slots 1 and 2 are on the left side of the switch and fan module slots 3 and 4 are on the right side of the switch.

CAUTION : DO NOT mix airflow directions. All fans must use the same airflow direction—reverse or normal. If you mix the airflow direction, to avoid damage to the switch, you must correct the mixed airflow.

1. Take the fan module out of the shipping box.
2. Slide the module into the bay.



The EMS100G32-R2 switch fan module installation

1. Fan module

FAN MODULE REPLACEMENT

CAUTION : Complete the following steps within one minute or the switch temperature could rise above safe thresholds and the switch could shut down:

1. Take the replacement fan module out of the shipping box.
2. Slide the installed fan module out of the bay.
3. Slide the replacement module into the bay.

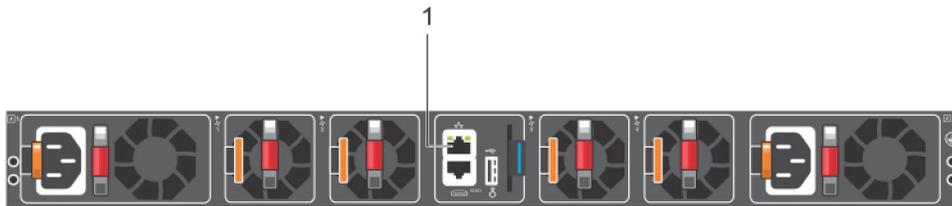
The EMS100G32-R2 switch provides three ports for management and one USB flash drive mount for file transfers.

NOTE :

The output examples in this section are for reference only. Your output may vary.

RJ-45 CONSOLE PORT ACCESS

The management ports are on the PSU-side of the switch.



The EMS100G32-R2 switch management ports

1. Out-of-band management port (top); RJ-45 console port (bottom)

NOTE :

When connecting the RJ-45 console to the patch panel or terminal server using Cat5e or Cat6 Ethernet cables, the maximum cable length is 100m. However, if the Ethernet cable is disconnected from the patch panel or terminal server but connected to the RJ-45 console, the maximum cable length is 6m. If the cable is longer than 6m when disconnected from the panel or server, your switch may not boot.

NOTE :

Ensure that any equipment that is attached to the serial port can support the required 115200 baud rate.

NOTE :

If the serial port on your computer cannot accept a female DB-9 connector, use a DB-9 to USB adaptor.

1. Install the provided RJ-45 connector-side of the provided cable into the switch console port.
2. Install the DB-9 female-side of the provided copper cable into the serial port on your computer. Or install the DB-9 cable into other data terminal equipment (DTE) server hardware.
3. Use the following settings to make the serial port connection:
 - 115200 baud rate
 - No parity
 - Eight data bits
 - One stop bit
 - No flow control

MICROUSB-B CONSOLE PORT ACCESS

The MicroUSB-B console port is on the I/O side of the switch.

NOTE :

The EMS100G32-R2 switches use the Silicon Labs CP2102 USB-B chip. To find the correct USB-B universal asynchronous receiver-transmitter (UART) driver, see the Downloads section of the <https://www.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers> site.

When you connect the microUSB-B port, it becomes the primary connection and, while connected, all messages are sent to the microUSB-B port.

1. Power on the client system (for example, your laptop).
2. Connect the USB-A end of cable into an available USB port on the client system.
3. Connect the microUSB-B end of cable into the microUSB-B console port on the switch.
4. Power on the switch.
5. Check Device Manager on your client system to find the com port number, for example, com 5 or 7 or 9.
6. Open your terminal software emulation program, such as Putty, to access the switch. Select the correct com port.
7. Confirm that the terminal settings on your terminal software emulation program are as follows:
 - 115200 baud rate
 - No parity
 - 8 data bits
 - 1 stop bit
 - No flow control



MANAGEMENT PORTS

USB STORAGE MOUNT

USB storage does not automatically mount. USB storage supports the FAT file system. To use USB storage, first mount the device using the following steps:

1. Start up the switch.
2. Press **Enter** on the **ONIE rescue mode** menu option from the ONIE Grub boot loader.

3. Create a mount directory for the USB storage.

```
ONIE:/ # mkdir /mnt/usb
```

4. View the fixed disks using the fdisk command.

```
ONIE:/mnt # fdisk -l
```

For internal storage:

```
Disk /dev/sda: 15.8 GB, 15829303296 bytes
255 heads, 63 sectors/track, 1924 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1                1         1925     15458303+  ee  EFI GPT
```

For USB storage:

```
Disk /dev/sdb: 30.9 GB, 30942946304 bytes
64 heads, 32 sectors/track, 29509 cylinders
Units = cylinders of 2048 * 512 = 1048576 bytes

   Device Boot      Start         End      Blocks   Id  System
```

5. Mount the device `/dev/sdb` to the `/mnt/usb` directory.

```
ONIE:/ # mount -t vfat /dev/sdb /mnt/usb
```

NOTE :

If the `/mnt/usb` directory is missing, the following message displays: `mount: mounting /dev/sdb on /mnt/usb failed: No such file or directory.`

NOTE :

If the USB device is not seen, the following message displays: `mount: mounting /dev/sdb on /mnt/usb failed: No such device or address.`

BEFORE YOU INSTALL AN OS

After powering on the EMS100G32-R2 switch, it goes through a power-on self-test (POST).

POST runs every time the switch is initialized and checks the hardware components to determine if the switch is fully operational before booting. After POST, the switch uses the Grub bootloader.

To select an entry, use the up and down arrow keys. Press **Enter** to select an OS or enter `e` to edit the commands before booting. Enter `c` for a command line. The selected entry runs automatically in the operating system.

MANAGEMENT PORTS

GRUB BOOTLOADER EXAMPLE

```
GNU GRUB version 2.02~beta2+e4a1fe391
```

```
+-----+
|*ONIE: Install OS
| ONIE: Rescue
| ONIE: Uninstall OS
| ONIE: Update ONIE
| ONIE: Embed ONIE
| EDA-DIAG
+-----+
```

Your switch comes with ONIE installed.

NOTE :

To access ONIE, use the RJ-45 or MicroUSB console port.

ONIE EXAMPLE

```
ONIE: Install OS
```

```
For downloading and installing an OS from a URL
Starts ONIE with ONIE Discovery Service
(factory default boot)
```

```
ONIE: Rescue
Starts ONIE without ONIE Discovery Service
Useful for running Diagnostics manually
```

```
ONIE: Uninstall OS
Restore to factory defaults erases any installed OS
```

```
ONIE: Update ONIE
For downloading and updating ONIE from a URL
```

```
ONIE: Embed ONIE
```

```
For downloading and updating ONIE from a URL and erases any installed OS
```

During the initial setup, the switch boots to ONIE Install. ONIE Install boots with ONIE Discovery to the console, ONIE:

NOTE :

After you have securely installed and powered on the EMS100G32-R2 switch, to configure your switch, see your thirdparty ONIE-compatible OS documentation.

CHECK YOUR SWITCH

To confirm that ONIE is working properly, use the `onie-sysinfo` command. Run the `onie-sysinfo` command at the ONIE prompt.

```
ONIE:/ # onie-sysinfo x86_64-dell_<platform>_c25

ONIE:/ # onie-sysinfo -c (Machine arch)
x86_64
ONIE:/ # onie-sysinfo -v (ONIE Version programmed)
3.23.1.0
ONIE:/ #
ONIE:/ # uname -a
Linux onie 3.2.35-onie+ #1 SMP Tue Dec 9 17:08:16 PST 2014 x86_64 GNU/Linux ONIE:/ #
ONIE:/ # lspci
00:00.0 Class 0600: 8086:1f0c
00:01.0 Class 0604: 8086:1f10
00:02.0 Class 0604: 8086:1f11
00:03.0 Class 0604: 8086:1f12
00:0e.0 Class 0600: 8086:1f14
00:0f.0 Class 0806: 8086:1f16
00:13.0 Class 0880: 8086:1f15
00:14.0 Class 0200: 8086:1f41
00:14.1 Class 0200: 8086:1f41
00:14.2 Class 0200: 8086:1f41
00:16.0 Class 0c03: 8086:1f2c
6:1f22 lass 0106: 8086:1f32
00:1f.0 Class 0601: 8086:1f38

00:1f.3 Class 0c05: 8086:1f3c
01:00.0 Class 0200: 14e4:b960 (NPU PCI detection)
01:00.1
ONIE:/ #
```

ONIE SERVICE DISCOVERY

ONIE attempts to locate the installer through several discovery methods.

To download and run an installer, the ONIE Service Discovery feature follows these steps in order and uses the first successful method found:

1. Search locally attached storage devices for one of the ONIE default installer filenames—for example, `onie self update` from the USB.
2. Discover TFTP-based image from the DHCP server.
3. Query to the IPv6 link-local neighbors using HTTP for an installer.

If none of the ONIE Service Discovery methods are successful, you can disable this using the `onie-discovery-stop` command.

You can install an operating system manually from HTTP, FTP, or TFTP using the `onie-nos-install <URL>` command.

MANAGEMENT PORTS

NOTE :

If you have a recovery USB plugged into your switch, you must remove it before using the `onie-nos-install` command.

The ONIE Install environment uses DHCP to assign an IP address to the management interface—`eth0`. If that fails, it uses the default IP address `192.168.3.10/255.255.255.0`.

To display the IP address, use the `ifconfig eth0` command, as shown.

ONIE:/ # ifconfig eth0

```
eth0 Link encap:Ethernet HWaddr 90:B1:1C:F4:9C:76
inet addr:10.11.53.33 Bcast:10.255.255.255 Mask:255.0.0.0
inet6 addr: fe80::92b1:1c7f:fe4:9c76/64 Scope:Link
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:18 errors:0 dropped:0 overruns:0 frame:0
TX packets:24 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000
RX bytes:1152 (1.1 KiB) TX bytes:6864 (6.7 KiB)
Interrupt:21 Memory:ff300000-ff320000
```

To assign an IP address to the management interface, `eth0`, and verify network connectivity, use the `ifconfig eth0 <ip address>` command, as shown.

ONIE:/ # ifconfig eth0 10.11.53.33/16 UP

Verify the network connection with ping.

ONIE:/ # ping 10.11.8.12

```
PING 10.11.8.12 (10.11.8.12): 56 data bytes
64 bytes from 10.11.8.12: seq=0 ttl=62 time=1.357 ms
64 bytes from 10.11.8.12: seq=1 ttl=62 time=0.577 ms
^C
```

This section lists the EMS100G32-R2 switch specifications.

CAUTION : Operate the product at an ambient temperature not higher than 113°F (45°C).

CAUTION : Lithium battery Caution: There is a danger of explosion if the battery is incorrectly replaced.

Replace only with same or equivalent type of battery. Dispose of the batteries according to the manufacturer's instructions.

CHASSIS PHYSICAL DESIGN

TABLE-7 CHASSIS PHYSICAL DESIGN

PARAMETER	SPECIFICATIONS
Height	1.72 inches (43.6 mm)
Width	17.1 inches (434 mm)
Depth	18.1 INCHES (460 MM)

TABLE-8 CHASSIS PHYSICAL DESIGN (CONTINUED)

PARAMETER	SPECIFICATIONS
Chassis weight with factory-installed components	21.6 lbs (9.8 kg)—PSUs and fans
Rack clearance required	Front: 5 inches (12.7 cm) Back: 5 inches (12.7 cm)

TABLE-9 ENVIRONMENTAL PARAMETERS

PARAMETER	SPECIFICATIONS
Operating temperature	32 to 113°F (0 to 45°C) continuously NOTE: Reduce maximum temperature by 1°F/228 feet (1°C/125 meters) above 3,117 feet (950 meters).
Operating humidity	5 to 85% (RH), non-condensing
Storage temperature	-40° to +158°F (-40 to +70°C)
Storage humidity	5 to 90%, non-condensing
Maximum thermal output	635W = 2167 BTU/Hr
Maximum operational altitude	10,000 feet (3,048 meters)
Maximum non-operational altitude	39,370 feet (12,000 meters)
Shock	Dell EMC Spec SV0115

TABLE-10 AC POWER REQUIREMENTS

PARAMETER	SPECIFICATIONS
Power supply	100–240 VAC 50/60 Hz
Maximum current draw per system	5.8A@110VAC and 2.4A@220VAC
Maximum power consumption	635W maximum

TABLE-11 AC POWER REQUIREMENTS (CONTINUED)

PARAMETER	SPECIFICATIONS
Typical power consumption	490W typical

TABLE-12 DC POWER REQUIREMENTS

PARAMETER	SPECIFICATIONS
Minimum and maximum input voltage range	-40VDC minimum
Maximum current at full load with fan	15.9A @40VDC

IEEE STANDARDS

- ◆ The EMS100G32-R2 switch complies with the following IEEE standards.
- ◆ 802.1ab (LLDP)
- ◆ 802.1ax (Layer 2)
- ◆ 802.1d, 802.1w, 802.1s, 802.1x (Mgmt/Security), 802.3x (Layer 2)
- ◆ 802.3 (1000BASE-KX)
- ◆ 802.3ba (40GbE and 100GbE ports)

ELECTROMAGNETIC COMPATIBILITY

Emissions

- ◆ International: CISPR32: Class A
- ◆ Australia/New Zealand: AS/NZS CISPR 32: Class A
- ◆ Canada: ICES-003, Issue-4, Class A
- ◆ Europe: EN55032: CISPR 32: Class A
- ◆ International: CISPR 32: Class A
- ◆ EN55032
- ◆ Japan: VCCI V-3/2011.04, Class A
- ◆ Korea: KN32, Class A
- ◆ Taiwan: CNS13438, Class A
- ◆ USA: FCC CFR47 Part 15, Subpart B, Class A

Immunity

- ◆ EN 300 386 v2.1.1 (2016-07) EMC for Network Equipment
- ◆ EN 55024 + A1 + A2
- ◆ EN 61000-3-2 Harmonic Current Emissions
- ◆ EN 61000-3-3 Voltage Fluctuations and Flicker
- ◆ EN 61000-4-2 ESD
- ◆ EN 61000-4-3 Radiated Immunity
- ◆ EN 61000-4-4 EFT
- ◆ EN 61000-4-5 Surge
- ◆ EN 61000-4-6 Low Frequency Conducted Immunity
- ◆ EN 61000-6-1
- ◆ EN 61000-4-11 Voltage Dips/Interruptions

PRODUCT RECYCLING AND DISPOSAL

You must recycle or discard this switch according to applicable local and national regulations. Black Box encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed.

Waste electrical and electronic equipment (WEEE) directive for recovery, recycle and reuse of IT and telecommunications products.

This switch is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.



The European WEEE symbol

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE.

This switch, which falls within the scope of the WEEE, is labeled with the crossed-out wheeled-bin symbol, as shown above, as required by WEEE.

APPENDIX A: REGULATORY INFORMATION

A.1 FCC STATEMENT

This equipment has been tested and found to comply with the regulations for a Class B 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 this Quick Installation Guide, 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/her own expense.

A.2 CE STATEMENT

This is a Class B product in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

A.3 ROHS

This product is RoHS compliant.

APPENDIX A: REGULATORY INFORMATION

A.4 NOM STATEMENT

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o



APPENDIX B: DISCLAIMER/TRADEMARKS

B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

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