



4UP 16-SLOT GEN4

OSS-PCIe4-4UP-16



INSTALLATION GUIDE

4UP 16-SLOT Gen4



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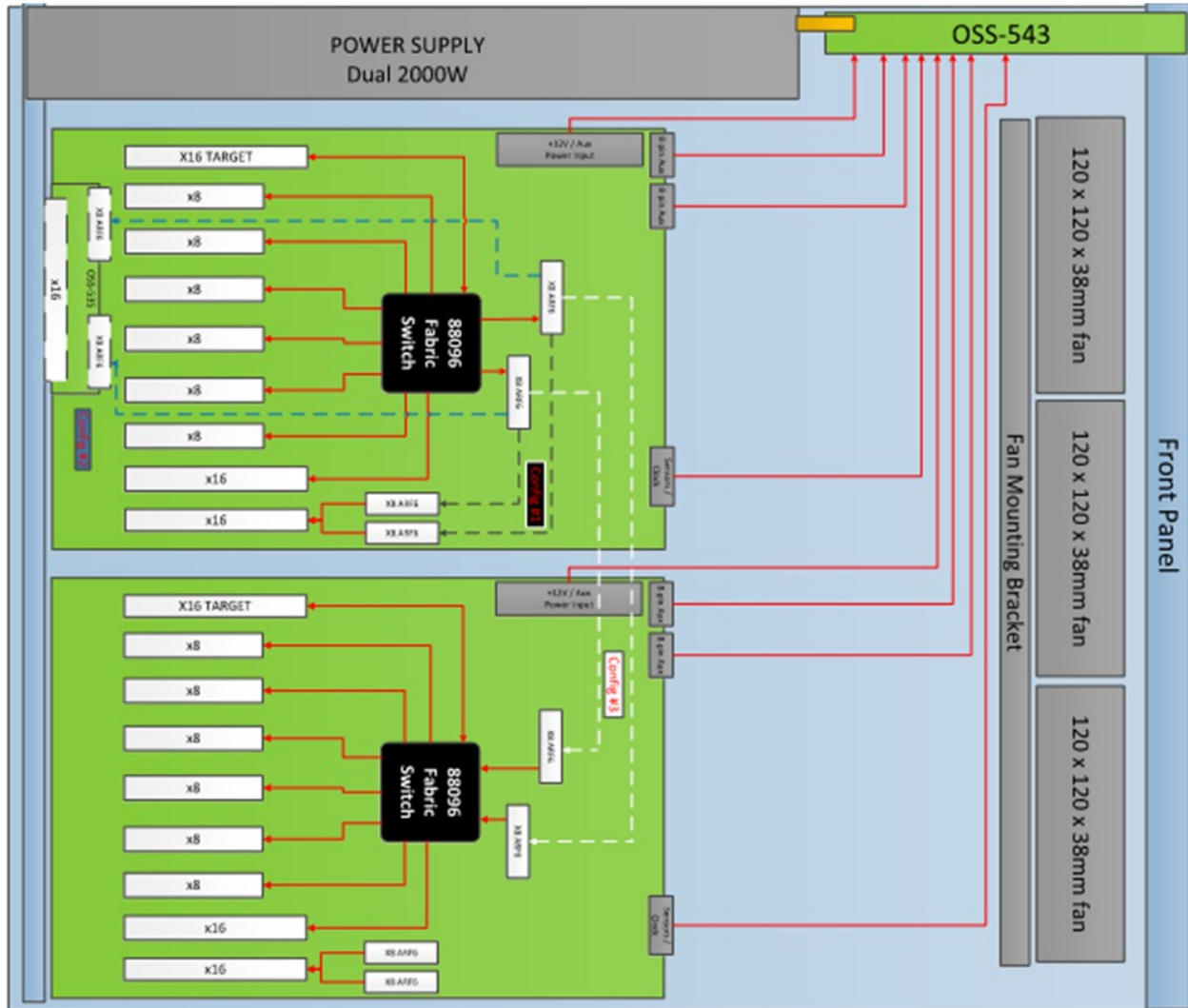
1 General Specifications

Item	Description
Enclosure	Dimensions: 17.2" x 7" x 18.5" (4U) Net weight 38 lbs
Host Options	1x PCIe x4 x16 Host-to-Target uplink (32GB/s) 2x PCIe x4 x16 Host-to-Target uplinks (64GB/s) 4x PCIe x4 x16 Host-to-Target uplinks (128 GB/s) SmartNIC Host
Backplane Options	Single OSS-521: <ul style="list-style-type: none"> • 1x single-width PCIe 4.0 x 16 FHFL upstream slot • 6x single-width PCIe 4.0 x16 FHFL downstream slots • 1x dual-width PCIe 4.0 x16 FHFL downstream slot Dual OSS-521: <ul style="list-style-type: none"> • 2x single-width PCIe 4.0 x 16 FHFL upstream slot • 12x single-width PCIe 4.0 x16 FHFL downstream slots (6x per upstream) • 2x dual-width PCIe 4.0 x16 FHFL downstream slot (1x per upstream)
Additional Options	Slot Standard <ul style="list-style-type: none"> • Modifies one dual-width PCIe 4.0 x16 FHFL downstream slot to two single-width PCIe 4.0 x16 FHFL downstream slots per backplane Riser <ul style="list-style-type: none"> • Adds and additional single-width PCIe 4.0 PCIe 4.0 FHFL downstream slot per backplane Linked <ul style="list-style-type: none"> • Links two backplanes together so all slots are downstream to a single upstream
Cooling	Operational Temperature: 0-35°C Operational Humidity: 10-90% relative humidity Operational Altitude: 0-10,000 feet above sea level Storage Temperature: -40°C - 71°C Fans: <ul style="list-style-type: none"> • 3x 180CFM 120mm fans • Default PWM controlled based on built-in temperature sensors • Optional IPMI system monitoring and control
Power Options	Single/ Dual AC 1600W Single/Dual DC 1600W
System Monitoring	Default - automatic dynamic temperature based fan speed control Optional-IPMI system monitoring with power, temperature, and fan speed control and monitoring
Fan Filters	Optional Quadra foam 45 PPI Replaceable Fan Filters
PCIe 4.0 Cable Lengths	1m 2m 3m
Power Cords	6' US 110V 6' US 240V 6' UK 2' IEC 6' IEC
Agency Compliance	Agency Certifications (testing pending): <ul style="list-style-type: none"> • FCC Class A • CE Safety & Emissions • UL, cUL • RoHS3
Warranty	1 Year Return to Factory. Extended Warranty is available and sold separately. Upon purchased of a new unit you can buy an extended warranty.
Operating System Supported	Windows 10, Windows Server and Linux based OS

1.1 Features

- PCIe Gen4 architecture
- Semi-rugged frame design
- Dynamic fan speed control
- Configurable slot and host uplinks to optimize throughput
- Integrated IPMI based system monitoring
- AC and DC power inlet options

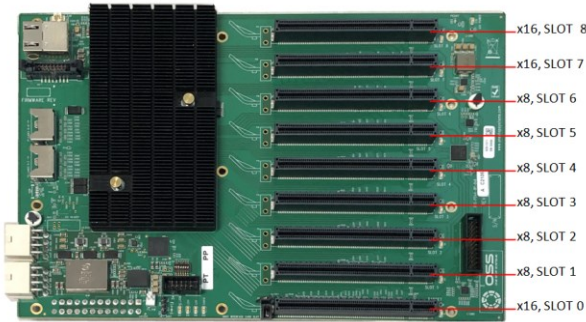
1.2 4UP Architecture (16 Slot)



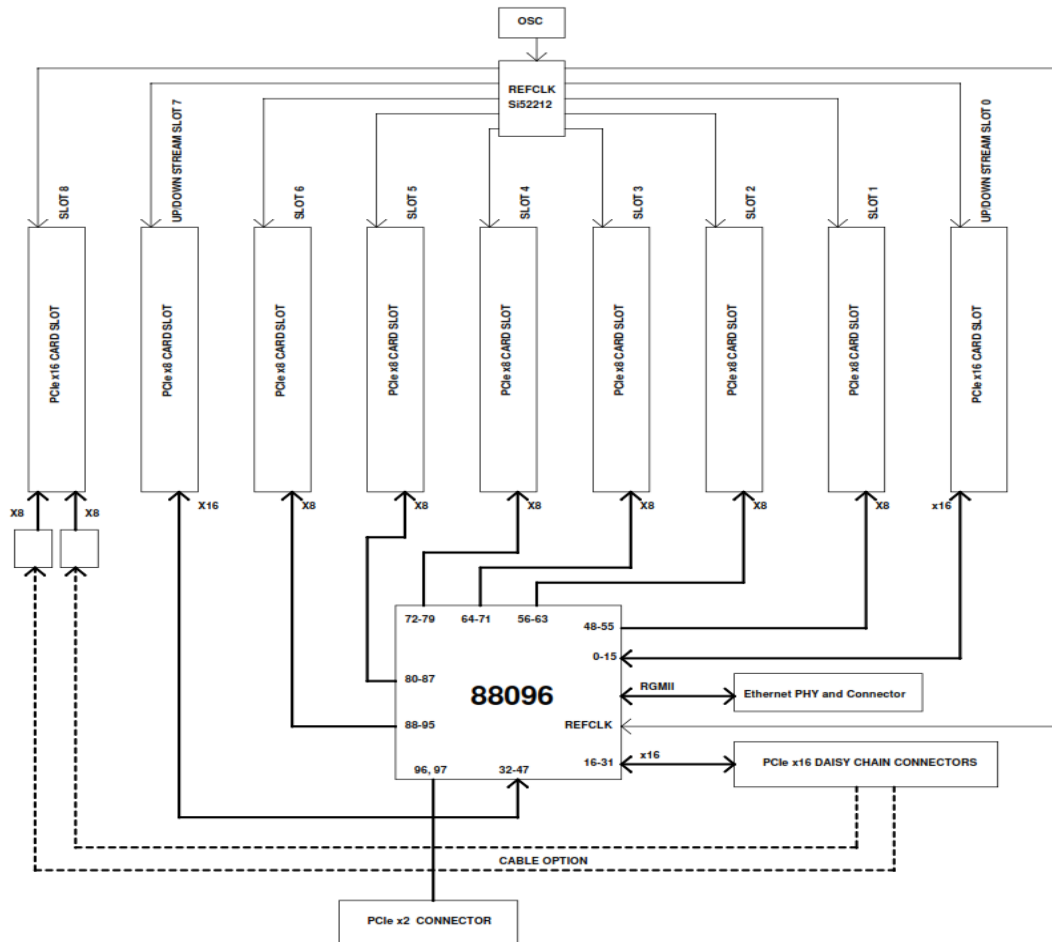
1.3 PCIe Slots

Slot Type: Closed-ended PCIe slot / connector, all the slots are x16 mechanical.

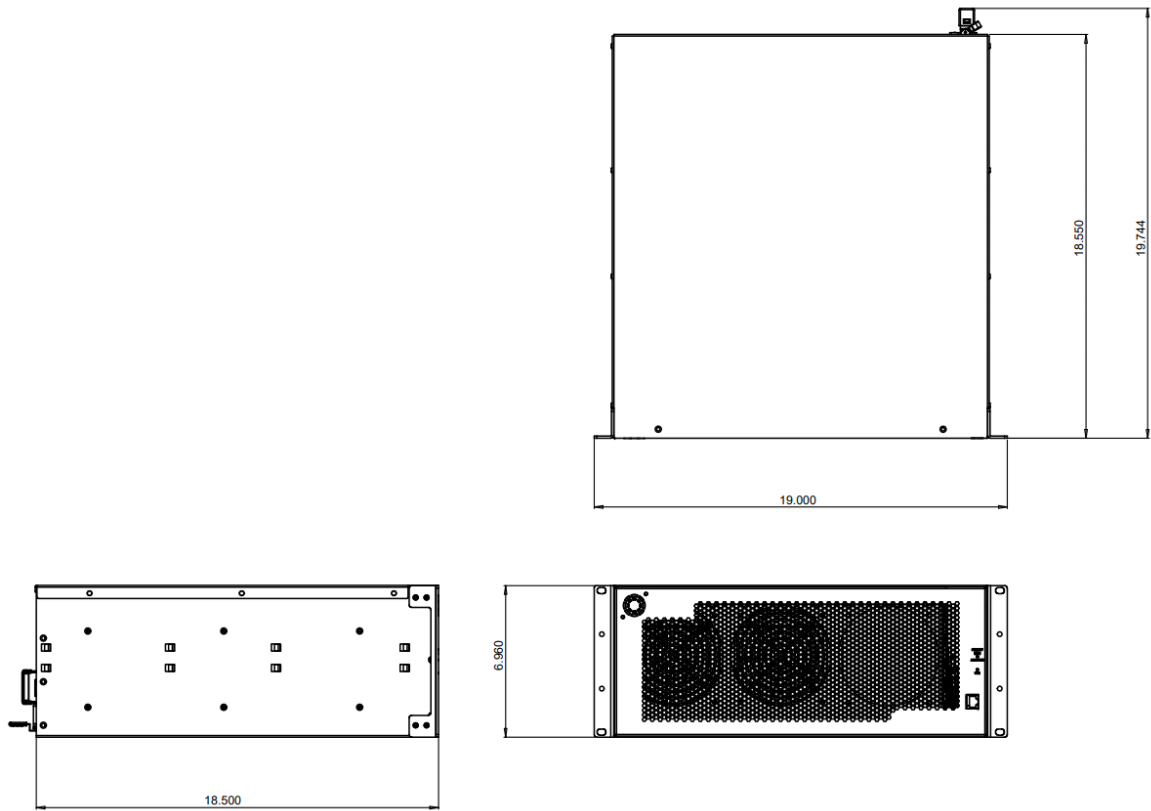
- Six x8 electrical slots (slots 1, 2, 3, 4, 5 and 6)
- Three x16 electrical slots (slots 0, 7 and 8)



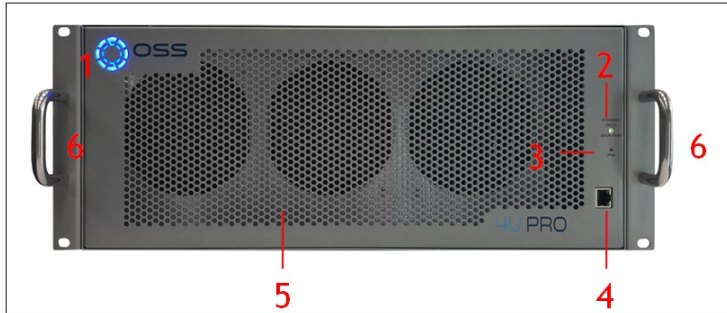
1.4 Backplane Block Diagram



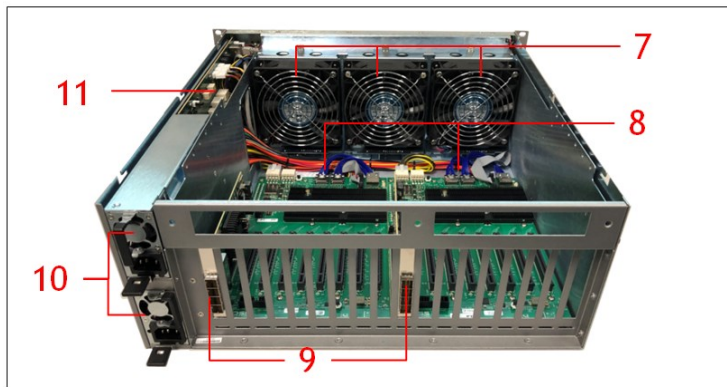
1.5 Dimensions



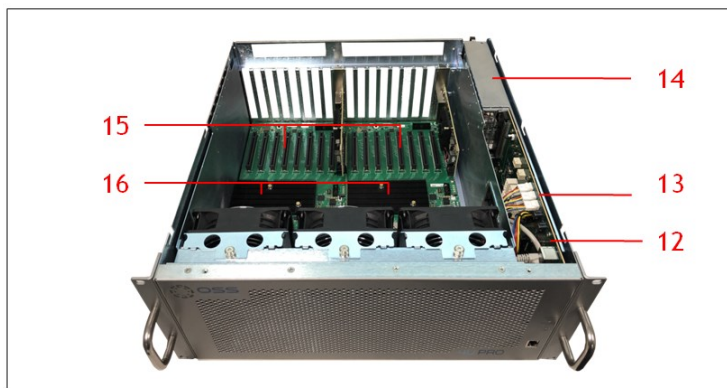
1.6 Parts Overview



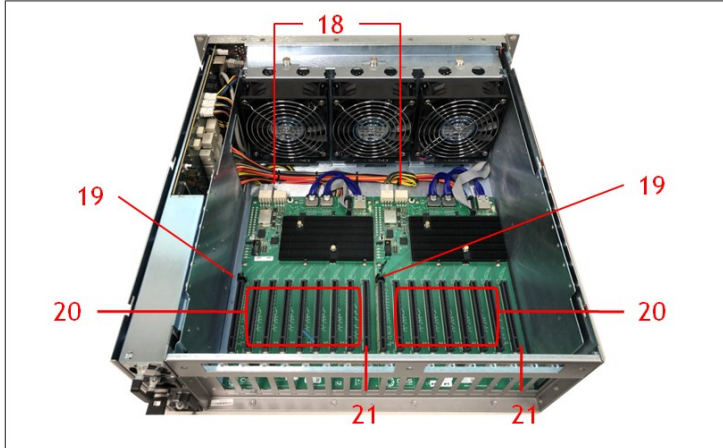
Number	Description
1	OSS LOGO-LED
2	Standby/ Main Power LED
3	IPMI LED
4	RJ45 Port – Access to IPMI
5	Front Panel
6	Front Handles



Number	Description
7	Removable Fans
8	ARC Connectors & Cables
9	Target Cards
10	Power Supplies
11	Auxiliary Power Connectors

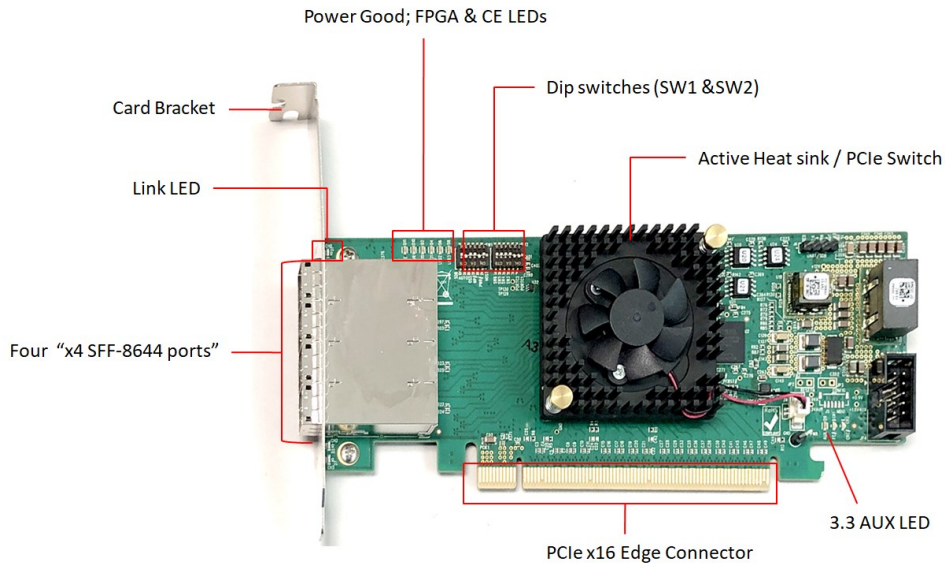


Number	Description
12	IPMI Module / Board
13	Fan Power Connectors
14	Power Supply Housing
15	Backplane & PCIe Slot (OSS -521 board)
16	Passive Heat sink / PCIe Switch



Number	Description
18	12V Input Power Connectors
19	Upstream Slots / Target Slots
20	Downstream Slots / PCIe Card Slots
21	Options Slots (Operates as either Downstream slot or Upstream slot depending on the slot-configuration)

1.7 HIB x16 Gen 4 Card



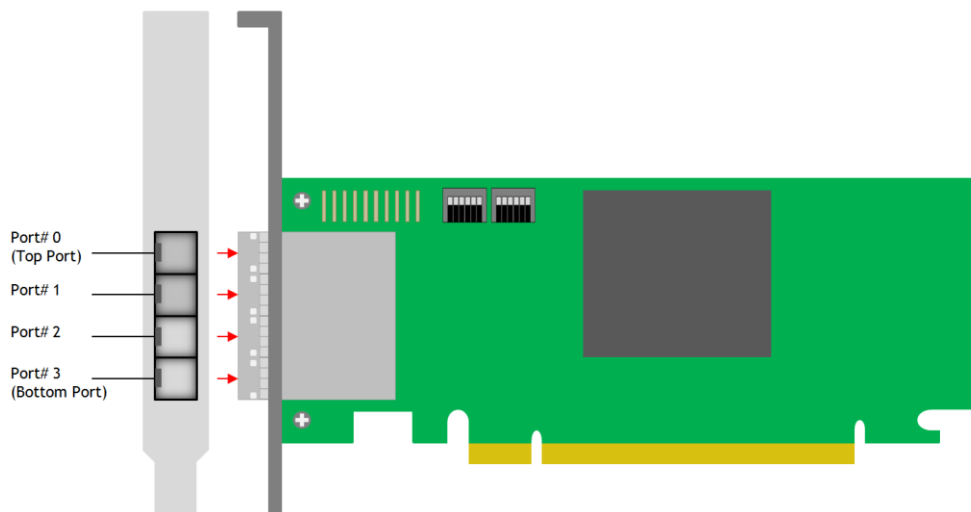
x4 cable Ports

There are four x4 cable ports /connectors available on the HIB Gen4 card. **Port #0** is located nearest to the Link LED.

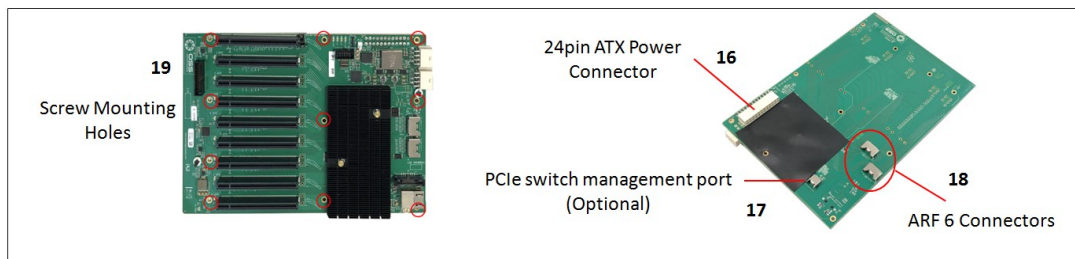
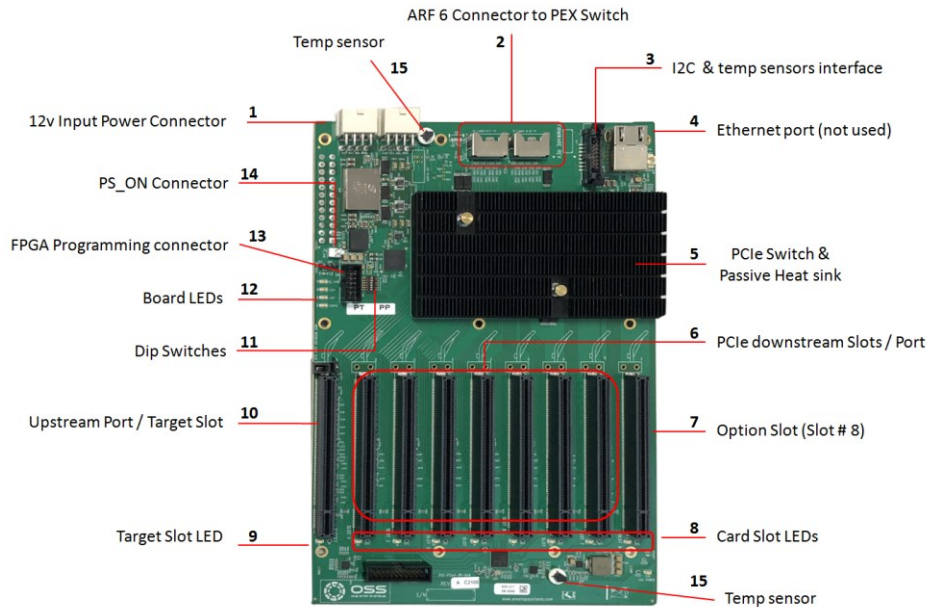
- A single x4 SFF-8644 cable must be inserted into port#0 of the Target card.
- On the Host card side, you can plug in a single x4 cable to any port as long as the Host card switch is set to x4 mode.

When using two x4 SFF-8644 cables, it must be connected to port#0 and port#1 of the Target card only.

- On the Host card side, plug-in the two cables to port#0 and portt#1 **OR** port#2 and port#3.



1.8 Backplane

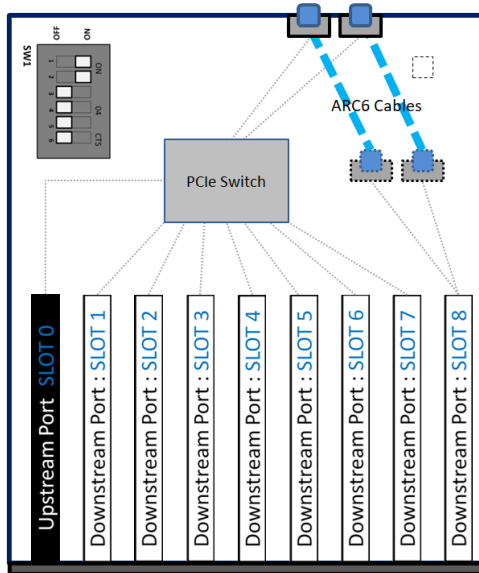


Item	Name	Description
1	12V Input Power	12V input power for the 538 board. Not to be used for external GPU aux
2	ARF 6 Top Connectors	For connecting ARC 6 cables between "Option slot" and PEX switch
3	I2C and temp sensors interface	Connector for I2C and temp sensors interface to the power backplane
4	Ethernet port	Not used
5	Passive Heat sink	Moves heat away from the PCIe chip
6	PCIe Downstream Slots / Port	PCIe card slot for 3 rd Party PCIe cards
7	Option Slot	Configurable card slot to operate either as an Upstream or Downstream modes
8	Card Slot LED	LED status indicator when slot is populated or not. Solid green when card is present. Off, when no card
9	Target Slot LED	LED status indicator for Target card. Solid green when Gen 4 adapter card is installed
10	Upstream Port / Target Slot	Designated slot for Target card only
11	Dip Switches	For slot configuration
12	Board LEDs	LED status indicator for the board
13	FPGA Connector	FPGA Programming connector
14	PS_ON	Enable to force power ON the backplane by placing a jumper on the connector
15	Temperature Sensor	Sensor for detecting temperature on the board
16	24-pin ATX Power Connector	For connecting ATX Power Supply
17	PCIe Switch Port	PCIe switch management port, optional
18	ARF 6 Bottom Connectors	For connecting ARC 6 cables between "Option slot" and PEX switch
19	Screw-Mounting Holes	For securing the board on to an enclosure

1.9 Slot Configurations

Configuration# 1: Default slot configuration. One Upstream slot and eight Downstream slots.

ARC6 cables are required and must be attached between the edge of the board and the slot connectors under the backplane. Without the ARC6 cables attached the SLOT 8 is inoperable.



1 Upstream Slot (SLOT 0)

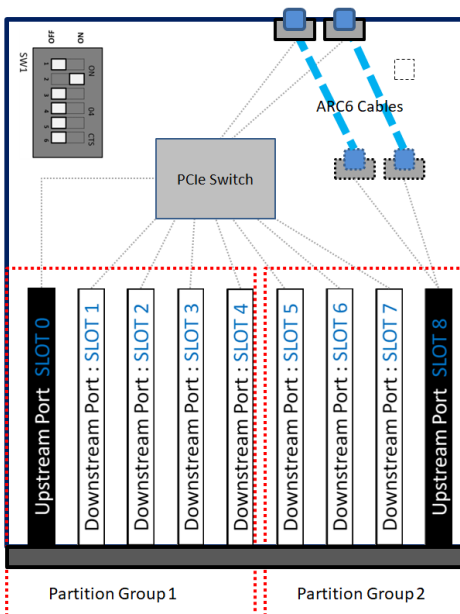
- One partition

8 Downstream Slots

- Slots # 1, 2, 3, 4, 5, 6, 7 and 8

Configuration# 2: Two Upstream slots (Slot 0 and SLOT 8) with two partitions.

- Slot 0: Partition #1 with four Downstream slots
- Slot 8: Partition #2 with three Downstream slots



2 Upstream Slots (SLOT 0 and SLOT 8)

- Two partitions

7 Downstream Slots

- 4 Downstream slots for **partition group 1**

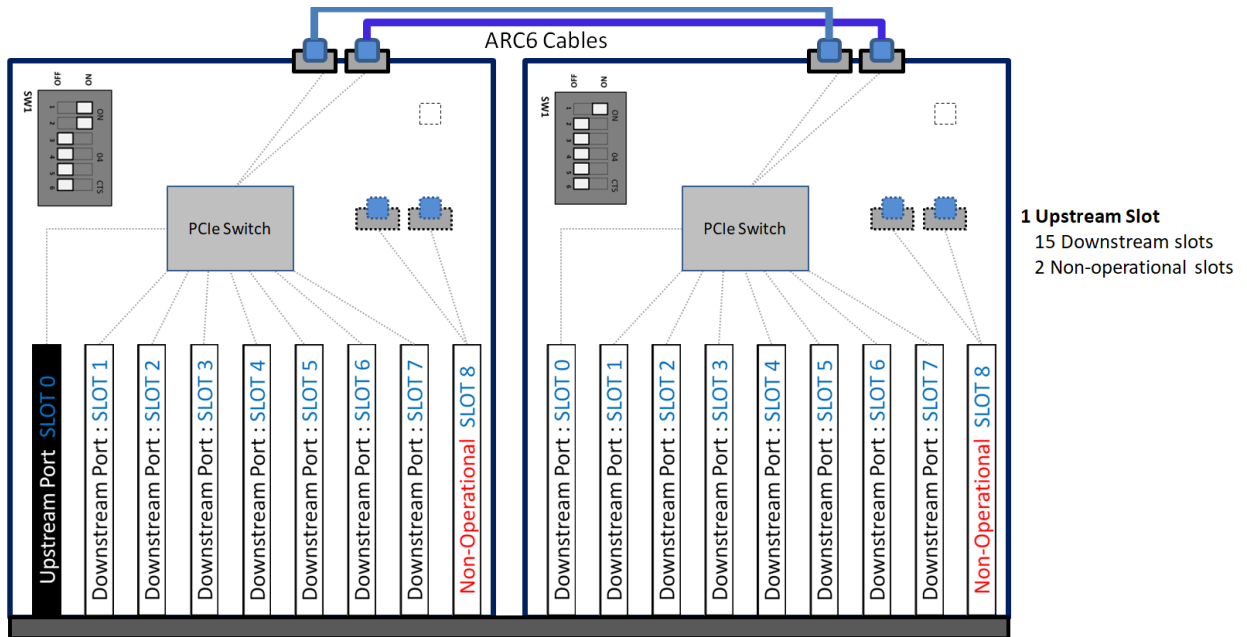
- Slots # 1, 2, 3 and 4

- 3 Downstream slots for **partition group 2**

- Slots # 5, 6 and 7

Configuration# 3: Two backplanes are daisy chained together.

- One Upstream slot and 15 Downstream slots.



1.10 Use Case Diagrams

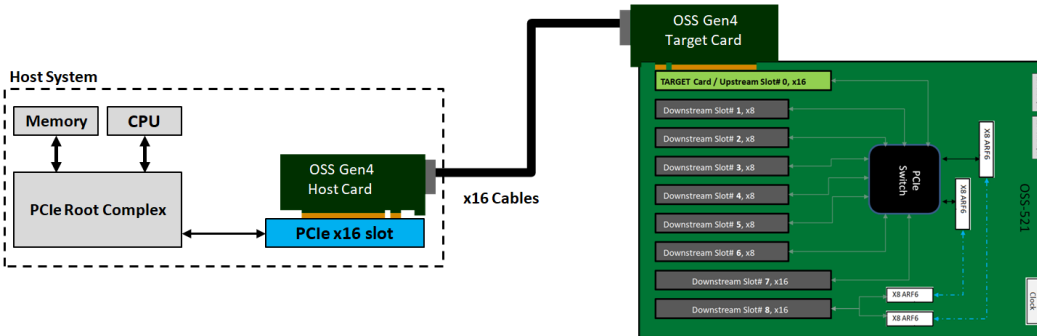
Configuration 1

OSS-521 backplane is linked to a single host computer.

- Four x4 link cables are connected between OSS Gen4 Host card and Target card.

8 Downstream slots

- 6 x8 slots (Slot 1, 2, 3, 4, 5 and 6)
- 2 x16 slots (Slot 7 and 8)

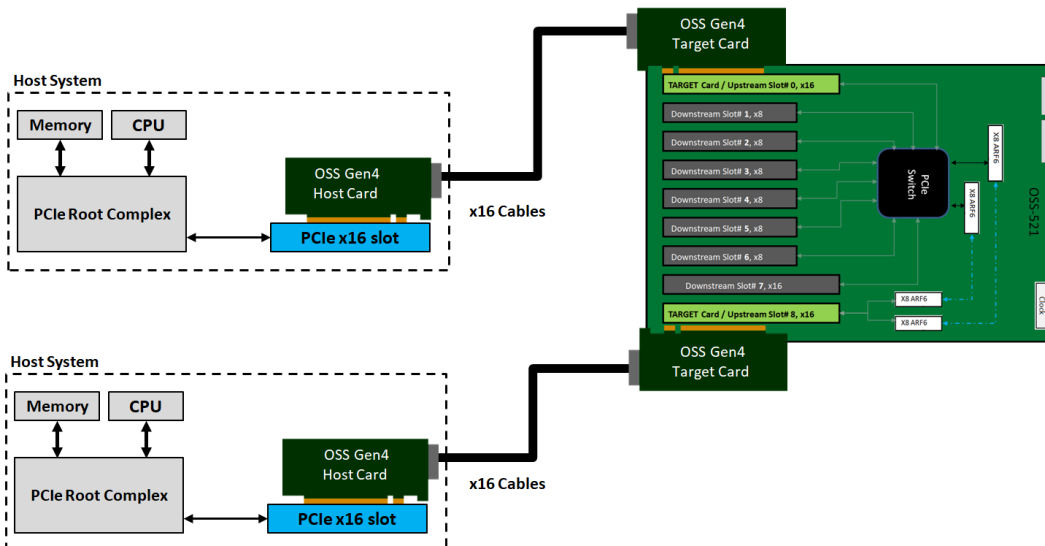


Configuration 2

OSS-521 backplane is linked to two host computers, see diagram below.

Two partitions / two Upstream slots (Slot 0 and SLOT 8) with a total of 7 downstream slots.

- Slot 0: Partition #1 with four Downstream slots
 - 4 x8 slots (Slot 1, 2, 3 and 4)
- Slot 8: Partition #2 with three Downstream slots
 - 2 x8 slots (Slot 5 and 6)
 - 1 x16 slot (Slot 7)



Configuration 3

Two OSS-521 backplanes are daisy chained together and it is linked to a single host computer.

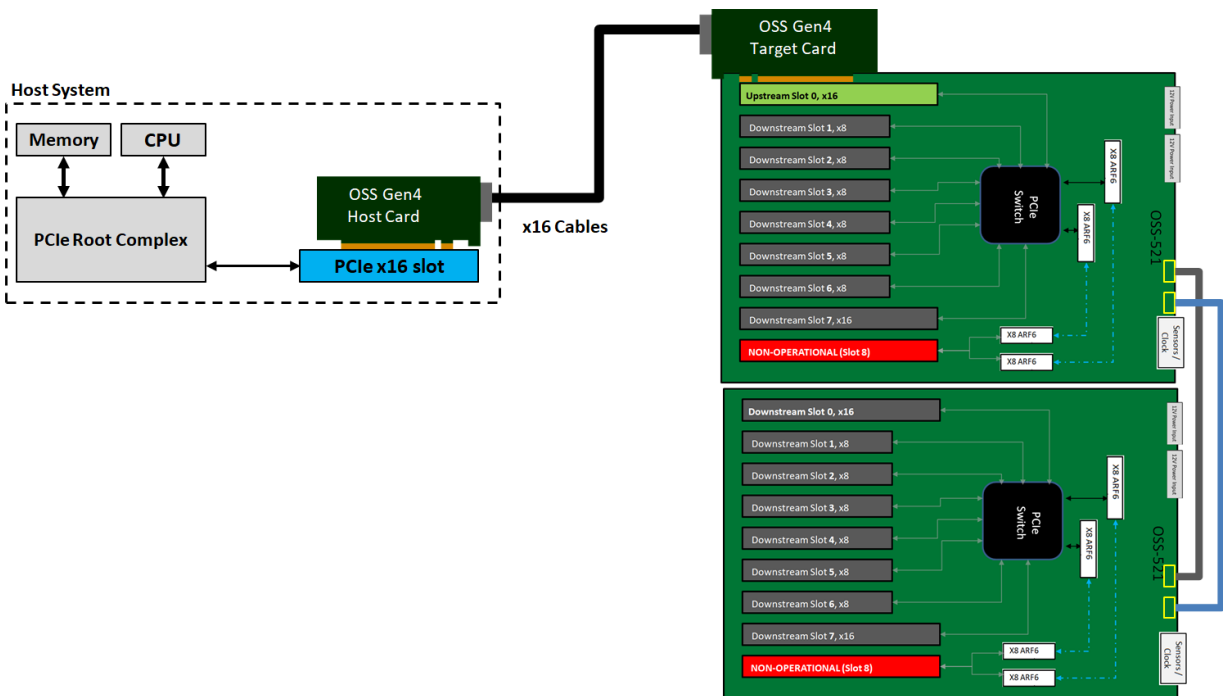
- 15 Downstream slots

1st backplane: 7 downstream slots

- 6 x8 slots (slot 1, 2, 3, 4, 5 and 6)
- 1 x16 slot (slot 7)
- One non-operational slot (slot 8)

2nd backplane: 8 downstream slots

- 6 x8 slots (slot 1, 2, 3, 4, 5 and 6)
- 2 x16 slots (slot 0 and 7)
- One non-operational slot (slot 8)



2 Getting Started

Steps on how to setup and use the 4UP expansion unit. You will find instructions for the following procedures:

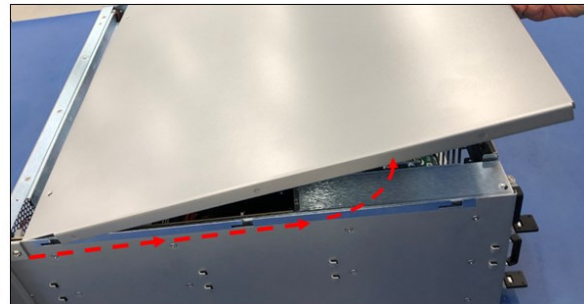
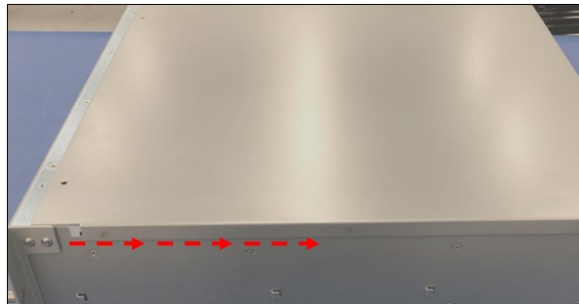
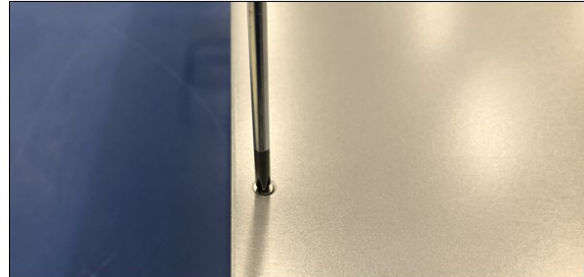
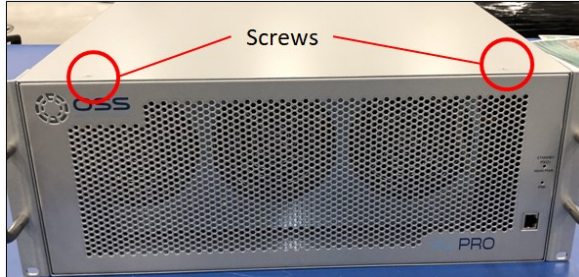
- How to Remove Top Cover
- Target Card Installation
- Host Card Installation
- GPU / PCIe Cards Installation
- Mini-SAS Cable Installation
- Powering Up the unit / system
- Hardware LED Check
- Device Verification via OS

3 Installation Overview

1. Remove the top cover.
 - a. Check inside the unit for loose components or damaged parts.
2. Check the Target card, make sure it is firmly installed and secured.
 - a. By default, the Target is already installed in the unit.
 - b. If the Target card is not installed or missing, please go to section on how to install the target card.
3. Install the Host card.
 - a. You should have another card that is configured as host card.
 - b. Check the dipswitches make sure it is set to host mode prior to installing the card.
4. Install PCIe / GPU cards.
 - a. Plug in your PCIe or GPU cards in the expansion unit.
5. Connect the external link cables.
 - a. Plug in the Mini-SAS HD SFF-8644 cables between Target and Host cards.
6. Plug in the power cords.
 - a. The unit is supplied power cord(s). You should have either one or two, depending on the number of power supplies installed in the unit.
 - b. The standard unit is assembled with an AC power supplies installed.
7. Power ON the host computer.
8. Check the hardware by verifying all LED status indicators.
 - a. Boards LED
 - b. Target & Host cards
 - c. Unit front power LED
 - d. Power supplies LED
9. Check the OSS devices via operating system, verifying all OSS devices are properly recognized.
 - a. For Windows, go to section on how to verify device on Windows OS
 - b. For Linux, go to section on how to verify device on Linux

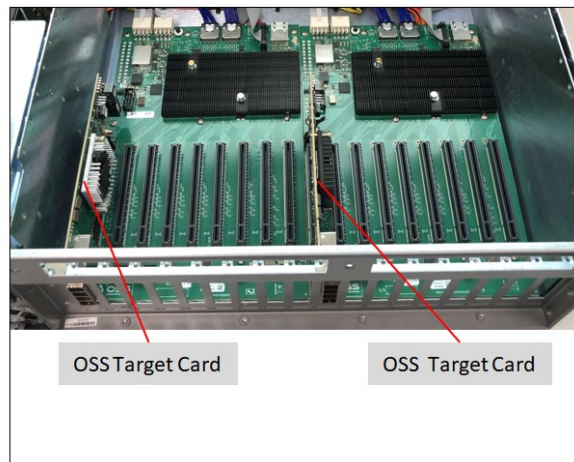
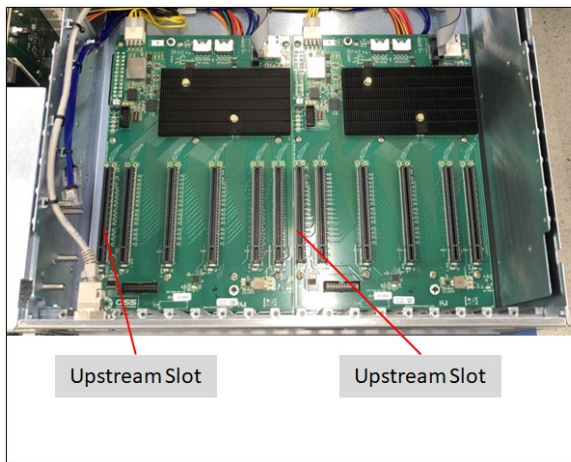
4 Remove Top Cover

1. Remove the two (2) mounting screws on top of the chassis.
2. Slide the enclosure cover towards the back of the unit to disengage it from the guides until it clears the back, and then lift the cover off.



5 Target Card Installation

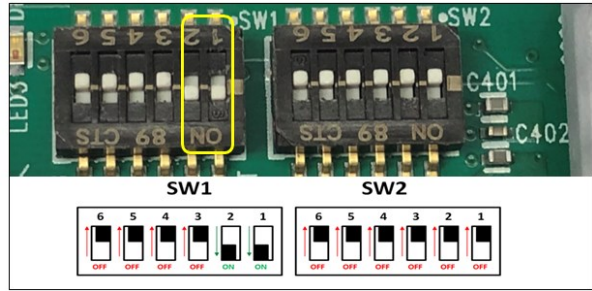
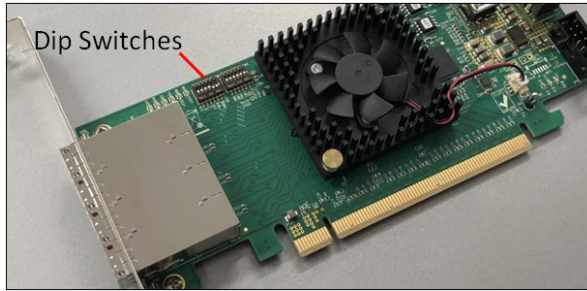
By default, the Target cards are already in the unit. See photos below for the correct slot location where the Target cards are installed.



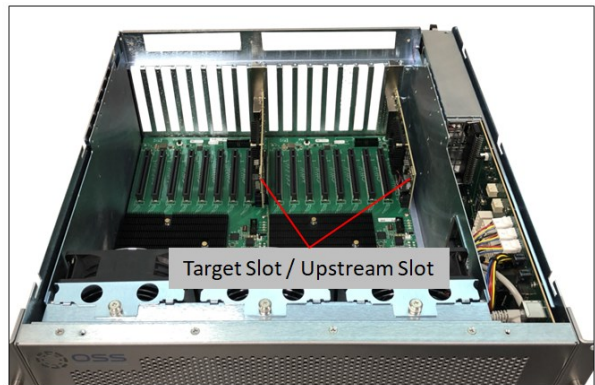
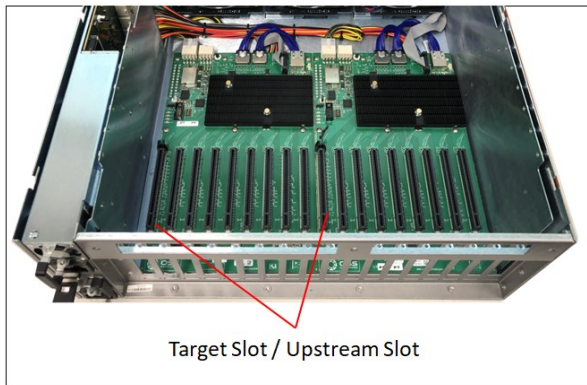
If the Target card is missing, follow the next steps below for Target card installation.

5.1 Target Card Configuration

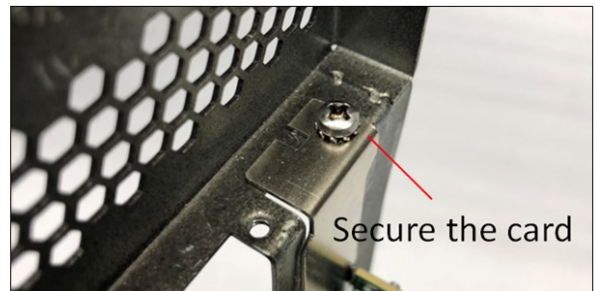
- Find the SW1 on the card and set the switches to target mode, see diagram / photo below.
- Move SW1 #1 and SW #2 to ON position



Once the card is configured, install the Target card in the designated target slot (upstream slot). Photo below shows the default location of the Upstream slots.

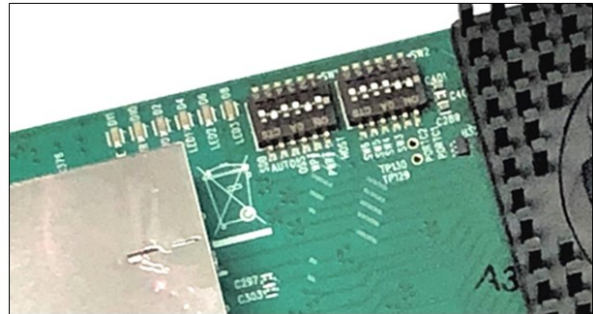
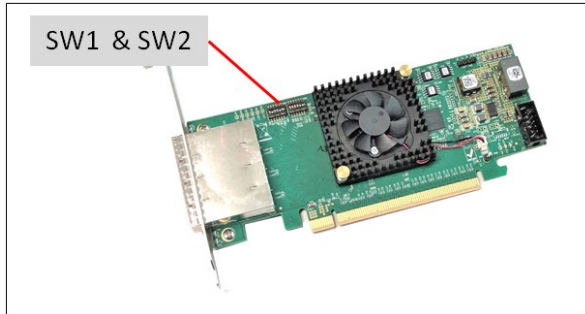


Make sure the card is firmly seated in the card slot and secured.



6 Host Card Installation

- Before installation, you must check the switches on the Host card.
- By default, all the switches on the Host card are set to OFF position ("Auto-Negotiation" mode).
- You can leave the switches to default or you can set the switches (SW1 and SW2) on the card for the desired Host operating mode. See "Host Card Configuration" section for more details.

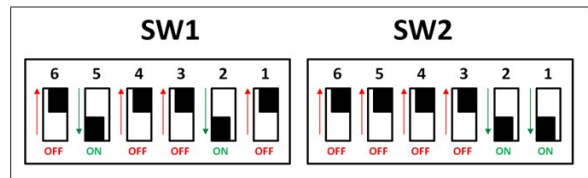
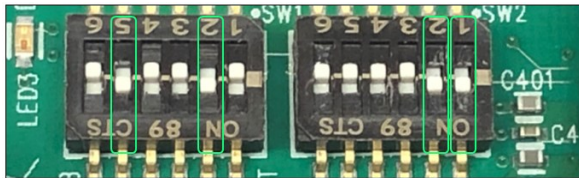


6.1 Host Card Configuration

The following diagrams / photos are the three switch settings for the Host card.

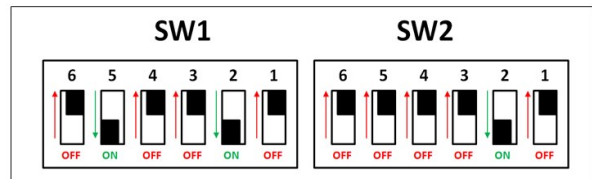
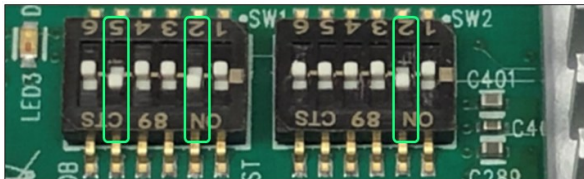
x16 Dip switch Settings:

- SW1 #2 = ON; #5 = ON.
- SW2 #1 = ON; #2 = ON



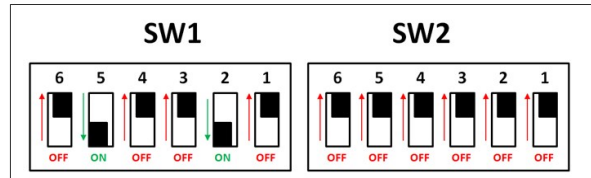
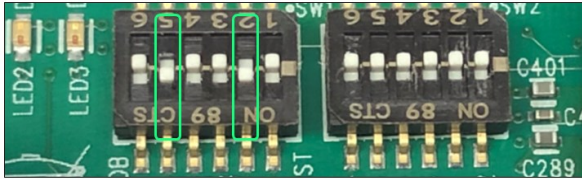
x8 Dip switch Settings:

- SW1 #2 = ON; #5 = ON
- SW2 #1 = OFF; #2 = ON or #2 = OFF and #1 = ON



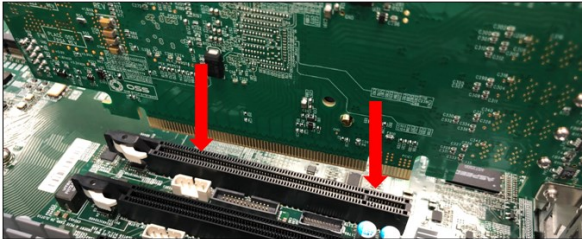
x4 Dip switch Settings:

- SW1 #2 = ON; #5 = ON
- SW2 = All OFF



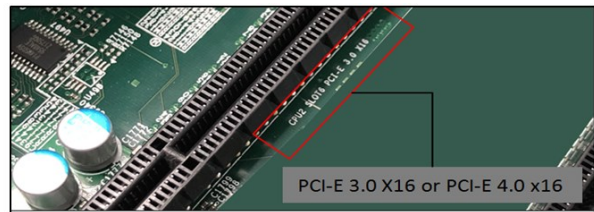
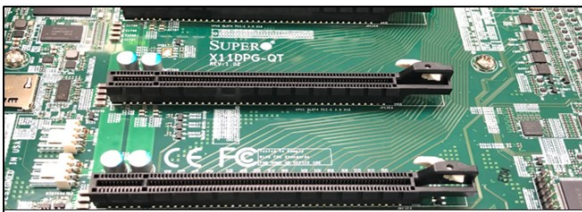
Once the Host-card is configured, install the card into a x16 Gen4 PCIe slot.

- Check the PCIe slot for any foreign debris as this can damage the card during installation.
- Align the host card PCIe connector on top of the PCIe slot and carefully push the card down until it is firmly seated.
- Secure the card with the screw.

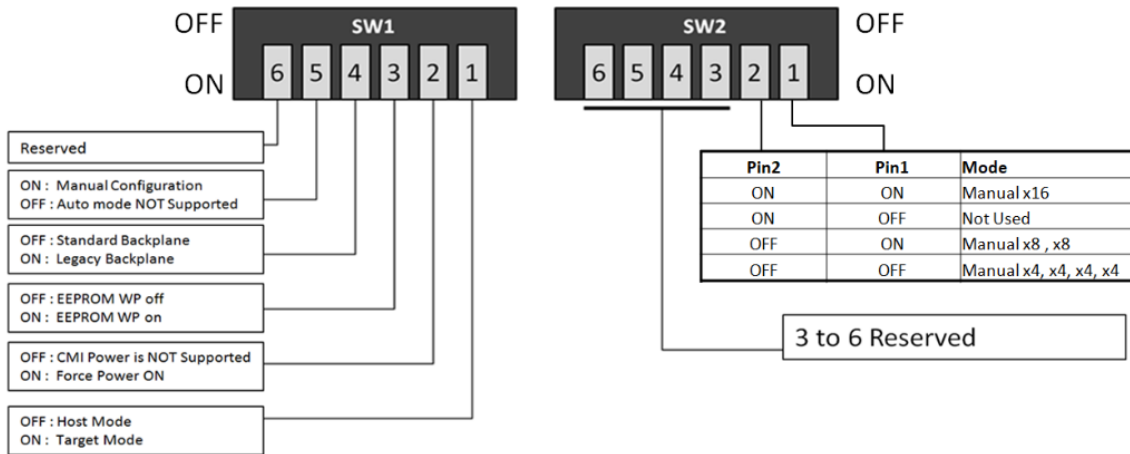


Below is a photo of a x16 PCIe slot connectors.

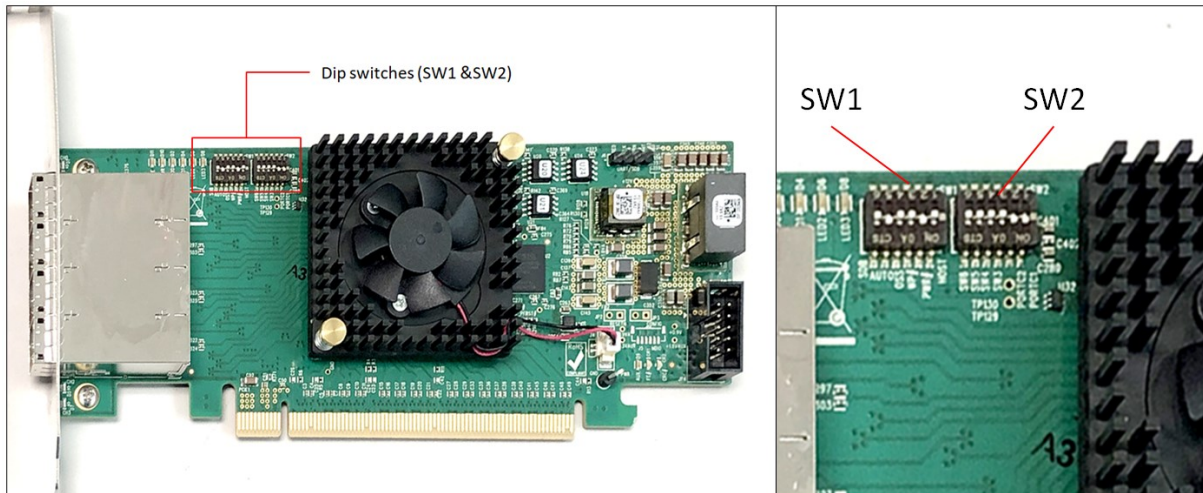
- The photo on the right is a PCI-E 3.0 x16 slot.
- The specification of the PCIe slot is printed on the board next to connector for easy identification.
- Use a x16 PCIe slot for the host card to achieve stable performance



6.2 Switch Settings



- SW1-5 must always be ON. Auto mode not supported
- SW2-3 to 6 are not used.
- Legacy backplane: Magma Gen3 backplane

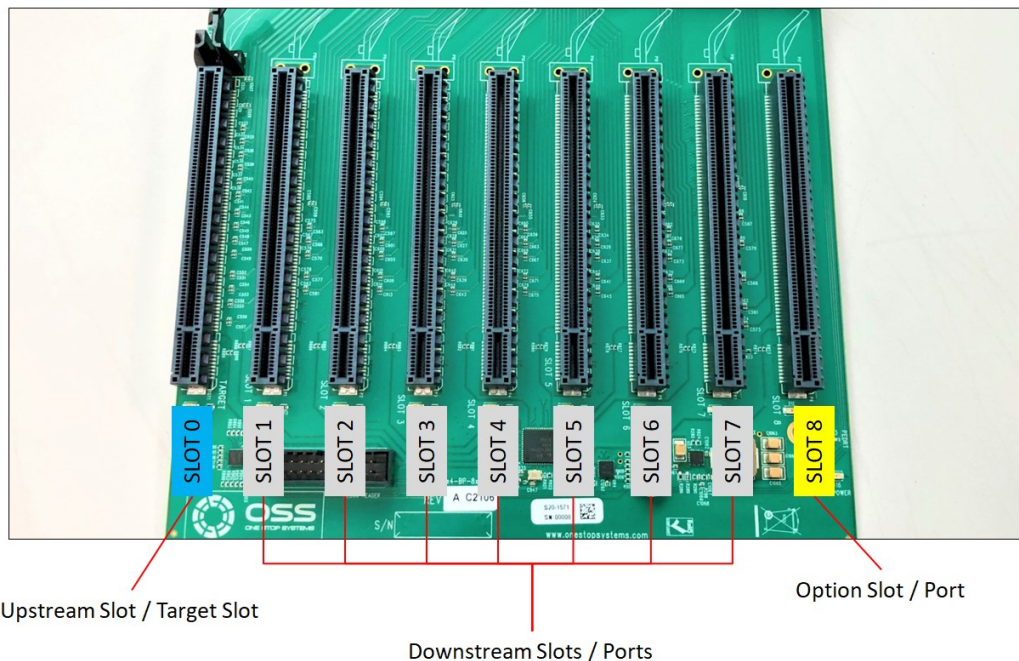


7 GPU / PCIe Cards Installation

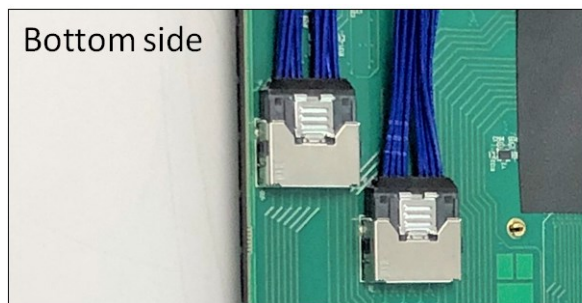
This chapter provides information on how to install GPU cards or PCIe cards into your One Stop Systems expansion chassis. More details on the installation of individual cards are provided by the card's manufacturer.

Install or plug your PCIe cards in the downstream PCIe slot. There are 7 available downstream slots and one option slot.

- **Slot 0** is the Upstream slot (aka: Target Slot)
- **Slots 1, 2, 3, 4, 5, 6 and 7** are downstream slots.
- **Slot 8** is an option slot. It can be used either as an upstream or downstream slot depending on the slot configuration.
 - Downstream mode: Use downstream slot for an end-point device (i.e. video card, Ethernet, sound card and etc).
 - Upstream mode: Use upstream slot for an OSS Gen4 target card only.

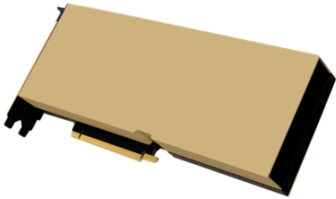


IMPORTANT: You need the ARC6 cables attached between the edge of the board and the slot connectors under the backplane. Without the cables attached, the slot 8 is inoperable.



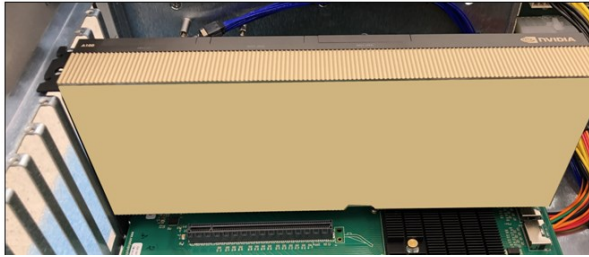
7.1 Install PCIe card / GPUs

In this example we are using NVIDIA A100 GPU.



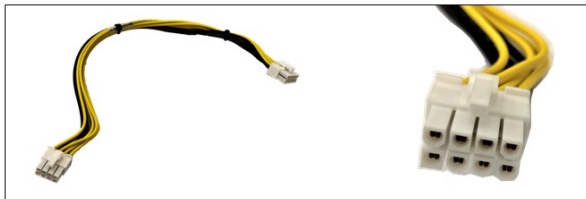
NOTE: Be sure to install the GPU cards following the card manufacturer's recommendations. Some GPU card manufacturers recommend that you install their software driver(s) prior to installing the hardware

- Install GPU card in the downstream slot one at a time.
- Align the card on top of the slot.
- Gently push the card down until it is firmly seated.
- Secure the GPU or the PCIe cards.



7.2 Connect Aux Power Cables

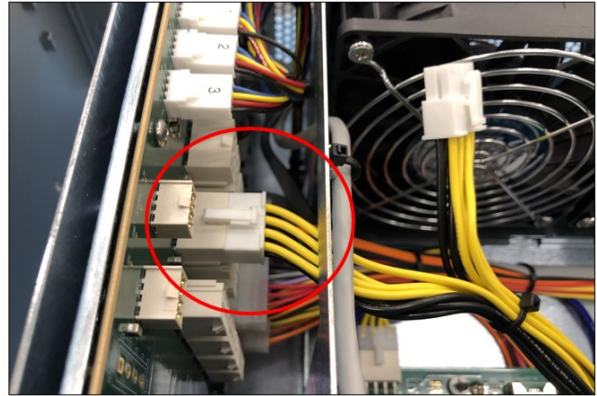
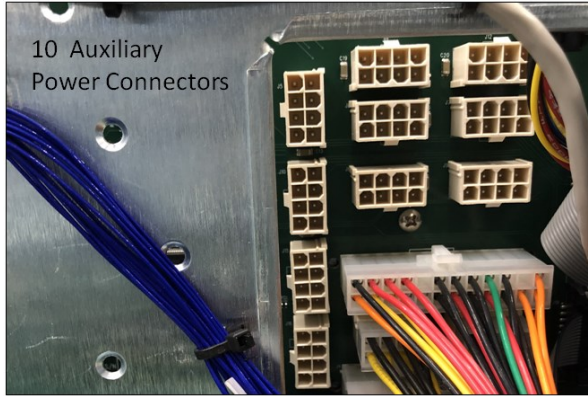
Plug in the appropriate auxiliary power cable to each GPU. Use the supplied compatible aux cable for your GPU. Photos below is an example of an auxiliary power cable available from OSS for purchase.



Plug in the aux cable to the GPU.



Plug in the other end of the aux cable to any of the available auxiliary power connectors on the power distribution board.



Perform the same installation methods for the remaining GPUs.



7.3 Auxiliary Cable Management

Route the cables away from the fan. Make sure the cables are not blocking the air flow. Use a zip-ties or tie-wraps to tuck the cables in. You can also use a Velcro strap to hold or tie down the cables.



8 Connect Link Cables

Use Gen4 Cables



8.1 Mini-SAS HD SFF-8644 Cable Installation

Connect all the appropriate PCIe link cables needed for the system.

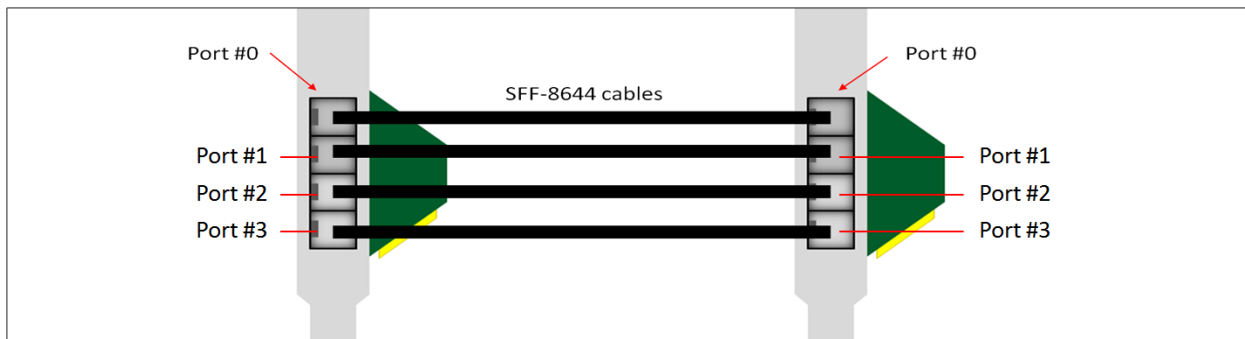
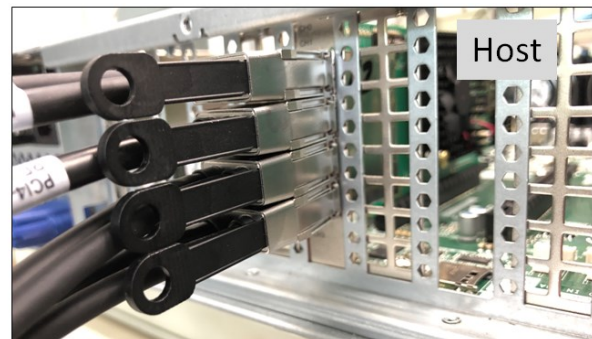
- When the host card is configured to operate at x16 mode, connect all four link cables.
- Configured to operate at x8 mode, connect two link cables
- Configured to operate at x4 mode, connect one link cable

See the following cable configurations for more details.

8.1.1 x16 Configuration: FOUR cables

- Plug-in the 1st cable to Port#0 (Top port) on both Target and Host cards.
- Plug-in the 2nd cable to Port#1 on both Target and Host cards.
- Plug-in the 3rd cable to Port#2 on both Target and Host cards.
- Plug-in the 4th cable to Port#3 (Bottom port) on both Target and Host cards

Note: It is easier to plug in the cables starting from bottom to top.



8.1.2 x8 Configuration: TWO cables

Note: Make sure the HIB616-x16 host card is manually set to x8 configuration, see the x8 switch setting section for more details

- Plug-in the 1st cable to Port#0 (Top port) on both Target and Host cards
- Plug-in the 2nd cable to Port#1 on both Target and Host cards.

On the host card side, you can move the two cables to the bottom ports.

- 1st Cable to PORT #2
- 2nd cable to PORT #3

Note: The two cables on the TARGET card must remain connected on PORT #0 and PORT #1. See diagrams below as an example.

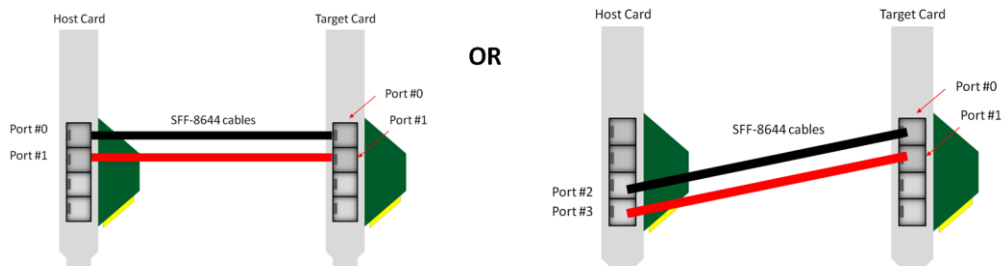


Photo B1: The two cables are connected on the Target card PORTS # 0 and # 1. The other end of the cables are connected on the Host card PORTS # 2 and # 3.

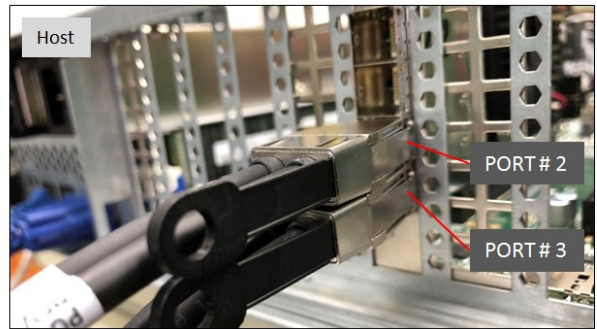
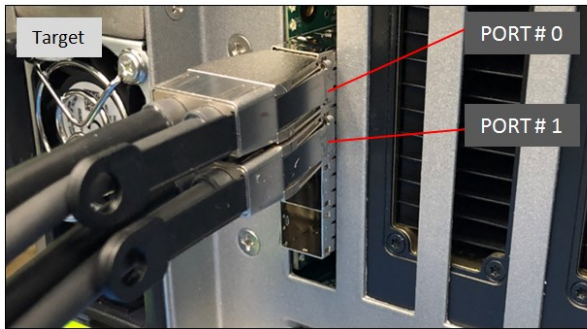
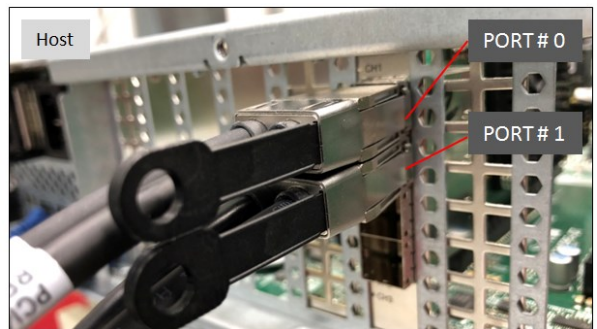
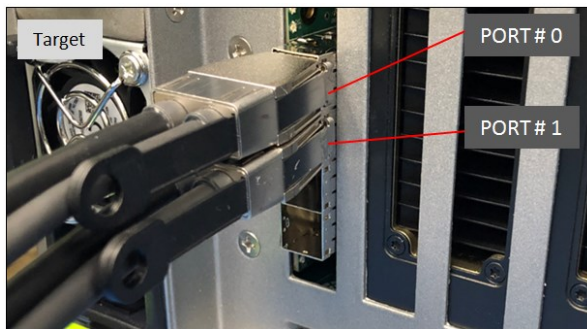
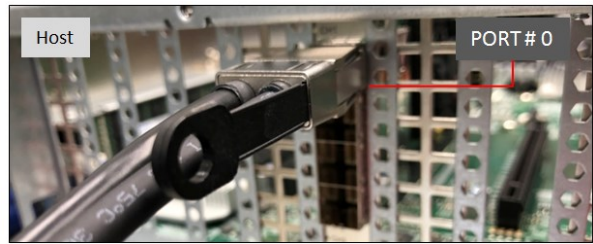


Photo B2: The two cables are connected on the Target card PORTS # 0 and # 1. The other end of the cables are connected on the Host card PORTS # 0 and # 1.



8.1.3 x4 Configuration: ONE cable

- Plug-in the single cable to Port # 0 (Top port) on both Target and Host cards.



On the Host card side, you can use any ports. The other end of the cable stays connected on Target card PORT # 0.

Photo A1: Cable is connected on the Target card PORT # 0. The other end of the cable is connected on the Host card PORT # 1.



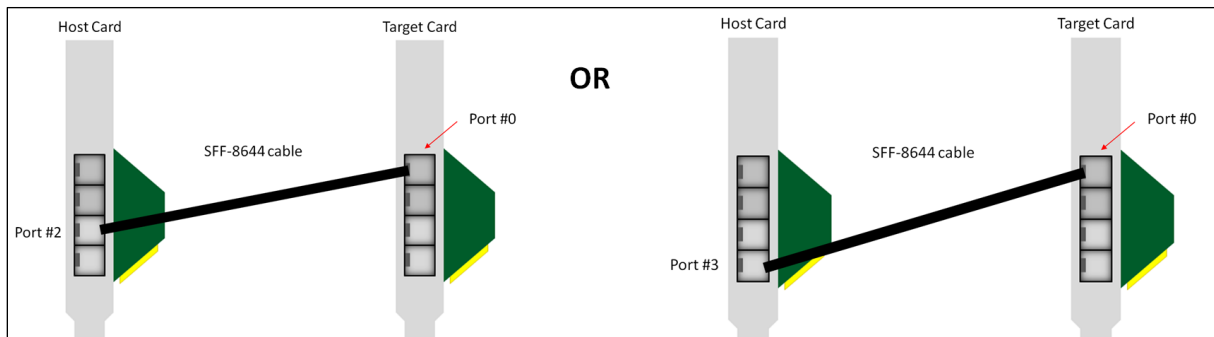
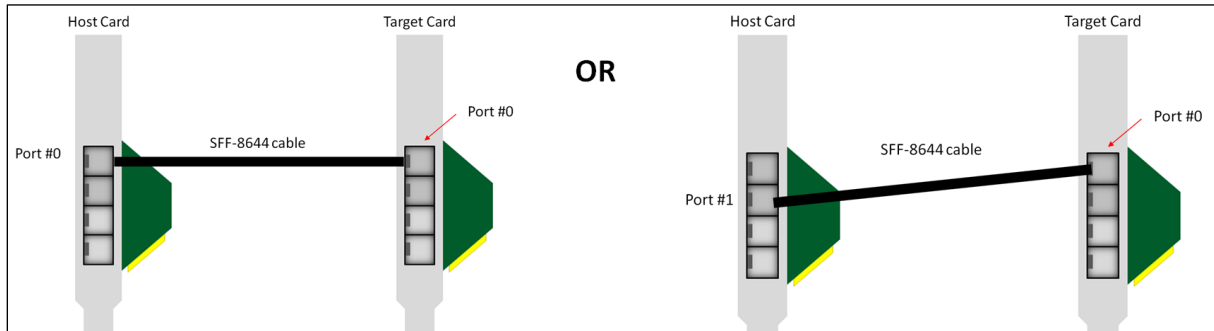
Photo B1: Cable is connected on the Target card PORT # 0. The other end of the cable is connected on the Host card PORT # 2.



Photo C1: Cable stays connected on the Target card PORT # 0. The other end of the cable is connected on the Host card PORT # 3.

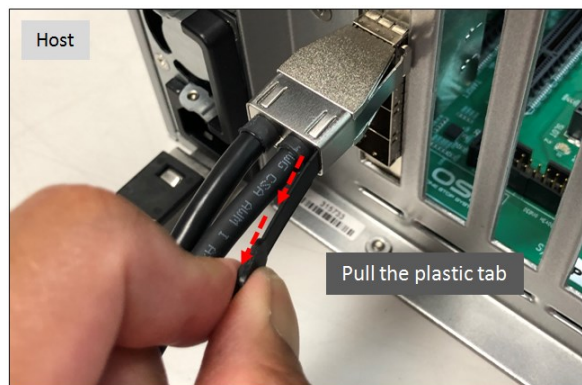


Diagrams below are different x4 cable configurations.



8.2 Disconnecting Mini-SAS HD SFF-8644 Cable

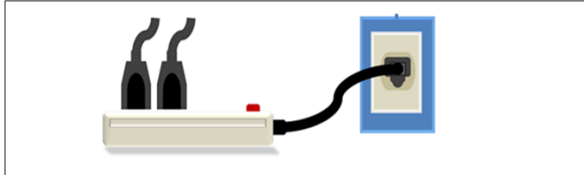
To disconnect the link cable, pull back the PLASTIC thumb tab to release metal clamp while slowly pulling the cable out.



9 Applying Power Correctly

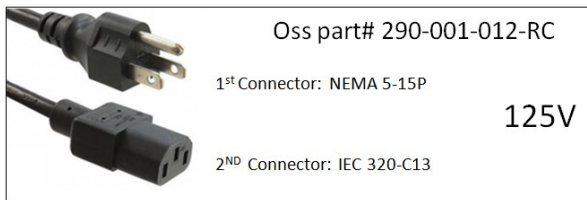
9.1 Connecting to electrical outlet

It is highly recommended using a power surge to protect your gear against random power spike damage. This product is provided with a power supply that **automatically adjusts to input voltages between 100 to 240 Vac**. A U.S. and Canadian 125V or 250V power supply cord is provided with this product. If you are using a 250V power cord, you would need to connect that to a PDU (power distribution unit). You can buy the PDU on any online electronic stores. OSS does not sell the PDU.



9.2 Connect Power Cords

Use the power cord supplied with the unit, connect the power cord to the back of the power supply. Ensure that the system's power supply unit is fully secured before connecting the power cord. You should have either the 125V or the 250V power cord. If you only have the 125V power cord and you require the 250V power cord please contact our Sales Team (sales@onestopsystems.com) to place an order.



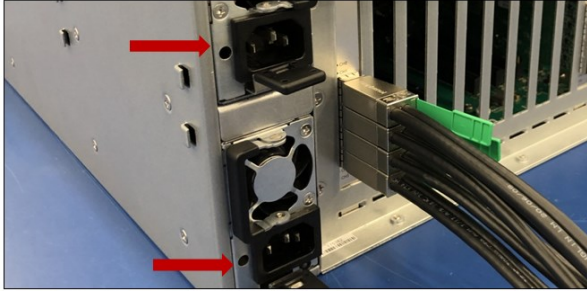
Power Cord Voltage Table

Power Cord	PSU Watt	Voltage	AMPS	Hz
125V	1000W	100-127V	12-9.5A	50-60Hz
250V	1800W	200-220V	10-9.5A	50-60Hz
250V	1980W	220-230v	10-9.8A	50-60Hz
250V	2000W	230-240V	10-9.8A	50-60Hz

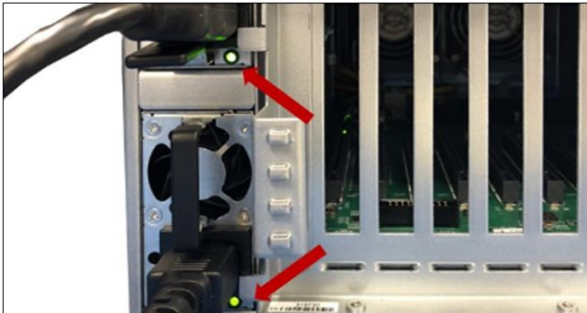
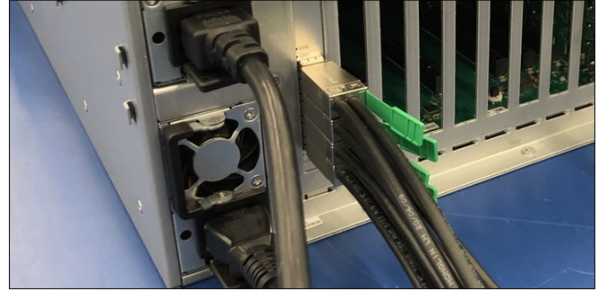
When using 115-125V power cord, the output power is limited (1000W)

Plug in the power cords to the power supplies, the entire unit will power UP.

- Power Supplies are ON
- All fans are activated
- Backplanes are ON



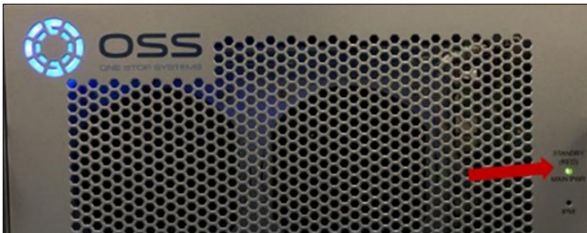
Green LED: PSU Good



Amber LED: PSU fault or power issue. If Power LED indicator is showing "Amber" in color, it indicates a fault or power issue.



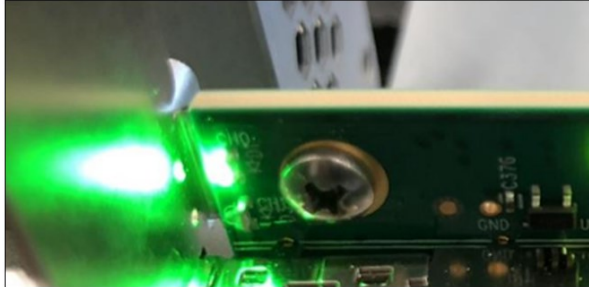
The two front LEDs , the OSS logo will illuminate as blue and the "STANDBY"(MAIN PWR) will come ON as "solid-green".



10 Powering UP the Computer

Before powering UP or turning ON the Host computer, make sure the Host adapter card is seated properly in a x16 Gen3 / Gen4 PCIe slot and the cables are firmly connected. Upon powering up the Host computer, it will initialize a link between the target and the host. The Link LED on both target and host cards will illuminate as solid green.

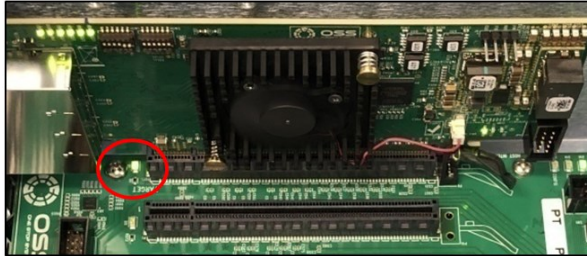
- Solid green Link LED, it means the negotiated link width between host and target card is x16.
- Blinking green Link LED, the link width is x8.



11 Hardware Check

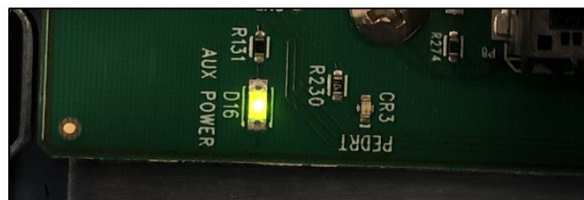
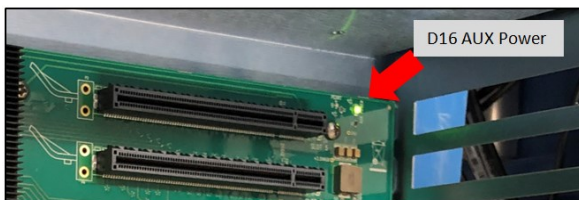
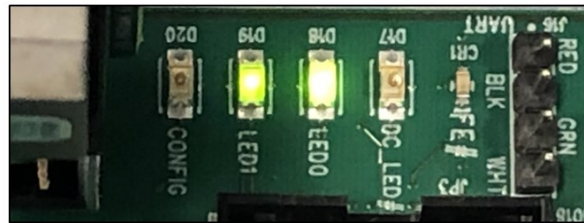
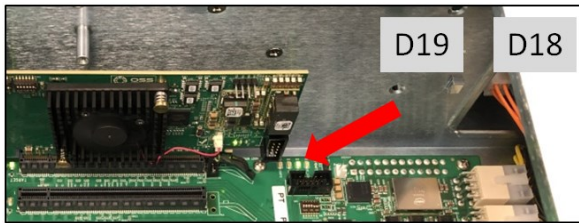
11.1 Verify Board LEDs

Check the Target SLOT LED, when a PCIe card is installed in the target slot, the LED will illuminate as solid green.



A fully operational back plane will illuminate the following LEDs. Check LEDs D19, D18 and D16, make sure they are correctly illuminated.

- D19- Blinking green (LED 1).
- D18-Solid green(LED 0).
- D16- AUX power, solid green.



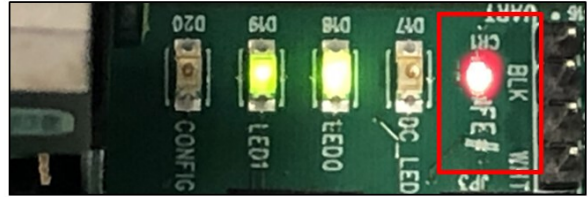
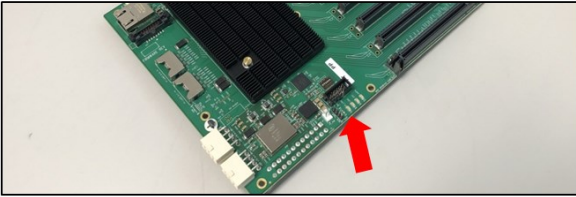
11.2 Fault LEDs (RED)

When the RED LED is illuminated on the backplane it signifies fault or error.

FE (Fatal Error) LED

Solid Red: Hardware failure

* Backplane need service or repair

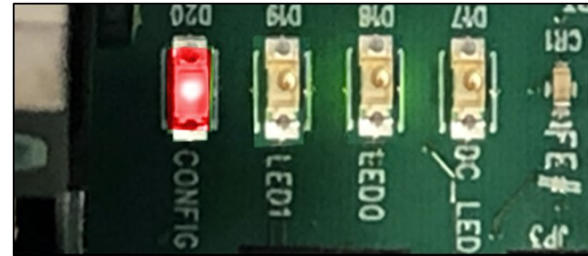


D20 / CONFIG LED

Solid Red:

- Board is not programmed
- Firmware corrupted

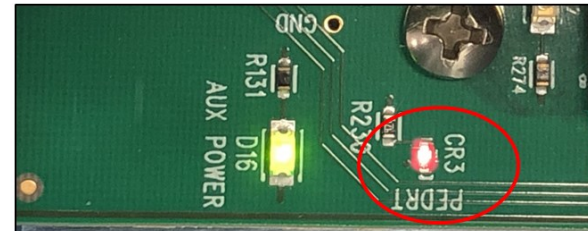
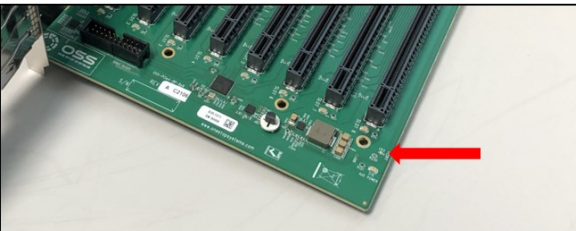
Need to send back to manufacturing for service or repair.



RED LED (CR3 / PEDRT):

The backplane is not getting initialized due to:

- * Faulty Target card
- * Board is not programmed

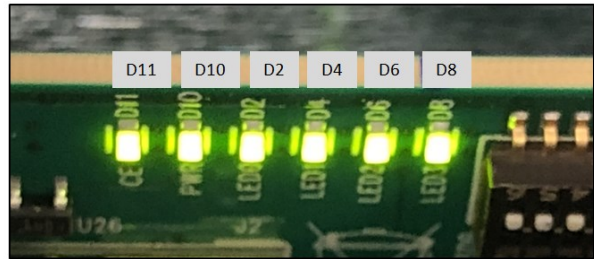
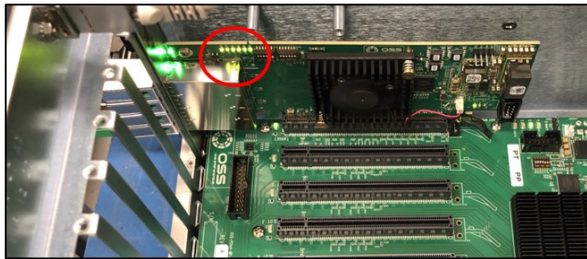


11.3 Verify Adapter Card LEDs

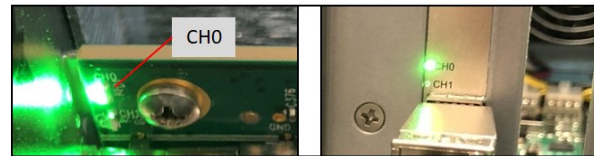
A working HIB adapter cards will illuminate the following LEDs (on both Host and Target cards).

D11	CE (Card edge)	Solid green
D10	PWR (Power)	Blinking green
D2	LED 0	Solid green
D4	LED1	Solid green
D6	LED2	Solid green
D8	LED3	Solid green
CHO	Link LED	Solid green
C9	Aux Power	Solid green

x16 configuration (Four x4 Cables connected)



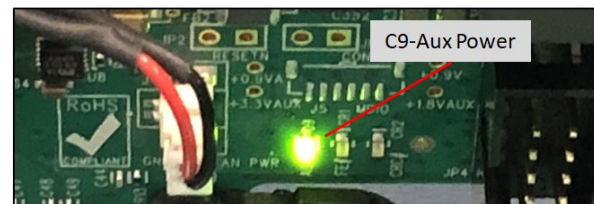
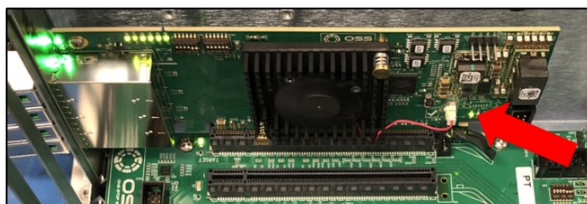
CHO LED will illuminate as solid green, a stable LINK between Target and Host cards.



When there is no link between Target and Host cards, the CHO LED is turned OFF.



The C9-Aux power LED will illuminate as solid green, which is an indication of power is present on the card.



11.4 Adapter Card LED Definitions

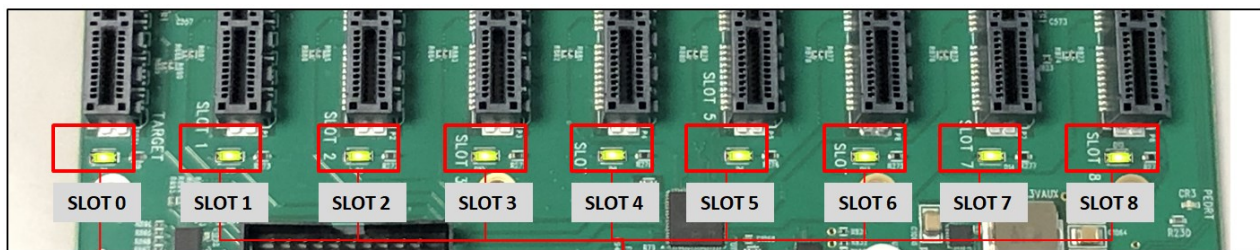
LED		Status	Description
CH0	D1	ON (Solid Green)	Link LED. Indicates a connectivity between OSS Host and Target cards.
LED0	D2	ON (Solid Green)	Power Good
LED1	D4	ON (Solid Green)	Power Good
LED2	D6	ON (Solid Green)	Power Good
LED3	D8	ON (Solid Green)	Power Good
CE	D11	ON (Solid Green)	Solid Green: The CARD EDGE connector is communicating to Gen4 PCIe switch on the host computer motherboard.
			Blinking Green: The CARD EDGE connector is communicating to Gen3 PCIe switch on the expansion board / backplane
PWR	D10	ON (Blinking Green)	Power Good / FPGA Healthy
AUX	D9	ON (Solid Green)	AUX Power Good

LEDs for SFF-8644 Cable Link cases:

1. Target mode (x16): D1 is the link indicator.
2. Host Mode, x16: D1 is the link indicator.
3. Host Mode, x8x8: D1 or D5 are the link indicators (one for each corresponding group of two SFF cages).
4. Host Mode, x4x4x4x4: D1, D3, D5, D7 are the link indicators (one for each SFF cage).

11.5 Slot LEDs

- The SLOT LEDs will illuminate either Solid green or blinking if a PCIe card is occupying the slot.
- The Target SLOT LED will illuminate as solid green (Gen4).



Target Slot LED

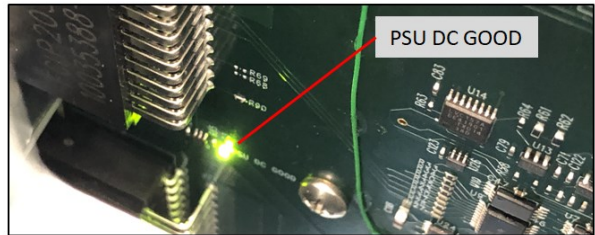
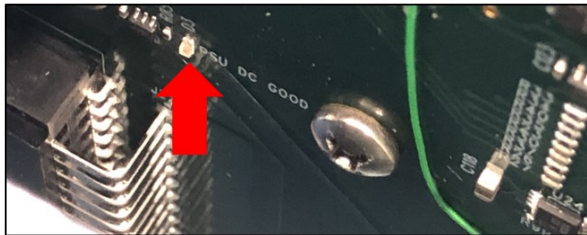
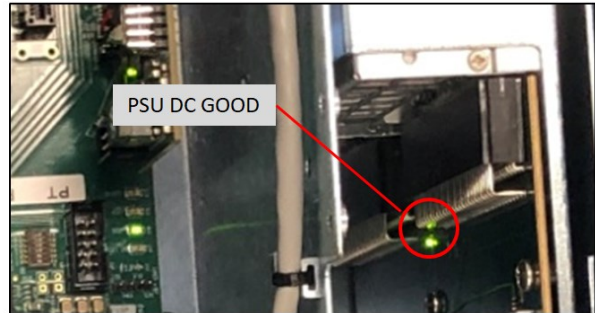
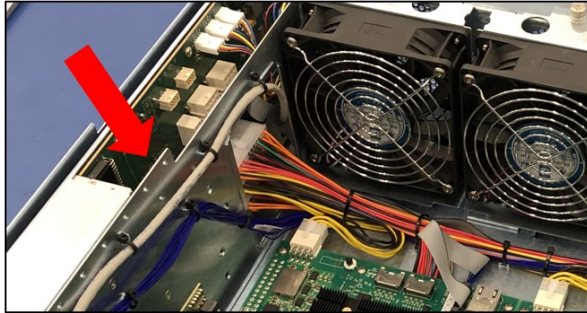
PCIe card slot LEDs

Solid	Gen4 Link
Blink 2Hz	Gen3 Link
Blink 1Hz	Gen2 Link
Blink 0.5Hz	Gen1 Link (Slow Blinking)
OFF	No card installed

11.6 Power Distribution Board LED

- When the PSU DC GOOD led is not illuminated, it is an indication of a faulty power supply and the unit will not power ON.
- Solid green: the PSU is working properly.

See photos below for the location of the "PSU DC GOOD" led.



11.7 Front LED

There are three visible LEDs located on the front of the unit.

- The LOGO led, will illuminate as solid BLUE.
- Standby / MAIN PWR—Solid green when unit is fully powered ON. Red when the unit is on standby mode.
- IPMI - This is optional. Will only illuminate as solid green when IPMI module is installed in the unit and operational.

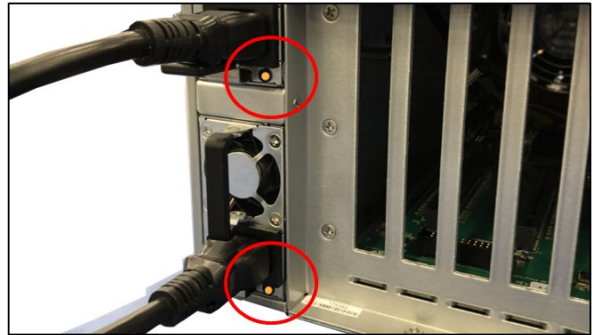
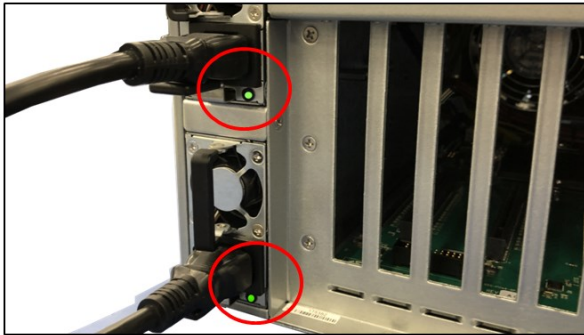


11.8 Power Supply LED Indicator

Both LEDs on the Power Supply should be ON as solid green, it indicates the OK status of the DC GOOD signal. The LED shall continue to glow under normal operation of the power supply.

During protection mode (main 12V rail), the LED should be amber.

- During protection mode (5Vsb rail), the LED should be OFF
- When protection is cleared, the LED should go back to the original intended status.
- When the unit is on standby with AC is present, the LED should be amber.
- When the unit is on standby with no AC is present, the LED should be OFF.
- When the unit is turned ON properly, the LED is green.
- During wakeup redundancy mode, the LED should be green.
- During wakeup redundancy sleep mode, the LED should be blinking green in 1Hz.



12 Software Installation

12.1 Software Driver Installation

One Stop Systems 4UP expansion unit requires no driver on Windows 7, Windows 8, Windows 10, Windows Server, Linux, Unix, Centos and Mac OS.

Before attempting to install anything on a Windows system, you should ensure that you have set a Restore Point, that all data files are closed and that you have a current backup of your data.

13 Verify HIB Device

This section contains information on how to check / verify the OSS devices on Linux and Windows OS environments.

13.1 Linux OS

To check if the OSS HIB cards and backplane are detected, use the following commands on the terminal window. You must logged-in as "super user (or as root)" when running the lspci command.

- **#lspci -tv | grep c010.** The c010 is the Device number of the OSS hardware.

The output below gives you a tree-like structure of the PCI Device B/D/F numbers of b8:00.0 and bd:00.0 (B=Bus number. D=Device number. F=Function number). **The /B/D/F numbers will vary from system to system.**

When the OSS HIB cards and backplane are detected, you should see three instances of devices enumerated, see photo below.

```

root@ossubuntu:~# lspci -tv | grep c010
|_.-1c.0-[5f]---00.0 Broadcom / LSI Device c010
|_.-1c.0-[5e]---00.0 Broadcom / LSI Device c010
|_.-1c.0-[5d]---00.0 Broadcom / LSI Device c010

```

* If you are only seeing one device, the host card is not linking up with the target device.

```

[root@localhost ~]# lspci -vt | grep c010
|_.-1c.0-[30]---00.0 Broadcom / LSI Device c010
[root@localhost ~]#

```

* If there are two devices detected, it is an indication that the backplane is not recognized.

You can also run lspci -m | grep 'Device 00b2'. Three instances of 00b2 signify that both host & targets cards including the backplane are correctly detected.

If one instance of 00b2 is showing up, only the Host card is detected, the Target and backplane are not recognized.

All PCIe cards in the backplane will not be enumerated.

Photo below shows three instances of 00b2 device, it indicates that the host card, target card and the backplane are recognized.

```

root@ossubuntu:~# lspci -m | grep 'Device 00b2'
5a:00.0 "Mass storage controller" "Broadcom / LSI" "Device c010" -rb0 "Broadcom / LSI" "Device 00b2"
5b:00.0 "Mass storage controller" "Broadcom / LSI" "Device c010" -rb0 "Broadcom / LSI" "Device 00b2"
5c:00.0 "Mass storage controller" "Broadcom / LSI" "Device c010" -rb0 "Broadcom / LSI" "Device 00b2"
root@ossubuntu:~#

```

If only two instances of 00b2 are coming up, both Host and Target cards are detected but the backplane is not recognized.

- All of PCIe cards installed in the card slots of the backplane will not be enumerated.

- **#lspci -vvv | grep c010.** The output below shows that the operating system is recognizing the OSS Host card, Target card and backplane.

```
File Edit View Bookmarks Settings Help
[root@localhost oss]# lspci | grep c010
c1:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c3:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c4:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c5:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c6:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c6:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c6:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c7:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c8:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c9:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:04.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:08.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
cb:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
cc:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ce:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
cf:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
cf:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
cf:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d3:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d4:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d4:08.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d4:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d4:18.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
d9:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
da:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
da:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
dd:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)
de:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
df:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
df:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
e2:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)
e3:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
e4:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
e4:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
e7:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)
[root@localhost oss]# lspci | grep c010 -c
41
[root@localhost oss]#
```

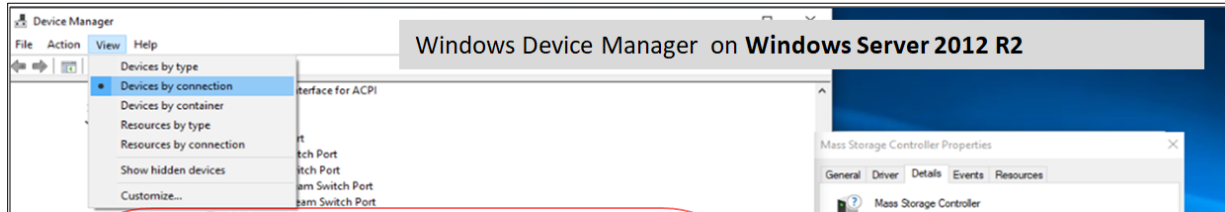
The output below shows that the operating system is only detecting the Host card. No link between Target card and Host card.

```
File Edit View Bookmarks Settings Help
[root@localhost oss]# lspci | grep c010
c1:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:0c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c2:1c.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c3:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c4:10.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c6:00.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c7:14.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
c7:15.0 PCI bridge: Broadcom / LSI Device c010 (rev b0)
ca:00.0 Mass storage controller: Broadcom / LSI Device c010 (rev b0)
[root@localhost oss]# lspci | grep c010 -c
10
[root@localhost oss]#
```

13.2 Windows 10 / Server

On Windows, find the 'My Computer' icon and "right-click" on it.

- Then select 'Manage' from the pop-up menu. Next, click on 'Device Manager' in the leftmost Computer Management window. Finally, click on the View Menu and select View Devices by Connection.

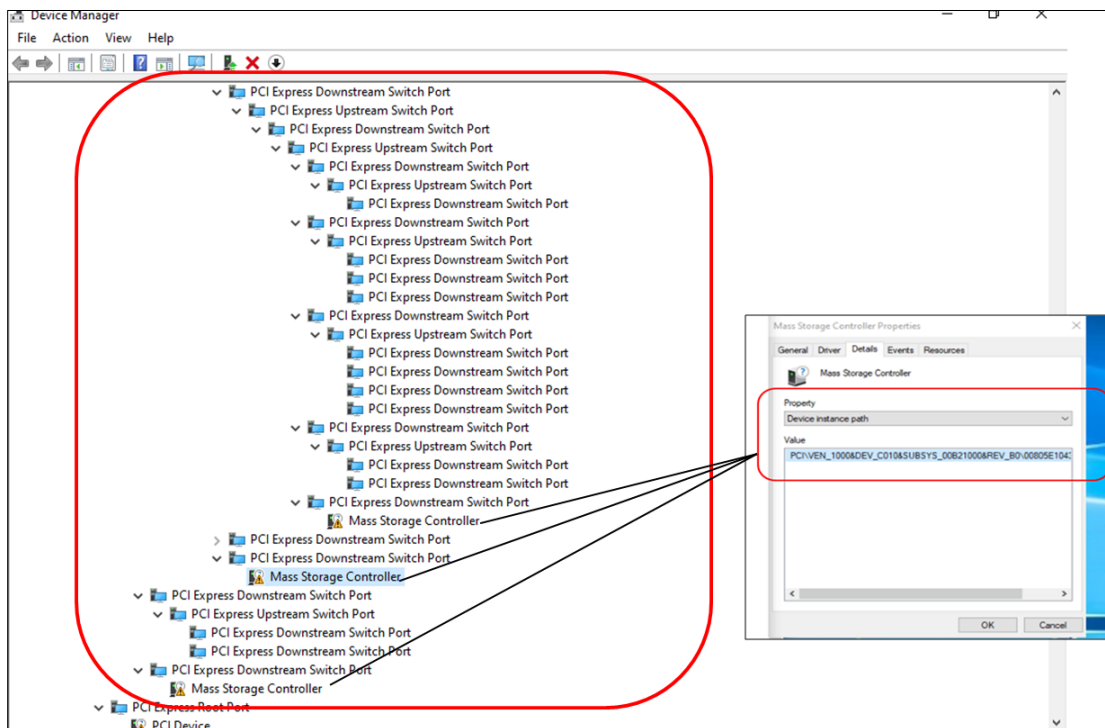


When everything is functioning correctly, your Windows Device Manager should look something like the screenshot below.

- You will see multiple instances of PCI standard PCI-to PCI bridge or PCI Express standard Upstream Switch Ports and PCI Express standard Downstream Switch Ports.

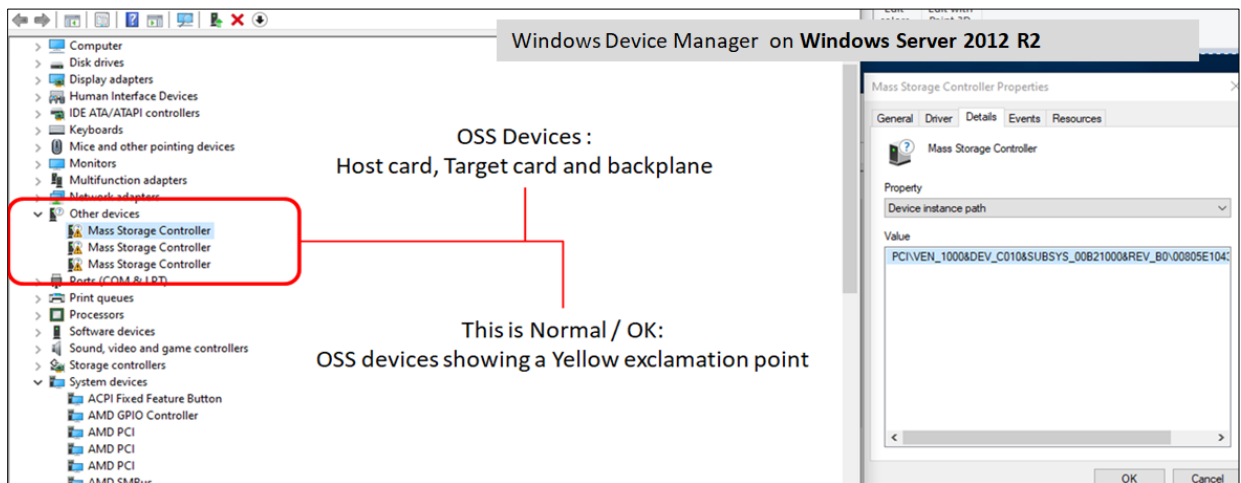
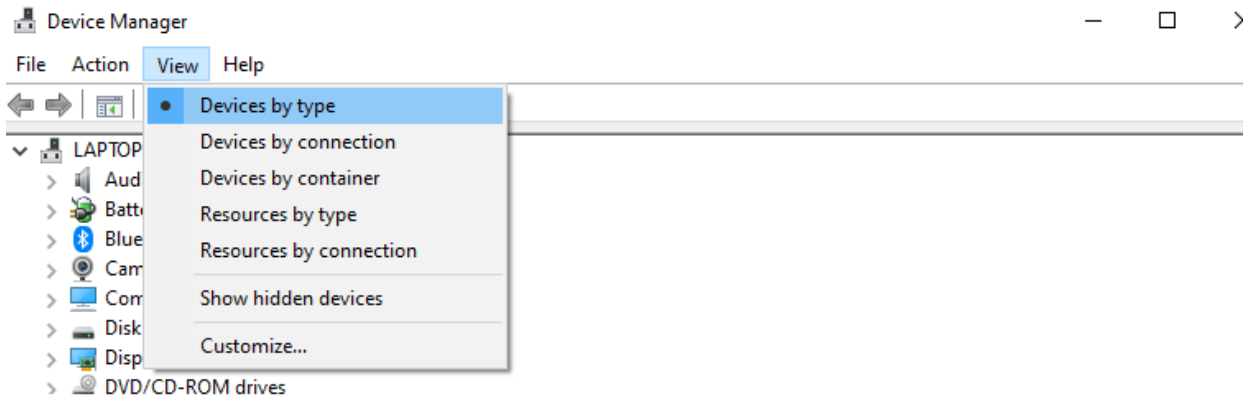
Viewing devices by connection

- Photo below shows the backplane, target card and host card are detected.
- OSS backplane with no PCIe cards installed—the downstream slots on the backplane are not populated.
- Showing multiple layers of PCI Express standard Upstream Switch Port and PCI Express standard Downstream Switch Port.



Viewing devices by type

Both adapter cards (host and target cards) and backplane are recognized / detected. The devices are coming up with a Yellow Exclamation point, this is normal. No need to install any drivers.



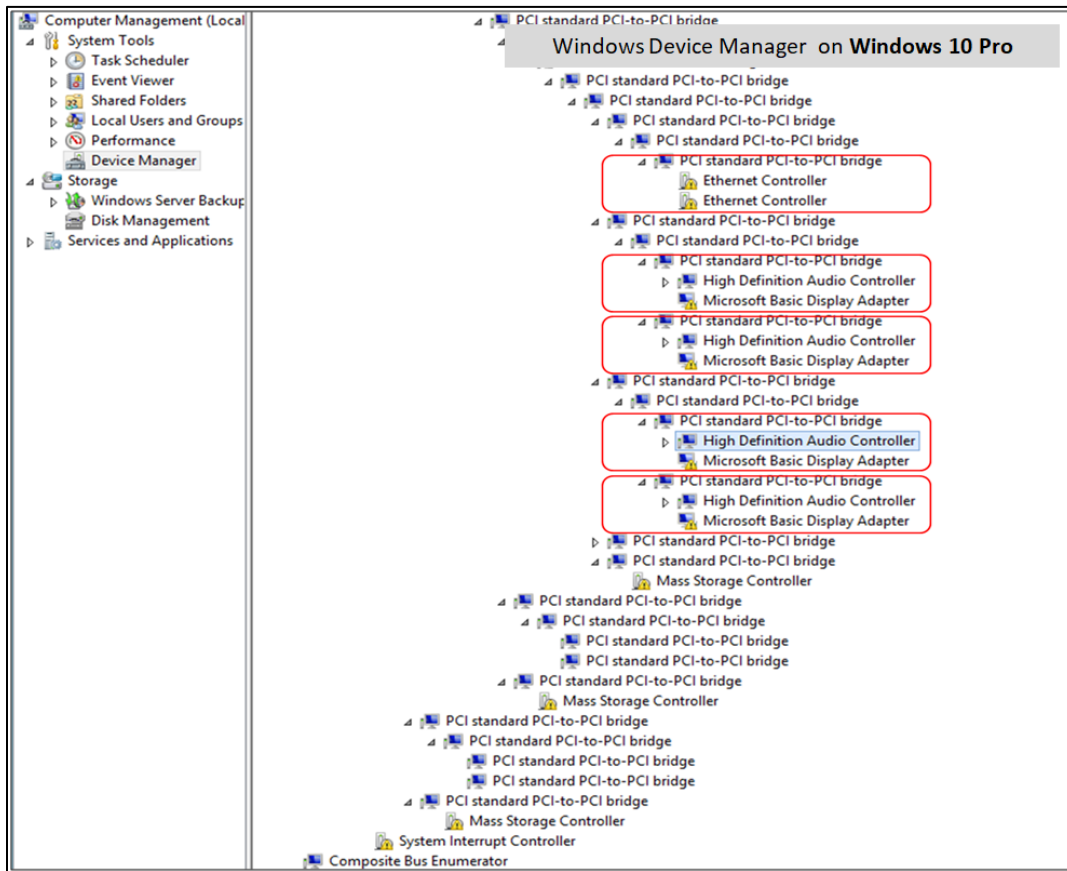
14.2 Windows

Find the 'My Computer' icon and "right-click" on it. Then select 'Manage' from the pop-up menu.

- Next, click on 'Device Manager' in the left most Computer Management window.
- Finally, click on the View Menu and select View Devices by Connection
- Open ACPI (BIOS) → Open PCI Bus → Click the '+' or '>' sign several times until you reach a PCI Express Root Port Complex.
- Then click or collapse all the '+' or '>' until you see multiple subsets of PCI standard PCI-to-PCI bridge. See screenshot below.

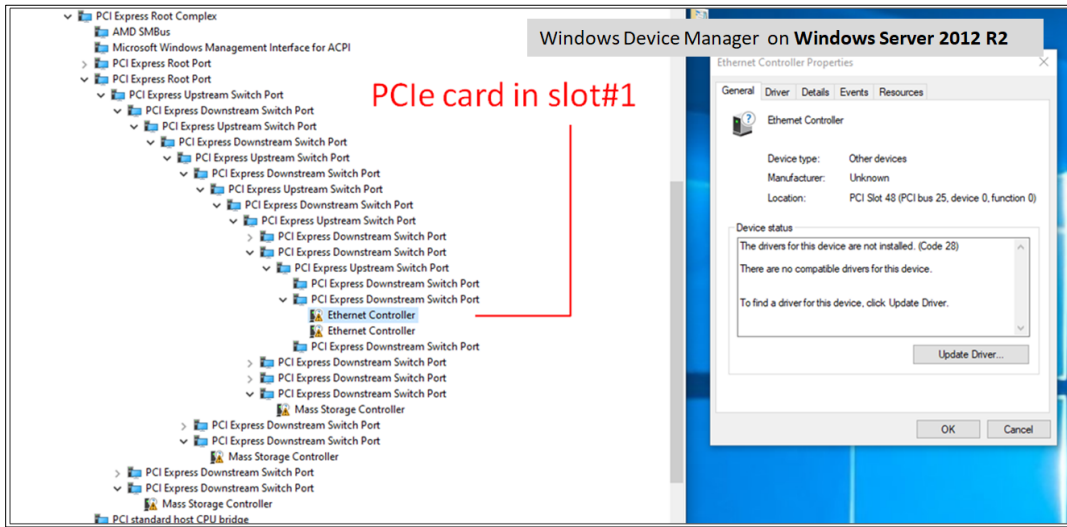
Collapse or click the '+' or '>' sign next to PCI standard PCI-to-PCI bridge or PCI Express Upstream Switch Port and Downstream Switch Port and you will find all the PCIe devices that are detected.

The screenshot below shows the OSS backplane is populated with five PCIe cards (but showing a yellow exclamation mark next to it, which means the driver is not loaded). You can obtain the driver from the card manufacturer or you can download it from the vendor's website. OSS does not provide 3rd party driver / software.



The screenshot below shows an Ethernet card is detected and it installed in slot#1.

- The image below was captured on a computer running Windows Server OS.

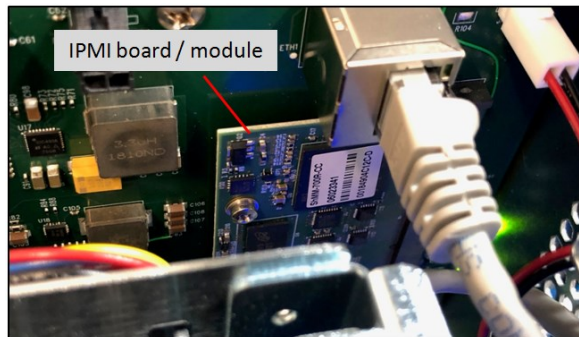


15 IPMI

IPMI is a configurable feature and it is not included with the base model. The IPMI module is installed during assembly.

- If you require this feature, select this option or contact your One Stop Systems sales representative at sales@onestopsystems.com.

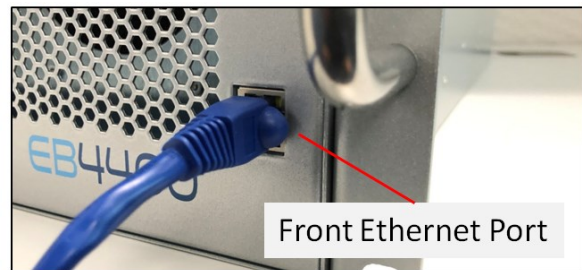
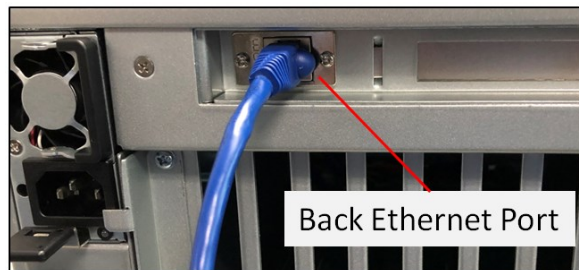
Unit equipped with IPMI, below photo shows the location of IPMI module installed in the unit.



How to setup and access IPMI, follow instructions below.

15.1 Connect Ethernet Cables

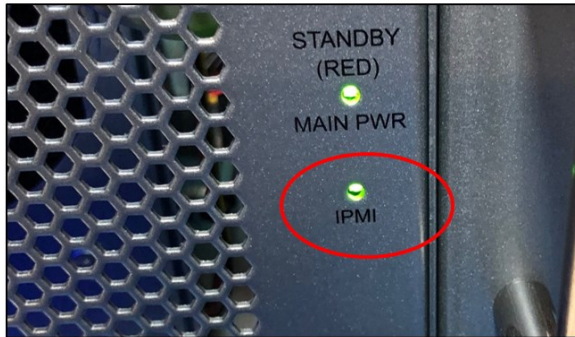
1. Connect Ethernet cable to either front or back Ethernet port; you can only use one or the other. You must plug-in the Ethernet cable first before you connect the power to the unit.
2. Plug in the other end of the Ethernet cable to your network (running DHCP).



3. Connect the power cord on the back of the unit.



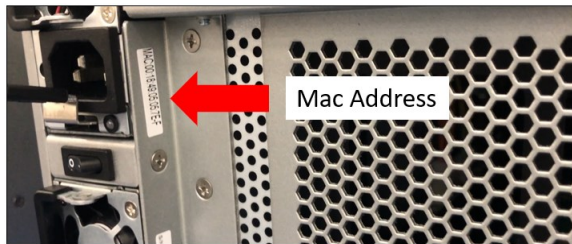
Upon connecting the power, the IPMI LED, will illuminate from solid red to blinking green and to solid green. When the led status is solid green, the IPMI is ready.



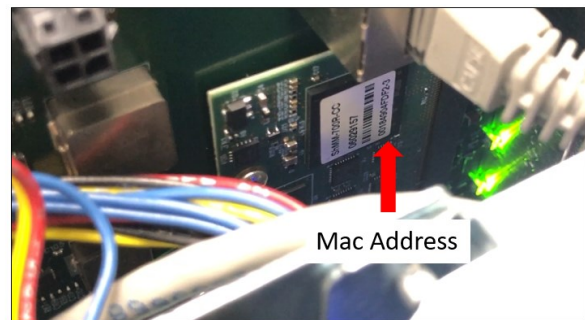
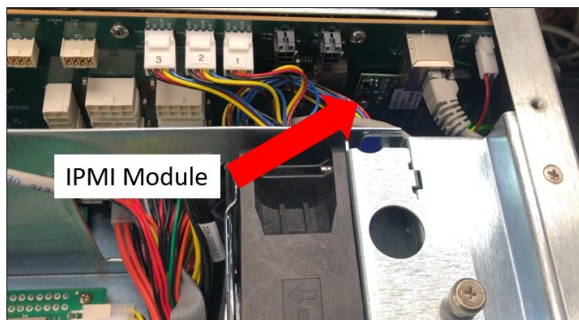
15.2 Locate Mac Address Label / Sticker

- The Mac Address can be found in the rear section of the unit and on the IPMI module inside the expansion unit.
- The photo below shows the location of the Mac Address label.

Back of the unit, Mac Address label / sticker (photo below).



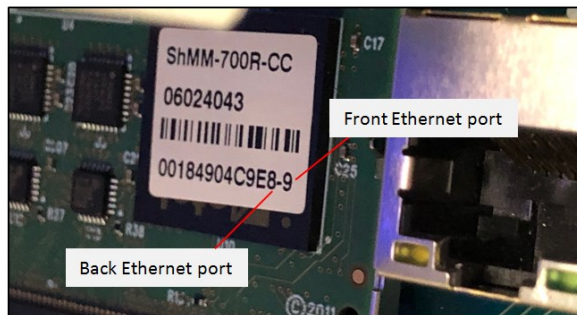
On the IPMI module inside the expansion unit, Mac Address label / sticker (photo below).



15.3 Ethernet Port & Mac Address

There are two Ethernet Ports on the 4UP expansion unit. Each port is assigned with unique Mac address.

- Below photo shows the Mac address (thirteen characters).
 - The last two numbers serve as the Ethernet port ID / location, number 8 and 9.
 - Number **8** is assigned for the back Ethernet port (eth0).
 - The last number **9** is for the front Ethernet (eth1).
- The Mac address for the front Ethernet is **00184904C9E9** and the back Ethernet port is **00184904C9E8**.
- The format to use when querying a Mac address may vary depending on the Operating System that you are running in your computer. It can be 00:18:49:04:C9:E9 or 00-18-49-04-C9-E9.



15.4 Discovering the IP Address from Mac Address

Use the known Mac address from the IPMI module to find or discover the DHCP IP address on the 4UP ethernet port.

- Front port (eth1), set to static IP address 192.168.0.20
- Rear port (eth0), set to DHCP address.

Multiple ways to discover and retrieve the IP address from a known Mac address (on the IPMI module):

1. Look in your DHCP server logfiles for a lease that matches the MAC address of the device.
2. A network or IP scanner, which can scan, retrieve, and resolve MAC addresses.
3. Command Lines: Windows Terminal or Linux terminal.

15.4.1 Using The DHCP To Find IP Addresses

In case you have access to the DHCP Server, you can look at all IP, MAC, and interface relationships, as well as the names of the devices and LAN lease times.

- Log into your DHCP server, and here we will be using the home gateway.
- If you are not aware of the IP address of the DHCP Server, you can run an ipconfig command on Windows or an ifconfig command on macOS or Linux.
- Type in the IP address within your browser and insert your credentials.
- Go to "DHCP" then to "DHCP Clients List" here, and you will be able to see how the MAC and IP addresses are mapped on the network.
- Match the IP with the MAC address.

Navigate to Data management->DHCP->Leases->Current leases in the GUI and you can export it to check the list of clients involved.

15.4.2 Using A Network or IP scanner

Using a software tool such as an IP scanner (this is just an example) to scan and discover all IP and Mac addresses on the network. Photo below displays the IP and Mac addresses after running the IP Scanner.

- Mac Address 00:18:49:04:F1:b8 and IP address of 10.2.5.2.

NOTE: The "nVent,Schroff GmbH" is the vendor / manufacture of the IPMI module.

Status	Name	IP	Manufacturer	MAC address	Comments
	WIN-TGRQHSL131H	10.2.5.1	ASUSTek COMPUTER I...	50:EB:F6:CF:EB:22	
>	10.2.5.2	10.2.5.2	nVent, Schroff GmbH	00:18:49:04:F1:B8	Mac Address
>	10.2.5.20	10.2.5.20	Cisco-Linksys, LLC	00:12:17:00:0A:26	

15.4.3 Command Lines: Windows OS

Using Command Prompt (elevated mode): "arp -a" command

For example, if your network IP has an address of 10.2.5.20, the broadcast address will be 10.2.5.255 if you have a /24 subnet (255.255.255.0)

- Open a command prompt and type: "ping 10.2.5.255."
- Wait for few minutes until all the pings have timed out to get a response.
- Then type this: "arp -a"

You should be able to find your MAC of your device, with its IP address.

- In this example, the MAC Address on the IPMI module Eth0 is 00-18-49-F1-B8.
- Match that with the IP address on the "arp" table, it is 10.2.5.2, see example photo below.

```
Pinging 10.2.5.255 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.2.5.255:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\Administrator>arp -a

Interface: 10.2.5.1 --- 0xa
Internet Address      Physical Address      Type
-----
10.2.5.2              00-18-49-04-f1-b8    dynamic
10.2.5.20             00-12-17-00-0a-26    dynamic
10.2.5.255            ff-ff-ff-ff-ff-ff    static
224.0.0.22            01-00-5e-00-00-16    static
224.0.0.251           01-00-5e-00-00-fb    static
224.0.0.252           01-00-5e-00-00-fc    static
255.255.255.255      ff-ff-ff-ff-ff-ff    static
```

IP Address ———— 10.2.5.2

Mac Address: OSS Device ———— 00-18-49-04-f1-b8

Using Windows PowerShell: "Get-NetNeighbor" command

Start Windows PowerShell as administrator and type:

```
"Get-NetNeighbor -LinkLayerAddress 00-18-49-04-c1-2c.
```

- Below photo is an example of Windows PowerShell cmdlet for querying the IP address using the Mac address.
- This is just one an example of PowerShell command that you can utilize. There are more commands available that you can use.

```
PS C:\WINDOWS\system32> Get-NetNeighbor -LinkLayerAddress 00-18-49-04-c1-2c
```

ifIndex	IPAddress	LinkLayerAddress	State	PolicyStore
7	192.168.1.153	00-18-49-04-C1-2C	Reachable	ActiveStore

15.4.4 Command Lines: Linux OS

Linux:

Photos below are an example of Linux commands to query the IP address and Mac address.

arp-a command

```
root@oss:/home/oss# arp -a
? (10.2.5.1) at 00:18:49:04:f1:b8 [ether] on enp4s0
? (10.2.5.20) at 00:12:17:00:0a:26 [ether] on enp4s0
root@oss:/home/oss# ip neigh
10.2.5.1 dev enp4s0 lladdr 00:18:49:04:f1:b8 REACHABLE
10.2.5.20 dev enp4s0 lladdr 00:12:17:00:0a:26 DELAY
root@oss:/home/oss# arp -n
Address                  HWtype  HWaddress           Flags Mask            Iface
10.2.5.1                  ether    00:18:49:04:f1:b8   C                      enp4s0
10.2.5.20                  ether    00:12:17:00:0a:26   C                      enp4s0
```

Arp-scan

```
root@oss:/home/oss# arp-scan 10.2.5.0/20
Interface: enp4s0, type: EN10MB, MAC: 50:eb:f6:cf:eb:22, IPv4: 10.2.5.1
WARNING: host part of 10.2.5.0/20 is non-zero
Starting arp-scan 1.9.7 with 4096 hosts (https://github.com/royhills/arp-scan)
10.2.5.2      00:18:49:04:f1:b8      nVent, Schroff GmbH
10.2.5.20    00:12:17:00:0a:26      Cisco-Linksys, LLC

2 packets received by filter, 0 packets dropped by kernel
Ending arp-scan 1.9.7: 4096 hosts scanned in 17.249 seconds (237.46 hosts/sec). 2 responde
root@oss:/home/oss# arp -a | grep 00:18:49:04:f1:b8
? (10.2.5.2) at 00:18:49:04:f1:b8 [ether] on enp4s0
root@oss:/home/oss#
```

Nmap -sP or nmap -sn

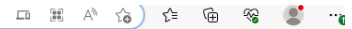
```
oss@oss-supermicro:~$ sudo nmap -sP 192.168.1.0/24 | awk '/Nmap scan report for/{printf $5;}MAC Address:/{print " => "substr($0, index($0,$3)) }' | sort >ipscan2.txt
oss@oss-supermicro:~$ ls
Desktop  Documents  Downloads  ipscan2.txt  ipscan.txt  Music  Pictures  Public  snap  Templates  Videos
oss@oss-supermicro:~$ cat ipscan2.txt | grep "00:18"
192.168.1.157 => 00:18:49:04:FD:F2 (nVent, Schroff GmbH)
192.168.1.170 => 00:18:49:05:05:D4 (nVent, Schroff GmbH)
oss@oss-supermicro:~$
```

Once you have identified the IP address, you can access the IPMI monitoring information via web interface.

Launch your internet browser and type the IP address, for example 192.168.1.157. Below photo is the OSS Web interface of the IPMI monitoring the following hardware.

1. Fan status and speed
2. Backplane Temperature
3. Power supply voltage and temperature

← ↻ ⚠ Not secure | 192.168.1.157



4UP, dual backplane (OSS-538 Ax, OSS-538 Ax), 2 power supplies, OSS-543 rev B or earlier - 24 May 2022

OSS-543 FRU Data

ADM1026 Internal Temperature Sensor	21C
-------------------------------------	-----

Fan 1 Status	OK
Fan 1 Speed	1110RPM

+3V3 STBY Voltage	3.3V
+3V3 MAIN Voltage	3.3V
+5VSB Voltage	5.1V
+12V Voltage	12.3V

Fan 2 Status	OK
Fan 2 Speed	1140RPM

Fan 3 Status	OK
Fan 3 Speed	1110RPM

PSU 1 FRU Data	
PSU 1 Input Voltage	118V
PSU 1 Output Voltage	12.2V
PSU 1 Output Current	5A
PSU 1 Input Power	80W
PSU 1 Output Power	60W
PSU 1 Temperature 1	26C
PSU 1 Temperature 2	38C
PSU 1 Temperature 3	39C

PSU 2 FRU Data	
PSU 2 Input Voltage	N/A
PSU 2 Output Voltage	N/A
PSU 2 Output Current	N/A
PSU 2 Input Power	N/A
PSU 2 Output Power	N/A
PSU 2 Temperature 1	N/A
PSU 2 Temperature 2	N/A
PSU 2 Temperature 3	N/A

Backplane 1 OSS-538			
Temp Sens 1	30C	Temp Sens 2	28C

Backplane 2 OSS-538			
Temp Sens 1	30C	Temp Sens 2	25C

15.5 Change the IP address Setting and FAN Speed

You need to remote login to the IPMI console. Use ssh + the IP address or use "PUTTY". There is no password to login, just press enter.

```
oss@oss-supermicro:~$ ssh root@192.168.1.157
root@192.168.1.157's password:
to install software: setup
to control backplane power: ipmi_pwr
to issue reset to supported peripherals: ipmi_rst
to show backplane switch port link status: ipmi_sd<
to show backplane switch port status: ipmi_bp<bp>
to show environmental sensor status: ipmi_clt
to show PSU status: ipmi_sea
to configure slots: slot_cfg<bp>
to change network settings: setip
to change fan speed control settings: setfan
#
```

15.5.1 Change the IP address

Use the setip command

```
oss@oss-supermicro:~$ ssh root@192.168.1.157
root@192.168.1.157's password:
to install software: setup
to control backplane power: ipmi_pwr
to issue reset to supported peripherals: ipmi_rst
to show backplane switch port link status: ipmi_sd<bp>
to show backplane switch port status: ipmi_bp<bp>
to show environmental sensor status: ipmi_clt
to show PSU status: ipmi_sea
to configure slots: slot_cfg<bp>
to change network settings: setip
to change fan speed control settings: setfan
# setip
Use static IP address for eth0 (rear)? [y/n]: n
Use static IP address for eth1 (front)? [y/n]: _
```

15.5.1 Modify FAN Speed

Use the setfan command

```
oss@oss-supermicro:~$ ssh root@192.168.1.157
root@192.168.1.157's password:
to install software: setup
to control backplane power: ipmi_pwr
to issue reset to supported peripherals: ipmi_rst
to show backplane switch port link status: ipmi_sd<bp>
to show backplane switch port status: ipmi_bp<bp>
to show environmental sensor status: ipmi_clt
to show PSU status: ipmi_sea
to configure slots: slot_cfg<bp>
to change network settings: setip
to change fan speed control settings: setfan
# setfan
Use fixed fan speed? [y/n]: n
# setfan
Use fixed fan speed? [y/n]: y
Enter fan speed in percent (range: 15-100), e.g.: 30: 100
Fan speed: 100
Is this correct? [y/n]: y
#
```

Power Cycle the unit after changing the settings!

16 Important Technical Information

16.1 Upstream and Downstream Slots

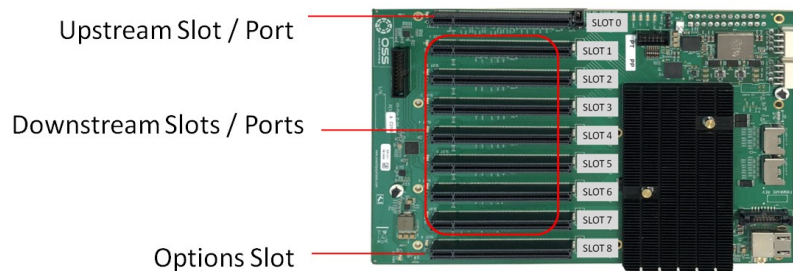
Upstream Slot: Also known as target slot. This is the designated slot for the Target adapter card only. OSS Host card or any PCIe cards will not operate in the Upstream slot / Target slot.

- Slot 0 is the default slot number for the Upstream slot.

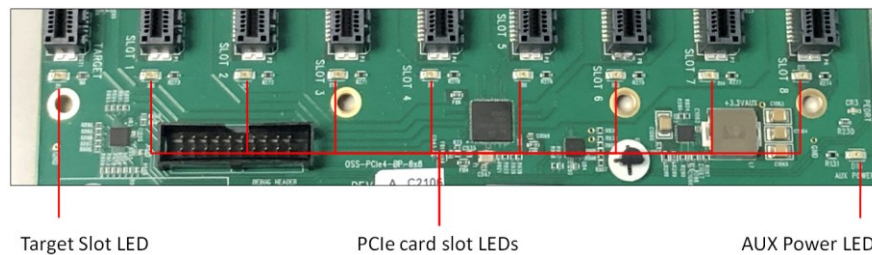
Downstream Slots: These are PCIe card slots #1, #2, #3, #4, #5, #6 and #7. Do not use the downstream slots for HIB Target card.

Option Slot: Slot 8, when configured accordingly, it will operate either in an Upstream mode or Downstream mode.

- Slot 8 configured as Downstream mode, will only work with an end-point device or a 3rd party PCIe card.
- Configured as an Upstream mode, use only an OSS HIB Target card.

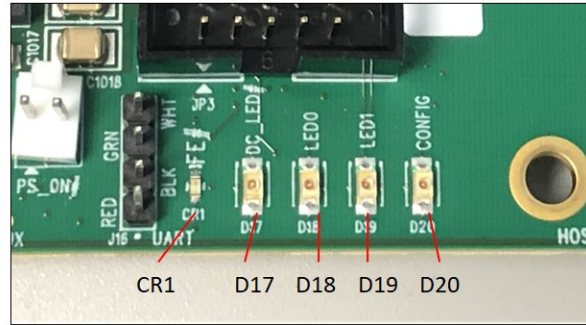
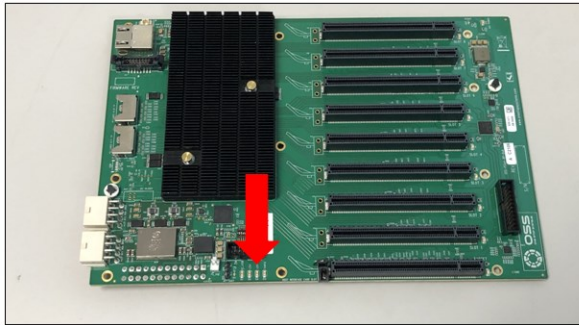


16.2 Slot LEDs



Item	Name	Description	When Lit (Solid Green or Blinking)	When Off
1	Target Slot LED	Upstream Slot LED	Solid = Gen4 Link Blink 2Hz = Gen3 Link Blink 1Hz = Gen2 Link Blink 0.5Hz = Gen1 Link (Slow Blinking)	OFF - Not Linked / No Card present in the slot
2	Downstream LED	PCIe slot LEDs	Solid = Gen4 Link Blink 2Hz = Gen3 Link Blink 1Hz = Gen2 Link Blink 0.5Hz = Gen1 Link (Slow Blinking)	OFF - Not Linked / No Card present in the slot
3	Aux Power LED	Auxiliary Board power LED	This is GREEN, denotes existence of auxiliary power +5VAUX	Board is at fault / error

16.3 Board LEDs

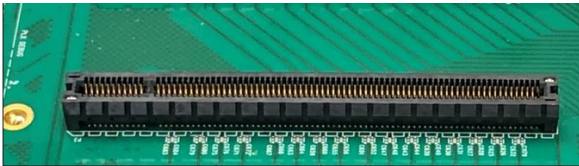


LED#	NAME	Description
CR2	FE LED	FE-Fault Error (SYS_ERROR#) LED
D7	DC LED	PCIe slot LEDs Daisy Chain Port Link Status LED
D8	LED 0	All Power Good
D9	LED 1	FPGA Blinking LED (When FPGA code is loaded and working: 8 blinks, 2 pause counts, 8 blinks)
D10	CONFIG	Config output from the FPGA, but enabled as an FPGA option. When RED, board is not programmed. OFF, board is programmed.

16.4 Slot Type

Slot Type: Closed-ended PCIe slot / connector, x16 mechanical.

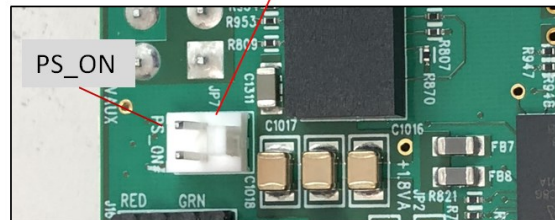
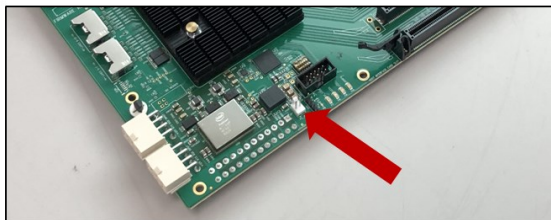
- Six x8 electrical slots (slots 1, 2, 3, 4, 5 and 6)
- Three x16 electrical slots (slots 0, 7 and 8)



16.5 PS_ON

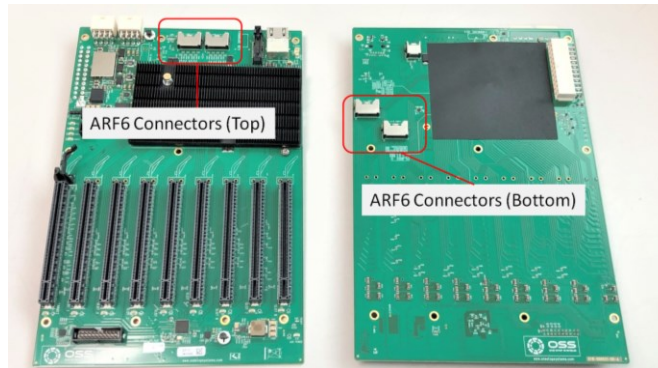
The board has a two-pin connector for placing a shunt / jumper that allows the backplane to be ON all the time when an ATX power supply is switched ON. See photos below for the location of the JP5 connector on the backplane.

Shunt/Jumper



16.6 ARF6 Connector

ARF6 Connector - For connecting ARC6 cable to daisy chain two backplanes together and to create a bridge or connection between SLOT 8 and the PCIe switch.

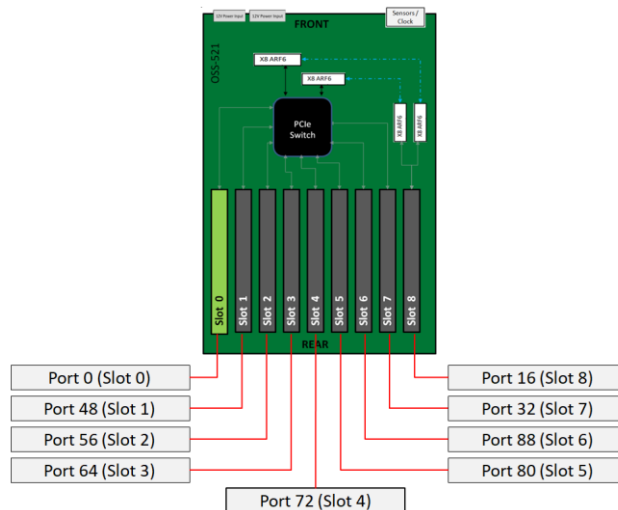


16.7 Slot Number and Port Mapping

Each slot on the OSS backplane is mapped to a PCIe port on the 88096 PCIe switch. Port mapping is hard-coded, it is essentially fixed. No means of changing or modifying it.

For example, a single GPU or PCIe card is seated in slot 2 on the backplane, PCIe port 56 will be automatically assigned to the card.

Port / Slot	Slot Mapping: 88096 Port
Slot 0	0
Slot 1	48
Slot 2	56
Slot 3	64
Slot 4	72
Slot 5	80
Slot 6	88
Slot 7	32
Slot 8	16 (Daisy chain) If slot 8 is cabled to the daisy chain port, it becomes port 16 of the 88096 (regardless of upstream/downstream configuration). NA: If not enabled, no port assignment.



16.8 Power Cords

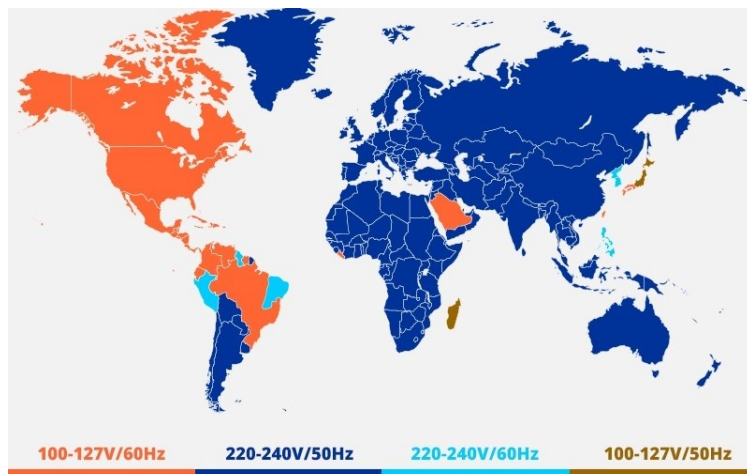
Two types of power cords can be used with this expansion unit, 125V and 250V. This is only applicable to AC power supplies.



16.8.1 Specifications

OSS PART#: 290-001-012-RC (125V)		OSS PART#: 290-001-032-RC (250V)	
Description: CORD NEMA5-15P C-13SJT		Description: CORD PWR MALE-FEMALE SJT	
Part Status	Active	Part Status	Active
Style	Male pins (Blades) to Female Sockets (slots)	Style	Male pins (Blades) to Female Sockets (slots)
1 st Connector	NEMA 5-15P	1 st Connector	IEC 320-C14
2 nd Connector	IEC 320-C13	2 nd Connector	IEC 320-C13
Number of Conductors	3	Number of Conductors	3
Cord Type	SJT	Cord Type	SJT
Wire Gauge	14 AWG	Wire Gauge	14 AWG
Shielding	Unshielded	Shielding	
Approval Marks	CSA, UL	Approval Marks	CSA, UL
Approved Countries	Canada, USA	Approved Countries	
Voltage Rating	125V	Voltage Rating	250V
Current Rating	15A	Current Rating	15A
Operating Temperature	60°C	Operating Temperature	105°C
Digi-Key Part#	Q944-ND	Digi-Key Part#	1175-1312-ND

16.8.2 Power cord socket and voltage tables world standards

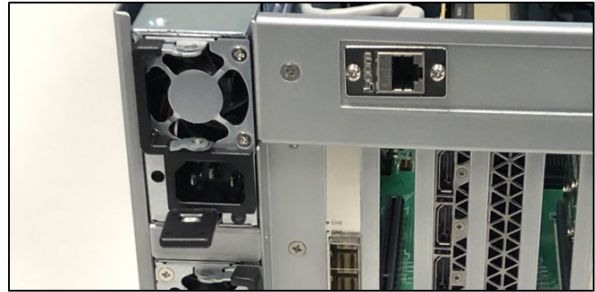


16.9 Power Supply

Power Options

- Single / Dual AC 1600W & DC 1600W
- Single / Dual AC 2600W & DC 2600W
- Single / Dual AC 2400W
- Single / Dual AC 3000W

AC Power Supply



DC Power Supply

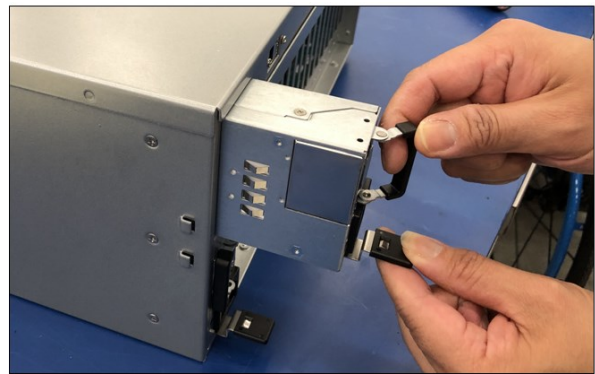
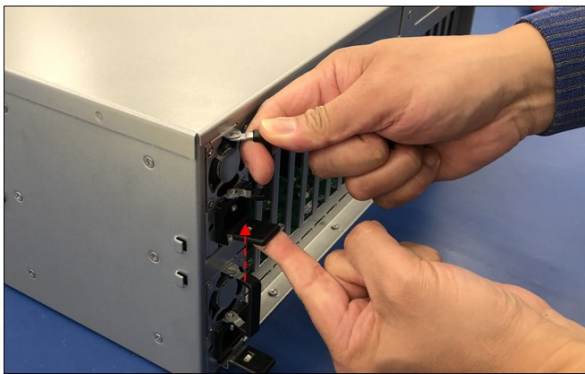
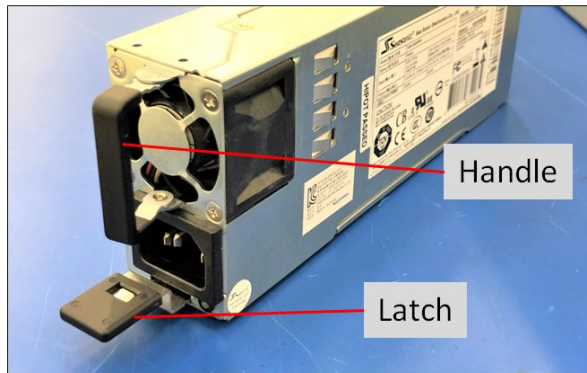


Standard or base model 4UP00 unit comes with one or two replaceable AC power supply modules (each 1600 W).

- With two power supply modules installed:
 - Share the power load requirements during normal operations.
 - Should one module fail for any reason, the power load will be shifted to the other module.
- LED indicator to keep you informed on normal/abnormal conditions for your PSU.
 - An indicator for the failure would be the LEDs on the back panel of the power supply behind the chassis.
 - For non-functioning equipment, these indicators would not show.

16.9.1 Removing AC Power Supply

1. Disconnect the power cord from the power supply you are removing.
2. Grasp the power-supply handle.
3. Press the black release latch **upward** and hold it.
4. Pull the power supply out of the bay.



16.9.2 Specifications

Input Rating

The power supply shall operate within all specified limits over the following input range. Harmonic distortions of up to 10% of the rated line voltage must not cause the power supply to go out of specified limits.

The power supply shall power off if the AC input is below VAClow_limit and shall start (auto recovery) if the VACrecover is reached. Input of VAC below VACrecover shall not cause any damage to the power supply, including the input fuse. The power supply shall also operate at Vin 240Vdc.

Parameter	Minimum Input	Rated Input	Maximum Input
115Vac	90Vac	100-127Vac	140Vac
230Vac	180Vac	200-240Vac	264Vac
Frequency	47Hz	50/60Hz	63Hz

240VDC Input Rating

PARAMETER	MIN	RATED	MAX
Voltage	192VDC	240VDC	288VDC
Current	10A	8.5A	

Maximum Input Current

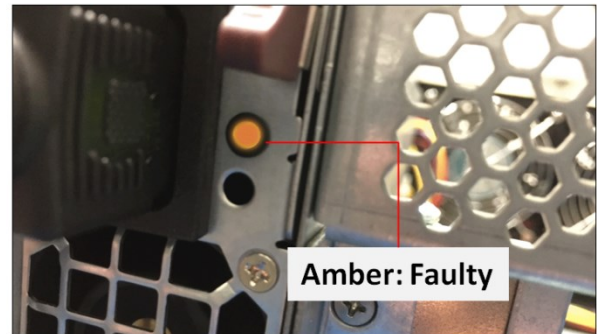
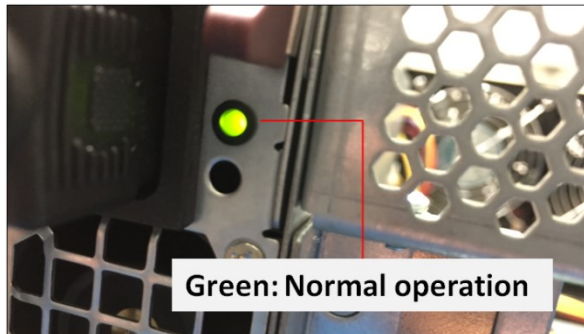
Input Voltage	Input Current	Maximum Power
90Vac	15A	1000W
100-127Vac	13-10A	1000W
140Vac	9A	1000W
180Vac	11.5A	1600W
200-240Vac	10-8.5A	1600W
264Vac	7.5A	1600W

Output Rating

GROUP	1		2
OUTPUT VOLTAGE	+12V		+12VSB
INPUT VOLTAGE	100-127Vac	200-240Vac	100-240Vac
MAX.LOAD	83.3A	133.3A	2.1A
CLST Peak 20sec duration *	89.3A	139.3A	2.4A
Pmax.app Peak 10msec duration *	103.3A	153.3A	
Pmax Peak 100µsec duration *	128.3A	178.3A	
MIN.LOAD	0A		0A
VOLTAGE REGULATION	±5%		±5%
RIPPLE & NOISE	120mV		120mV
Max. Capacitive Loads	50000µF		3100µF
Min. Capacitive Loads *	2000µF		10µF
Dynamic Load Capacitive Load	2000µF		20µF

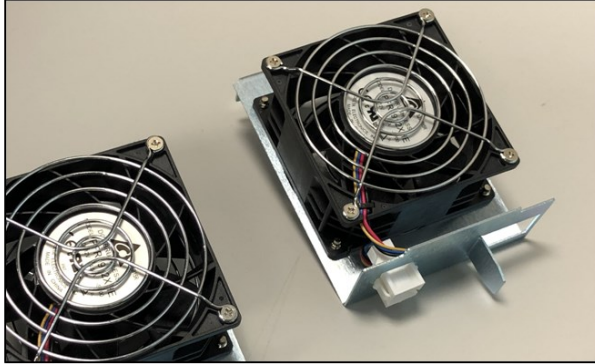
16.9.3 LED Indicator

Power Supply Condition	LED State
Output ON and OK	GREEN
No AC power to all power supplies	OFF
PSU standby state AC present / Only 12VSB on	1Hz Blink GREEN
Power supply is cold standby state or always standby state as defined in the Cold Redundancy section of the CRPS Common Requirements Specification	1Hz Blink GREEN
AC cord unplugged or AC power lost; with a second power supply in parallel still with AC input power.	AMBER
Power supply critical event causing a shutdown; failure, over current, short circuit, over voltage, fan failure, over temperature	AMBER
Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan.	1Hz Blink Amber
Power supply FW updating	2Hz Blink GREEN



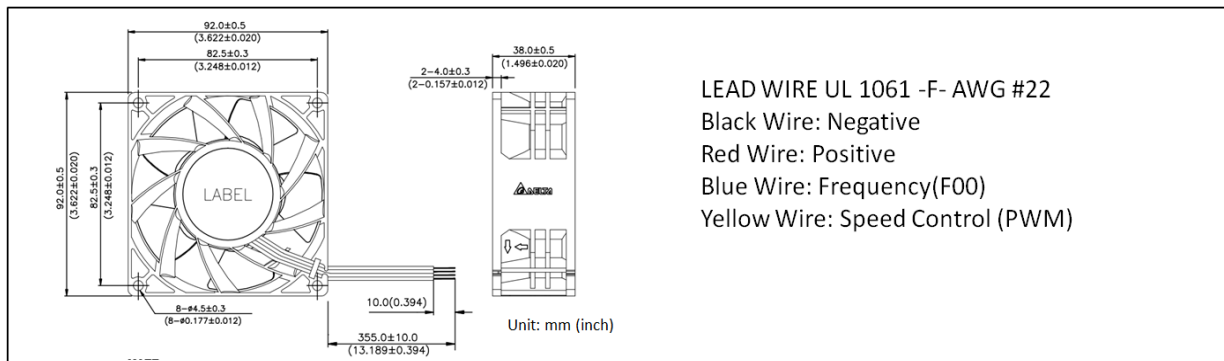
16.10 Fan

The expansion unit has two fans installed with sufficient capacity to provide cooling to the extreme-high-heat- generating GPUs. These are high CFM / RPM replaceable fans. The fans have a PWM controlled fan speed (4x lead wires), regulated by the temperature sensors within the system.



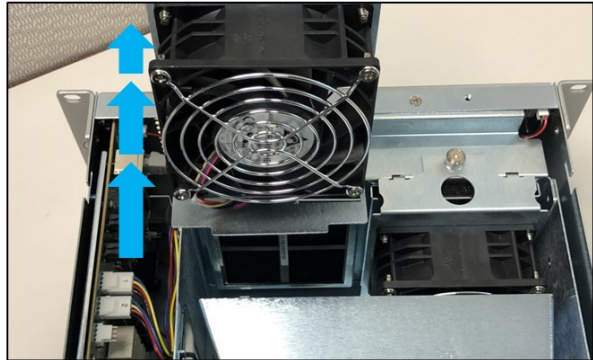
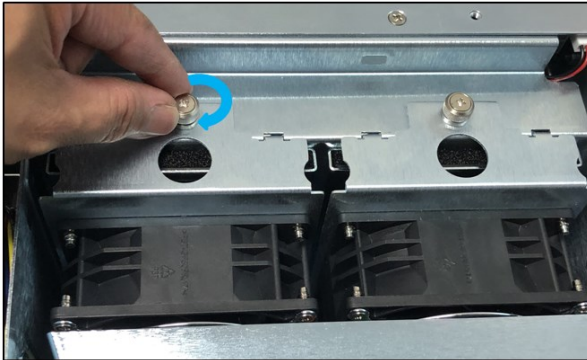
16.10.1 Fan Specifications

Series	PFR	Power (Watts)	44.40W
Part Status	Active	RPM	11500RPM
Voltage Rated	12 VDC	Termination	4 Wire Leads
Size / Dimension	Square-92mm L X 92mm H	Ingress Protection	--
Width	38.00mm	Operating Temperature	-10~+70°C
Air Flow	185.55CFM (5.255 m3/min)	Weight gram (g)	260g
Static Pressure	2.523inchH2O (64.10mmH2O)	Current Rating	3.70A
Bearing Type	Ball	Voltage Rating	07.0-13.2VDC
Fan Type	Axial	Material Frame	Plastic
Features	Speed Sensor (Tach), PWM control	Material Blade	--
Noise	71.0dB(A)	Lifetime @ Temp	70000 Hrs@40°C



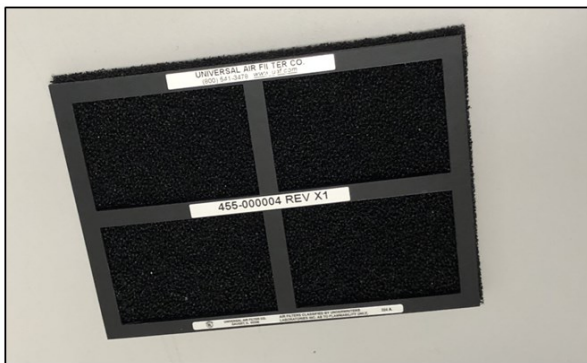
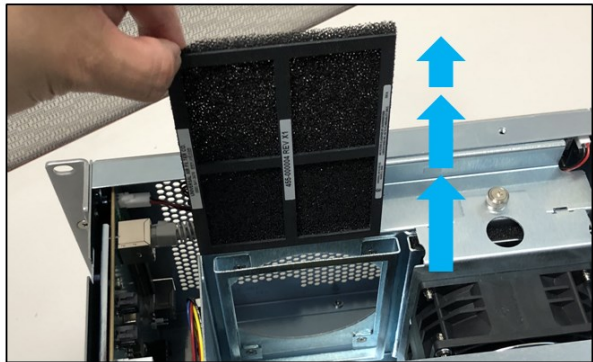
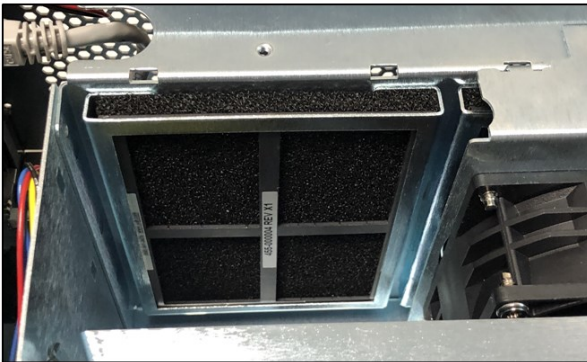
16.10.2 How to remove Fan

Loosen the thumbscrew and slowly pull the fan out, see photos below.



16.11 Fan Foam Air Filter

The 4UP can be configured to come with fan foam air filters with minimal airflow resistance to prevent dust from entering the expansion unit. You can easily remove and clean the filter. To access the foam air filter, simply remove the fan first and pull the filter out, see photos below.



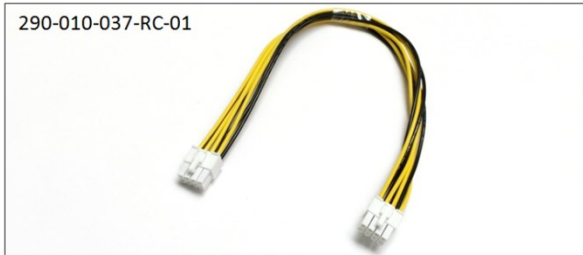
16.12 Auxiliary power cables

The aux power cable is available for the unit but it is not a standard item. It is optional and sold separately. If your card requires an extra power, please contact our Sales team.

There are two different sets of aux power cables, see table below.

Aux Power Cable	Part Number	Description	Connector	#of Connector
8 pin	290-010-037-RC-01	Cable Assy, Aux Pwr, 8 Pin, NVIDIA 2.0, 12", Expansion System, M176 (OSS)	8-pin male to 8-pin male	One 8-pin connector
	290-010-037-RC-02	Cable Assy, Aux Pwr, 8 Pin, NVIDIA 2.0, 24" Expansion System, M176 (OSS)	8-pin male to 8-pin male	One 8-pin connector
6+2 pin	290-010-013-RC	Cable Assy, Canister, External Pwr, Dual 6+2 PCIe Graphics Only	8-pin male to 2 6+2-pin male	Two 6+2 pin connectors
	290-010-036-RC	Cable Assy, Aux Pwr, 6+2 Pin, 24", Expansion System, M176 (OSS)	8-pin male to 2 6+2-pin male	Two 6+2 pin connectors

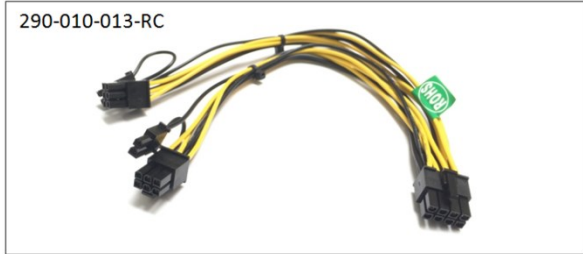
290-010-037-RC-01



290-010-037-RC-02






290-010-013-RC



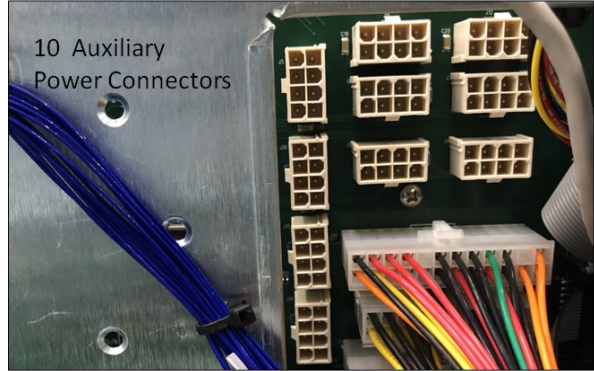
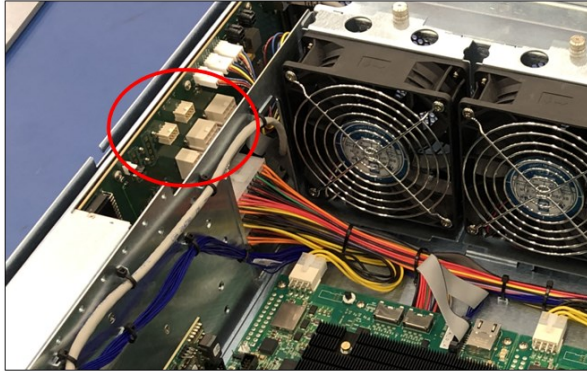
290-010-036-RC



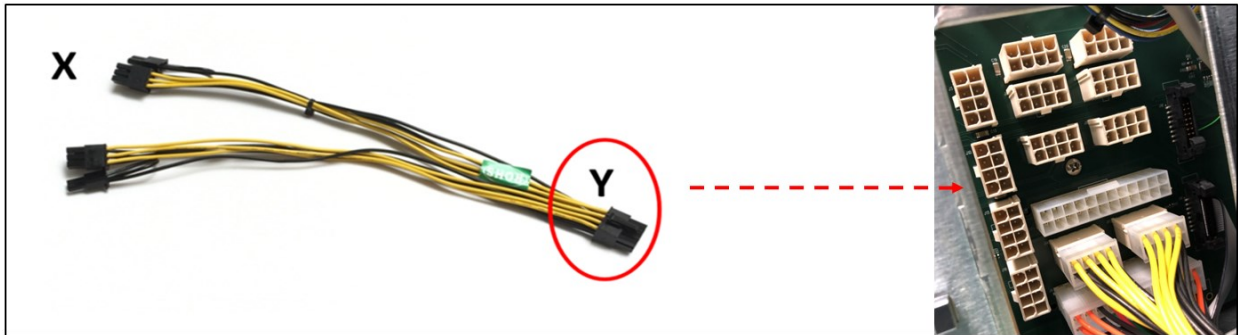
	Connectors	Can provide power of
	8 pin	150 Watts
	Two 6+2 pin	300 Watts
	6 pin	75 Watts

16.12.1 Aux power cable installation

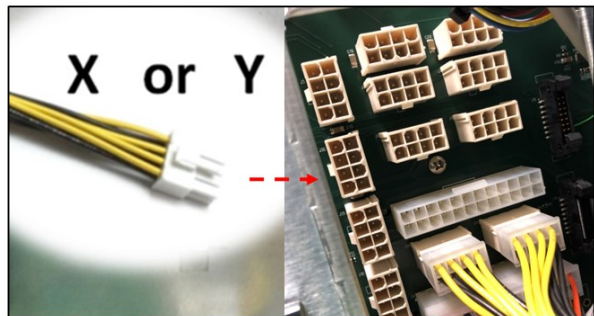
The extra power is supplied directly from the power supply backplane and there are 10 available AUX power connections / ports in which the auxiliary power cables are plugged in, see photo below.



To plug in the 6+2 pin cable correctly, connect the **Y** end connector of the cable to the power distribution board, see photos below.



To plug in the 8-pin cable correctly, you can use either **X** or **Y** end of the cable, see photos below.



Ensure the cable is fully seated and secured.

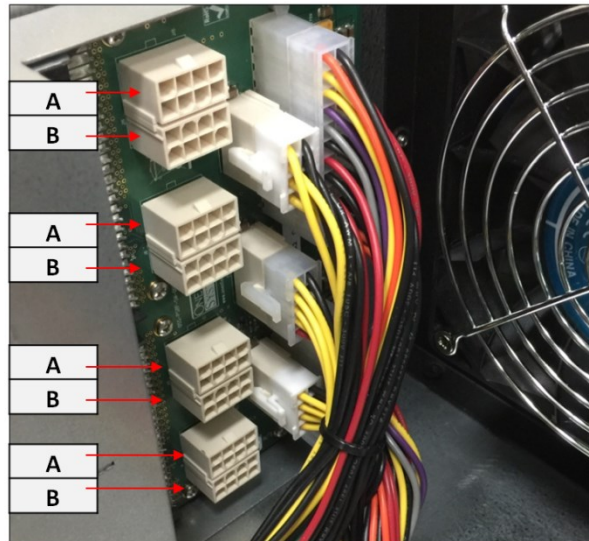
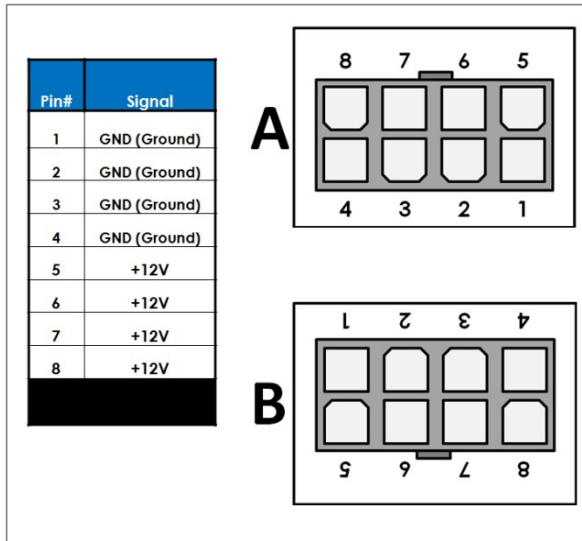


NOTE

Route cables away from FANs. For safety and proper airflow avoid blocking the fans.

16.12.2 Pin Outs

PSU board aux port pin outs



8-pin aux power cable and pin outs

Figure A1

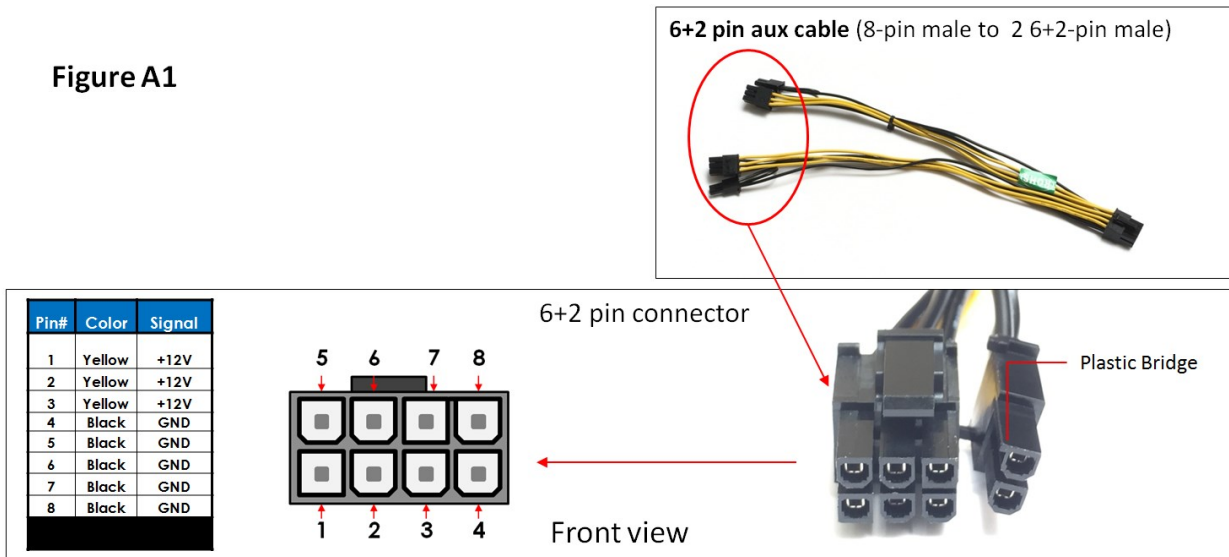
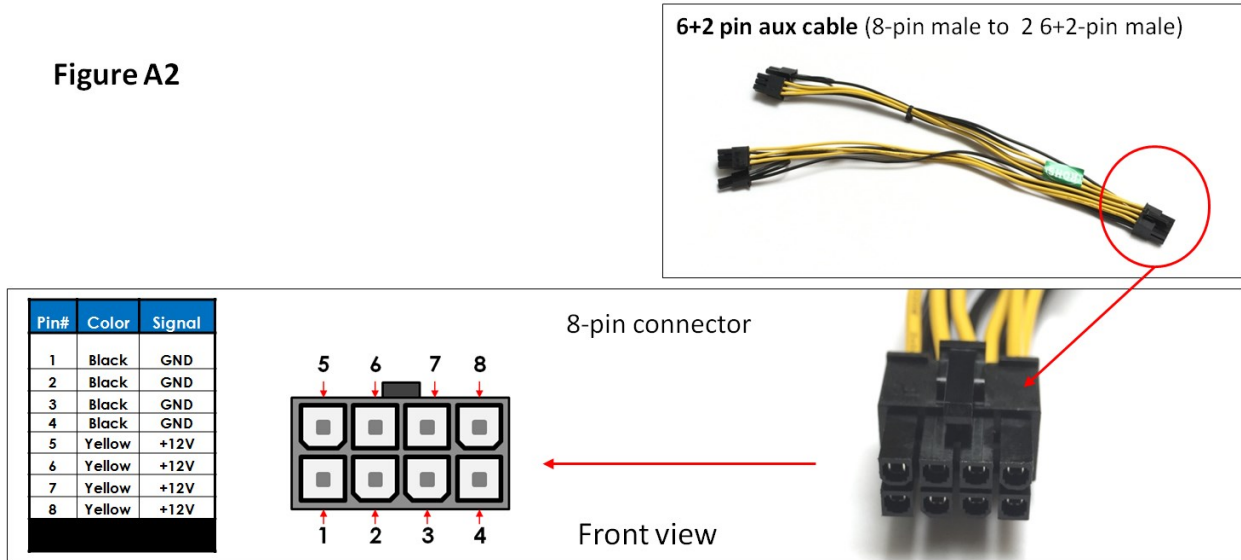


Figure A2



6+2-pin aux power cable and pin outs

Figure B1

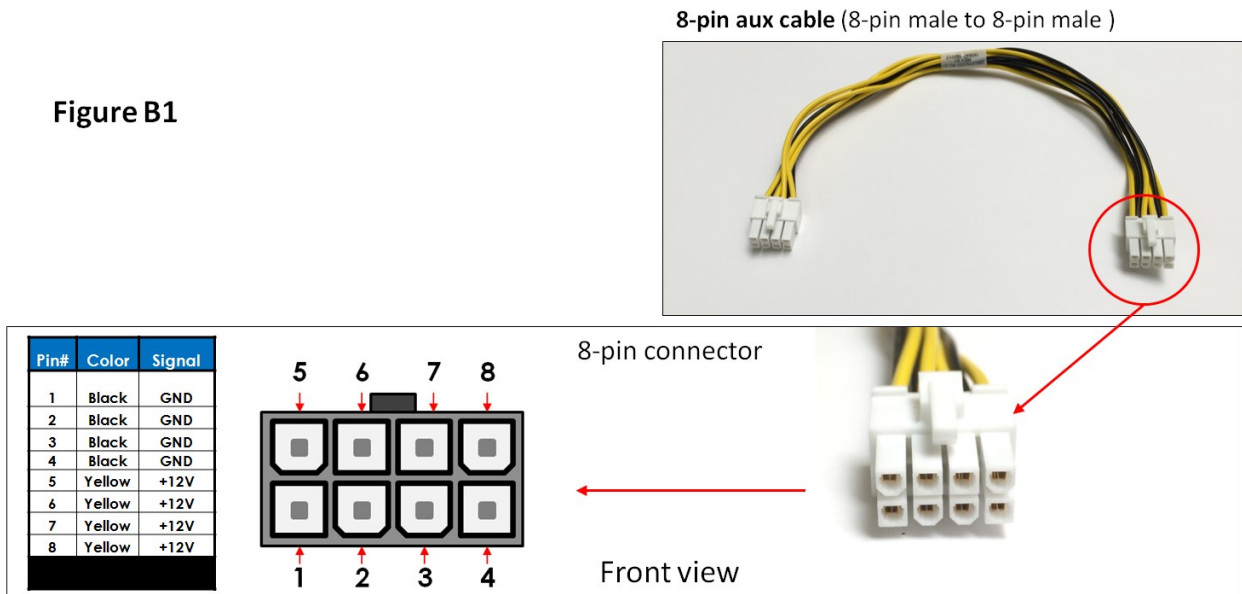
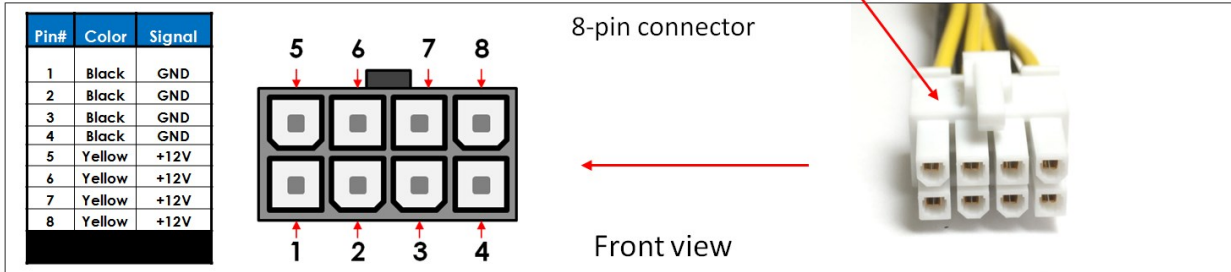
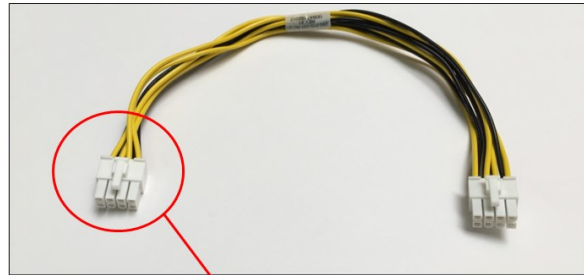


Figure B2

8-pin aux cable (8-pin male to 8-pin male)



16.12.3 Using the Auxiliary Power Cable

When using a PCIe card such as FPGA GPU cards that requires additional power, you may need auxiliary power cables. Depending on the power requirement of your PCIe card, it will have a different built-in aux power port in which you attach the aux power cable.

A PCIe slot provides 75 watts of slot power, which is not enough to meet the power requirement for a high-end add-in card with power consumption. A direct connection to the power system is needed to obtain additional power. This can be done by using the 6+ 2 pin or 8 pin auxiliary power cables. The below photos represent how the 6+2 pin connector and 8 pin aux power cables are attached to the PCIe card or GPU card.

The photo below is an example of a PCIe card or GPU card that has two 6-pin power connectors.

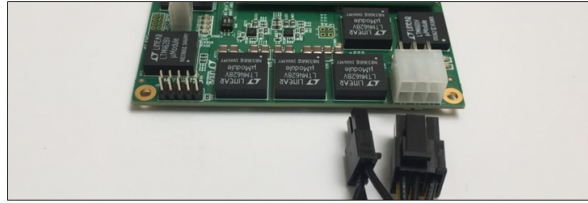


The photos below are example of a PCIe card or GPU card that has a 6pin power connector. You need one 6+2pin aux cable to provide extra power.

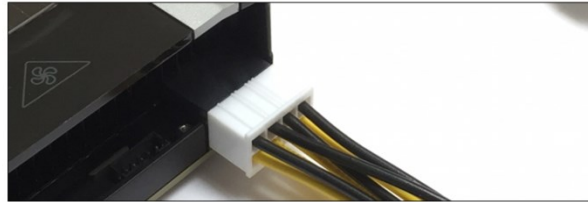
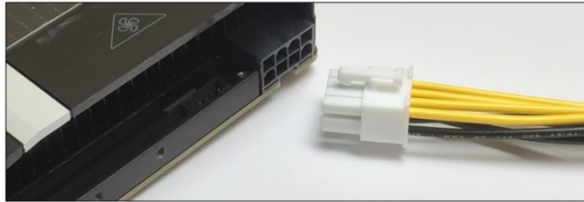




FPGA card



The photo below is an example of a PCIe card that has an 8pin power connector. You need one 8-pin aux cable to provide extra power.



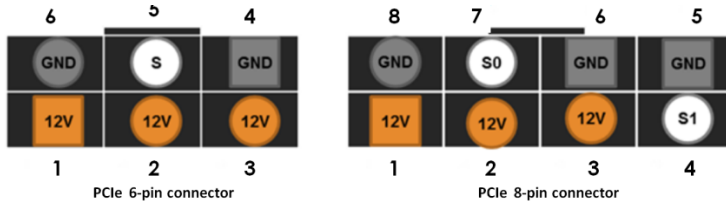
Each PCIe x16 slot on the 522 OSS board provides 75 Watts of power which is adequate for most video cards. But a high-end GPU cards usually need more power. To accommodate graphics cards needing more than 75 watts, the **PCI-SIG (Special Interest Group)** introduced two standards for supplying additional power to a video card via additional graphics power connectors:

- **PCI Express x16 Graphics 150 W-ATX Specification**—Published in October 2004, this standard defines a six-pin (2x3) auxiliary power connector capable of delivering an additional 75 W to a graphics card directly from the power supply, for a total of 150 W to the card.
- **PCI Express 225 W/300 W High Power Card Electromechanical Specification**—Published in March 2008, this standard defines an eight-pin (2x4) auxiliary power connector capable of supplying an additional 150 W of power, for a total of either 225 watts (75+150) or 300 watts (75+150+75) of available power.

Graphics Card Auxiliary Power Connector Configurations	
Maximum Power Draw	Auxiliary Power Connector Configuration
75 Watts	None
150 Watts	One six-pin connector
225 Watts	Two six-pin connectors*
300 Watts	One eight-pin connector + one six-pin connector
375 Watts	Two eight-pin connectors
450 Watts	Two eight-pin connectors + one six-pin connector

*May optionally use one eight-pin connector instead

GPU Card Power Connectors



Pin	PEX 6-pin	PCe 8-pin
1	12V	12V
2	12V	12V
3	12V	12V
4	GND	SENSE1
5	SENSE	GND
6	GND	SENSE0
7	--	GND
8	--	GND

Example below, when using a GPU card that has a maximum power consumption of 300 Watt. It has an 8-pin and 6-pin power connectors.

Number of Pins	Watt
6 pin connector	provides 75 Watts
8 pin connector	provides 150 Watts

To provide additional power, you need two 6+2pin cable connectors, see Figure A.

Note: 300 Watt power needed = 75 Watt from PCIe slot + 75 Watt from 6-pin + 150 Watt from 8-pin.



Figure B shows the wrong power cable to use due to special keying on the eight-pin connector. The GPU power connector has a different keying to prevent interchanging with the +12 V power connectors.

NOTE: We do not provide different aux power cables (i.e. 8pin to 4pin Molex) other than what we offer. If your PCIe card requires a different power adapter or aux power cable, you would have to buy it from other electronic stores.

16.13 Expansion Unit Power Consumption

The expansion unit draws a maximum of 304 Watts (2 Fans + 1Backplane + 1Interface board + IPMI board) of power without any boards or cards installed.

16.14 Power consumption breakdown per hardware

Item	Hardware	Power Consumption
1	Target Card OSS Gen 4	60 Watts
2	Fans	88.80 Watts (44.40 Watt per fan)
3	Backplane	150 Watt per backplane
4	IPMI board	6 Watts

17 Troubleshooting

17.1 Device is not detected or recognized

1. Shutdown the system
2. Disconnect the cables
3. Disconnect the power from the unit
4. Remove the HIB card from the unit and host computer
5. Re-insert the HIB card
6. Reconnect the cables
7. Turn ON the unit

17.2 My PCIe devices are showing UP with a Yellow Exclamation mark

1. Obtain the software / driver from the 3rd party vendor.
2. Install or re-install the driver
3. Reboot the system after installing the driver

17.3 No link between host and target cards

1. Check the dipswitches on each card. Make sure the Target card is set to target mode and Host card is set to host mode.
2. Check the Target card is installed in the target slot / upstream slot.
3. Use a validated / certified OSS HIB Cable adapter Gen4 cards
4. Reseat the Cables. Make sure you are using a Gen4 cables.
5. Swap or replace the host card, target card and Link cables.
6. If you are still having the same issue after replacing the host card, target card and cables, your next step is to replace the backplane with a known good board or contact Technical Support for assistance.

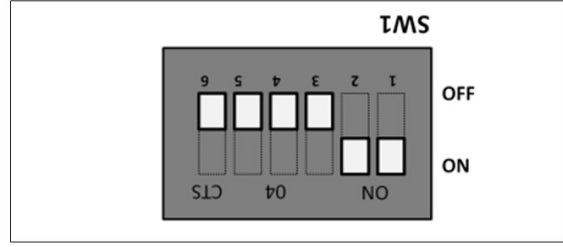
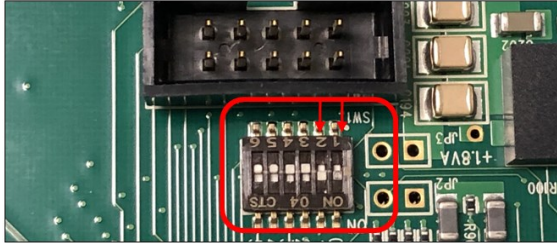
17.4 Broken OSS-Backplane

1. If you received a brand new DOA (Dead on Arrival) board, please contact OSS to RMA board and request for a replacement.
2. If you have an out of warranty board, please contact OSS Sales team and buy a new replacement board.
 - Standard warranty is 1 year, unless you have an SLA or extended warranty coverage.
3. If you purchased a second-hand / used board and it is broken, please contact OSS Sales team to buy a replacement.
 - Note: Purchasing a second-hand / used product is not covered under warranty.

17.5 My PCIe cards are not detected

Both Target and Host cards are linked, the LINK LED on both cards are illuminated and all the LED indicators on the cards are working. However, the Operating System is not recognizing all of my PCIe cards that are installed on the backplane.

1. Check the Dip switches on the backplane make sure they are set correctly, see photos below for the correct settings.



18 How to Get More Help

You can visit the Technical Support FAQ pages:

- Go to www.onestopsystems.com, click "Support" from the top menu and select "Knowledgebase and FAQ".

18.1 Contacting Technical Support

Our support department can be reached by phone at [1 \(760\) 745-9883](tel:1-760-745-9883). Support is available Monday through Friday, 8:00 AM to 5:00 PM PT. When contacting Technical Support make sure to include the following information:

1. Exact and correct serial #
2. Service Ticket or Case # (if you already submitted an online request)
3. Computer Type & Model: Operating System
4. Make & Model of PCI/PCIe cards: Application
5. Problem description

When submitting an online technical support request always provide a valid working e-mail address, phone number, shipping address and proper contact name. Check your e-mail for an automated response containing the case # and updates.

You can also visit our web site at <https://www.onestopsystems.com/pages/support> for a quick response, use the Technical Support and RMA Request Form available in the Support Section of the website. Simply complete the form with all required information. Please make sure that your problem description is sufficiently detailed to help us understand your problem.

Shipping or Transporting of Expansion Unit with PCI / PCIe cards

Any PCIe cards in **should be removed** (or not to be installed) prior to shipment to avoid or prevent possible damage. Note: Expansion board and PCIe / PCI cards that arrive damaged in shipment will not be covered under warranty.

18.2 Returning Merchandise

If factory service is required, a Service Representative will give you a Return Merchandise Authorization (RMA) number. Put this number and your return address on the shipping label when you return the item(s) for service. Please note that One Stop Systems WILL NOT accept COD packages, so be sure to return the product freight and duties-paid. Ship the well-packaged product to the address below:

Attention:RMA # _____, One Stop Systems
2235 Enterprise Street, #110
Escondido, CA 92029
USA

It is not required, though highly recommended, that you keep the packaging from the original shipment of your product. However, if you return a product for warranty repair/ replacement or take advantage of the 30-day money back guarantee, you will need to package the product in a manner similar to the manner in which it was received from our plant. We cannot be responsible for any physical damage to the product or component pieces of the product (such as the host or expansion interfaces for the expansion chassis) that are damaged due to inadequate packing. Physical damage sustained in such a situation will be repaired at the owner's expense in accordance with Out of Warranty Procedures. Please, protect your investment, a bit more padding in a good box will go a long way to insuring the device is returned to use in the same condition you shipped it in. Please call for an RMA number first.

18.3 Third Party Hardware & Software Support Policy

OSS tests, certifies and bundles many popular third party hardware and software products with OSS hardware for ease of use and guaranteed operation. OSS encourages customer innovation by combining OSS products in new and interesting ways with third party and customer developed hardware and software. Unfortunately, with virtually infinite combinations of hardware and software, OSS cannot test and validate every possible configuration. OSS is committed to supporting its products and identifying if any technical issue may be related to third-party hardware or software. In order to isolate technical issues, OSS may request that the system be returned to the same configuration that shipped from the OSS factory and any non-OSS supplied third-party hardware or software be removed from the system during troubleshooting.

We test, certify and support many third party hardware and software products along with OSS hardware and are happy to integrate a fully supported system. Ask us about that service and we would be happy to help. If an OSS product is fully functional and a support issue is related to third-party hardware or software that did not ship from the OSS factory, the customer requesting support should reach out to the third-party vendor for assistance to fully troubleshoot the issue.

18.4 Online Support Resources

If you need technical support, product assistance or have a technical inquiry we encourage you to submit it online using our Technical Support Form. Go to www.onestopsystems.com and click "Support" from the top menu.



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