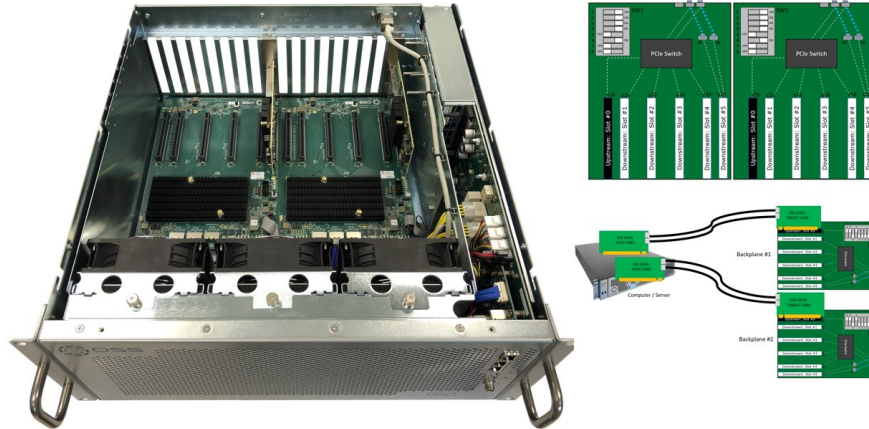




Gen 5 4UP 10-SLOT Unit



User Manual

Gen5 4UP 10-SLOT Unit Standard



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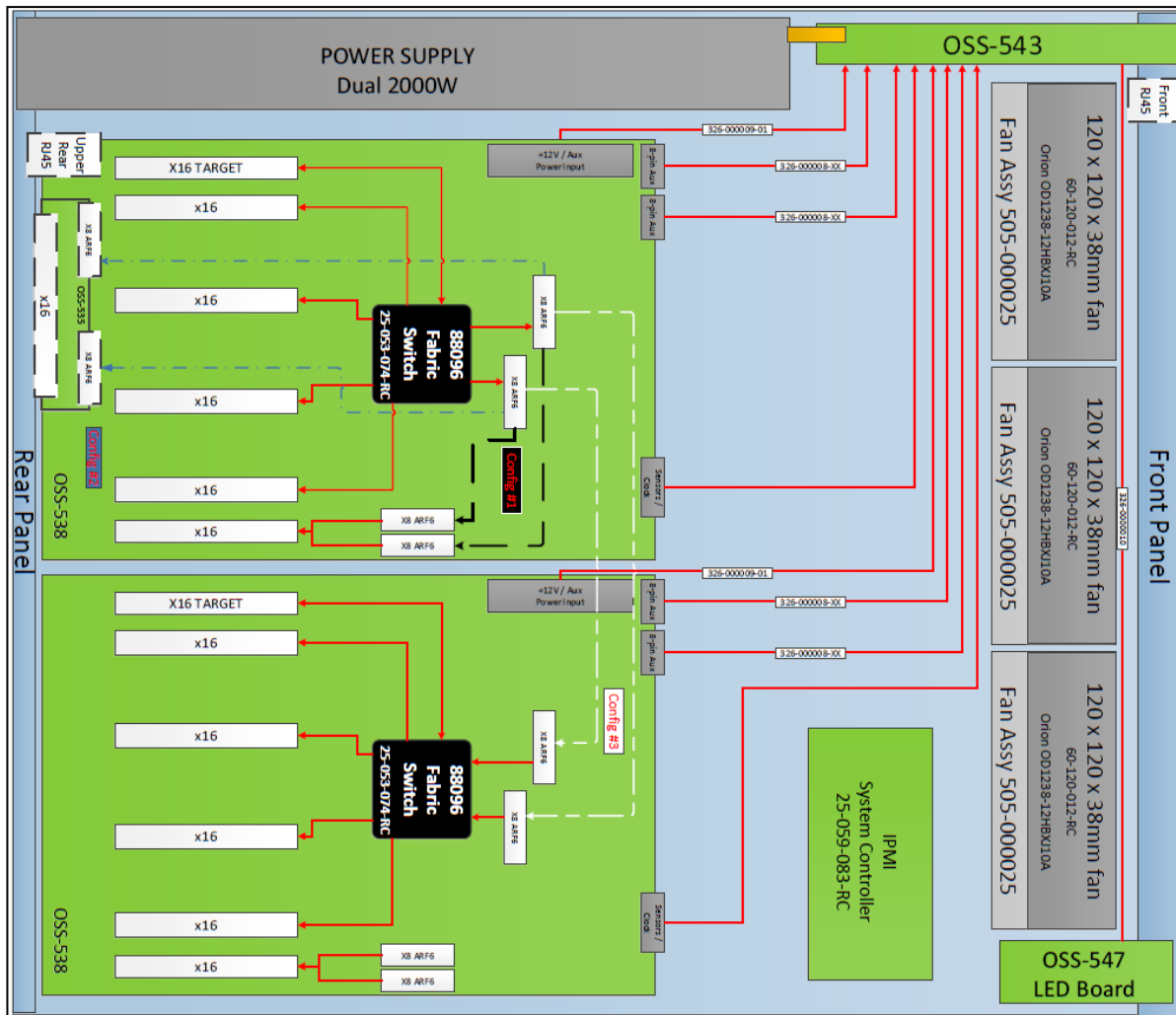
1 General Specifications

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 (64GB/s) 2x PCIe x4 x16 Host-to-Target uplinks (128GB/s) 4x PCIe4 x16 Host-to-Target uplinks (256 GB/s) SmartNIC Host
Backplane Options	Single OSS-580: <ul style="list-style-type: none"> • 1x single-width PCIe 5.0 x 16 FHFL upstream slot • 6x single-width PCIe 5.0 x16 FHFL downstream slots • 1x dual-width PCIe 5.0 x16 FHFL downstream slot Dual OSS-580: <ul style="list-style-type: none"> • 2x single-width PCIe 5.0 x 16 FHFL upstream slot • 12x single-width PCIe 5.0 x16 FHFL downstream slots (6x per upstream) • 2x dual-width PCIe 5.0 x16 FHFL downstream slot (1x per upstream)
Additional Slot Options	Standard <ul style="list-style-type: none"> • Modifies one dual-width PCIe 5.0 x16 FHFL downstream slot to two single-width PCIe 5.0 x16 FHFL downstream slots per backplane Riser <ul style="list-style-type: none"> • Adds and additional single-width PCIe 5.0 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: 3x 180CFM 120mm fans <ul style="list-style-type: none"> • Default PWM controlled based on built-in temperature sensors
Power Options	Single/Dual AC 2600W 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 C19 6' US 240V C19 6' US 240V C14 6' UK 2' 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 Gen5 architecture
- Semi-rugged frame design
- Dynamic fan speed control
- OSS Developed U-BMC
- Configurable slot and host uplinks to optimize throughput
- AC and DC power inlet options

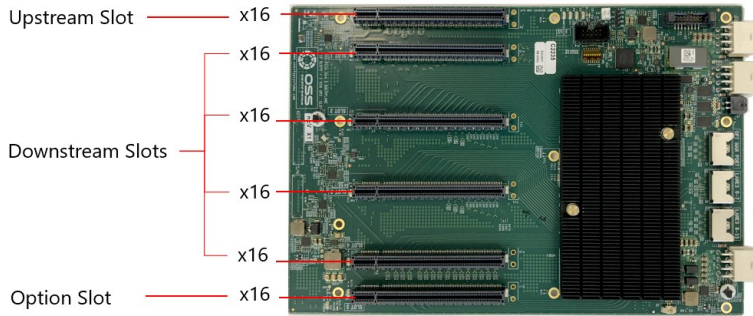
1.2 4UP Gen5 Architecture



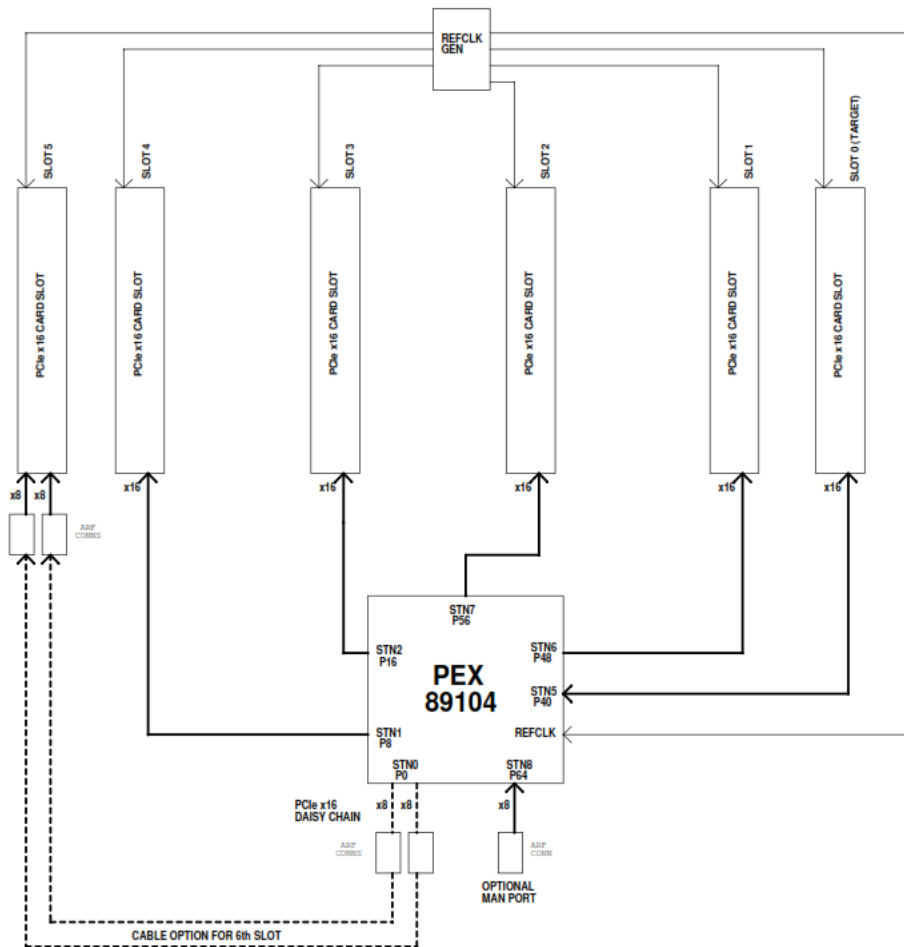
1.3 PCIe Slots

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

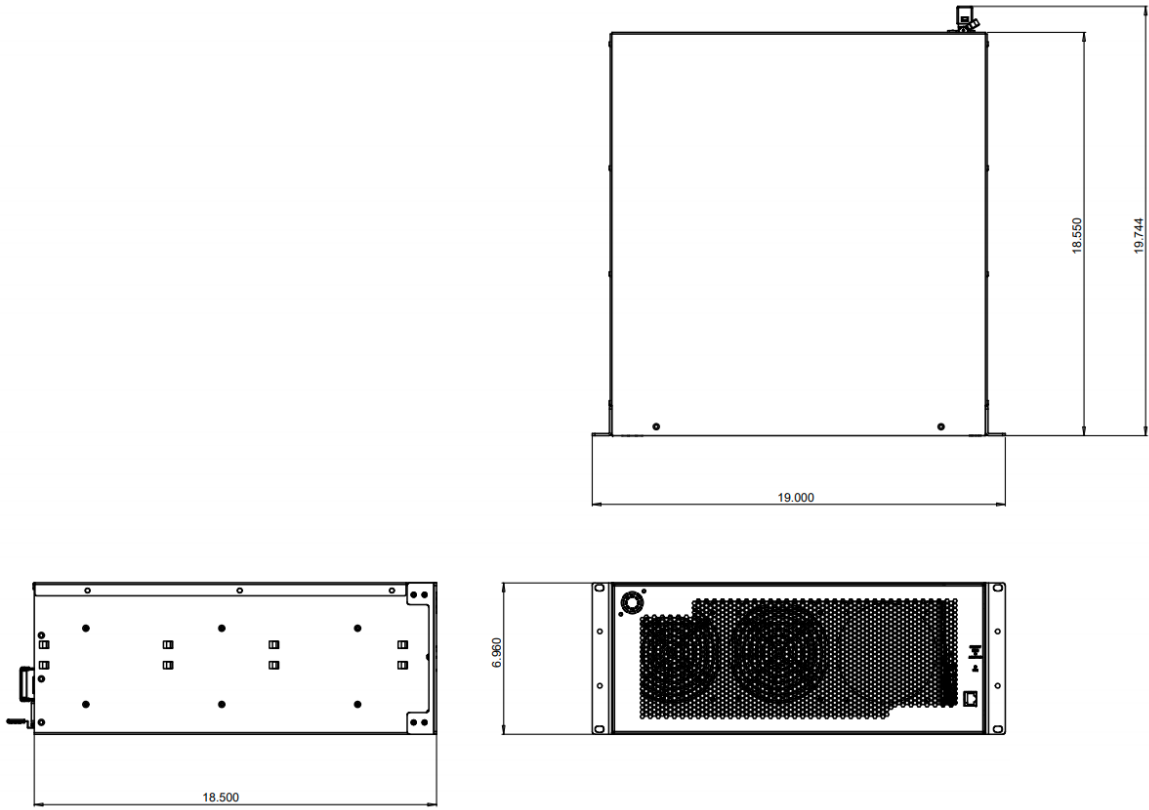
- Six x16 electrical slots (slots 0, 1, 2, 3, 4, and 5).
- Option slot is configurable to operate in x8 or x16.



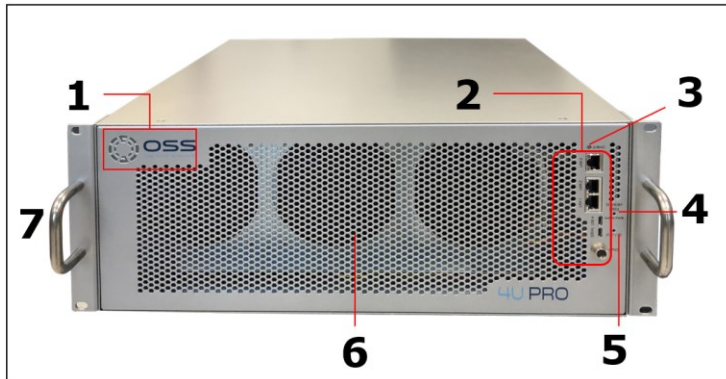
1.4 Backplane Block Diagram



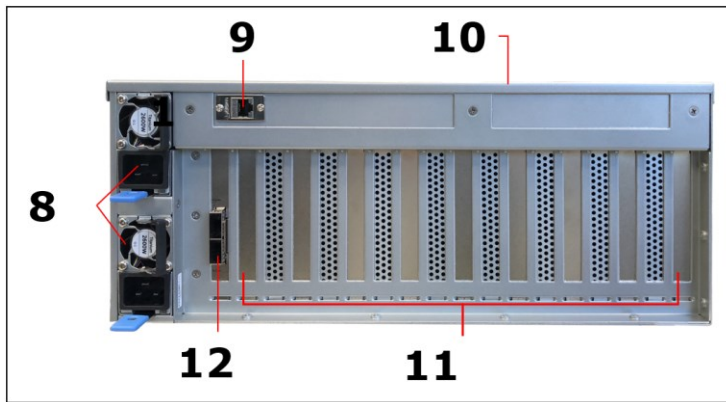
1.5 Dimensions



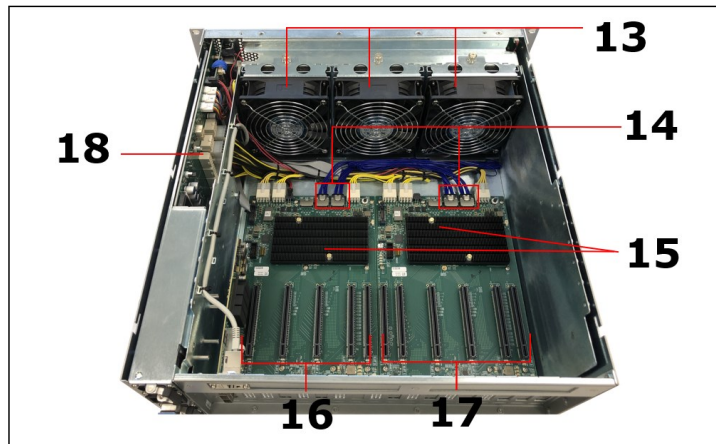
1.6 Expansion Unit Overview



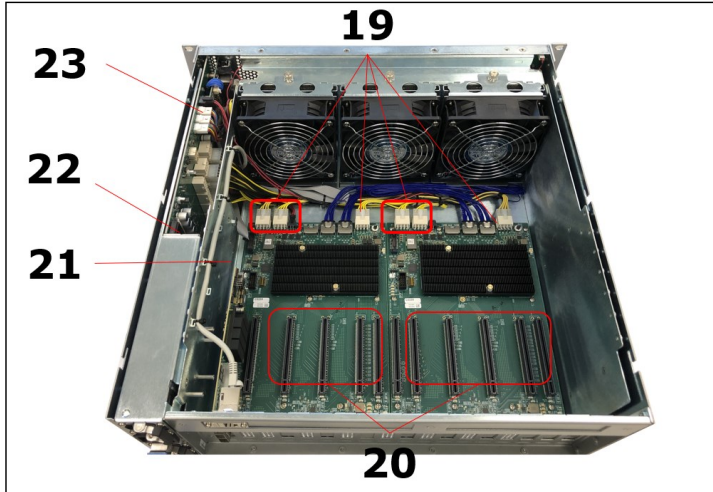
Number	Description
1	OSS LOGO-Power LED
2	UBMC External Ports
3	UBMC Alarm LED (Red-Fault or Green-Good)
4	Standby / Main Power LED
5	STAT ID LED
6	Front Panel
7	Front Handle



Number	Description
8	Power Supplies
9	LAN Port #4
10	Top Cover
11	Slot Fillers
12	Target Card (Cable Connectors)



Number	Description
13	Removable Fans
14	ARC Cables & ARC Connectors
15	PCIe Switches (with Passive Heatsink)
16	Expansion Backplanes #1 (PCIe Slots)
17	Expansion Backplane #2 (PCIe Slots)
18	Auxiliary Power Connectors

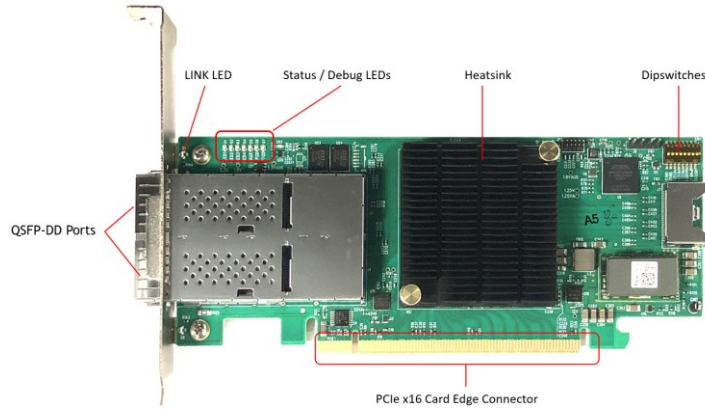


Number	Description
19	12V Input Power Connectors
20	Downstream PCIe Slots
21	Gen 5 OSS-579 Target Card
22	Power Supply Housing
23	FAN Power Cables

1.7 HIB x16 Gen 5 Card

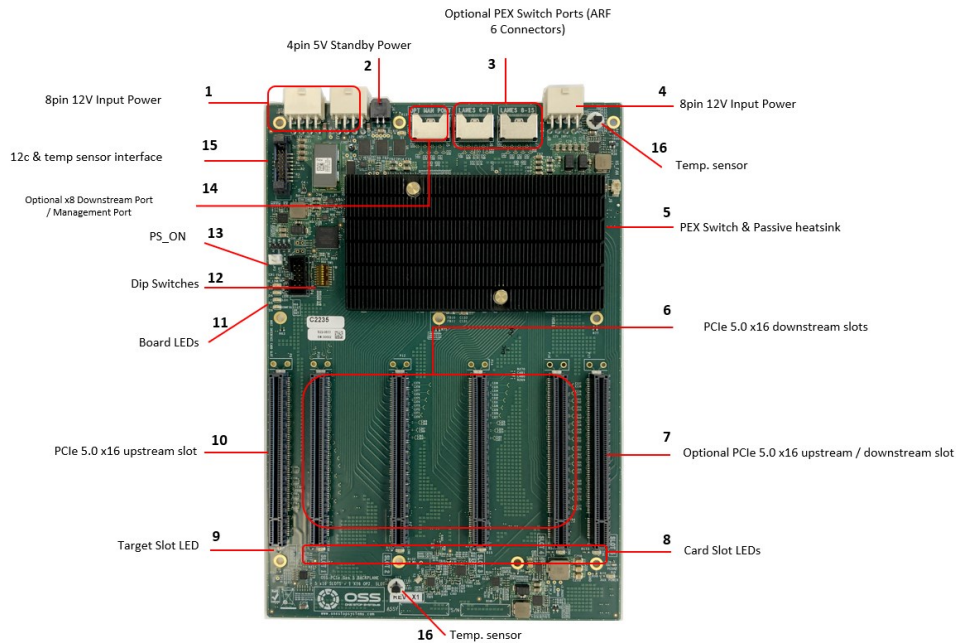
PCIe x16 Gen 5 host interface board with PCIe dual QSFP-DD cable connectors that can be configured as x16 or two x8 cable ports.

- The cable adapter operates in host or target mode controlled with DIP switch settings.
- With the OSS-PCIe5-HIB732-x16-H installed in a PCIe slot in PCIe Gen 5 motherboard and the OSS-PCIe5-HIB732-x16-T installed in an external target chassis full 128 GB/sec (full duplex) PCIe Gen 5 bandwidth is enabled using dual **custom QSFP-DD copper cables** up to 2m in length.



1.8 Backplane

The 10-Slot Gen5 expansion unit is composed of two OSS-580 (5slot backplane) backplanes and two OSS-579 target cards.



1.8.1 Description

Item	Name	Description
1	12V Input Power	12V input power for the 580 board. Not to be used for external GPU aux.
2	5V STB	5V Standby input power
3	ARF 6 Top Connectors	For connecting ARC 6 cables between "Option slot" and PEX switch
4	12V Input Power	12V input power for the 580 board. Not to be used for external GPU aux.
5	PEX and Passive Heatsink	PCIe Switch. Passive Heatsink on top of the PCIe Switch. Moves heat away from the PCIe chip.
6	Downstream Slots	PCIe card slot for 3 rd Party PCIe cards
7	Option PCIe Slot	Configurable card slot to operate either as an Upstream or Downstream modes
8	Card Slot LEDs	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. x16 PCIe slot
11	Board LEDs	LED status indicator for the board; Power LED status
12	Dip Switches	OSS-580 Option slot and Daisy-chain configuration
13	PS_ON	Enable to force power ON the backplane by placing a jumper on the connector
14	Option Management Port	Optional PCIe switch management port. This port is actively configured and ready to use as Downstream port.
15	I2C and temporary sensors interface	Connector for I2C and temperature sensors interface to the power backplane
16	Temperature Sensor	Sensor for detecting temperature on the board

2 Configuration

2.1 Two Host cards + Two Target cards

Two OSS-579 Host adapter cards in the host computer and each host card is linked to a target card per OSS-580 backplane in the expansion chassis.

- This configuration, there are two Upstream slots and 10 Downstream slots.
 - One Target card per backplane. Five downstream slots per backplane.
- 2 x16 Upstream slots + 10 x16 Downstream slots (combining both backplanes).
- It can accommodate 10 single-width full length PCIe cards.

Parts needed for this configuration:

1. Two Host adapter cards (OSS-579)
2. Two Target adapter cards (OSS-579)
3. Four custom OSS QSFP-DD Cables. Two cables per target card & backplane.
 - a. x16 link connection, use two cables between host and target.
 - b. x8 link connection, use one cable between host and target. When using x8 link, you must set the dipswitches on the host card to x8 mode.
4. Two 5slot backplanes (OSS-580)
5. Four ARC cables

2.2 One Host Card + Two Target Cards

One OSS-579 Host adapter card in the computer is linked to two Target cards in the expansion chassis.

- This configuration, there two Upstream slot and 10 Downstream slots.
 - One Target card per backplane. Five downstream slots per backplane.
- 10 x16 Downstream slots + 2 x16 Upstream slots (combining both backplanes).
- This configuration can accommodate 10 single-width full length PCIe cards.

Parts needed for this configuration:

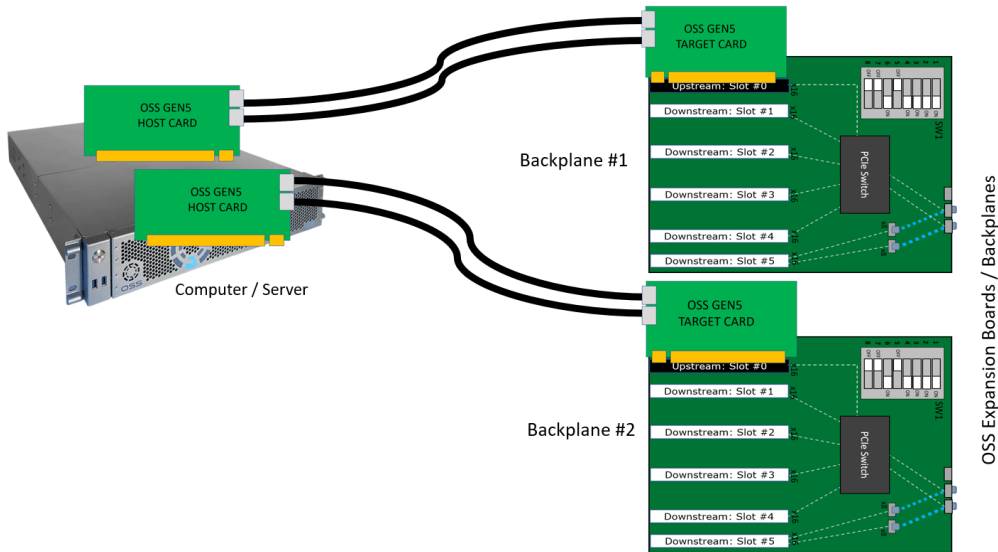
1. One Host adapter cards (OSS-579)
2. Two Target adapter cards (OSS-579)
3. Two custom OSS QSFP-DD Cables.
 - a. x8 link connection, use one cable between host and target. When using x8 link, you must set the dipswitches on the host card to x8 mode.
4. Two 5slot backplanes (OSS-580)
5. Four ARC cables

2 Use Cases

Two Host cards + Two Target cards

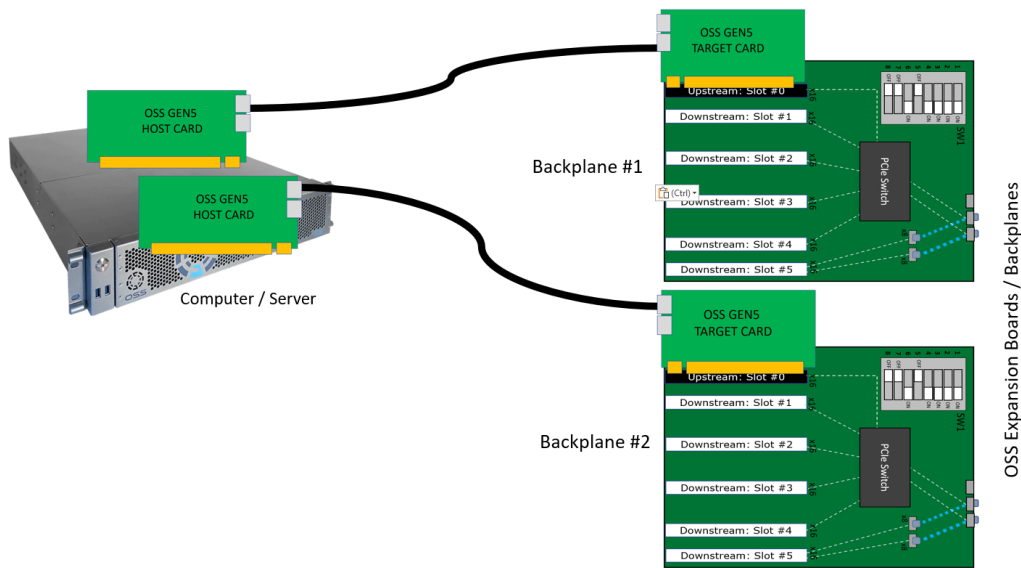
3.1 Use Case #1: x16, x16 - x16, x16

- x16 connection: Two QSFP-DD cables connected between host and target.



3.2 Use Case #2: x8, x8 - x8, x8

- x8 connection: One QSFP-DD cable connected between host and target.

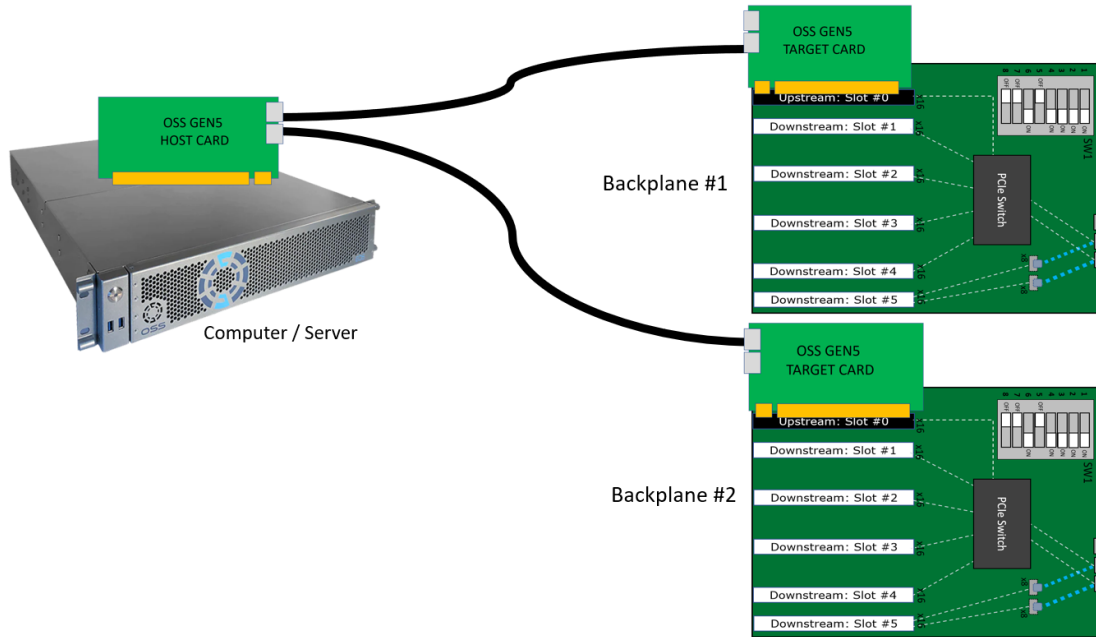


One Host card + Two Target cards

3.3 Use Case #3: x8 - x8, x8

- x8 connection: One QSFP-DD cable connected between host and target.

One host card linked to two target cards in the expansion unit.



4 Getting Started

Steps on how to setup and use the 4UP-Gen5 expansion unit. You will find instructions for the following.

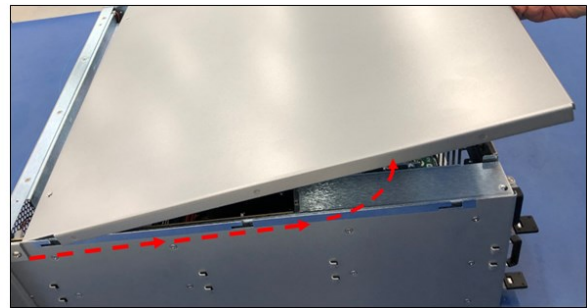
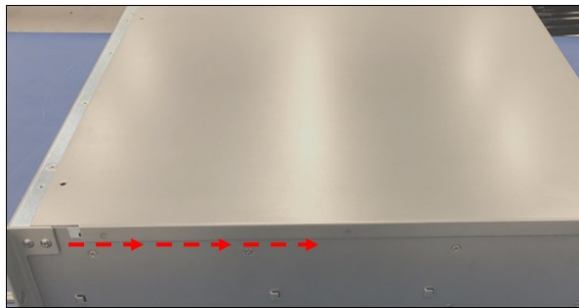
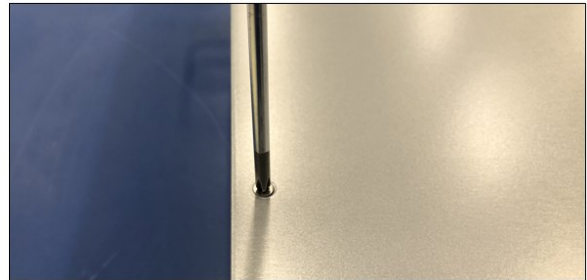
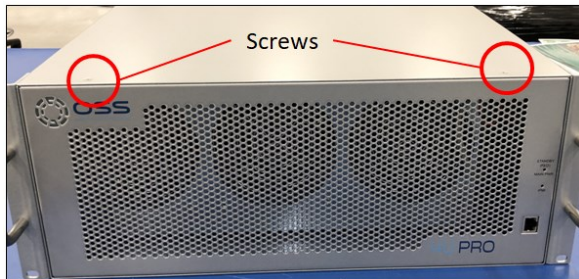
- How to Remove Top Cover
- Backplane Dipswitch Settings
- Target Card Installation
- Host Card Installation
- GPU / PCIe Cards Installation
- Link Cable Installation
- Powering Up the unit / system
- Hardware LED Check
- Post Installation

5 Installation Overview

1. Remove the top cover.
 - a. Check inside the unit for loose components or damaged parts.
2. Inspect backplane dipswitches
 - a. Need to verify the dipswitches on both backplanes are set correctly.
3. 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.
4. 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.
5. Install PCIe / GPU cards.
 - a. Plug in your PCIe or GPU cards in the expansion unit.
6. Connect the external link cables.
 - a. Plug in the QSFP-DD cables between Target and Host cards.
7. Plug in the power cords.
 - a. The unit is supplied with power cord(s). You should have either one or two, depending on the number of power supplies installed in the unit.
8. Power ON the host computer.
9. 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
10. 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

6 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.

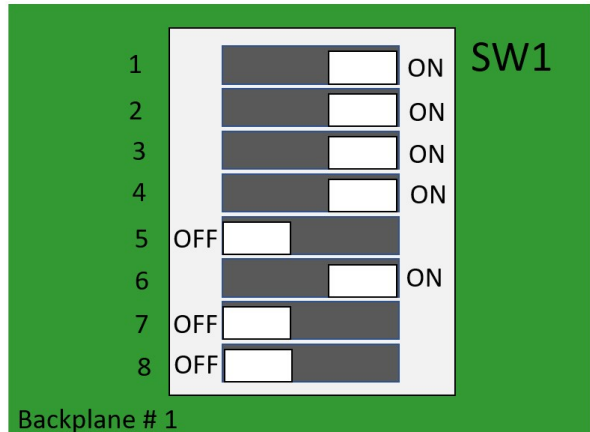
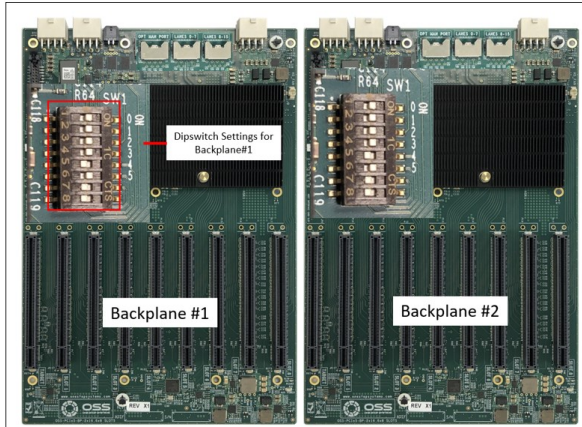


7 Backplane Dipswitch Settings

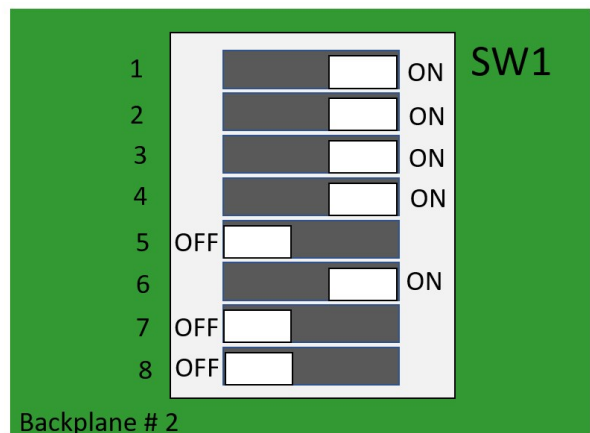
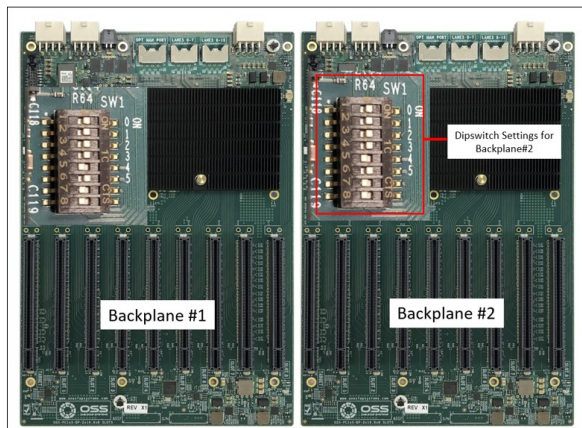
Before you start installing cards in the expansion unit, please inspect the dipswitches on both backplanes first.

- Both backplane dipswitches (SW1) have the same settings.

Check SW1 on **Backplane # 1**, make sure the dipswitches are set properly, refer to the settings below.



Check SW1 on **Backplane # 2**, make sure the dipswitches are set properly, refer to the settings below.



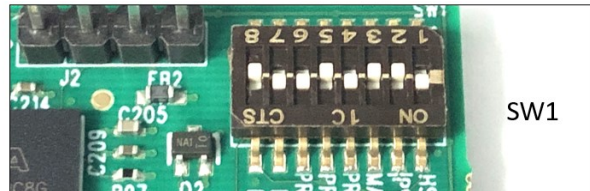
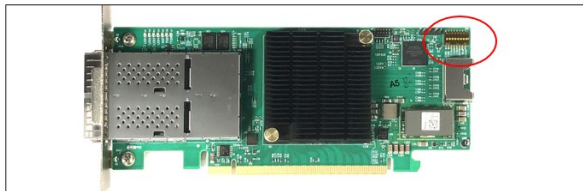
When the dipswitches are set incorrectly, any of the PCIe cards will not be detected. The host computer will not recognize the PCIe cards populated on the downstream slots.

8 Target Card Installation

By default, the Target card is installed the unit. Should you need to install the Target card, follow the steps below.

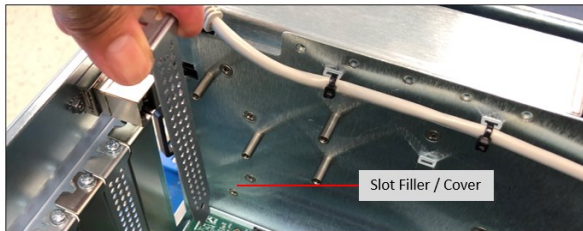
8.1 Set Target Card Dipswitches

- Configure the card first, make sure to set the card switches to Target mode.
- Find the SW1 on the card and set the switches to target mode. See photo below for the correct dipswitch settings.

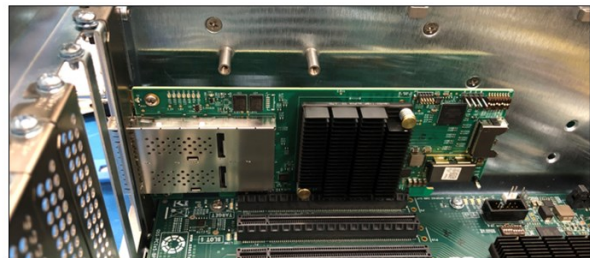
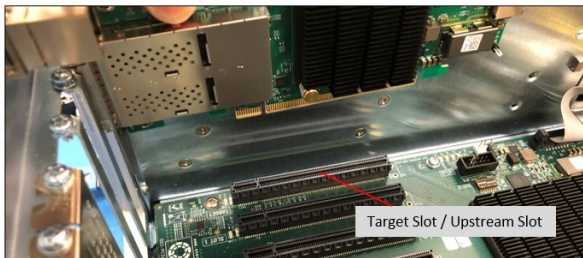


8.2 Install Target Card

Remove the slot filler in the expansion unit.



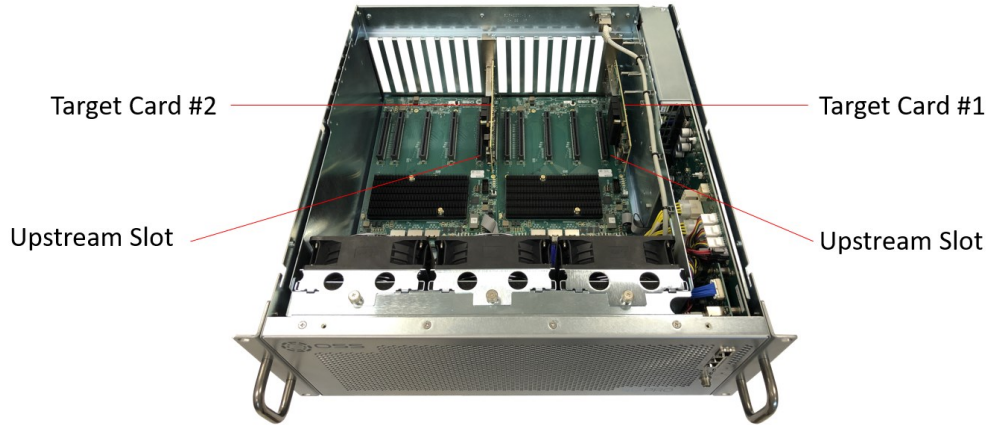
Install Target card in the designated target slot (upstream slot). Align the card on top of the slot, slowly push the card down until firmly seated.



Make sure the card secured.



Photo below shows the default location of the Upstream slot and Target card in the expansion unit.

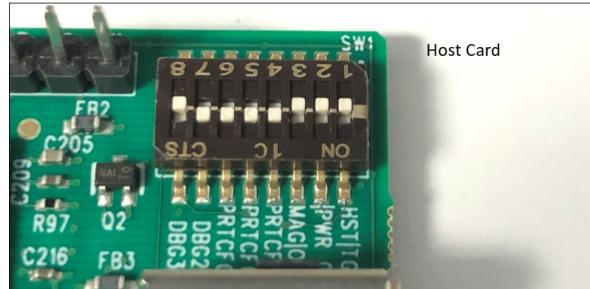
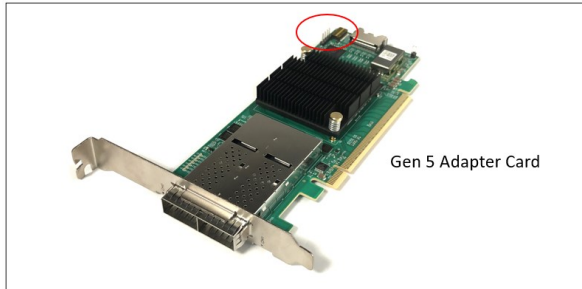


9 Host Card Installation

Before installation, you must check the switches on the Host card. The switches must be set to host mode x16.

9.1 Set Host Card Dipswitches

Find the SW1 on the card. Set the dipswitches on the card to host mode @x16, see photo below.

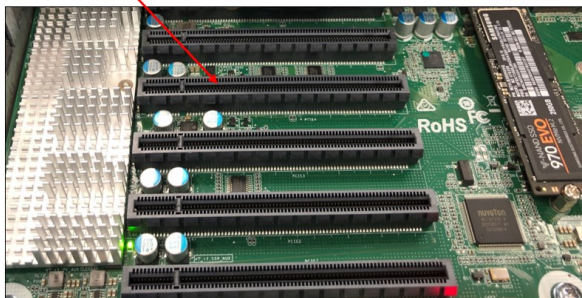


9.2 Install Host Card

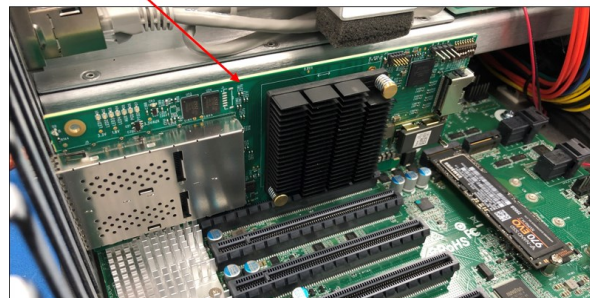
Once the Host-card is configured, install the card into a x16 Gen5 PCIe slot on a computer motherboard.

- 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.

x16 PCIe Gen 5 slot



OSS Gen5 Host Card



A configured host card must be installed in the computer's PCIe slot. Should you need to use the OSS-579 adapter card as a Target card, you need to set the dipswitches to target mode.

10 Link Cable Installation

Use the supplied QSFP-DD cables by One Stop Systems.

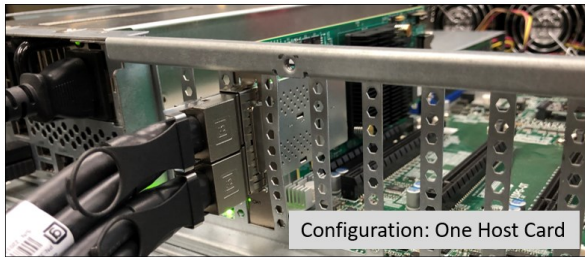
- One Stop Systems QSFP-DD are **custom cables**.
- Standard QSFP-DD will not work with OSS Gen5 adapter cards



Plug in the two cables to each target card. See photos below for the correct orientation of the cables when connecting to the target card.

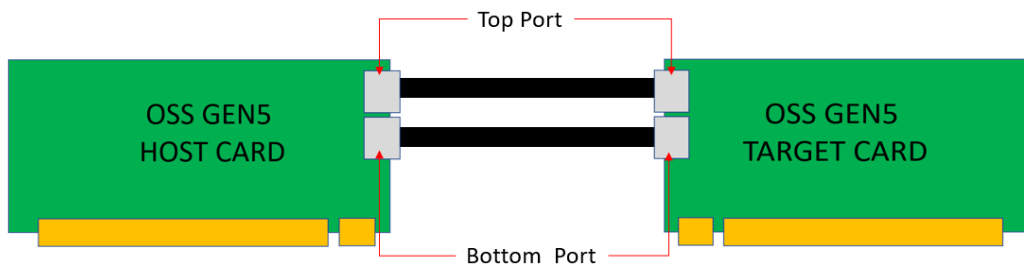


Connect the other end of the cables to the host adapter card in the computer.



10.1 Cable Orientation

Use the diagram below as reference for connecting the cables between the host and targets cards.



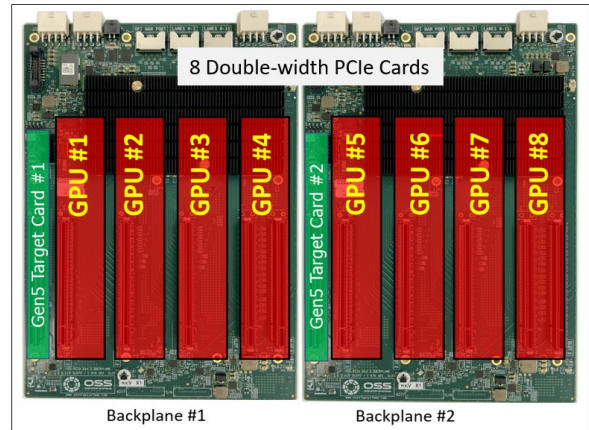
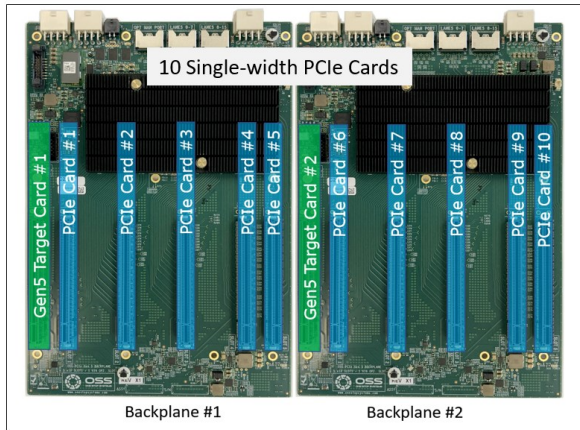
11 GPU / PCIe Cards Installation

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. It is highly recommended to start installing the card from the rear of the expansion unit on far-right end of the board for easy access and visibility of the slot.

The expansion unit can accommodate a total of 10 full length single-width PCIe cards.

- When installing double-width PCIe card, you can only fit 8 in the expansion unit, see diagram below.



11.1 Install PCIe card / GPUs

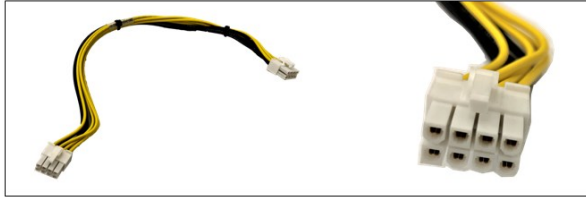
NOTE: Be sure to install the GPU cards following the card manufacturer's recommendations. Please check with GPU card manufacturers for software recommendation prior to installing the hardware.

- 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.



11.2 Connect Aux Power Cables

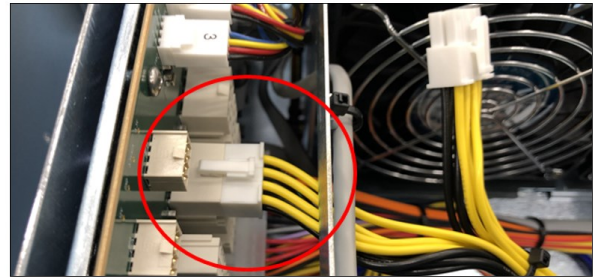
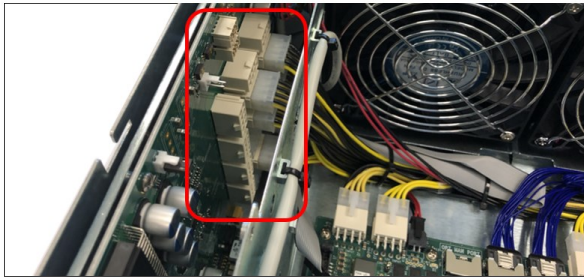
Plug in the right auxiliary power cable to each GPU. Use the supplied compatible aux cable for your GPU. Photos below is an example of an auxiliary power cable available from OSS for purchase.



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. Photo below shows 8 double-wide GPU cards installed in the expansion chassis with Aux power cables correctly connected.



11.3 Auxiliary Cable Management

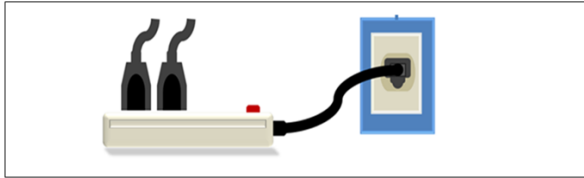
Route the cables away from the fan. Make sure the cables are not blocking the air flow. Use a zip-ties or tie-wraps to tuck the cables in. You can also use a Velcro strap to hold or tie down the cables.



12 Applying Power Correctly

12.1 Connecting to electrical outlet

It is highly recommended using a PDU or power strip with surge protection to protect your gear against random power spike damage. A 250V power supply cord is provided with this product. You can buy the PDU on any online electronic stores. OSS does not sell the PDU.



12.2 Connect Power Cords

Use the power cord supplied with the unit. The unit is shipped with "C14-to-C19, 15Amp" power cords.



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.



Upon connecting the power cords, the entire unit will power UP.

- Power Supply LED will illuminate as solid green.
- All fans are activated / spinning.
- Backplanes are ON.

13 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 Gen5 PCIe slot and the cables are rigidly 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.
 - Go to “Hardware Check” chapter for more details.

14 Hardware Check

14.1 Verify Adapter Card LEDs

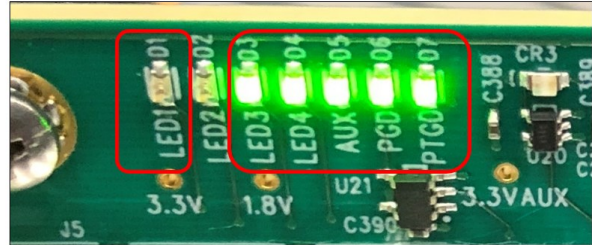
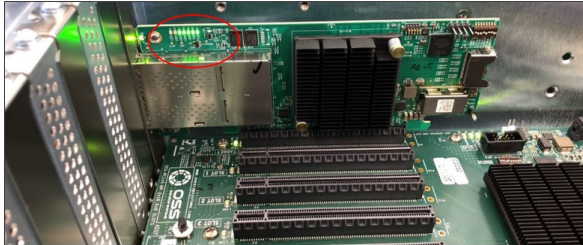
Check the Host adapter card LEDs to verify proper operation. A working host and target adapter cards will illuminate the following LEDs.

D9 LED (Link LED): The LED should illuminate as solid green, which shows a x16 link status between host and target.



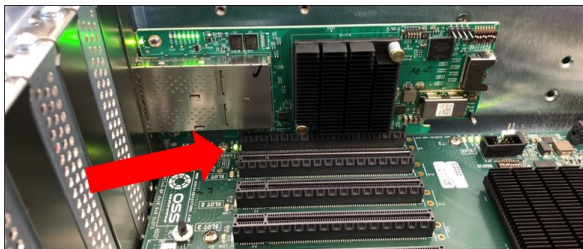
LEDs D7, D6, D5, D4, D3 and D1 will illuminate on both host and target cards, see photos below.

D7	PTGD-Port Good	Solid green, indicates Gen5 link Blink rate 2Hz indicates Gen4 link Blink rate 1Hz indicates Gen3 link
D6	PGD- Power Good	Solid Green
D5	3.3V AUX power ON	Solid green
D4	LED4: Power good 0.8V (switch core)	Solid green
D3	LED3 Power good 1.25V (switch serdes power)	Solid green
D1	LED1: Atlas switch heartbeat	Blinking green (4 times)



14.2 Verify Target Slot LED

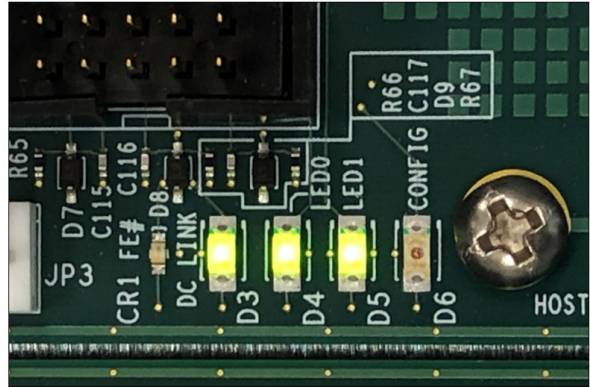
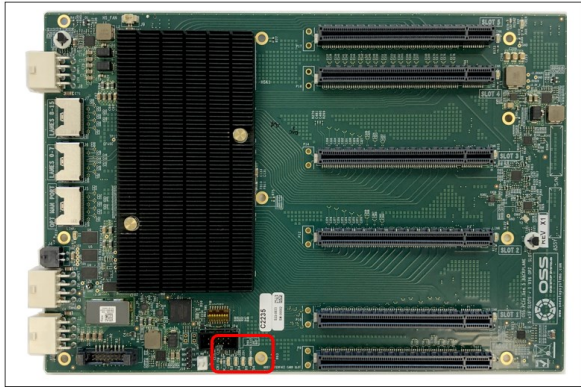
Check the Target SLOT LED (D10). After powering UP the host computer, the Target SLOT LED on the backplane will illuminate as solid green, showing the presence of the PCIe card in the slot. See photos below.



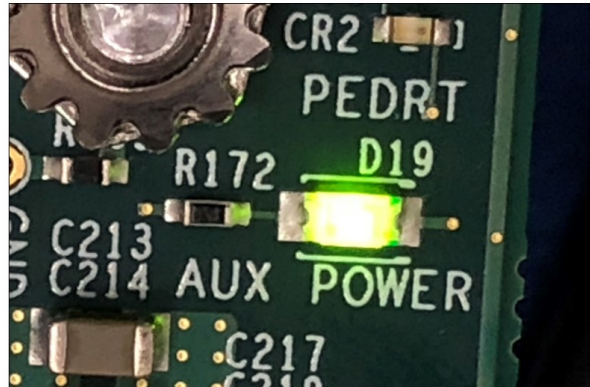
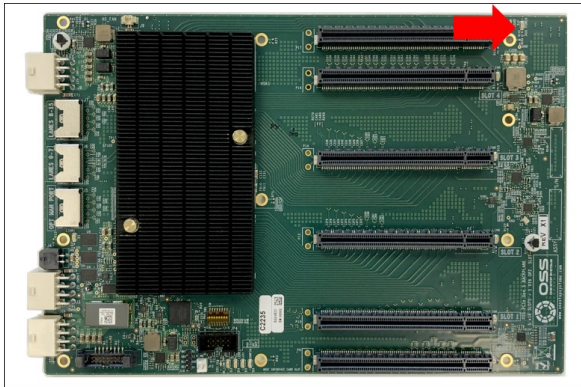
14.3 Verify Board LEDs

Check the board LEDs. A fully operational back plane will illuminate the following LEDs.

- DC LINK (solid green),
- D4 (solid green)
- D5 (flashing pattern)
 - DC---->Daisy-chain

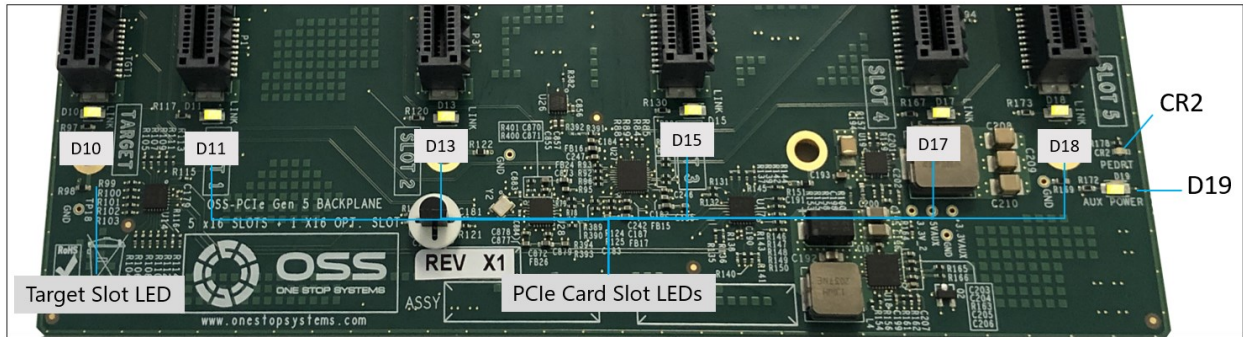


- D19: AUX power, solid green.



14.4 Check Card Slot LEDs

- The downstream SLOT LEDs will illuminate either solid green or blinking if a PCIe card is installed in the card slot.
 - Depending on the Gen speed of the PCIe card occupying the slot, it will affect the LED illumination pattern (i.e., solid or flashing)
- The Target SLOT LED will illuminate as solid or blinking green when populated with cards, see photo below.



14.5 LED Descriptions

Ref Des	Color	Definition
		Fatal Error When ON (as solid RED) the backplane is not initializing due to - Faulty Target Card - Board programming corrupted - Board firmware not loaded; board not programmed.
CR1	Red	
CR2	Red	System in Reset
D1	Green	Link Status Man Port
D3	Green	Link Status Daisy Chain
D4	Green	LED0: All Power Good
D5	Green	LED1: Flashing Pattern
D6	Green	FPGA Config
D10	Green	Link Status Slot 0
D11	Green	Link Status Slot 1
D12	Green	Link Status Slot 2
D13	Green	Link Status Slot 3
D14	Green	Link Status Slot 4
D15	Green	Link Status Slot 5
D16	Green	Link Status Slot 6
D17	Green	Link Status Slot 7
D18	Green	Link Status Slot 8
D19	Green	AUX Power Good

14.6 Front LED

There are visible LEDs found on the front of the unit.

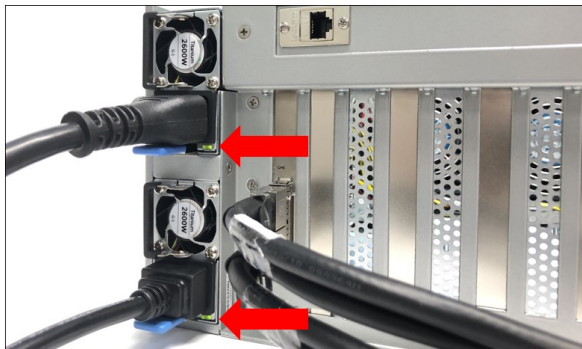
- The LOGO led, will illuminate as solid BLUE.
- Standby / MAIN PWR—Solid green when unit is fully powered ON. Red when the unit is on standby mode.



14.7 PSU LEDs

Check the power supply LEDs, it will illuminate as solid green. To find the power supply LEDs, look on the bottom side of the exposed power supply as shown from the photos below.

Green LED: PSU Good



Descriptions for the status of the power supply LEDs:

- If both power supplies are showing green solid LEDs, the power supply is working correctly.
- If the LEDs are displaying amber, the power supply is not working correctly or the system is turned off, but the power supply is still connected to the power source.

15 Software 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.

For 3rd party PCIe cards, it will require to install the driver and software in the host computer. Customer can obtain and download the necessary driver or software for their cards from the vendors website.

Should the customer need help on how to configure their card, please contact the card vendors.

16 Post Installation

16.1 Linux

16.1.2 Adapter cards & Backplanes

To check or verify the OSS devices on Linux windows terminal, use the command “lspci -vvv | grep c030”. The c030 is the vendor device ID of the OSS_579 card and OSS_580.

2 Host cards + 2 Target Cards + 2 Backplanes

Hardware Setup: Two host cards linked to the expansion chassis, one host card per target card (linked by two QSFP-DD cables).

- Type or enter “lspci -vvv | grep c030” on the terminal window. The output will display **76 of c030 device IDs**, combining all four OSS_579 adapter cards and the two OSS_580 backplanes.

```
[root@localhost oss]# lspci -vvv | grep c030
8e:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8f:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8f:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8f:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8f:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
90:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
91:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
93:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
94:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
96:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
97:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
97:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
98:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
99:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
99:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9a:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9d:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:04.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9f:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a0:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a8:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a9:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ac:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ad:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
af:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c7:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ca:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ca:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cb:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cd:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ce:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ce:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:04.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d3:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d3:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d7:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
db:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
dc:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
dc:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
df:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
e0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
e2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
e5:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
e6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
[root@localhost oss]# lspci -vvv | grep c030 -c
76
[root@localhost oss]#
```

2 Host Cards only

Hardware Setup: Two host cards in the host computer; not linked to an expansion unit.

- Type “lspci -vv | grep c030” and the output (screenshot below) will show **28 c030** devices. See screenshot below

```
[root@localhost oss]# su root
[root@localhost oss]# lspci -vvv | grep c030
9a:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9b:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9c:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9d:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9f:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a0:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a3:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a7:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c7:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ca:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ca:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cd:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ce:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
[root@localhost oss]# lspci -vvv | grep c030 -c
28
[root@localhost oss]#
```

Two Host Cards
Both host cards are not linked to an expansion unit.

1 Host Card + 2 Target Cards + 2 Backplanes.

Hardware Setup: One host card is linked to two target cards in the expansion unit.

- Type “lspci -vvv | grep c030”, It will display **62 of c030** device IDs. Combining all three OSS_579 adapter cards and the two OSS_580 backplanes. See screenshot below.

```
[root@localhost oss]# lspci -vvv | grep c030
a3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a4:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a4:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a4:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a5:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a8:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a9:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ab:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ac:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ac:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ad:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ae:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ae:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
af:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b0:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:04.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b3:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b5:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b5:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b8:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
bb:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
bd:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
be:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
be:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c7:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c7:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c8:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
c9:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cb:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:04.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cc:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
cd:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ce:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
ce:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d4:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d7:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
d7:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
da:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
db:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
dd:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
df:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
e0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
[root@localhost oss]# lspci -vvv | grep c030 -c
62
[root@localhost oss]#
```

62 c030 PCI Bridge Devices

1 Host Card only

Hardware Setup: One host card in the host computer; not linked to an expansion unit.

- Type “lspci -vv | grep c030” and the output (see screenshot below) will show **14 c030** devices. See screenshot below.

```
[root@localhost oss]# lspci -vv | grep c030
9d:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9e:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9f:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a2:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a3:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a5:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a6:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a6:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a9:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
aa:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
[root@localhost oss]# lspci -vv | grep c030 -c
14
[root@localhost oss]#
```

1 Host Card in the computer
The host card is not linked to an expansion unit.

16.1.3 Device Hierarchy

This section will show you the tree-like structure of the OSS 10slot expansion unit on Linux OS environment.

2 Host cards + 2 Target Cards + 2 5slot Backplanes

Hardware Setup #1: Two Host cards are linked to two target cards + two 5slot backplanes. No PCIe cards installed on both backplanes.

- To check on the device hierarchy, type or enter the command “lspci -vvt” on a terminal window.
 - The screenshot below shows the hierarchy of the 10-Slot expansion unit without PCIe cards installed in on both backplanes.

```
Using username "oss".
[oss@192.168.1.79 ~]$ ssh root@192.168.1.110
ost login: Mon Oct 10 13:02:05 2022 from 192.168.1.110
oss@localhost ~$ su root
password:
root@localhost oss# lspci -vvt
--(0000:01)---+05.0 Intel Corporation Sky Lake-E VT-d
+05.2 Intel Corporation Sky Lake-E SAS Configuration Registers
+05.4 Intel Corporation Sky Lake-E IODAPIC Configuration Registers
+06.0 Intel Corporation Sky Lake-E HTI 0
+06.1 Intel Corporation Sky Lake-E HTI Registers
+07.0 Intel Corporation Sky Lake-E HTI 0
+07.1 Intel Corporation Sky Lake-E HTI Registers
+10.0 Intel Corporation Sky Lake-E HTI 0
+10.1 Intel Corporation Sky Lake-E HTI Registers
+12.0 Intel Corporation Sky Lake-E NMHT Registers
+12.1 Intel Corporation Sky Lake-E NMHT Registers
+12.2 Intel Corporation Sky Lake-E NMHT Registers
+12.3 Intel Corporation Sky Lake-E NMHT Registers
+12.4 Intel Corporation Sky Lake-E NMHT Registers
+12.5 Intel Corporation Sky Lake-E NMHT Registers
+13.0 Intel Corporation Sky Lake-E NMHT Registers
+13.1 Intel Corporation Sky Lake-E NMHT Registers
+14.0 Intel Corporation Sky Lake-E NMHT Registers
+14.1 Intel Corporation Sky Lake-E NMHT Registers
+14.2 Intel Corporation Sky Lake-E NMHT Registers
+14.3 Intel Corporation Sky Lake-E NMHT Registers
+14.4 Intel Corporation Sky Lake-E NMHT Registers
+14.5 Intel Corporation Sky Lake-E NMHT Registers
+17.0 Intel Corporation Sky Lake-E NMHT Registers
+17.1 Intel Corporation Sky Lake-E NMHT Registers
--(0000:02)---+03.0 [c1-e7]---+03.0 [c2-e7]---+03.0 [c3-e8]---+03.0 [c4-e8]---+03.0 [c5]---
+03.1 [c6-e8]---+03.0 [c7-e8]---+03.0 [c8]---
+0c.0 [c9-e4]---+0c.0 [ca-e4]---+0c.0 [cb-e3]---+0c.0 [cc-e3]---+0c.0 [cd-e1]---+0c.0 [ce-e1]---+0c.0 [cf]---
+0c.1 [d0-e1]---+0c.0 [d1-e1]---+0c.0 [d2-d5]---+0c.0 [d3-d5]---+0c.0 [d4]---
+0c.2 [d6-d8]---+0c.0 [d7-d8]---+0c.0 [d9]---
+0c.3 [da-da]---+0c.0 [db]---
+0c.4 [db-e4]---+0c.0 [dc-e4]---+0c.0 [dd]---
+0c.5 [de-e1]---+0c.0 [e0-e1]---+0c.0 [e1]---
+0c.6 [e2-e3]---+0c.0 [e3]---
+0c.7 [e4]---
+0c.8 [e5-e7]---+0c.0 [e6-e7]---+0c.0 [e7]---
+05.0 Intel Corporation Sky Lake-E VT-d
+05.2 Intel Corporation Sky Lake-E SAS Configuration Registers
+05.4 Intel Corporation Sky Lake-E IODAPIC Configuration Registers
+08.0 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.0 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.1 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.2 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.3 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.4 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.5 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.6 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.7 Intel Corporation Sky Lake-E LMS Channel 1
+09.8 Intel Corporation Sky Lake-E LMS Channel 1
+09.9 Intel Corporation Sky Lake-E LMS Channel 1
+09.1 Intel Corporation Sky Lake-E LMS Channel 2
+09.2 Intel Corporation Sky Lake-E LMS Channel 2
+09.3 Intel Corporation Sky Lake-E LMS Channel 2
+09.4 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.5 Intel Corporation Sky Lake-E Integrated Memory Controller
+09.6 Intel Corporation Sky Lake-E LMS Channel 1
+09.7 Intel Corporation Sky Lake-E LMS Channel 1
+09.8 Intel Corporation Sky Lake-E LMS Channel 3
+09.9 Intel Corporation Sky Lake-E LMS Channel 3
+09.1 Intel Corporation Sky Lake-E LMS Channel 3
+09.2 Intel Corporation Sky Lake-E LMS Channel 2
+09.3 Intel Corporation Sky Lake-E LMS Channel 2
+09.4 Intel Corporation Sky Lake-E LMS Channel 2
+09.5 Intel Corporation Sky Lake-E LMS Channel 2
+09.6 Intel Corporation Sky Lake-E LMS Channel 2
+09.7 Intel Corporation Sky Lake-E LMS Channel 2
+09.8 Intel Corporation Sky Lake-E LMS Channel 2
+09.9 Intel Corporation Sky Lake-E LMS Channel 2
+09.1 Intel Corporation Sky Lake-E CHA Registers
+09.2 Intel Corporation Sky Lake-E CHA Registers
+09.3 Intel Corporation Sky Lake-E CHA Registers
+09.4 Intel Corporation Sky Lake-E CHA Registers
+09.5 Intel Corporation Sky Lake-E CHA Registers
+09.6 Intel Corporation Sky Lake-E CHA Registers
+09.7 Intel Corporation Sky Lake-E CHA Registers
+09.8 Intel Corporation Sky Lake-E CHA Registers
+09.9 Intel Corporation Sky Lake-E CHA Registers
```

Hardware Setup #2: Two Host cards are linked to two target cards + two 5slot backplanes. 5 PCIe cards installed on backplane #1.

- Type or enter the command "lspci -vvt" on a terminal window.
 - Below screenshot shows the tree-like structure of the 10-Slot expansion unit showing backplane #1 populated with 5 different PCIe cards. Backplane #2 with no cards in the downstream slots.



Hardware Setup #3: Two Host cards are linked to two target cards + two 5slot backplanes. 5 PCIe cards installed on backplane #2.

- Type or enter the command "lspci -vvt" on a terminal window.
 - Below screenshot shows the tree-like structure of the 10-Slot expansion unit showing backplane #2 populated with 5 different PCIe cards. Backplane #1 with no cards in the downstream slots.



1 Host card + 2 Target Cards + 2 5slot Backplanes

Hardware Setup #1: 1 Host card is linked to two target cards + two 5slot backplanes. No cards on both backplanes.

- Type or enter the command "lspci -vtt" on a terminal window.
 - The screenshot below shows the hierarchy (tree-like structure) of the 10-Slot expansion, 1 host card linked to two target cards + two 5slot backplanes, without PCIe cards installed.

```
root@localhost:~# clear
root@localhost:~# lspci -vtt
+--[0000:00:00]-->05.0 Intel Corporation Sky Lake-E VT-d
+--05.2 Intel Corporation Sky Lake-E SAS Configuration Registers
+--05.4 Intel Corporation Sky Lake-E IONAPIC Configuration Registers
+--06.0 Intel Corporation Sky Lake-E KTI 0
+--06.1 Intel Corporation Sky Lake-E UPI Registers
+--0f.0 Intel Corporation Sky Lake-E KTI 0
+--0f.1 Intel Corporation Sky Lake-E UPI Registers
+--10.0 Intel Corporation Sky Lake-E KTI 0
+--10.1 Intel Corporation Sky Lake-E UPI Registers
+--12.0 Intel Corporation Sky Lake-E MHTI Registers
+--12.1 Intel Corporation Sky Lake-E MHTI Registers
+--12.2 Intel Corporation Sky Lake-E MHTI Registers
+--12.4 Intel Corporation Sky Lake-E MHTI Registers
+--12.5 Intel Corporation Sky Lake-E MHTI Registers
+--13.0 Intel Corporation Sky Lake-E MHTI Registers
+--15.1 Intel Corporation Sky Lake-E DRIIO Registers
+--16.0 Intel Corporation Sky Lake-E MHTI Registers
+--16.1 Intel Corporation Sky Lake-E DRIIO Registers
+--16.4 Intel Corporation Sky Lake-E MHTI Registers
+--16.5 Intel Corporation Sky Lake-E MHTI Registers
+--17.1 Intel Corporation Sky Lake-E DRIIO Registers
+--[0000:a2:00:00]-->00.0-[a3-e1]----00.0-[a4-e1]----00.0-[a6-a7]----00.0-[a7]--
+--00.0-[a8-aa]----00.0-[a9-aa]----10.0-[aa]--
+--00.0-[ab-de]----00.0-[ac-de]---->00.0-[ad-c5]----00.0-[ae-c5]----00.0-[af-c3]----00.0-[b0-c3]-->00.0-[b1]--
+--00.0-[b4-b7]----00.0-[b5-b7]----00.0-[b8]-->
+--04.0-[b8-ba]----00.0-[b9-ba]----00.0-[ba]-->
+--06.0-[ba-bc]----00.0-[bd]-->
+--0c.0-[bd-d0]----00.0-[de-c3]---->00.0-[df]-->
+--10.0-[c1-c3]----00.0-[c2-c3]----00.0-[c3]-->
+--05.0-[c6-de]----00.0-[c7-de]----00.0-[c8-dc]----00.0-[c9-dc]---->00.0-[ca]-->
+--00.0-[cd-d0]----00.0-[ce-d0]----00.0-[cf]-->
+--04.0-[d1-d3]----00.0-[d2-d3]----00.0-[d3]-->
+--06.0-[d4-d5]----00.0-[d5]-->
+--0c.0-[d6-d9]----00.0-[d7-d9]----00.0-[d8]-->
+--10.0-[da-dc]----00.0-[db-dc]----00.0-[dc]-->
+--10.0-[df-e1]----00.0-[e0-e1]----00.0-[e1]--
+--05.0 Intel Corporation Sky Lake-E VT-d
+--05.2 Intel Corporation Sky Lake-E SAS Configuration Registers
+--05.4 Intel Corporation Sky Lake-E IONAPIC Configuration Registers
+--09.0 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.1 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.2 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.3 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.4 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.5 Intel Corporation Sky Lake-E IM Channel 1
+--0a.6 Intel Corporation Sky Lake-E IMS Channel 1
+--0a.7 Intel Corporation Sky Lake-E IMP Channel 1
+--0b.0 Intel Corporation Sky Lake-E ECSS Channel 2
+--0b.1 Intel Corporation Sky Lake-E IM Channel 2
+--0b.2 Intel Corporation Sky Lake-E IMS Channel 2
+--0b.3 Intel Corporation Sky Lake-E IMP Channel 2
+--0c.0 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0c.1 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0c.2 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0c.3 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0c.4 Intel Corporation Sky Lake-E IM Channel 1
+--0c.5 Intel Corporation Sky Lake-E IMP Channel 1
+--0d.0 Intel Corporation Sky Lake-E ECSS Channel 2
+--0d.1 Intel Corporation Sky Lake-E IM Channel 2
+--0d.2 Intel Corporation Sky Lake-E IMS Channel 2
+--0d.3 Intel Corporation Sky Lake-E IMP Channel 2
+--[0000:92:05:00]-->05.0 Intel Corporation Sky Lake-E VT-d
+--05.2 Intel Corporation Sky Lake-E SAS Configuration Registers
+--05.4 Intel Corporation Sky Lake-E IONAPIC Configuration Registers
+--09.0 Intel Corporation Sky Lake-E Integrated Memory Controller
+--0a.1 Intel Corporation Sky Lake-E Integrated Memory Controller
```

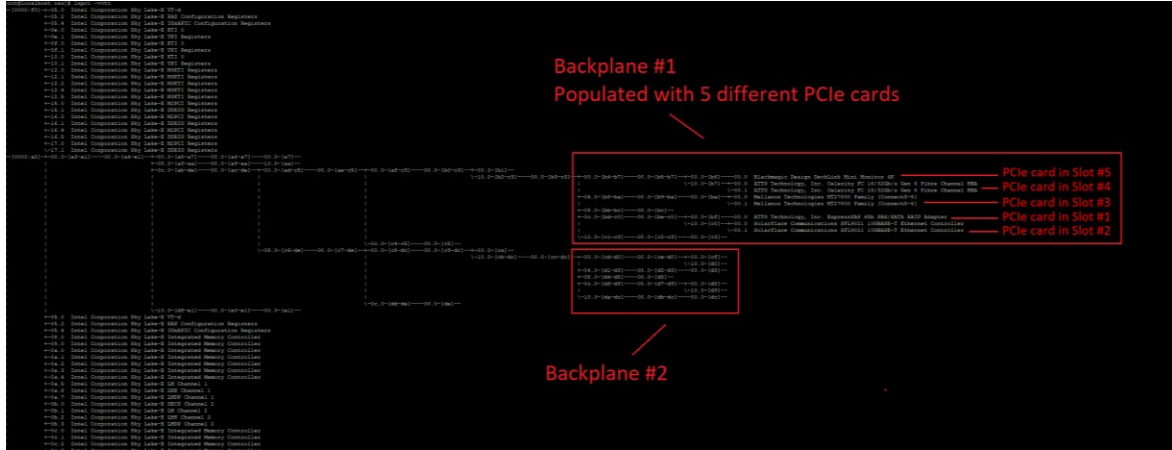
No PCIe cards installed on both backplanes

Backplane #1

Backplane #2

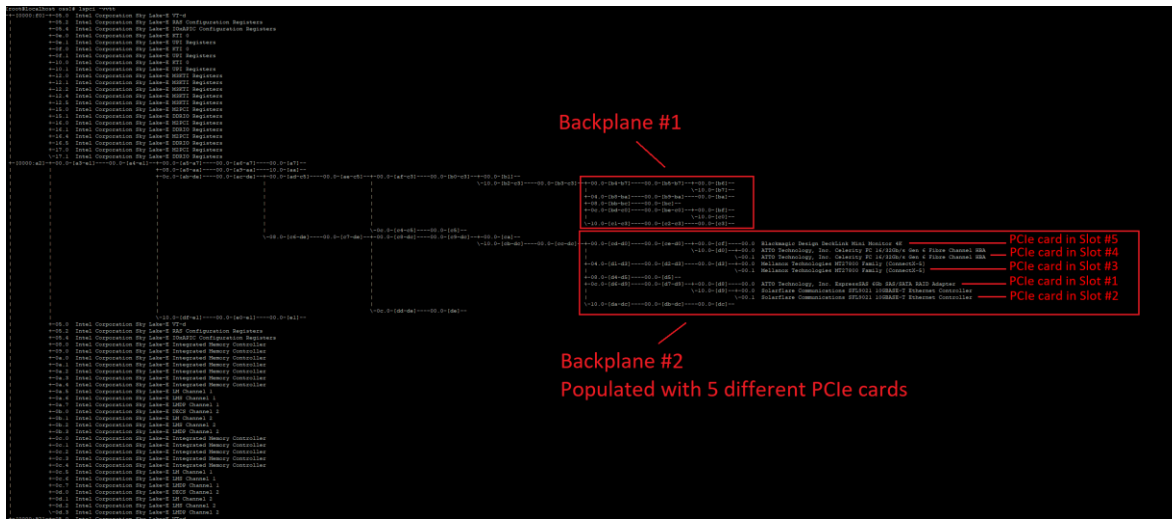
Hardware Setup #2: 1 Host card is linked to two target cards + two 5slot backplanes. 5 PCIe cards installed on backplane #1.

- Type or enter the command “lspci -vtt” on a terminal window.
 - Below screenshot shows the tree-like structure of the 10-Slot expansion unit showing backplane #1 populated with 5 different PCIe cards. Backplane #2 with no cards in the downstream slots.



Hardware Setup #3: 1 Host card is linked to two target cards + two 5slot backplanes. 5 PCIe cards installed on backplane #2.

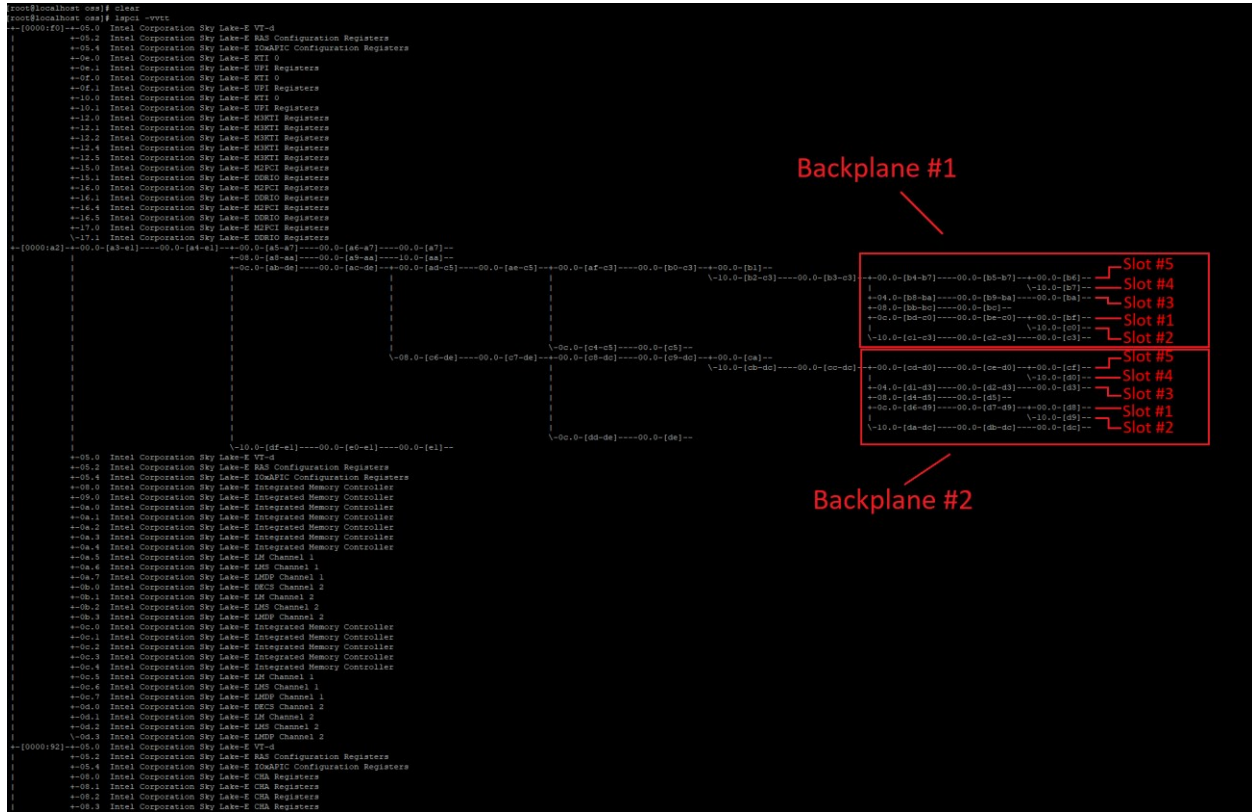
- Below screenshot shows the tree-like structure of the 10-Slot expansion unit showing backplane #2 populated with 5 different PCIe cards. Backplane #1 with no cards in the downstream slots.



Screenshot below shows the **hierarchy order of two OSS-580 backplanes and their corresponding downstream slots** on LINUX OS environment.

- One host adapter card in the computer is linked to two target cards + two OSS-580 backplanes. Both backplanes are in the same PCI Express root port.

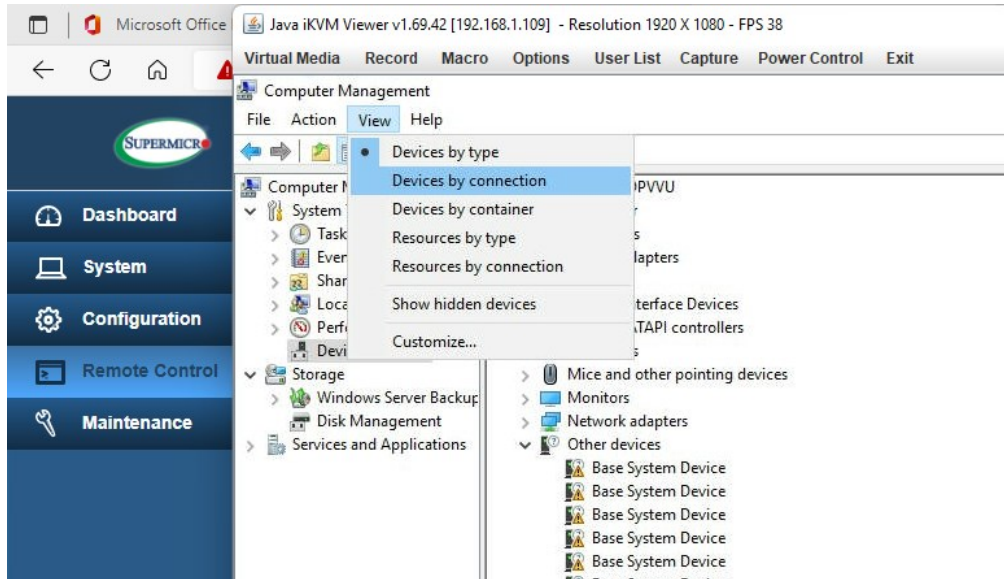
This hierarchy may change depending on the operating system, CPU, motherboard being used and the location of the PCIe slot where the host card is plugged in on the motherboard.



16.2 Windows OS

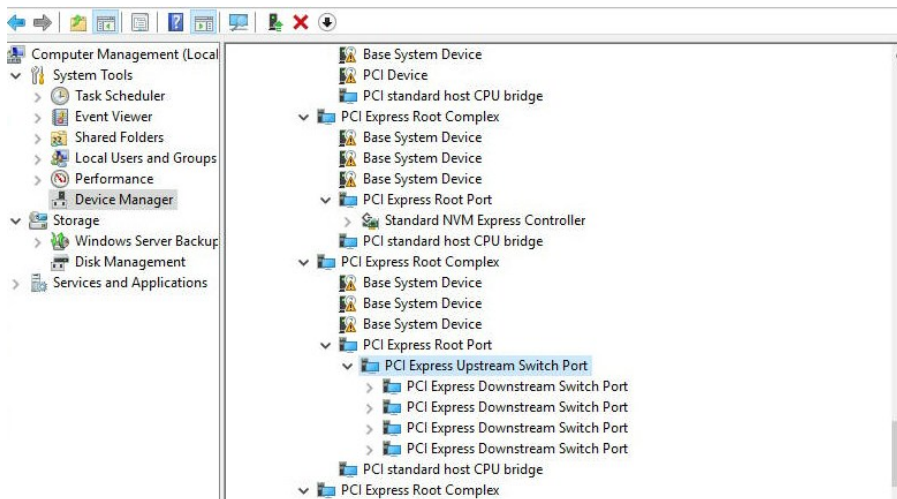
This section will show you how to check and verify the OSS expansion unit on Windows OS.

Start the Windows Device Manager, select view from the top menu, and then select 'Device by Connection.'



Select and expand PCI Express Root Port.

- An instance of PCI Express Upstream Switch Port will appear; select and expand the arrow signs.
 - Four instances of PCI Express Downstream Switch Ports will show up.
 - Select and expand all PCI Express Downstream Switch Ports.
- Continue to expand all arrow signs until everything is fully expanded.



16.2.1 Adapter cards & Backplanes

2 Host cards + 2 Target Cards + 2 Backplanes

The screenshot below stands for “Windows Device manager” detecting host and target adapter cards + two OSS-580 backplanes.

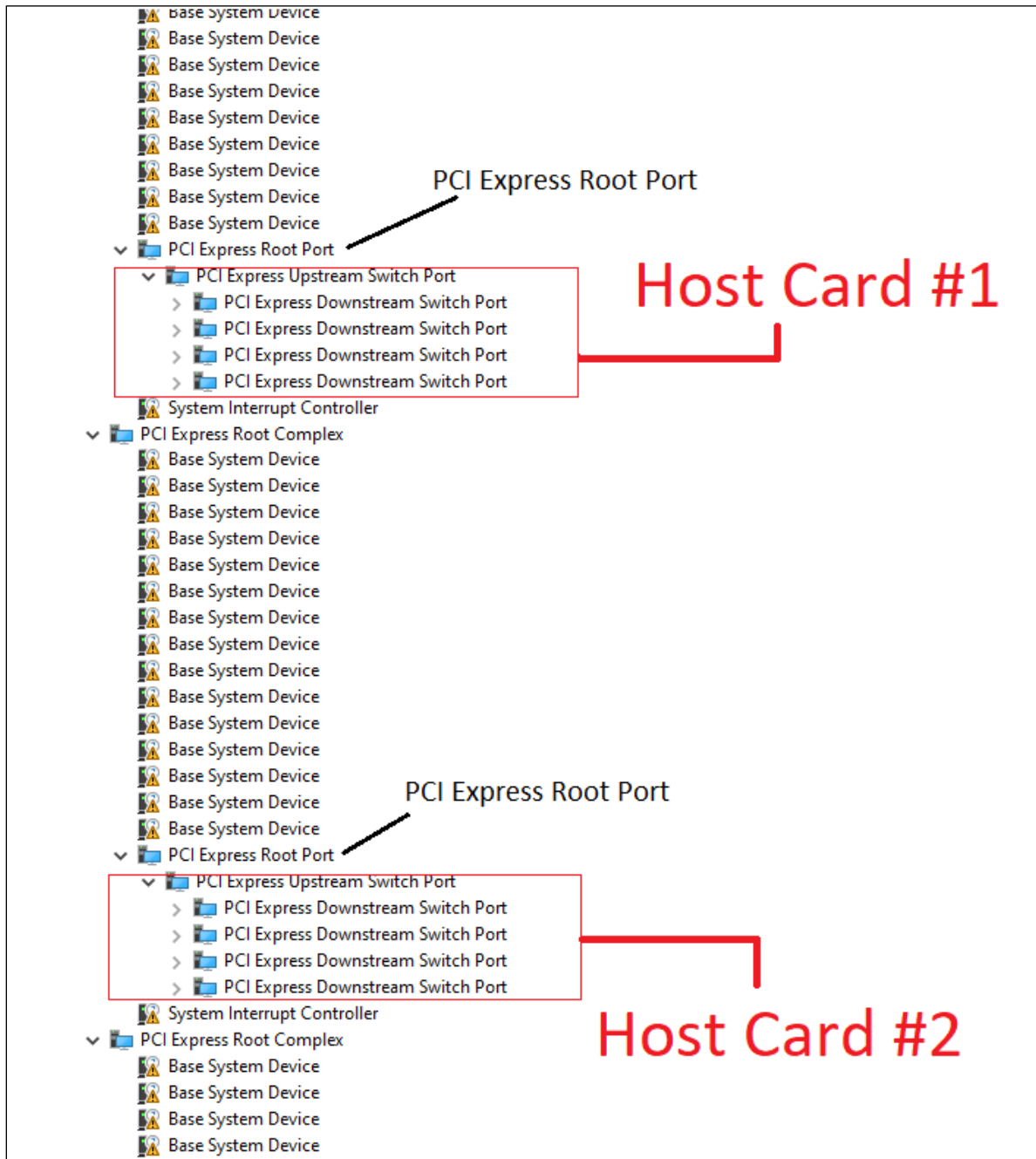
- Two host cards are linked to the expansion chassis; one host card per target card (linked by two QSFP-DD cables).
- Each backplane shows up in a separate PCI Express Root Port.
- Both backplanes are not populated with PCIe cards.



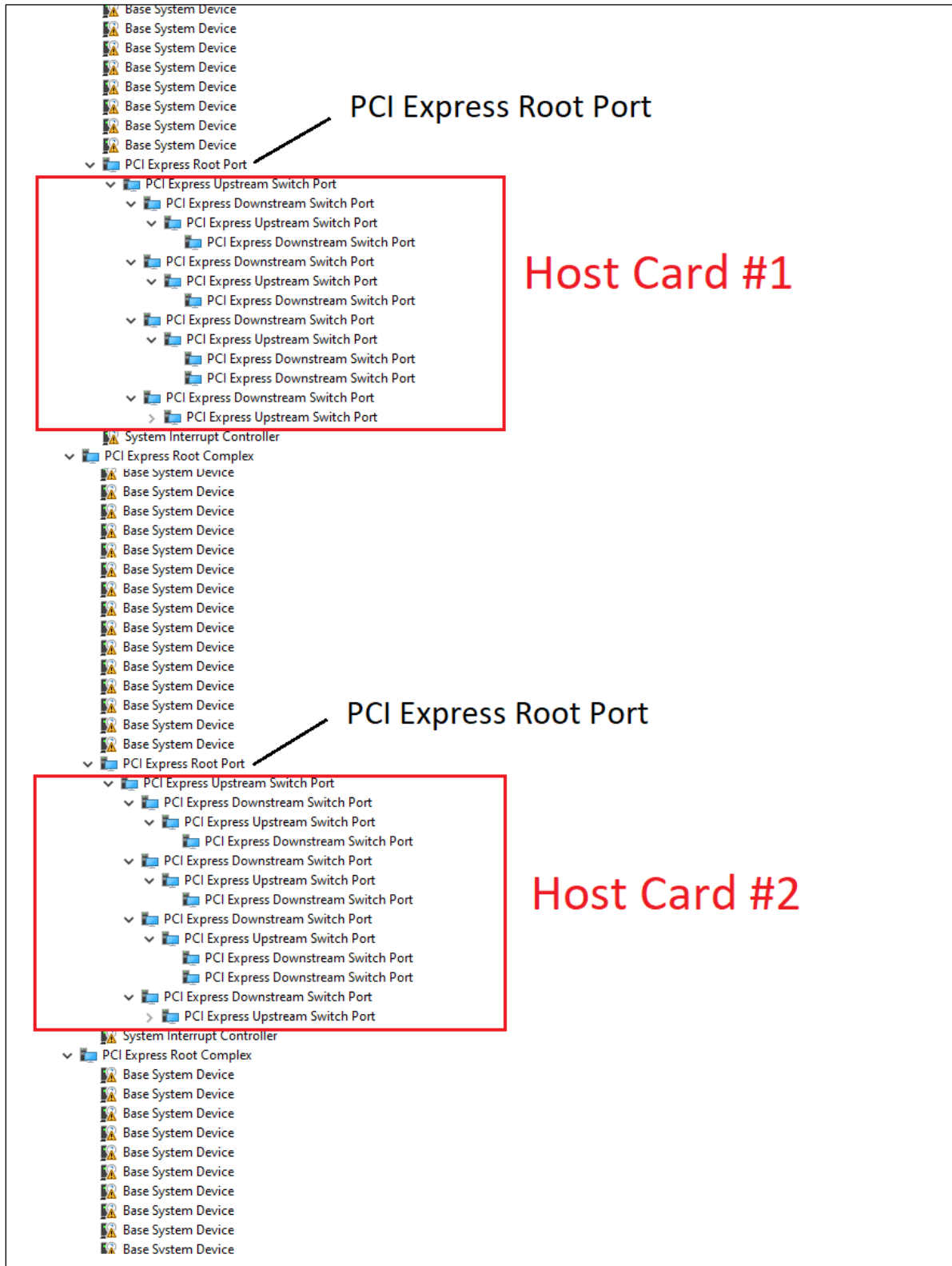
2 Host Cards only

The screenshot below stands for “Windows Device manager detecting two host adapter cards” only.

- These two host adapter cards are not linked to an expansion unit.
- Each host adapter card shows up in a separate PCI Express Root Port.



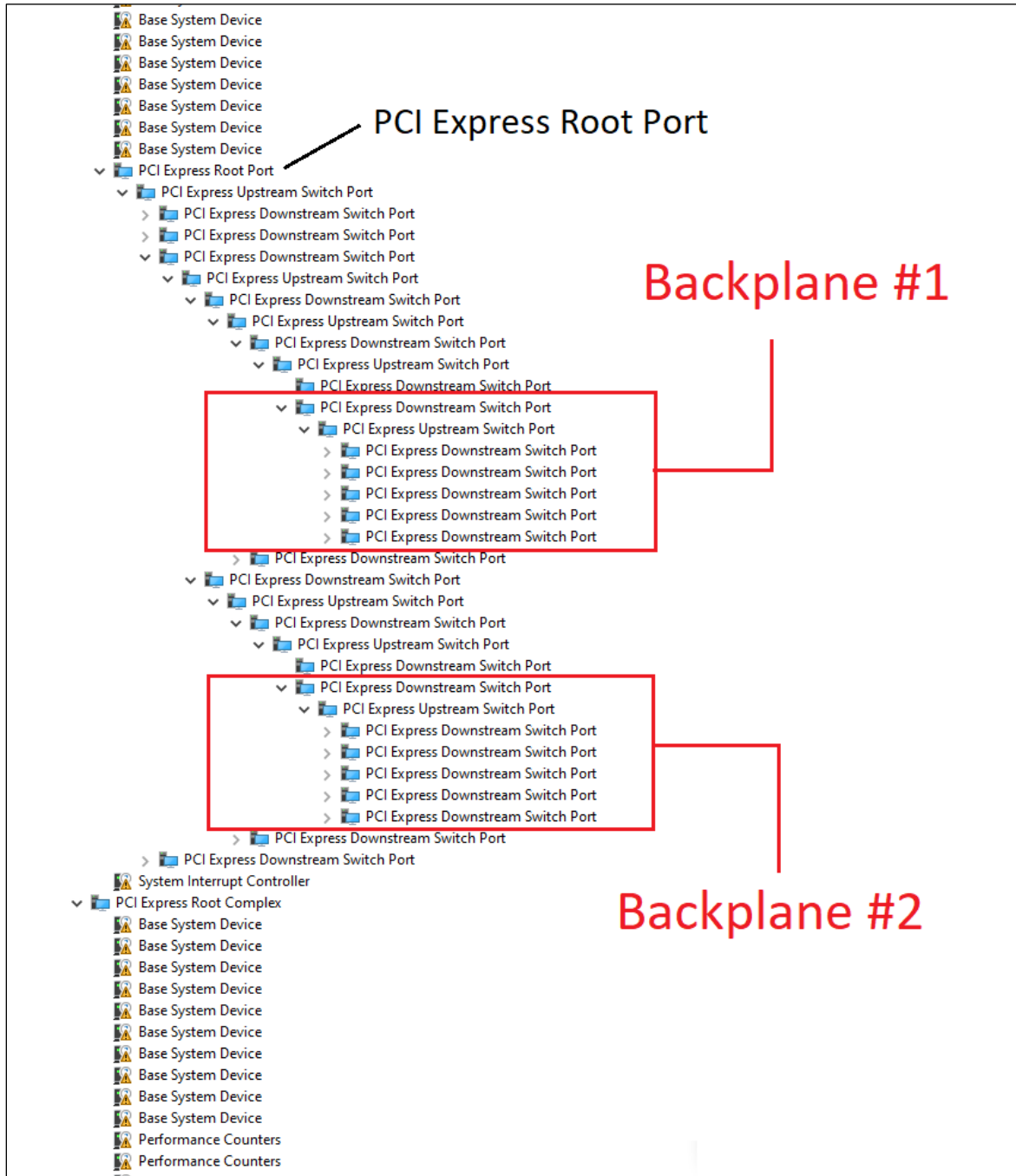
Screenshot below stands for “two host cards fully expanded in Windows Device Manager.” Both cards are not linked to an expansion unit.



1 Host Card + 2 Target Cards + 2 Backplanes

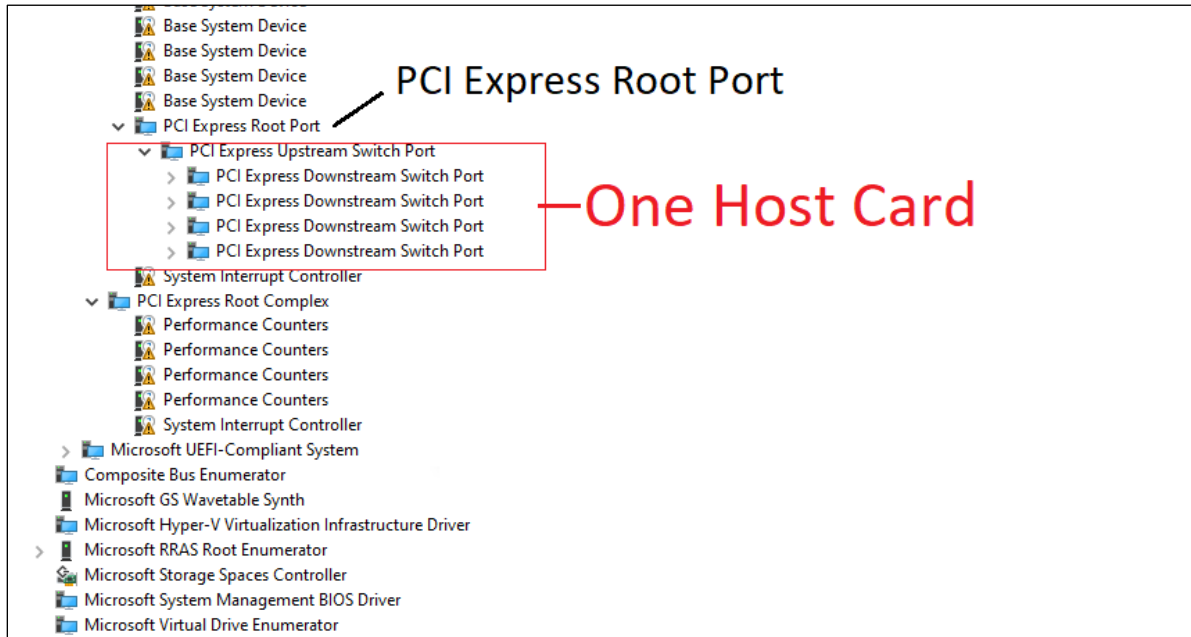
The screenshot below stands for "Windows Device manager" detecting 1 host card + two target adapter cards + two OSS-580 backplanes.

- One host card is linked to two target cards in the expansion unit.
- Both backplanes are in the same PCI Express Root Port.
- Both backplanes are not populated with PCIe cards.

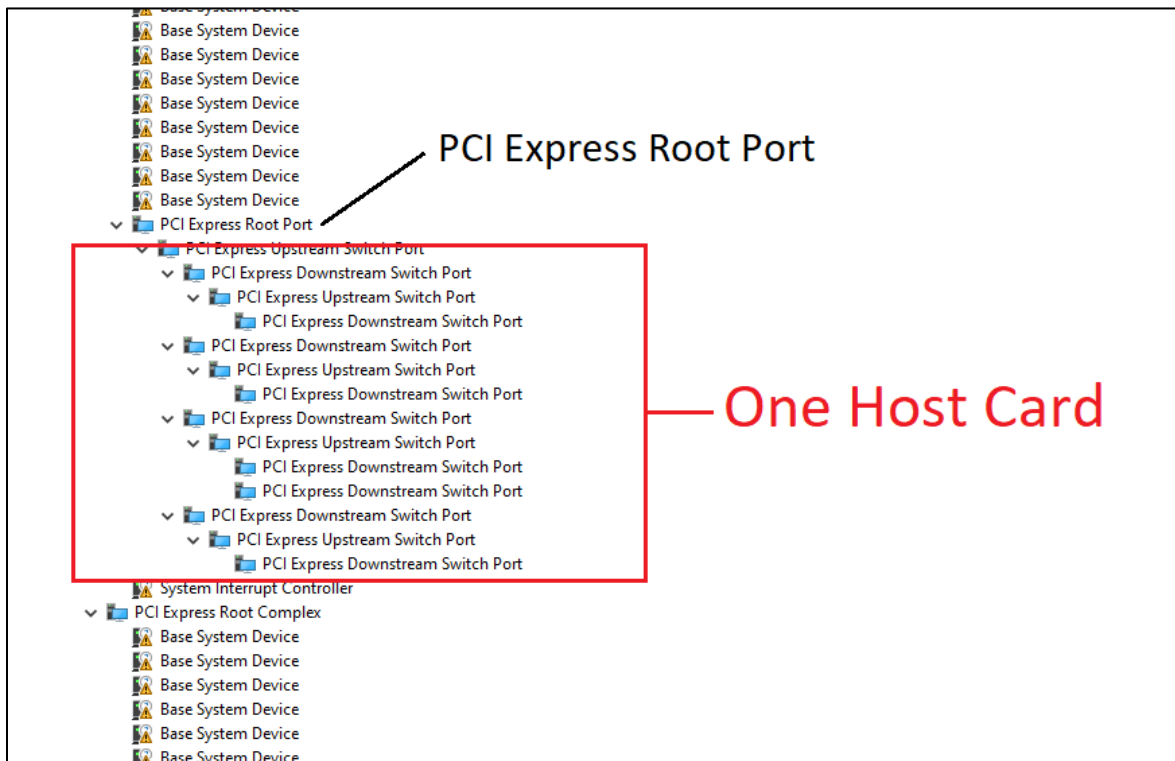


1 Host Card only

The screenshot below stands for "Windows Device manager detecting one host adapter card." The single host adapter card is not linked to an expansion unit



Screenshot below stands for "one host card fully expanded in Windows Device Manager." The host card is not linked to an expansion unit.

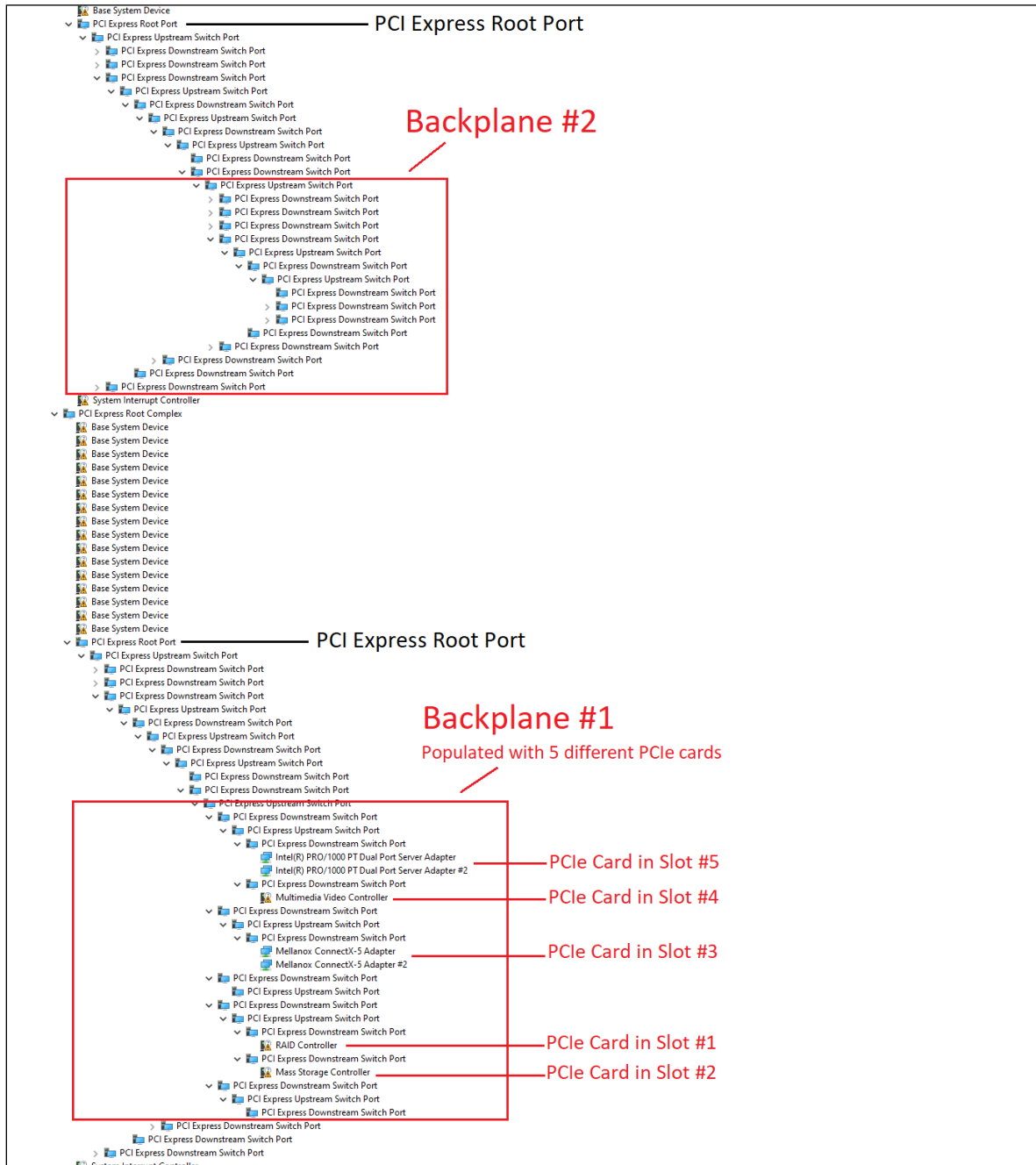


16.2.2 Device Hierarchy

2 Host cards + 2 Target Cards + 2 5slot Backplanes

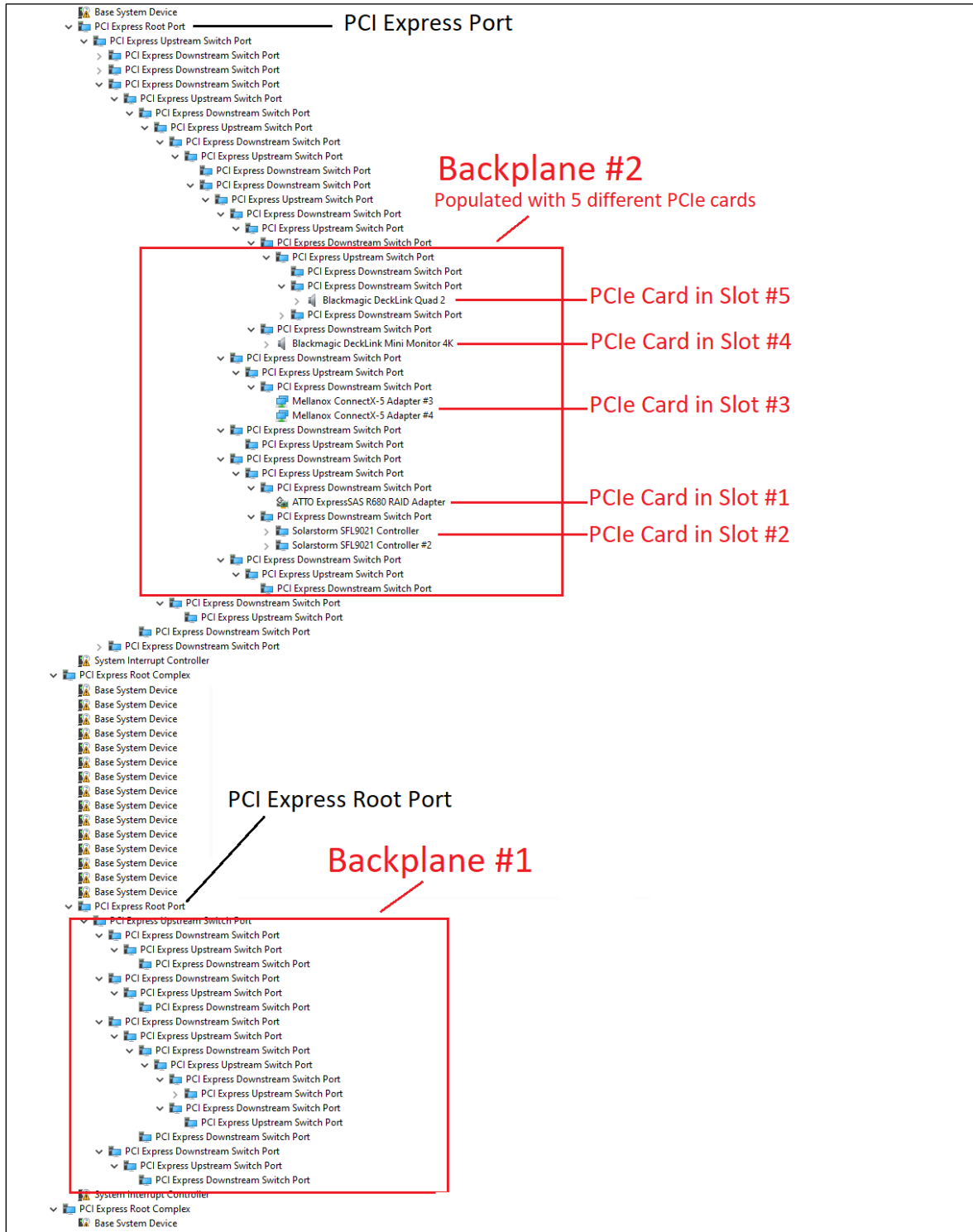
Screenshots below shows Windows Device Manager detecting backplane #1 populated with 5 different PCIe cards.

- **Hardware Setup:** 2 Host cards linked to two target cards + two 5slot backplanes. **5 PCIe cards installed in backplane #1**
- Backplane #2 with no cards in the downstream slots.
- Each backplane shows up in a separate “PCI Express Root Port.”



Screenshots below shows Windows Device Manager detecting backplane #2 populated with 5 different PCIe cards.

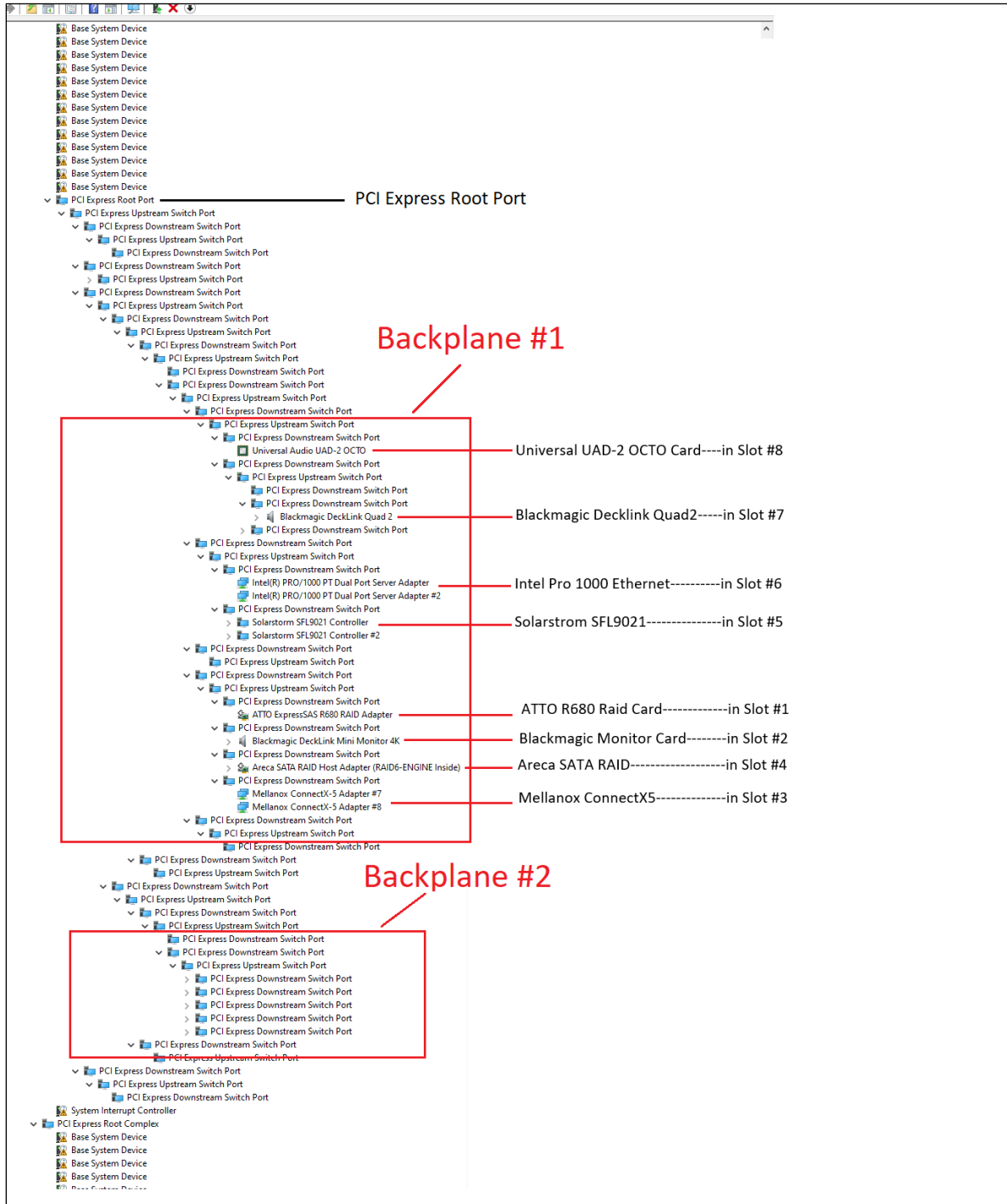
- **Hardware Setup:** 2 Host cards linked to two target cards + two 5slot backplanes. 5 PCIe cards installed in backplane #2.
- Backplane #1 with no cards in the downstream slots.
- Each backplane shows up in a separate “PCI Express Root port.”



1 Host Card + 2 Target Cards + 2 Backplanes

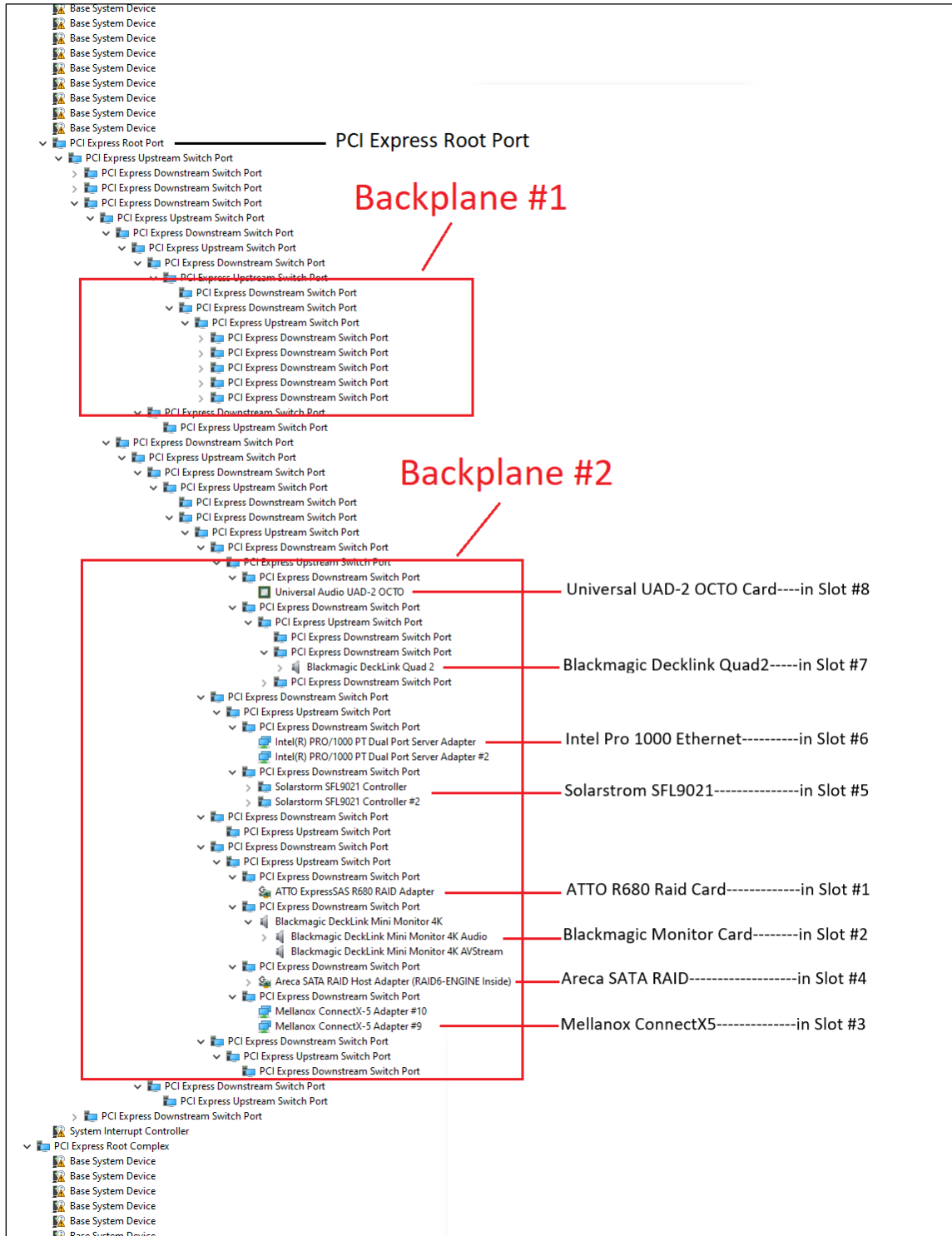
Screenshots below shows Windows Device Manager detecting backplane #1 populated with 5 different PCIe cards.

- **Hardware Setup:** 1 Host card linked to two target cards + two 5slot backplanes. 5 PCIe cards installed in backplane #1
- Backplane #2 with no cards in the downstream slots.
- Both backplanes show up in the same "PCI Express Root port."



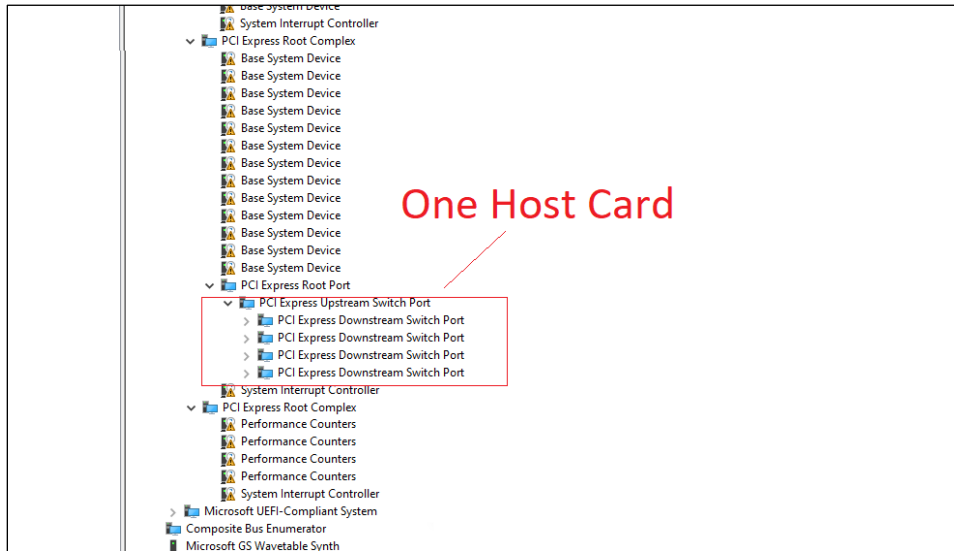
Screenshots below shows Windows Device Manager detecting backplane #2 populated with 5 different PCIe cards.

- **Hardware Setup:** 1 Host card linked to two target cards + two 5slot backplanes. 5 PCIe cards installed in backplane #2.
- Backplane #1 with no cards in the downstream slots.
- Each backplane shows up in the same "PCI Express Root port."

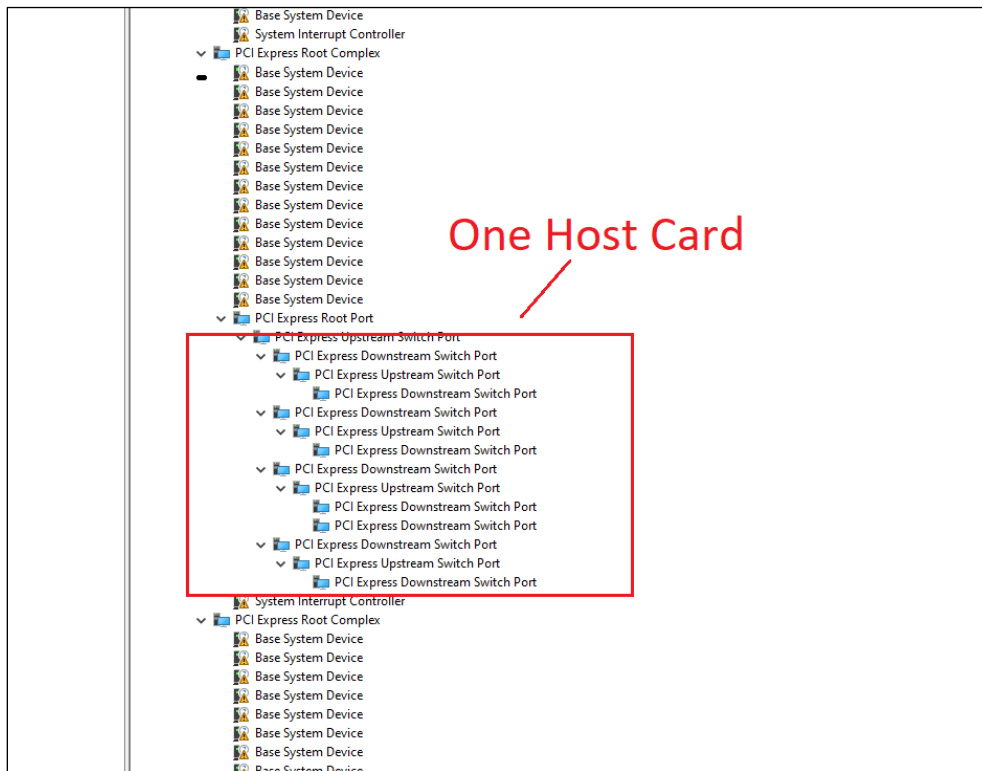


1 Host Card only

The screenshot below stands for “Windows Device manager detecting one host adapter card.” The single host adapter card is not linked to an expansion unit



Screenshot below stands for “one host card fully expanded in Windows Device Manager.” The host card is not linked to an expansion unit.

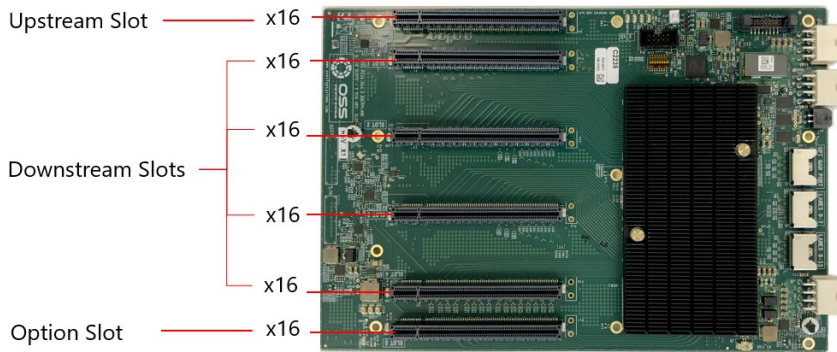


17 Important Technical Information

17.1 Slot Type

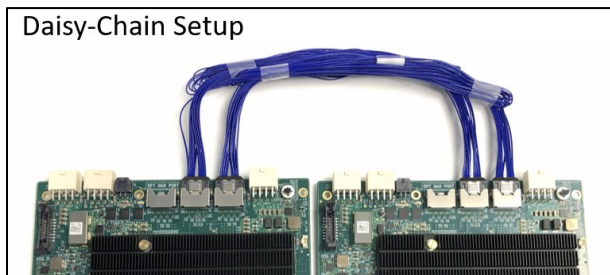
Slot Type: Closed-ended PCIe slot / connector, all the slots are x16 mechanical.

- Six x16 electrical slots (slots 0, 1, 2, 3, 4, and 5)
- Option slot is configurable to run in x8 or x16.

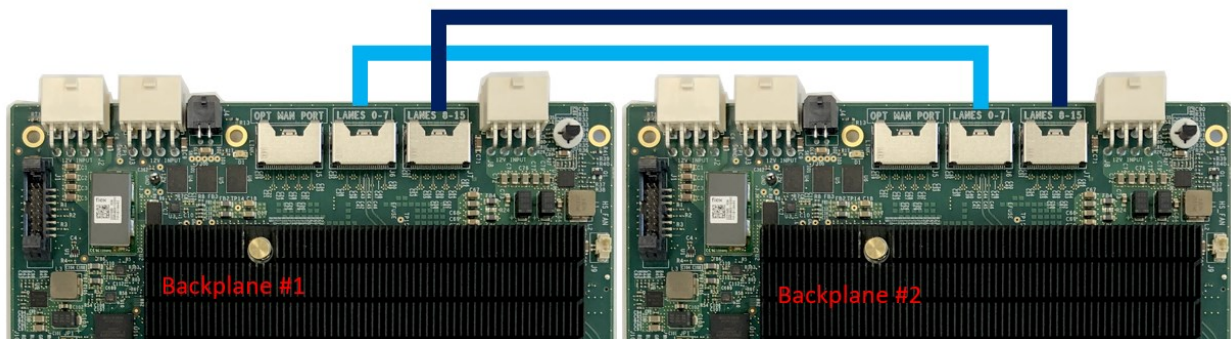


17.2 ARF6 Connectors

The ARF6 Connector is for connecting ARC6 cables to daisy chain two backplanes together or to create a connection between the PCIe Option SLOT and the PCIe switch.

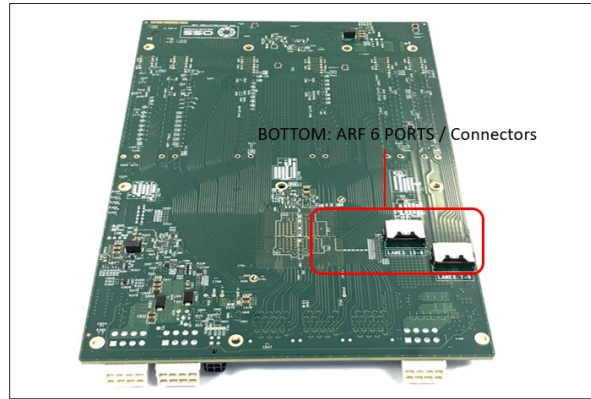
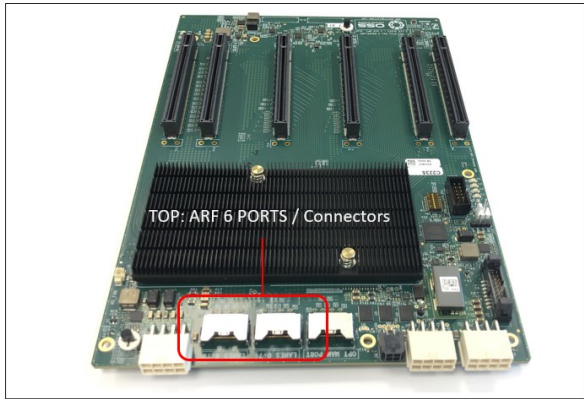


For Daisy-Chain setup, follow the diagram below for connecting the ARC cables between two backplanes.

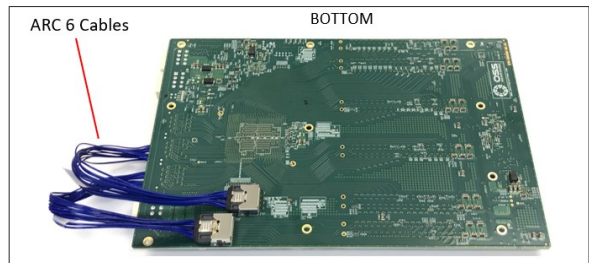
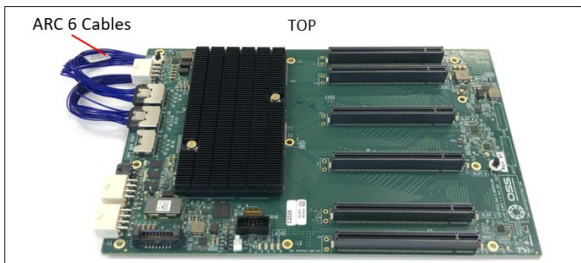


Enabling Option Slot

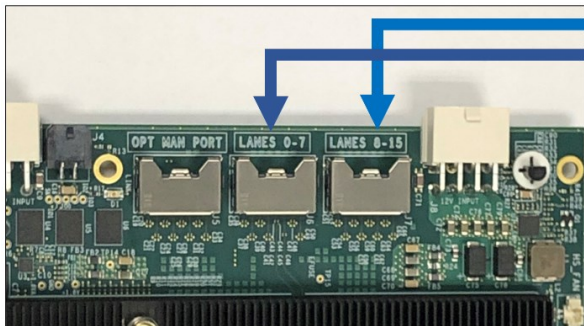
Photos below showing the location of the ARF6 connectors, top and bottom.



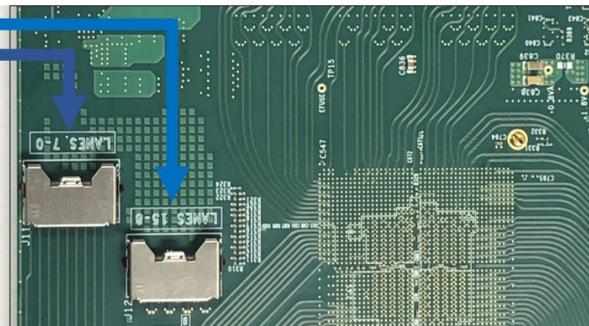
To enable "Option Slot", attach the ARC 6 cables between the TOP and Bottom ARF6 connectors. This creates a connection between the PCIe switch and the Option Slot.



Follow the diagram below for connecting the Arc Cables between top and bottom ARF6 ports.



Top Backplane



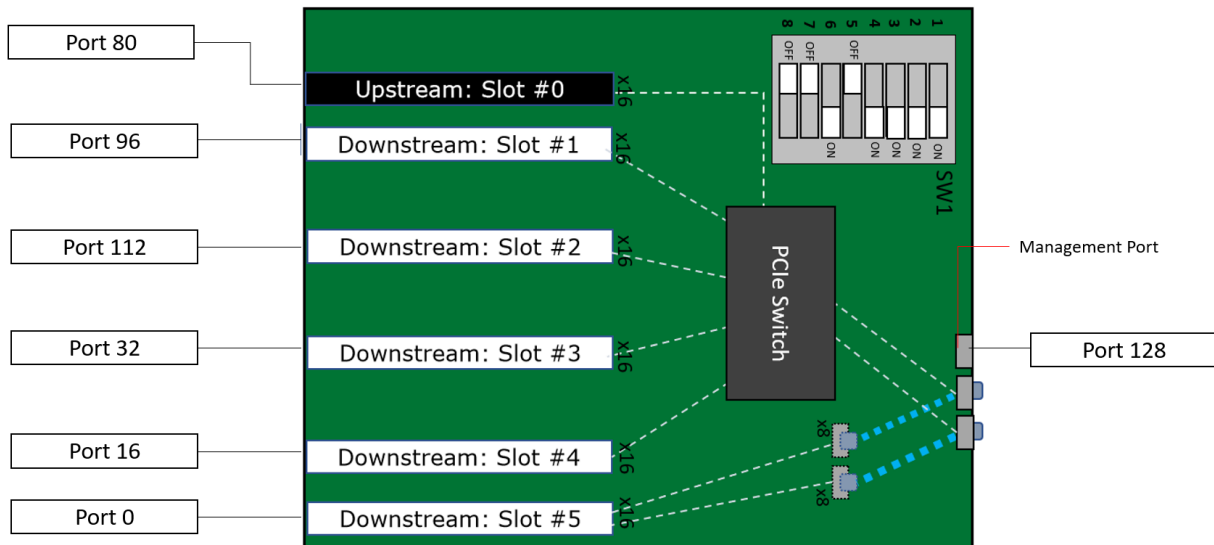
Bottom Backplane

If cables are not connected between the TOP and Bottom ARF6 connectors, the slot # 5 will remain inactive. Basically, any cards you plugin in the option slot will be inoperative.

17.3 Slot Number and Port Mapping

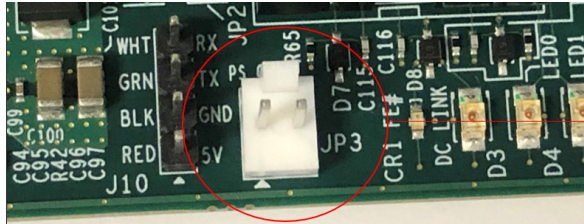
Each slot on the OSS backplane is mapped to a PCIe port on the PCIe switch. Port mapping is hard-coded, it is fixed. You cannot change or modify the port address.

PCIE Slot Mapping	Port Mapping (PCIe Switch)	Notes
Slot 0	80	
Slot 1	96	
Slot 2	112	
Slot 3	32	
Slot 4	16	
Daisy-Chain Port	0	
Management Port	128	
Slot 5	0	Cabled from Daisy Chain (DC) Port



17.4 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 JP3 connector on the backplane. You can buy the shunt from any online hardware stores.



Shunt / Jumper



17.5 Power Supply

Power Options

Single/Dual AC 2600W	Single/Dual AC 1600W	Single/Dual DC 1600W
----------------------	----------------------	----------------------

Single/Dual AC Power Supply



DC Power Supply

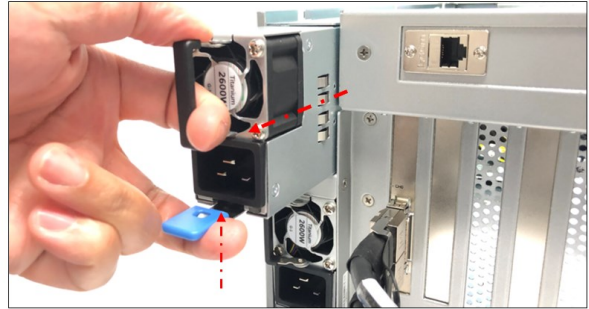
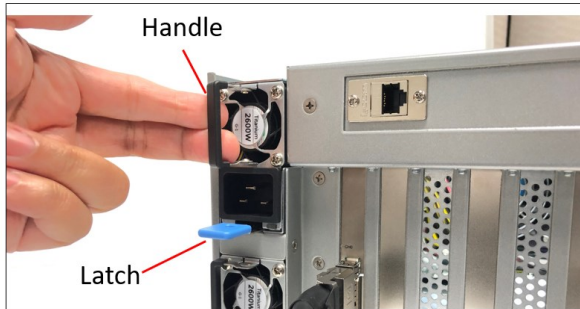


Standard or base model 4UP-Gen5 unit comes with one or two replaceable AC power supply modules (ea. 1600 W)

- 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
 -

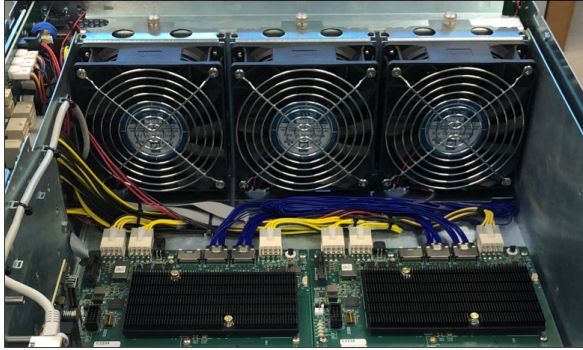
17.5.1 Removing AC Power Supply

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.



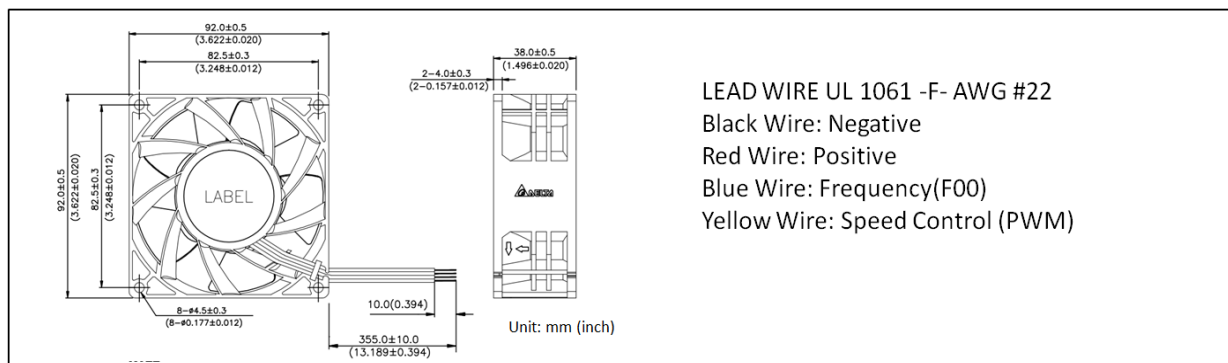
17.6 Fan

The expansion unit has three 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.



17.6.1 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



17.6.2 How to remove Fan

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

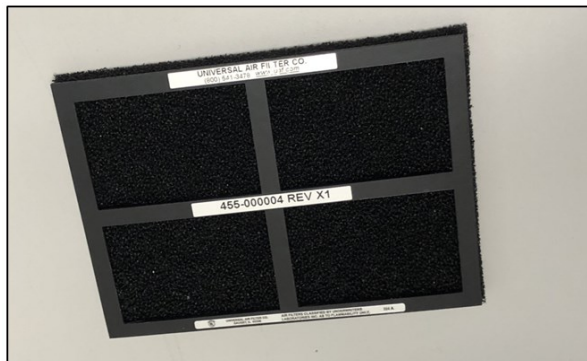


17.6.3 Fan Foam Air Filter

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.



The foam fan filter is optional. It can be ordered and installed during assembly.

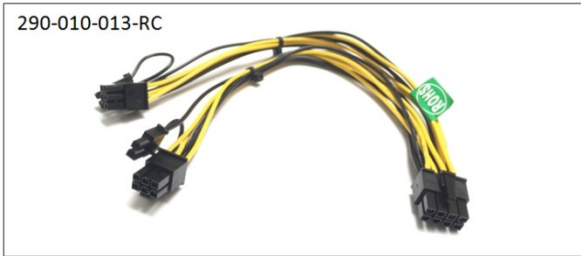
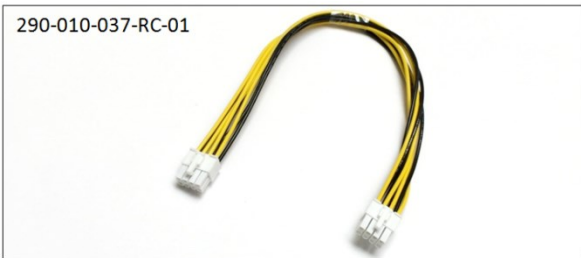





17.7 Auxiliary power cables

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.

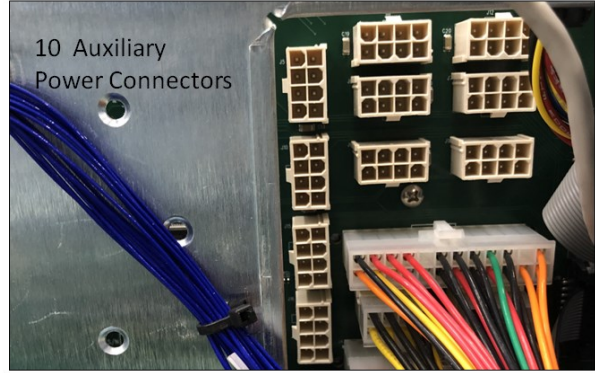
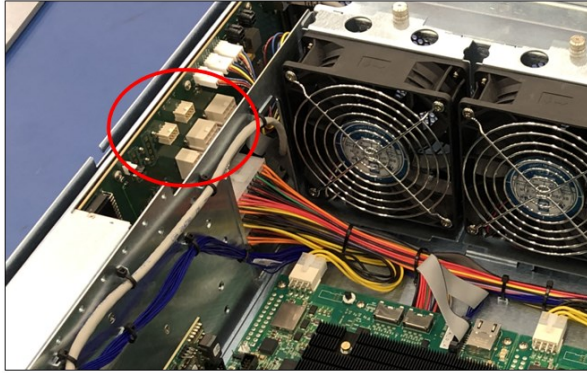
Aux Power Cable	Part Number	Description	Connector	#of Connector
8 pins	290-010-037-RC-01	Cable Assy, Aux Pwr, 8 Pin, NVIDIA 2.0, 12", Expansion System, M176 (OSS)	8-pin male to 8-pin male	One 8-pin connector
	290-010-037-RC-02	Cable Assy, Aux Pwr, 8 Pin, NVIDIA 2.0, 24" Expansion System, M176 (OSS)	8-pin 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



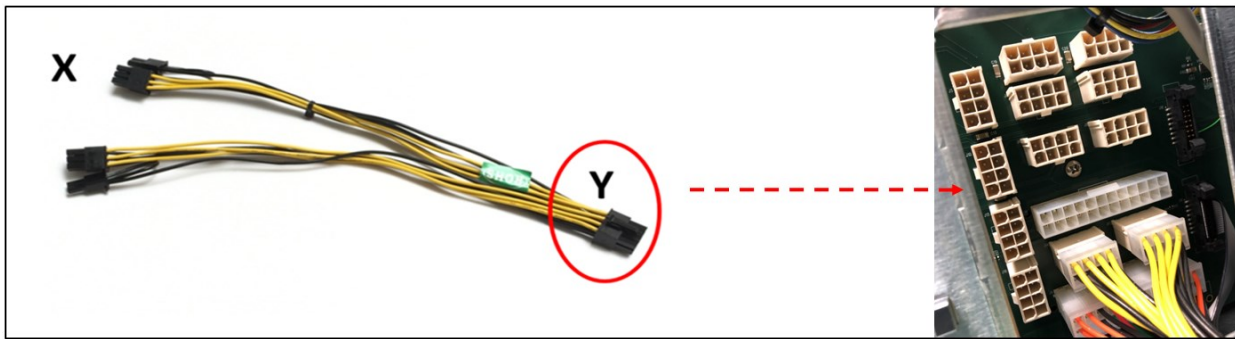
	Connectors	Can provide power of
	8 pin	150 Watts
	Two 6+2 pin	300 Watts
	6 pin	75 Watts

17.7.1 Aux power cable installation

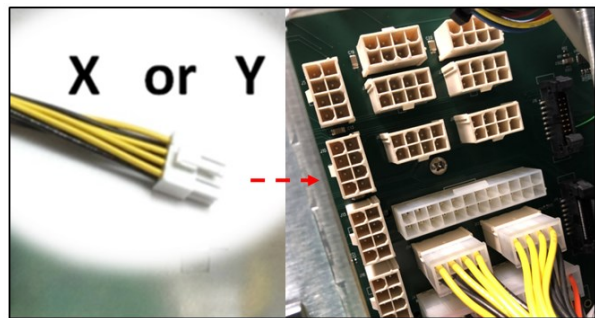
The extra power is supplied directly from the power supply backplane and there are 10 available AUX power connections / ports in which the auxiliary power cables are plugged in, see photo below.



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.

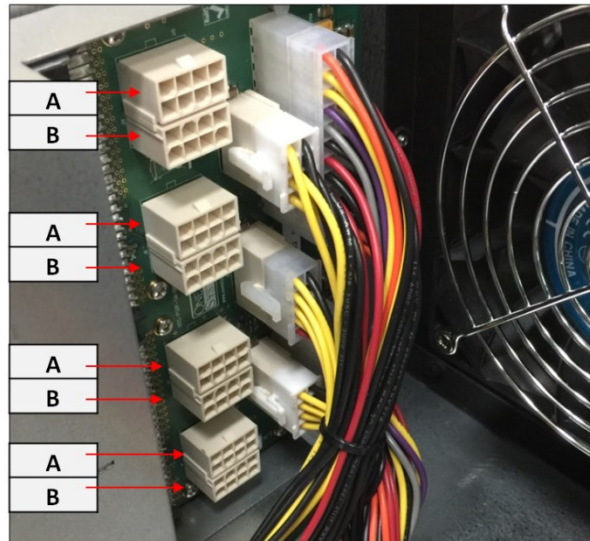
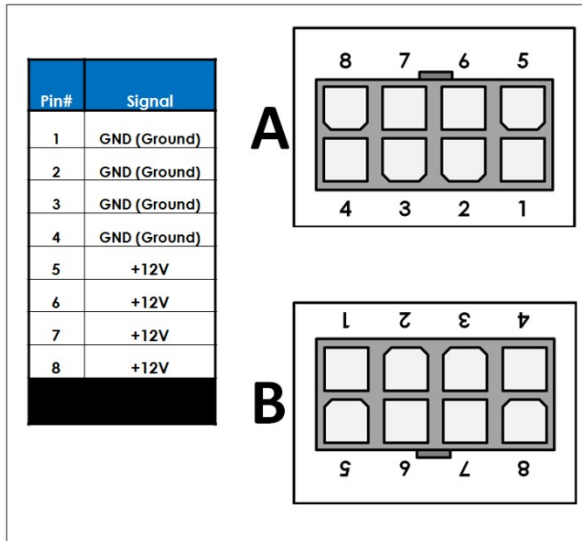


NOTE

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

17.7.2 Pin Outs

PSU board aux port pin outs



8-pin aux power cable and pin outs

Figure A1

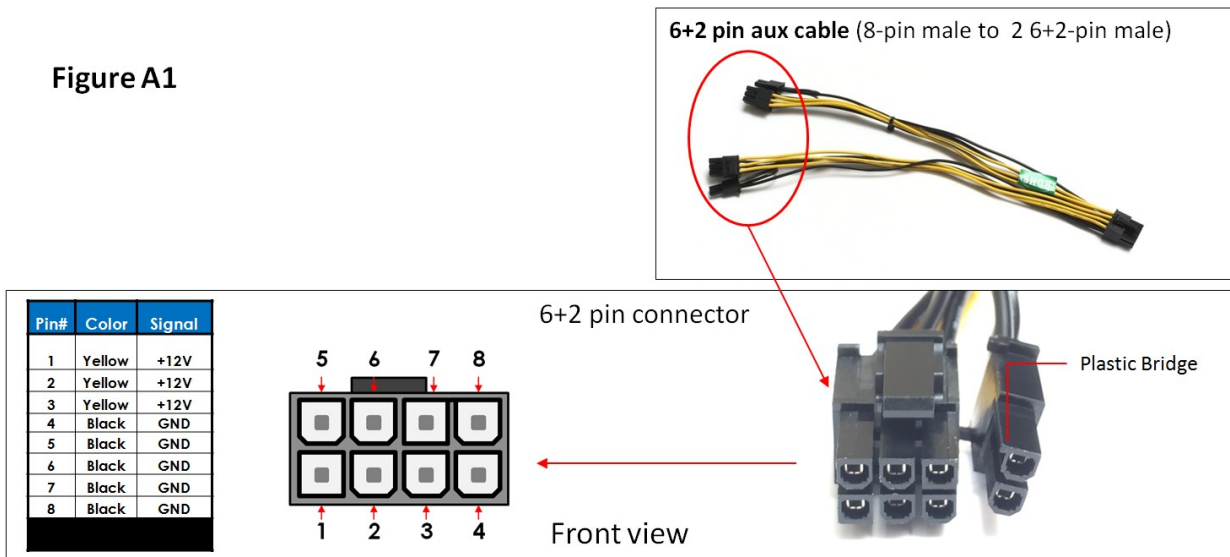
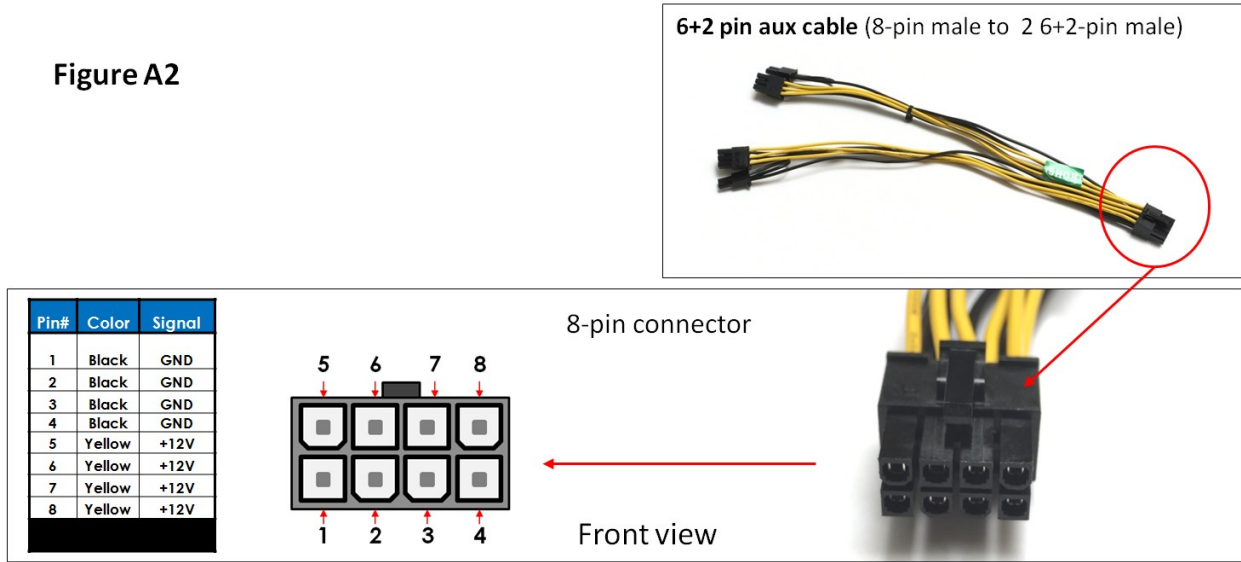


Figure A2



6+2-pin aux power cable and pin outs

Figure B1

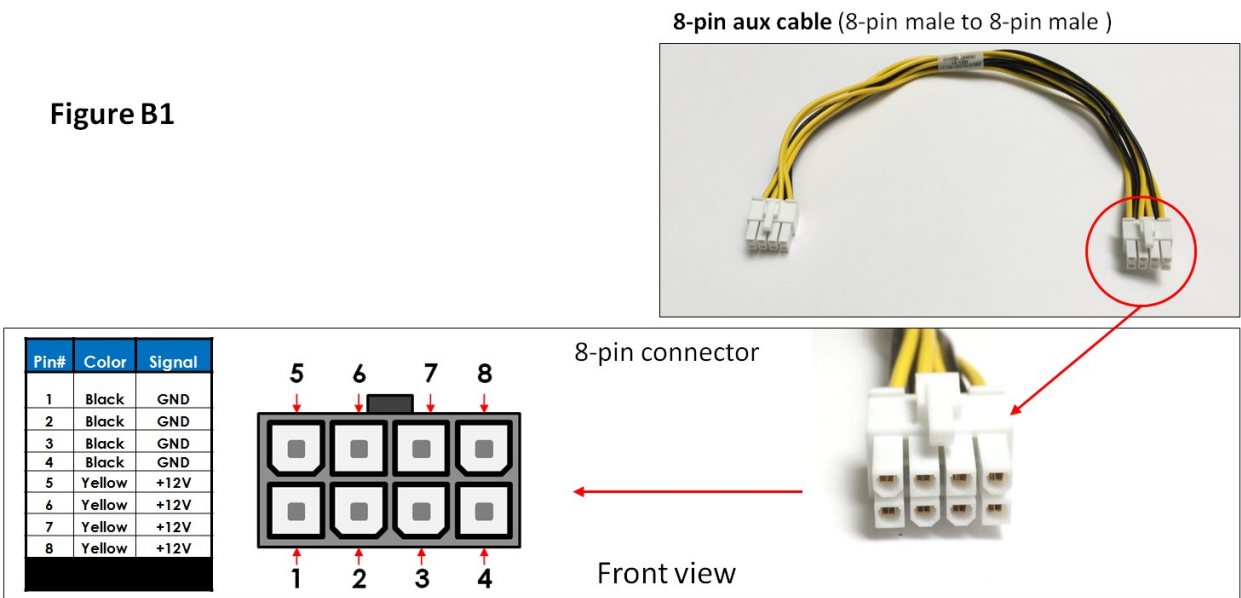
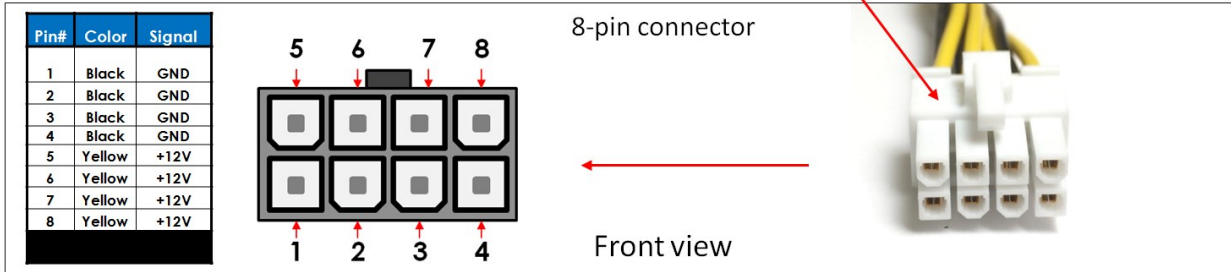
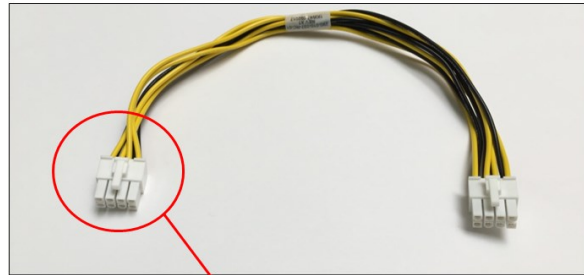


Figure B2

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



17.7.3 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 stand for how the 6+2 pin connector, and 8 pin aux power cables are attached to the PCIe card or GPU card.

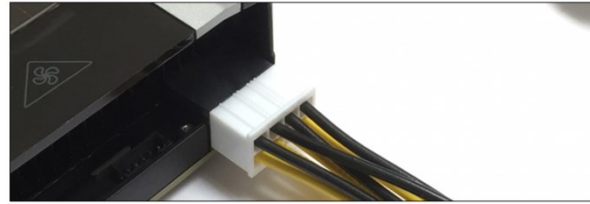
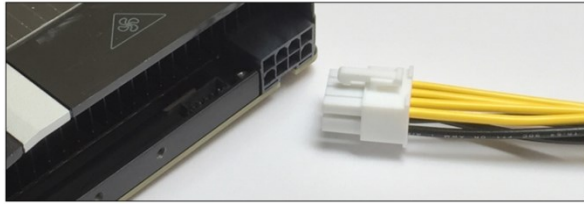
The photo below is an example of a PCIe card or GPU card that has two 6-pin power connectors.



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 supply extra power.



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



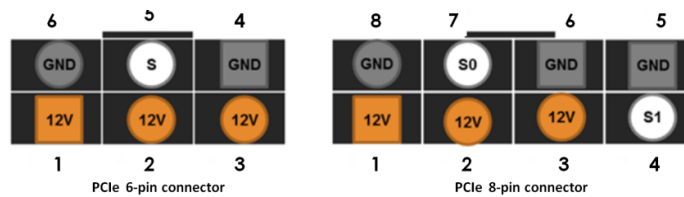
Each PCIe x16 slot on the 522 OSS board supplies 75 Watts of power which is adequate for most video cards. But high-end GPU cards usually need more power. To accommodate graphics cards needing more than 75 watts, the **PCI-SIG (Special Interest Group)** introduced two standards for supplying additional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

17.8 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.

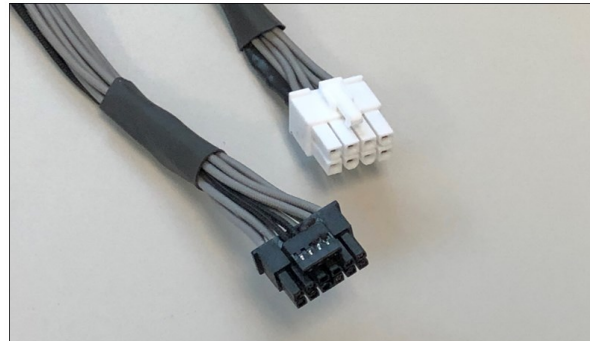
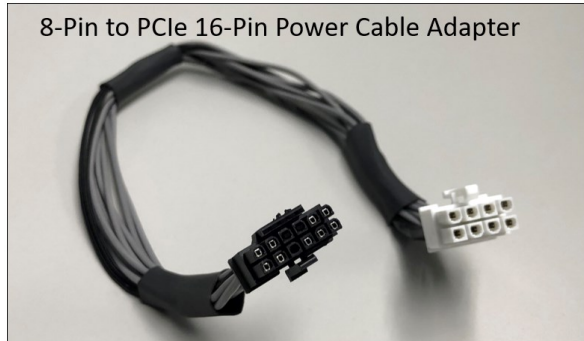
17.9 Power consumption breakdown per hardware

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	UBMC	6 Watts

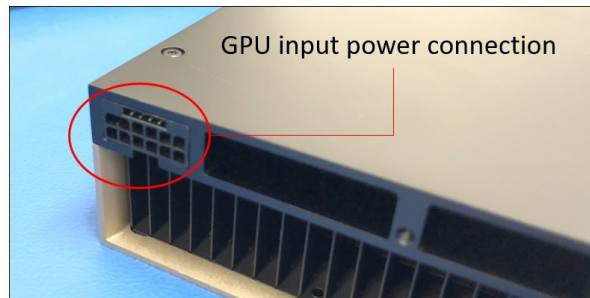
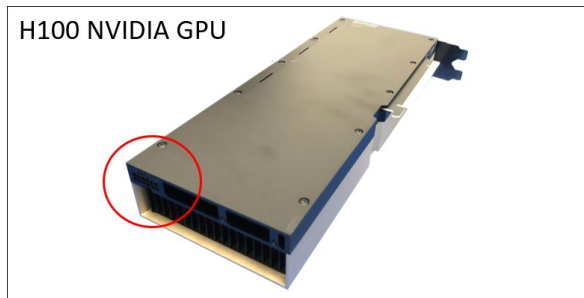
18 Providing Power to NVIDIA H100 GPU

If you are using an H100 Nvidia GPU, you need a custom auxiliary power cable adapter (8-Pin to PCIe 16-Pin Power Cable Adapter) to provide power to the GPU. Contact OSS sales team to order the "8-Pin to PCIe 16-Pin Power Adapter".

Below photo is the custom OSS "8-Pin to PCIe 16-Pin Power Cable Adapter".

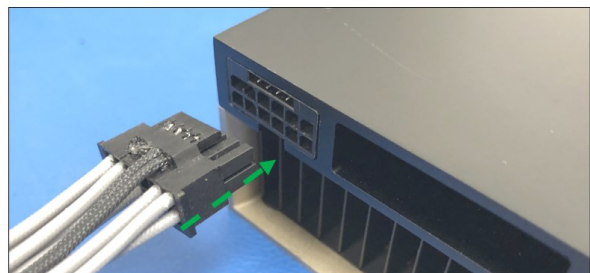
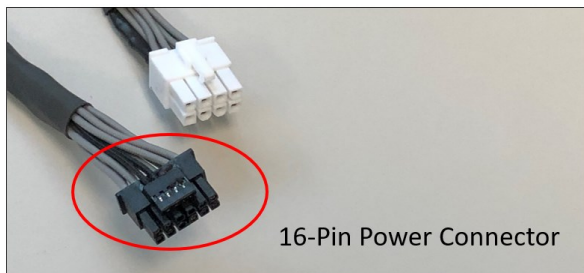


Below photo is an H100 NVIDIA GPU showing the input 16-pin power connection.



18.1 Connecting the Gen5 Aux Power Adapter

Plug in the 16-pin cable connector to the H100 GPU input power connection.



Plug in the other-end of the cable, the 8-pin cable connector, to any available aux power connectors on the "PDB" power distribution board in the expansion unit.

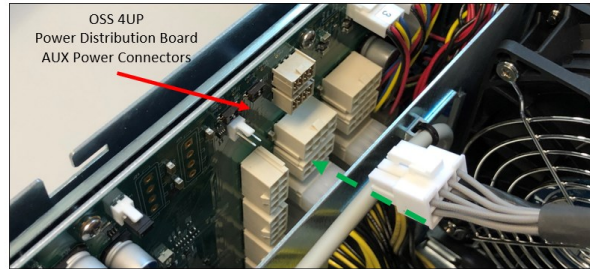
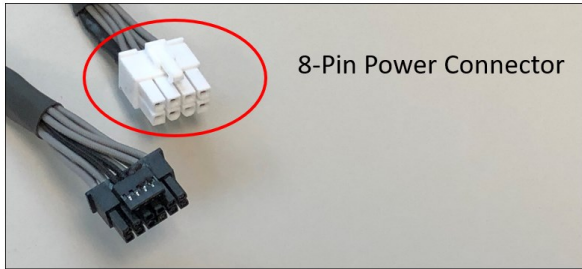
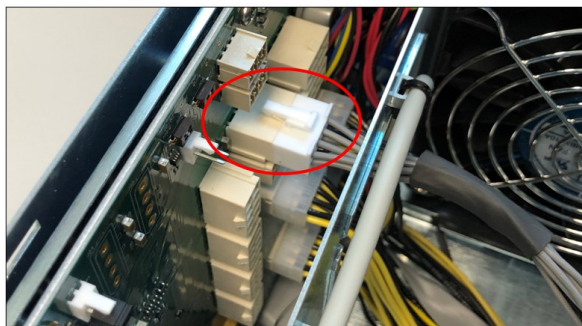


Photo below shows the 8pin cable connector rigidly connected to the aux power connector on the power distribution board.



19 Troubleshooting

19.1 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

19.2 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

19.3 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. Makes 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.

19.4 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.

19.5 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 my PCIe cards that are installed on the backplane.

1. Check the Dip switches on the backplane make sure they are set correctly.

20 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".

20.1 Contacting Technical Support

Our support department can be reached by phone at [1 \(760\) 745-9883](tel:17607459883). 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 damage. Note: Expansion board and PCIe / PCI cards that arrive damaged in shipment will not be covered under warranty.

20.2 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: MA # _____, 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 like 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 ensuring the device is returned to use in the same condition you shipped it in. Please call for an RMA number first.

20.3 Third Party Hardware & Software Support Policy

OSS evaluates, 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 infinite combinations of hardware and software, OSS cannot evaluate and validate every configuration. OSS is committed to supporting its products and identifying if any technical issue may be related to third-party hardware or software. 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 evaluate, 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.

20.4 Online Support Resources

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

4U Pro 10 Slot Unit Standard



2235 Enterprise Street, Suite#110, Escondido CA 92029

Toll-Free : +1(800)285-8900 US • Main: +1 (760) 745-9883 • Fax: +1 (760) 745-9824

www.onestopsystems.com