# NVIDIA Spectrum-3 SN4000 1U and 2U Switch Systems Hardware User Manual

# Table of contents

**Relevant models:** SN4600/SN4600C and SN4700

## About this Manual

This manual describes the installation and basic use of NVIDIA Ethernet switches based on the NVIDIA® Spectrum®-3 ASIC.

## Ordering Information

See Ordering Information.

## Intended Audience

This manual is intended for IT managers and system administrators.

## Related Documentation

- NVIDIA Onyx (MLNX-OS) User Manual
- Cumulus Linux User Guide
- Open Network Install Environment (ONIE) Quick Start Guide
- Hands-on workshops:
    - Cumulus Linux training course
    - Onyx training course

For onsite or remote services, contact nbu-services-sales@nvidia.com.

## Revision History

A list of the changes made to this document are provided in Document Revision History.

# Ordering Information

The following table lists ordering information for the available systems.

Pay special attention to the airflow direction when ordering your system. For more details, see Air Flow.

## Ordering Part Numbers

## SN4600/SN4600C Part Numbers

| NVIDIA SKU | Legacy OPN | Description | Lifecycle Phase |
|---|---|---|---|
| 920-9N302-00F7-0C2 | MSN4600-CS2FC | NVIDIA Spectrum-3 based 100GbE 2U Open Ethernet switch with Cumulus Linux, 64 QSFP28 ports, 2 power supplies (AC), x86 CPU, standard depth, P2C airflow, rail kit | MP (Mass Production) |
| 920-9N302-00R7-0C0 | MSN4600-CS2RC | NVIDIA Spectrum-3 based 100GbE 2U Open Ethernet switch with Cumulus Linux, 64 QSFP28 ports, 2 power supplies (AC), x86 CPU, standard depth, C2P airflow, rail kit | MP (Mass Production) |

## SN4700 Part Numbers

| NVIDIA SKU | Legacy OPN | Description | Lifecycle Phase |
|---|---|---|---|
| 920-9N301-00FB-0C0 | MSN4700-WS2FC | NVIDIA Spectrum-3 based 400GbE 1U Open Ethernet switch with Cumulus Linux, 32 QSFPDD ports, 2 power supplies (AC), x86 CPU, standard depth, P2C airflow, rail kit | MP (Mass Production) |

| NVIDIA SKU | Legacy OPN | Description | Lifecycle Phase |
|---|---|---|---|
| 920-9N301-00RB-0C0 | MSN4700-WS2RC | NVIDIA Spectrum-3 based 400GbE 1U Open Ethernet switch with Cumulus Linux, 32 QSFPDD ports, 2 power supplies (AC), x86 CPU, standard depth, C2P airflow, rail kit | MP (Mass Production) |

# Legacy End-of-Life (EOL) Part Numbers

The OPNs in the following table are no longer available for ordering.

## SN4600/SN4600C Part Numbers

| NVIDIA SKU | Legacy OPN | Description | Lifecycle Phase |
|---|---|---|---|
| 920-9N302-00FA-0C0 | MSN4600-VS2FC | NVIDIA Spectrum-3 based 200GbE 2U Open Ethernet switch with Cumulus Linux, 64 QSFP56 ports, 2 power supplies (AC), x86 CPU, standard depth, P2C airflow, rail kit | EOL (End of Life) |
| 920-9N302-00RA-0C0 | MSN4600-VS2RC | NVIDIA Spectrum-3 based 200GbE 2U Open Ethernet switch with Cumulus Linux, 64 QSFP56 ports, 2 power supplies (AC), x86 CPU, standard depth, C2P airflow, rail kit | EOL (End of Life) |

# Introduction

The NVIDIA® Spectrum™-3 SN4280-X Smart Switch with four BlueField DPUs is purpose-built for intelligent management of data centers. Allowing maximum flexibility, the SN4280-X provides port speeds spanning from 50G to 400G. The SN4280-X is a programmable switch, delivering high performance and low latency, making it ideal for building wire-speed, cloud-scale Layer 2 and Layer 3 networks. With support for advanced software-defined networking features, it's an optimal choice for cloud infrastructure, at high workloads.

The NVIDIA® BlueField®-3 data processing unit (DPU) is the third-generation data-center-infrastructure-on-a-chip that enables software-defined, hardware-accelerated IT infrastructures from cloud to core data center to edge. BlueField-3 DPU offloads, accelerates, and isolates software-defined networking, storage, security, and management functions in ways that profoundly improve data center performance, efficiency, and security.

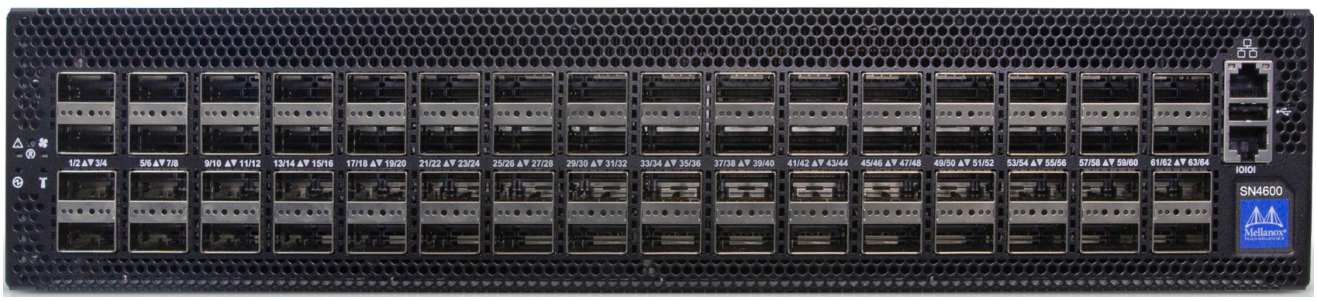
Packet buffer architecture has a major impact on overall switch performance. The Spectrum-3 packet buffer is monolithic and fully shared across all ports, supporting cut-through, line-rate traffic, without compromising scale or features. With its fast packet buffer, Spectrum-3 provides a high-performance, fair, and bottleneck-free data path for mission-critical applications.

With the current shift from virtual-machine-based architectures to container-based architectures, the high-scale forwarding tables required by modern data centers and mega clouds have increased by up to an order of magnitude or more. To meet these needs for scalability and flexibility, the SN4280-X uses intelligent algorithms and efficient network resource sharing at scale.

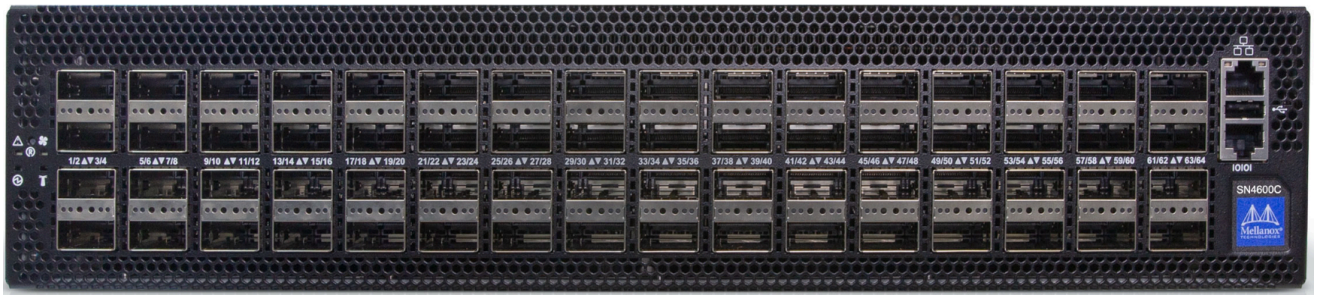
For a full list of all available ordering options, see Ordering Information.

## Front View

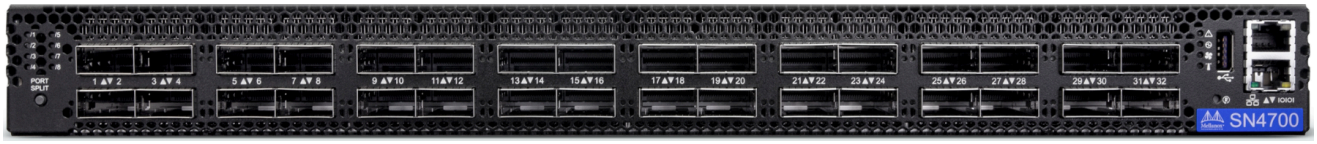
**SN4600 Front View**




**SN4600C Front View**

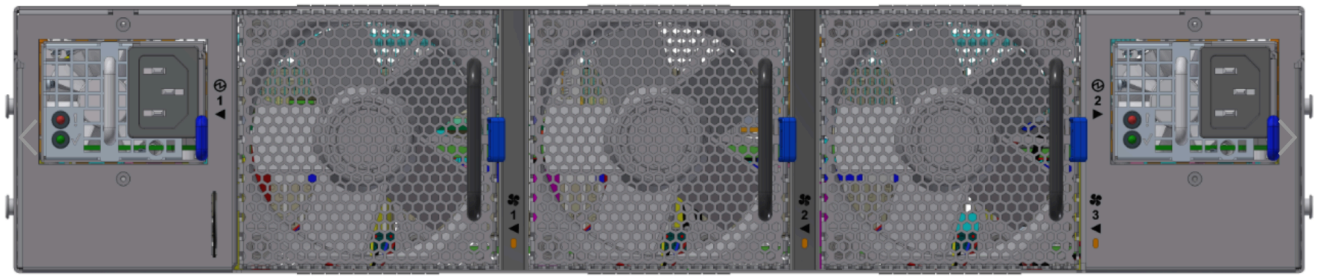



**SN4700 Front View**

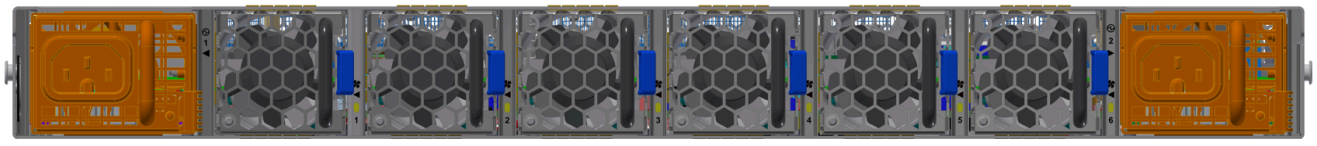



# Rear View

**SN4600/SN4600C Rear View**



**SN4700 Rear View**



# Speed and Switching Capabilities

The table below describes maximum throughput and interface speed per system model.

| System Model | Interfaces | Supported Rates | Max Throughput |
|---|---|---|---|
| SN4600 | 64 x QSFP56 | 64 x 40/200GbE<br>128 x 1/10/25/50/100GbE | 25.6Tb/s |
| SN4600C | 64 x QSF28 | 64 x 40/100GbE<br>128 x 1/10/25/50/100GbE | 12.8Tb/s |
| SN4700 | 32 x QSFP-DD | 32 x 400GbE<br>64 x 40/200GbE<br>128 x 1/10/25/50/100GbE | 25.6Tb/s |

*The system can support different interfaces and speed rates using QSFP/QSDP-DD to SFP adapters or hybrid cables. For further information, see Splitter (Breakout) Cables and Adapters.

# Management Interfaces, PSUs, and Fans

The table below lists the various management interfaces, PSUs, and fans per system model.

| System Model | uUSB | MGT (Management) | Console | PSU | Fan |
|---|---|---|---|---|---|
| SN4600 | Front | Front | Front | Yes, 2 | Yes, 3 |
| SN4600C | Front | Front | Front | Yes, 2 | Yes, 3 |
| SN4700 | Front | Front | Front | Yes, 2 | Yes, 6 |

# Features

For a full feature list, please refer to the system's product brief. Go to https://www.nvidia.com/en-us/networking/. In the main menu, click on Products > Ethernet Switch Systems, and select the desired product family.

# Certifications

For a list of certifications (such as EMC, safety, and others), contact your NVIDIA representative.

# Installation

## System Installation and Initialization

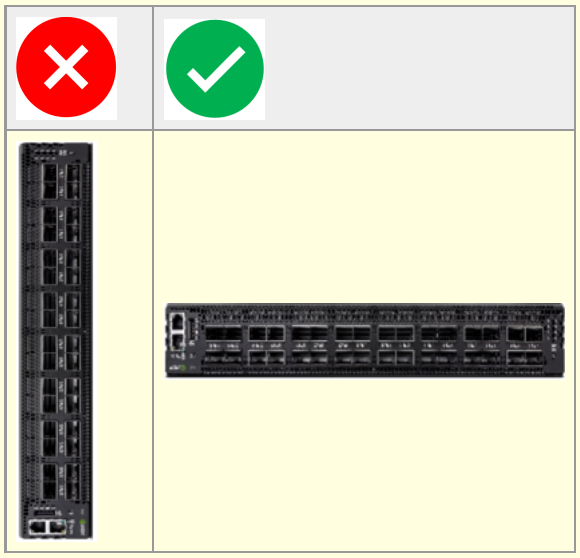
Installation and initialization of the system require attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

**Note**

The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Take precautions to guarantee proper ventilation and maintain sufficient airflow at ambient temperature.

**Note**

Due to thermal considerations, the switch systems must be installed in a horizontal position. Do not install the systems vertically.



**Note**

Unless otherwise specified, NVIDIA products are designed to work in an environmentally controlled data center with low levels of gaseous and dust (particulate) contamination.

The operation environment should meet severity level G1 as per ISA 71.04 for gaseous contamination and ISO 14644-1 class 8 for cleanliness level.

The installation procedure for the system involves the following phases:

| Step | Procedure | See |
|---|---|---|
| 1 | Review the safety warnings | Safety Warnings |
| 2 | Pay attention to the air flow consideration within the system and rack | Air Flow |
| 3 | Make sure that none of the package contents are missing or damaged | Package Contents |
| 4 | Mount the system into a rack enclosure | 19" System Mounting Options |
| 5 | Power on the system | Initial Power On |
| 6 | Perform a system bring-up | System Bring-Up |
| 7 | [Optional] FRU replacements | FRU Replacements |

# Safety Warnings

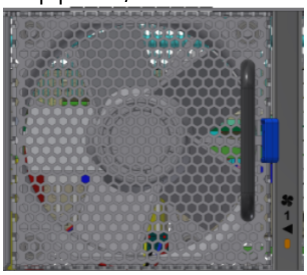
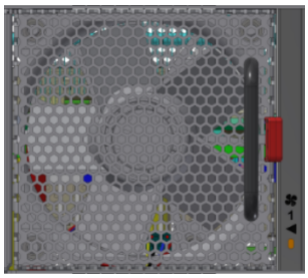
Prior to installation, review the Safety Warnings.

# Air Flow

NVIDIA systems are offered with two air flow patterns:

**Note**

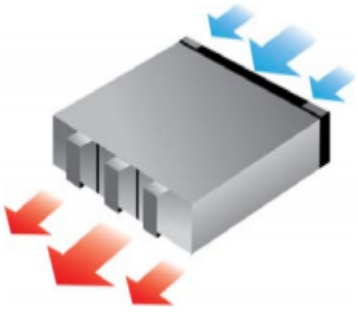
The following images are provided for illustration purposes only.
Designs may vary.

| | |
|---|---|
| • Power (rear) side inlet to connector side outlet: marked with blue power supplies/fans FRUs' handles.<br>  | • Connector (front) side inlet to power side outlet: marked with red power supplies/fans FRUs' handles.<br>  |

**⚠ Warning**

All servers and systems in the same rack should have the same airflow direction. FRU components must also have the same airflow direction to avoid affecting heat dissipation.

The table below provides an air flow color legend and respective OPN designation.

| Direction | Description and OPN Designation |
|---|---|
|  | Connector side inlet to power side outlet. Red latches are placed on the power inlet side.<br>OPN designation is *-R*. |

| Direction | Description and OPN Designation |
|---|---|
|  | Power side inlet to connector side outlet. Blue latches are placed on the power inlet side.<br>OPN designation is *-F*. |

# Package Contents

Before installing your new system, unpack it and make sure that all the parts have been sent. Check the parts for damage that may have occurred during shipping.

The SN4600/SN4600C package includes:

- 1x System
- 1x Rail kit
- 1x Power cable for each power supply unit (Type C13-C14)
- 1x Harness: HAR000028 – Harness RS232 2M cable (DB9 to RJ-45)
- 1x Cable retainer for each power supply unit

The SN4700 package includes:

- 1x System
- 1x Rail kit
- 2x Power cables:
  - 2x 180 - 250VAC 15A 1830MM C14 to C15 UL power cable
- 1x Harness: HAR000631 – Harness RS232 2M cable (DB9 to RJ-45)
- 2x Cable retainers for each power supply unit

**Note**

If anything is damaged or missing, contact networking-support@nvidia.com

## Mounting Options

By default, the systems are sold with fixed rail-kits. For installation instructions, refer to the relevant links in the following table:

| System Model | Fixed Rail-kit (Default) |
|---|---|
| SN4600/SN4600C | SN4600/SN4600C Fixed Rail Kit |
| SN4700 | SN4700 Fixed Rail Kit |

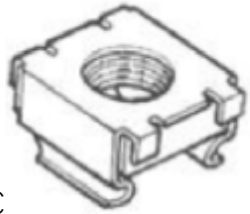
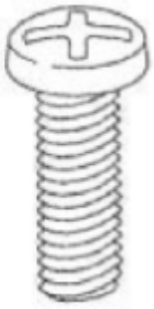
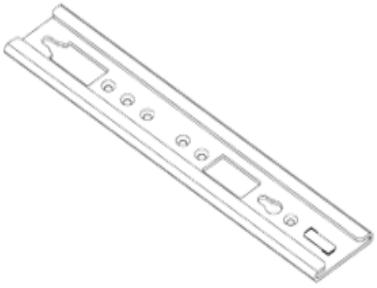
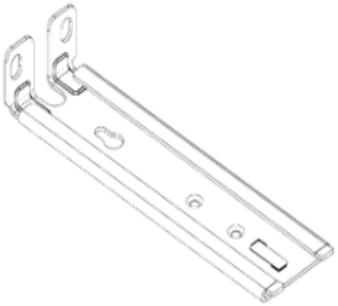
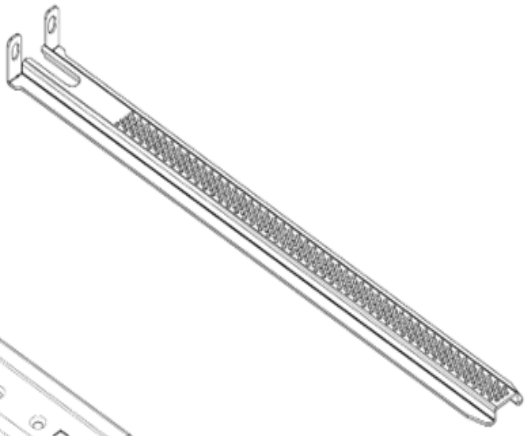
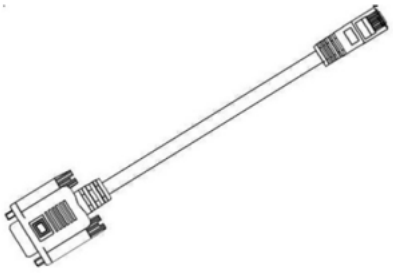
# SN4600/SN4600C Fixed Rail Kit

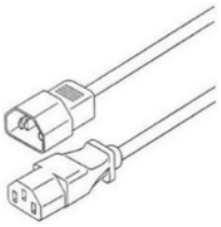
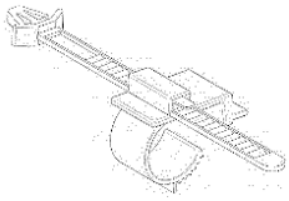
| Kit OPN | Legacy OPN | Rack Size and Rack Depth Range |
|---|---|---|
| 930-9NRKT-00JN-000 | MTEF-KIT-J | 430-800 mm |

## Package Contents (System and Rail Kit)

- 1 x System
- 1 x Fixed rail kit for 16.9-31.5" (430-800mm) racks
- 2 x Power cables – Type C13-C14
- 1 x Harness: HAR000631 – Harness RS232 2M cable – DB9 to RJ-45
- 2 x Cable retainers

| Quantity | Item |
|---|---|
| Rail-Kit Package | |

| Quantity | Item |
|---|---|
| 4× |  A |
| 8× (of each) |   B,C |
| 2× (of each) |    D,E,F |
| System Package | |
| 1× |  |

| Quantity | Item |
|---|---|
| 4× |  |
| 2× |  |

***Prerequisites:***

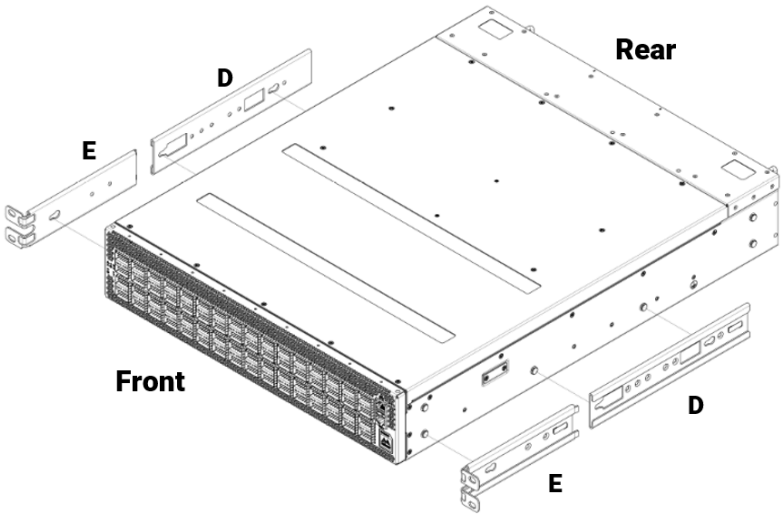
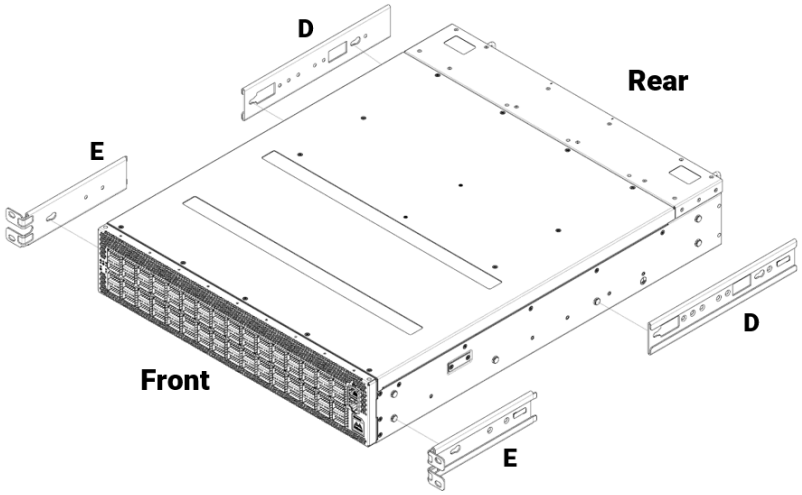
Before mounting the system to the rack, select the way you wish to place the system. Pay attention to the airflow within the rack cooling, connector and cabling options.

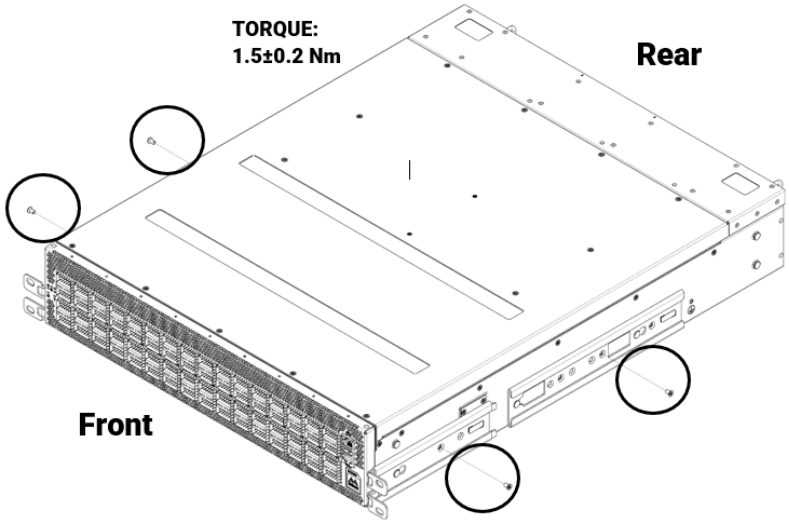
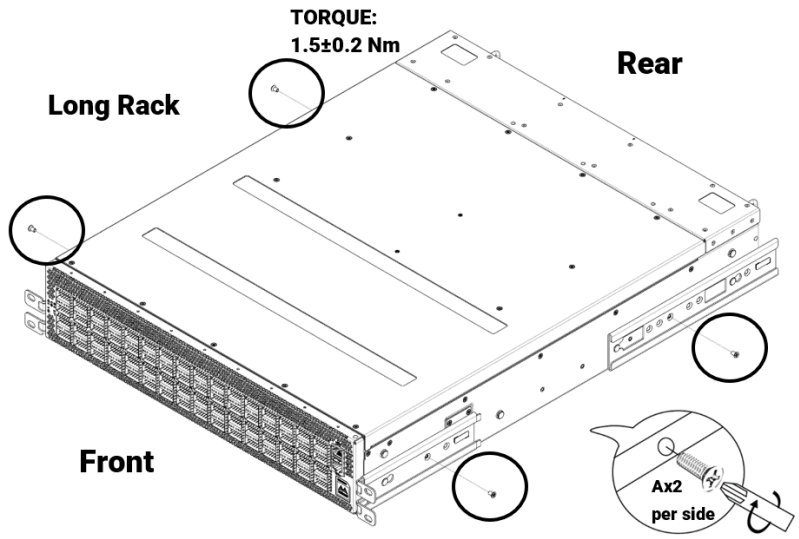
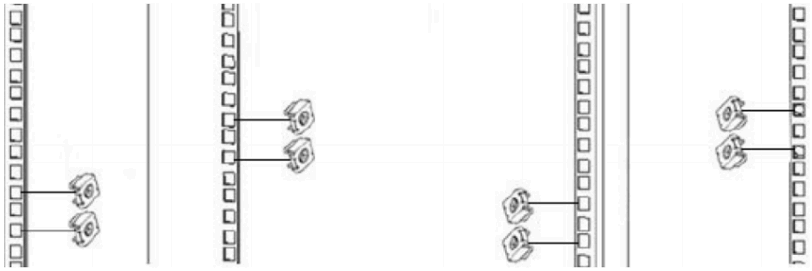
While planning how to place the system, consider the two installation options shown in the figures below, and review the following points:

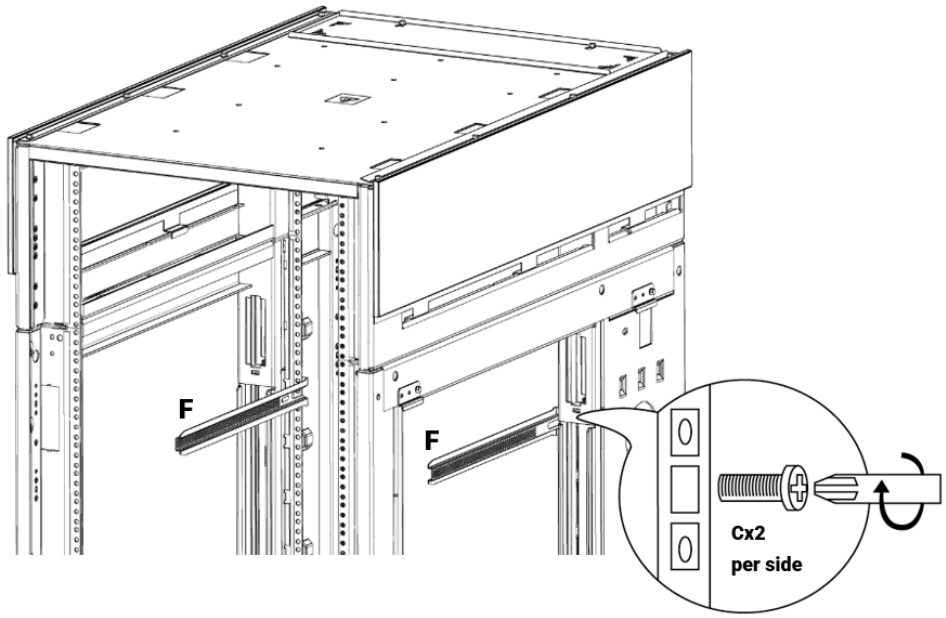
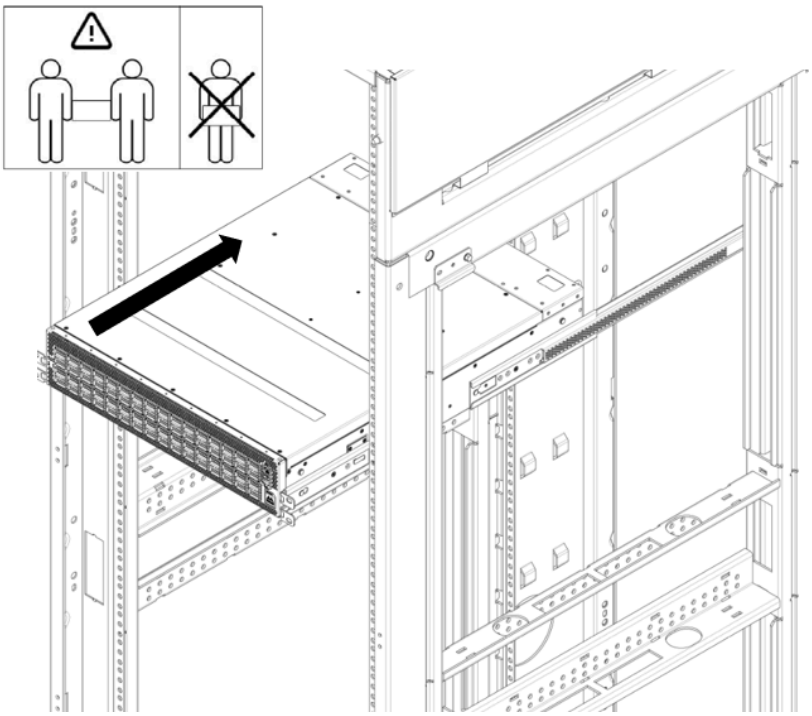
- Make sure the system air flow is compatible with your installation selection. It is important to keep the airflow within the rack in the same direction.
- Note that the part of the system to which you choose to attach the rails (the front panel direction, as demonstrated in Option 1 or the FRUs direction, as demonstrated in Option 2) will determine the system's adjustable side. The system's part to which the brackets are attached will be adjacent to the cabinet.
- The FRU side is extractable. Mounting the rack brackets inverted to the FRU side (Option 2) will allow you to slide the FRUs, in and out.

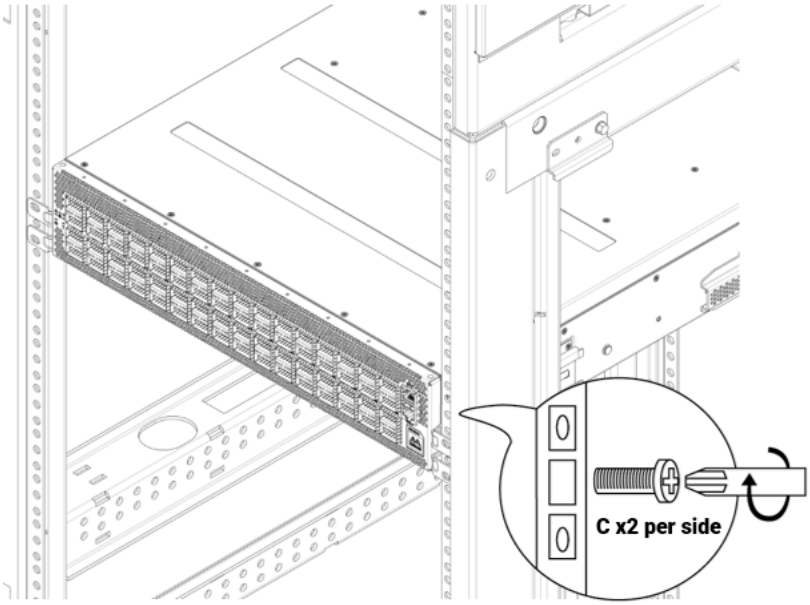
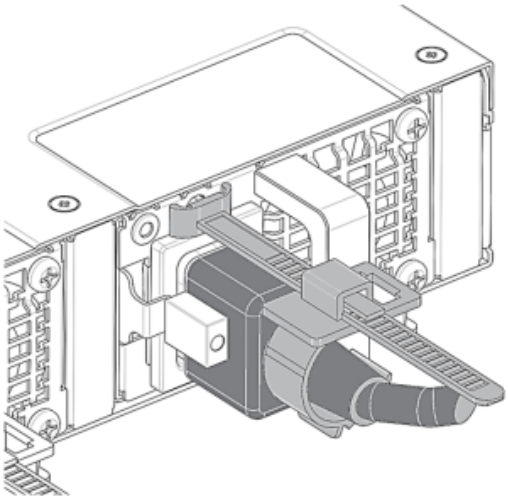
**⚠ Warning**

At least two people are required to safely mount the system in the rack.

| # | Illustration |
|---|---|
| 1 | Attach parts D and E (two of each) to the switch. Push the switch chassis pins through the slider key holes until it locks. Pay attention to the rack type.<br>**Short racks (430mm to 580mm):**<br>  <br> |
| | **Standard racks (580mm to 800mm):**<br>  <br> |
| 2 | **Short racks:** |

| # | Illustration |
|---|---|
| |  |
| | **Standard racks:**<br>  |
| 3 | Install 8 cage nuts (B) in the desired 2U slots of the rack.<br>  |
| 4 | Do not tighten the screws yet. |

| # | Illustration |
|---|---|
| |  |
| 5 |  |
| 6 | Tighten all M6 screws (C) with a torque of **4.5±0.5.** |

| # | Illustration |
|---|---|
| |  |
| 7 | A cable retainer should be used to secure the power cord when plugging it into each power socket (located on the rear side of the switch). To secure the power cord inside the retainer, press the small tab on the retainer strip to loosen the loop and pull. (The following diagram is for general illustration; the rear view does not necessarily match that of the actual system).<br>  |

# Removing the System from the Rack

***To remove a unit from the rack:***

1. Turn off the system and disconnect it from peripherals and from the electrical outlet.

While your installation partner is supporting the system's weight:

2. Loosen the screws attaching the rack mount ears to the rack. Do not remove them yet.

3. Loosen the screws attaching the rack mount blades to the rack, and pull the blades towards you, while your partner is holding the system.

4. Extract the loosened screws from Step 2 and dismount the system from the rack.

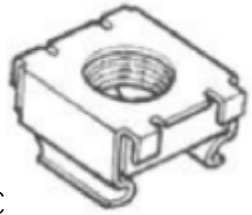
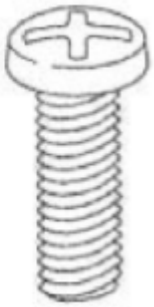
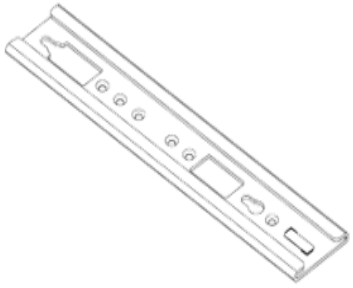
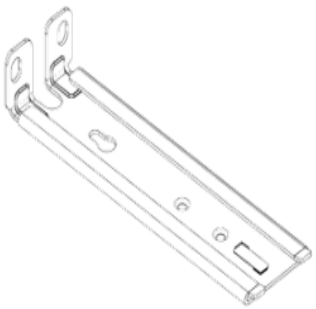
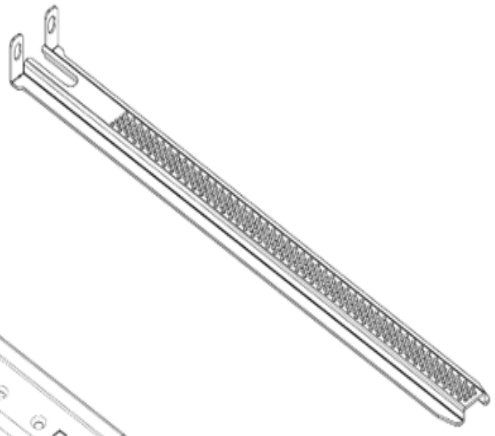
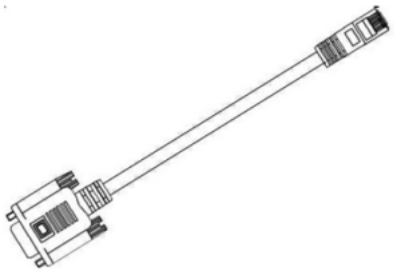
5. Remove the rails and brackets from the chassis by unscrewing 4 screws.

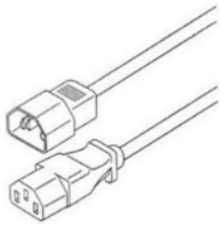
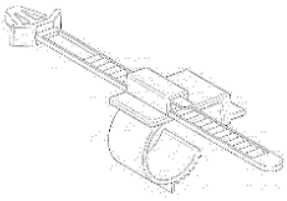
# SN4700 Fixed Rail Kit

| Kit OPN | Legacy OPN | Rack Size and Rack Depth Range |
|---|---|---|
| 930-9NRKT-00JN-000 | MTEF-KIT-J | 430-800 mm |

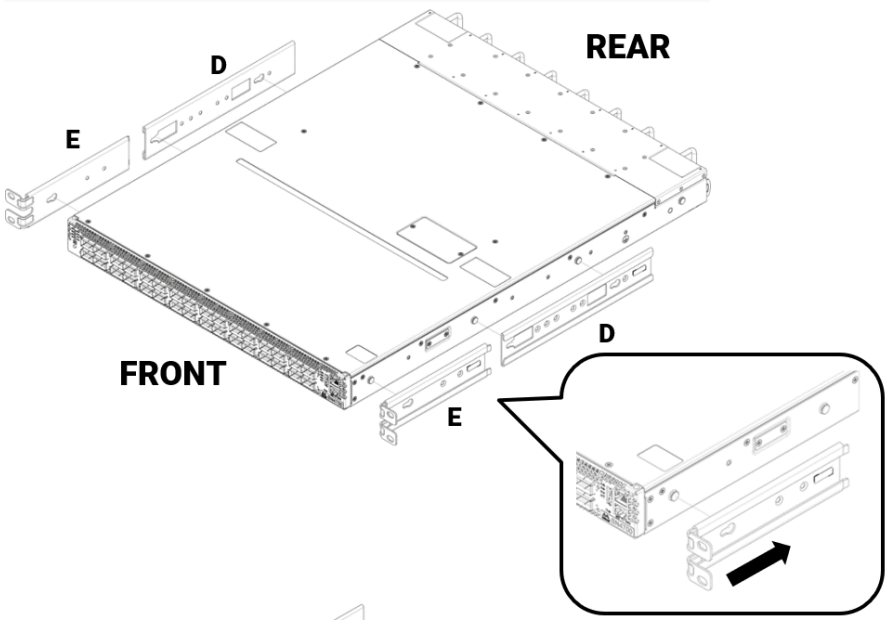
## Package Contents (System and Rail-Kit)

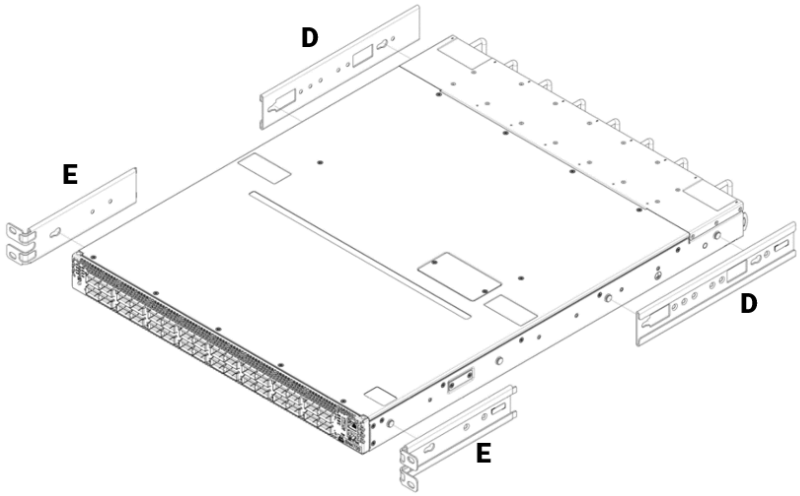
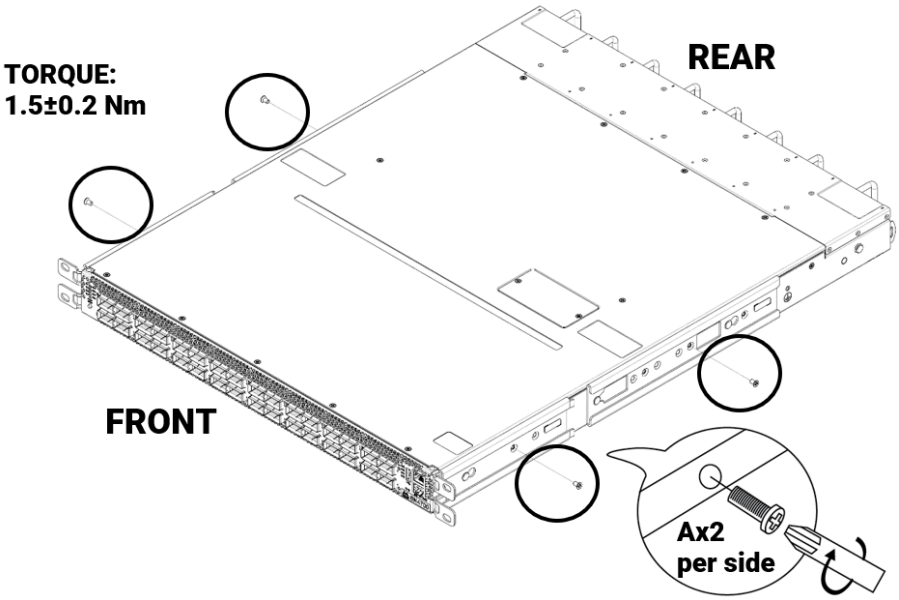
- 1x System
- 1x Fixed rail kit for 16.9-31.5" (430-800mm) racks
- 4x Power cables*:
- 2x 250V 10A 1830MM C14 TO C15 power cable
- 2x 110V 15A 1830MM C14 TO C15 UL power cable
- 1x Harness: HAR000631 – Harness RS232 2M cable – DB9 to RJ-45
- 2x Cable retainers

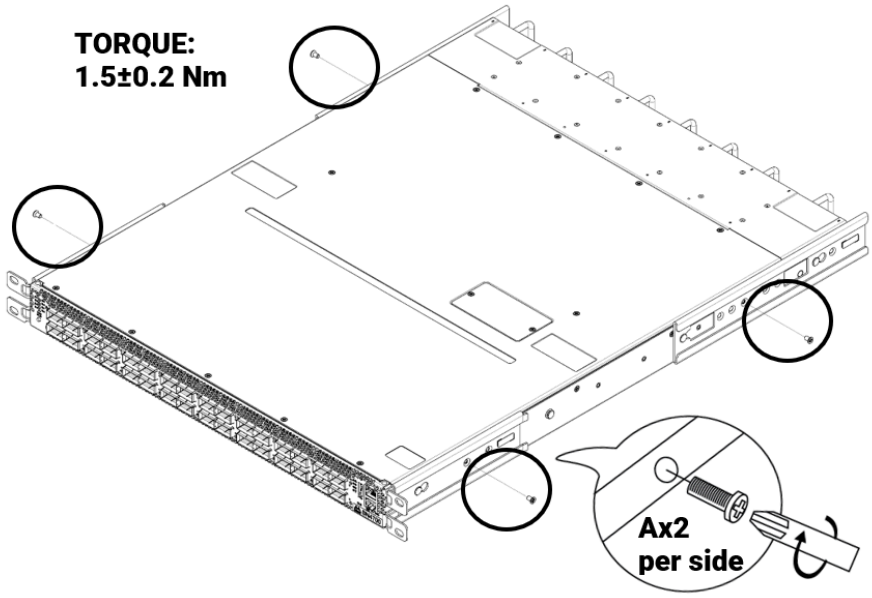
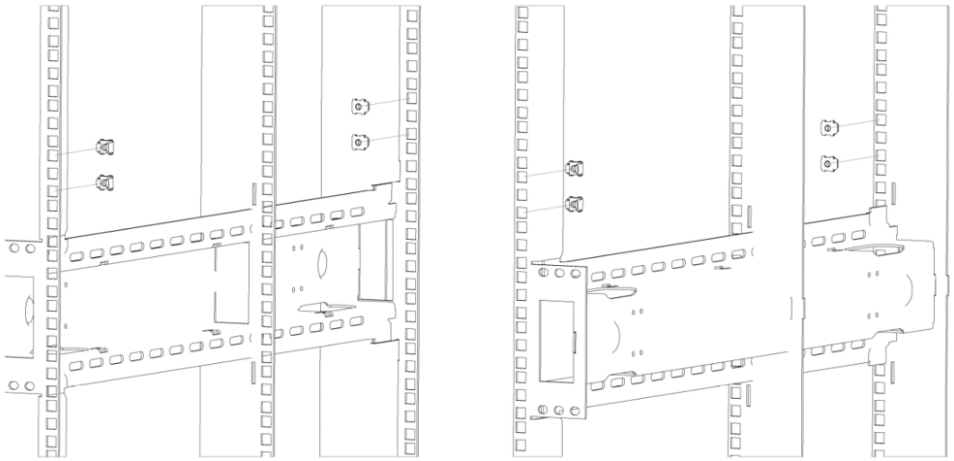
| Quantity | Item |
|---|---|
| 4× |  A |
| 8× (of each) |   B,C |
| 2× (of each) |    D,E,F |
| 1× |  |

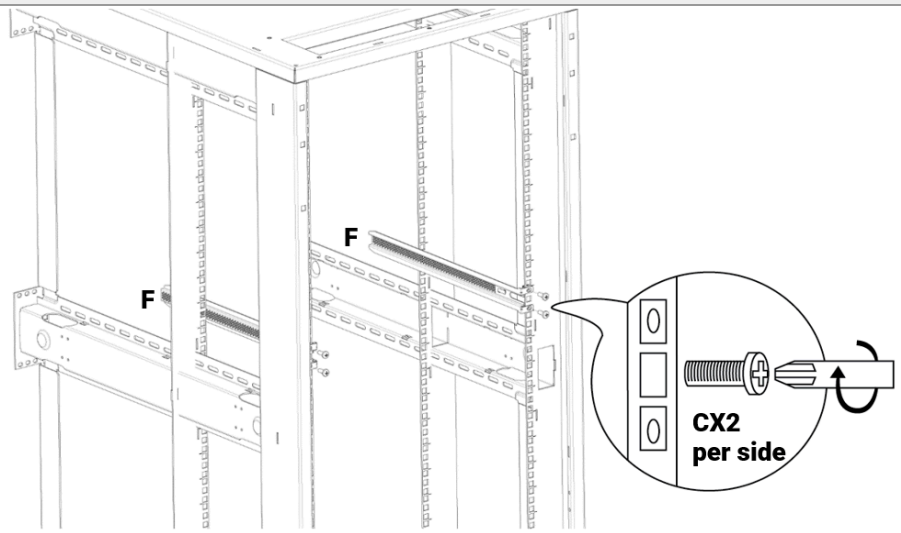
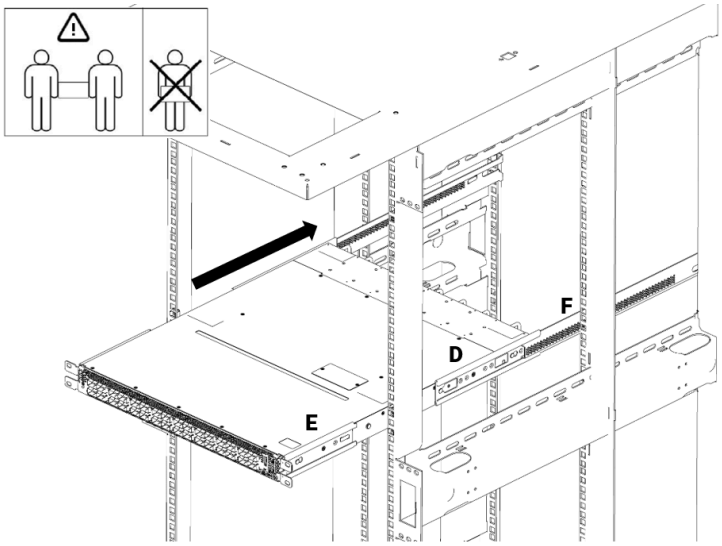
| Quantity | Item |
|---|---|
| 4× |  |
| 2× |  |

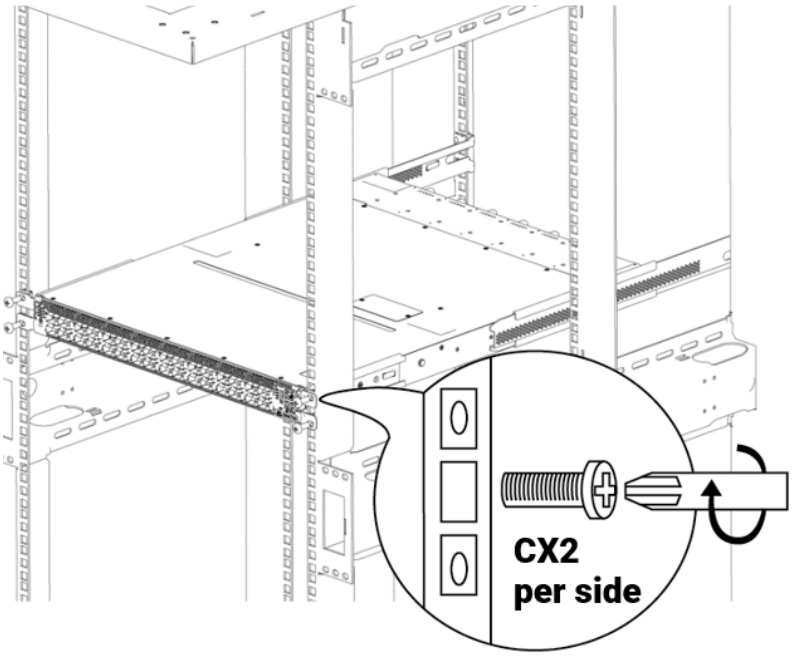
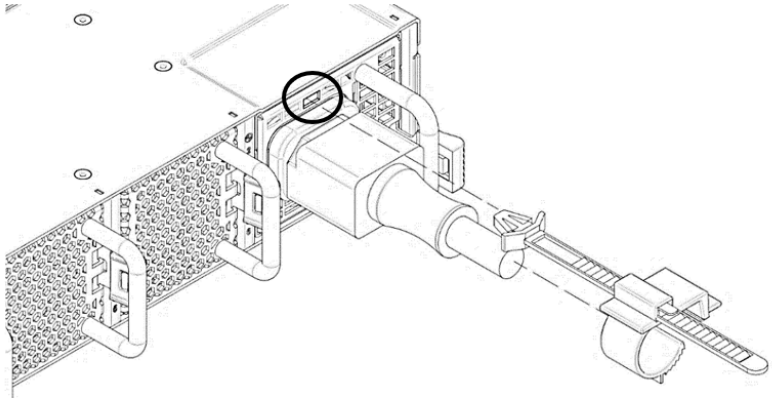
# Installation Instructions

| # | Illustration |
|---|---|
| 1 | Attach parts D and E (x2 of each) to the switch. Push the switch chassis' pins through the slider key holes, until locking occurs. Pay attention to the rack's type.<br>**Short racks (430-580mm):**<br>  |
| | **Standard racks (580-800mm):** |

| # | Illustration |
|---|---|
| |  |
| 2 | **Short racks:**<br>  |
| | **Standard racks:** |

| # | Illustration |
|---|---|
| |  |
| 3 | Install 8 cage nuts (B) in the desired 1U slots of the rack.<br>  |
| 4 | Do not tighten the screws yet. |

| # | Illustration |
|---|---|
| |  |
| 5 |  |
| 6 | Tighten all M6 screws (C) with a torque of **4.5±0.5.** |

| # | Illustration |
|---|---|
| |  |
| 7 | **Optional - Using a cable retainer:**<br>Insert the retainer anchor into the designated slot above the power cord inlet.<br>To secure the power cord inside the retainer, press the small tab on the retainer strip to loosen the loop.<br>  |

***To remove a unit from the rack:***

1. Turn off the system and disconnect it from peripherals and from the electrical outlet.

   While your installation partner is supporting the system's weight:

2. Loosen the screws attaching the rack mount ears to the rack. Do not remove them yet.

3. Loosen the screws attaching the rack mount blades to the rack, and pull the blades towards you, while your partner is holding the system.

4. Extract the loosened screws from Step 2 and dismount the system from the rack.

5. Remove the rails and brackets from the chassis by unscrewing 4 screws.

# Cable Installation

## Power Cable and Cable Retainer

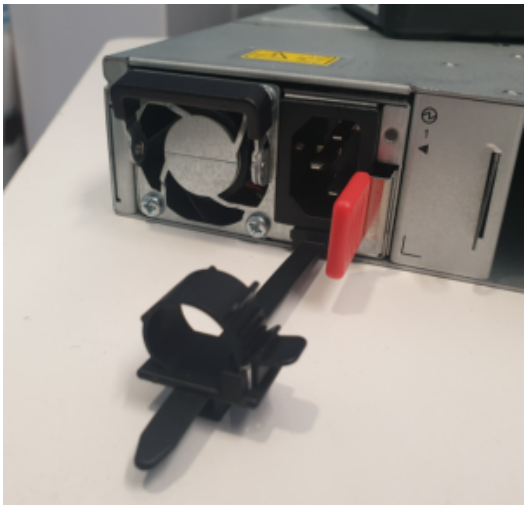
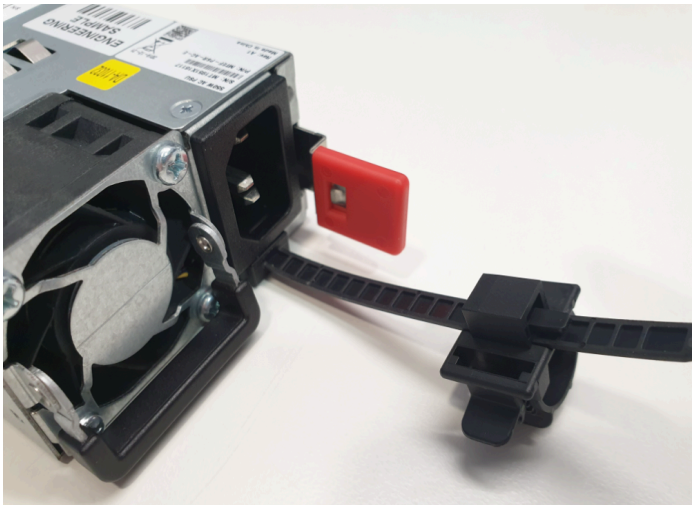
In some switch models, the product's package includes cable retainers. It is highly recommended to use them in order to secure the power cables in place. Please adhere to the following instructions:

1. Verify the integrity of the retainer assembly, as demonstrated in the below table:- The snaps' push-pins must have visible edges with no broken or torn parts.

   - The shoulders' pins should be in-tact and must not be bent inwards.

2. It is advised to place the PSU on a flat, stable surface. While you secure the PSU in place, use two thumbs to insert the retainer's two snaps into the designated holes located near the AC inlet. Make sure that the retainer's plastic loop is facing upwards, as demonstrated in the below table.

> **Note**
>
> For demonstration purposes, the images in this document show C2P (Connector-to-Power) airflow PSUs with red latches, yet the instructions apply to P2C (Power-to-Connector) PSUs with blue latches as well.

| Correct Insertion | Incorrect Insertion |
| --- | --- |
|  |  |

3. Push the retainer until the shoulders' pins are open and aligned with the PSU front panel.

4. Make sure that the retainer is fully locked in place by gently attempting to pull it outwards.

5. Open the plastic loop and route the AC cord through it. Locate the loop over the AC cord, as shown in the following table, and fasten it tightly.

| Proper Loop Placement | Improper Loop Placement |
| --- | --- |
|  |  |

**Note**

Each cable retainer can be used once only. Once the retainer has been fully inserted and the shoulders' pins have been adjusted, the retainer cannot be used again, and should be discarded if pulled out.

## Port Cables

All cables can be inserted or removed with the unit powered on.

To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The LED indicator, corresponding to each data port, will light when the physical connection is established. When a logical connection is made, the relevant port LED will turn on.

To remove a cable, disengage the locks and slowly pull the connector away from the port receptacle. The LED indicator for that port will turn off when the cable is unseated.

For a list of Supported Cables and Transceivers, please see the interconnect product specifications page.

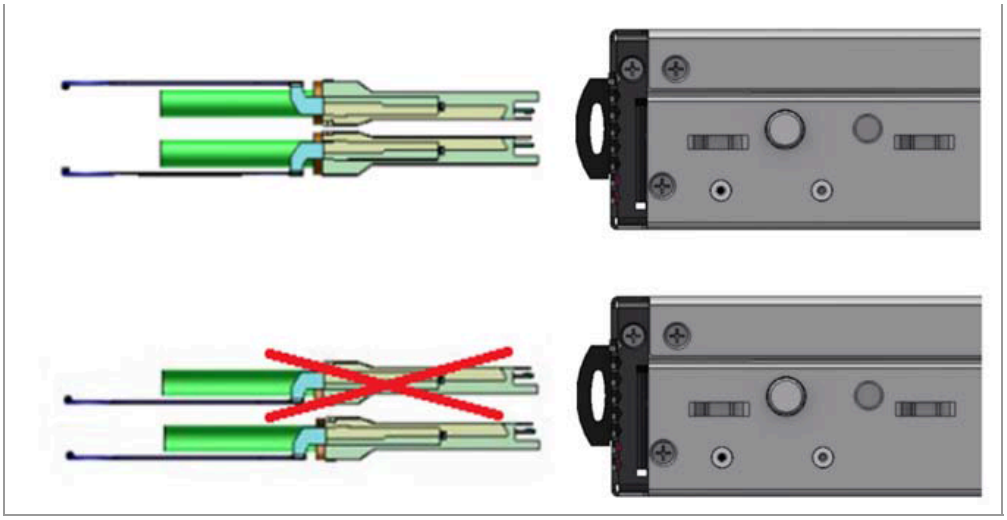
For full cabling guidelines, please see NVIDIA Cable Management Guidelines and FAQs Application Note.

For more information about port LEDs, refer to Port LEDs.

**⚠ Warning**

Do not force the cable into the cage with more than 40 newtons / 9.0 pounds / 4kg force. Greater insertion force may cause damage to the cable or to the cage.

**QSFP Cable Orientation**



## Splitter (Breakout) Cables and Adapters

When using an NVIDIA splitter cable, the following splitting options are available:

**SN4600 (see "SN4600/SN4600C Splitting Options"):**

- Each 200GbE port can be split to 2 ports of 100GbE without any limitation.
- Each 200GbE odd number port can be split to 4 ports of 50GbE while disabling (unmapping) the 100GbE port above or below it.
- Each 100GbE port can be split to 2 ports of 50GbE without any limitation. Each 100GbE odd number port can be split to 4 ports of 25GbE, while disabling (unmapping) the 100GbE port above or below it. See "SN4600/SN4600C Splitting Options" below.

**SN4600C (see "SN4600/SN4600C Splitting Options"):**

- Each 100GbE port can be split to 2 ports of 50GbE without any limitation.
- Each 100GbE odd number port can be split to 4 ports of 25GbE ports, while disabling (unmapping) the 100GbE port above or below it. See "SN4600/SN4600C Splitting Options" below.

**SN4700 (see "SN4700 Splitting Options"):**

- Each 400GbE port (ports #1-32) can be split to 8 ports of 50GbE, while blocking the adjacent ports.
- Each 400GbE port (ports #1-32) can be split to 2 ports of 200GbE or 4 ports of 100GbE, without any limitations.

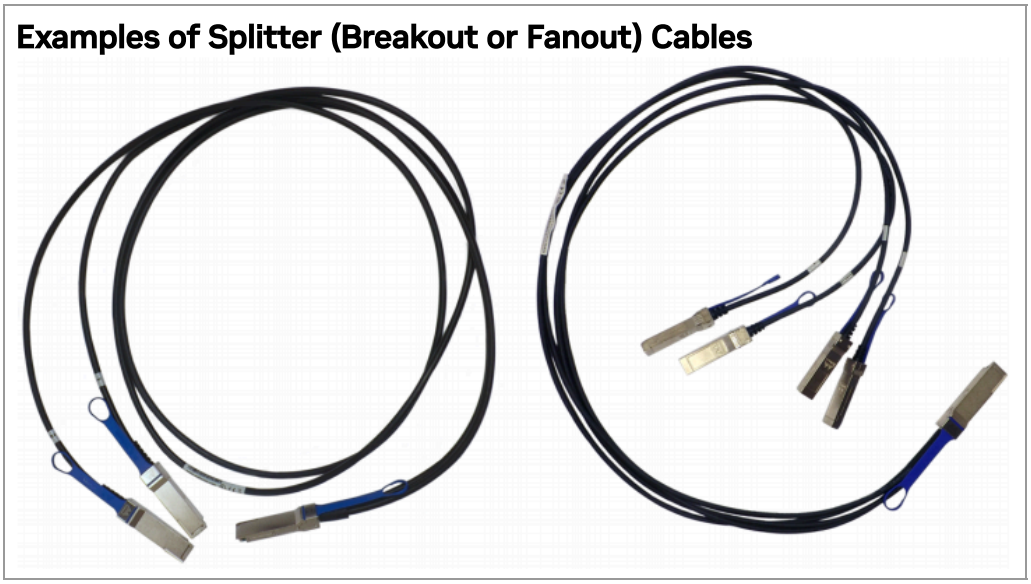
## Using Splitter (Breakout) Cables with NVIDIA Onyx (MLNX-OS)

When using this feature, you should log into the NVIDIA Onyx (MLNX-OS) CLI and configure the individual ports to be 'split-2' or 'split-4'. See NVIDIA LinkX Cables and Transceivers for more information.

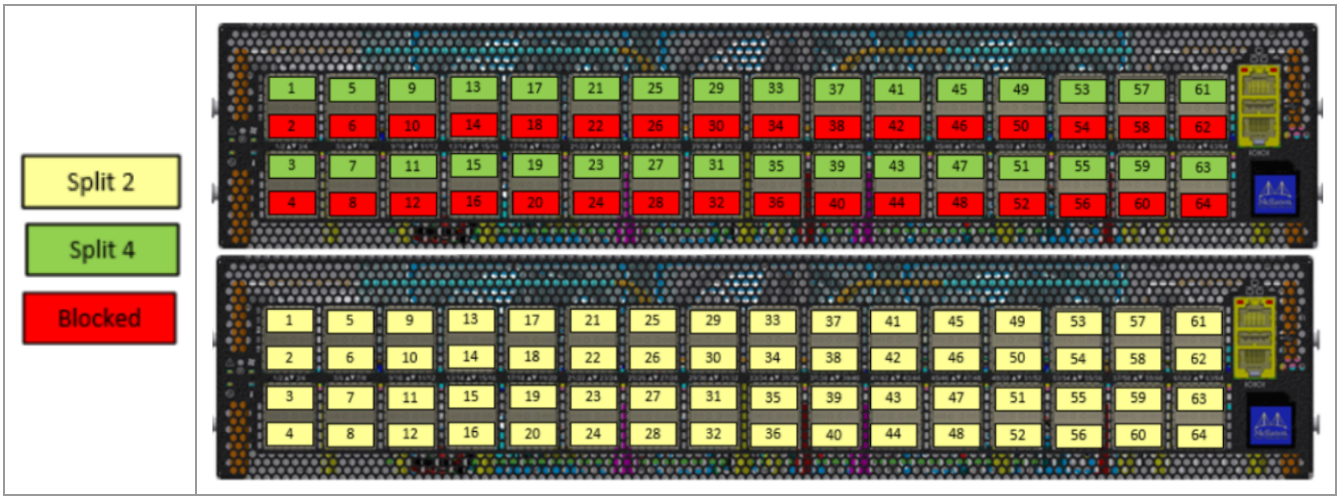
## Using Splitter (Breakout) Cables with Cumulus Linux

If you are using 4x10G direct attach copper cables or active optical cables, edit the `/etc/cumulus/ports.conf` to enable support for these cables, then restart the switchd service using the `sudo systemctl restart switchd` command. For more details, see Switch Port Attributes.

**Examples of Splitter (Breakout or Fanout) Cables**



## SN4600/SN4600C Splitting Options




### SN4700 Splitting Options


# Initial Power On

Each system's input voltage is specified in the Specifications chapter.

The power cords should be standard 3-wire AC power cords including a safety ground and rated for 15A or higher.

**Note**

In the SN4700 systems, two power cords are provided for each power supply unit In order to meet the electrical requirements of various regions. Please make sure to use the cord that meets the power requirements of your country or region.

**⚠ Warning**

The system platform will automatically power on when AC power is applied. There is no power system. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

1. Plug in the first power cable.
2. Plug in the second power cable.
3. Wait for the System Status LED to turn green.

**⚠ Warning**

It may take up to five minutes to turn on the system. If the System Status LED shows amber after five minutes, unplug the system and contact your NVIDIA representative for assistance.

4. Check the System Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation as shown in the figure below. For more information, refer to “LEDs”.

*The figure is for illustration purposes only. The LEDs location and shape may slightly vary in different systems.

**Warning**

After inserting a power cable and confirming the green System Status LED light is on, make sure that the Fan Status LED shows green.

If the Fan Status LED is not green, unplug the power connection and check that the fan module is inserted properly and that the mating connector of the fan unit is free of any dirt and/or obstacles. If no obstacles were found and the problem persists, call your NVIDIA representative for assistance.

Two Power Inlets - Electric Caution Notifications:

**Warning**

Risk of electric shock and energy hazard. The two power supply units are independent. Disconnect all power supplies to ensure a powered down state inside of the switch platform.

## SN4700D Initial Power On

To power on the SN4700D switch system:

1. fully insert the DC power plug into the busbar rail located at the rear of the system. After insertion, secure the system to the rack using the provided rail kit.

2. Check the System Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation as shown in the figure below. For more information, refer to "LEDs".

*The figure is for illustration purposes only. The LEDs location and shape may slightly vary in different systems.

# System Bring-Up

If your switches are running NVIDIA Onyx (MLNX-OS), follow the instructions in this section.

For Cumulus Linux switches, refer to the Cumulus Linux Quick Start Guide. Cumulus Linux uses the OpenSSH package to provide SSH functionality. To securely access a Cumulus Linux switch remotely, see SSH for Remote Access.

## Configuring Network Attributes Using NVIDIA Onyx (MLNX-OS)

The procedures described in this chapter assume that you have already installed and powered on the system according to the instructions in this document. The system comes with a pre-configured DHCP. If you wish to disable it, refer to Disable Dynamic Host Configuration Protocol (DHCP). If a manual configuration is required, follow the instructions in the next section.

## Manual Host Configuration

To perform initial configuration of the system:

Step 1. Connect a host PC to the Console RJ45 port of the system, using the supplied harness cable (DB9 to RJ45).

**Note**

Make sure to connect to the Console RJ45 port, and not to the (Ethernet) MGT port. Pay attention to the icons:

| | |
|---|---|
| Console RJ45 |  |
| Ethernet MGT |  |

Step 2. Configure a serial terminal program (for example, HyperTerminal, minicom, or Tera Term) on your host PC with the settings described in the table below. If successful, you should get the CLI prompt of the system.

**Serial Terminal Program Configuration**

| Parameter | Setting |
|---|---|
| Baud Rate | 115200 (or 9,600) |
| Data bits | 8 |
| Stop bits | 1 |
| Parity | None |
| Flow Control | None |

Step 3. Log in as an admin and enter *admin* as password. Upon first login, the NVIDIA Onyx (MLNX-OS) configuration wizard will start.

Step 4. To configure network attributes and other initial parameters to the system, follow the configuration wizard as shown in the table below.

**Configuration Wizard Session**

| Wizard Session Display | Comments |
|---|---|
| NVIDIA configuration wizard | You must perform this configuration the first time you operate the system or after |

| Wizard Session Display | Comments |
|---|---|
| Do you want to use the wizard for initial configuration? yes | resetting the system. Type ‘y’ and then press <Enter>. |
| Step 1: Hostname? [switch-1] | If you wish to accept the default hostname, press <Enter>. Otherwise, type a different hostname and press <Enter>. |
| Step 2: Use DHCP on mgmt0 interface? [no] yes | Perform this step to obtain an IP address for the system. (mgmt0 is the management port of the system).<br>If you wish the DHCP server to assign the IP address, type ‘yes’ and press <Enter>.If you type ‘no’ (no DHCP), then you will be asked whether you wish to use the ‘zeroconf’ configuration or not.If you enter ‘no’ (no Zeroconf), you must enter a static IP, and the session will continue. |
| Step 3: Enable IPv6? [yes] | The management interface will be able to use IPv6 addresses.<br>If you enter "no" (no IPv6), you will automatically be referred to Step 6. |
| Step 4: Enable IPv6 auto-config (SLAAC) on mgmt0 interface? [no] | This turns on auto-configuration of the IPv6 addresses. This is unsuitable for DHCPv6. |
| Step 5: Enable DHCPv6 on mgmt0 interface? [no] | To enable DHCPv6 on the MGMT0 interface. |
| Step 6: Admin password (Press <Enter> to leave unchanged)? <new_password><br>Step 6: Confirm admin password? <new_password> | To avoid illegal access to the machine, please type a password and then press <Enter>. Then confirm the password by re-entering it. Note that password characters are not printed. |
| You have entered the following information:<br><A summary of the configuration is now displayed.>To change an answer, enter the step number to return to or hit <enter> to save changes and exit.Choice: <Enter>Configuration changes saved. | The wizard displays a summary of your choices and then asks you to confirm the choices or to re-edit them.<br>Either press <Enter> to save changes and exit, or enter the configuration step number that you wish to return to.*Note: To re-run the configuration wizard, run the command “configuration jump-start” in Config mode.* |

The table below shows an example of static IP configuration for mgmt0 interface.

**Configuration Wizard Session - Static IP Configuration**

```
NVIDIA configuration wizard

Do you want to use the wizard for initial configuration? yes

Step 1: Hostname? []
Step 2: Use DHCP on mgmt0 interface? [yes] no
Step 3: Use zeroconf on mgmt0 interface? [no]
Step 4: Primary IP address? [for example 192.168.10.4]
10.10.10.10
Mask length may not be zero if address is not zero (interface
eth0)
Step 5: Netmask? [0.0.0.0] 255.255.255.0
Step 6: Default gateway? [for example 192.168.10.1] 10.10.10.255
Step 7: Primary DNS server?
Step 8: Domain name?
Step 9: Enable IPv6? [yes]
Step 10: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no]
Step 11: Admin password (Enter to leave unchanged)?

To change an answer, enter the step number to return to.
Otherwise hit <enter> to save changes and exit.
Choice:
Configuration changes saved.

To return to the wizard from the CLI, enter the “configuration
jump-start”
command from configure mode. Launching CLI...
```

Step 5. Before attempting a remote (for example, SSH) connection to the system, check the mgmt0 interface configuration. Specifically, verify the existence of an IP address. To check the current mgmt0 configuration, enter the following command:

```
switch01 (config) # show interfaces mgmt0
Interface mgmt0 status:
  Comment:
  Admin up:          yes
  Link up:           yes
  DHCP running:      yes
  IP address:        192.168.1.100
  Netmask:           255.255.255.0
  IPv6 enabled:      yes
  Autoconf enabled:  no
  Autoconf route:    yes
  Autoconf privacy:  no
  DHCPv6 running:    no
  IPv6 addresses:    1
  IPv6 address:      fe80::202:c9ff:fe63:b55a/64
  Speed:             1000Mb/s (auto)
  Duplex:            full (auto)
  Interface type:    ethernet
  Interface source:  physical
  MTU:               1500
  HW address:        00:02:C9:63:B5:5A

  RX bytes:          968810197      TX bytes:        1172590194
  RX packets:        10982099       TX packets:      10921755
  RX mcast packets:  0              TX discards:     0
  RX discards:       0              TX errors:       0
  RX errors:         0              TX overruns:     0
  RX overruns:       0              TX carrier:      0
  RX frame:          0              TX collisions:   0
                                    TX queue len:      1000

switch01 (config) #
```

Step 6. Check the software version embedded in your system, using the `show version` command. Compare this version to the latest version that can be retrieved from NVIDIA support site. For software upgrade instructions, refer to the *NVIDIA Onyx (MLNX-OS) User Manual*.

## Disable Dynamic Host Configuration Protocol (DHCP)

DHCP is used for automatic retrieval of management IP addresses.

If a user connects through SSH, runs the wizard and turns off DHCP, the connection is immediately terminated, as the management interface loses its IP address. In such a case, the serial connection should be used.

**Note**

<localhost># ssh admin@<ip-address>

```
Mellanox Onyx (MLNX-OS) Switch Management
```

```
Password:
```

```
Mellanox Switch
```

```
Mellanox configuration wizard
```

```
Do you want to use the wizard for initial
configuration?
yes
```

```
Step 1: Hostname? [my-switch]
```

```
Step 2: Use DHCP on mgmt0 interface? [yes] no
```

```
<localhost>#
```

## Remote Connection with NVIDIA Onyx (MLNX-OS)

After the network attributes are set, you can access the CLI via SSH or the WebUI via HTTP/HTTPs.

To access the CLI, perform the following steps:

1. Set up an Ethernet connection between the system and a local network machine using a standard RJ45 connector.
2. Start a remote secured shell (SSH) using the command:
   `ssh -l <username> <IP_address>`

   ```
   # ssh -l <username> <ip_address>
   Mellanox Onyx (MLNX-OS) Switch Management

   Password:
   ```

3. Log in as admin (default username is *admin*, password is *admin*).
4. When you get the CLI prompt, you are ready to use the system.

For additional information about NVIDIA Onyx (MLNX-OS), refer to the *NVIDIA Onyx (MLNX-OS) User Manual*.

# FRU Replacements

**Note**

For a list of the FRU replacements, see "Accessory and Replacement Parts".

# Power Supplies

NVIDIA systems that are equipped with two replaceable power supply units work in a redundant configuration. Either unit may be extracted without bringing down the system.

> ⚠ **Warning**
>
> Make sure that the power supply unit that you are NOT replacing is showing green for the power supply unit LED.

***To extract a power supply unit:***

1. Remove the power cord from the power supply unit.
2. Grasp the handle and pull the unit outwards. As the unit unseats, its status LEDs will turn off.
3. Remove the power supply unit.

**PS Unit Pulled Out**

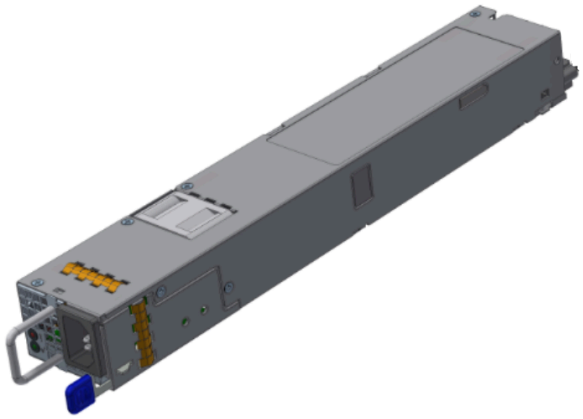


*Illustration only. The design may vary in different systems.

***To insert a power supply unit:***

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

> **Warning**
>
> Do not attempt to insert a power supply unit with a power cord connected to it.

2. Make sure that the board connector is on the lower side of the FRU module, and Insert the unit by sliding it into the opening, until a slight resistance is felt.
3. Continue pressing the power supply unit until it seats completely. The latch will snap into place, confirming the proper installation.
4. Insert the power cord into the supply connector.
5. Insert the other end of the power cord into an outlet of the correct voltage.

> **Warning**
>
> The green power supply unit indicator should light. If it does not, repeat the whole procedure to extract the power supply unit and re-insert it.

## Fans

The system can fully operate if one fan FRU is dysfunctional. Failure of more than one fan is not supported.

> **Warning**
>
> Make sure that the fans have the air flow that matches the model number. An air flow opposite to the system design will cause the system to operate at a higher (less than optimal) temperature. For power supply unit air flow direction, refer to Air Flow.

**Note**

If operating the systems at full capacity with all ports occupied, and at 40°C ambient temperature, and one of the system fans becomes faulty, it is recommended to replace the fan within 24 hours of failure.

***To remove a fan unit:***

**Note**

When replacing a faulty fan unit in an operational switch system, do not leave the slot unpopulated for more than 60 seconds.

1. Grasping the handle with your right hand, push the latch release with your thumb while pulling the handle outward. As the fan unit unseats, the fan unit status LEDs will turn off.
2. Remove the fan unit.

***To insert a fan unit:***

1.
    1. Make sure the mating connector of the new unit is free of any dirt or particles.
    2. Insert the fan unit by sliding it into the opening until slight resistance is felt. Continue pressing the fan unit until it seats completely.

**Warning**

The Fan Status LED should turn green. If not, extract the fan unit and reinsert it. After two unsuccessful attempts to

install the fan unit, power off the system before attempting any system debug.

# Interfaces

The systems support the following interfaces:

- 10/100/1000Mb Ethernet management interface (RJ45)
- USB port (Type A or uUSB connector)
- RS232 console port (RJ45)
- Reset button
- Status and port LEDs

Refer to Management Interfaces, PSUs and Fans for full configuration options.

## Speed

Ethernet speed must be set manually. The system's ports can be manually configured to run at speeds ranging from 1GbE to 200GbE/400GbE (for more details, see Specifications). To change the port speed configuration, use the *speed* command under interface configuration mode. Refer to the *NVIDIA Onyx (MLNX-OS) User Manual* for instructions on port speed reconfiguration.

## RS232 (Console)

**Note**

The RS232 serial "Console" port is labeled  .

The "Console" port is an RS232 serial port on the front side of the chassis that is used for initial configuration and debugging. When you install the system, you must connect a PC to this interface and configure network parameters for remote connections. Refer to System Bring-Up for complete instructions.

## Management

**Note**

The RJ45 Ethernet “MGT” port is labeled  .

The RJ45 Ethernet “MGT” port provides access for remote management. The management ports are configured with auto-negotiation capabilities by default (10MbE to 1000GbE). The management ports’ network attributes (such as IP address) need to be pre-configured via the RS232 serial console port or by DHCP before use. Refer to System Bring-Up for complete instructions.

**Warning**

Use only FCC-compliant Ethernet cables.

## USB

The USB connector complies with the USB 3.0 Standard. It can be used to connect to an external disk for software upgrades or file management.To view the full matrix of the USB configuration options, refer to Management Interfaces, PSUs and Fans.

**Note**

USB 1.0 is not supported.

**Note**

Do not use excessive force when inserting or extracting the USB disk to or from the connector.

## Reset Button

The reset button is located on the front side of the system and requires a tool to be pressed.

> ⚠ **Warning**
>
> Do not use a sharp, pointed object such as a needle or a push pin to press the reset button. Use a flat object instead.

When using an NVIDIA Onyx (MLNX-OS) based system, keeping the reset button pressed for more than 15 seconds will reset the system and the “admin” password. You can then log in without a password and set a new password for the “admin” user.

For Cumulus Linux password reset instructions, refer to the Cumulus Linux user guide.

## Status and Port LEDs

See LED Notifications.

# Data Interfaces

The data interfaces use QSFP28/56/DD connectors. The full list of interfaces per system is provided in Speed and Switching Capabilities.As detailed in the following table, for additional data interfaces, each QSFP28/56/DD port can be connected with a QSFP28/56/DD cable or connector through NVIDIA QSFP28/56/DD to SFP (Dynamix QSA™) adapters, hybrid, or split cables*.

| Model Family | Ports | Maximum Speed |
|---|---|---|
| SN4600 | 64 | 200GbE PAM4 |

| Model Family | Ports | Maximum Speed |
|---|---|---|
| | | 100GbE NRZ |
| | | 40GbE |
| | 128 | 100GbE PAM4 |
| | | 50GbE |
| | | 25GbE |
| | | 10GbE |
| | | 1GbE |
| SN4600C | 64 | 100GbE |
| | | 40GbE |
| | 128 | 50GbE |
| | | 25GbE |
| | | 10GbE |
| | | 1GbE |
| SN4700 | 32 | 400GbE |
| | 64 | 200GbE PAM4 |
| | | 100GbE NRZ |
| | | 40GbE |
| | 128 | 100GbE PAM4 |
| | | 50GbE |
| | | 25GbE |
| | | 10GbE |
| | | 1GbE |

*In the SN4600 and SN4700 systems, when interconnecting switch-to-switch and switch-to-NIC in 50GbE, 100GbE, 200GbE, and 400GbE-based PAM4 speeds, the supported length of PAM4 passive copper and breakout cables is up to 2.5m.

# Data Ports Maximum Power

The "Maximum High Power Support" column in the following table specifies each system's maximum power capabilities per port:

| Model Family | Ports | Maximum High Power Support |
|---|---|---|
| SN4600 | All ports | 5W |
| | 49-50, 53-54, 57-58, 61-62 | 6.5W |
| SN4600C | 1-48 | 3.5W |
| | 49-64 | 5W |
| SN4700 | All ports | 12W |

# LED Notifications

The system's LEDs are an important tool for hardware event notification and troubleshooting.

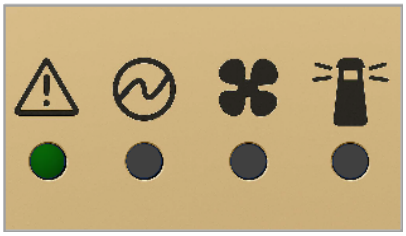
### LED Symbols

| Symbol | Name | Description | Normal Conditions |
|---|---|---|---|
|  | System Status LED | Shows the health of the system. | Green/flashing green when booting |
|  | Fan Status LED | Shows the health of the fans. | Green |
|  | Power Supply Units LEDs | Shows the health of the power supply units. | Green |
|  | Unit Identifier LED | Lights up on command through the CLI. | Off or blue when activated by the user |

## System Status LED

The green LED shows the system's status.

**Front (Ports Side):**



*The figure is provided for illustration purposes only. The design may slightly vary in different systems.

> **⚠ Warning**
>
> It may take up to five minutes to turn on the system. If the System Status LED shows amber after five minutes, unplug the system and contact your NVIDIA representative for assistance.

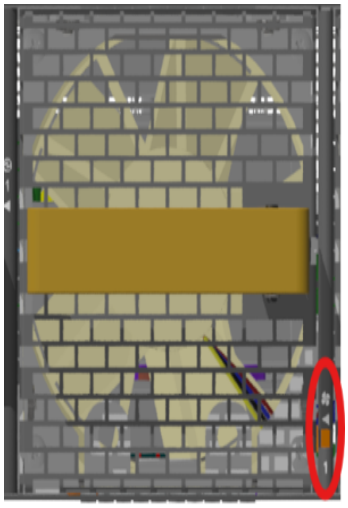
### System Status LED Assignments

| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Green | The system is up and running normally. | N/A |
| Flashing Green | The system is booting up. | Wait up to five minutes for the booting process to complete. |
| Solid Amber | An error has occurred. For example, corrupted firmware, system is overheated, etc. | If the system status LED displays amber five minutes after starting the system, refer to Troubleshooting. |

# Fan Status LED

### Fan Status LED - Front and Rear Sides

| | | |
|---|---|---|
| **Front (Ports Side):**  | Both of these LEDs show the fans' status.<br>*The figures are provided for Illustration purposes only. The design may slightly vary in different systems. | **Rear (FRUs Side):** |

| | | |
|---|---|---|
| | |  |

**Fan Status Front LED Assignments**

| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Green | All fans are up and running. | N/A |
| Solid Amber | Error, one or more fans are not operating properly. | Replace faulty FRUs |

**Fan Status Rear LED Assignments (One LED per Fan)**

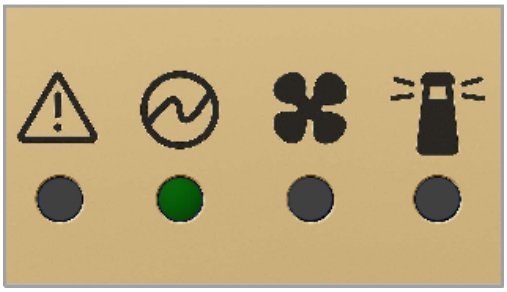
| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Green | A specific fan unit is operating. | N/A |
| Solid Amber | A specific fan unit is missing or not operating properly. | Replace fan unit |

> ⚠ **Warning**
>
> **Risk of Electric Shock:** When the fan module is removed, the power pins are accessible within the module cavity. Do not insert tools or body parts into the fan module cavity.

# Power Supply Status LEDs

The green LED shows the power supply status.

**Front (Ports Side):**



*The figure is provided for Illustration purposes only. The design may slightly vary in different systems.

There are two power supply inlets in the system (for redundancy). The system can operate with only one power supply connected. Each power supply unit has two single color LEDs on the right side of the unit that indicate the unit's status.

When looking from the FRUs side, the primary power supply (PS) unit is located on the left side of the system, and the secondary unit is located on the right side.

### Rear Side Panel

*The figure is provided for Illustration purposes only. The design may slightly vary in different systems.

### Power Supply Unit Status Front LED Assignments

| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Green | All power supply units are connected and running normally. | N/A |

| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Amber | One or both of the power supplies are not operational or not powered up/the power cord is disconnected. | Make sure the power cord is plugged in and active. If the problem resumes, refer to Troubleshooting. |

**Power Supply Unit Status Rear LED Assignments**

| LED Behavior | Description | Action Required |
|---|---|---|
| Solid Green | The PSU is running normally. | N/A |
| Flashing Green 1Hz | AC Present, Standby: On, Main Output: Off | Refer to Troubleshooting. For further assistance, call your NVIDIA representative. |
| Flashing Amber 1Hz | PSU warning: events where the PSU continues to operate | |
| Solid Amber | PSU failure (voltage, current, temperature, or fan related issue) | |
| Off | No AC power to all power supplies. | Plug in the AC cord |

# Unit Identification LED

The blue UID LED is a debug feature that the user can activate to find a particular system within a cluster.

To activate the UID LED on a switch system, refer to the S ONiC User Manual, that is available on the NVIDIA Enterprise Support Portal .

# Port LEDs

# SN4600/SN4600C Port LEDs

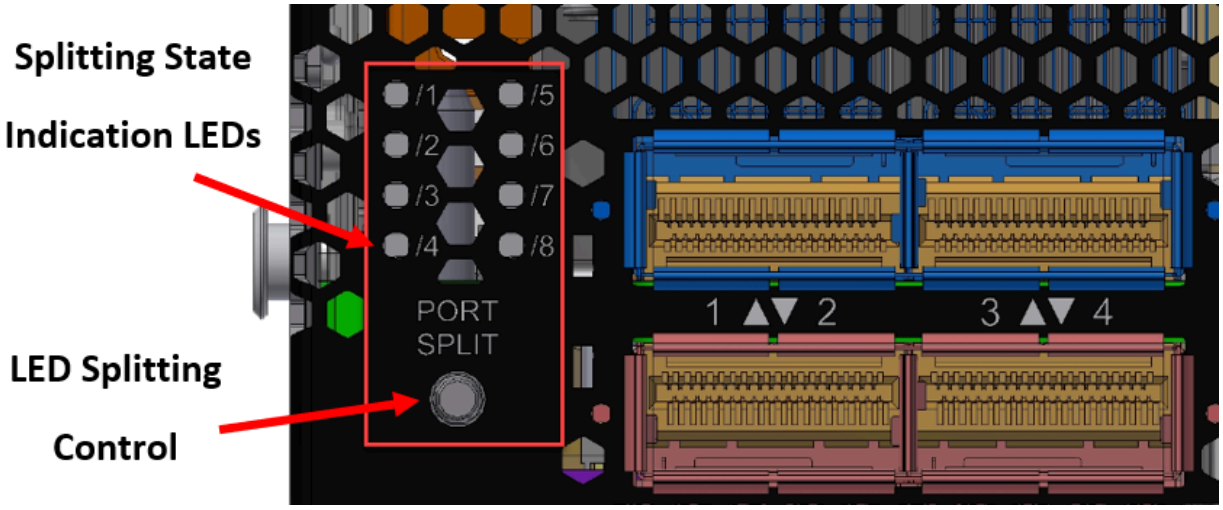
| SN4600/SN4600C |
| --- |
|   |

**SN4600/SN4600C Port LEDs Indications**

| LED Behavior | Description | Action Required |
| --- | --- | --- |
| Off | Link is down | Refer to Troubleshooting. |
| Solid Green | Link is up with no traffic | N/A |
| Flashing Green | Link is up with traffic | N/A |
| Flashing Amber | A problem with the link | Refer to Troubleshooting. |

# SN4700 Port LEDs

Each QSFP module can be used as two 4X ports/four 2X ports/eight 1X ports. Each QSFP-DD has one dedicated bi-color LED. An LED splitting button is available to provide link information for more than one port using only one LED. The button displays up to eight indication states. Press the button to cycle through the various states. The current state can be identified by the LED splitting state indication LEDs. The states and their indications are detailed in the following table.




**SN4700 LED Splitting Options**

| State | State Indication LEDs [/1 /2 /3 /4] | QSFP Module LED Indication | Comments |
|---|---|---|---|
| 0 | | Any link is up | See details in Port LEDs Indications table below (State 0) |
| 1 | | 8x/4xA/2xA/1xA | • See details in Port LEDs Indications table below (States 1-8).<br>• Only one of the link types can be up at a given time. |
| 2 | | 8x/4xB/2xB/1xB | |
| 3 | | 8x/2xC/1xC | |
| 4 | | 8x/2xD/1xD | |
| 5 | | 8x/1xE | |
| 6 | | 8x/1xF | |
| 7 | | 8x/1xG | |
| 8 | | 8x/1xH | |

**SN4700 Port LEDs Indications**

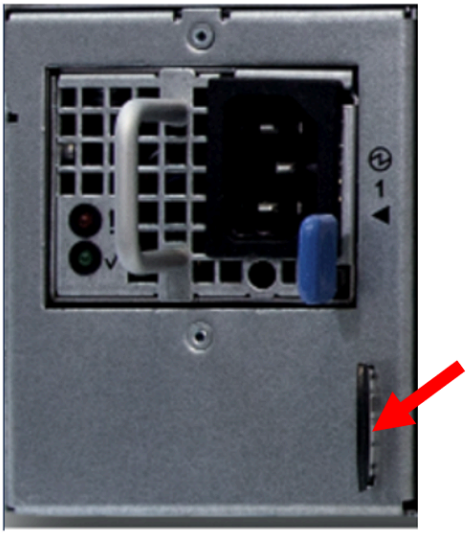
| State | LED Behavior | Description | Action Required |
|---|---|---|---|
| 0 | Off | No 8x/4x/2x/1x link was established on this QSFP module | N/A |
| | Solid Green | At list one link was established: 8x/4x/2xA/2xB/1xA/1xB/1xC/1xD/1xE/1xF/1xG/1xH | |
| | Flashing Green | Traffic is running in linked ports | |
| | Flashing Amber | N/A | |
| 1-8 | Off | Link is down | |
| | Solid Green | Link is up with no traffic | |
| | Flashing Green | Link is up with traffic | |
| | Flashing Amber | Problem with the link | Refer to Troubleshooting. |

# Inventory Information

The system's inventory parameters (such as serial number, part number and GUID address) can be extracted from the inventory pull-out tab on the lower left side of the rear panel.

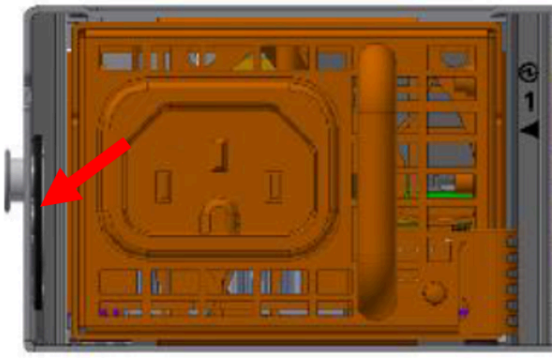
**Pull-out Tab**

**SN4600/SN4600C**




Switch-Eth SN4600 64 ports 100GbE
S/N: MTYYWWSZZZZZ
YYYY-MM-DD
P/N: MSN4600-CS2F
Rev: XX
Made in Israel
以色列制造

## SN4700




Switch-Eth SN4700 32 ports 400GbE
S/N: MTYYWWSZZZZZ
YYYY-MM-DD
P/N: MSN4700-WS2F
Rev: A5
Made in Israel
以色列制造

# Software Management

The system includes an embedded management CPU card that runs NVIDIA Onyx® (MLNX-OS®) management software. This system includes a CLI, WebUI, SNMP, system management software, Ethernet protocols, and IB management software (OpenSM).

- For NVIDIA Onyx (MLNX-OS) systems management package and related documentation, refer to the Onyx product page.
- For Cumulus Linux software management instructions, refer to the Cumulus Linux User Guide.

**Warning**

The Ethernet ports for remote management connect to Ethernet systems. These systems must be configured to 100Mb/1Gb auto-negotiation.

**Note**

NVIDIA recommends no more than two subnet managers for any single fabric.

## Software Upgrade

## NVIDIA Onyx (MLNX-OS) Software Upgrade

Software and firmware updates are available from the NVIDIA support website. Check that your current revision is the latest one available on the NVIDIA support website. If you do not have the latest revision, upgrade your software. Copy the updated software to a known location on a remote server within the user's LAN.

## Switch Firmware Update

The systems do not require firmware updating. Firmware updating is done through the NVIDIA Onyx (MLNX-OS) management software.

## Cumulus Linux Software Upgrade

For Cumulus Linux software upgrade instructions, see Upgrading Cumulus Linux.

# Troubleshooting

| Problem Indicator | Symptoms | Cause and Solution |
|---|---|---|
| LEDs | System Status LED is blinking for more than 5 minutes | Cause: NVIDIA Onyx (MLNX-OS) software did not boot properly and only firmware is running.<br>Solution: Connect to the system via the console port, and check the software status. You might need to contact an FAE if the NVIDIA Onyx (MLNX-OS) software did not load properly. |
| | System Status LED is Amber | Cause:<br>• Critical system fault (CPU error, bad firmware)<br>• Exceeds temperature threshold<br>Solution:<br>• Check environmental conditions (room temperature) |
| | Fan Status LED is Amber | Cause: Possible fan issue<br>Solution:<br>• Check that the fan is fully inserted and nothing is blocking the airflow<br>• Replace the fan FRU if needed |
| | PSU Status LED is Amber | Cause: Possible PSU issue<br>Solution:<br>• Check/replace the power cable<br>• Replace the PSU if needed |
| System boot failure while using NVIDIA Onyx (MLNX-OS) | Software upgrade failed on x86 based systems | Solution:<br>• Connect the RS232 connector (CONSOLE) to a laptop.<br>• Push the system's reset button. |

| Problem Indicator | Symptoms | Cause and Solution |
|---|---|---|
| | | • Press the ArrowUp or ArrowDown key during the system boot. The GRUB menu will appear. For example:<br><br>Default image: 'SX_X86_64 SX_3.4.0008 2014-11-10 20:07:51 x86_64'<br>Press enter to boot this image, or any other key for boot menu<br>Booting default image in 3 seconds.<br>Boot Menu<br>----------<br>0: SX_X86_64 SX_3.4.0008 2014-11-10 20:07:51 x86_64<br>1: SX_X86_64 SX_3.4.0007 2014-10-23 17:27:34 x86_64<br>----------<br>Use the ArrowUp and Arrowdown keys to select which entry is highlighted.<br>Press enter to boot the selected image or 'p' to enter a password to unlock the next set of features.<br>Highlighted entry is 0:<br>"<br><br>• Select previous image to boot by pressing an arrow key and choosing the appropriate image. |

| Problem Indicator | Symptoms | Cause and Solution |
|---|---|---|
| System boot failure while using Cumulus Linux | Software upgrade failed on x86 based systems | Refer to the Cumulus Linux user guide. |

# Specifications

## SN4600/SN4600C Specifications

| Feature | | Value |
|---|---|---|
| Mechanical | Size: | 3.46” x 16.85” x 22.3”<br>88mm (H) x 428mm (W) x 566.4mm (D) |
| | Mounting: | 19” rack mount |
| | Weight: | 14.64kg |
| | Speed: | SN4600: 1/10/25/50/100/200GbE per port<br>SN4600C: 1/10/25/40/50/100GbE per port |
| | Connector cage: | 64 QSFP28 |
| Environmental | Temperature: | Operational: 0° to 40°C<br>Non-Operational: -40° to 70°C |
| | Humidity: | Operational: 10%-85% non-condensing<br>Non-Operational: 10%-90% non-condensing |
| | Altitude: | 3050m |
| | Noise level: | 67.6dBA |
| Regulatory | Safety/EMC: | CB, cTUVus, CE, CU, S_Mark, FCC, VCCI, ICES, RCM, BSMI, KCC, CCC |
| | RoHS: | RoHS compliant |
| Power | Input voltage: | **SN4600:**<br>1x/2x, 15A/100 Vac, 15A/110Vac, 12A/120Vac, 10A/200-240Vac,50/60Hz<br>**SN4600C:**<br>1x/2x, 10A/100-127Vac, 50/60Hz, 6A/200-240Vac,50/60Hz |
| | Global power consumption: | SN4600:<br>Typical power with passive cables (ATIS): 600W<br>SN4600C:<br>Typical power with passive cables (ATIS): 466W |
| Main Devices | CPU: | Intel x86 2.20GHz Quad Core |

| Feature | | Value |
|---|---|---|
| | PCIe: | 4x Gen 3.0 |
| | Switch: | NVIDIA Spectrum-3 |
| | Memory: | SN4600: 16GB RAM, 60GB SSD<br>SN4600C: 8GB RAM, 30GB SSD |
| Throughput | | SN4600: 12.8 Tb/s<br>SN4600C: 6.4 Tb/s |

## SN4700 Specifications

| Feature | | Value |
|---|---|---|
| Mechanical | Size: | 1.72'' x 16.85'' x 22.3''<br>44mm (H) x 428mm (W) x 568.5mm (D) |
| | Mounting: | 19" rack mount |
| | Weight: | 11.6kg |
| | Speed: | 1/10/25/40/50/100/200/400GbE per port |
| | Connector cage: | 32 QSFP-DD |
| Environmental | Temperature: | Operational: 0° to 35°C<br>Non-Operational: -40° to 70°C |
| | Humidity: | Operational: 10%-85% non-condensing<br>Non-Operational: 10%-90% non-condensing |
| | Altitude: | 3050m |
| Regulatory | Safety/EMC: | CB, cTUVus, CE, CU, S_Mark, FCC, VCCI, ICES, RCM, BSMI, KCC, CCC |
| | RoHS: | RoHS compliant |
| Power | Input voltage: | 1x/2x, 100Vac 15A, 110Vac 15A, 120Vac 12A, 200-240Vac 10A,<br>50/60Hz<br>**Note:** Two power cords are provided for each power supply unit in order to meet the electrical requirements of various regions. Make sure to use the cord that meets the power requirements of your country or region. |
| | Global power | Typical power with passive cables (ATIS): 630W |

| Feature | | Value |
|---|---|---|
| | consumption: | |
| Main Devices | CPU: | Intel x86 2.20GHz Quad Core |
| | PCIe: | 4x Gen 3.0 |
| | Switch: | NVIDIA Spectrum-3 |
| | Memory: | 16GB RAM , 60GB SSD |
| Throughput | | 12.8 Tbps |

# Appendixes

This document contains the following appendixes:



# Accessory and Replacement Parts

**Ordering Part Numbers for Replacement Parts**

| Part Type | Part Number | Legacy Part Number | Description | Supported Systems |
|---|---|---|---|---|
| **Rack Installation Kits** | 930-9NRKT-00JN-000 | MTEF-KIT-J | Static rack installation kit for 1U/2U systems into 4 poles, 430-800mm depth racks | SN4600/SN4600C, SN4700 |
| **Fan Modules** | 930-9NFAN-00IT-000 | MTEF-FANF-I | NVIDIA fan module, 80 x 80 [mm], P2C airflow | SN4600 |
| | 930-9NFAN-00J7-000 | MTEF-FANR-I | NVIDIA fan module, 80 x 80 [mm], C2P airflow | SN4600 |
| | 930-9BFAN-00IX-000 | MTEF-FANF-M | NVIDIA fan module, 40 x 40 [mm], P2C airflow | SN4700 |
| | 930-9BFAN-00JB-000 | MTEF-FANR-M | NVIDIA fan module, 40 x 40 [mm], C2P airflow | SN4700 |
| | 930-9NFAN-00IS-000 | MTEF-FANF-G | 2U Systems fan module P2C airflow with shutters | SN4600C |

| Part Type | Part Number | Legacy Part Number | Description | Supported Systems |
|---|---|---|---|---|
| | 930-9NFAN-00J6-000 | MTEF-FANR-G | 2U Systems fan module C2P airflow with shutters | SN4600C |
| **Power Supplies** | 930-9BPSU-00JZ-000 | MTEF-PSF-AC-C | 200G 1U systems 1100W AC power supply with P2C airflow | SN4600C |
| | 930-9BPSU-00JG-000 | MTEF-PSR-AC-C | 200G 1U systems 1100W AC power supply with C2P airflow | SN4600C |
| | 930-9NPSU-00J2-000 | MTEF-PSF-AC-F | 1500W AC power supply, P2C airflow | SN4600, SN4700 |
| | 930-9NPSU-00JJ-000 | MTEF-PSR-AC-F | 1500W AC power supply, C2P airflow | SN4600, SN4700 |
| **Cables and Harnesses** | HAR000631 | N/A | RS232 cable, DB9 to RJ45 2M harness 2M for SX67X0 and SB78X0 | SN4600/SN4600C, SN4700 |
| | ACC001449 | N/A | Power cord gray 250V 10A 1830MM C14 to C15 EUR + CCC | SN4600/SN4600C, SN4700 |
| | ACC001550 | N/A | Power cord black 110V 15A 1830MM C14 to C15 UL | SN4600/SN4600C, SN4700 |

# Thermal Threshold Definitions

Three thermal threshold definitions are measured by the Spectrum®-3 ASICs, and impact the overall switch system operation state as follows:

- **Warning** 105°C: On managed systems only: When the ASIC device crosses the 100°C threshold, a warning threshold message will be issued by the management software, indicating to system administration that the ASIC has crossed the warning threshold. Note that this temperature threshold does not require nor lead to any action by the hardware (such as switch shutdown).

- **Critical** 120°C: When the ASIC device crosses this temperature, the switch firmware will automatically shut down the device.

- **Emergency** 130°C: In case the firmware fails to shut down the ASIC device upon crossing its critical threshold, the device will auto-shutdown upon crossing the emergency (130°C) threshold.

For thermal threshold definitions in Cumulus Linux, see Configuring Configuring SNMP Traps Traps in the Cumulus User Guide.

# Interface Specifications

## Small Form Factors Specifications

NVIDIA switch systems come in a flexible range of form factors: SFP/QSFP, SFP28/QSFP28, SFP56/QSFP56 and SFP-DD/QSFP-DD.

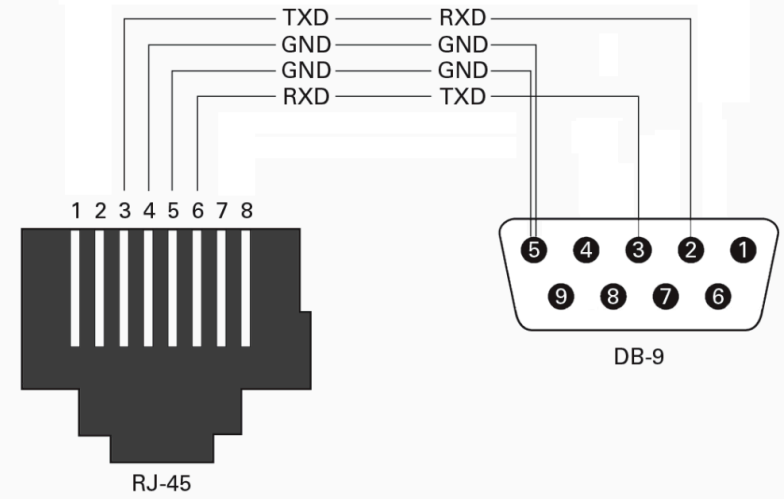
All form factors specification documents are available on the Storage Networking Industry Association (SNIA) Website.

## USB Standard Specifications

For the specification documents of all available USB types, refer to the document library in the USB Organization Website.

## RJ45 to DB9 Harness Pinout

NVIDIA supplies an RS232 harness cable (DB9 to RJ45) to connect a host PC to the system's console RJ45 port.




# Disassembly and Disposal

## Disassembly Procedure

To disassemble the system from the rack:

1. Unplug and remove all connectors.
2. Unplug all power cords.
3. Remove the ground wire.
4. Unscrew the center bolts from the side of the system with the bracket.

> ⚠ **Warning**
>
> Support the weight of the system when you remove the screws so that the system does not fall.

5. Slide the system from the rack.
6. Remove the rail slides from the rack.
7. Remove the caged nuts.

# Disposal

According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste. Dispose of this product and all of its parts in a responsible and environmentally friendly way.

# Lithium Battery

The product's real-time clock includes a Lithium coin battery (CR2032) that contains perchlorate. When replacing the battery, use only a replacement battery that is recommended by the equipment manufacturer.

> ⚠ **Warning**
>
> The battery can explode if not properly used, replaced, or disposed of. Dispose of the battery according to your local regulations. Do not attempt to recharge the battery, disassemble, puncture, or otherwise damage it.

# Document Revision History

| Date | Revision | Description |
|---|---|---|
| December 5, 2024 | 2.2 | Updated obsolete cross-references |
| November 17, 2024 | 2.1 | Updated links to interconnect products in Cable Installation section |
| September 17, 2024 | 2.0 | Resolved broken links in LED Notifications section |
| May 30, 2024 | 1.9 | Fixed formatting on Specifications page. |
| July 24, 2022 | | Updated OPNs in sections:<br>• Ordering Information<br>• Installation<br>• Accessory and Replacement Parts<br><br>Updated Interface Specifications |
| February 3, 2022 | 1.8 | Updated Interfaces section |
| December 16, 2021 | 1.7 | Updated LED Notifications section |
| November 1, 2021 | 1.6 | Added SN4410 |
| August 10, 2021 | 1.5 | Updated:<br>• SN4700 temperature in Specifications section |
| February 15, 2021 | 1.4 | Updated:<br>• High Power/LR4 Transceivers Support in Interfaces section<br>• Speeds in Specifications section |

| Date | Revision | Description |
|---|---|---|
| January 11, 2021 | 1.3 | Added:<br>• A note in Specifications section regarding the operational temperature of the SN4700 systems |
| October 25, 2020 | 1.2 | Updated:<br>• High Power/LR4 Transceivers Support in Interfaces<br>• Global Power Consumption in Specifications section |
| October 8, 2020 | 1.1 | Updated Accessory and Replacement Parts section |
| June 24, 2020 | 1.0 | Initial release |

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