

Dell Networking S6000–Open Networking (ON) Installation Guide

January 2017

Notes, Cautions, and Warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your computer.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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About this guide

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

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

⚠ **WARNING:** 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.

⚠ **WARNING:** This equipment contains optical transceivers, which comply with the limits of Class 1 laser radiation.



Figure 1. Class 1 laser product

⚠ **WARNING:** When no cable is connected, visible and invisible laser radiation may be emitted from the aperture of the optical transceiver ports. Avoid exposure to laser radiation. Do not stare into open apertures.

Topics:

- [Information symbols](#)
- [Related documents](#)

Information symbols

This book uses the following information symbols:

ⓘ **NOTE:** The Note icon signals important operational information.

⚠ **CAUTION:** The Caution icon signals information about situations that could result in equipment damage or loss of data.

⚠ **WARNING:** The Warning icon signals information about hardware handling that could result in injury.

⚠ **WARNING:** The ESD Warning icon requires that you take electrostatic precautions when handling the device.

Related documents

For more information, see the *Dell Networking S6000–Open Networking (ON) Getting Started Guide*.

ⓘ **NOTE:** For the most recent documentation, visit the Dell EMC support page at www.dell.com/support.

The S6000–ON system

The following sections describe the Dell EMC S6000–ON system.

Topics:

- [Introduction](#)
- [Features](#)
- [Physical dimensions](#)
- [Ports](#)
- [System status](#)
- [LED display](#)
- [Prerequisite](#)
- [Orderable S6000–ON components](#)

Introduction

The S6000-ON is a one rack unit (RU) full-featured 10 GbE and/or 40 GbE switch/router system.

The system contains 32 ports of 40 GbE that you can use to create a configuration of 96 ports of 10 GbE small form-factor pluggable plus (SFP+), using breakout cables, and eight ports of 40 GbE quad small form-factor pluggable plus (QSFP+).

The S6000-ON power supply unit (PSU)-side contains the PSU and fan modules.

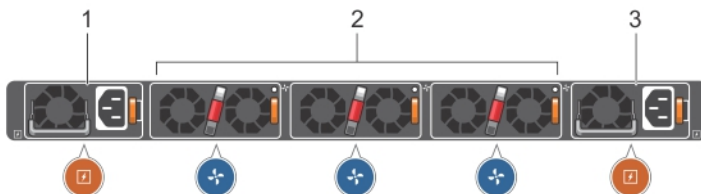


Figure 2. S6000–ON PSU-side view

- 1 PSU 1
- 2 Fan Modules 1 through 3
- 3 PSU2

The S6000-ON input/output (I/O) side includes:

- Thirty-two fixed QSFP+ ports
- One USB 2.0 port
- One USB-B serial console port
- One RS-232 serial console port
- One 10/100/1000BaseT RJ-45 Ethernet management port

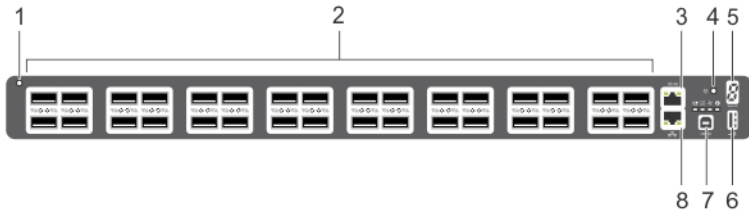


Figure 3. S6000-ON I/O-side view

- 1 System LED
- 2 Thirty-two QSFP+ Ports
- 3 Serial Console
- 4 Reset
- 5 Stack ID
- 6 USB-A
- 7 USB-B Console
- 8 Management

NOTE: The system light emitting diodes (LEDs) are on the I/O side. The fan tray power indicators are on the PSU side.

Features

The S6000-ON offers the following features:

- Thirty-two SFP+ and QSFP+ ports
- One universal serial bus (USB-A) port
- One USB-B console port
- One RS-232 serial console port
- One RJ-45 Ethernet management port
- On-board central processing unit (CPU) system
- Two hot-plug redundant power supplies
- Three removable fan modules
- Temperature monitoring
- Software-readable thermal monitor
- Real-time clock (RTC) support
- Current monitoring for power management
- Standard 1U chassis high

Physical dimensions

The S6000-ON has the following physical dimensions:

- 434 x 460 x 43.5 mm—W x D x H
- 17.09 x 18.11 x 1.71 inches—W x D x H

Ports

The S6000-ON offers the following ports.

- Serial RS-232 port (RJ-45 type)
- Out of band (OOB) Ethernet management port (RJ-45 type)
- Thirty-two 40 Gbps QSFP+ ports
- One universal serial bus port (USB Type-A)

System status

You can view S6000-ON status information using the light emitting diodes (LEDs).

LED display

The S6000-ON includes LED displays on both the I/O- and PSU-side of the chassis, as shown.

For LED information, see your third-party operating software documentation.

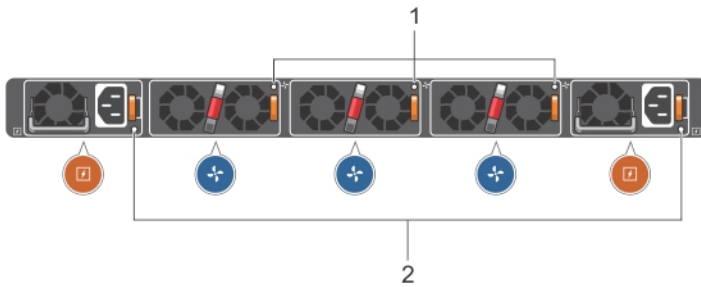


Figure 4. PSU and fan tray LEDs

- 1 Fan Tray 1 through 3 LEDs
- 2 PSU 1 and 2 LEDs

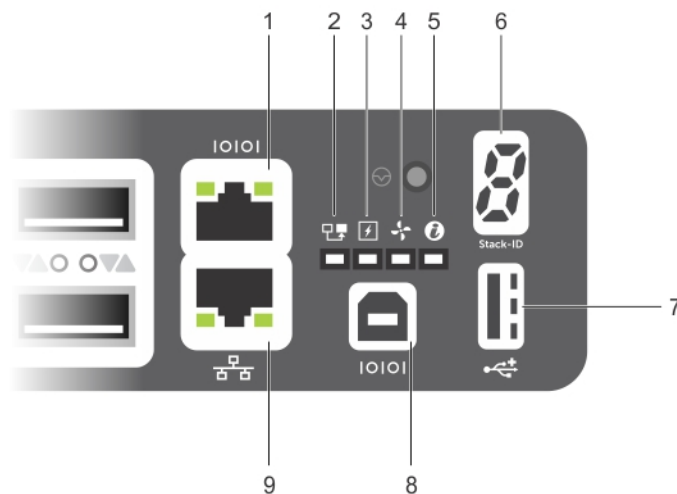


Figure 5. I/O-side view LEDs

- 1 Serial Console
- 2 Master LED
- 3 Power LED
- 4 Fan Status LED
- 5 Locator LED
- 6 Stack ID
- 7 USB-A
- 8 USB-B Console
- 9 Management

LED behavior

The following S6000-ON system LED behavior is seen during ONIE operations:

Table 1. LED behavior

LED	Description
System Status LED	<ul style="list-style-type: none"> • Off—no power • Blinking green—booting or system is in Diagnostic mode • Solid green—normal operation • Solid red—critical alarm • Blinking red—noncritical alarm
Master LED	<ul style="list-style-type: none"> • Solid green—system is in Stacking Master mode • Off—system is in Slave mode
Fan LED	<ul style="list-style-type: none"> • Solid green—fan is powered on and running at the expected RPM • Solid yellow—fan failed including incompatible airflow direction
Power Status LED	<ul style="list-style-type: none"> • Off—no power • Solid green—normal operations • Blinking yellow—a power supply has failed
Locator LED	<ul style="list-style-type: none"> • Off—locator function is disabled • Blinking blue—locator function is enabled

Prerequisite

The following is a list of components required for a successful installation of the S6000-ON.

NOTE: Detailed installation instructions for the S6000-ON are provided in [Site Preparations](#) and [Install the S6000-ON](#).

- S6000-ON chassis
- AC cables to connect the AC power source to each of the chassis' AC power supplies (country/regional configured)
- Mounting brackets for rack installation (included)
- Screws for rack installation and #1 and #2 Phillips screwdrivers (not included)
- Ground cable (not included, optional)
- Ground cable screws (included)

- Copper/fiber cables

Other optional components are:

- Additional power supply unit
- Additional fan module
- Additional mounting brackets (if installing in a four-post rack or cabinet)

Orderable S6000–ON components

You can order the S6000–ON system in several configurations. You can also order optional modules and optics separately.

- S6000–ON AC Normal Airflow: thirty-two 40 Gbps QSFP+ ports, two AC power supplies, and three fan subsystems—airflow from the I/O side to the PSU side
- S6000–ON AC Reverse Airflow: thirty-two 40 Gbps QSFP+ ports, two AC power supplies, and three fan subsystems—airflow from the PSU side to the I/O side
- Fan with airflow from the I/O side to the PSU side
- Fan with airflow from the PSU side to the I/O side
- AC Power supply with airflow from the I/O side to the PSU side
- AC Power supply with airflow from the PSU side to the I/O side

Site preparations

The S6000–ON is suitable for installation as part of a common bond network (CBN). You can install the system in:

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

For more information about S6000–ON specifications, see [Specifications](#).

ⓘ | NOTE: Install the S6000–ON system into a rack or cabinet before installing any optional components.

Topics:

- [Site selection](#)
- [Cabinet placement](#)
- [Rack mounting](#)
- [Grounding](#)
- [Fans and airflow](#)
- [Power](#)
- [Storing components](#)

Site selection

Install Dell EMC equipment in restricted access areas.

A restricted access area is one where service personnel can only gain access using a special tool, lock, key or other means of security and access is controlled by the authority responsible for the location.

Ensure that the area where you install your S6000–ON system meets the following safety requirements:

- Near an adequate power source. Connect the system to the appropriate branch circuit protection as defined by your local electrical codes.
- Environmental temperature between 32° to 113°F—from 0° to 45°C.
- Relative humidity that does not exceed 90 percent noncondensing.
- In a dry, clean, well-ventilated and temperature-controlled room, away from heat sources such as hot air vents or direct sunlight.
- Away from sources of severe electromagnetic noise.
- Positioned in a rack or cabinet, or on a desktop with adequate space in the front, rear, and sides of the S6000–ON for proper ventilation and access.

Cabinet placement

Install the S6000–ON only in indoor cabinets designed for use in a controlled environment.

Do not install the S6000–ON in outside plant cabinets. For cabinet placement requirements, see [Site Selection](#).

The cabinet must be a minimum cabinet size. Airflow must be according to 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 earth ground.

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

Grounding

Dell EMC recommends you ground your system. Use the S6000-ON in a common bond network (CBN).

Connect the grounding cables as described in [Install the S6000-ON](#).

Fans and airflow

The S6000-ON fans support two airflow options.

Be sure to order the fans suitable to support your site's ventilation. Use a single type of airflow fan in your system. Do not mix reverse and normal airflows in a single S6000-ON chassis.

Fan combinations

The S6000-ON has stock keeping units (SKUs) that support the following configurations:

- AC PSU with fan airflow from I/O to PSU
- AC PSU with fan airflow from PSU to I/O

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

Installation of the fans is done as part of the factory install based on SKU type.

For proper ventilation, position the S6000-ON 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 S6000-ON systems near each other, position the two chassis at least 5 inches (12.7 cm) apart to permit proper airflow. The fan speed increases when the internal temperature reaches 72°C and decreases to normal speed when the temperature falls to 58°C. The S6000-ON never intentionally turns off the fans.

Power

To connect the chassis to the applicable power source, use the appropriate power cord with the S6000-ON. An AC power cord is included with the system.

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

The system is powered-up as soon as the power cord is connected between the system and the power source.

CAUTION: Always disconnect the power cable before you service the power supply slots.

CAUTION: Use the power supply cord as the main disconnect device on the AC system. Ensure that the socket-outlet is located/installed near the equipment and is easily accessible.

Storing components

If you do not install your S6000-ON and components immediately, properly storing the system and all optional components.

⚠ WARNING: ESD damage can occur when components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the S6000-ON and its accessories. After you remove the original packaging, place the S6000-ON and its components on an anti-static surface.

Follow these storage guidelines:

- Storage temperature must remain constant ranging from -4° to 158°F—from -20°C 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.

NEBS compliance

For your system to be network equipment building system (NEBS) compliant, you must follow the instructions detailed in this section. To be NEBS compliant, orient your system 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: The SFP+, QSFP, QSFP28, console, Ethernet management, and universal serial bus (USB) ports are suitable for connection to intrabuilding or unexposed wiring or cabling only. You MUST NOT metalically connect the ports to interfaces that connect to the out side plant (OSP) or its wiring. Use these interfaces as intrabuilding interfaces only (Type-2 or Type-4 ports as described in GR-1089-CORE, Issue 6) and they require isolation from the exposed OSP cabling. Adding primary protectors is not sufficient protection to connect these interfaces metalically to OSP wiring.

⚠ WARNING: If you install and connect the S6000-ON system to a commercial AC power source, you must connect the system to an external special protection device (SPD).

To be NEBs compliant:

- Locate your system in a restricted-access area were only trained personnel are allowed access.
- Install and connect your system to the common bonding network (CBN).
- You can also install and connect your system to the central office.
- Connect the battery returns of your system as DC-I.
- Ground your system using a copper ground conductor.
- Clean and coat all bare grounding connection points on your system with an antioxidant solution before making connections.
- Bring all unplated surfaces on your system to a bright finish and treat them with an antioxidant solution before making connections.
- To ensure electrical continuity, remove any nonconductive surfaces on your system from the threads and connection points.
- Use the two-hole, Listed, compression-type lug with an AWG 14 gauge wire for system grounding.

ⓘ NOTE: The S6000-ON can operate at -40.5 VDC to -60 VDC at a maximum current level of 15A.

ⓘ NOTE: The S6000-ON is Earthquake Z4-compliant when you attach the ReadyRails to the four-post frame using threaded hardware. Do not use the tool-less or two-post installation methods.

S6000–ON installation

To install the S6000–ON system, Dell EMC recommends completing the installation procedures in the order presented in this chapter. Always handle the S6000–ON and its components with care. Avoid dropping the system or its field replaceable units (FRUs).

⚠ WARNING: ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the S6000–ON and its components. As with all electrical devices of this type, take all the necessary safety precautions to prevent injury when installing this system.

Topics:

- [Unpack the system](#)
- [Rack or cabinet hardware installation](#)
- [Ground cable attachment](#)
- [QSFP+ optic installation](#)
- [System power-up](#)

Unpack the system

ⓘ NOTE: Before unpacking the system, inspect the container and immediately report any evidence of damage.

When unpacking the S6000–ON switch, make sure that the following items are included:

- One S6000–ON switch
- One RJ-45 to DB-9 female cable
- Two sets of rail kits—no tools required
- Two PSUs
- At least one country/region-specific AC power cord
- *S6000–ON Getting Started Guide*
- *Safety and Regulatory Information*
- *Warranty and Support Information*

Unpacking Steps

- 1 Place the container on a clean, flat surface and cut all straps securing the container.
- 2 Open the container or remove the container top.
- 3 Carefully remove the switch from the container and place it on a secure and clean surface.
- 4 Remove all packing material.
- 5 Inspect the product and accessories for damage.

Rack or cabinet hardware installation

You may either place the switch on the rack shelf or mount the switch directly into a 19" wide, EIA-310- E-compliant rack. Installation methods include four-post, two-post, or threaded. The Dell ReadyRails™ system is provided for one 1U front-rack and two-post installations.

The ReadyRails system includes two separately packaged rail assemblies and two rails that are shipped attached to the sides of the switch.

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

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

ℹ NOTE: Do not use the mounted Ready-Rails 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 that can damage the equipment and possibly cause personal injury. Stabilize racks in a permanent location before loading begins. Mount the components beginning at the bottom of the rack, then work to the top. Do not exceed your rack load rating.
- Power considerations—Connect only to the power source specified on the unit. When multiple electrical components are installed 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 40°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, power strips usage.
- Do not mount the equipment with the rear panel facing in the downward position.

Dell ReadyRails installation

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

⚠ CAUTION: Your system is not NEBS Earthquake Z4-compliant if you use the 1U tool-less square-hole or two-post installation methods.

- 1 With the ReadyRails flange ears facing outward, place one rail between the left and right vertical posts. Align and seat the rear flange rail pegs in the rear vertical post flange.

Item 1 and its extractions show how the pegs appear in both the square and nonthreaded round holes.

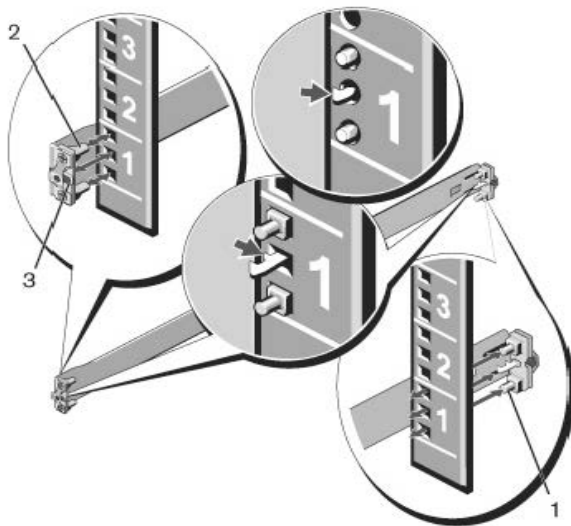


Figure 6. 1U tool-less configuration

- 2 Align and seat the front flange pegs in the holes on the front side of the vertical post, item 2.
- 3 Repeat this procedure for the second rail.
- 4 To remove each rail, pull on the latch release button on each flange ear and unseat each rail, item 3.

Two-post flush-mount configuration

⚠ CAUTION: Your system is not NEBS Earthquake Z4-compliant if you use this installation method.

- 1 Remove the tool-less latch castings from the front side of each ReadyRails assembly, item 1.
Use a Torx driver to remove the two screws from each front flange ear on the switch side of the rail. Remove each latch casting. Retain the castings for future rack requirements. It is not necessary to remove the rear flange castings.

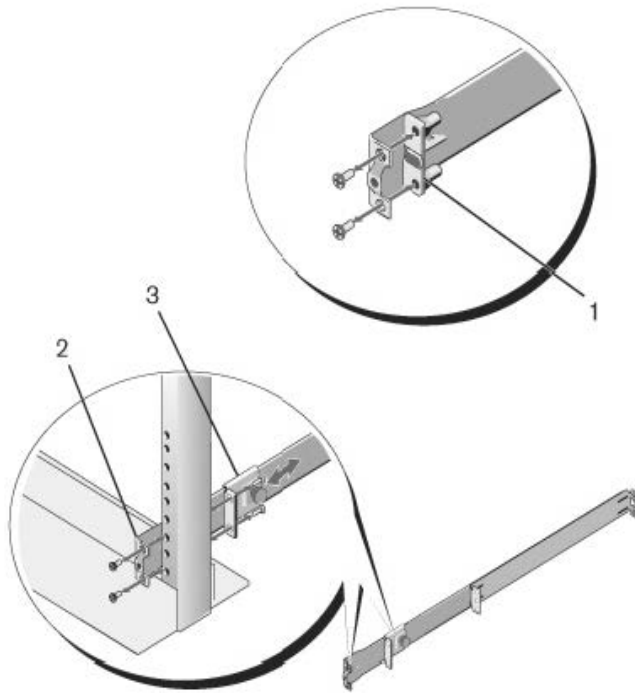


Figure 7. Two-post flush-mount configuration

- 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 configuration

⚠ CAUTION: Your system is not NEBS Earthquake Z4-compliant if you use this installation method.

- 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.

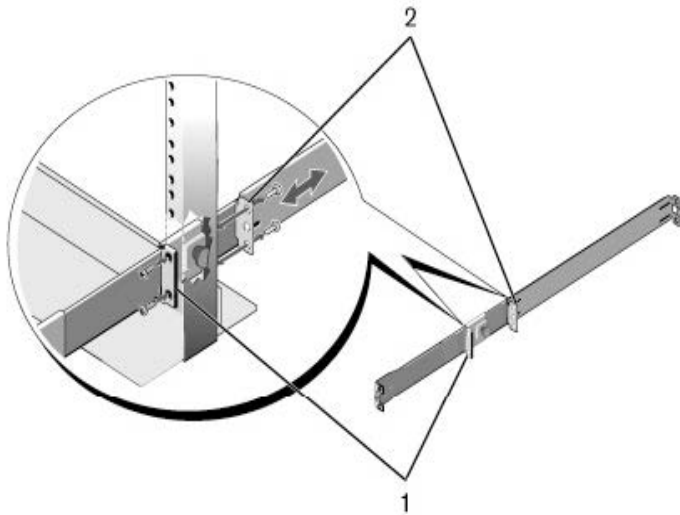


Figure 8. Two-post center-mount configuration

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

Four-post threaded configuration

⚠ CAUTION: To be NEBS Earthquake Z4-compliant, you must remove the tool-less latch castings described in Step 1.

- 1 Remove the tool-less latch castings from each end of the ReadyRails assemblies.
Use a Torx driver to remove the two screws from each latch casting. Remove each casting, item 1. Retain the castings for future rack requirements.

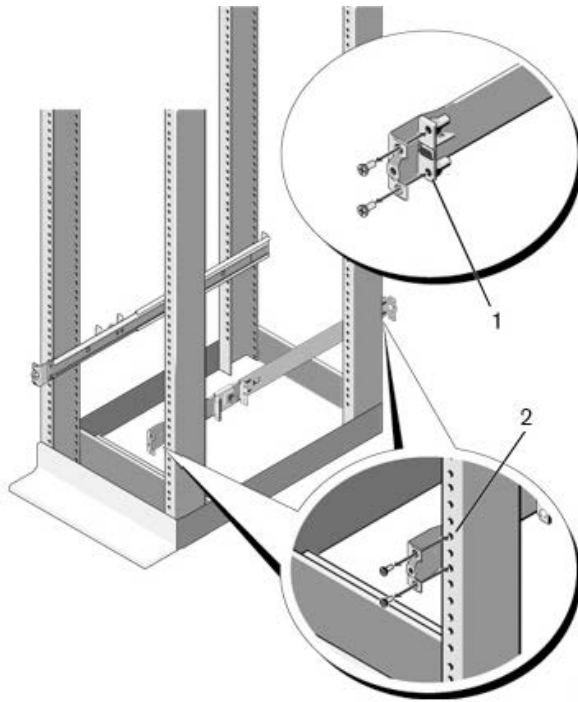


Figure 9. Four-post threaded configuration

- 2 Attach the front and rear flanges for each rail to the post flanges with two user-supplied screws at each end, item 2.

S6000-ON system installation

You can mount the system in the 1U front-rack, four-post or two-post configurations. The following is an example of a front-rack configuration.

For the 1U two-post flush or center configurations, slide the system into the rails in the same manner as the four-post configurations.

Installing a 1U Front-Rack

You must configure the rails that are attached to the system.

- 1 Attach the switch rails (inner chassis members) to the S6000-ON system. The following illustration, item 3, shows the detail for the front standoff with the locking tab.

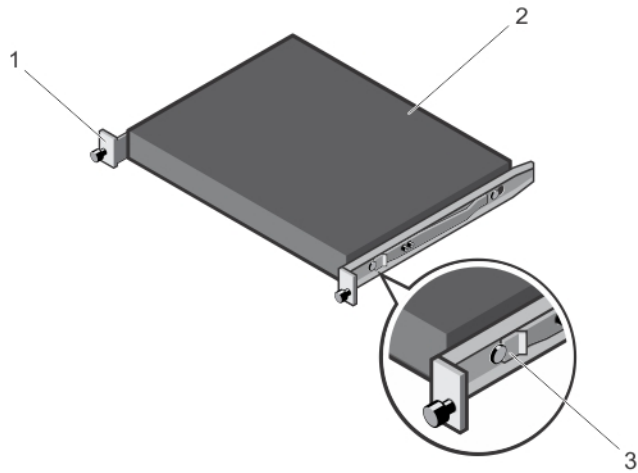


Figure 10. Attaching the Switch Rails

- 2 After you have installed both switch rails, line them up on the previously mounted Ready-Rails and slide the switch in until it is flush with front of rack. About three inches prior to full insertion, the rail locking feature engages to keep the switch from inadvertently sliding out of the rack and falling.

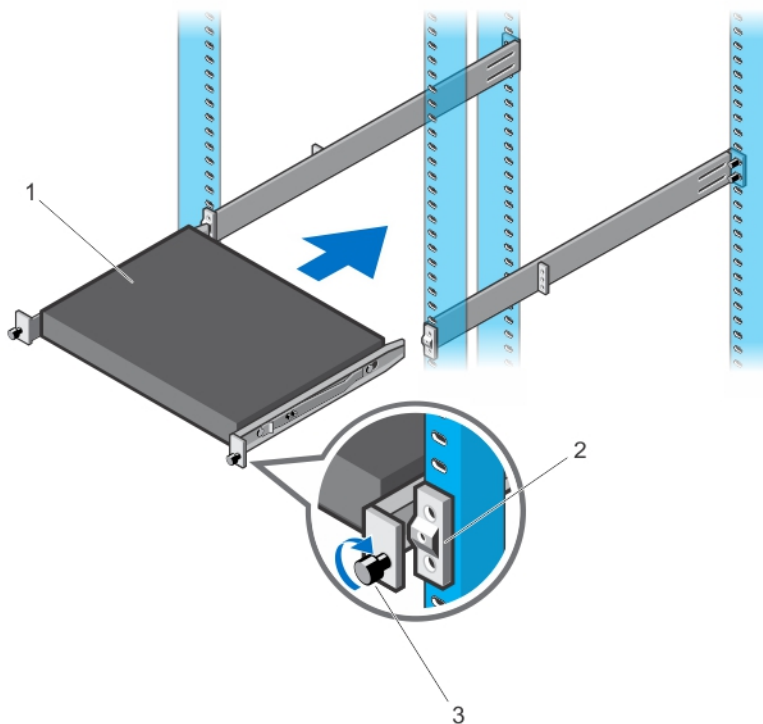


Figure 11. Front Rack Installation

① **NOTE:** Do not the use the mounted Ready-Rails as a shelf or a workplace.

Ground cable attachment

Dell EMC recommends you ground your system. To attach the ground cable to the chassis, use a single M4x0.7 screw. The cable itself is not included with the S6000-ON. To properly ground the chassis, use a 6AWG one-hole lug, #10 hole size, 63" spacing, not included in shipping. The 1-hole lug must be a UL recognized, crimp-type lug.

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

ⓘ NOTE: The rack installation “ears” is not suitable for grounding.

ⓘ 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.

- 1 Take the one M4x0.7 screw from the package.
- 2 Cut the cable to the desired length.
The cable length must facilitate proper operation of the fault interrupt circuits. Use the shortest cable route allowable.
- 3 Attach the one-hole lug to the chassis using the supplied 10-32 screw with the captive internal tooth lock washer. Torque the screw to 20 in-lbs.
- 4 Attach the other end of the ground cable to a suitable ground point.
The rack installation ears are not a suitable grounding point.

QSFP+ optic installation

⚠ WARNING: ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the S6000-ON and its 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 this may cause eye damage.

- 1 Position the optic so it is in the correct position.
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.
You can install the LR4 optics only in the top-row front-end ports 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, and 31.

ⓘ NOTE: Both rows of QSFP+ ports require that the 40G optics be inserted with the tabs facing up.

Remove the QSFP+ Optics

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. Prior to pulling the release tab, you may need to gently push the optic into the port to ensure it is seated properly. Do not jerk or tug repeatedly on the tab.

System power-up

Supply power to the S6000-ON after it is mounted in a rack or cabinet.

Dell EMC recommends reinspecting your system before powering it up. Verify that:

- the equipment is properly secured to the rack and properly grounded, recommended.
- the equipment rack is properly mounted and grounded, recommended.
- the ambient temperature around the unit, which may be higher than the room temperature, is within the limits specified for the S6000-ON.
- there is sufficient airflow around the unit.

- the input circuits are correctly sized for the loads and that you use sufficient overcurrent protection devices.
- all protective covers are in place.
- blank panels are installed if you do not install optional modules.

NOTE: A US AC power cable is included for powering up an AC 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 S6000-ON system and its components.

Power up sequence

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

Power supplies

The S6000–ON supports two hot-swappable PSUs with integrated fans that provide cooling for the system.

The S6000–ON supports AC power supplies with two air-flow directions—I/O to PSU and PSU to I/O. Two PSUs are required for full redundancy, but the system can operate with a single PSU.

NOTE: If you use a single PSU, install a blank plate in the other PSU slot. Dell EMC recommends using power supply 2 (PSU2) as the blank plate slot.

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

WARNING: ESD damage can occur if components are mishandled. Always wear an ESD-preventive wrist or heel ground strap when handling the S6000–ON and its components.

WARNING: To prevent electrical shock, ensure that the S6000–ON is grounded properly. If you ground your equipment incorrectly, excessive emissions may result. To ensure that the power cables meet your local electrical requirements, use a qualified electrician.

Topics:

- [Components](#)
- [AC power supply installation](#)
- [AC power supply replacement](#)
- [S6000–ON system installation](#)

Components

The following power supply options are available for the S6000–ON:

- AC power supply with integrated fan
- AC power supply with integrated reverse flow fan

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

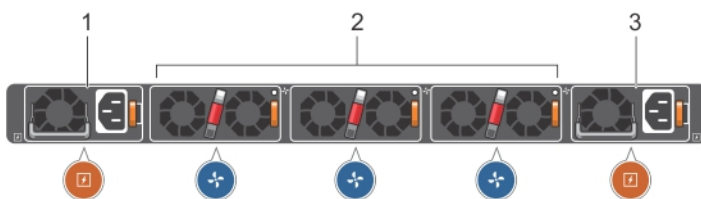


Figure 12. S6000–ON with PSU

- 1 PSU 1
- 2 Fan Modules 1 through 3

The PSUs are in a single piece with the PSU fans. You can replace the fan trays individually, but you cannot replace the fans that are attached to the PSUs. If the fans attached to the PSU fail, you must replace the entire PSU. For fan tray replacement procedures, see [Fans](#).

⚠ WARNING: Prevent exposure and contact with hazardous voltages. Do not attempt to operate this system 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 chassis.

ⓘ NOTE: To comply with the GR-1089 Lightning Criteria for Equipment Interfacing with AC Power Ports, use an external SPD at the AC input of the router.

AC 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 S6000-ON chassis.

ⓘ 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 and the status LED is at the bottom of the PSU.

ⓘ NOTE: If you use a single PSU, install a blank plate in the other PSU slot. Dell Networking recommends using power supply 2 (PSU2) as the blank plate slot.

- 1 Remove the PSU slot cover from the S6000-ON—the PSU side of switch.
You may select either of the two PSU slots.
- 2 Remove the PSU from the electro-static bag.
- 3 Insert the PSU into the switch PSU slot. Insert the PSU exposed PCB edge connector first.
The PSU slot is keyed such that the PSU can only be fully inserted in one orientation.

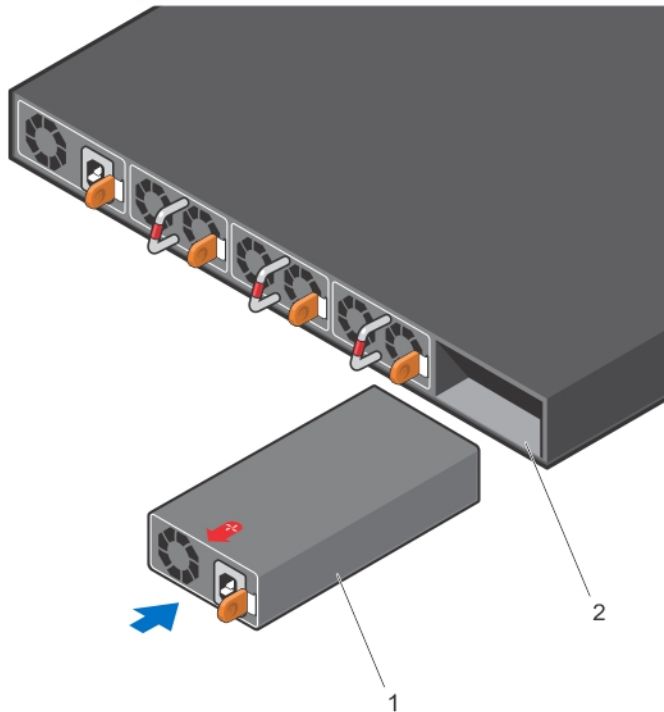


Figure 13. PSU installation

1—PSU

2—Slot

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 three prong cord from the switch PSU to the external power source.
- 5 Repeat steps 1 through 4 if you have a second power supply using the second PSU slot on the S6000-ON system.

NOTE: The S6000-ON powers up when the cables are connected between the power supply and the power source.

AC power supply replacement

CAUTION: Disconnect the power cord before removing the power supplies. Also, disconnect all power cords 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 S6000-ON chassis.

NOTE: If a PSU fails, you must replace the entire unit. There are no field serviceable components in the PSU. To request a hardware replacement, see [Technical Support](#).

NOTE: If you use a single PSU, install a blank plate in the other PSU slot. Dell EMC recommends using power supply 2 (PSU2) as the blank plate slot.

- 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 cord to the replacement PSU.

NOTE: The system powers up when the cables are connected between the power supply and the power source.

S6000-ON system installation

To configure your system, after you have securely installed and powered on the S6000-ON, see your open network installation environment (ONIE)-compatible third-party operating system documentation at <http://onie.org>.

Fans

The S6000-ON comes from the factory two PSU and three fan modules installed in the chassis. The S6000-ON has SKUs that support the following configurations.

- AC PSU with fan airflow from I/O to PSU
- AC PSU with fan airflow from PSU to I/O

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

Installation of the fans is done as part of the factory install based on SKU type.

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.

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

Topics:

- [Components](#)
- [Fan module installation](#)
- [Fan module replacement](#)
- [Fan air filter replacement](#)

Components

The following are the S6000-ON fan components:

- S6000-ON Fan module
- S6000-ON Fan module—reverse flow

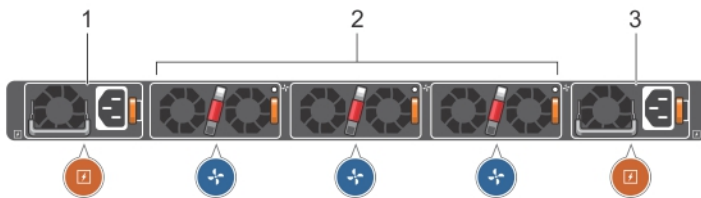


Figure 14. S6000-ON fan modules and PSU

- 1 PSU 1
- 2 Fan Modules 1 through 3
- 3 PSU 2

Fan module installation

The fan modules in the S6000-ON are field replaceable.
Module slot 0 is on the left side of the chassis; module slot 1 is on the right side of the chassis.

CAUTION: DO NOT mix airflow directions. Both fans must use the same airflow direction—reverse or normal.

- 1 Take the fan module out of the shipping box.
- 2 Use the grab handle to slide the module into the bay.

Fan module replacement

CAUTION: Complete steps 1 and 2 within one minute or the system powers down.

- 1 Use the grab handle to slide the fan module out of the bay.
- 2 Use the grab handle on the replacement module to slide it into the bay.

Fan air filter replacement

Environmental factors can decrease the amount of time required between air filter replacements. Check the environmental factors regularly. An increase in temperature and/or particulate matter in the air might affect performance.

CAUTION: Check the fan air filters at six-month intervals and replace them as necessary. To accurately determine air filter replacement intervals, regularly monitor the speeds of the cooling fans. An increase in overall fan speed may indicate a clogged filter.

You must replace the fan air filters with new filters; you cannot clean and reuse the old fan air filters. Replacement filter media must meet the requirements found in GR-63-CORE.

- Minimum dust arrestance of 65%, per ASHRAE Standard 52.1-1992. OR
- Minimum Efficiency Rating Value (MERV) of 2, per ANSI/ASHRAE Standard 52.2-2007.

CAUTION: For Network Equipment Building Systems (NEBS) compliance, use NEBS approved filters.

Use fan air filters with reverse air flow systems (blue banded PSUs and fans). You can replace the air filters individually on each fan within the system without powering down a PSU module or disrupting traffic.

The fan air filter media slides into the frame from the top. No tools are required.

- 1 Determine which filters to replace.
- 2 Unlatch and remove the first module that needs the filter replaced.
- 3 Slide the existing filter upwards to remove it from the module.
- 4 Replace the filter with a new filter of the same size.
- 5 Repeat for the remaining modules that need the filter replaced.

Management ports

Besides the 10 GbE and 40 GbE switch ports, the S6000-ON provides several ports for management and storage.

Topics:

- [RS-232 console port access](#)
- [USB-B console port access](#)
- [Before you install an OS system](#)
- [USB storage](#)

RS-232 console port access

The RS-232 console port is on the I/O-side of the S6000-ON chassis, as shown.

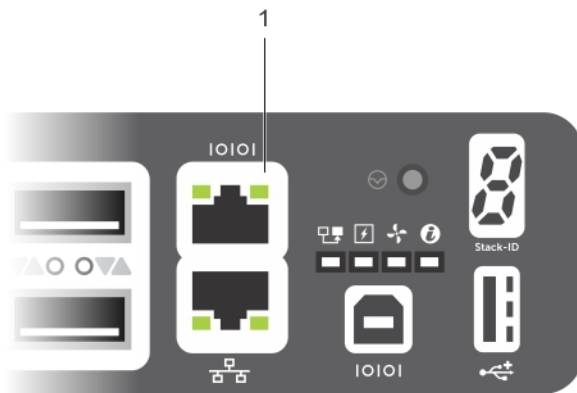


Figure 15. RS-232 console port location

- 1 RS-232 Console Port

NOTE: Before starting this procedure, be sure that your PC has a 9-pin serial port and that you have a terminal emulation program already installed and running on the PC.

NOTE: If your PC's serial port cannot accept a female DB-9 connector, acquire a DB-9 male-to-male adaptor.

- 1 Install the provided RJ-45 connector side of the provided copper cable into the S6000-ON console port.
- 2 Install the DB-9 female side of the provided copper cable into your PC's serial port or into other DTE terminal server hardware that you intend to use.
- 3 Keep the default terminal settings on the console as follows:
 - 115200 baud rate
 - No parity

- 8 data bits
- 1 stop bit
- No flow control

Accessing the Console Port

To access the console port, use the following steps.

- 1 Install the provided RJ-45 connector side of the provided copper cable into the S6000-ON console port.
- 2 Install the DB-9 female side of the provided copper cable into your PC's serial port (or into other DTE terminal server hardware that you intend to use).
- 3 Keep the default terminal settings on the S6000-ON console as follows:
 - 115200 baud rate
 - No parity
 - 8 data bits
 - 1 stop bit
 - No flow control

USB-B console port access

The terminal settings are the same for the USB-B port and the console port:

- 115200 baud rate
- No parity
- 8 data bits
- 1 stop bit
- No flow control

When you connect the USB-B port, it becomes the primary connection and, when the system is connected, it sends all messages to the USB-B port.

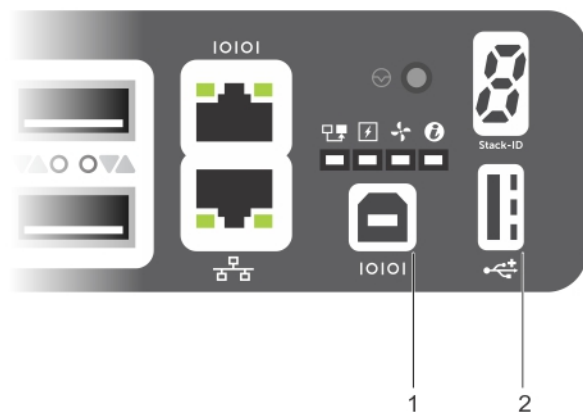


Figure 16. USB-B console port connector

1—USB-B Port

① NOTE: Before starting this procedure, be sure that you have a terminal emulation program already installed on your PC. You need to install the appropriate drivers to support the USB-B port. For assistance, contact Dell Networking Technical Support.

- 1 Power on the PC.
- 2 Connect the USB-A end of cable into an available USB port on the PC.
- 3 Connect the USB-B end of cable into the USB-B console port on the S6000-ON.
- 4 Power on the S6000-ON.
- 5 Install the necessary USB device drivers.
You need an internet connection. For assistance, contact Dell Networking Technical Support.
- 6 Open your terminal software emulation program to access the S6000-ON.
- 7 Keep the default terminal settings on the S6000-ON console as follows:
 - 115200 baud rate
 - No parity
 - 8 data bits
 - 1 stop bit
 - No flow control

Before you install an OS system

After powering on the S6000-ON system, it goes through a power-on self-test (POST).

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

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

Grub bootloader example

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

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

Your system comes with open networking installation environment (ONIE) installed.

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
ONIE: Diag ONIE
    Run Diagnostic package for S6000-ON

```

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

ONIE Service Discovery on the S6000-ON System

ONIE attempts to locate the installer through a number of discovery methods, as shown. To download and run an installer, the ONIE Service Discovery feature uses the first successful method found.

- 1 Passed from the boot loader.
- 2 Search locally attached storage devices for one of the ONIE default installer filenames (for example, USB).
- 3 Exact the URLs from DHCPv4.
- 4 Inexact URLs based on DHCPv4 responses.
- 5 Query to IPv6 link-local neighbors using HTTP for an installer.
- 6 TFTP waterfall — from DHCPv4 option 66

Example of the ONIE `ifconfig eth0` Command

Example of the ONIE `ifconfig eth0 <ip address>` Command

If none of the ONIE Service Discovery methods are successful, you can disable it 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.

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.

```

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::92b1:1cff:fef4:9c76/64 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 the network connectivity, use the `ifconfig eth0 <ip address>` command.

```

ONIE:/ # ifconfig eth0 10.11.53.33/16

```

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

```

USB storage

USB storage does not automatically mount. The supported file system is FAT. To use USB storage, first mount the device.

- 1 Create a mount directory for the USB.

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

- 2 View the fixed disks using fdisk.

```
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
--------	------	-------	-----	--------	----	--------

- 3 Mount the device /dev/sdb to the /mnt/usb directory.

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

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

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

- 4 OPTIONAL: Add a device to the file systems table (fstab) and mount the file systems.

```
ONIE:/ # vi /etc/fstab
```

```
# FSTAB entry for the ONIE-BOOT partition mounted on /boot
LABEL=ONIE-BOOT /mnt/onie-boot ext4 defaults,rw,errors=remount-ro 0 1
/dev/sdb /mnt/usb vfat defaults 0 1
```

```
ONIE:/ # mount -a
```

Specifications

This chapter lists the S6000–ON specifications.

⚠ CAUTION: Operate the product at an ambient temperature not higher than 40°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.

Topics:

- Chassis physical design
- IEEE standards
- Agency compliance

Chassis physical design

Table 2. Chassis physical design

Parameter	Specifications
Height	1.71 inches (43.5 mm)
Width	17.08 inches (434 mm)
Depth	18.11 inches (460 mm)
Weight	16.12 lbs (7.32 kg)

Table 3. Environmental parameters

Parameter	Specifications
Operating temperature	32° to 113°F (0° to 45°C)
Operating humidity	5 to 90% (RH), non-condensing
Storage temperature	–40° to 158°F (–40° to 70°C)
Storage humidity	5 to 95% (RH), non-condensing
Maximum thermal output	419.7 BTU/hr

Table 4. AC power requirements

Parameter	Specifications
Power supply	100–240 VAC 50/60 Hz
Maximum current draw per system	2.9 A @ 280 watts/100vac

Parameter	Specifications
	1.4 A @ 280 watts/200vac
Maximum power consumption	286 Watts
Reliability	MTBF 355,178 hours

IEEE standards

The S6000–ON complies with the following IEEE standards:

- 802.3ab Gigabit Ethernet (1000BASE-T)
- 802.3ae 10 Gigabit Ethernet (10GBASE-X)
- 802.3ba 40 Gigabit Ethernet (40GBase-SR4, 40GBase-CR4) on optical ports
- 802.3u Fast Ethernet (100BASE-TX)
- 802.3z Gigabit Ethernet (1000BASE-X)

Agency compliance

The S6000–ON is designed to comply with the following safety and agency requirements.

USA Federal Communications Commission (FCC) statement

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 designated 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. If it is not installed and used in accordance to the instructions, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures necessary to correct the interference at their own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Dell Networking is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications in the equipment. Unauthorized changes or modification could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Figure 17. Canadian Department of Communication statement

European Union EMC Directive Conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Dell Networking can not accept responsibility for any failure to satisfy the

protection requirements resulting from a non-recommended modification of this product, including the fitting of non-Dell Networking option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/ European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

⚠ WARNING: This is a Class A product. In a domestic environment, this device may cause radio interference, in which case, you may be required to take adequate measures.

European Community Contact

Dell Networking, EMEA - Central

Dahlienweg 19

66265 Heusweiler

Germany

<http://www.force10networks.com/german/>

Tel: +49 172 6802630

Email: EMEA Central Sales

Japan: VCCI compliance for class A equipment

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Figure 18. VCCI compliance label

⚠ WARNING: Use the AC power cords with Dell Networking equipment only. Do not use Dell Networking AC power cords with any unauthorized hardware.

This is Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

本製品に同梱いたしております電源コードセットは、本製品専用です。本電源コードセットは、本製品以外の製品ならびに他の用途でご使用いただくことは出来ません。製品本体には同梱された電源コードセットを使用し、他製品の電源コードセットを使用しないで下さい。

Figure 19. VCCI compliance label

Korean certification of compliance

A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
------------------------	---

Figure 20. Korean compliance label

Safety standards and compliance agency certifications

- CUS UL 60950-1, 2nd Edition
- CSA 60950-1-03, 2nd Edition
- EN 60950-1, 2nd Edition
- EN 60825-1, 1st Edition
- EN 60825-1 Safety of Laser Products—Part 1: Equipment Classification Requirements and User's Guide
- EN 60825-2 Safety of Laser Products—Part 2: Safety of Optical Fibre Communication Systems
- FDA Regulation 21CFR 1040.10 and 1040.11
- IEC 60950-1, 2nd Ed, including all National Deviations and Group Differences

Electromagnetic compatibility (EMC)

Emissions

- International: CISPR 22: 2006, Class A
- Australia/New Zealand: AS/NZS CISPR 22:2009, Class A
- Canada: ICES-003, Issue-4, Class A
- Europe: EN55022 2006 (CISPR 22: 2006), Class A
- Japan: VCCI V-3/2011.04 Class A
- USA: FCC CFR47 Part 15, Subpart B, Class A

Immunity

- EN 300 386 v1.5.1:2010 EMC for Network Equipment
- EN55022 2006, Class A
- EN 55024 1998 + A1: 2001 + A2: 2003
- 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

Product recycling and disposal

You must recycle or discard this system according to applicable local and national regulations. Dell Networking encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Dell Networking offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products.

Waste Electrical and Electronic Equipment (WEEE) directive for recovery, recycle and reuse of IT and telecommunications products

Dell Networking switches are 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.



Figure 21. 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.

Dell EMC products, which fall within the scope of the WEEE, are labeled with the crossed-out wheeled-bin symbol, as shown, as required by WEEE.

For information about Dell product recycling offerings, see the WEEE Recycling instructions on Support. For more information, contact the Dell Technical Assistance Center (TAC).

Technical support

The following section supplies contact information for Dell Technical Support.

Topics:

- [Dell support](#)
- [Technical assistance center](#)
- [Hardware replacement request](#)

Dell support

Dell support provides a range of documents and tools to assist you with effectively using Dell EMC equipment and mitigating the impact of network outages.

Through Dell Support you can obtain technical information regarding Dell Networking products, access to software upgrades and patches, and open and manage your Technical Assistance Center (TAC) cases. Dell Networking Support provides integrated, secure access to these services.

Accessing iSupport Services

The URL for iSupport is <http://www.dell.com/support>. You must have a userid and password to access iSupport services. If you do not have a userid and password, you can request these at the website.

To request a userid, password, and iSupport services, follow these steps.

- 1 On the Dell Networking Support page, click the **Account Request** link.
- 2 Fill out the User Account Request form and click **Send**. You will receive your userid and password by email.
- 3 To access iSupport services, click the **LOGIN** link and enter your userid and password.

Technical assistance center

How to Contact Dell Networking TAC Log in to Support at www.dell.com/support and select the Service Request tab.

Information to Submit When Opening a Support Case

- Your name, company name, phone number, and email address
- Preferred method of contact
- Model number
- Software version number
- Symptom description

Managing Your Case Log in to iSupport and select the **Service Request** tab to view all open cases and Return Materials Authorizations (RMAs).

Technical Documentation Log in to iSupport and select the **Documents** tab. You can access this page without logging in using the **Documentation** link on the iSupport page.

Contact Information Web: www.dell.com.

Telephone:

- US and Canada: 1.866.965.5800
- International: +1.800.456.3355

Hardware replacement request

- 1 Determine the part number and serial number of the component.
To list the numbers for all components installed in the chassis, use the `show hardware` command.
- 2 Request an RMA number from TAC by opening a support case. Open a support case by:
 - Using the Create Service Request form on the Support page.
 - Contacting Dell EMC directly by email or by phone.
 - Provide the following information when using email or phone:
 - Part number, description, and serial number of the component.
 - Your name, organization name, telephone number, fax number, and email address.
 - Shipping address for the replacement component, including a contact name, phone number, and email address.