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

Table of contents

Relevant models: SN4600/SN4600C, SN4700 and SN4700D

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)

SN4700D Part Numbers

NVIDIA SKU	Legacy OPN	Description
920-9N301-00RB-NC0	MSN4700-WSARC	Spectrum-3 based 400GbE 1U Open Ethernet Switch, 32 QSFPDD ports, 48VDC Busbar, x86 CPU, standard depth, C2P airflow, Rail Kit, with Cumulus

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 SN4000 series switches are the 4th generation of NVIDIA Spectrum® switches, purpose-built for leaf/spine/super-spine datacenter applications. Allowing maximum flexibility, SN4000 series provides port speeds spanning from 1GbE to 400GbE, and a port density that enables full rack connectivity to any server at any speed. In addition, the uplink ports allow a variety of blocking ratios to suit any application requirement. The SN4000 series is ideal for building wire-speed and cloud-scale layer-2 and layer-3 networks. The SN4000 platforms deliver high performance, consistent low latency along with support for advanced software defined networking features, making it the ideal choice for web scale IT, cloud, hyperconverged storage and data analytics applications.

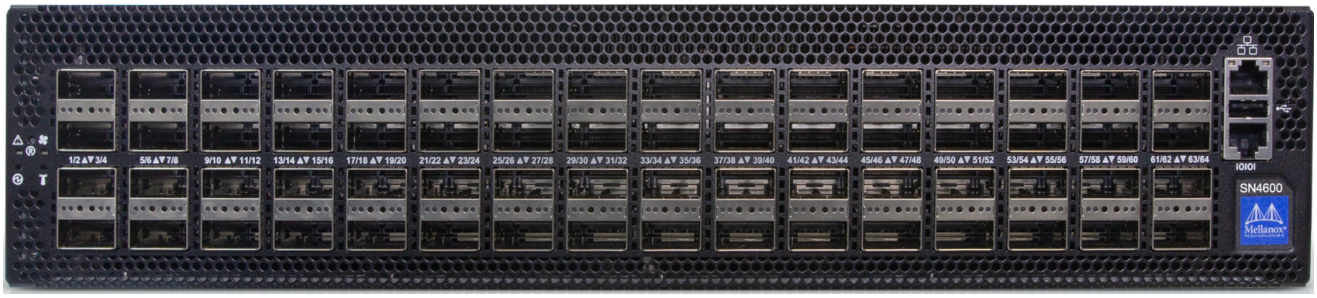
Open Ethernet breaks the paradigm of traditional switch systems, eliminating vendor lock-in. Instead of forcing network operators to use the specific software that is provided by the switch vendor, Open Ethernet offers the flexibility to use a choice of operating systems on top of Ethernet switches, thereby re-gaining control of the network, and optimizing utilization, efficiency and overall return on investment. Open Ethernet adopts the same principles as standard open solutions for servers and storage, and applies them to the world of networking infrastructure. It encourages an ecosystem of open source, standard network solutions. These solutions can then be easily deployed into the modern data center across network equipment that eases management and ensures full interoperability. With a range of system form factors, and a rich software ecosystem, SN4000 series allows you to pick and choose the right components for your data center.

NVIDIA SN4000 series platforms are based on the high-performance NVIDIA Spectrum-3 ASIC with a switching capacity of 12.8 Tb/s. SN4000 platforms are available in a range of configurations, each delivering high performance combined with feature-rich layer 2 and layer 3 forwarding, ideally suited for both top-of-rack leaf and fixed configuration spines. The NVIDIA SN4000 series provides full wire speed, cut through-mode latency, on-chip fully-shared 64MB packet buffering, and flexible port use in addition to advanced capabilities. Combining a wide range of innovations in the area of programmability, telemetry, and tunneling with industry leading performance, NVIDIA SN4000 series is capable of addressing today's data center's complex networking requirements.

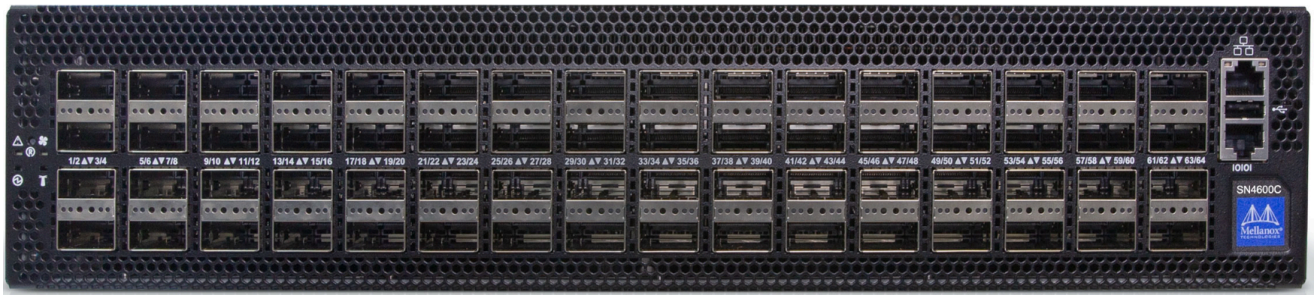
For a full list of all available ordering options, see Ordering Information.

Front View

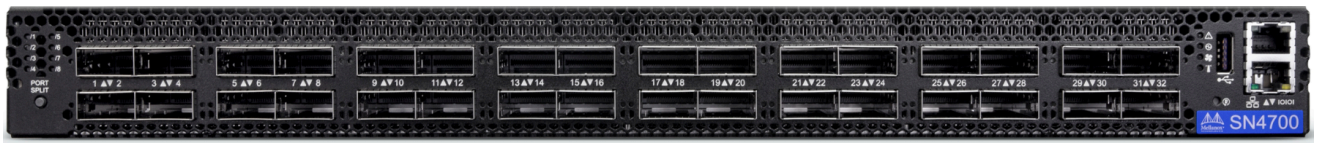
SN4600 Front View



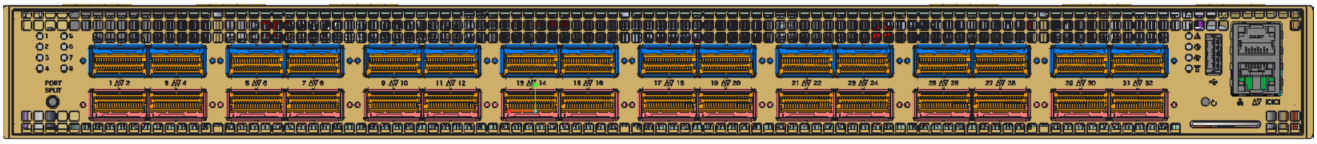
SN4600C Front View



SN4700 Front View

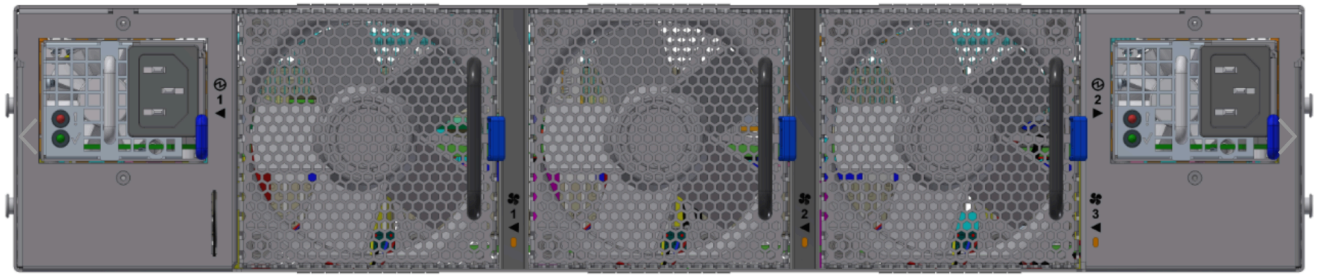


SN4700D Front View

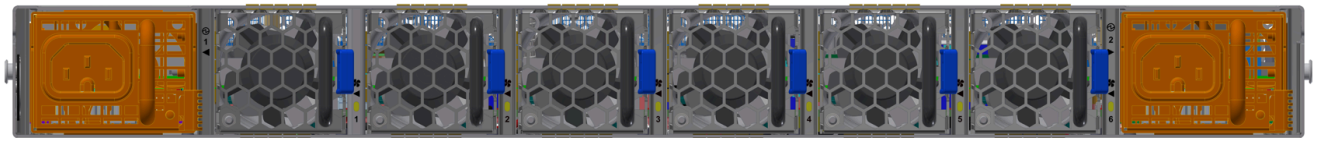


Rear View

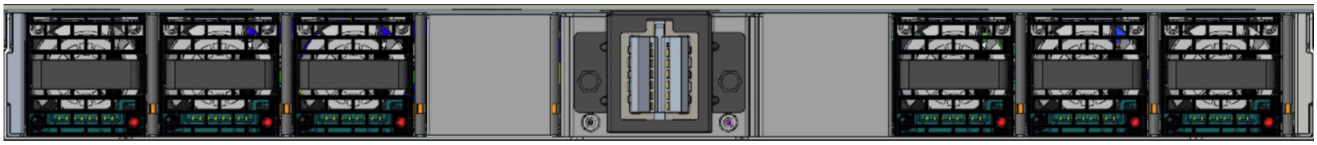
SN4600/SN4600C Rear View



SN4700 Rear View



SN4700D 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 128 x 1/10/25/50/100GbE	25.6Tb/s
SN4600C	64 x QSF28	64 x 40/100GbE 128 x 1/10/25/50/100GbE	12.8Tb/s
SN4700/SN4700D	32 x QSFP-DD	32 x 400GbE 64 x 40/200GbE 128 x 1/10/25/50/100GbE	25.6Tb/s

*The systems 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
SN4700D	Front	Front	Front	No, powered by a DC busbar	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

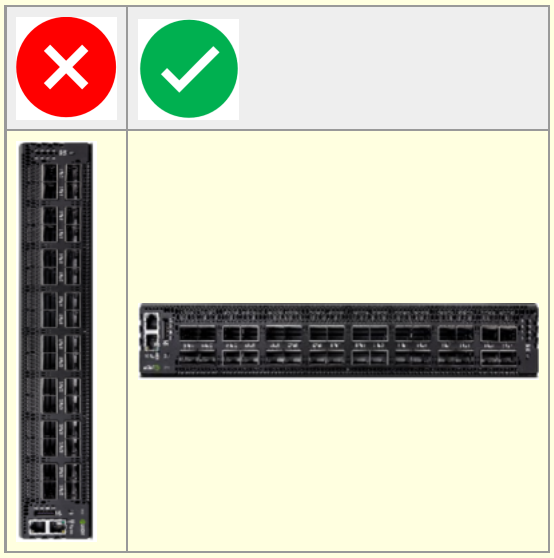
Installation and initialization of the system require attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

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

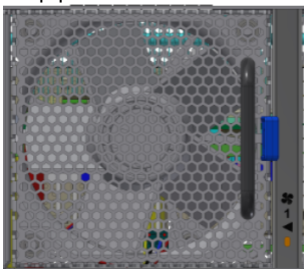
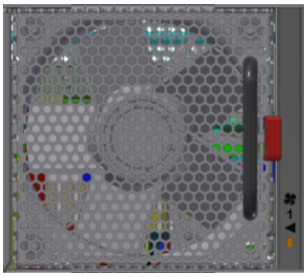
Prior to installation, review the Safety Warnings.

Air Flow

The SN4000 systems are offered in the two airflow patterns detailed below; availability varies by model and may include one or both options. Please refer to the specific product description for details.

Note

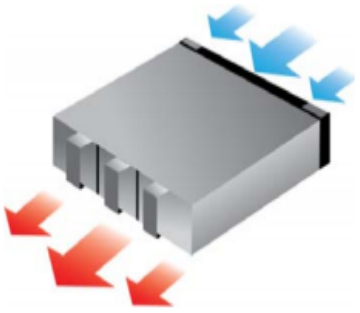
The following images are provided for illustration purposes only. Designs may vary.

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

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. 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. 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

The SN4700D package includes:

- 1x System

- 1x Rail kit
- 1x Harness: HAR000631 – Harness RS232 2M cable (DB9 to RJ-45)

Note

If the product is supplied with dust caps, do not remove them until installation is required. Keep dust caps installed on all unused ports to prevent foreign object contamination of the cage and to avoid thermal air-pressure leakage.

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
SN4700D	SN4700D Fixed Rail Kit

FRU Replacements

Power Supplies

Note

This section does not apply to the SN4700D systems, which are powered by a DC busbar.

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

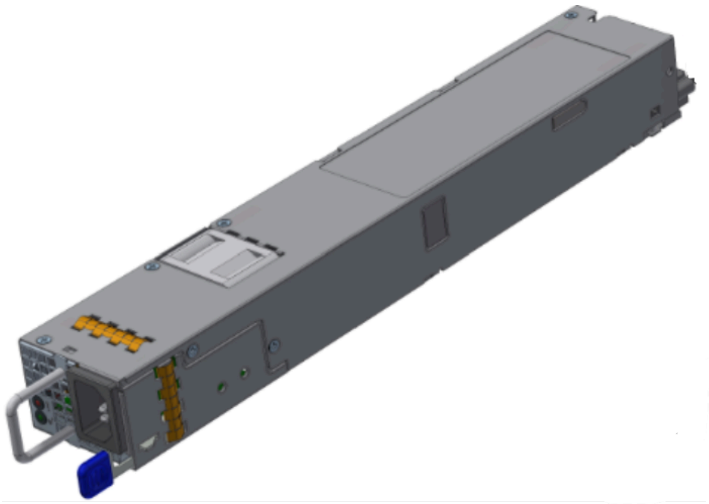


*Illustration only. The design may vary in different systems.

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.

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

Parameter	Setting
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 Do you want to use the wizard for initial configuration? yes	You must perform this configuration the first time you operate the system or after 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). 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. 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.

Wizard Session Display	Comments
Step 6: Admin password (Press <Enter> to leave unchanged)? <new_password> 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: <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. 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*.

Initial Power On

SN4600/SN4700 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.

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:

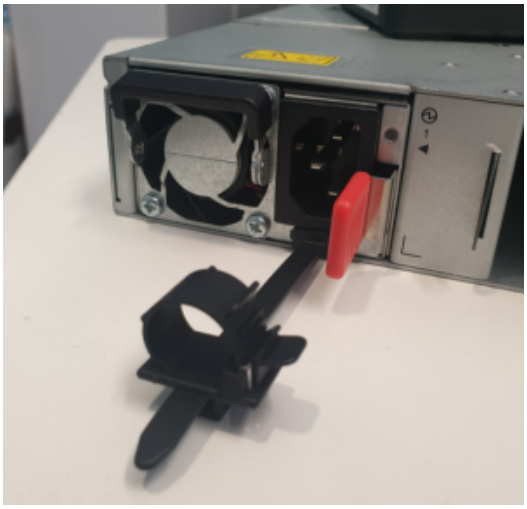
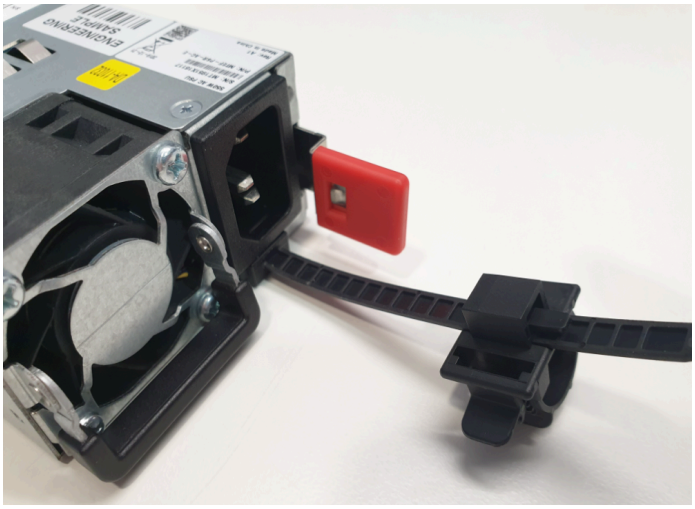
1. Verify the integrity of the retainer assembly, as demonstrated in the below table:- The snaps' push-pins must have visible edges with no broken or torn parts.

   - 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.

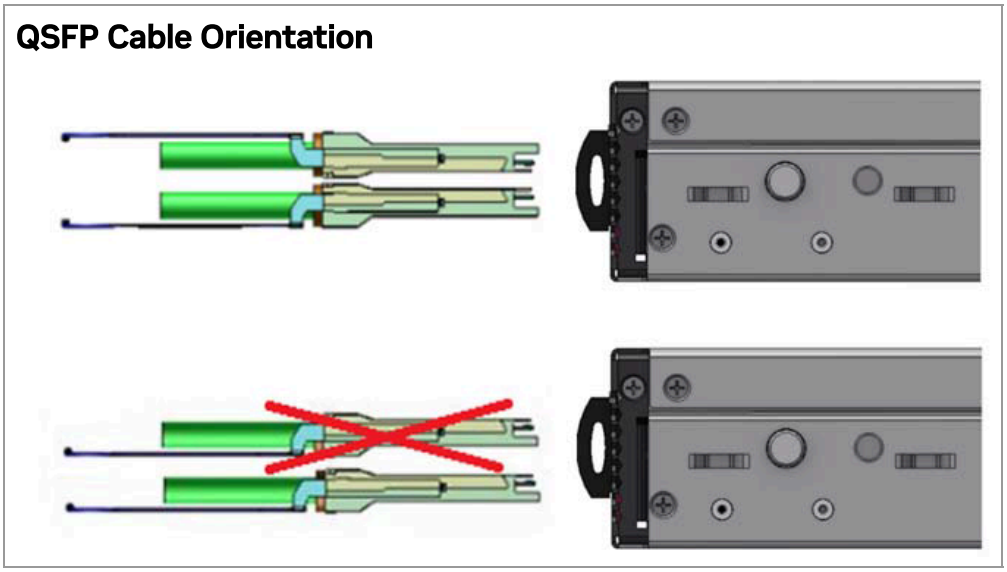
For a list of Supported Cables and Transceivers, please see the interconnect product specifications page.

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/SN4700D (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.

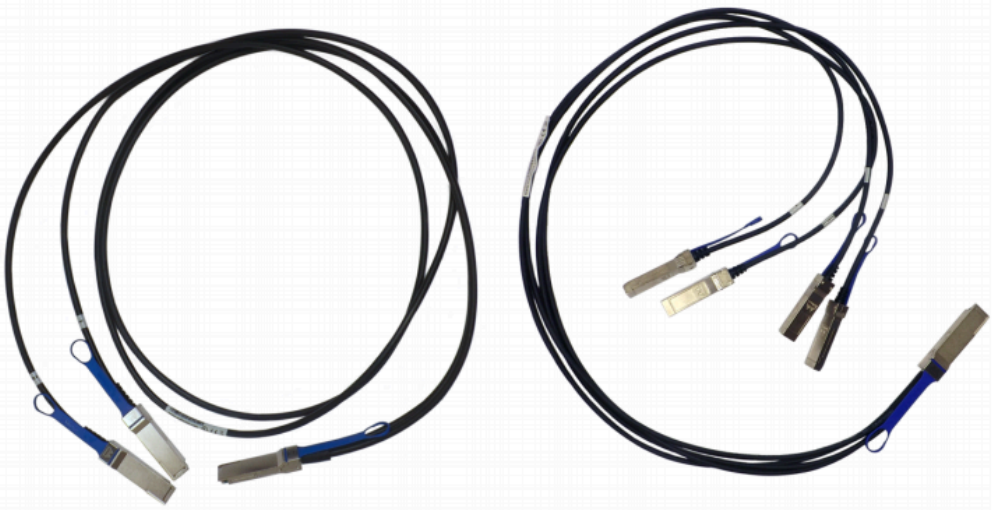
Using Splitter (Breakout) Cables with NVIDIA Onyx (MLNX-OS)

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.

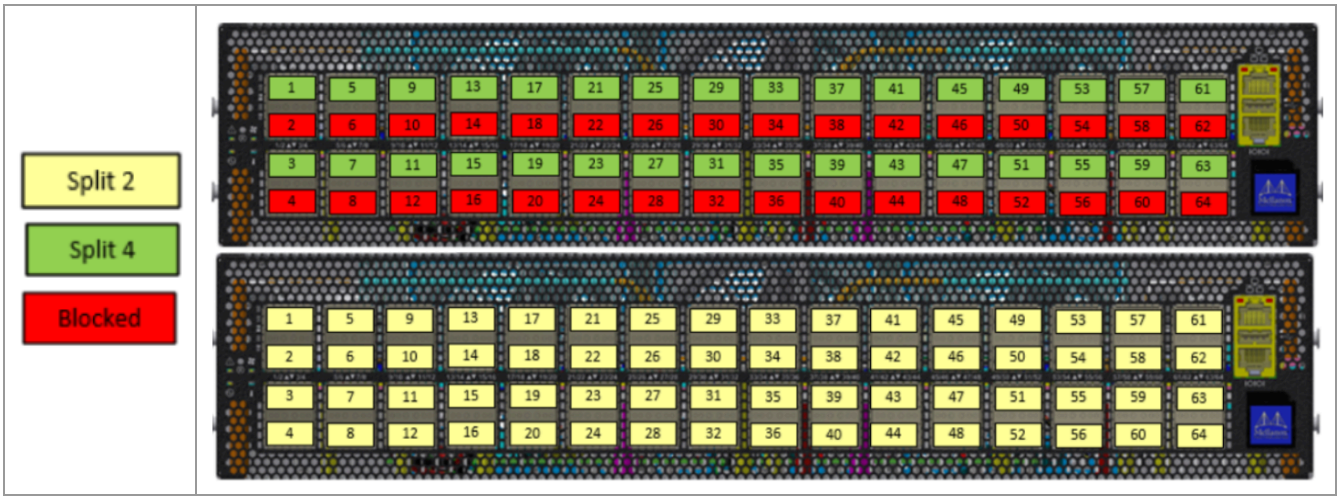
Using Splitter (Breakout) Cables with Cumulus Linux

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/SN4700D Splitting Options

SN4700D Rail Kit

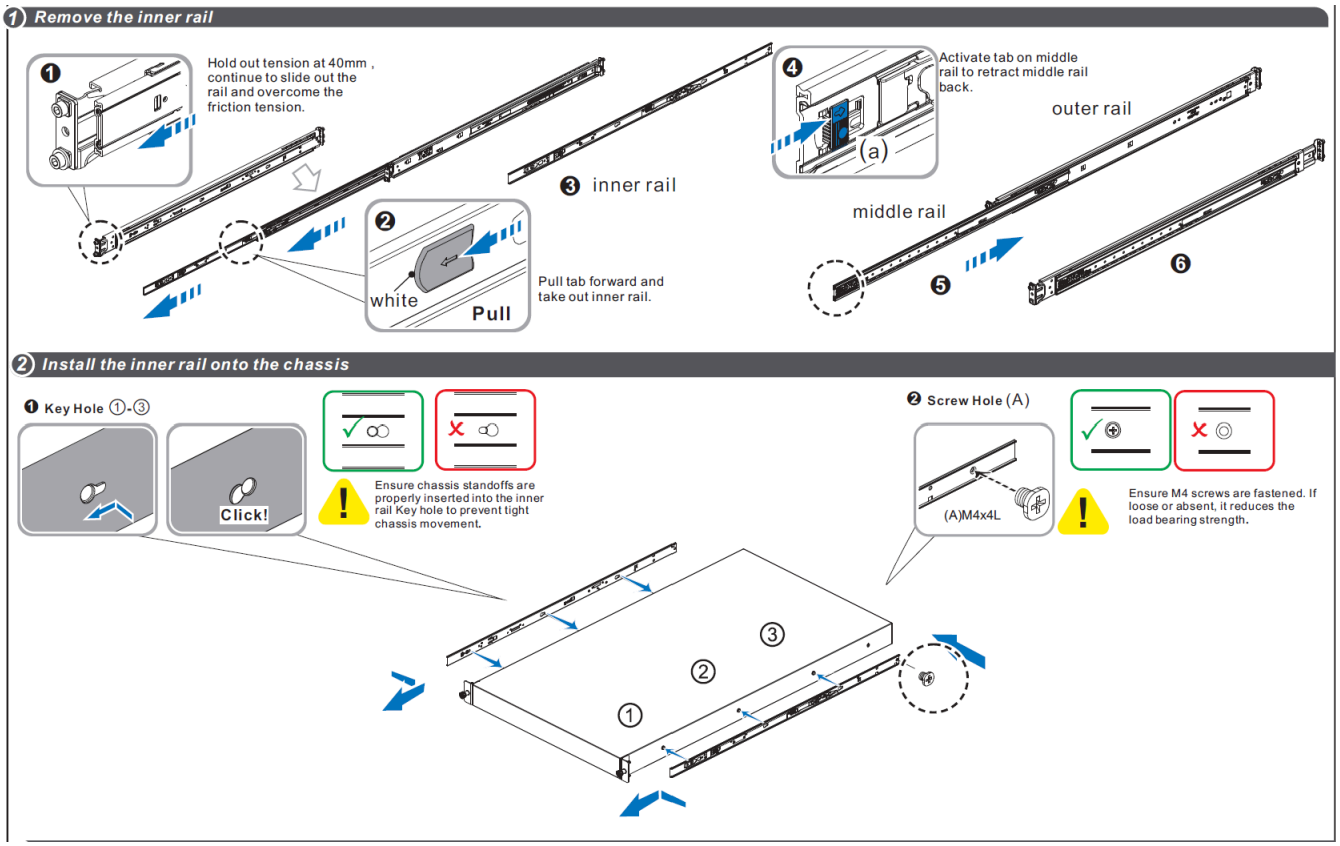
Kit Part Number	Description
ACC-KIT001265	Installation kit for standard\short depth 2U switches (19" DGX mountable)

The following instructions have been prepared and provided with permission from King Slide.

Package Contents

SCREW PACK							
Name	Image	Quantity	Torque(kgf.cm)	Name	Image	Quantity	Torque(kgf.cm)
(A)M4x4L(P0.7)		2	15~20	(C)SPACER		2	
(B)SHC-M5x10.0L-P0.8		2	20~25	(D)TORX-M5x10.0L-P0.8		2	20~25

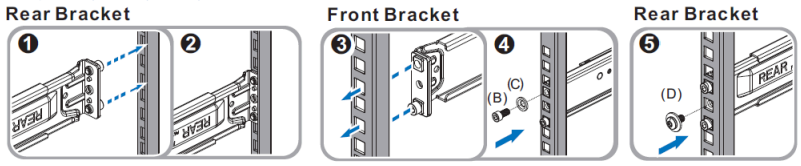
Installation Instructions



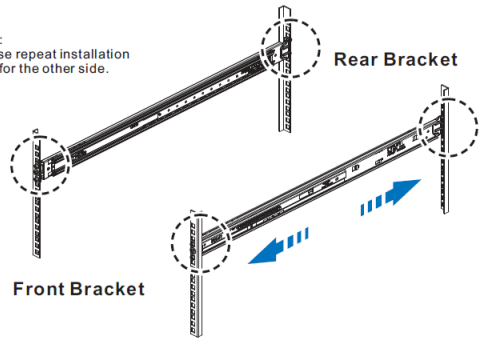
❸ Fix the outer rail/bracket assembly to the frame

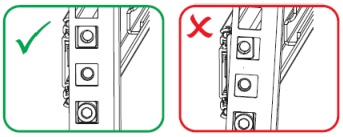
Front and rear brackets must be securely fastened onto the rack post before proceeding with chassis installation. Failure to do so risks rail detachment from rack post and subsequent chassis fall-off.

❶➡❷➡❸➡❹➡❺



Note:
Please repeat installation step for the other side.



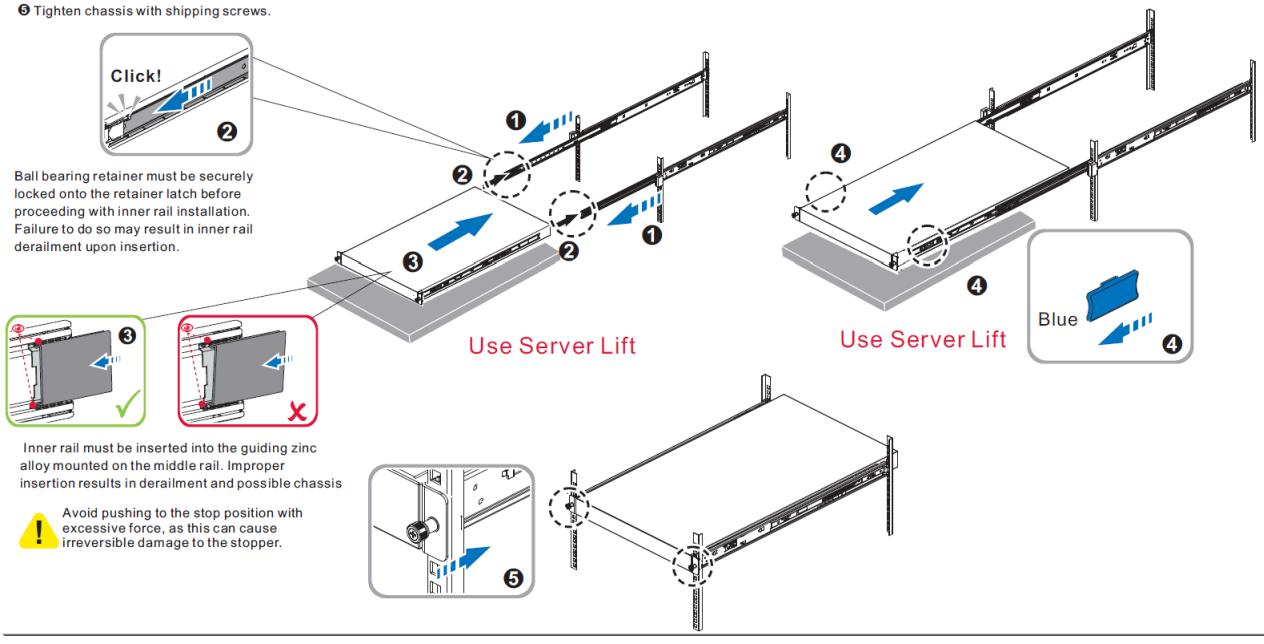


Ensure the square guiding zinc alloys are securely inserted into the column holes before fastening the screw. Misaligned rail leads to tight chassis movement and reduced load bearing strength.

❹ Insert the chassis to complete the installation

❶❷ Pull the middle rail fully extended in lock position, ensure ball bearing retainer is located at the front of the middle rail.
❸ Insert the chassis into middle-outer rails.
❹ When hit a stop, please pull/push the blue release tab on the inner rails.
❺ Tighten chassis with shipping screws.

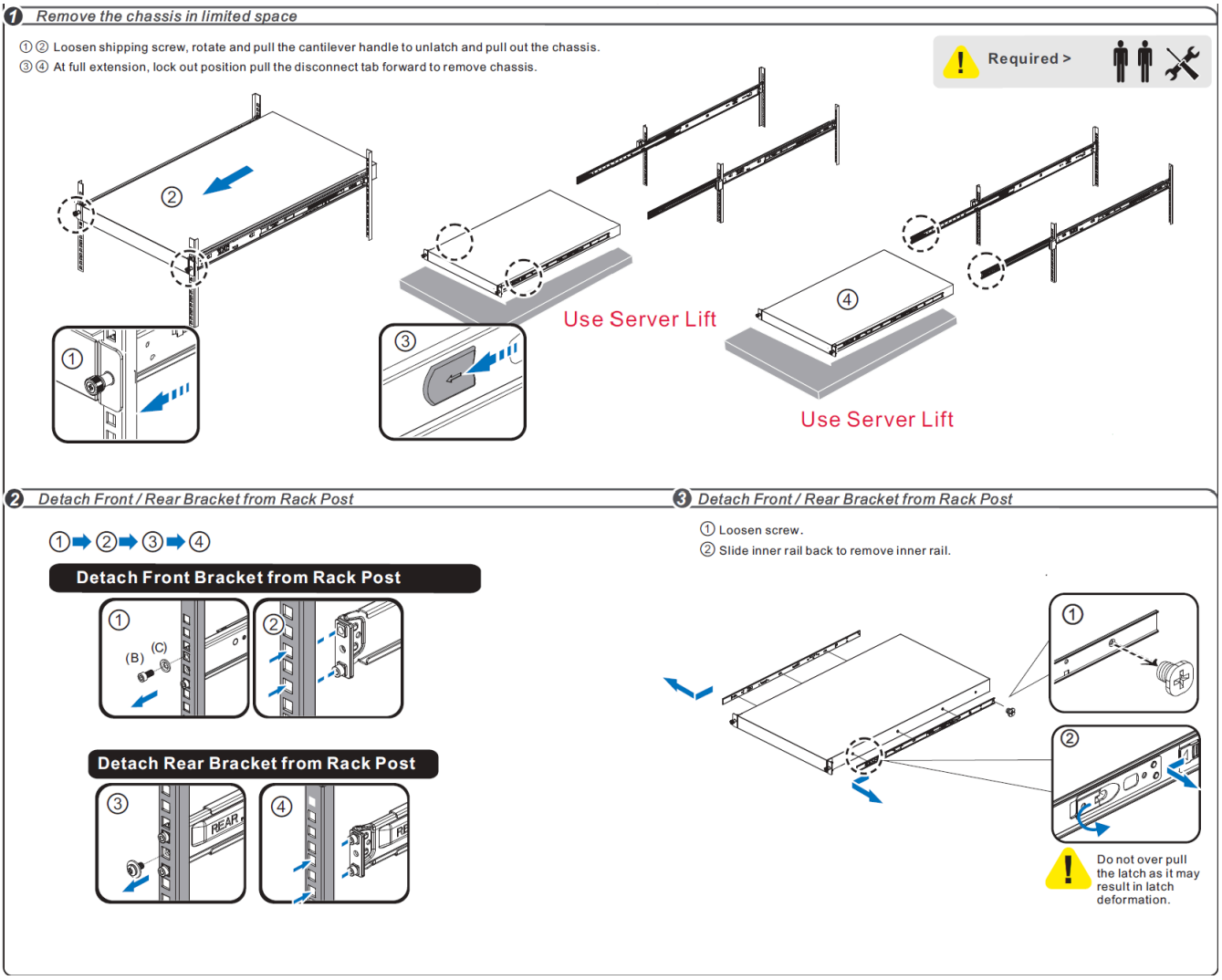
Required >



Ball bearing retainer must be securely locked onto the retainer latch before proceeding with inner rail installation. Failure to do so may result in inner rail derailment upon insertion.

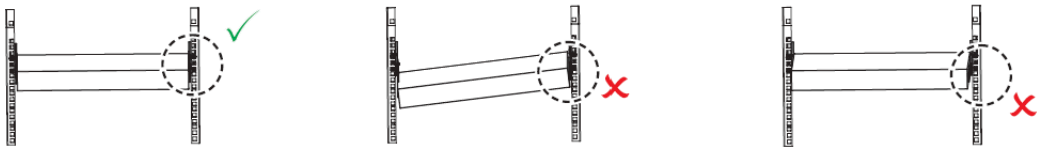
Inner rail must be inserted into the guiding zinc alloy mounted on the middle rail. Improper insertion results in derailment and possible chassis

Avoid pushing to the stop position with excessive force, as this can cause irreversible damage to the stopper.



Troubleshooting

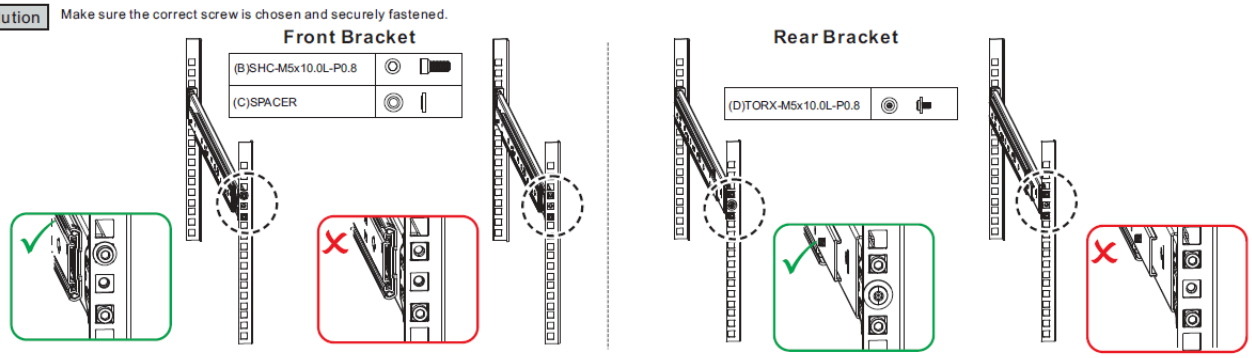
Failure Mode : Chassis falling-off or tilting after installation



***Possible causes and solutions*:**

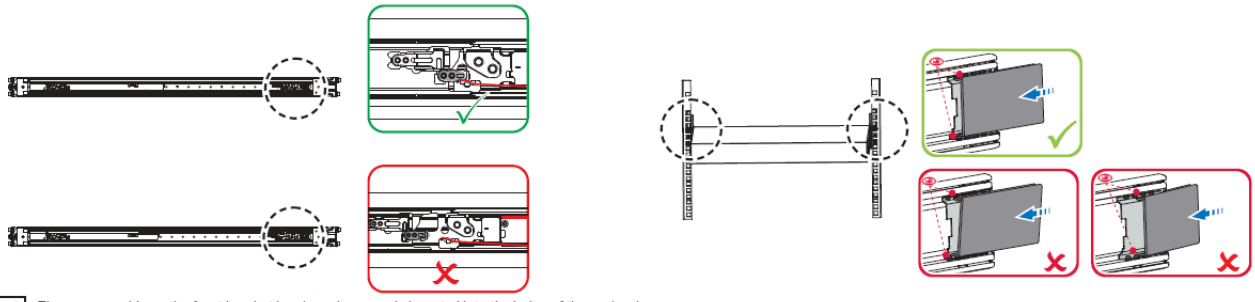
Cause1 Operator installed without fastening screw on to the front and rear bracket, or screw loosely fastened leading to screws detaching.

Solution Make sure the correct screw is chosen and securely fastened.



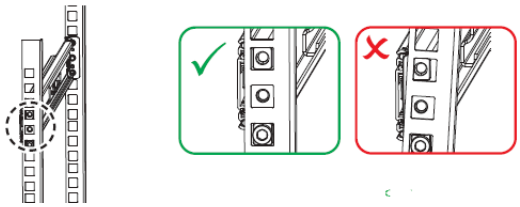
Cause2 Inner rail derailed from the middle rail during installation, and is likely due to the ball bearing retainer not being locked by the retainer latch during inner rail installation, or the inner rail not being inserted properly into the guiding zinc alloy mounted on the middle rail.

Solution Ensure that the ball bearing retainer is securely locked onto the retainer latch before proceeding with chassis/inner rail installation. Additionally, verify that the inner rail is properly slotted into the guiding zinc alloy during installation.



Cause3 The square guide on the front bracket has been improperly inserted into the holes of the rack column.

Solution Ensure the square guiding block on the front bracket is securely inserted into the column holes before fastening the screw.

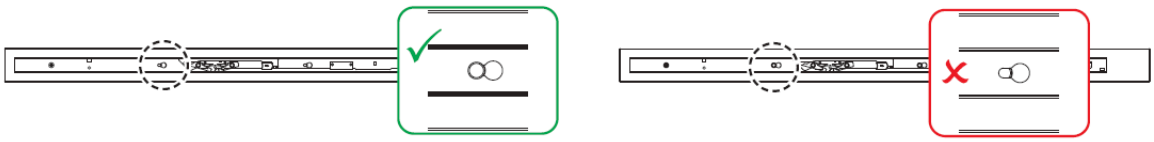


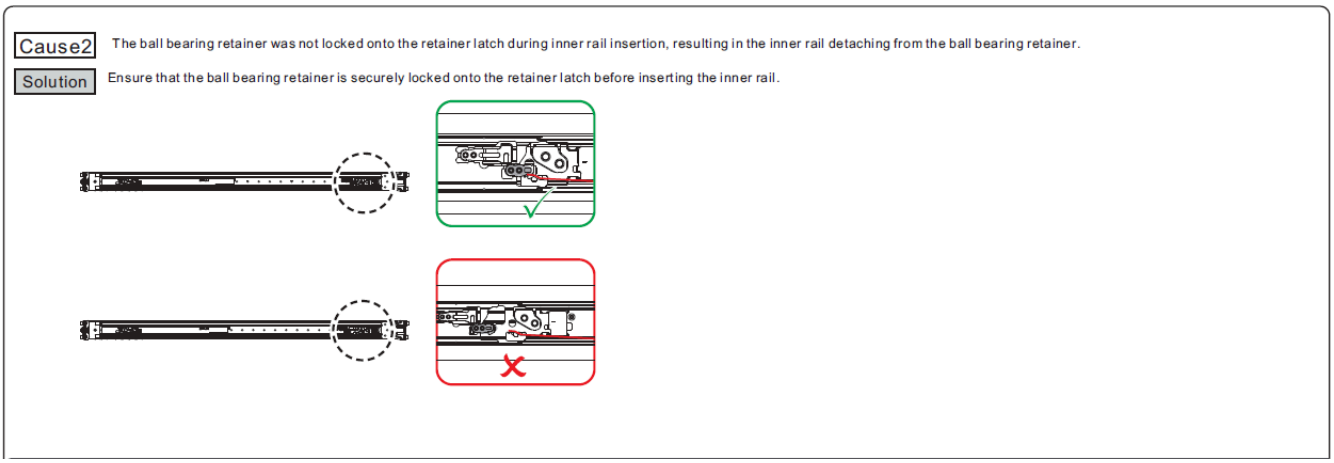
Failure Mode : Tight Chassis movement

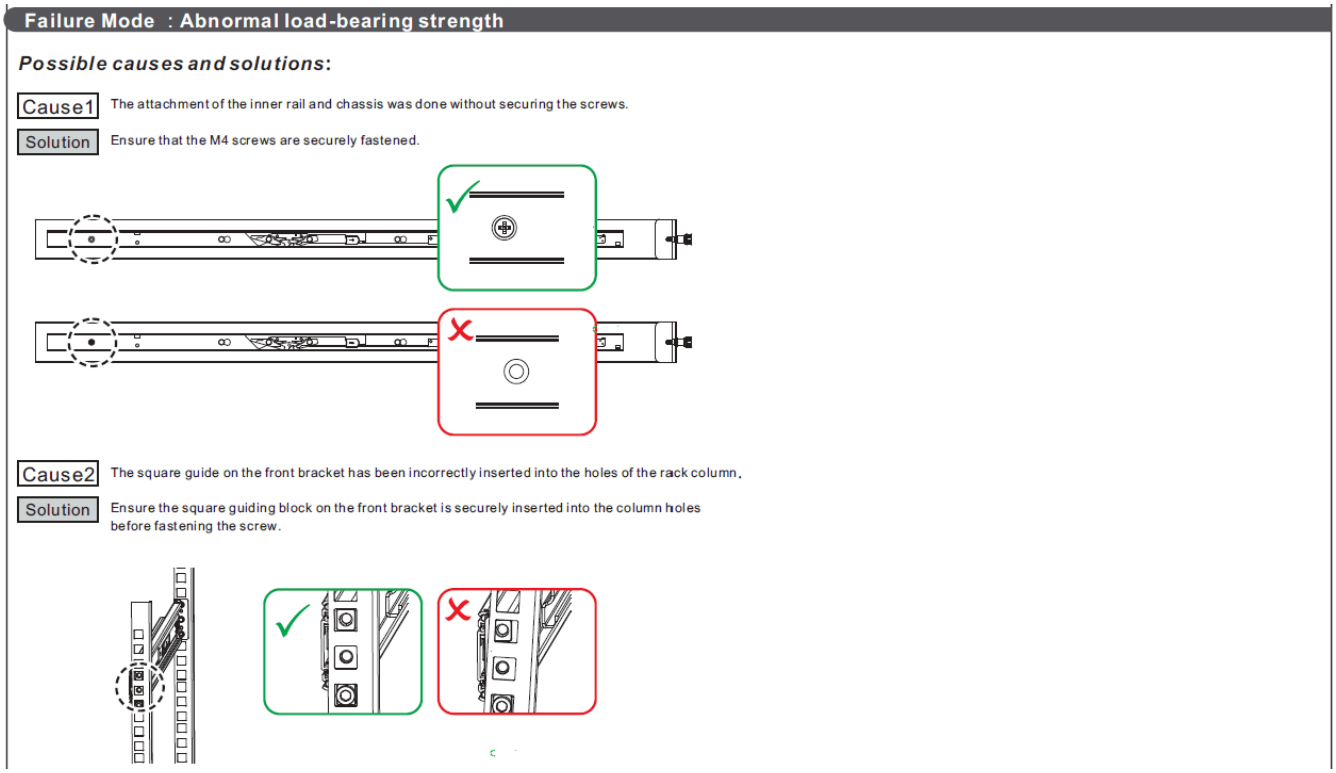
***Possible causes and solutions*:**

Cause1 Chassis standoffs were incorrectly slotted into the key holes, resulted in a distorted rail profile.

Solution Ensure that all standoffs are properly inserted into their respective keyholes.







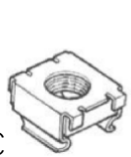
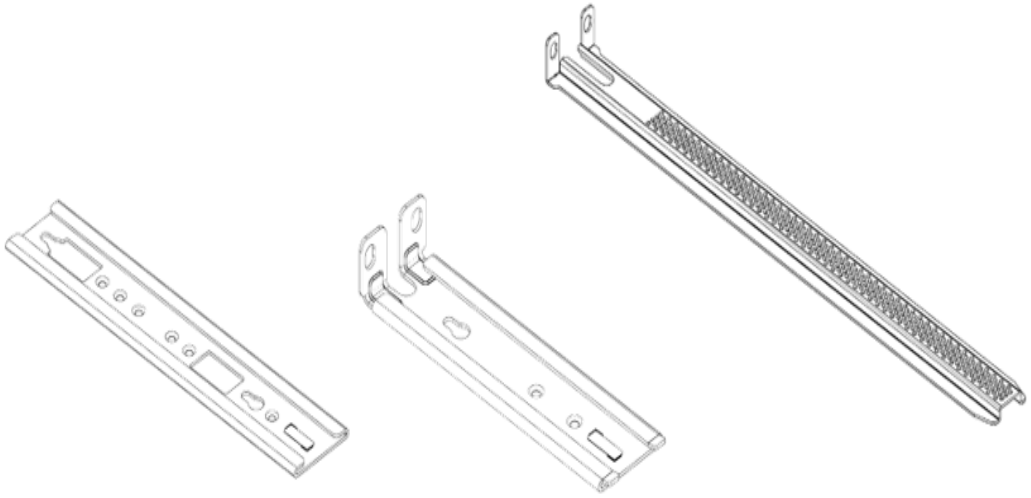
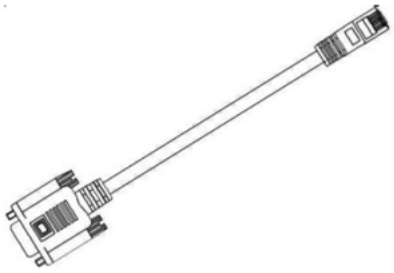
SN4700 Fixed Rail Kit

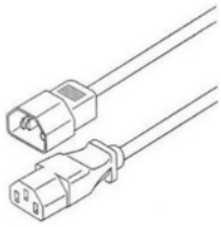
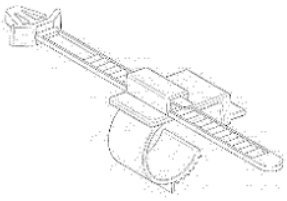
Kit OPN	Legacy OPN	Rack Size and Rack Depth Range
930-9NRKT-00JN-000	MTEF-KIT-J	430-800 mm

Package Contents (System and Rail-Kit)

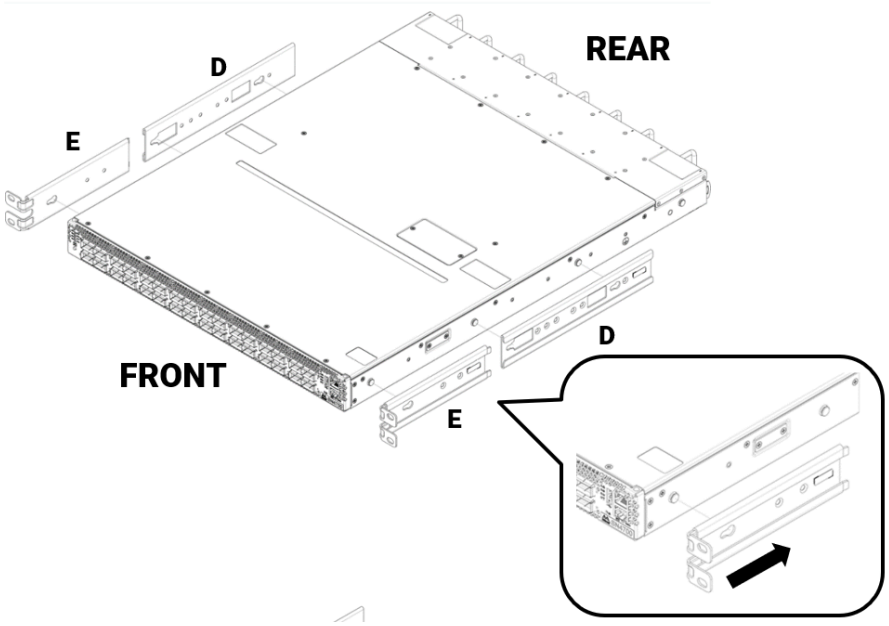
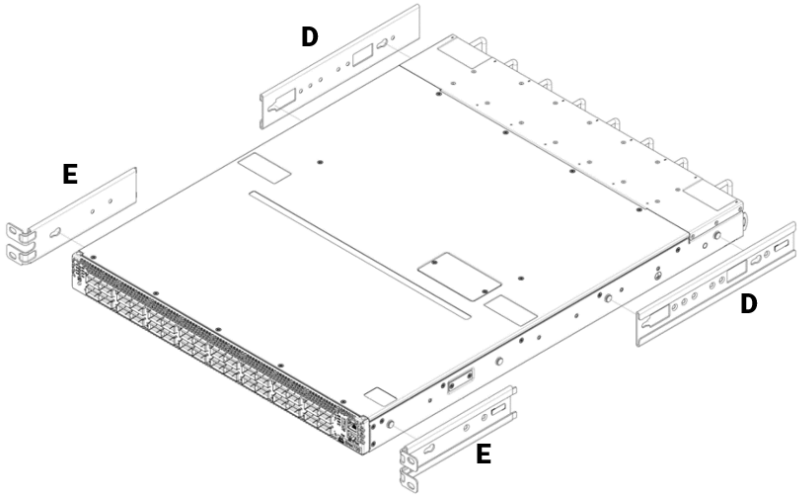
- 1x System

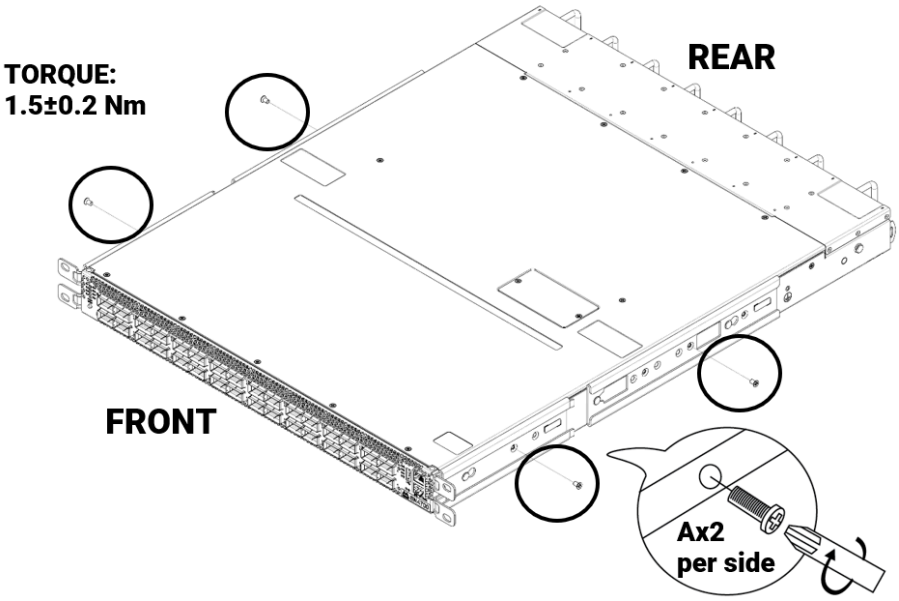
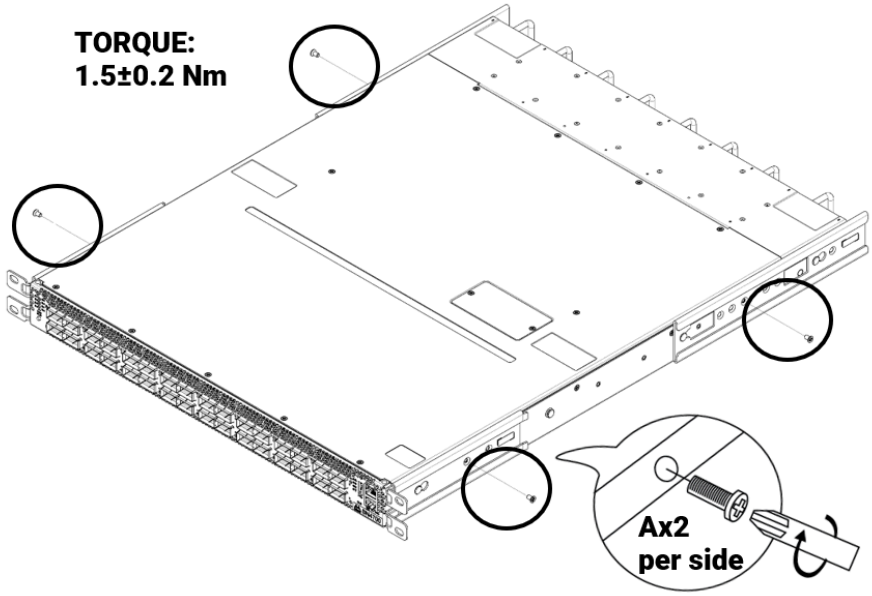
- 1x Fixed rail kit for 16.9-31.5" (430-800mm) racks
- 4x Power cables*:
- 2x 250V 10A 1830MM C14 TO C15 power cable
- 2x 110V 15A 1830MM C14 TO C15 UL power cable
- 1x Harness: HAR000631 – Harness RS232 2M cable – DB9 to RJ-45
- 2x Cable retainers

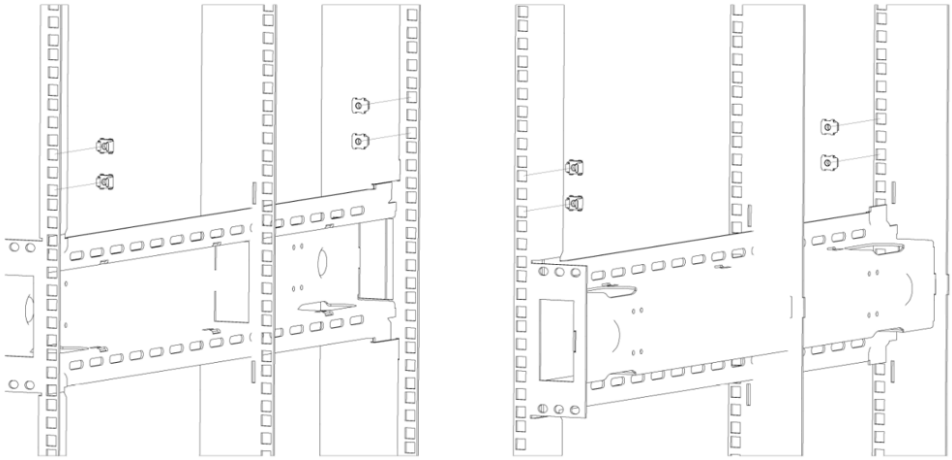
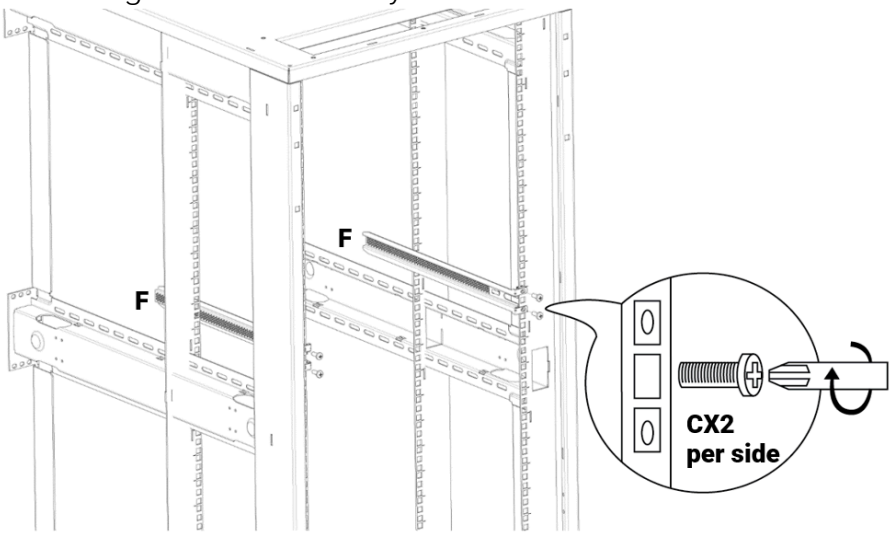
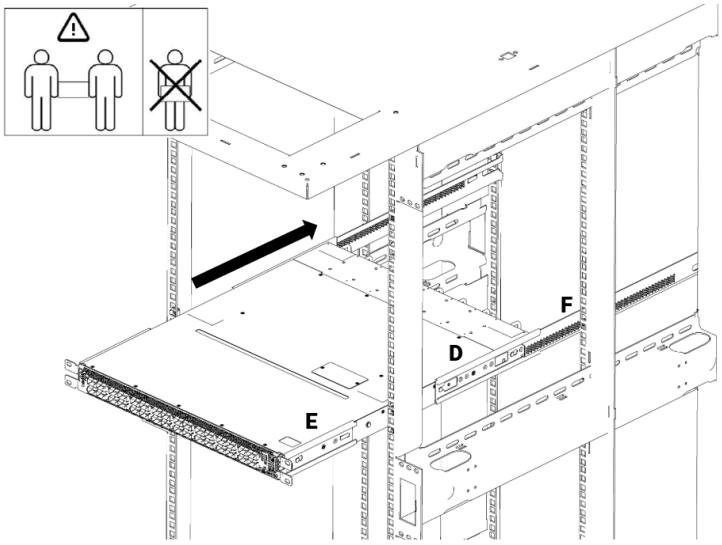
Quantity	Item
4×	 A
8× (of each)	 B,C
2× (of each)	 D,E,F
1×	

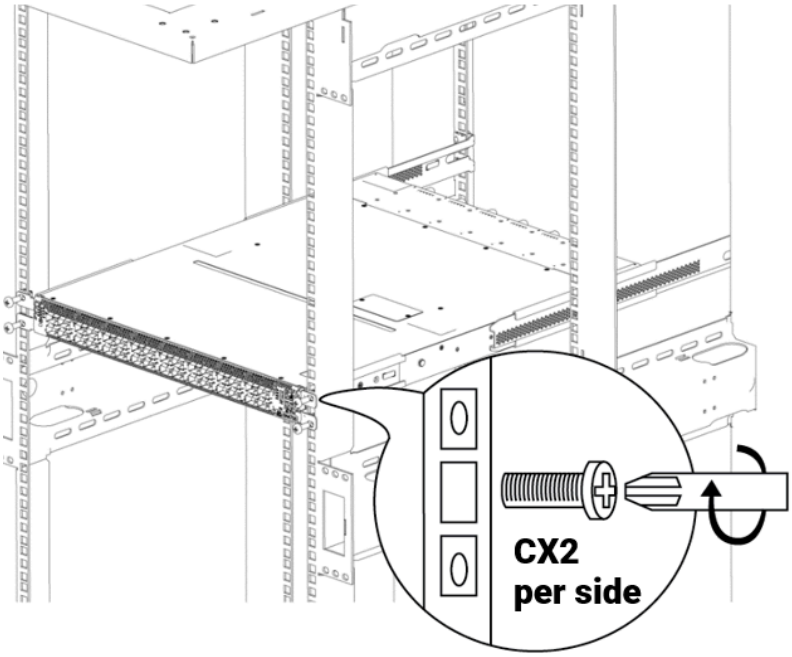
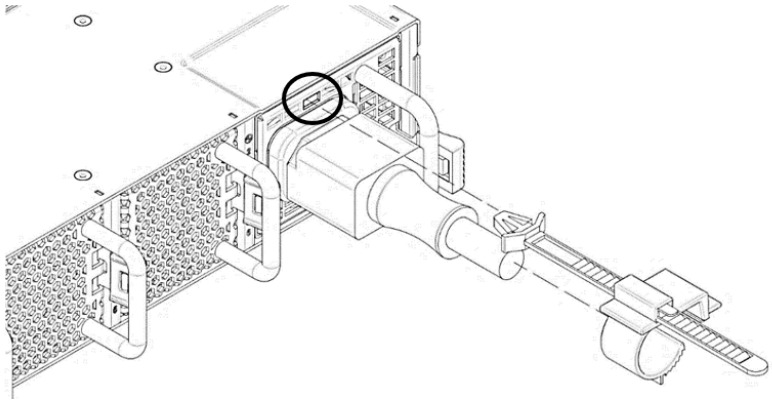
Quantity	Item
4×	
2×	

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. **Short racks (430-580mm):** 
	Standard racks (580-800mm): 

#	Illustration
2	**Short racks:**  **Standard racks:** 

#	Illustration
3	Install 8 cage nuts (B) in the desired 1U slots of the rack. 
4	Do not tighten the screws yet. 
5	

#	Illustration
6	Tighten all M6 screws (C) with a torque of **4.5±0.5.** 
7	**Optional - Using a cable retainer:** Insert the retainer anchor into the designated slot above the power cord inlet. To secure the power cord inside the retainer, press the small tab on the retainer strip to loosen the loop. 

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.

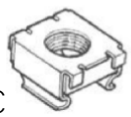
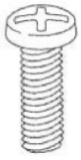
5. Remove the rails and brackets from the chassis by unscrewing 4 screws.

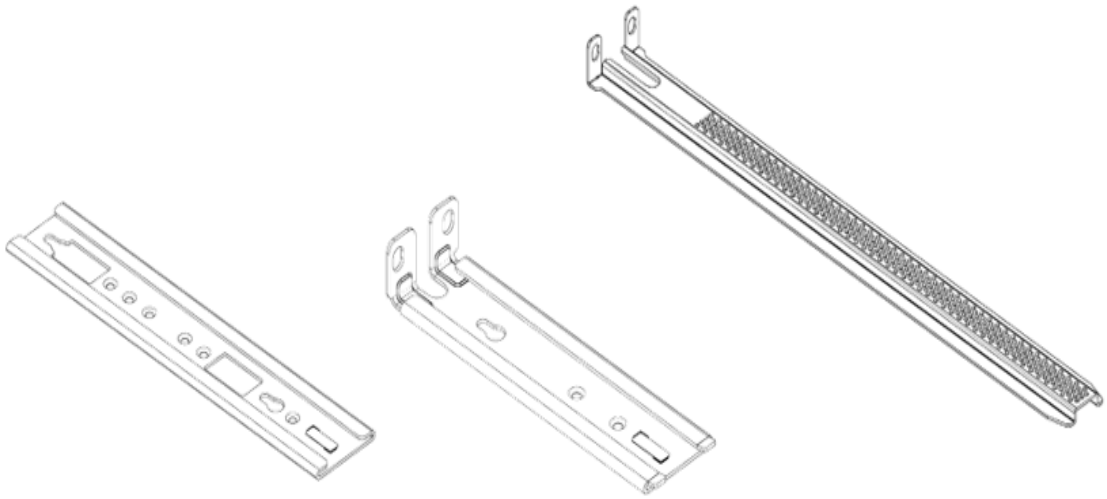
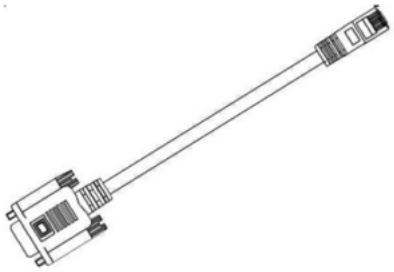
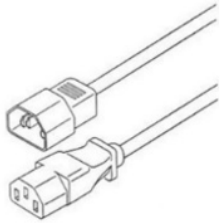
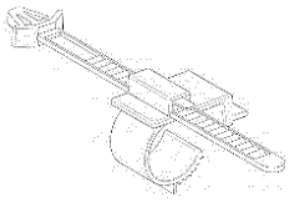
SN4600/SN4600C Fixed Rail Kit

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	
4×	 A
8× (of each)	  B,C

Quantity	Item
2× (of each)	 D,E,F
System Package	
1×	
4×	
2×	

Prerequisites:

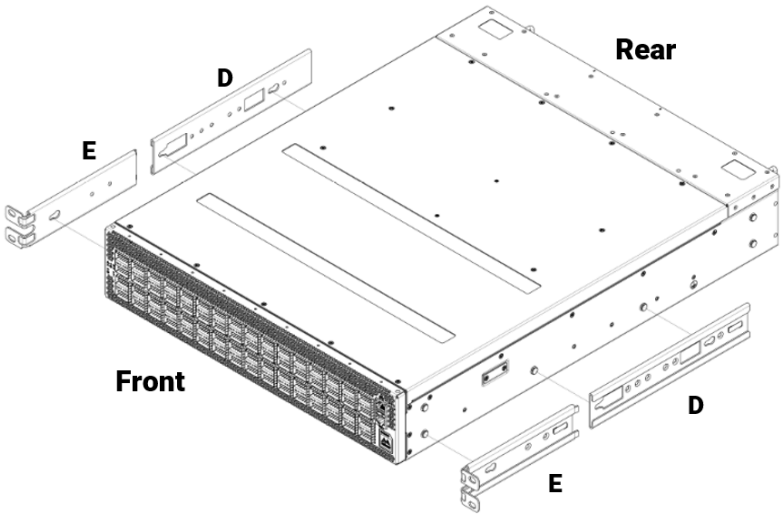
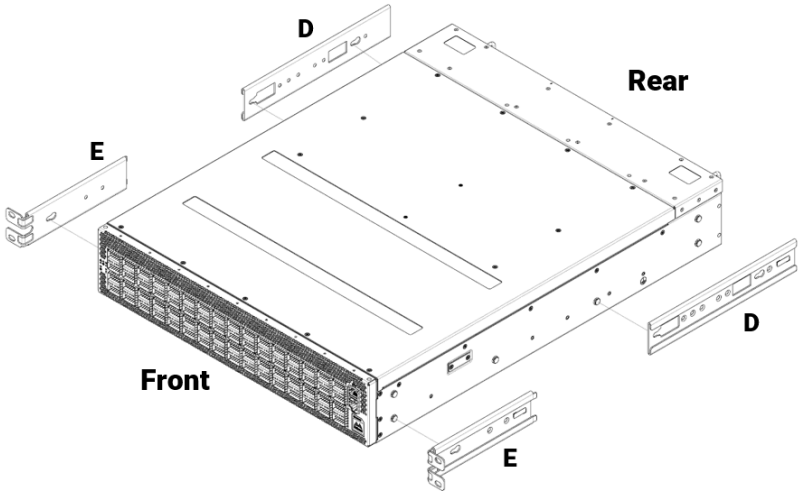
Before mounting the system to the rack, select the way you wish to place the system. Pay attention to the airflow within the rack cooling, connector and cabling options.

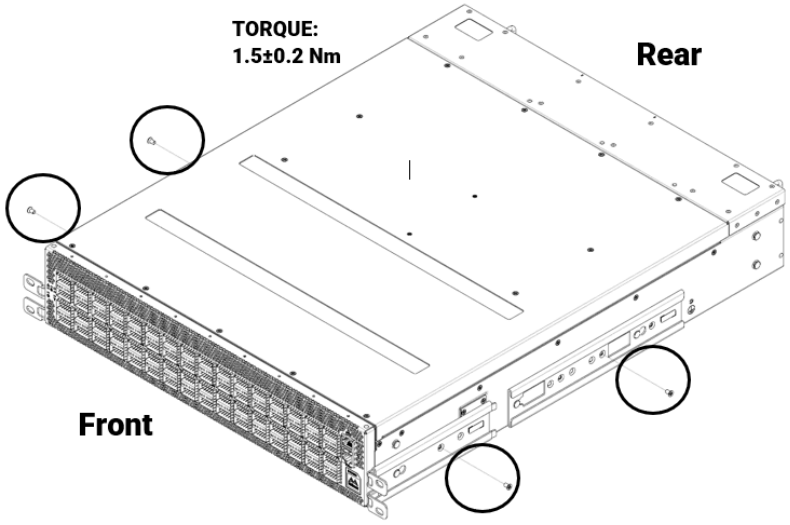
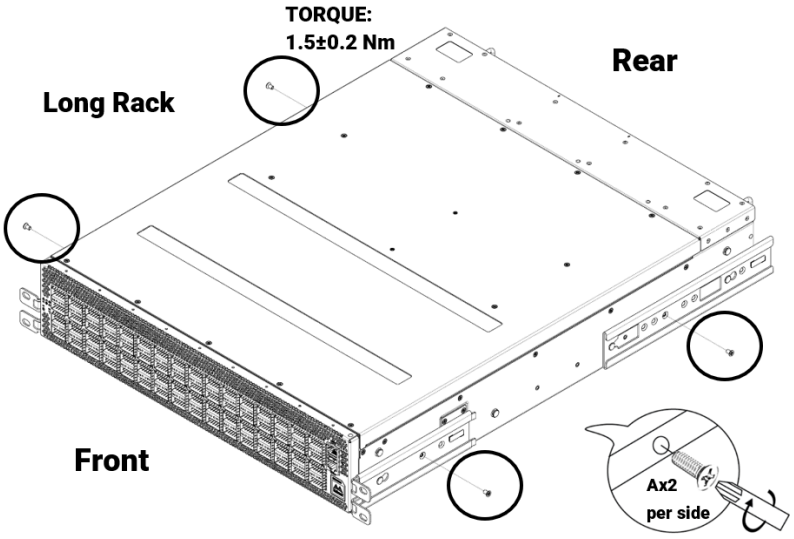
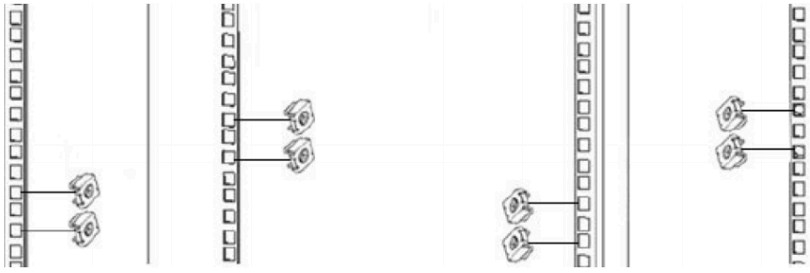
While planning how to place the system, consider the two installation options shown in the figures below, and review the following points:

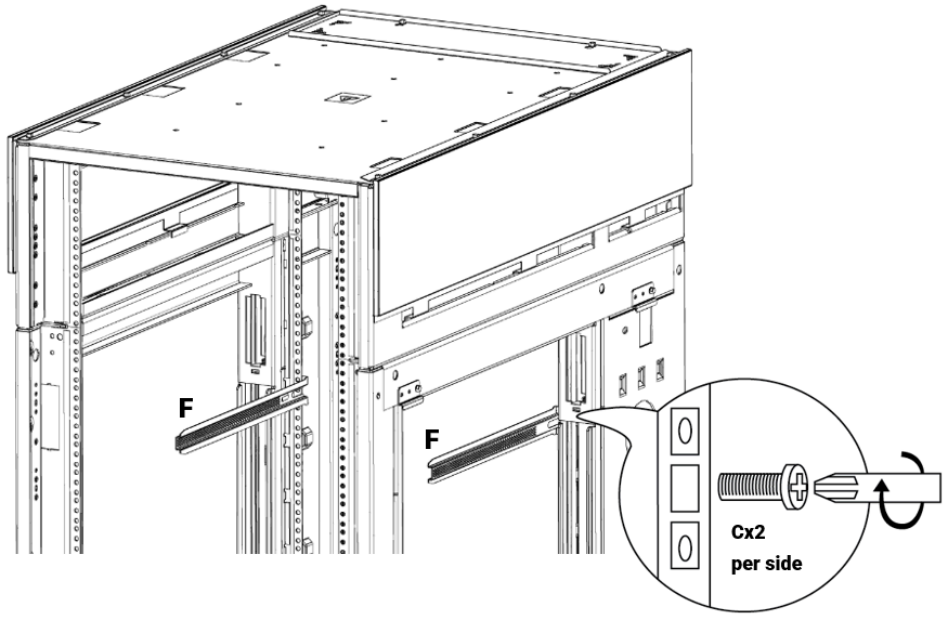
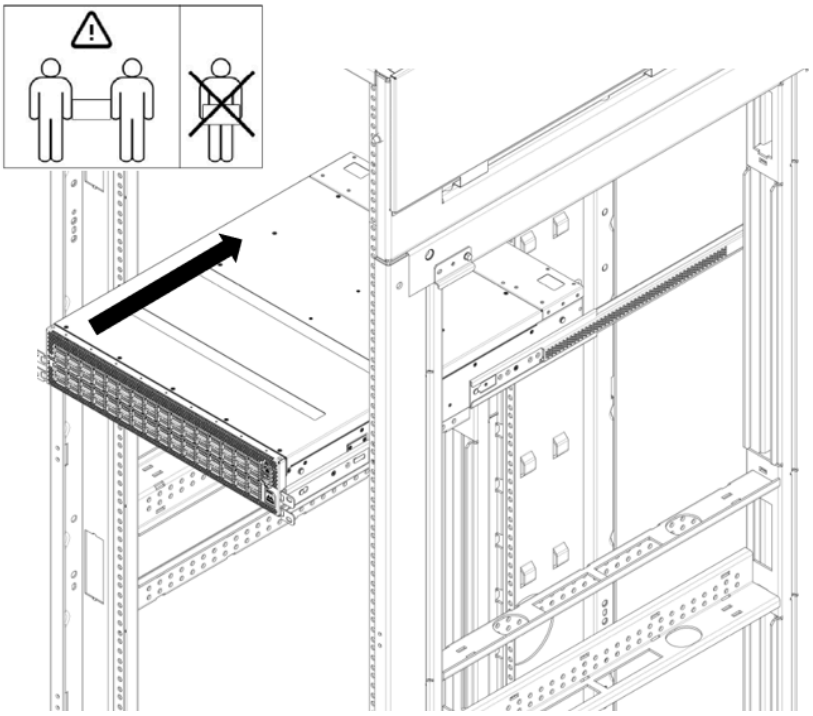
- Make sure the system air flow is compatible with your installation selection. It is important to keep the airflow within the rack in the same direction.
- Note that the part of the system to which you choose to attach the rails (the front panel direction, as demonstrated in Option 1 or the FRUs direction, 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.

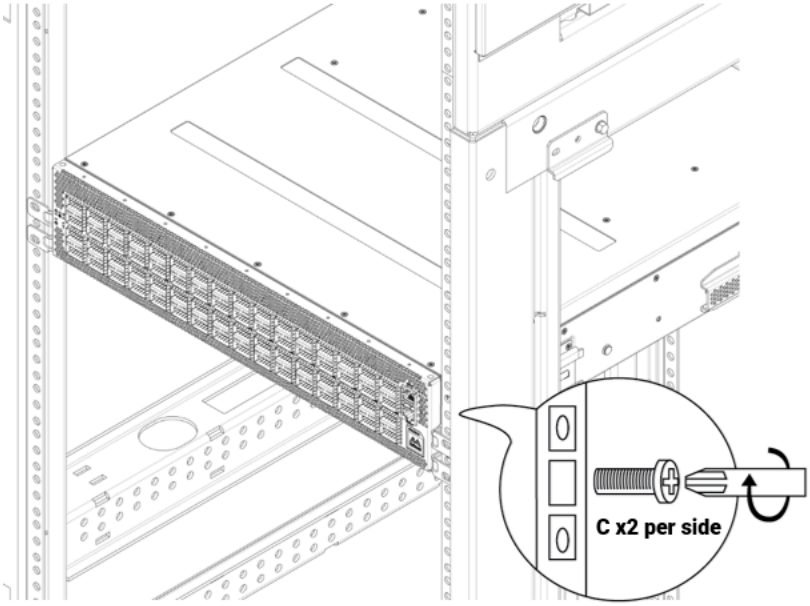
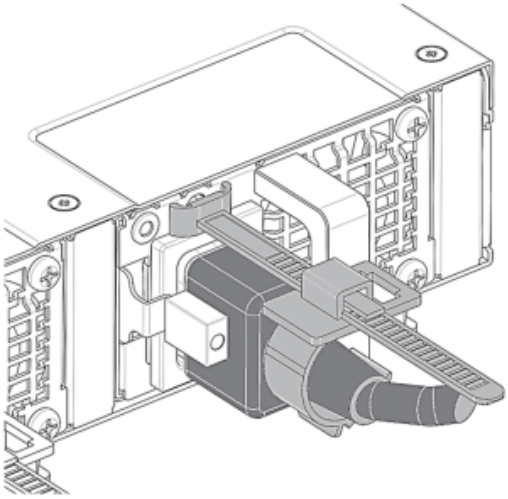
⚠ Warning

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. **Short racks (430mm to 580mm):** 
	Standard racks (580mm to 800mm): 

#	Illustration
2	**Short racks:**  **Standard racks:** 
3	Install 8 cage nuts (B) in the desired 2U slots of the rack. 

#	Illustration
4	Do not tighten the screws yet. 
5	

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

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.

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 IOIOI .

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

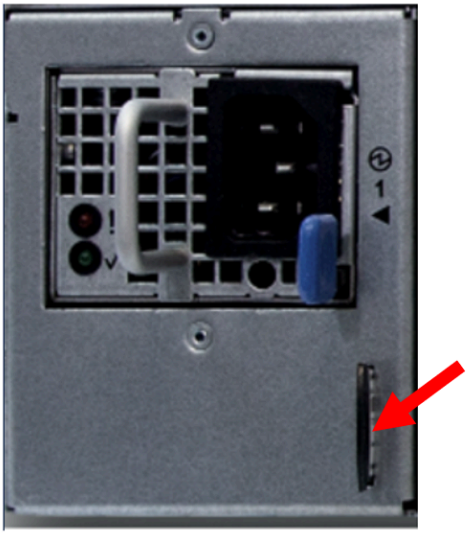
See LED Notifications.

Inventory Information

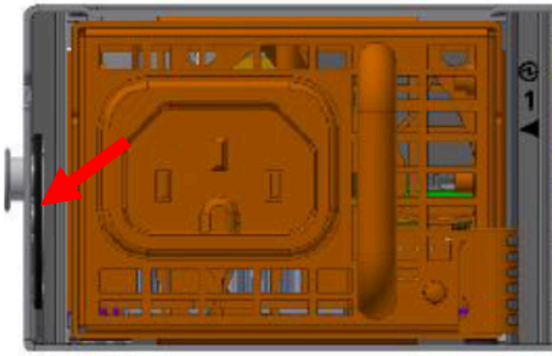
The system’s inventory parameters (such as serial number, part number and GUID address) can be extracted from the inventory pull-out tab on the lower left side of the rear panel.

Pull-out Tab

SN4600/SN4600C



SN4700/SN4700D



LED Notifications

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

LED Symbols

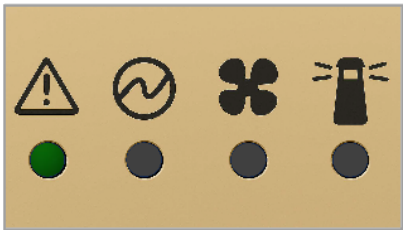
Symbol	Name	Description	Normal Conditions
	System Status LED	Shows the health of the system.	Green/flashing green when booting
	Fan Status LED	Shows the health of the fans.	Green

Symbol	Name	Description	Normal Conditions
	Power Supply Units LEDs / DC Power Distribution Board Status LED	Shows the health of the power supply units/power distribution board.	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.

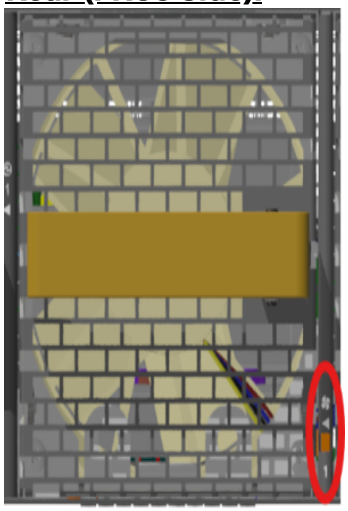
System Status LED Assignments

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.

LED Behavior	Description	Action Required
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. *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)

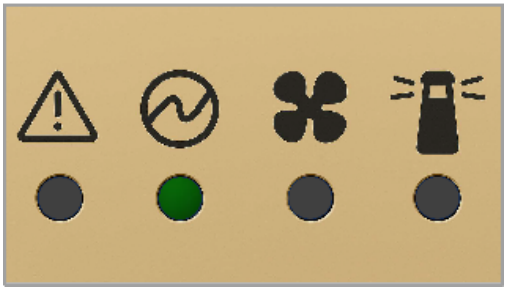
LED Behavior	Description	Action Required
Solid Green	A specific fan unit is operating.	N/A
Solid Amber	A specific fan unit is missing or not operating properly.	Replace fan unit

> **⚠ 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 (the power distribution board status in SN4700D).

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
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)	

LED Behavior	Description	Action Required
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

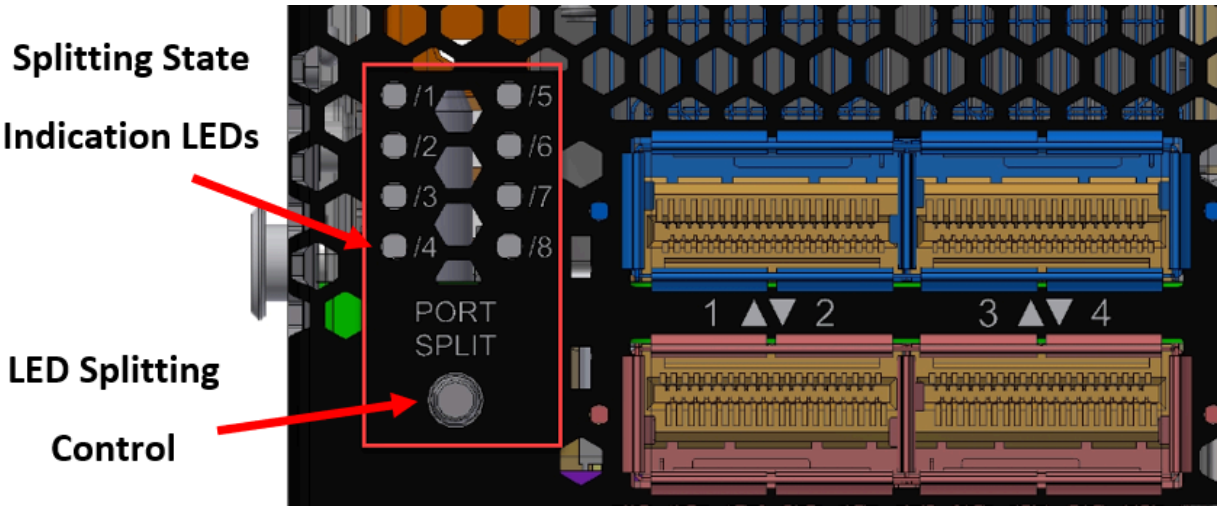
SN4600/SN4600C


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/SN4700D 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/SN4700D 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)

State	State Indication LEDs [/1 /2 /3 /4]	QSFP Module LED Indication	Comments
1		8x/4xA/2xA/1xA	• See details in Port LEDs Indications table below (States 1-8). • 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/SN4700D 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.

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
		100GbE NRZ
		40GbE
	128	100GbE PAM4
		50GbE
		25GbE
		10GbE
		1GbE
SN4600C	64	100GbE
		40GbE
	128	50GbE
		25GbE
		10GbE
		1GbE
SN4700/SN4700D	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/SN4700D	All ports	12W

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. 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: • Critical system fault (CPU error, bad firmware) • Exceeds temperature threshold Solution: • Check environmental conditions (room temperature)
	Fan Status LED is Amber	Cause: Possible fan issue Solution: • Check that the fan is fully inserted and nothing is blocking the airflow • Replace the fan FRU if needed
	PSU Status LED is Amber	Cause: Possible PSU issue Solution: • Check/replace the power cable • Replace the PSU if needed

Problem Indicator	Symptoms	Cause and Solution
System boot failure while using NVIDIA Onyx (MLNX-OS)	Software upgrade failed on x86 based systems	Solution: • Connect the RS232 connector (CONSOLE) to a laptop. • Push the system's reset button. • Press the ArrowUp or ArrowDown key during the system boot. The GRUB menu will appear. For example:

Problem Indicator	Symptoms	Cause and Solution
		``` Default image: 'SX_X86_64 SX_3.4.0008 2014-11-10 20:07:51 x86_64' Press enter to boot this image, or any other key for boot menu Booting default image in 3 seconds. Boot Menu ---------- 0: SX_X86_64 SX_3.4.0008 2014-11-10 20:07:51 x86_64 1: SX_X86_64 SX_3.4.0007 2014-10-23 17:27:34 x86_64 ---------- Use the ArrowUp and Arrowdown keys to select which entry is highlighted. Press enter to boot the selected image or 'p' to enter a password to unlock the next set of features. Highlighted entry is 0: " ``` • 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” 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 SN4600C: 1/10/25/40/50/100GbE per port
	Connector cage:	64 QSFP28
Environmental	Temperature:	Operational: 0° to 40°C Non-Operational: -40° to 70°C
	Humidity:	Operational: 10%-85% non-condensing 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:** 1x/2x, 15A/100 Vac, 15A/110Vac, 12A/120Vac, 10A/200-240Vac,50/60Hz **SN4600C:** 1x/2x, 10A/100-127Vac, 50/60Hz, 6A/200-240Vac,50/60Hz
	Global power consumption:	SN4600: Typical power with passive cables (ATIS): 600W SN4600C: Typical power with passive cables (ATIS): 466W

Feature		Value
Main Devices	CPU:	Intel x86 2.20GHz Quad Core
	PCIe:	4x Gen 3.0
	Switch:	NVIDIA Spectrum-3
	Memory:	SN4600: 16GB RAM, 60GB SSD SN4600C: 8GB RAM, 30GB SSD
Throughput		SN4600: 12.8 Tb/s SN4600C: 6.4 Tb/s

SN4700 Specifications

Feature		Value
Mechanical	Size:	1.72'' x 16.85'' x 22.3'' 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 Non-Operational: -40° to 70°C
	Humidity:	Operational: 10%-85% non-condensing 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

Feature		Value
Power	Input voltage:	1x/2x, 100Vac 15A, 110Vac 15A, 120Vac 12A, 200-240Vac 10A, 50/60Hz **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 consumption:	Typical power with passive cables (ATIS): 630W
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

SN4700D Specifications

Feature		Value
Mechanical	Size:	1.69'' x 17.2'' x 30.7'' 43mm (H) x 438mm (W) x 781mm (D)
	Mounting:	19" MGX Rack (Busbar)
	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 Non-Operational: -40° to 70°C
	Humidity:	Operational: 10%-85% non-condensing 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

Feature		Value
Power	Input voltage:	48VDC/54VDC, Blind-mate Busbar Range 40-60VDC
	Global power consumption:	Typical power with passive cables (ATIS): TBD
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:

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.

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.

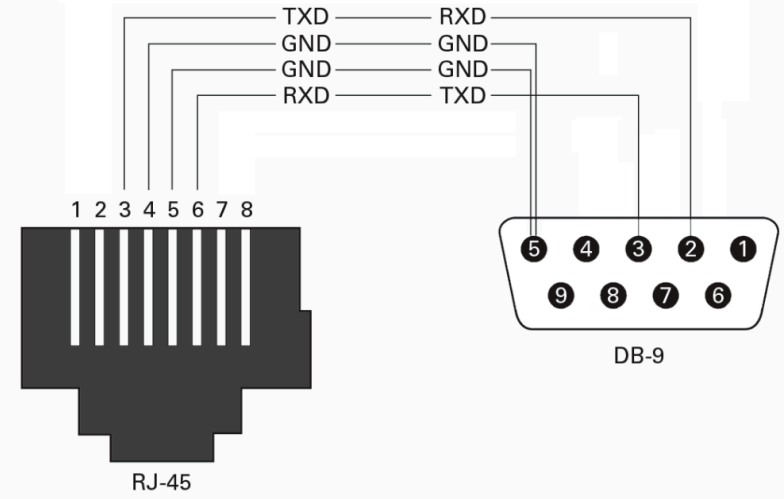
All form factors specification documents are available on the Storage Networking Industry Association (SNIA) Website.

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.



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.

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
	ACC-KIT001265	-	RACK INSTALLATION KIT STANDARD\SHORT DEPTH 2U SWITCHES	SN4700D
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/SN4700D
	930-9BFAN-00JB-000	MTEF-FANR-M	NVIDIA fan module, 40 x 40 [mm], C2P airflow	SN4700/SN4700D
	930-9NFAN-00IS-000	MTEF-FANF-G	2U Systems fan module P2C airflow with shutters	SN4600C
	930-9NFAN-00J6-000	MTEF-FANR-G	2U Systems fan module C2P airflow with shutters	SN4600C

Part Type	Part Number	Legacy Part Number	Description	Supported Systems
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
	930-9NPSU-00JJ-000	MTEF-PSR-AC-F	1500W AC power supply, C2P airflow	SN4600
Cables and Harnesses	HAR000631	N/A	RS232 cable, DB9 to RJ45 2M harness 2M	SN4600/SN4600C, SN4700/SN4700D
	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

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: • Ordering Information • Installation • Accessory and Replacement Parts 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: • SN4700 temperature in Specifications section
February 15, 2021	1.4	Updated: • High Power/LR4 Transceivers Support in Interfaces section • Speeds in Specifications section

Date	Revision	Description
January 11, 2021	1.3	Added: • A note in Specifications section regarding the operational temperature of the SN4700 systems
October 25, 2020	1.2	Updated: • High Power/LR4 Transceivers Support in Interfaces • 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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