



648 Port InfiniBand FDR Switch Platform Hardware Installation Guide

PN: MSX6536-10R, MSX6536-NR

Rev 1.4

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Revision History

Table 1 - Revision History of this Installation Guide

Revision	Date	Details
1.4	January 2013	Added new figures Added nut for ground post.
1.3	January 2012	Added N+N information Added bookmarks
1.2	January 2012	Added Troubleshooting section Updated Initial Configuration to include IPv6 New Address for Israel New copyright
1.1	Nov 2011	Added shock stickers Aligned the UM with the IG procedures.
1.0	July 2011	Initial Release

About this Manual

This manual provides installation and set-up instructions for the SX6536 QSFP Chassis InfiniBand Switch Platform.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the switch platform.

The manual assumes familiarity with the InfiniBand® architecture specification.

Related Documentation

The documentation set accompanying the QSFP Chassis InfiniBand Switch platform includes the following:

Table 2 - Reference Documents and Web Sites

<i>InfiniBand Architecture Specification, Vol. 1, Release 1.2.1</i>	The InfiniBand Architecture Specification that is provided by IBTA
<i>Switch Hardware Errata</i>	For any possible errata due to hardware issues see the switch support product page. This requires a customer support login.
<i>Mellanox MLNX-OS™ SwitchX® Software WebUI User's Manual</i>	WebUI Overview for MLNX-OS software.
<i>Mellanox MLNX-OS™ SwitchX® Software User Manual</i>	This document contains information regarding configuring and managing Mellanox Technologies' SwitchX® Switch Platforms.
<i>MLNX-OS™ Software Command Reference Guide</i>	Command Reference Guide for MLNX-OS listing all of the commands available through MLNX-OS with explanations and examples.
<i>MLNX-OS™ Software Configuration Guide</i>	Configuration Guide for MLNX-OS displaying different configuration scenarios.

Document Conventions

Throughout this manual, the name SX6536 and the terms chassis and switch are used to describe the switch, unless explicitly indicated otherwise.

The following pictures are used throughout this document to indicate information that is important to the user.



This symbol makes recommendations to the user.



This symbol indicates information that is helpful to the user.



This symbol indicates a situation that can potentially cause damage to hardware or software.



WARNING! This symbol indicates a situation that can potentially cause personal injury and / or damage to hardware or software.

1 Installation



This chassis can be installed in standard 19" racks that have depths between 65cm and 80cm between the vertical supports of the rack.

Installation and initialization of the chassis is a simple process requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment. Your chassis comes only with the power supplies and fans pre-installed. The rest of the openings are populated with blanks. All of the leafs, spines, and management modules come shipped in a separate package.

The chassis requires initial configuration to get the chassis and Fabric management up and running through remote management. See the Installation Guide that is packed in the box for the instructions to make the initial configuration.



This unit is intended for installation in a Restricted Access Location. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.

1.1 Environmental and Safety Recommendations

The following are Mellanox recommendations.



Recommended ambient temperature in the System room is $20^{\circ} \pm 5^{\circ}$ C.
Recommended humidity range is $40\% \pm 15\%$ without condensing.



It is highly recommended that the installation sites be as isolated as possible from all sources of radio transmissions and electrical interference.



It is highly recommended that the installation site building be equipped with a lightning rod.



It is highly recommended that the installation site be equipped with smoke detectors and a fire alarm warning system.



The system requires a KVA rated UPS system. It is recommended that a UPS system be installed to protect the equipment in the event of unexpected power failure.



Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits or use a 3 phase circuit.

1.2 Chassis Package Contents

The package includes:

- 1 chassis with the following modules installed:
 - 8 fans
 - 10 PSUs
- 1 Installation Guide
- 1 chassis
- 1 box containing various other parts
- 1 installation kit box
- 1 box containing 10 power cords 250v 15a 2.0M, C14 to C13, USA UL Standard
- 1 cable management kit

Before you install your new SX6536 series chassis, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damage that may have occurred during shipping.



If anything is damaged or missing, contact your customer representative immediately.



The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Guarantee proper ventilation, by leaving 8cm (3") of space to the front and rear of the switch. This will ensure proper air flow through the chassis. This is crucial for maintaining good airflow at ambient temperature. In particular, route cables such that they do not impede the air into or out of the chassis.

1.3 Leaf Package Contents

The leafs are ordered by the customer and are shipped 4 to a box. The customer will receive as many boxes as needed to fill the order.

1.4 Spine Package Contents

The spines are shipped 3 to a box. The customer will receive as many boxes as needed to fill the chassis with a full complement of spines.



Insert the bottom spine board first.

1.5 Management Package Contents

The package includes:

- all of the management modules ordered by the customer
- 1 RJ45 to DB9 harness for each management module received

1.6 Physical Installation



Warning: This equipment is very heavy. Safety is the first concern. Make sure that adequate manpower and proper equipment is used for transporting and moving the chassis.

The fully loaded chassis weighs:

327.15kg (721.24 LBS.) full configuration

128.97kg (284.33 LBS.) empty configuration

157.57kg (347 LBS.) shipped configuration

The switch platform uses 31U of rack space in a standard 19" rack, 29U for the chassis and 2U for the shelf. The switch ships from the factory with mounting holes on the spine side. There are upper brackets to connect the leaf side to the rack near the top of the chassis, and there are two lock-down bars to secure the chassis to the shelf. The weight of the switch is supported from underneath the unit by the shelf.

This chassis can be installed in standard 19" racks that have between 65cm and 80cm between the vertical supports of the rack. Make sure that a fully populated rack including cables will have sufficient air flow for cooling.



Choose a rack which is able to support the mechanical and environmental characteristics of a fully populated switch chassis.

1.6.1 Starting with the Rack

1.6.1.1 Rack Recommendation

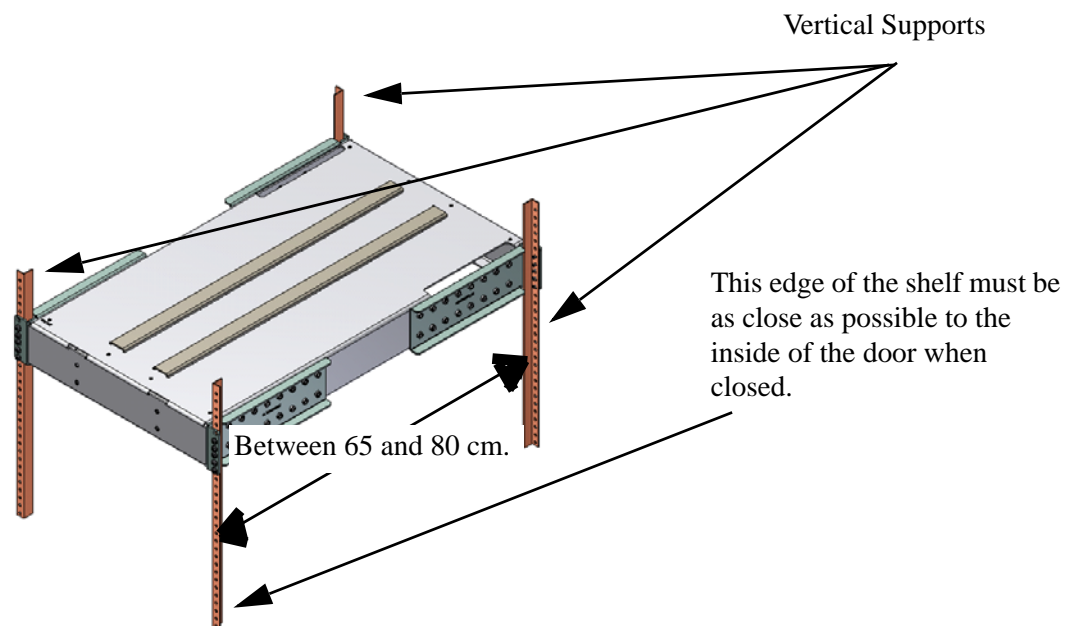


Due to the space required by up to 648 connector cables Mellanox recommends a rack that is 120 cm long and 80cm wide. This will allow for proper cable management and enough ventilation to properly cool the chassis.

1.6.1.2 Preparing the Rack

The rack may need to be modified to accommodate the SX6536 chassis. The distance between the vertical supports must be between 65 and 80 cm.

Figure 1: Distance Between the Vertical Supports



The vertical supports may have to be moved so that the vertical support closest to the door is a minimum of 6 cm from the inside of the door. This is required so that the shelf will not hit the door.



If you move the vertical supports make sure that you reinstall them vertically plumb.

1.6.2 ESD Connection

Before starting any procedure on the SX6536 switch system:

1. Put an ESD prevention wrist strap on your wrist, and make sure there is good contact between your body and the strap.
2. Plug the other end of the wrist strap to a valid ground. Make sure that this is a tight fit.

1.6.3 Installation Procedure



Installing the chassis will be a lot easier if you can remove the sides of the rack.



You will need a fork lift, to move and insert the chassis into the rack.

1.6.3.1 Requirements

You will need:

- #2 phillips screwdriver
- a fork lift
- measuring tape
- #3 phillips screwdriver
- a grounding lug
- ground wire of sufficient length and gauge to properly ground the chassis



The installation will be much easier with a power screwdriver.



It is recommended to use AWG6 or 4mm diameter wire for grounding purposes.



It is recommended to have at least two people for the duration of the installation procedure. Use a mechanical lift to raise this chassis. If not, use enough manpower to ensure the safety and wellbeing of all of the people involved in the installation.

1.6.3.2 Installation and Cable Management Kit Parts

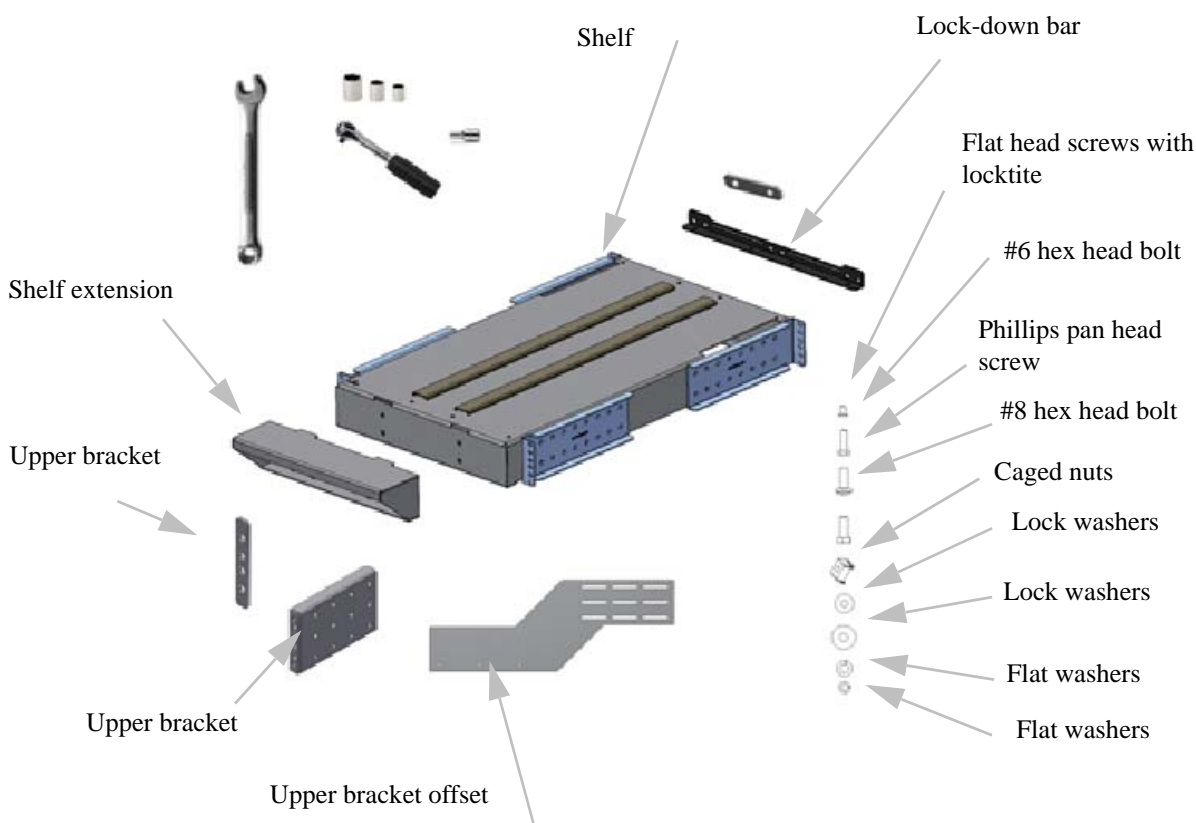
- Parts included in the installation kit:
 - 1 shelf with brackets pre-installed
 - 1 left side upper bracket offset
 - 2 lock down bars
 - 8 lock washers for the upper brackets to vertical support
 - 12 hex head bolts – 8 for the upper brackets and 4 for the shelf extension
 - 1 shelf extension
 - 1 right side upper bracket offset
 - 2 upper bracket washers
 - 12 lock washers for the upper brackets to upper bracket offsets
 - 34 caged nuts 20 for the shelf and 14 for the chassis faceplate

- 34 pan head screws for the caged nuts 20 for the shelf and 14 for the chassis face-plate
- 32 lock washers – 20 for the lock down bars and 12 for the upper brackets to upper bracket offsets
- 2 upper brackets
- 1 open end ratchet wrench 10mm
- 1 socket wrench
- 2 extensions for the socket driver
- 4 flat washers for the shelf extension
- 1 nut Size M-8 for ground post
- 20 flat washers– 8 for the lock down bars and 12 for the upper brackets
- 32 hex head bolts – 20 for the lock down bars and 12 for the upper brackets to upper bracket offsets
- 12 flat head screws with locktite for the upper bracket offsets
- 1 socket nut driver 8mm
- 1 socket nut driver 10mm
- 1 socket nut driver 14mm
- 1 box wrench
- 6 two hole lock washers for lock down bars

• Parts included in the cable management installation kit:

- 1 cable management rack RH
- 1 cable management rack LH
- 16 caged nuts M6
- 16 M6 bolts

Figure 2: Installation Kit Parts

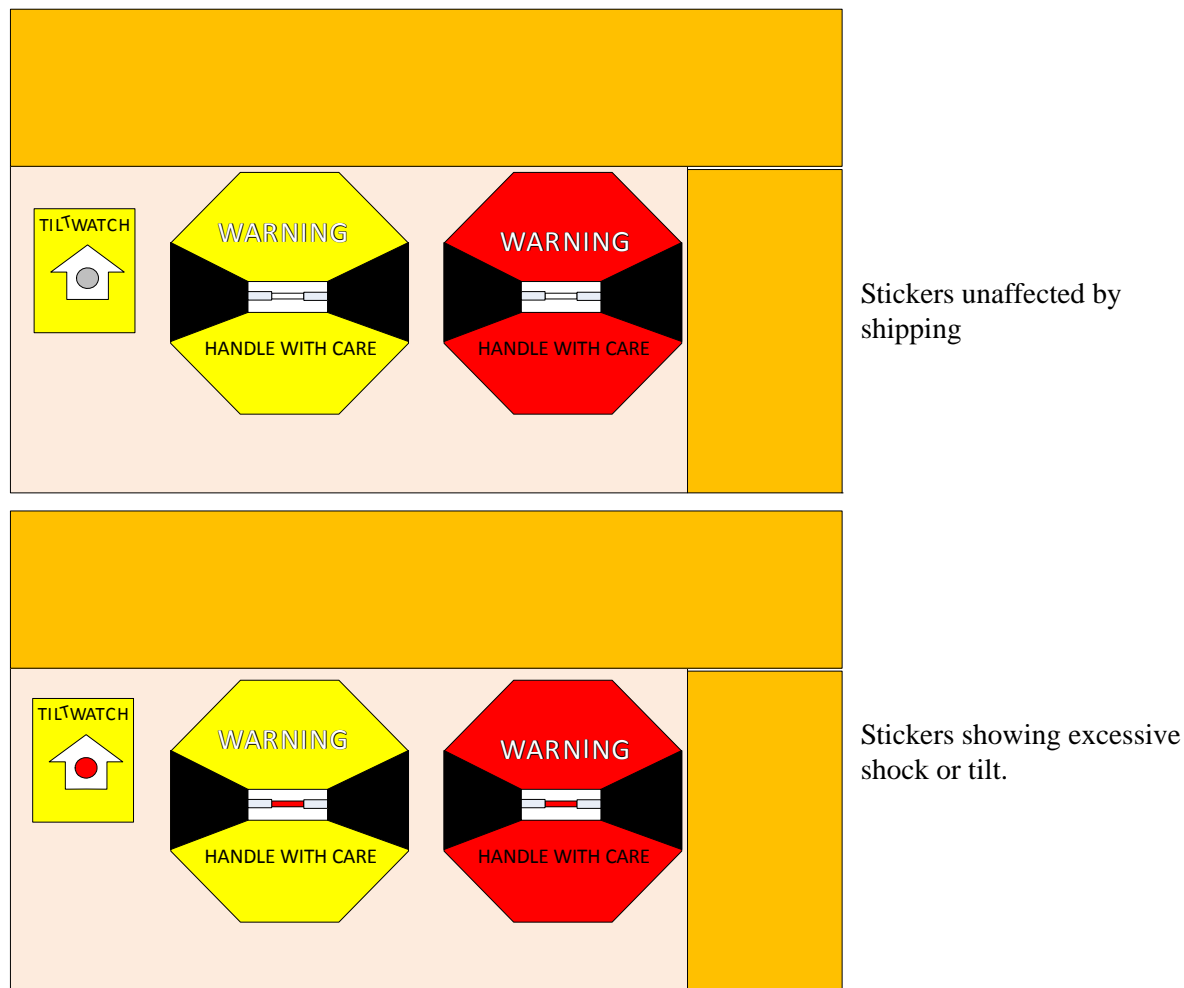


1.6.3.3 Container Mishandling

The container has shock and tilt stickers applied. These will turn red if the container has been mishandled or roughly handled. Upon receipt of the container look for and inspect the shock and tilt stickers to confirm that they have not tripped. If one or more are red

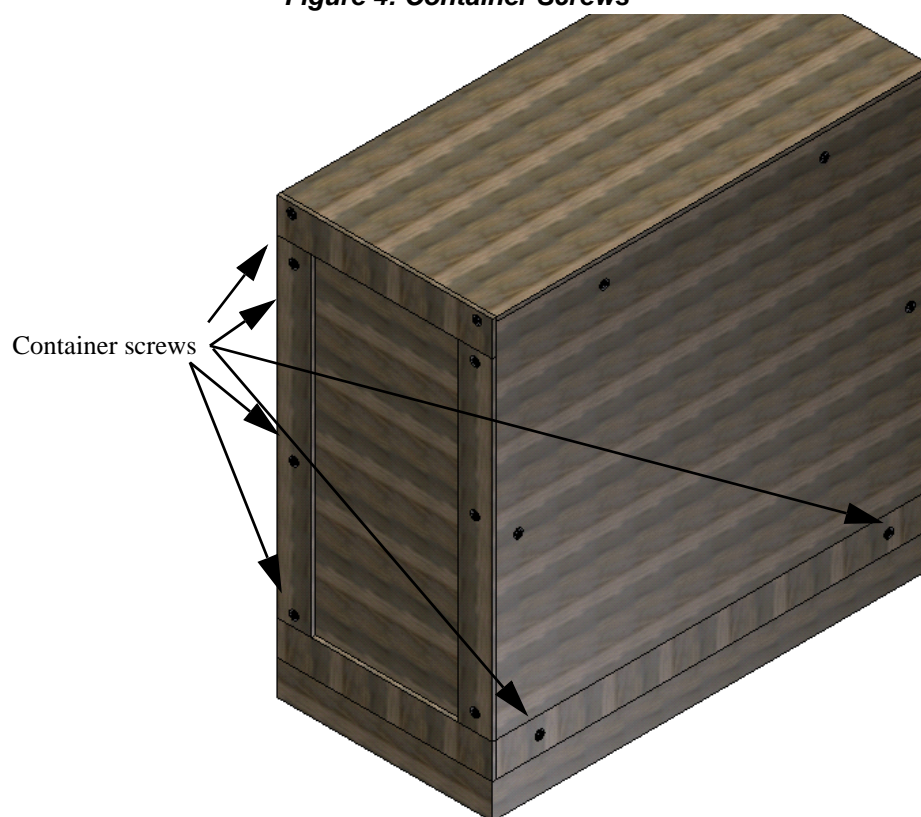
notify the shipper and Mellanox. This on its own does not indicate damage to the contents. But, be sure to carefully inspect the contents if any of the shock and tilt stickers have tripped.

Figure 3: Shock and Tilt Stickers



1.6.3.4 Opening the Container

Step 1. Before starting the procedure, put the ESD strap on and connect it to a valid ground.

Figure 4: Container Screws

It is highly recommended to have a screw gun or electric screwdriver for this step.

- Step 1. Remove the four sides of the container by unscrewing the phillips head screws holding the sides on.
- Step 2. Remove and put aside the box.
- Step 3. Visually inspect the chassis, make sure that:
- there is no visible damage
 - 10 PSUs are installed for the chassis
 - all 8 fans are installed
- Step 4. Remove all protective plastic film from all sides and top of the chassis.



The leafs, spines, and management modules are shipped separately.



Do not remove any of the blocks or either of the lock-down bars at this time.

1.6.3.5 Installing the Shelf



The chassis is on ball bearings and can roll easily. Be aware that the chassis can roll off of the pallet. **Should the chassis start to fall, move out of the way.** The chassis can cause grave bodily harm should it fall on or near you.

- Step 1. Select the location in the rack. Try to keep the chassis as low as possible to keep the center of gravity low.



It is recommended to set the top of the shelf at U5. Try and keep the chassis as low as possible. Set the shelf from U3 to U5.



Placing the shelf too low may make it impossible to tighten the shelf brackets, in step 9

The maximum height that the chassis can be mounted, will be determined by the maximum height that the fork lift can raise the pallet.

- Step 2. Open the Installation kit and make sure that all of the parts are in the box. See Figure 2, “Installation Kit Parts”.

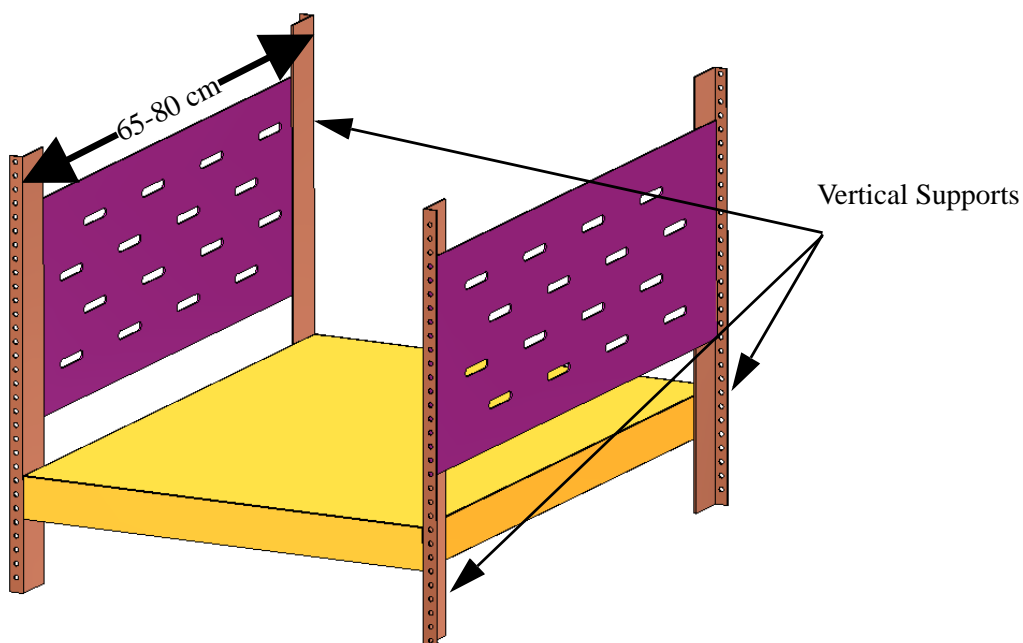
The chassis will sit in the rack with the spine side as close as possible to the door. This leaves maximum room for the cable management system.



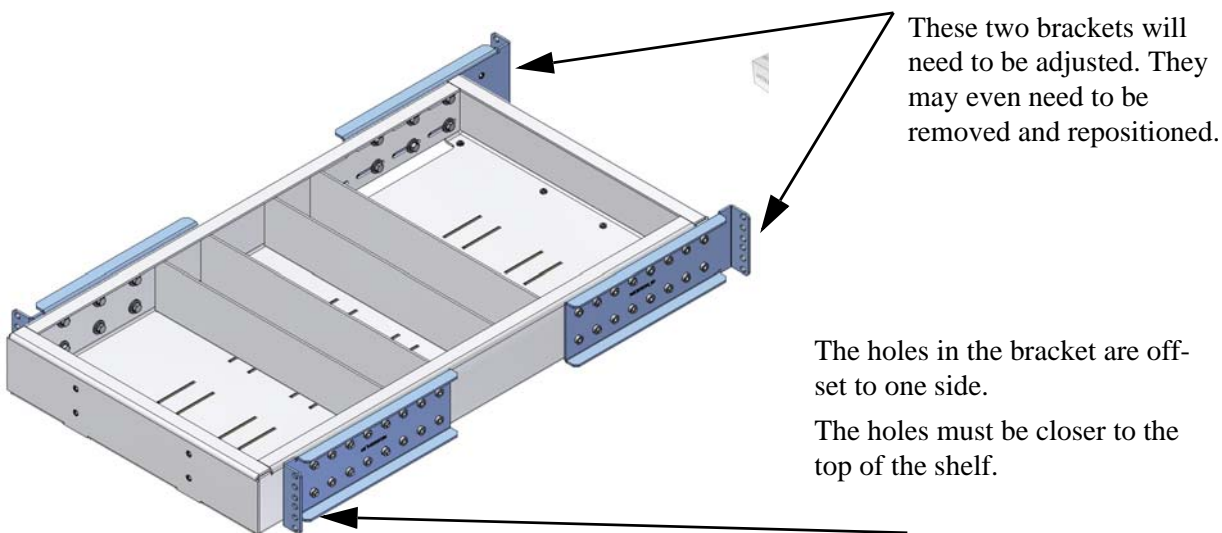
The distance between the vertical supports must be between 65 cm(25.6”) and 80 cm(31.5”). If the distance in your rack is different, move the vertical supports so that one pair is ~10 cm(4in.) away from the door.



The side of the chassis with the spine units will sit flush with the vertical supports of the rack. The side of the chassis with the QSFP connectors will sit at the edge of the shelf closer to the center of the rack.

Figure 5: Vertical Rack Supports Dimension

- Step 3. Measure the distance between the vertical supports and adjust the shelf brackets according to this distance. This chassis can be installed in a rack with a distance between the vertical supports of from 65cm(25.6in.) to 80cm(31.5in.).
- Step 4. The shelf comes with the four brackets pre-installed. Two of the brackets should be loose. They may need to be removed and repositioned to meet the distance between the vertical supports of the rack.

Figure 6: Adjustable Shelf Brackets

- Step 5. Move the shelf brackets on the shelf. Place the shelf bracket so that it measures slightly more than the measured distance between the vertical rack supports. Make sure that there is enough play in the bracket so that it can move to the vertical support. **Do not tighten the hex head bolts.**



You may need to remove the brackets and reinstall them.

Figure 7: Placing the Shelf Bracket

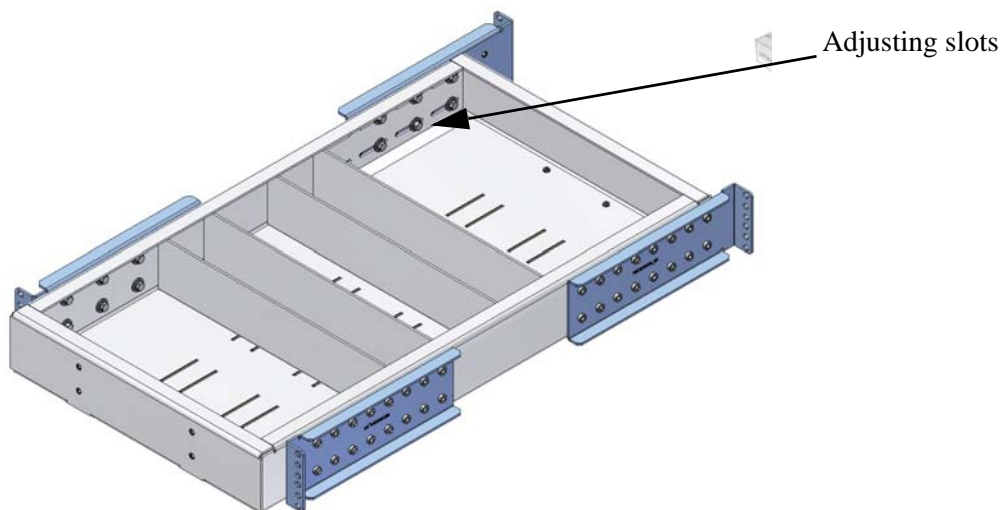
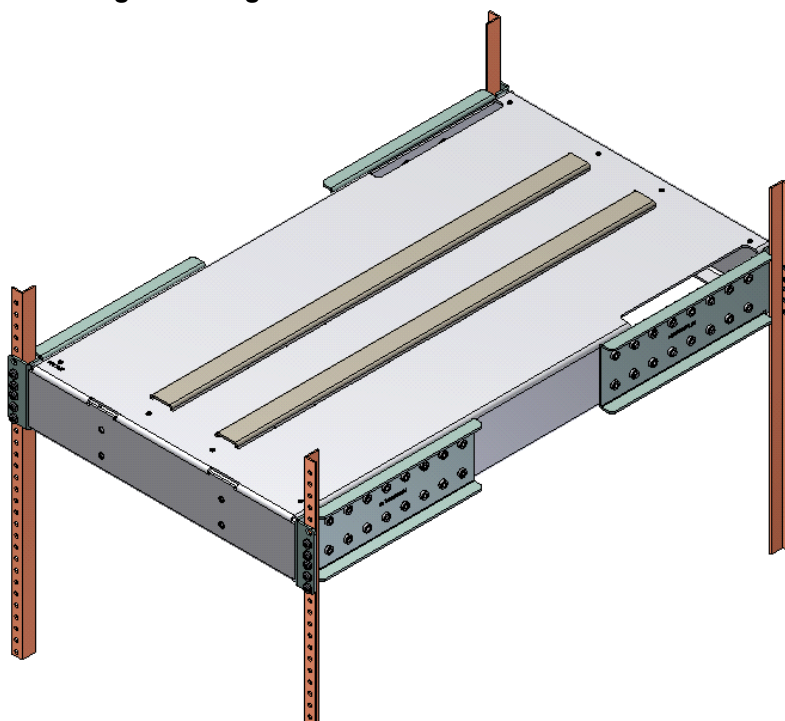
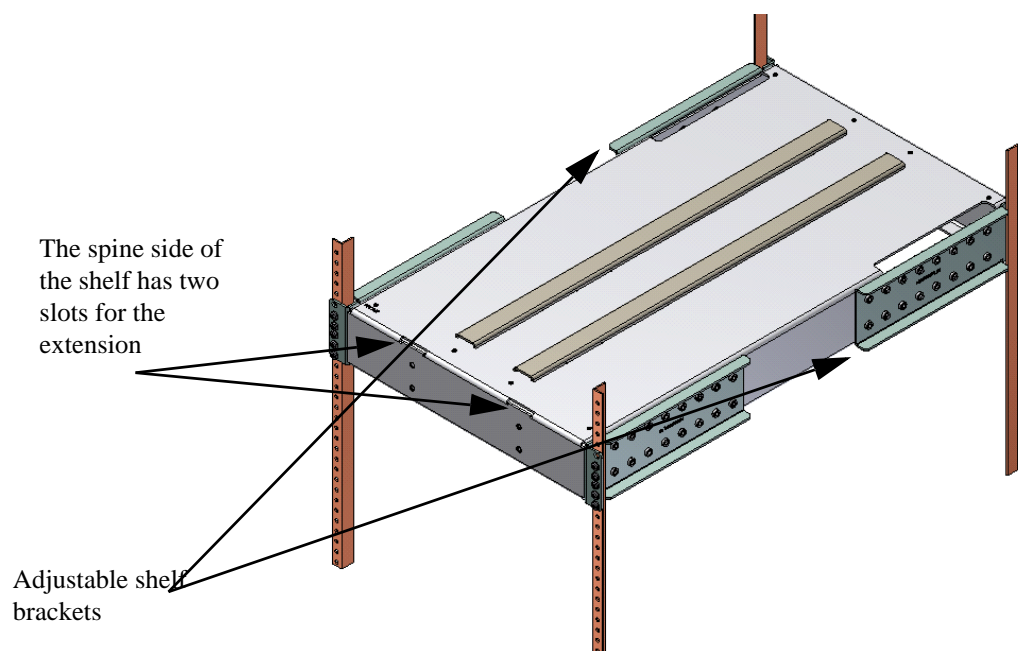


Figure 8: Caged Nut Locations for the Shelf Brackets

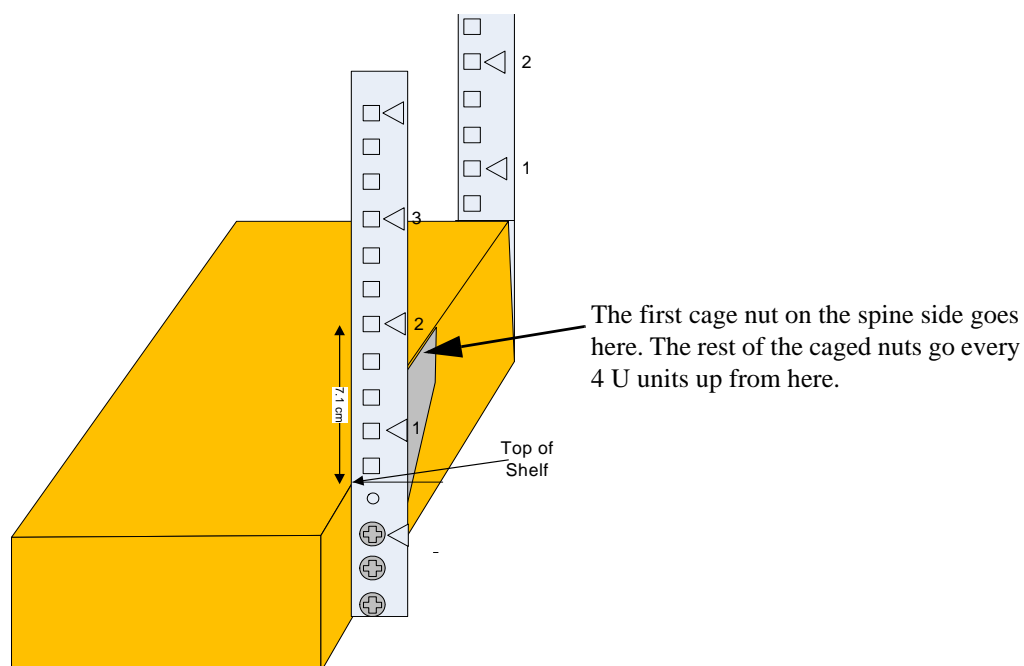


- Step 6. Insert five nuts into the rack for each of the four shelf brackets (the 2 brackets that are adjustable and the 2 that are fixed). Make sure that the caged nuts are all at the same height on the vertical supports. **Do not use the top hole in the bracket.**
- Step 7. Put the Shelf into the rack and twist the shelf into place. Make sure the spine side of the shelf is closest to the rack doors. See Figure 9 to identify the spine side of the shelf.
- Step 8. Install and tighten the 20 M6 bolts into the caged nuts.

Figure 9: Shelf Brackets



- Step 9. Tighten the 16 hex head bolts on the adjustable brackets.

Figure 10: U Numbering Above Shelf

- Step 10. Place 14 caged nuts into the vertical rack support at the locations corresponding to the holes in the chassis faceplate. The holes in the faceplate start at 2U above the shelf and are spaced every 4U centered as you go up the vertical rack support. There are 7 holes on each side.

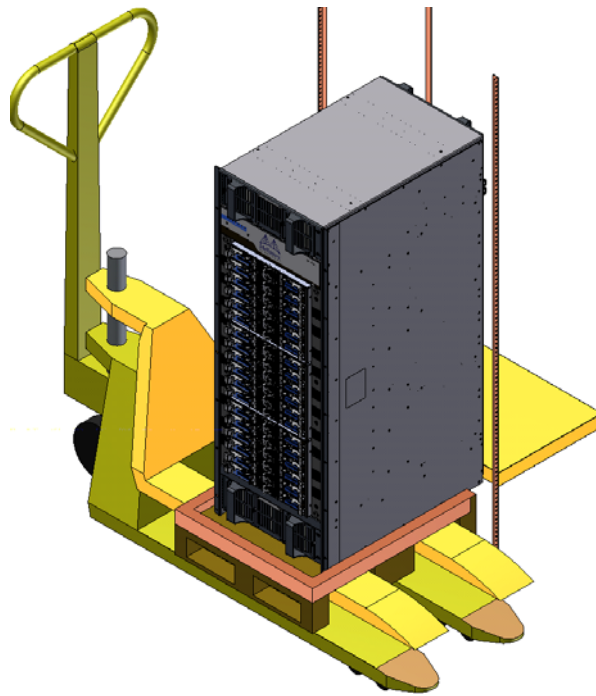
1.6.3.6 Inserting the Chassis



The chassis is on ball bearings and can roll easily. Be aware that the chassis can roll off of the pallet. **Should the chassis start to fall, move out of the way.** The chassis can cause grave bodily harm should it fall on or near you.

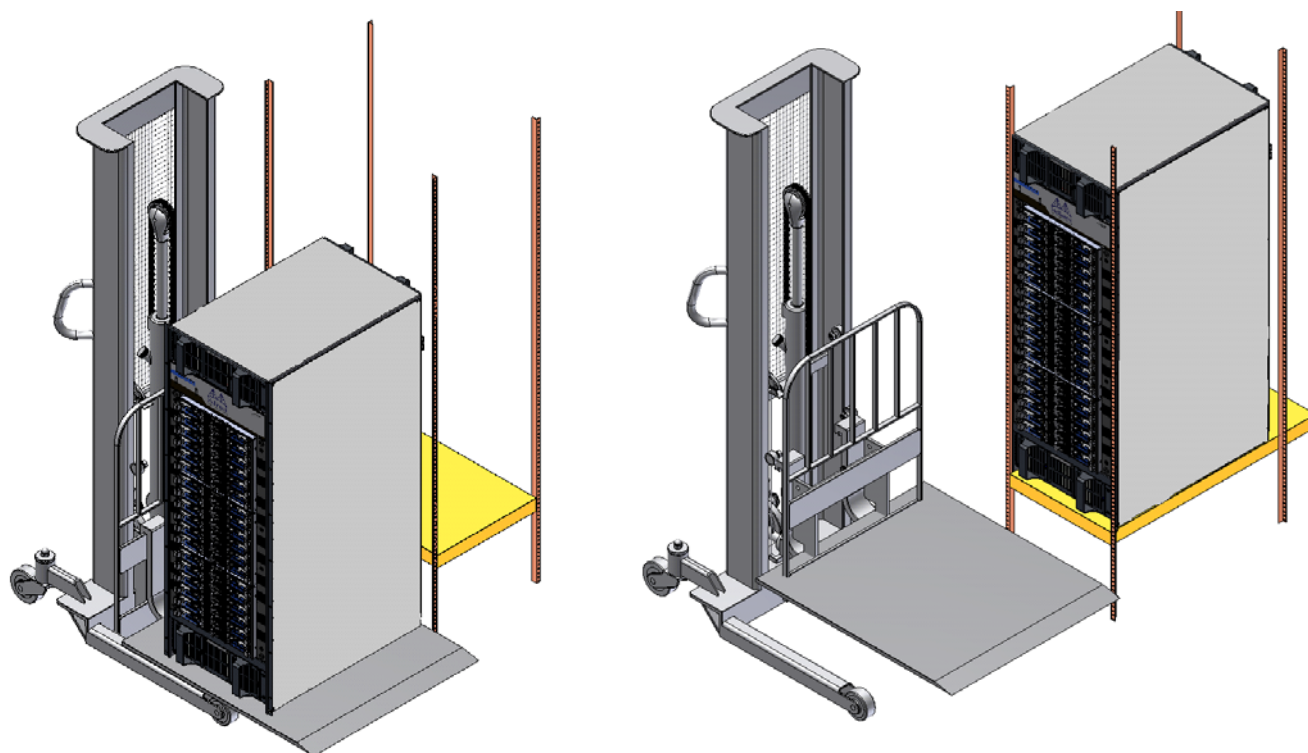
- Step 1. Put the container on the fork lift.

Figure 11: Putting the Chassis in the Rack Using a Fork Lift

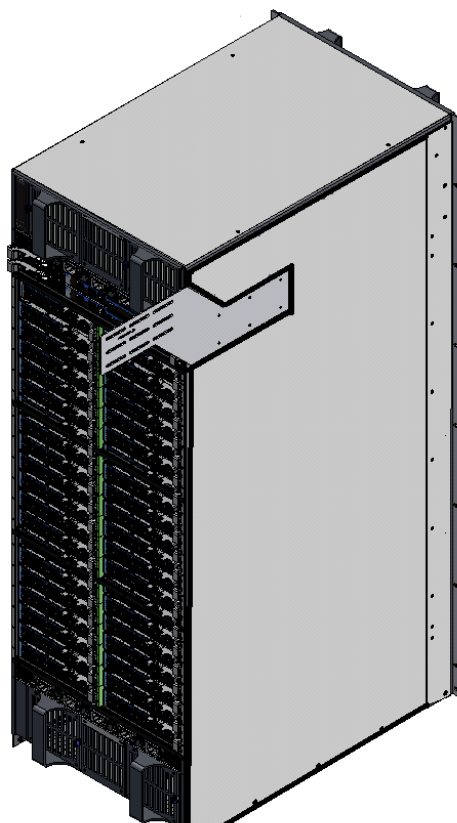


The chassis is screwed down to the pallet on both the spine side and the leaf side.

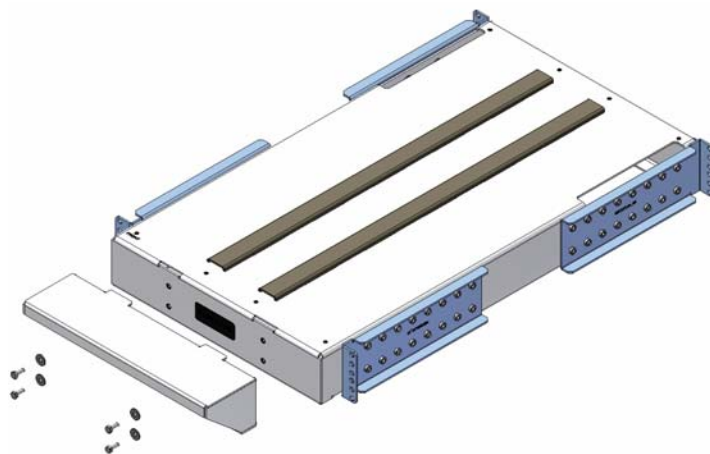
Figure 12: Putting the Chassis in the Rack Using a Mechanical Lift



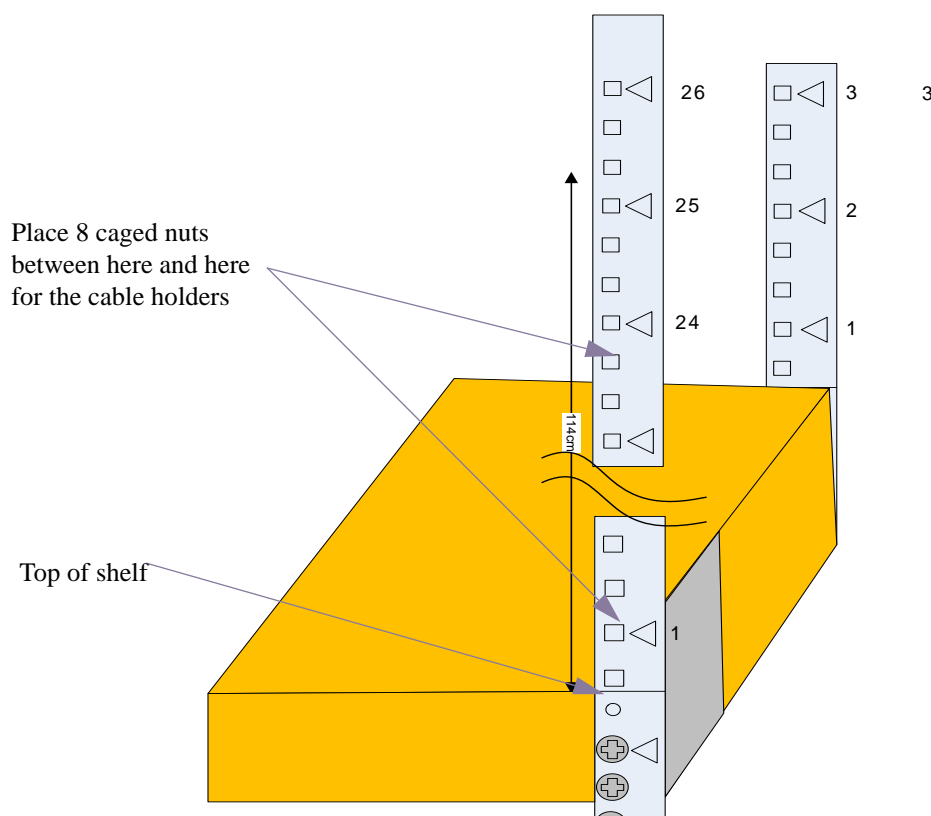
The chassis is screwed down to the pallet on both the spine side and the leaf side.

Figure 13: Place the Upper Bracket Offset

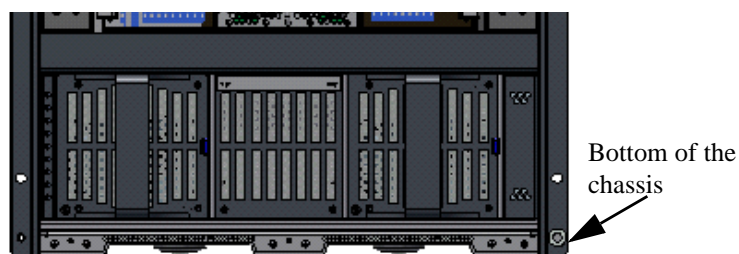
- Step 2. Screw on the two Upper Bracket offsets onto the chassis using six flat head screws for each offset.

Figure 14: Attach the Shelf Extension

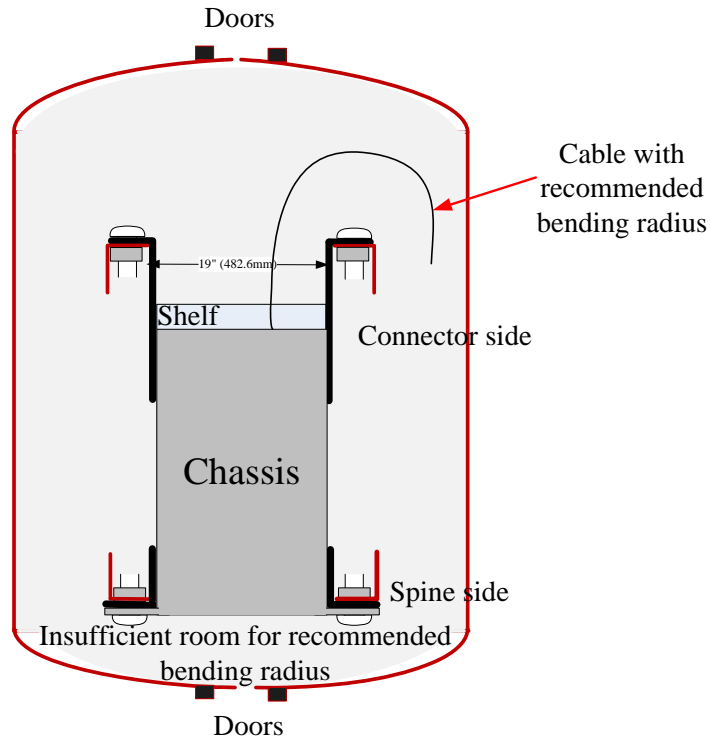
- Step 3. Screw on the shelf extension using four bolts with flat washers.

Figure 15: Place Caged Nuts

- Step 4. If you are installing the cable management system, place 14 caged nuts on the other side of the rack in the vertical supports.

Figure 16: Location for the Lock-down Bar

- Step 5. Unscrew both lock-down bars.
- Step 6. Decide which side of the rack you want the data connectors.

Figure 17: Placement of Chassis in Rack

You will most likely need extra room for cable bending on the connector side of the chassis and should plan to keep the spine side as close to the rack door as possible, thus having more room for the cables.

Step 7. Place the chassis in front of the rack and as close as possible to the rack.

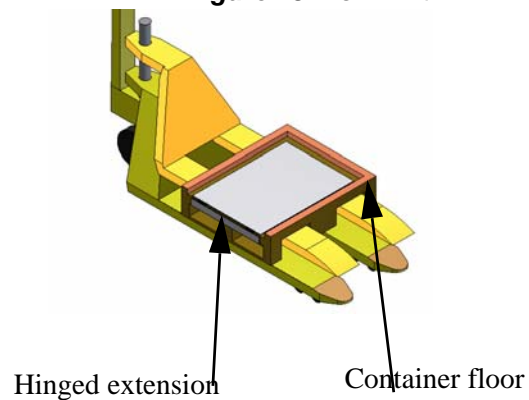
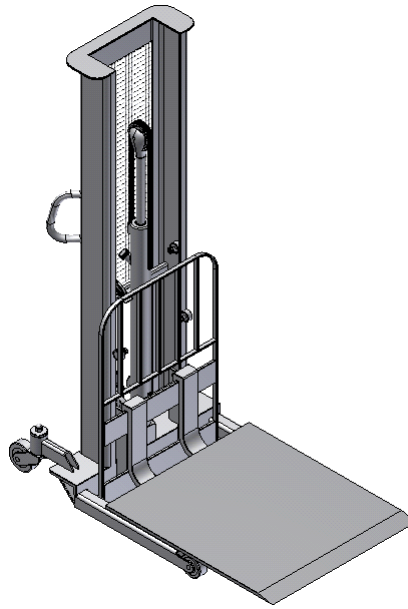
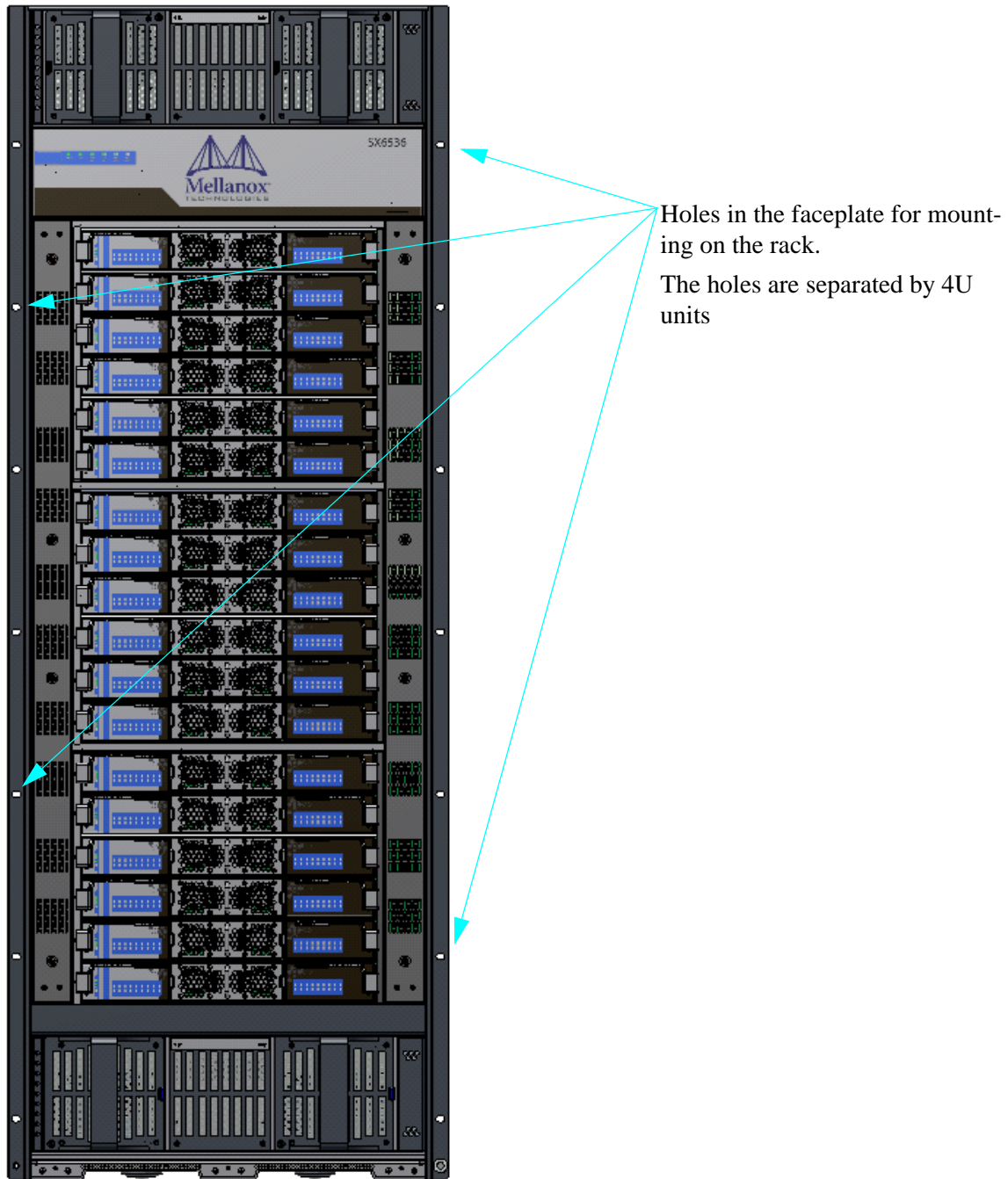
Figure 18: Fork Lift

Figure 19: Mechanical Lift

- Step 8. Raise the chassis so that it is ~5cm above the shelf in the rack.
- Step 9. Raise the hinged extension on the container floor.
- Step 10. Lower the chassis until the hinged extension is sitting on the shelf extension.
- Step 11. Push the chassis from the container to the shelf.



Save the container pallet to remove this chassis. It will be necessary for the removal and disposal procedures.

Figure 20: Face Plate Mounting Bolt Locations

- Step 12. Slide the chassis onto the shelf and determine the location of the upper brackets, on the vertical supports on the connector side of the chassis.



Do not move the forklift away from the rack just yet.

- Step 13. Confirm that the caged nuts for the faceplate are in the correct location.

Step 14. Slide the chassis out just far enough to install the upper brackets. See Figure 21.

Figure 21: Upper Bracket Installation

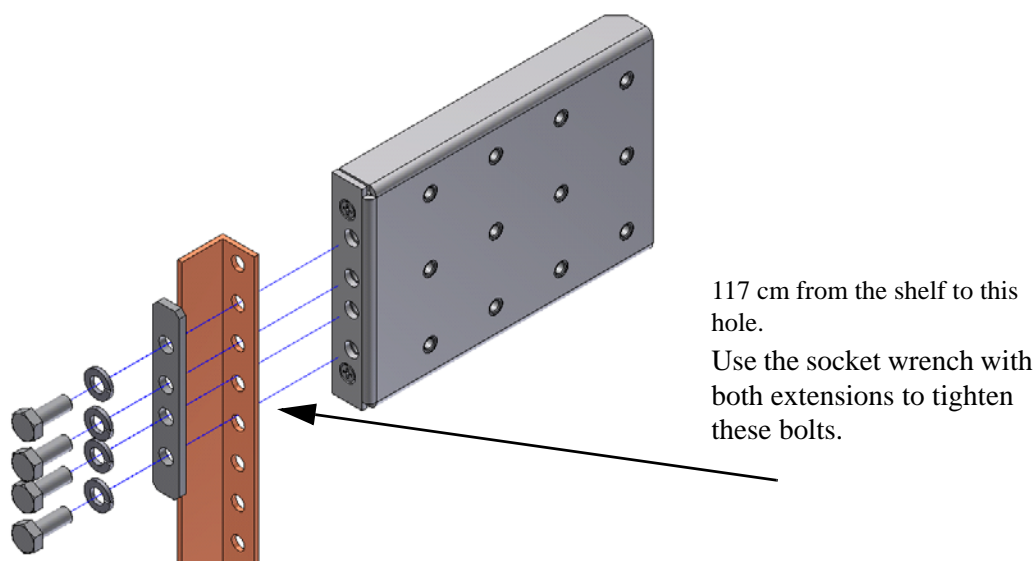
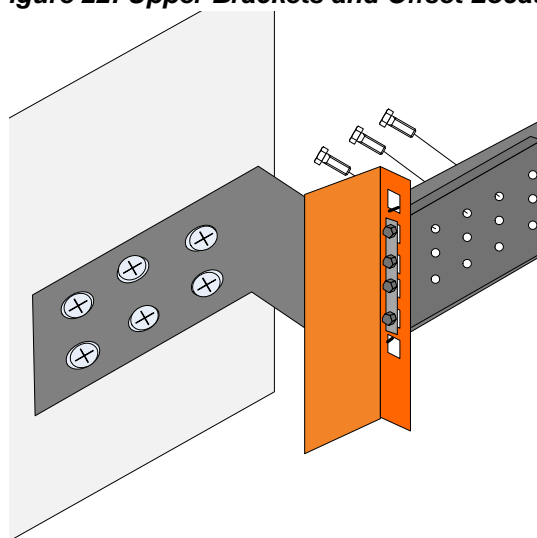
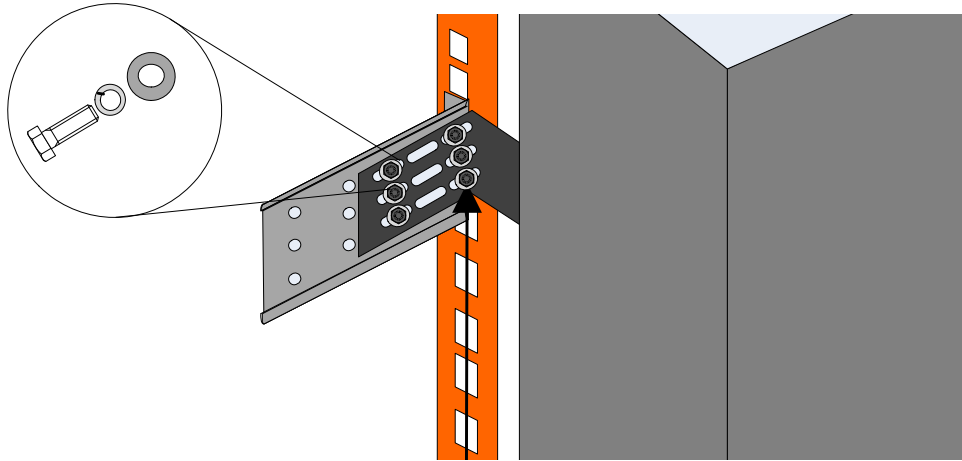


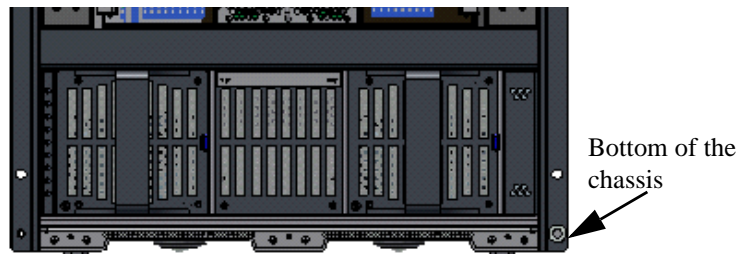
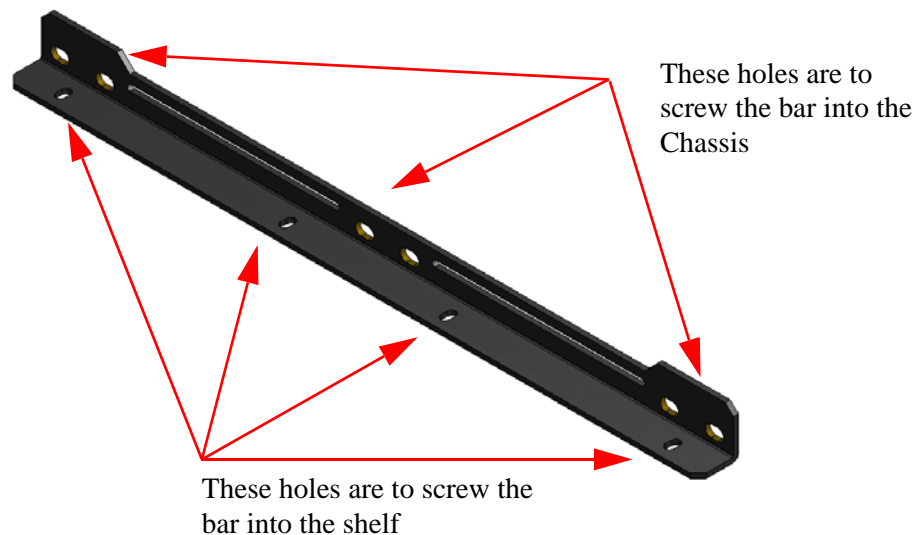
Figure 22: Upper Brackets and Offset Location



- Step 15. Screw the upper brackets onto the vertical supports and tighten in place. See Figure 22. You will need the socket wrench with both extensions to tighten these bolts.
- Step 16. Slide the chassis onto the shelf until the face plate of the chassis touches the vertical rack support.
- Step 17. Make sure the upper brackets are installed in their correct location.
- Step 18. Screw the 14 bolts through the faceplate into the caged nuts, **DO NOT TIGHTEN**.

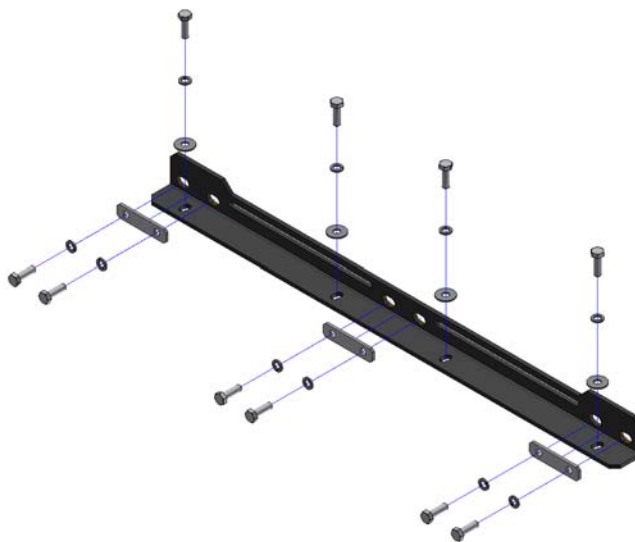
Figure 23: Offset to Upper Bracket Bolts

- Step 19. For each offset and upper bracket, screw six bolts through the offset into the upper bracket. See Figure 23. Use one flat washer and one lock washer for each of these bolts. DO NOT TIGHTEN.

Figure 24: Location for the Lock-down Bar**Figure 25: Lock-Down Bar**

- Step 20. Place the front lock-down bar at the edge of the chassis and align the holes in the lock-down bar with the holes in the shelf. Screw down the lock-down bar. You will need the 10 hex head screws and washers for each lock down bar. **DO NOT TIGHTEN**
- Step 21. Screw down the second lock-down bar.

Figure 26: Lock Down Bars Bolt and Washer Order

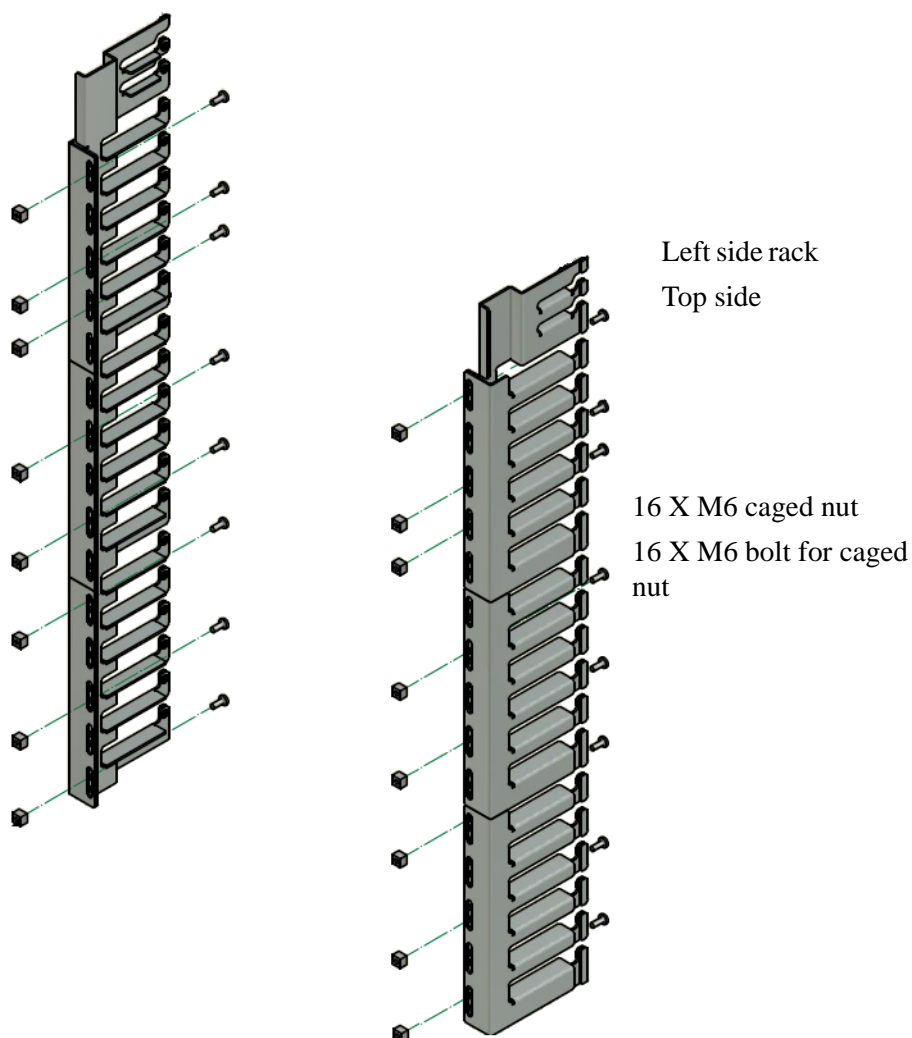


- Step 22. Remove the shelf extension and save for removal of the chassis.
- Step 23. Connect a valid ground, See Section 1.6.5, “Ground Connections,” on page 32, for detailed instructions.
- Step 24. Tighten the faceplate screws. See Figure 20.
- Step 25. Tighten the upper bracket to upper bracket offset screws. See Figure 23.
- Step 26. Tighten the lock down bars. See Figure 26.
- Step 27. Go to Section 3, “Chassis Power Up,” on page 37 to power up the switch system.

1.6.4 Installing the Cable Holder



Now is the time to install the cable holder.

Figure 27: Cable Holder

- Step 1. Place the Cable holder next to the rack, on the connector side of the chassis, and identify the holes where the caged nuts were placed in step 4



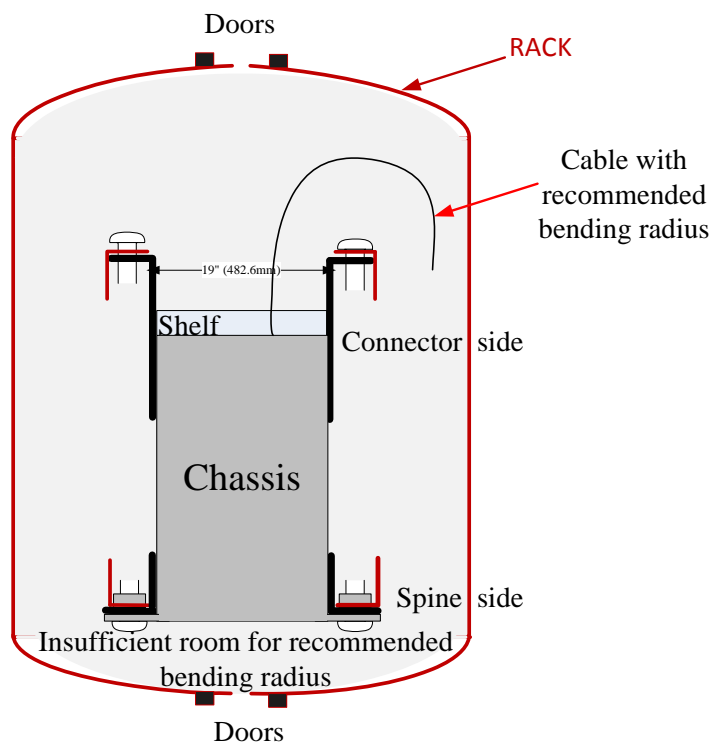
The cable holders should go to the outside of the vertical supports.

- Step 2. Set the bottom of the cable holder at the level of the shelf.



If the cable holder is not set properly the upper bracket will not line up with the cable holder.

- Step 3. Screw the cable holder onto the rack using the screws provided.
- Step 4. Repeat steps 1- 3 for the second cable holder.

Figure 28: Placement of Chassis in Rack

You will most likely need extra room for cable bending on the connector side of the chassis and should plan to keep the spine side as close to the rack door as possible, thus having more room for the cables. See Figure 1.6.5 on page 32.

1.6.5 Ground Connections

Make sure to connect the ground post to a valid electrical ground. Use a grounding lug and a ground wire of sufficient capacity to safely convey a potential discharge. The grounding post is M-8 with 1.25mm pitch threads. A ground wire of AWG 6 or 4mm diameter is recommended for grounding this device. The chassis is concurrently grounded through each of the PSUs. Only connect the PSU cords to properly grounded outlets. Do not rely on the PSU grounds. It is absolutely necessary to connect the grounding post. Make sure the connections are solid and permanent. If you choose to not use the ground screw, make sure that the rack is properly grounded and that there is a valid ground connection between the chassis of the switch and the rack. Test the ground using an Ohm meter.

Figure 29: Ground Connection

1.7 Power Connections

The switch includes integrated hot-swap power supplies which support up to 10 load-sharing 1000W or 1600W supply units. The slots for the power supply units (PSUs) are on the spine side. The left side has odd numbered PSUs and the right side has even numbered PSUs. Each PSU has a dedicated AC inlet. This design enables the optional use of separate main and backup AC feeds. The input voltage is Autorange, 100-240 VAC, 50Hz or 60Hz. The output voltage for the PSUs is 48V. The power cords should be standard 3-wire AC power cords including a safety ground.

1.8 Powering Up the Switch Platform



Make sure that the power cords are compatible with your outlets. Power cords for different countries can be ordered from Mellanox. See the user manual appendix for ordering part numbers for power cords.

- Step 1. Plug in the power cords to the PSUs.
- Step 2. Plug the other end of the power cord into grounded outlets.



Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits or use a 3 phase circuit.

With N+1 PSU redundancy the chassis must be started with a full compliment of possible PSUs, thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC fail over protection.

N+N - will allow for either of the following 2 scenarios.

- Connecting 5 power supplies to a different power supply grid will create N+N grid redundancy, this is High Availability. Under these conditions should a power supply fail (an electric company power failure or blackout for example) power grid High Availability will continue to keep the chassis running at full capacity through a secondary or backup power supply grid or generator or battery backup system.
- The chassis can also be configured for N+1 times 5. This is all 10 PSUs are supplied from a single power source usually the commercial electric grid. This enables 5 power supply redundancy.

With N+N optional PSU grid redundancy the chassis can run on 1/2 of the full complement of PSUs. N+N allows the chassis to run on 5 PSUs supplied from one power grid while 5 are connected to a second power grid.



With power grid A charged with current and power grid B not charged there is only grid redundancy and not PSU redundancy.

The power system will divide the current consumption by the number of working PSUs. Should one of the PSUs fail, the total current consumption will then be divided by the remaining working PSUs. When the failed PSU is hot swapped the new PSU will ramp up and pass its share of current, so that the total current is always divided by the number of working PSUs.

Figure 30: Multiple Power Inlets - Electric Caution Notification

CAUTION

Risk of electric shock and energy hazard.

The PSUs are all independent.

Disconnect all power supplies to ensure a powered down state inside of the switch platform.

ACHTUNG

Gefahr des elektrischen Schocks. Entfernen des Netzsteckers eines Netzteils spannungsfrei. Um alle Einheiten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen

ATTENTION

Risque de choc et de danger e'lectriques. Le de'branchment d'une seule alimentation stabilise'e ne de'branch uniquement qu'un module "Alimentation Stabilise'e". Pour isoler completement le module en cause, Il faut de'brancher toutes les alimentations stabilise'es.

- Step 3. Check the Status LEDs on all of the management modules and confirm that all of the LEDs show status lights consistent with normal operation.



Warning: Any yellow or red status LEDs on any of the management modules is cause for concern and must be dealt with immediately.

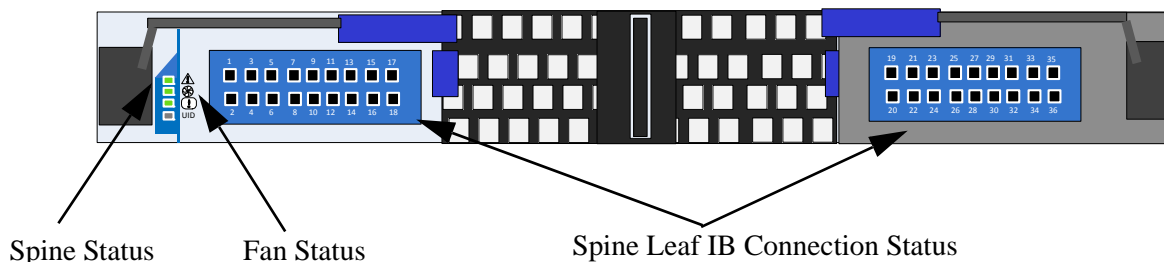
- Step 4. Check that none of the LEDs on the spines are yellow.



It can take up to 5 minutes to boot up the system. Turn off the system if any LEDs remain red for more than 5 minutes.

- Step 5. Check that the leaf status LEDs in the spines are lit.

Figure 31: Spine Module



2 InfiniBand QSFP Cable Installation

The switch uses industry standard QSFP InfiniBand cables which are available from Mellanox Technologies. The standard QSFP cables support full 56+56Gb/s (FDR), 40+40Gb/s (FDR10), 40+40Gb/s (QDR), 20+20Gb/s (DDR) and 10+10Gb/s (SDR) bi-directional wire speed of the switch ports. All InfiniBand QSFP connections are made to the leaf boards. Each leaf has 18 InfiniBand QSFP connectors in two rows, which are numbered 1-18.



If maximum cable lengths are exceeded data transfer will be reduced and the bit error rate will increase.



FDR BandWidth is supported only by MLNX QSFP cables.



FDR and FDR10 are only guaranteed to work with approved Mellanox Cables.

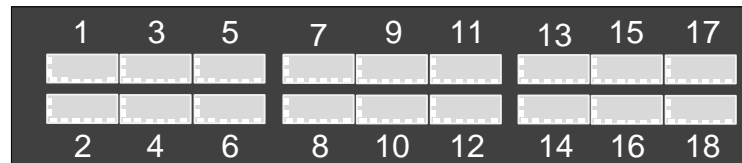
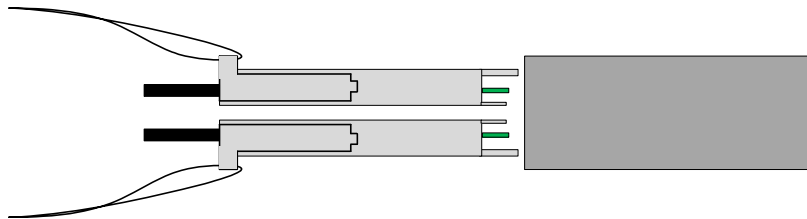
All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector onto the port receptacle until the connector is firmly seated. The LED indicator, corresponding to each data port, will light orange when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with the other end of the connector plugged into a functioning port). When a logical connection is made the LED will change to green. When data is being transferred the light will blink green. To remove, disengage the lock and slowly pull the connector away from the port receptacle.



Warning: Take care to not impede the air flow through the ventilation holes next to the InfiniBand ports. Use cable lengths which allow routing horizontally around to the side of the chassis before bending upward or downward in the rack.

2.1 Port Connector Interfaces

The connector side of the switch has 36 leaf boards and each leaf board has 18 QSFP ports. The ports on each leaf board are placed in two rows, 9 ports to a row. The ports are labelled as shown in Figure 32. The bottom row ports are flipped from the top row. See Figure 33.

Figure 32: Port Numbering**Figure 33: Top and Bottom Ports**

2.2 Supported Approved Cables

For a list of approved cables for this switch see the Mellanox approved cable list.

http://www.mellanox.com/related-docs/user_manuals/Mellanox_approved_cables.pdf

2.3 Cable Power Classes

Chassis and switches need to be able to dissipate the heat generated by high power I/O cables and modules. The Mellanox SX65xx chassis are rated for cables up to class 2 as per the SFF committee classification ([SFF-8436.PDF](#)).

See <http://www.mellanox.com/content/pages.php?pg=cables> for the cable class rating of Mellanox cables.

3 Chassis Power Up



Before starting any procedure on the SX6536 series chassis system put an ESD prevention wrist strap on your wrist and connect to the SX6536 series chassis.

With N+1 PSU redundancy the chassis must be started with a full complement of possible PSUs, thereafter it can run on one less than the total number of PSUs. This final PSU is redundant and allows for hot swapping a PSU should one fail. Connecting the PSUs to different AC lines provides AC failover protection.

The system should continue to run and allow a hot swap of a defective PSU. Should there not be enough power to keep all of the leafs running, MLNX-OS may power down some leafs. If this happens it will be necessary to reboot the chassis once the defective PSU has been replaced.

With 1600W optional PSU supplies the chassis can run on as little as 1/2 of the full complement of PSUs. N+N allows the chassis to run on 5PSUs supplied from one power grid while 5 are connected to a second power grid.

- Step 1. Check all FRUs for proper insertion and seating before connecting the AC power cords.
- Boards
 - Power supplies
 - Leaf fan modules
 - Spine fan modules



Populate the chassis with the leafs before you power up the chassis.

- Step 2. Insert all leafs that you plan to use, in the chassis.
- Step 3. Insert all spines in the chassis.
- Step 4. Insert thermal blanks in unused leaf slots to maintain balanced air flow.
- Step 5. Tighten all leaf and spine mounting screws.
- Step 6. Connect the power cords to the PSUs.
- Step 7. Connect the power cords to grounded electrical outlets.



With N+1 1000 W PSU redundancy, do not power up the chassis with less than all PSUs installed.



A fully loaded SX6536 switch system can draw 8 kW of power. Make sure that the outlets and circuits will not be overloaded. Spread out the load over at least two or three circuits, or a 3 phase supply. High Availability requires 2 separate power grids.

3.1 Power Supply, Management Board, and Spine Board Indicator Status at Power ON

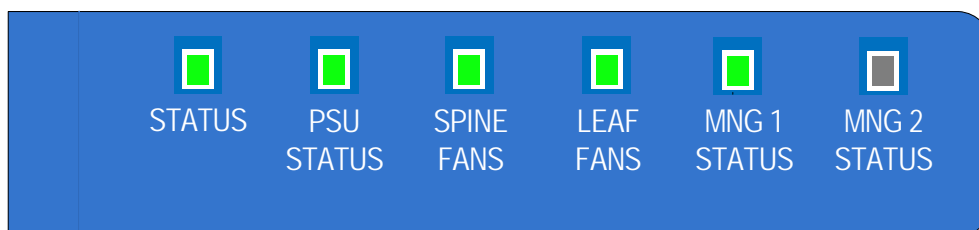


It can take up to 5 minutes to boot up the system. Turn off the system if any LEDs remain red for more than 5 minutes.

As the power is turned on, you should observe the following conditions for normal operation:

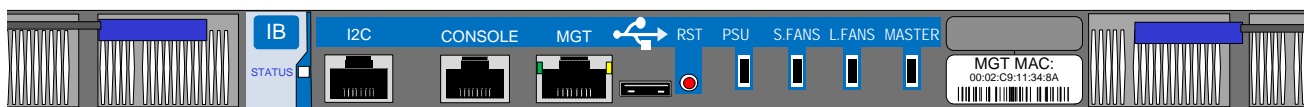
- Step 1. Power Supply Unit(s) AC OK and DC OK indicators are ON and FAIL indicators are OFF.
- Step 2. There is a *green* Status LED per spine board, per leaf board, and per management module that indicates power supplies are good.
- Step 3. Spine Board indicators will display status of internal links to the installed leaf boards. All PHY links to existing leaf Boards should be ON.
- Step 4. Check the Spine LEDs and make sure they coincide with Figure 34.

Figure 34: Spine Side Panel Display Status Indications



- Step 5. Check the Spine LEDs and make sure they coincide with Figure 35.

Figure 35: Management Module Status Indications for Normal Operation



4 InfiniBand Fabric Initialization and Management

Subnet Management and Subnet Administration are standard components defined by the InfiniBand Specification which implement fabric initialization, discovery, and configuration.



The switch's switching fabric can be managed by MLNX-OS, as well as any third party Subnet Management software running on an InfiniBand Host that is connected to any switch port. The switch is also compatible with the Open Source Subnet Manager OpenSM.

The chassis is basically an InfiniBand fabric built out of individual InfiniBand switch devices and appears so to external Subnet Managers. The chassis supports the System Image GUID feature of the InfiniBand specification which means that software management tools that support this feature can recognize all the internal devices as a single switch system.

4.1 Configuring the Switch Management Modules for the First Time

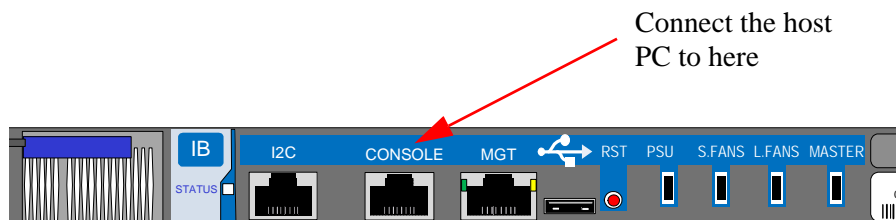


On SX65xx systems, when having dual management systems, first connect the cable and configure the master management module CPU and only then configure the slave. By default the master CPU is the top management module. For further information on the master and slave roles, see the MLNX-OS Software UM section "High Availability" for more information.

Initial configuration must be done on all of the management modules.

- Step 1. Connect the host PC RS232 connector to the CONSOLE port of the management module using the supplied cable.

Figure 36: Connecting the Harness to the Console



No remote IP connection is available at this stage.

- Step 2. Configure a serial terminal program (for example, HyperTerminal, Minicom, or Tera Term) on your host PC with the settings described in Table 3.

Table 3 - Serial Terminal Program Configuration

Parameter	Setting
Baud Rate	9600
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

- Step 3. Login (from serial terminal program) as *admin* and use *admin* as password. This starts the Mellanox configuration wizard.
- Step 4. Go through the Mellanox configuration wizard. Table 4 shows an example of a wizard session.

Table 4 - Configuration Wizard Session - IP Configuration by DHCP (Sheet 1 of 2)

Wizard Session Display (Example)	Comments
Mellanox configuration wizard Do you want to use the wizard for initial configuration? yes	You must perform this configuration the first time you operate the switch or after resetting the switch. Type 'y' and then press <Enter>.
Step1: Hostname? [switch-1]	If you wish to accept the default hostname, then press <Enter>. Otherwise, type a different hostname and press <Enter>.
Step 2: Use DHCP on mgmt0 interface? [no]	Perform this step to obtain an IP address for the switch. (eth0 is the management port of the switch.) 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 'yes' (yes Zeroconf), the session will continue as shown in Table 5. If you enter 'no' (no Zeroconf), then you need to enter a <i>static</i> IP, and the session will continue as shown in Table 6.
Step 3: Enable IPv6? [yes] yes	The management interface will be able to use IPv6 addresses.
Step 4: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no] no	This turns on autoconfiguration of the IPv6 addresses. This is unsuitable for DHCPv6.

Table 4 - Configuration Wizard Session - IP Configuration by DHCP (Sheet 2 of 2)

Wizard Session Display (Example)	Comments
<p>Step 5: Admin password (Press <Enter> to leave unchanged)? <new_password> Step 6: Confirm admin password? <new_password></p>	<p>To avoid illegal access to the machine, please type a password and then press <Enter>. Then confirm the password by re-entering it.</p> <p>Note that password characters are <i>not</i> printed.</p>
<p>You have entered the following information:</p> <ol style="list-style-type: none"> 1. Hostname: <switch name> 2. Use DHCP on mgmt0 interface: yes 3. Enable IPv6: yes 4. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: no 5. Admin password (Enter to leave unchanged): (CHANGED) <p>To change an answer, enter the step number to return to. Otherwise hit <enter> to save changes and exit.</p> <p>Choice: <Enter></p> <p>Configuration changes saved. To return to the wizard from the CLI, enter the “configuration jump-start” command from configuration mode. Launching CLI...</p> <p><switch name> [></p>	<p>The wizard displays a summary of your choices and then asks you to confirm the choices or to re-edit them.</p> <p>Either press <Enter> to save changes and exit, or enter the configuration step number that you wish to return to.</p> <p>Note: To run the command “configuration jump-start” you must be in Config mode.</p>

Table 5 - Configuration Wizard Session - IP Zeroconf Configuration

Wizard Session Display - IP Zeroconf Configuration (Example)
<pre> Mellanox configuration wizard Do you want to use the wizard for initial configuration? y Step 1: Hostname? [switch-112126] Step 2: Use DHCP on mgmt0 interface? [yes] no Step 3: Use zeroconf on mgmt0 interface? [no] yes Step 4: Default gateway? [For example:192.168.10.1] Step 5: Primary DNS server? Step 6: Domain name? Step 7: Enable IPv6? [yes] yes Step 8: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no] no Step 9: Admin password (Enter to leave unchanged)? Step 9: Confirm admin password? (Enter to leave unchanged)? You have entered the following information: 1. Hostname: switch-112126 2. Use DHCP on mgmt0 interface: no 3. Use zeroconf on mgmt0 interface? [no] yes 4. Default gateway: 192.168.10.1) 5. Primary DNS server: 6. Domain name: 7. Enable IPv6: yes 8. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: no 9. Admin password (Enter to leave unchanged): (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... switch-1 > </pre>

Table 6 - Configuration Wizard Session - Static IP Configuration

Wizard Session Display - Static IP Configuration (Example)
<p>Mellanox configuration wizard</p> <p>Do you want to use the wizard for initial configuration? y</p> <p>Step 1: Hostname? [switch-112126]</p> <p>Step 2: Use DHCP on mgmt0 interface? [yes] n</p> <p>Step 3: Use zeroconf on mgmt0 interface? [no]</p> <p>Step 4: Primary IP address? [for example 192.168.10.4] Mask length may not be zero if address is not zero (interface eth0)</p> <p>Step 5: Netmask? [0.0.0.0] 255.255.255.0</p> <p>Step 6: Default gateway? [for example 192.168.10.1]</p> <p>Step 7: Primary DNS server?</p> <p>Step 8: Domain name?</p> <p>Step 9: Enable IPv6? [yes] yes</p> <p>Step 10: Enable IPv6 autoconfig (SLAAC) on mgmt0 interface? [no] no</p> <p>Step 11: Admin password (Enter to leave unchanged)?</p> <p>You have entered the following information:</p> <ol style="list-style-type: none"> 1. Hostname: switch-112126 2. Use DHCP on mgmt0 interface: no 3. Use zeroconf on mgmt0 interface: no 4. Primary IP address: 192.168.10.4 5. Netmask: 255.255.255.0 6. Default gateway: 192.168.10.1 7. Primary DNS server: 8. Domain name: 9. Enable IPv6: yes 10. Enable IPv6 autoconfig (SLAAC) on mgmt0 interface: no 11. Admin password (Enter to leave unchanged): (unchanged) <p>To change an answer, enter the step number to return to. Otherwise hit <enter> to save changes and exit.</p> <p>Choice:</p> <p>Configuration changes saved.</p> <p>To return to the wizard from the CLI, enter the "configuration jump-start" command from configure mode. Launching CLI...</p> <p>switch-1 ></p>

- Step 5. Before attempting a remote (for example, SSH) connection to the switch, check the eth0 interface configuration. Specifically, verify the existence of an IP address. To check the current eth0 configuration, enter the following commands:

```

sx-43 [standalone: master] > enable
sx-43 [standalone: master] # show interfaces mgmt0

```

The following is an example of the output:

```
Interface mgmt0 state

Admin up:          yes
Link up:           yes
IP address:        192.168.10.43
Netmask:           255.255.255.0
Speed:             1000Mb/s (auto)
Duplex:            full (auto)
Interface type:    ethernet
Interface source:  physical
MTU:               1500
HW address:        00:02:C9:11:2A:AE
Comment:

RX bytes:          1343502058      TX bytes:
313920869
RX packets:        17589211      TX packets:    992717
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
```

- Step 6. On SX65xx systems, configure the Box IP (BIP) centralized location for chassis High Availability according to the steps in the MLNX-OS Software UM section “Box IP Centralized Location”.

4.2 Rerunning the Wizard

If you want to rerun the wizard run the following commands:

```
sx-43 [standalone: master] > enable
sx-43 [standalone: master]# configure terminal
sx-43 [standalone: master]# configuration jump-start
```

5 MLNX-OS Management Software

MLNX-OS is a software based management system that can be run with either a command line interface or with a *WebUI* interface. Chassis management comes with the switch system.

5.1 Starting an SSH Connection to the Switch



SSH connection also supports TelNet.

- Step 1. Set up an Ethernet connection between the switch and a local network machine (“the remote machine” henceforth) using a standard RJ-45 connector.
- Step 2. Connect to the remote machine.
- Step 3. Start a remote shell to the switch using the following command:

```
ssh -l admin <your ip address>
```
- Step 4. When prompted for a password enter “admin”.

Note: The IP address used above is the same IP address that was assigned to the Mellanox configuration wizard in the “Configuring the Switch Management Modules for the First Time” section.

- Step 5. You can enter any supported command now.



For a complete reference of commands, please see *Mellanox MLNX-OS Management Software User’s Manual*.

5.2 Starting a WebUI Connection to the Switch

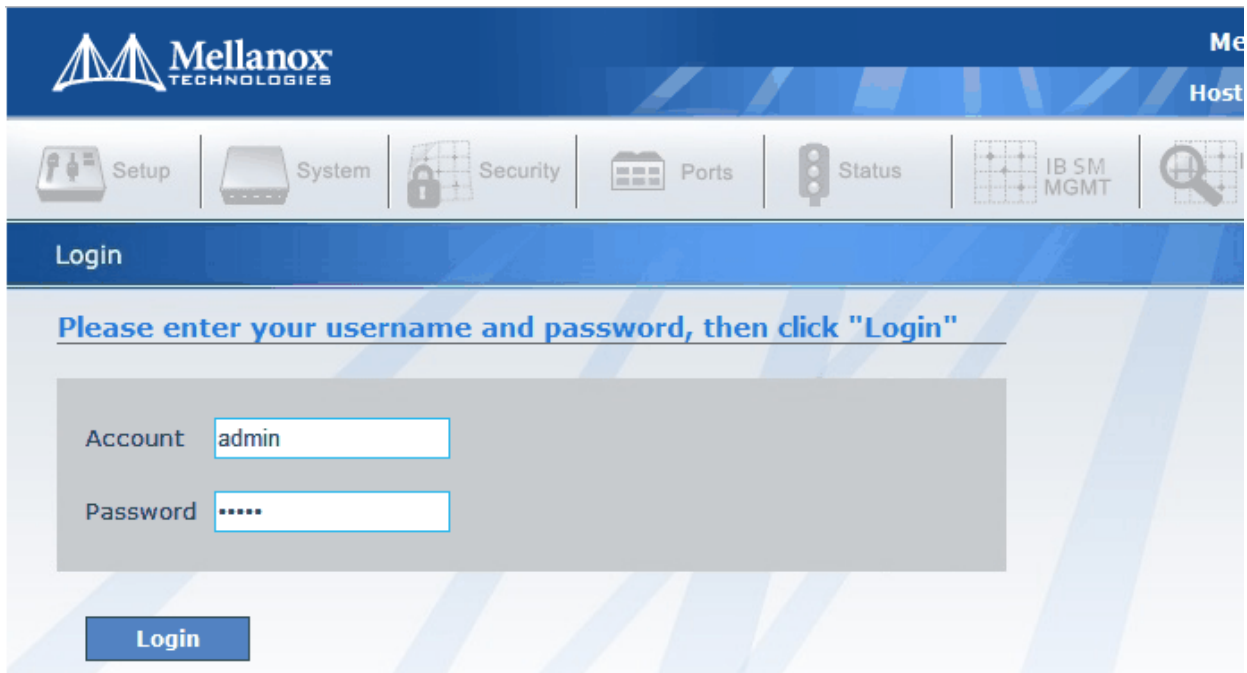
- Step 1. Set up an Ethernet connection between the switch and a local network machine (“the remote machine” henceforth) using a standard RJ-45 connector.
- Step 2. Start a Web browser – Google Chrome, Internet Explorer 7.0 or Mozilla Firefox 3.0.



Make sure the screen resolution is set to 1024*768 or higher.

- Step 3. Enter the following URL: `http://<switch_IP_address>`
where `<switch_IP_address>` is the IP address of the switch or its DNS name.
- Step 4. You will receive the login window for remote management of the switch.

Figure 37: Web UI Login Page



The image shows the Mellanox Technologies Web UI Login Page. At the top, there is a blue header with the Mellanox Technologies logo on the left and the text "Me Host" on the right. Below the header is a navigation bar with icons and labels for "Setup", "System", "Security", "Ports", "Status", "IB SM MGMT", and a search icon. The main content area has a blue "Login" header. Below this, a blue instruction bar says "Please enter your username and password, then click 'Login'". A light gray login form contains two input fields: "Account" with the text "admin" and "Password" with masked characters "*****". A blue "Login" button is positioned below the form.

- Step 5. Use *admin* for both the login (Account) and the password.

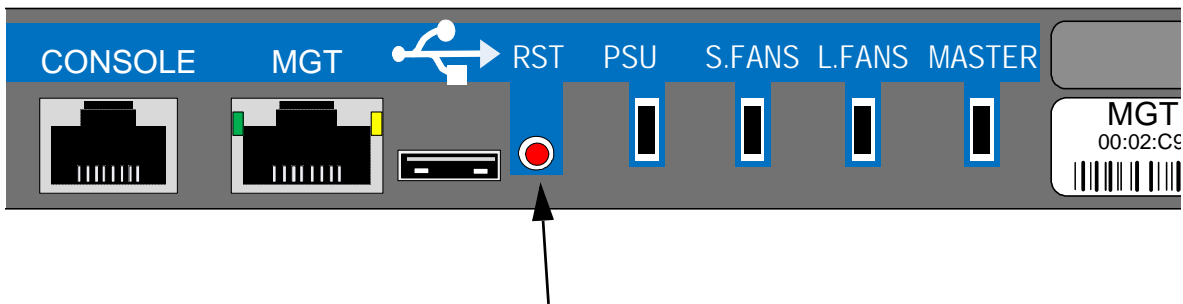
6 Resetting the Switch – RST

The Reset button resets the chassis management module when the button is pushed. When the button is held down for 15 seconds the chassis is reset and the password deleted.



DO NOT use a sharp pointed object such as needle or push pin for pressing the Reset button. Sharp objects can cause damage, use a flat object such as a paper clip.

Figure 38: Reset Button



This button resets the CPU of the management module. A quick push of this button performs this reset. When the reset button is pushed on the master management module this management module is reset becoming the slave and the other management module becomes the master. If there is only one management module in the chassis all of the leafs and ports are reset by bringing them down and powering them up when the reset button is pushed. When the button is held down for 15 seconds the management module is reset and the password is deleted. You will then be able to enter without a password and make a new password for the user admin.

7 TroubleShooting

7.1 Power Supply Unit



If the Power supplies cannot supply enough power the management module may shut down the leafs until the power being supplied is sufficient to run the operating leafs. If the management module does shut down some leafs, it may be necessary to reboot the chassis to get the shut down leafs up and running again.

As each PSU is plugged in, make sure that the green power LEDs on the PSU comes on.

If the AC power LED is off:

- Step 1. Check that the power cable is the correct power cable for your country.
- Step 2. Check that the power cable is plugged into a working outlet.
- Step 3. Check that the power cable has a voltage within the range of 100 - 240 volts AC.
- Step 4. Remove and reinstall the power cable.
- Step 5. Check the circuit breakers to be sure that the breaker has not tripped.
- Step 6. Check that the power cable is good. Replace the power cable.
- Step 7. If the AC power LED is green but the OK power LED is off or the FAIL LED is on – Replace the PSU.

7.2 Leaf Board

The power LED for the Leaf board is off:

- Step 1. Make sure that all of the PSUs are showing DC OK.
- Step 2. Uninstall and reinstall the Leaf board.
- Step 3. When the Yellow LED is on, this indicates a fault in the board, uninstall and reinstall the Leaf board.
- Step 4. If uninstalling and reinstalling the Leaf board does not work, burn the latest FW on the Leaf board and uninstall and reinstall the Leaf board.
- Step 5. Replace the Leaf board with a new one.



Should any of the leaf boards shut down due to over temperature, it may be necessary to reboot the chassis.

The Physical link LED for the InfiniBand connector does not come on:

- Step 1. Check that both ends of the cable are connected.
- Step 2. Check that the locks on the ends are secured.
- Step 3. Make sure that the latest FW version is installed on both the HCA card and the switch.
- Step 4. If media adapters are used check that the all connections are good, tight, and secure.
- Step 5. Replace the cable.

The Activity indication does not come on:

Check that the Subnet Manager has been started.

7.3 Management Module

7.3.1 Yellow Status LED (for the Chassis) on the Management Module is Lit

- Step 1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
- Step 2. Reset the master management module by pushing the reset button. If you have two management modules installed this will convert the master management module to the slave and convert the slave to the master.



If there is only one management module in the chassis all of the leafs and ports are reset by bringing them down and powering them up when the management module is removed.

- Step 3. Make sure the S.Fans and L.Fans LEDs are green.
- Step 4. Make sure that the spine and the leafs both have the same version of FW.
- Step 5. Reburn the FW and remove and reinstall the management module.
- Step 6. If you are running the chassis with only one management module, remove and reinstall the management module. Make sure the mating connectors of the unit are free of any dirt and/or obstacles. See Section 5.5 on page 74.
- Step 7. If you are running the chassis with only one management module, replace the management module.

7.3.2 Yellow LED for the Leaf Fan on the Management Module is Lit

- Step 1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
- Step 2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
- Step 3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
- Step 4. Determine which fan module is problematic by checking the status LED on each fan module.
- Step 5. Remove and reinstall the problematic fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 5.4 on page 71.
- Step 6. Replace the Leaf fan module.



There are two non-interchangeable types of leaf fan modules. If the new leaf fan does not go into the chassis confirm that it is the correct fan module.



Replace defective leaf fan modules as soon as they are identified.



Should any of the leaf boards shut down due to over temperature, it may be necessary to reboot the chassis.

7.3.3 Yellow LED for the Spine Fan on the Management Module is Lit

- Step 1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
- Step 2. Determine which spine has a defective fan by checking the Fan LEDs on all of the spines.
- Step 3. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
- Step 4. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
- Step 5. Remove and reinstall the fan unit of the spine. Make sure the mating connector of the new unit is free of any dirt and/or obstacles. See Section 5.4 on page 71.
- Step 6. Replace the spine fan module.



Replace defective spine fan modules as soon as they are identified.

7.4 Spine Board

The yellow LED on the Spine board is lit:

- Step 1. Check the MLNX-OS management for confirmation and possible explanation of the alert.
- Step 2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
- Step 3. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the switch using a vacuum cleaner.
- Step 4. Remove and reinstall the spine board. Make sure the mating connectors of the unit is free of any dirt and/or obstacles. See Section 5.3 on page 69.
- Step 5. Make sure that the spine and the Leafs both have the same version of FW.
- Step 6. Reburn the FW and remove and reinstall the spine.
- Step 7. Replace the spine board.

7.5 MLNX-OS Software

For a instructions concerning software updates see the Mellanox MLNX-OS™ SwitchX® Software WebUI User's Manual or the Mellanox MLNX-OS™ SwitchX® Software User Manual.

For more information and documentation on the SX6536 Series go to:
the Mellanox Website <http://www.mellanox.com>



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648 Port InfiniBand FDR Switch Platform Installation Guide



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