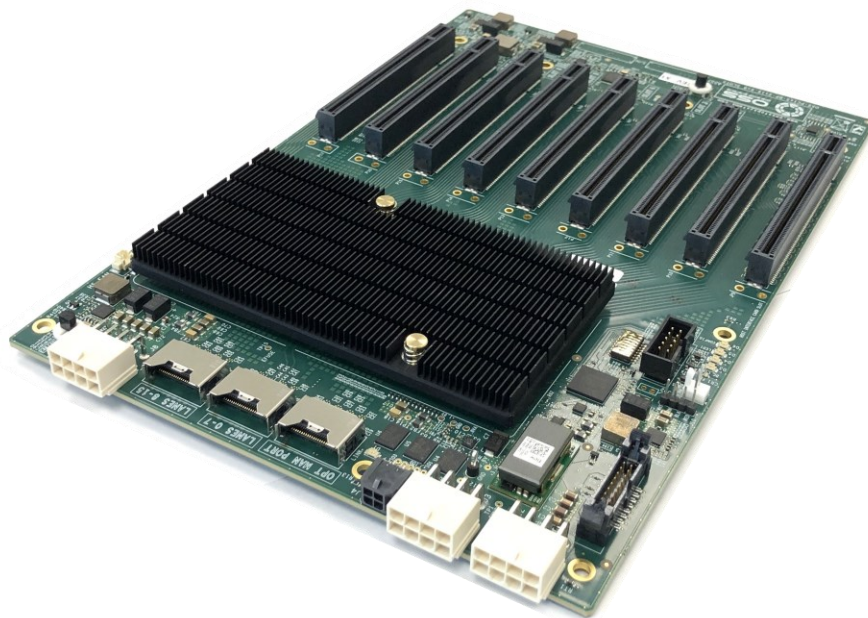




OSS-581 Gen5 Backplane



INSTALLATION GUIDE

OSS-581 Gen5 Backplane



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ONE STOP SYSTEMS

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1 Getting Started

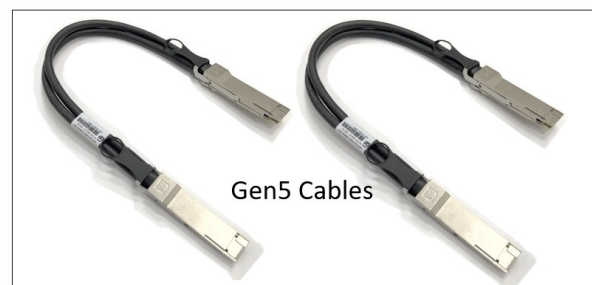
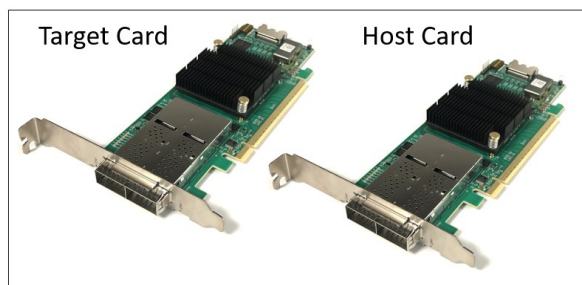
This section is all about the steps on how to install the backplane. You will find instructions for the following procedures:

- Unpacking
- Upstream and Downstream Slots
- Hardware Requirements
- Backplane Installation
- Cable Adapter Card Installation
- Link Cable Installation
- Powering Up the unit / system
- Verify Device Installation

2 Unpacking

Check and identify the standard supplied item. Inspect the backplane for physical defects and damages.

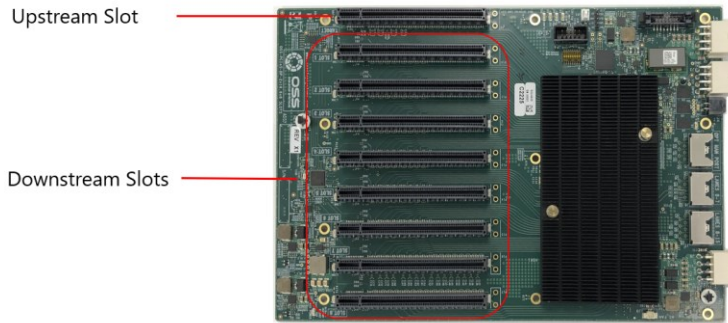
- To achieve superior performance and reliability it is recommended to use a certified and compatible set of an OSS Gen5 adapter cards (aka: Host Interface Board) and cables.
- The OSS backplane is designed and programmed to work with OSS Gen5 adapter cards (also backward compatible with Gen4 adapter card).



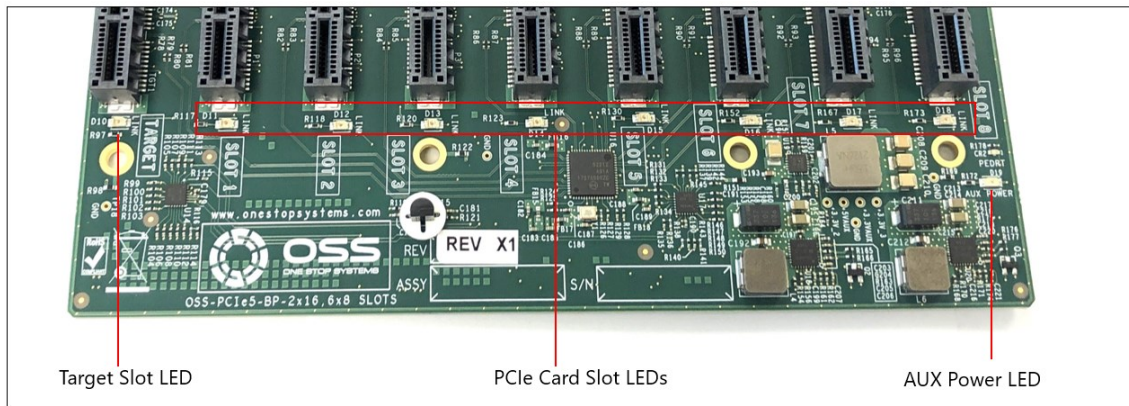
3 Backplane Information

3.1 Upstream and Downstream Slots

- **Upstream Slot:** Also known as target slot. Designated slot for the Target adapter cards only. Slot0 is the default slot for the Upstream slot.
- **Downstream Slots:** These are PCIe card slots #1, #2, #3, #4, #5, #6 and #7. Do not use the downstream slots for HIB Target card.
- **Option Slot:** Slot 8, when configured accordingly, it will operate either in an Upstream mode or Downstream mode.

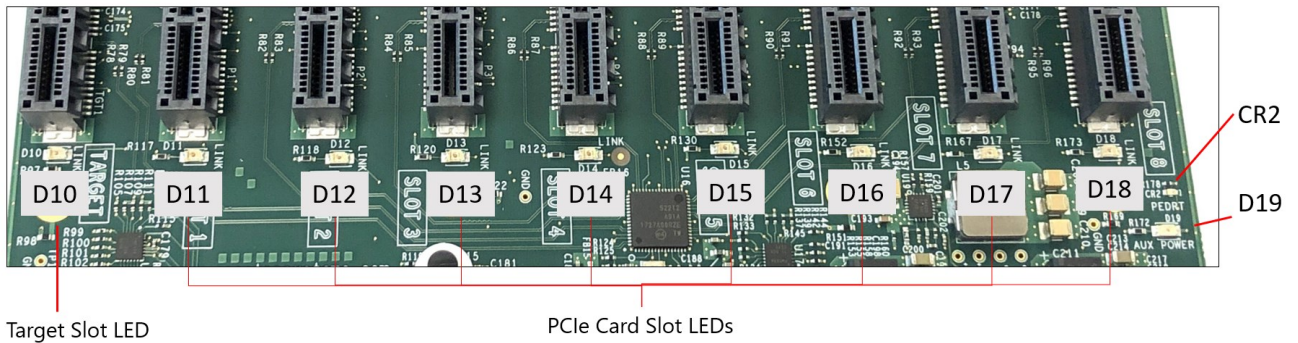
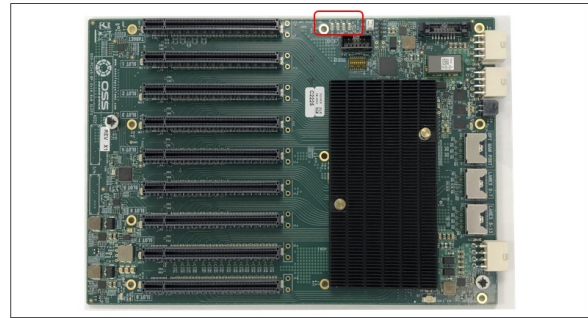
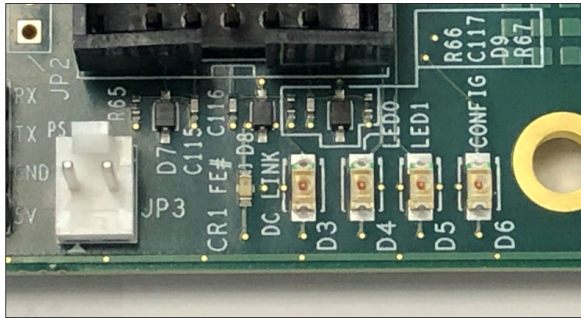


3.2 Slot LEDs



Item	Name	Description	When Lit (Solid Green or Blinking)	When Off
1	Target Slot LED	Upstream Slot LED	Solid = Gen5 Link Blink 2Hz = Gen4 Link	OFF - Not Linked / No Card present in the slot
2	Downstream LED	PCIe slot LEDs	Solid = Gen5 Link Blink 2Hz = Gen4 Link	OFF - Not Linked / No Card present in the slot
3	Aux Power LED	Auxiliary Board power LED	This is GREEN, denotes existence of auxiliary power +5VAUX	Board is at fault / error

3.3 Board LEDs

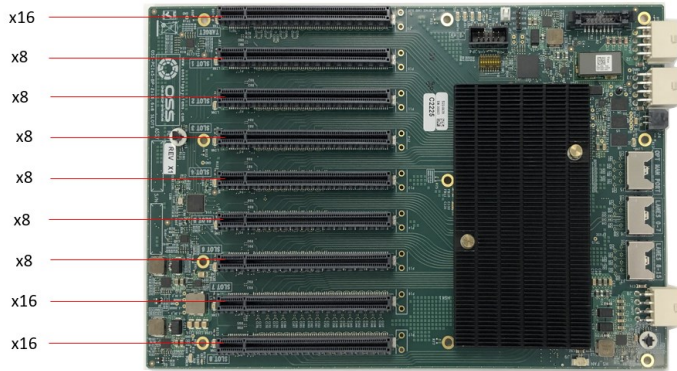


Ref Des	Color	Definition
CR1	Red	Fatal Error
CR2	Red	System in Reset
D1	Green	Link Status Man Port
D3	Green	Link Status Daisy Chain
D4	Green	LEDO: All Power Good
D5	Green	LED1: Flashing Pattern
D6	Green	FPGA Config
D10	Green	Link Status Slot 0
D11	Green	Link Status Slot 1
D12	Green	Link Status Slot 2
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

3.4 Slot Type

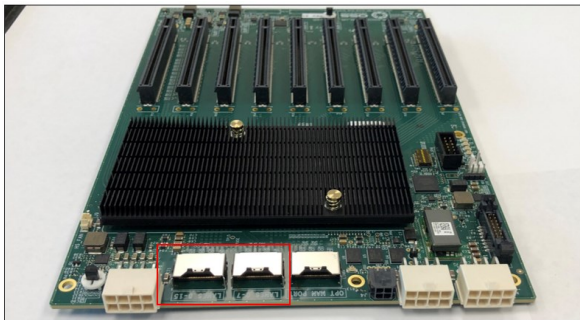
Slot Type: Closed-ended PCIe slot / connector, all the slots are x16 mechanical.

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

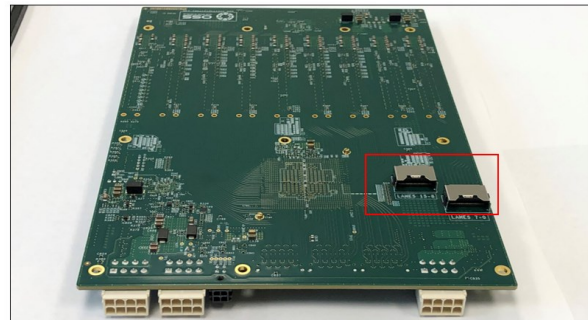


3.5 ARF6 Connectors

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



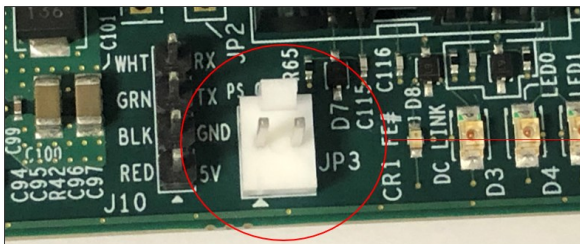
TOP: ARF 6 Ports / Connectors



BOTTOM: ARF 6 Ports / Connectors

3.6 PS_ON

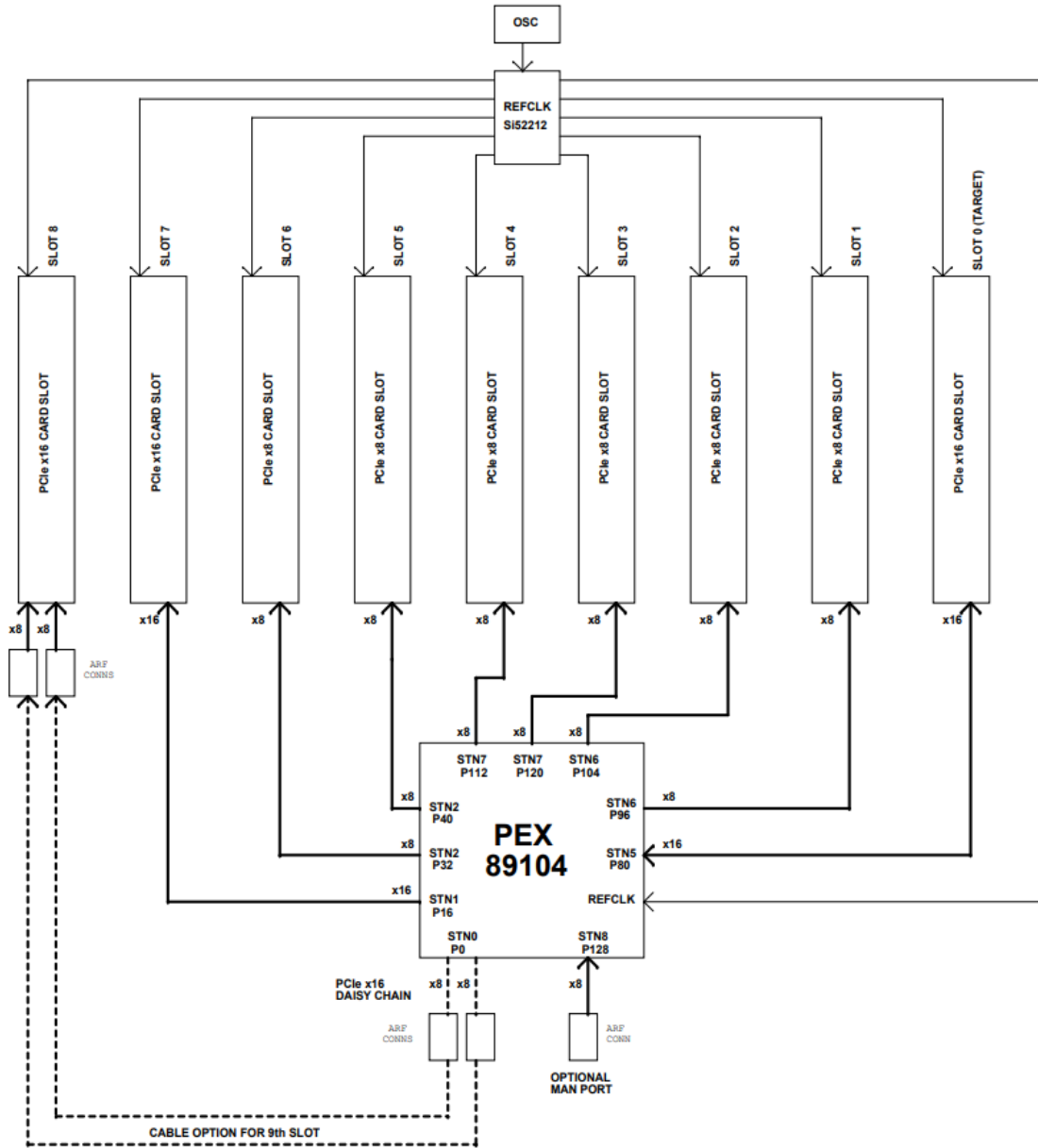
The board has a two-pin connector for placing a shunt / jumper that allows the backplane to be ON all the time when an ATX power supply is switched ON. See photos below for the location of the JP3 connector on the backplane. You can buy the shunt from any online hardware stores.



Shunt / Jumper



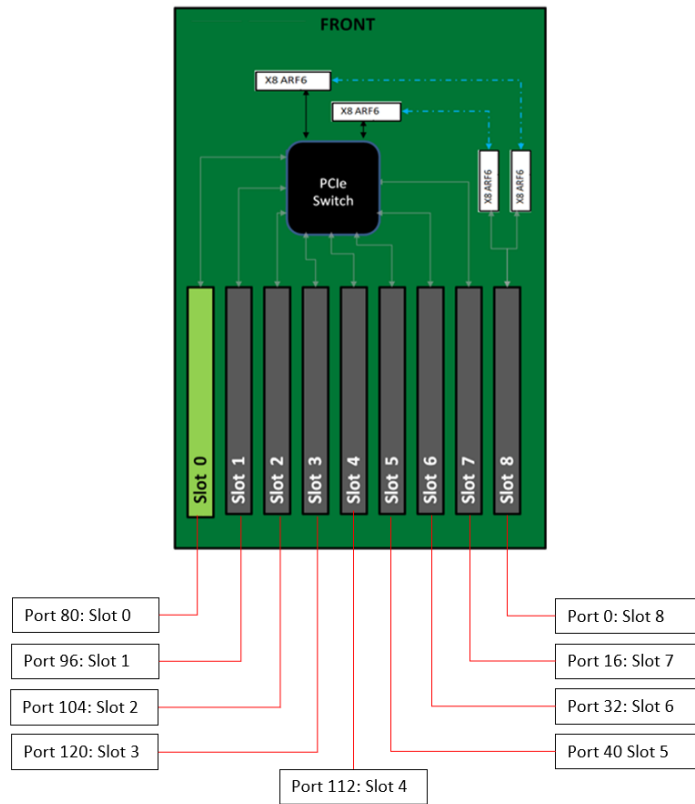
3.7 Block Diagram



3.8 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. No means of changing or modifying it.

PCIE Slot Mapping	Port Mapping (PCIe Switch)	Notes
Slot 0	80	
Slot 1	96	
Slot 2	104	
Slot 3	120	
Slot 4	112	
Slot 5	40	
Slot 6	32	
Slot 7	16	
Slot 8	0	Cabled from Daisy Chain (DC) Port
DC Port	0	
Main Port	128	



3.9 Power Consumption

OSS-581 with no PCIe cards installed:

- Max Power 100W (calculate ~80W, but adding some margin)

OSS-581 with qty 9, 25W PCIe cards installed:

- Max Power 400W (calculate ~330W but adding margin and factoring in efficiency of 3.3V power supplies)

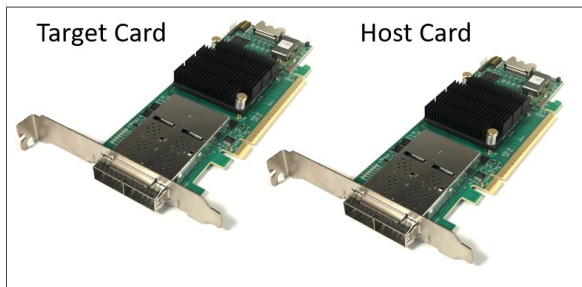
If PCIe cards are more than 25W, then the power goes up accordingly.

Note: all OSS-581 power comes from +12V (except for ~5W max of +5Vsb).

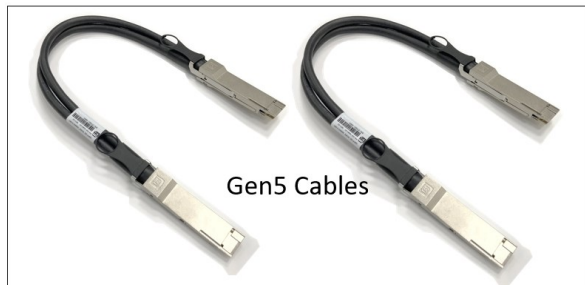
4 Hardware Requirements

1. OSS Gen 5 Target and Host Cards
2. Gen 5 PCIe x8 Cable (qty: 2): QSFP-DD Cables
3. Gen5 or Gen4 x16 PCIe slot (computer motherboard)
4. ATX Power Supply: Minimum of 400 Watt

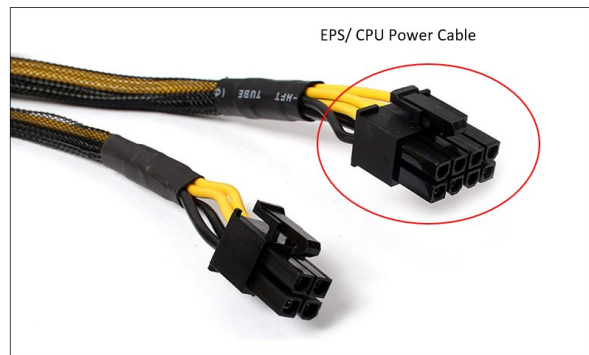
Gen5 Target and Host Card



QSFP-DD Cables

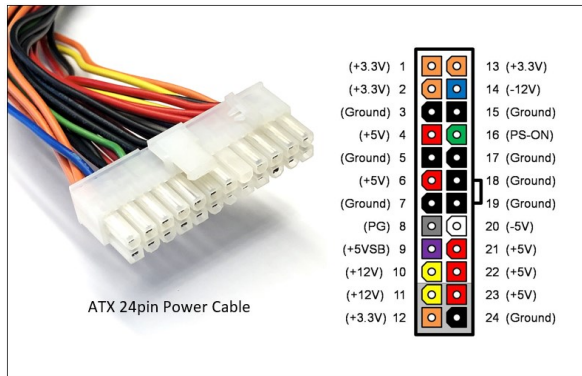


ATX Power Supply with 24pin power cable and at least two available EPS power cable. The EPS power cable is also known as CPU power cable that has 8pin power connector

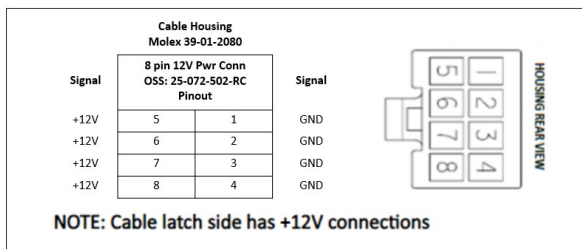


4.1 Pinouts

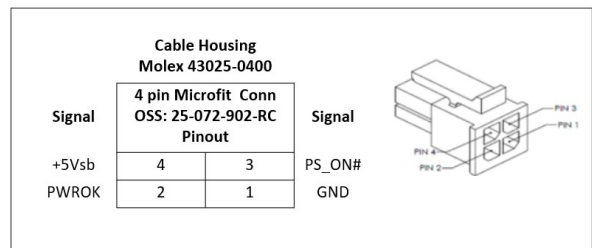
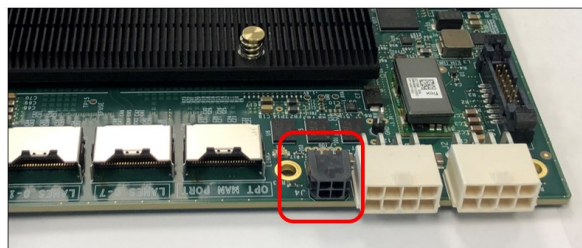
ATX 24pin connector pinout



12V Input Connector Pinout

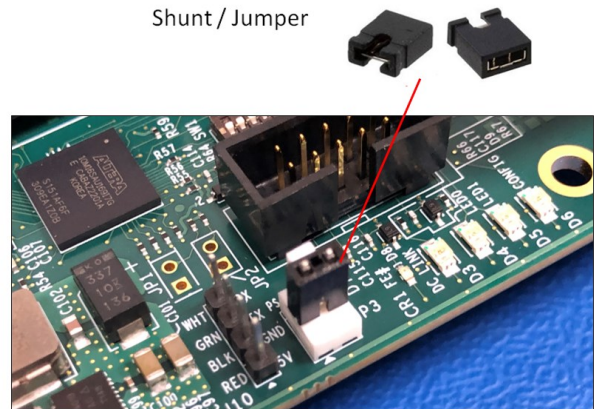
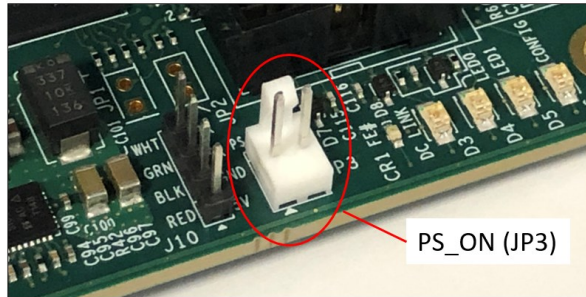


5V Stand-by Connector Pinout



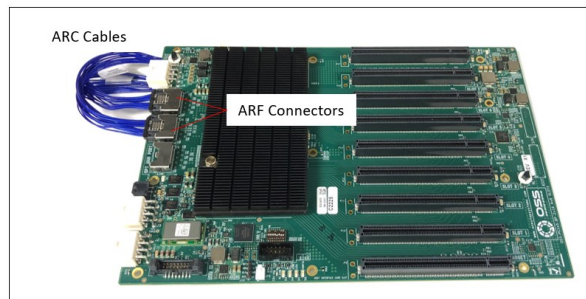
5 Setup / Installation

5.1 Install Jumper / Shunt on JP3

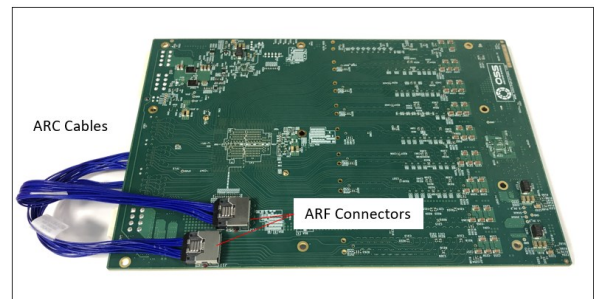


5.2 Plugin ARC Cables

Connect the Arc cables to the Arf connectors onboard the backplane.

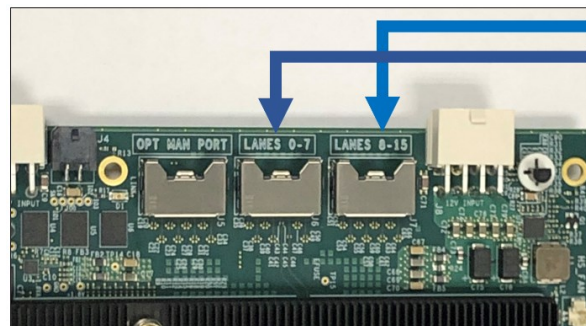


Top Backplane

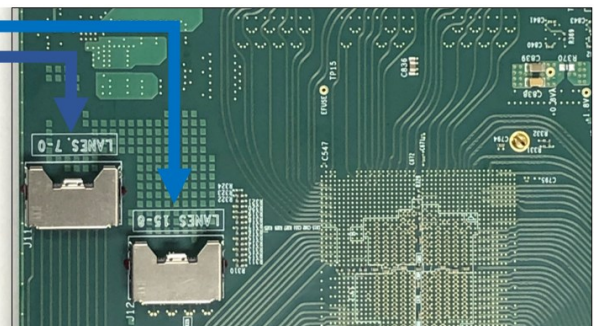


Bottom Backplane

Follow the diagram below for connecting the Arc Cables.

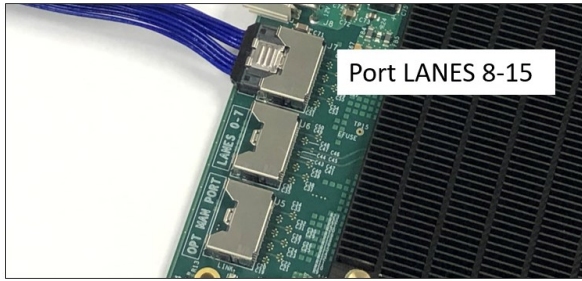


Top Backplane

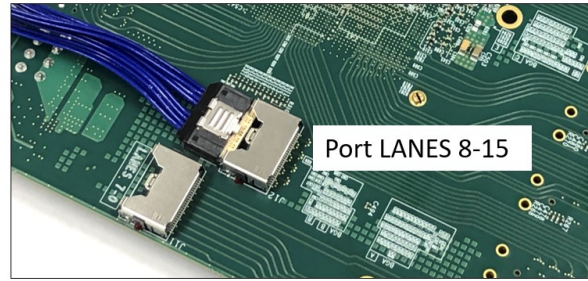


Bottom Backplane

Connect the first ARC cable to port LANES 8-15

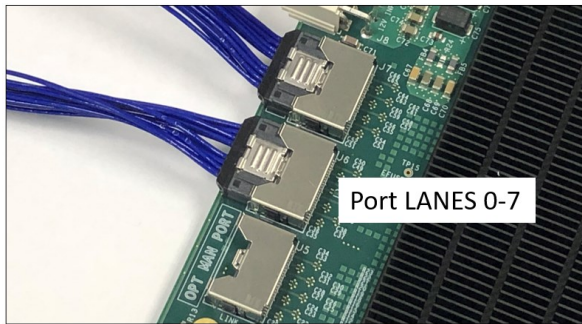


Top Backplane

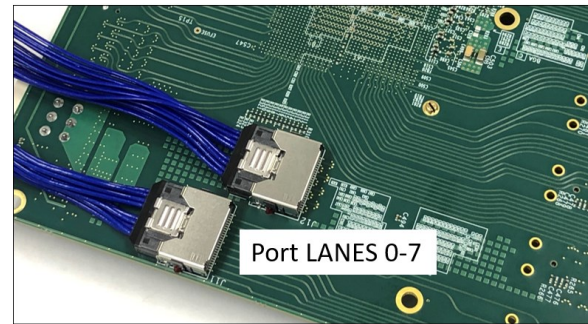


Bottom Backplane

Connect the 2nd Arc cable to Port LANES 0-7



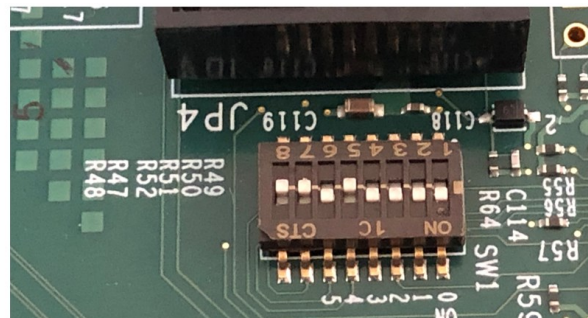
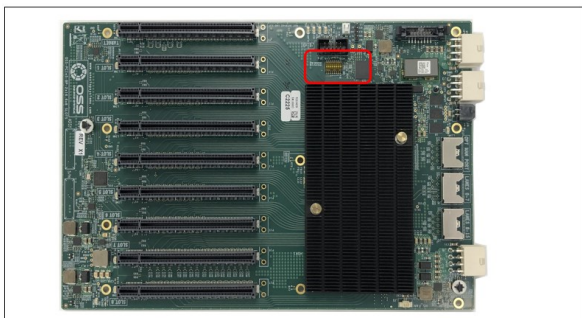
Top Backplane



Bottom Backplane

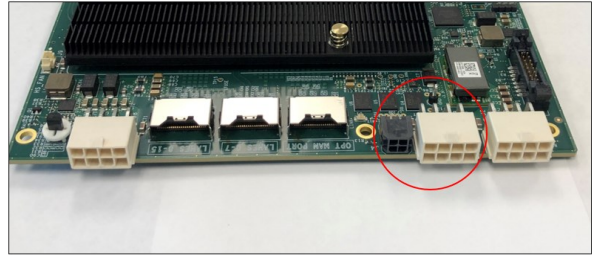
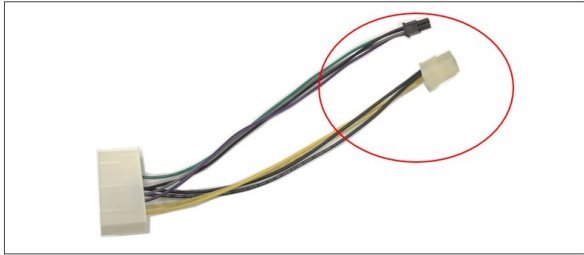
5.3 Set Backplane Dipswitches

Configure the backplane SW Dipswitches. Set the switches using the settings shown from the photo below.

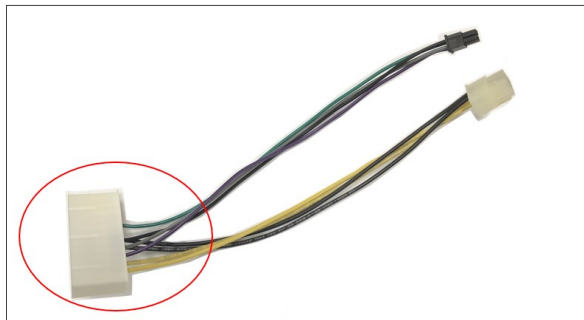


5.4 Connect Power Cables

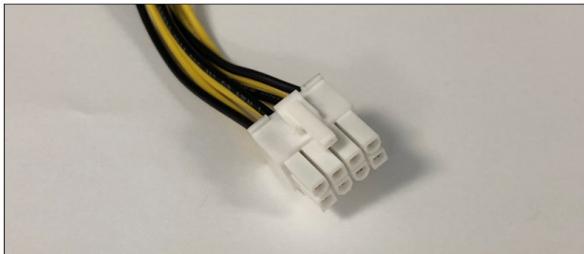
Plug in the supplied power adapter cable (24pin-to-4pin cables). Connect the two power cables to the backplane, see photos below.



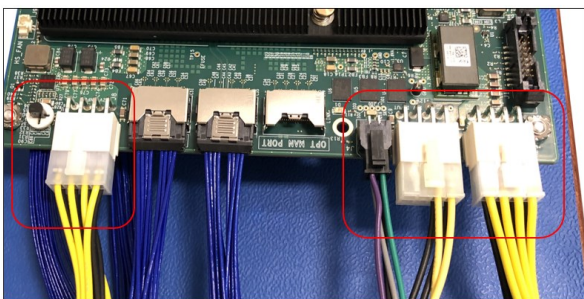
Connect the other end of the cable to the ATX power supply 24pin power connector.



From the ATX power supply, connect the 8pin power cable to the remaining 12v input power connector on the board.



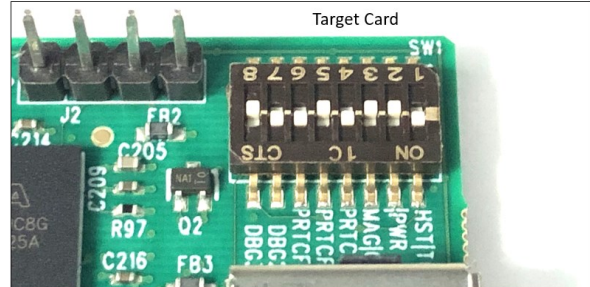
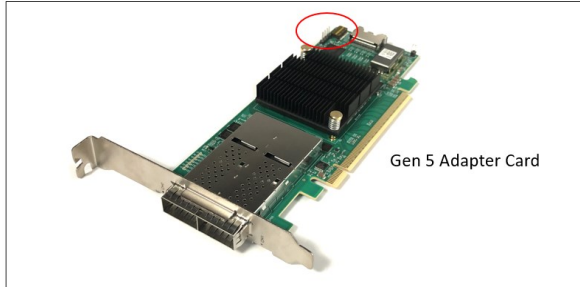
Below photo shows all the power cables attached to the backplane.



6 Install Adapter Card

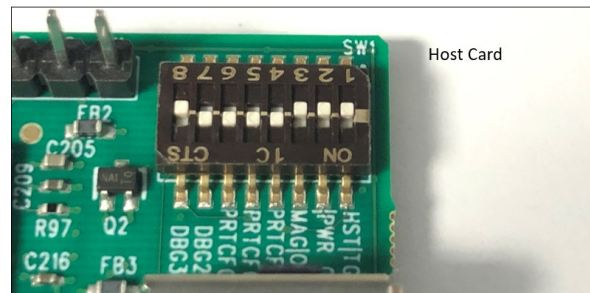
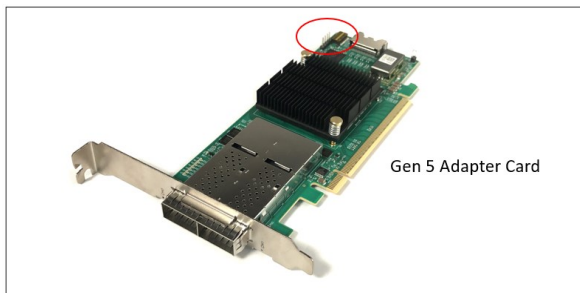
6.1 Set Target Card Dipswitches

Set the dipswitches on the card to target mode, see photo below for correct settings



6.2 Set Host Card Dipswitches

Set the dipswitches on the card to host mode, see photo below.

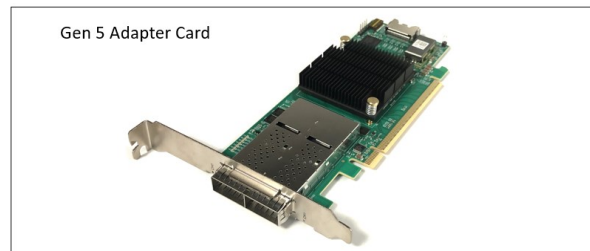
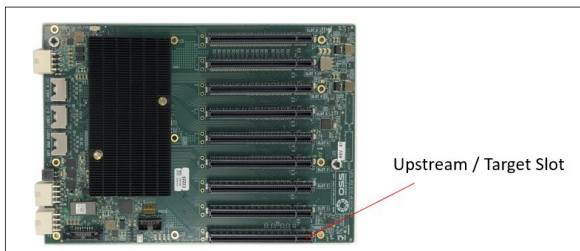


6.3 Install Target Card

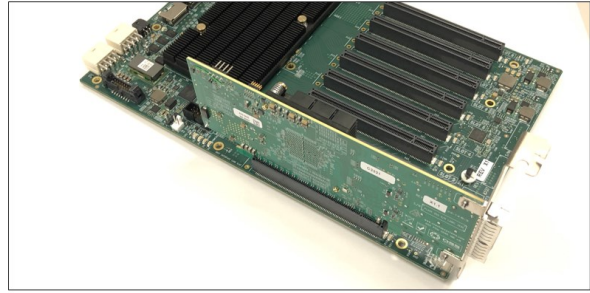
Use the designated Target Slot / Upstream Slot on the backplane when installing the card.

- See photo below for the correct default location of the Target slot (Upstream Slot).

Plug in the target card in the upstream slot on the backplane.



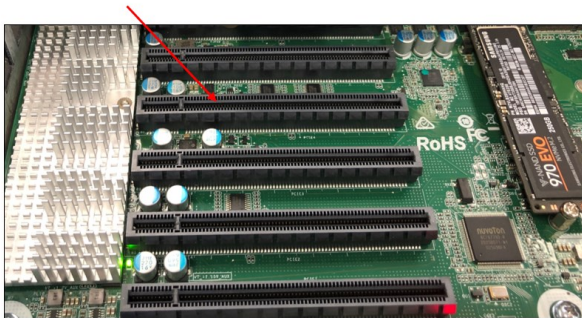
As shown below, the OSS target card is installed in Upstream slot 0.



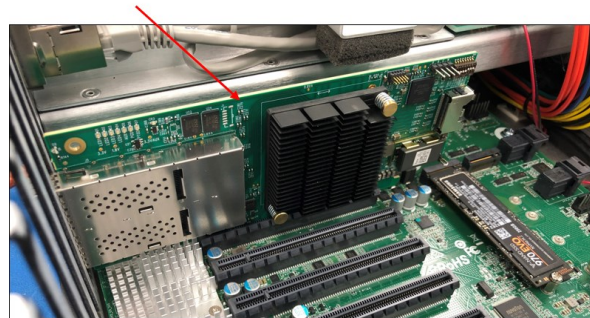
6.4 Host Card Installation

The host card can only be installed in the computer motherboard's PCIe slot. Install the Host card in an x16 Gen5 PCIe slot.

x16 PCIe Gen 5 slot

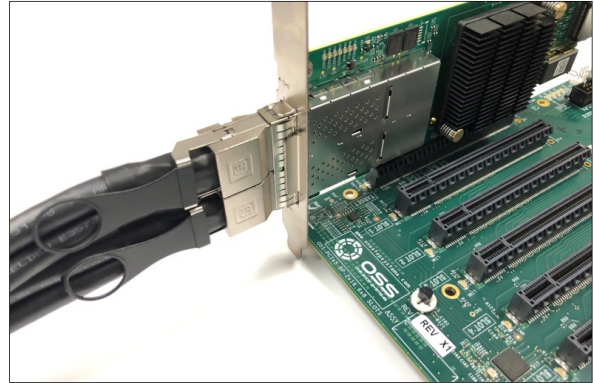
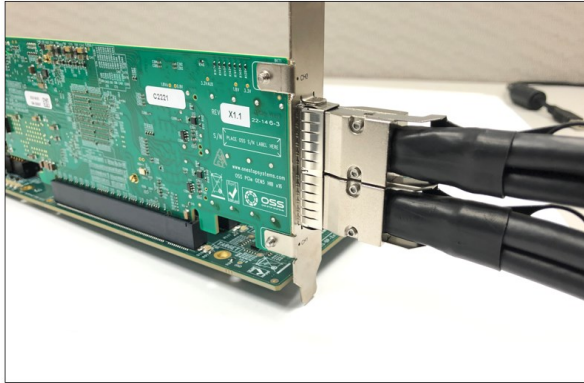


OSS Gen5 Host Card

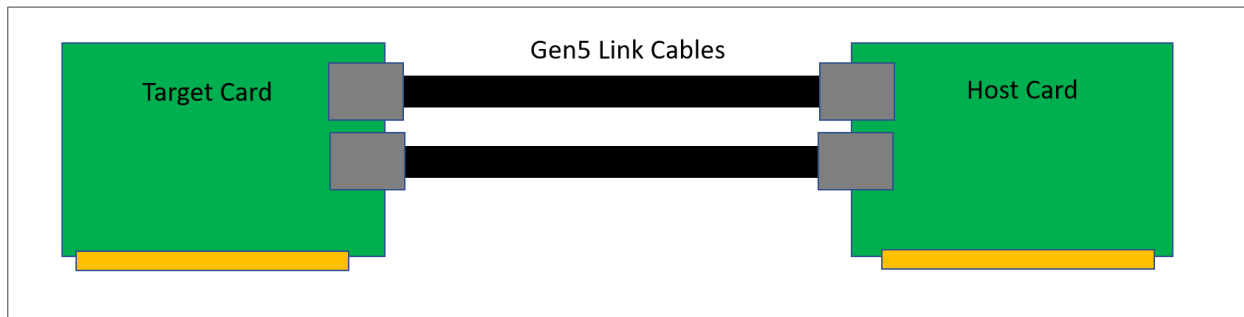


7 Cable Installation

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



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



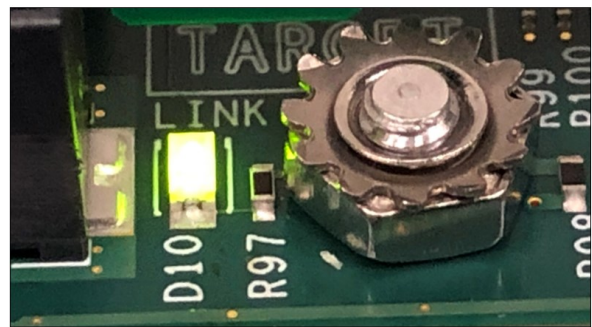
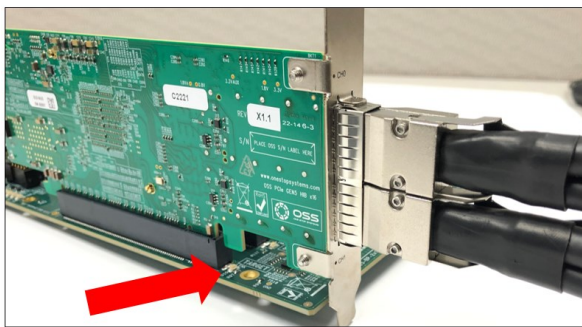
8 Powering UP the unit

- Power ON the Gen5 backplane first.
- Turn ON the host computer

9 Hardware Check

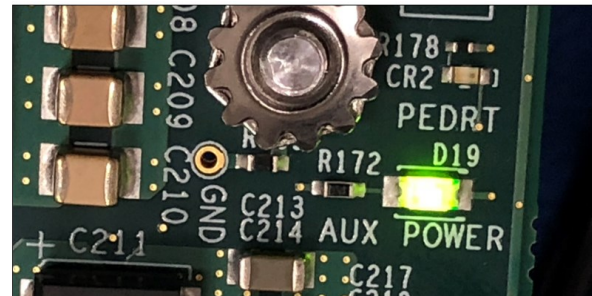
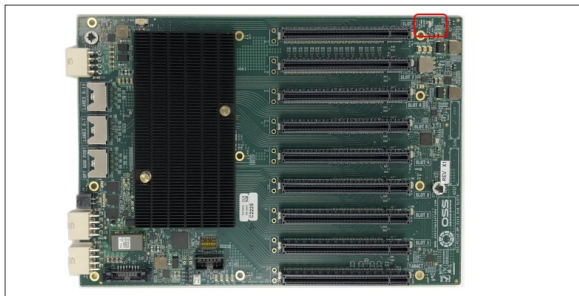
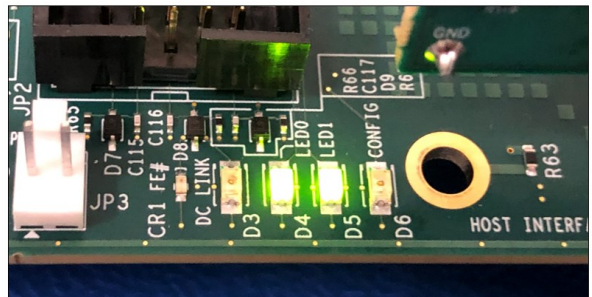
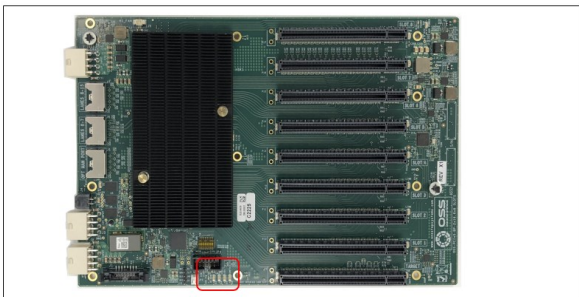
9.1 Verify Board LEDs

After powering UP the host computer, the Target SLOT LED on the backplane will illuminate as solid green as shown below.



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

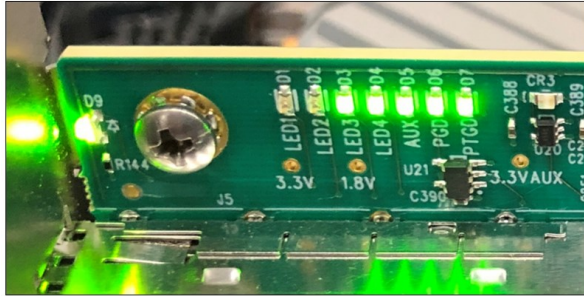
- D4 & D5
- D19: AUX power, solid green.



9.2 Verify Adapter Card LEDs

After powering ON the host computer, it will instantly power UP the target device.

- A fully operational adapter cards will illuminate the following LEDs (on both Host and Target cards).



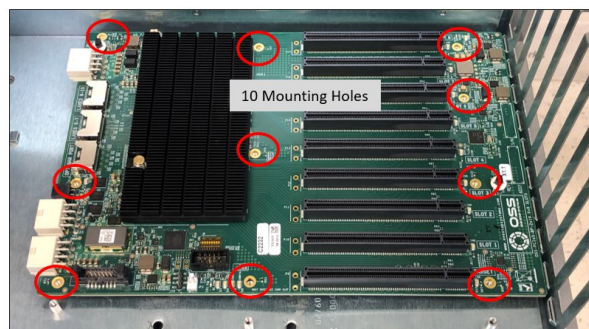
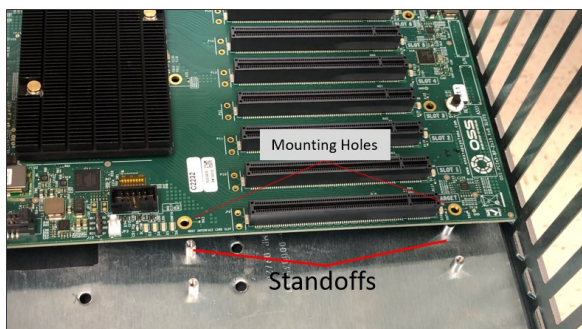
10 Mounting the backplane

To install the backplane in an enclosure, use the provided screws and plastic washer (see photo below). Check the kit that is shipped with the unit, the screws and plastic washers are included.

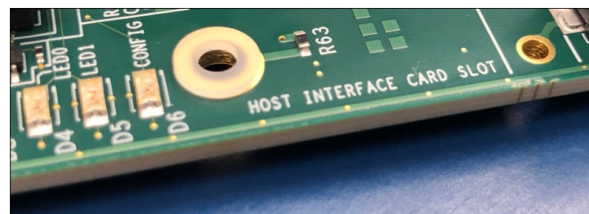
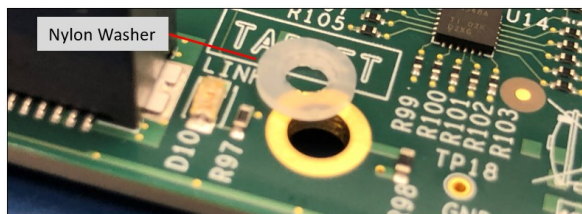


For installing / mounting the backplane in the enclosure, follow the steps below.

1. Slide the backplane into place. Align the mounting holes to the standoffs.



2. Place the plastic washer on top of the mounting hole.



3. Install the screw to secure the backplane down.



Start with the corners, holding the board firmly, so that it screws-holes line up. When screwing the screws in, don't use too much pressure as this can break the board. You want the screws properly tight enough to secure the backplane, but not so tight that can crack the board.

- Once you've done the corners, put screws in the remaining holes.

11 Post Installation

Verify the OSS devices after installation.

11.1 Linux

To check or verify if the OSS devices are detected, type or enter the command “`lspci -vvv |grep c030`”, see output below.

- It will show 46 total number of c030 device IDs, combining both OSS_579 adapter cards and the OSS_581 board.
- The c030 is the vendor device ID of the OSS_579 card and OSS_581.

The screenshot below shows 46 c030, indicating that the host device is communicating with the target and expansion backplane.

```

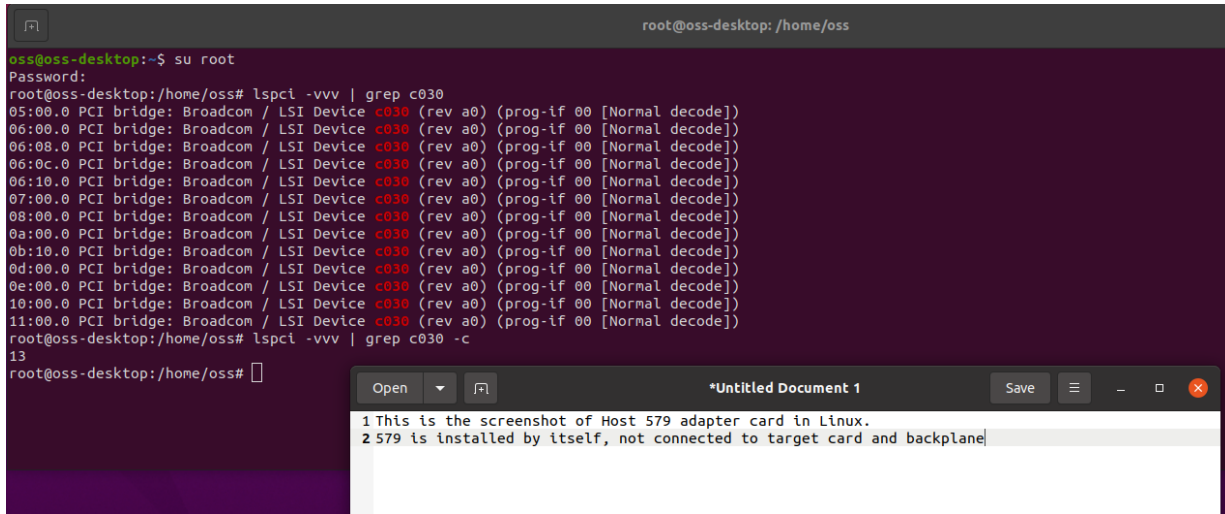
root@OSSuperServer:~# lspci -vvv | grep c030 -c
46
root@OSSuperServer:~#

root@OSSuperServer:~# root@OSSuperServer:~# lspci -vvv | grep c030
84:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
85:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
85:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
85:0c.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
85:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
86:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
87:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
89:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8a:10.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8c:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
8d:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
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])
91:10.0 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])
94:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
94:04.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
94:08.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
94:0c.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])
95:00.0 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])
96:10.0 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])
9a:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
9a:08.0 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])
a0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
a0:08.0 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])
a0:18.0 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])
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])
b0:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])
b1:00.0 PCI bridge: Broadcom / LSI Device c030 (rev a0) (prog-if 00 [Normal decode])

```

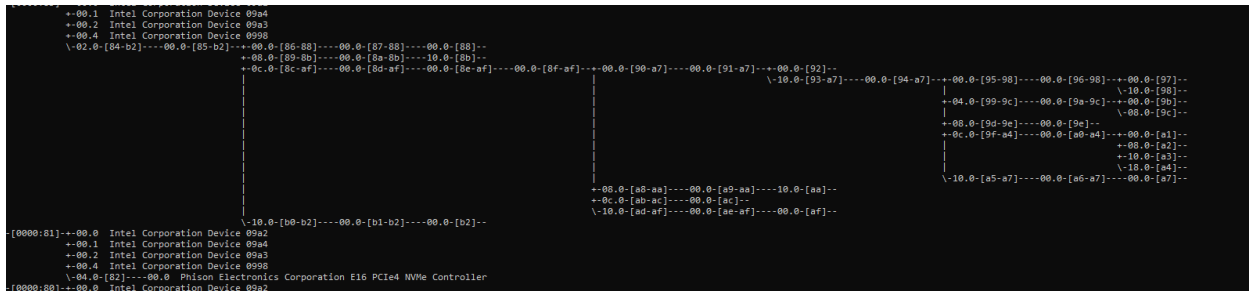
The screenshot below shows the output of “lspci -vvv |grep c030” with the OSS_579 host card only being detected.

- This is the single OSS_579 host card displaying 13 of c030 device IDs.



To check on the OSS-581 device hierarchy type or enter the command on a terminal window “lspci -vvtt”.

The screenshot below shows the hierarchy (tree-like structure) of the OSS_581 backplane without PCIe cards in the slots.



Below photo is the tree-like structure of the OSS_581 backplane with all 8 slots populated with different PCIe cards.

- Using the same command “lspci -vvtt”.

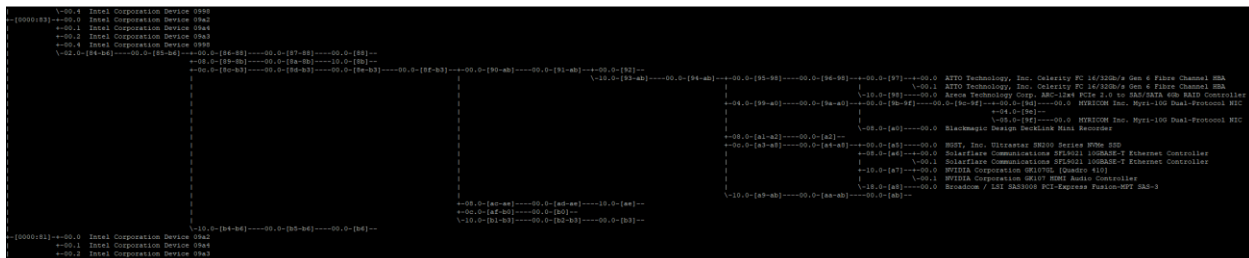
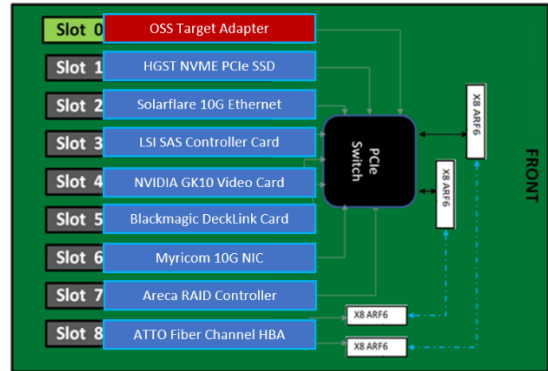


Photo below shows the hierarchy order of eight physical slots on the OSS_581 backplane populated with different PCIe cards.

```

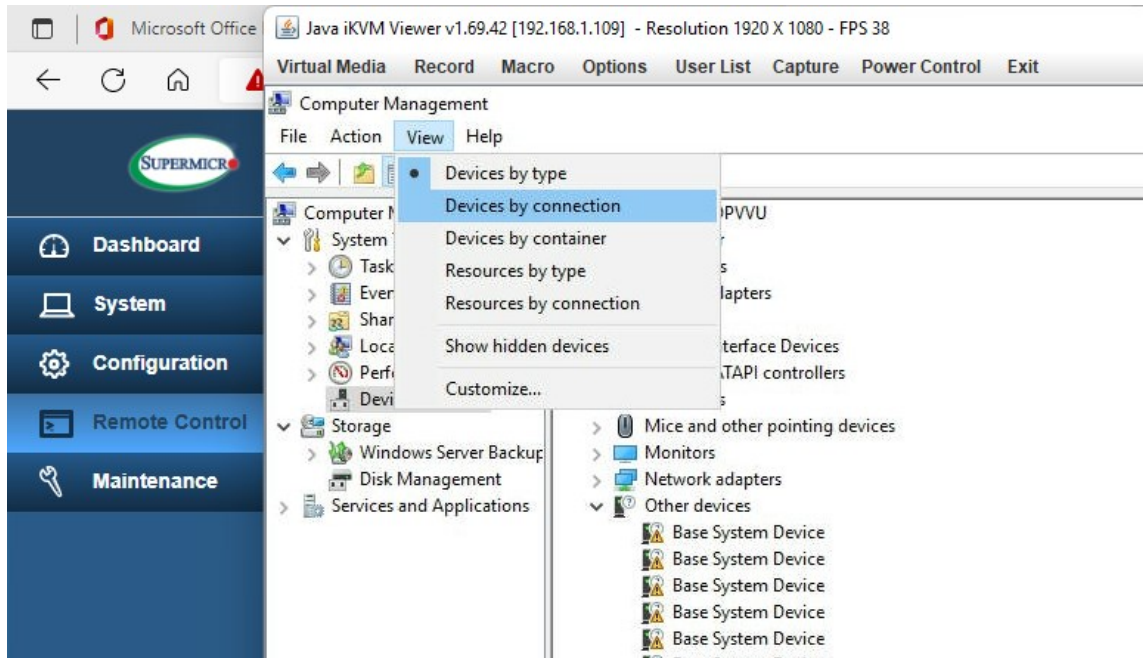
00.0-[92]--
10.0-[93-ab]----00.0-[94-ab]---+00.0-[95-98]----00.0-[96-98]---+00.0-[97]---+00.0  ATTO Technology, Inc. Celerity FC 16/32Gb/s Gen 6 Fibre Channel HBA
|
| \-00.1 ATTO Technology, Inc. Celerity FC 16/32Gb/s Gen 6 Fibre Channel HBA
| \-10.0-[98]----00.0  Areca Technology, Corp. ARC-116x PCIe 2.0 to SAS/SATA 6Gb RAID Controller
++04.0-[95-a0]----00.0-[9a-a0]---+00.0-[9a-9d]----00.0-[9c-9d]---+00.0-[9d]---+00.0  MYRICON Inc. Myri-10G Dual-Protocol NIC
|
| \-04.0-[9e]--
| \-05.0-[9e]---00.0  MYRICON Inc. Myri-10G Dual-Protocol NIC
|
+00.0-[a1-a2]----00.0-[a2]--
| \-00.0-[a0]----00.0  Blackmagic Design DeckLink Mini Recorder
+0c.0-[a3-a8]----00.0-[a4-a8]---+00.0-[a5]----00.0  HGST, Inc. Ultrastar SN200 Series NVMe SSD
|
| \-00.0-[a6]---+00.0  Solarflare Communications SFP9021 10GBASE-T Ethernet Controller
| \-00.1 Solarflare Communications SFP9021 10GBASE-T Ethernet Controller
+10.0-[a7]---+00.0  NVIDIA Corporation GK107GL [Quadro 410]
|
| \-00.1 NVIDIA Corporation GK107 HDMI Audio Controller
| \-10.0-[a8]---+00.0  Broadcom / LSI SAS3000 PCI-Express Fusion-MPT SAS-3
|-10.0-[a9-ab]----00.0-[aa-ab]----00.0-[ab]--
10.0-[ae]--
00.0-[b3]--
  
```

- ATTO Card----->>> is in slot# 8
- Areca RAID Controller Card----->>> is in slot# 7
- Myricom 10G Ethernet Card----->>> is in slot# 6
- Black Magic DeckLink Card----->>> is in slot# 5
- HGST NVMe PCIe SSD Card----->>> is in slot# 1
- Solarflare 10G Ethernet Card----->>> is in slot# 2
- NVIDIA GK107 Video Card----->>> is in slot# 4
- LSI SAS Controller Card----->>> is in slot# 3



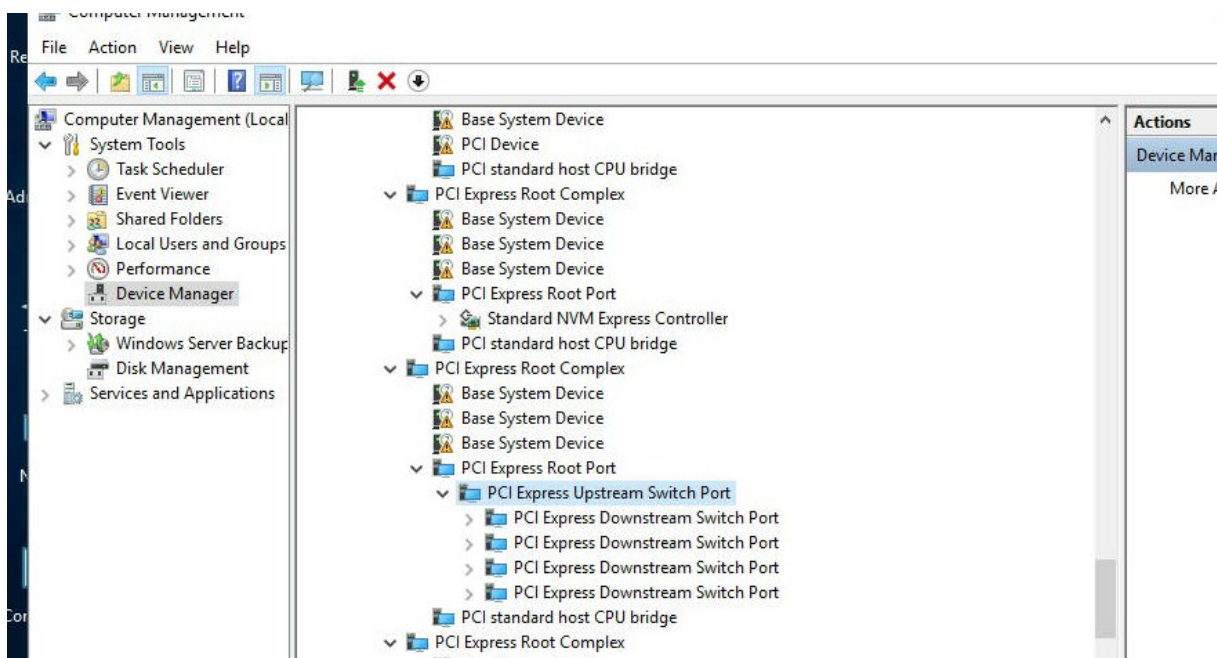
11.2 Windows

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.

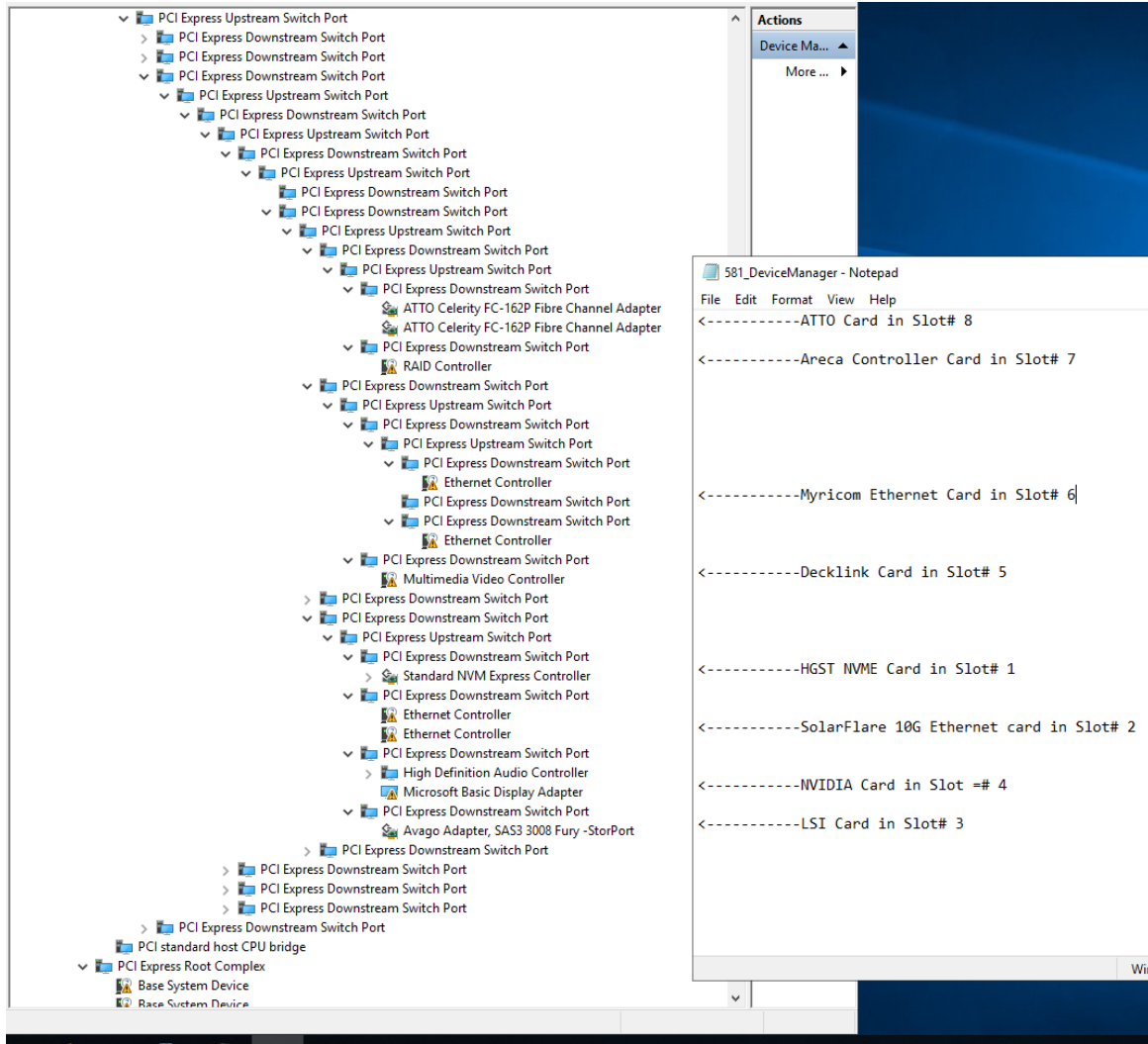
The screenshot below shows a fully expanded PCI Express Upstream and downstream Ports.

- Displaying the OSS-581 + both OSS-579 cards are detected in Windows Device Manager.
- There are no PCIe cards installed in the slots.



The screenshot below shows the hierarchy of OSS_581 card slots populated with 8 different PCIe cards.

- All 8 PCIe cards are detected in Windows Device Manager.



12 How to Get More Help

12.1 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 this address <https://www.onestopsystems.com> 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.

12.2 Returning Merchandise

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

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

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

12.3 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 assess 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 assess, 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.

12.4 Online Support Resources

As a product user and customer, listed below are our Online Support Resources

<https://www.onestopsystems.com/support> provides Knowledgebase Articles such as troubleshooting methods, compatibility, FAQ, documentation, and product technical information. 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. If you need to send a unit for repair or diagnostic evaluation, fill out our RMA (Return Material Authorization) online request form.



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www.onestopsystems.com