OSS-595 Gen5 Adapter Card

INSTALLATION GUIDE

OSS-595 Gen5 Adapter Card

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Table of Contents

1 Technical Information 4
1.2 Product Information 4
1.3 General Specification 5
1.4 Features 6
1.5 Dimensions 6
1.6 Supported Use Cases 7
1.6.1 Two 595 Cards & 580 Backplane 7
1.6.2 Two 595 cards & 580 Backplane 7
1.6.3 Two 595 cards & two 580 backplanes 8
1.6.4 Two 595 cards & two 580 backplanes 8
1.6.5 OSS-595 + Passive OSS-596 card & 580 Backplane 9
1.6.5 OSS-595 + Passive OSS-596 card & 580 Backplane 9
1.6.6 OSS-595 + Passive OSS-596 card & two 580 Backplanes 10
1.6.7 OSS-595 + Passive OSS-596 card & two 580 Backplanes 10
1.7 OSS-595 Card Dipswitch Settings 11
1.7.1 Host mode 11
1.7.2 Target mode 11
1.8 LED Indicators 12
2 Hardware Requirements 13
3 Software Requirements 13
4 Unpacking 14
5 Setup / Installation 15
5.1 Installation Overview 15
5.2 Set Dipswitches 15
5.2.1 Set Target Card Dipswitches 15
5.2.2 Set Host Card Dipswitches 15
5.3 Prepare OSS Backpklane 16
5.4 Install Target Card 16
5.5 Install Host Card 17
6 Cable Installation 18
7 Powering UP the unit 19
8 Hardware Check 20
8.1 Verify Backplane LEDs 20
8.2 Verify OSS-595 Card LEDs 21
9 Post Installation 22
9.1 Linux 22

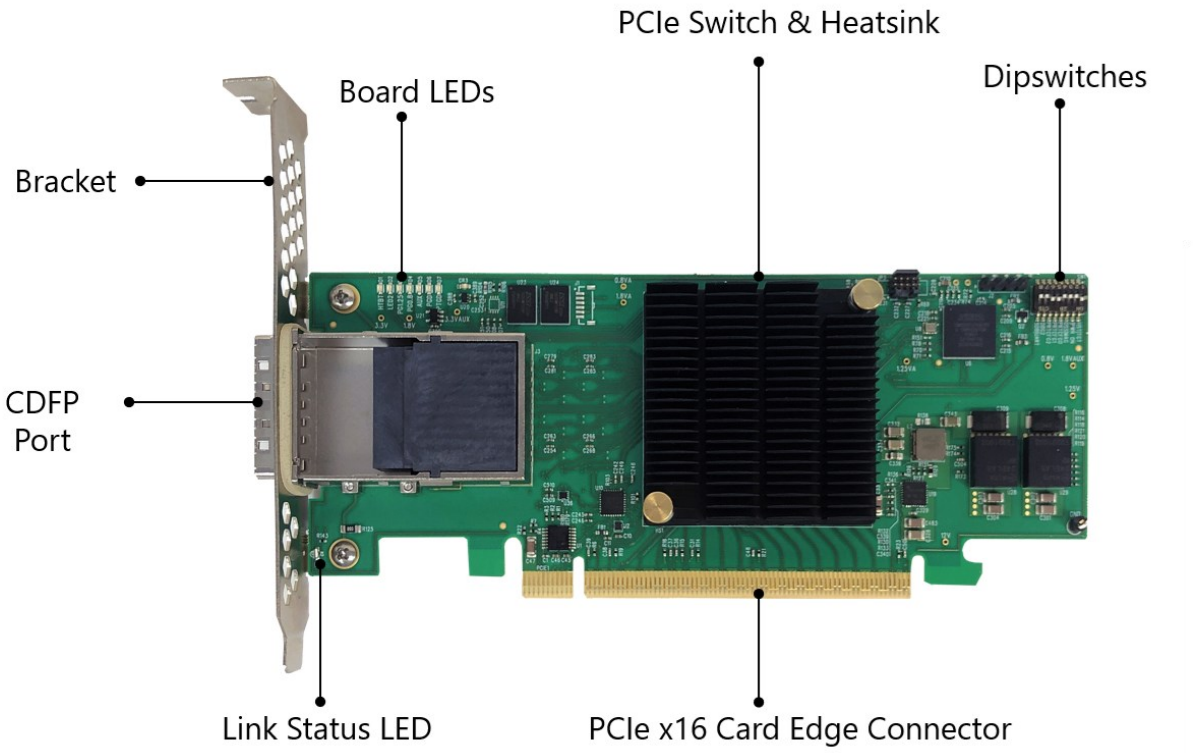
9.2 Windows 25
10 How to Get More Help 28
10.1 Contacting Technical Support 28
10.2 Returning Merchandise 28
10.3 Third Party Hardware & Software Support Policy 28
10.4 Online Support Resources 28

1 Technical Information

1.2 Product Information

PCIe x16 Gen 5 host interface board with a 32-lane switch and PCIe CDFP v0.7 cable connector.

- The 32-lane cable adapter operates in either host or target mode controlled with DIP switch settings (see user manual for dip switches setting).
- Installing OSS-PCIe5-HIB732-CDFP32-H in a PCIe slot in a PCIe Gen 5 motherboard and connecting it to an OSS-PCIe5-HIB732-CDFP32-H in target mode or connect to passive HIB, OSSPCIe5-HIB732-CDFPASS-x16-T via a standard CDFP cable up to 1m allows for data transfer bandwidths up to 128GB/sec.
- All PCIe devices in the remote chassis appear to the host CPU as directly connected PCIe peripherals on the PCIe switch fabric.



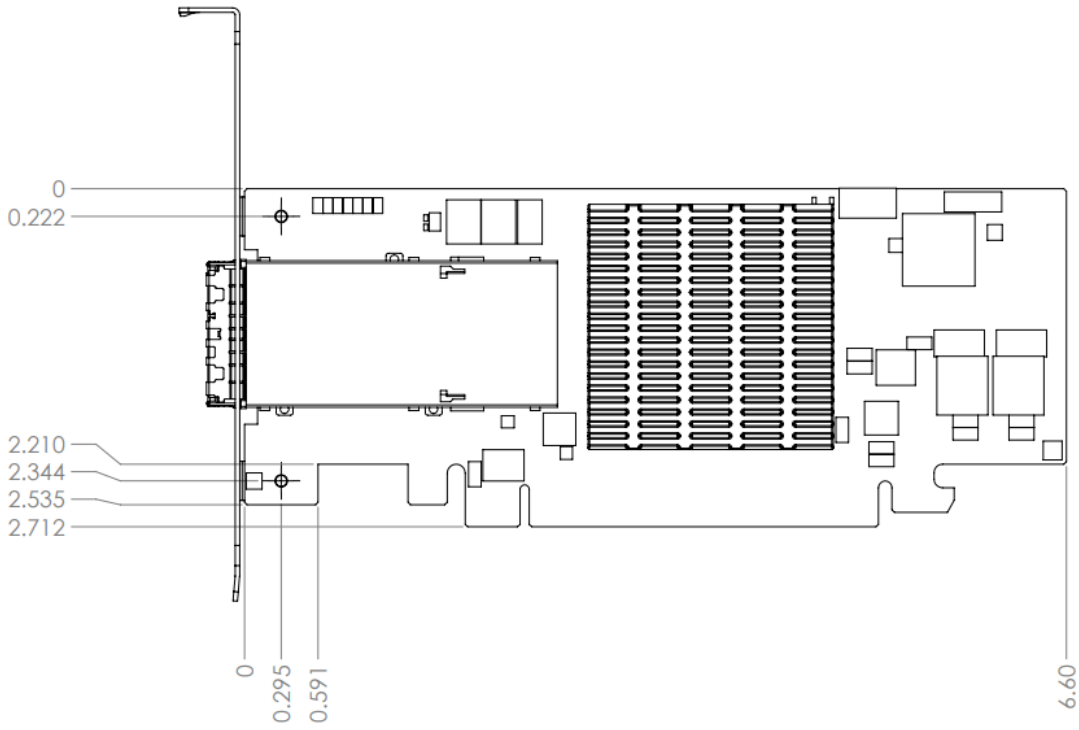
1.3 General Specification

Form Factor	PCIe 5.0 x16 low profile, half-length
Dimensions	6.6” x 2.65” (16.76 x 6.73 cm) at 0.063” (1.6mm) thickness
Bandwidth	32GT/sec per lane, 128 GB/sec (full duplex) with x16 lanes
Connectors	PCIe x16 card edge connector Standard CDFP v0.7 connector
Bracket	Standard and low-profile brackets available
PCIe Switch	Broadcom PEX 89032 • 32 GT/sec 32 lane PCI Express Gen 5 Switch • Embedded ARM Processor • DMA channels/functions enabling data transfers with very low latency • Improved SSC Isolation
Switch Latency	115 nsec
Cable Types	Supports the following cable types: • Standard CDFP uplink cables up to 1m • Remote power and reset control
Cable Connection Modes	Supports the following cable types: • Standard CDFP uplink cables up to 1m • Remote power and reset control
Power	• 20 W Max • 1.5A @3.3V • 1.2A @12V • 250mA@3.3 aux
Operating Temperature	-10 C to +50 C
Storage Temperature	-40 C to 85 C
Operating Humidity	10% to 90% relative humidity non-condensing
Storage Humidity	5% to 95% relative humidity non-condensing
Agency Compliance	Designed to meet the following agency standards: • FCC—Part 15 Class A, 47CFR; Canada ICES-003, issue 4, Class A; Japan: VCCI, Class A; CE Emission 2004-108EC • UL/IEC 62368-1; Canada: CSA C22.2 No. 62368-1; Argentina: IEC62368-1; IEC 62368-1 (CB Certificate and CB Test Report) • CE Mark (EN55022 Class A, EN62368-1, EN55024, EN61000-3-2, EN610000-3-3) • CISPR 22, CISPR 24, Class A; Australia/New Zealand AS/NZS CISPR 22, Class A • RoHS 3 Compliance (Directive 2015/863/EC
Drivers / Software	Requires no software / driver installation
Supported Operating Systems	Windows 10 & Windows 10 Pro Windows 2012 Server and higher Centos 7 Ubuntu 16x and higher

1.4 Features

- Operates at PCIe Gen 5 speeds up to 32 GT/sec per lane
- Delivers 128 GB/sec (full duplex) bandwidth with x16 lanes
- No drivers required
- Utilizes standard cables with sideband signals to support power control and remote reset (CMI functionality)
- Low profile, half-length form factor
- Guaranteed to operate with all OSS expansion products

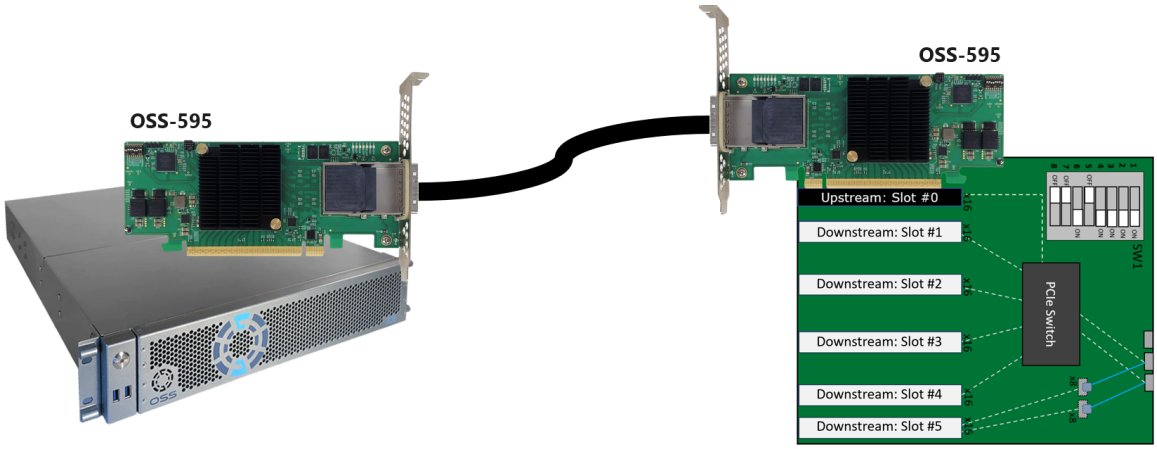
1.5 Dimensions



1.6 Supported Use Cases

1.6.1 Two 595 Cards & 580 Backplane

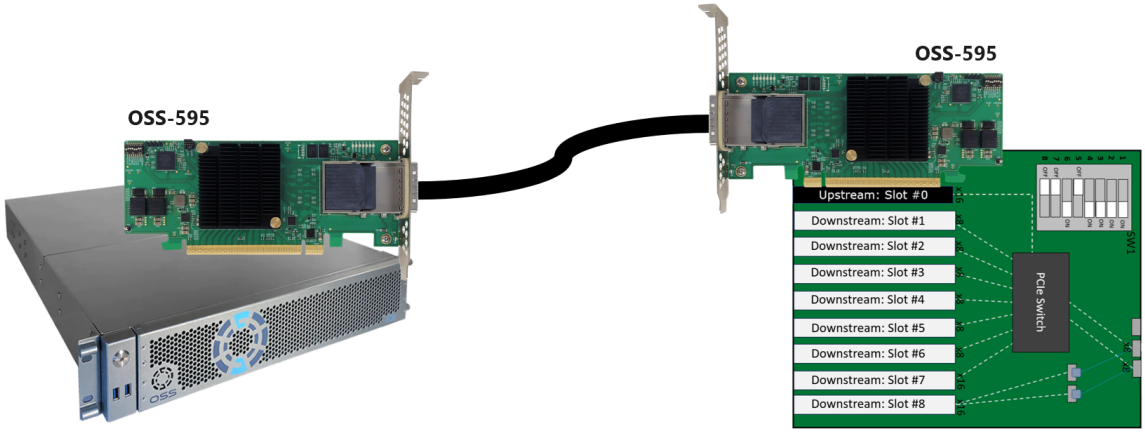
Using a two 595 HBA cards and a cable connected between a host computer and a Gen5 5-slot backplane



OSS-580 Backplane

1.6.2 Two 595 cards & 580 Backplane

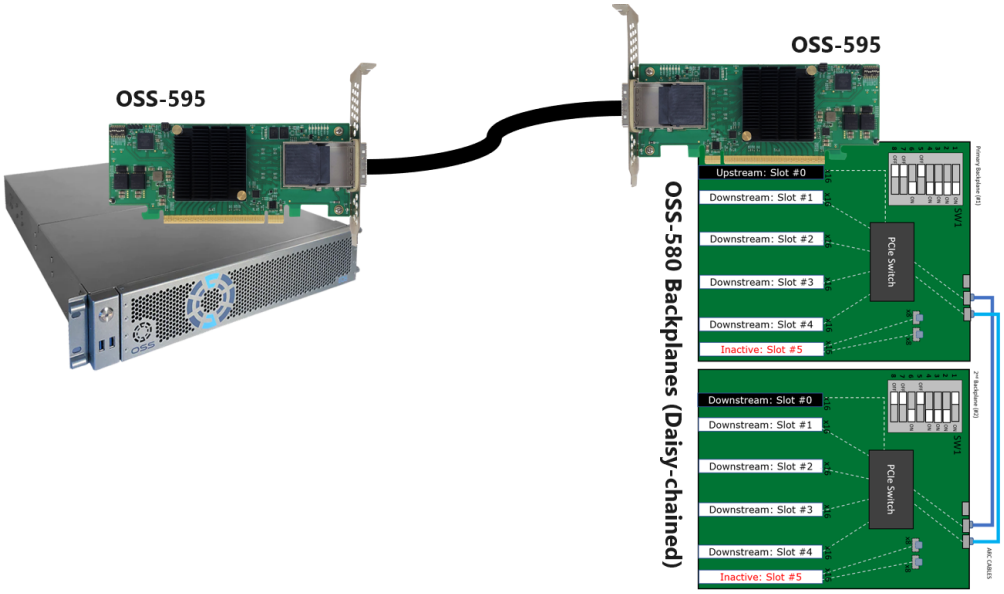
Using a two 595 HBA cards and a cable connected between a host computer and a Gen5 8-slot backplane.



OSS-581 Backplane

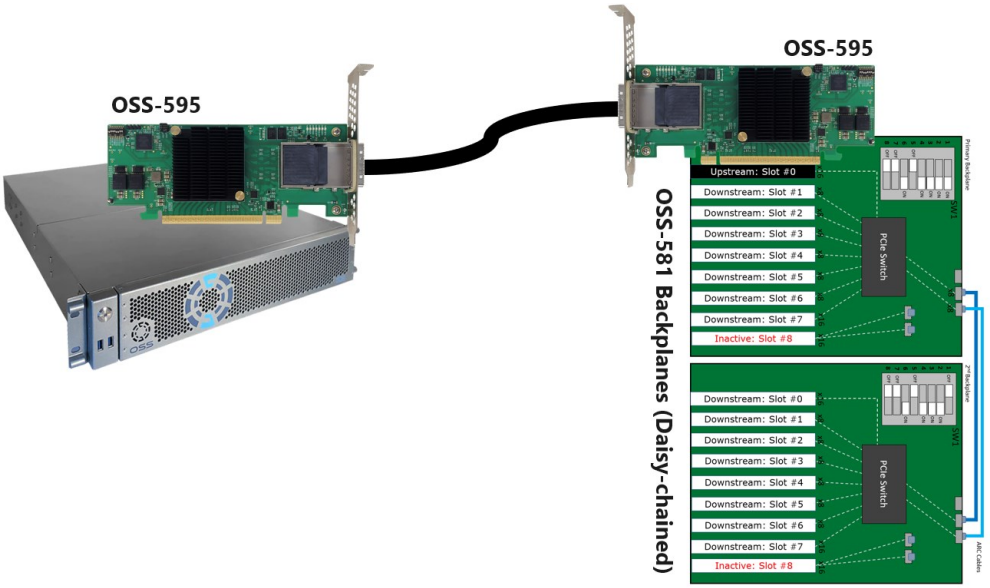
1.6.3 Two 595 cards & two 580 backplanes

Using two 595 HBA cards and a cable connected between a host computer and two Gen5 5-slot backplanes daisy-chained together.



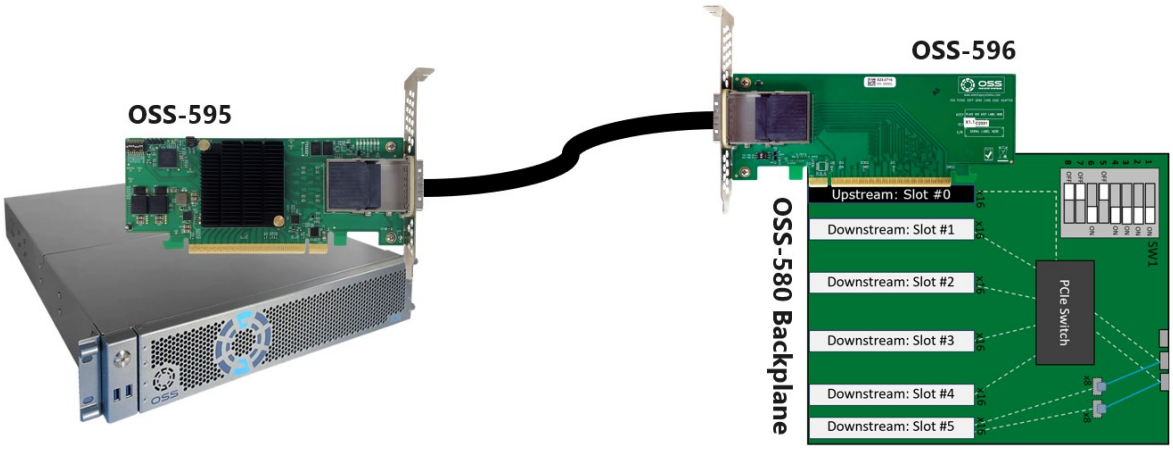
1.6.4 Two 595 cards & two 580 backplanes

Using two 595 HBA cards and a cable connected between a host computer and two Gen5 8-slot backplanes daisy-chained together.



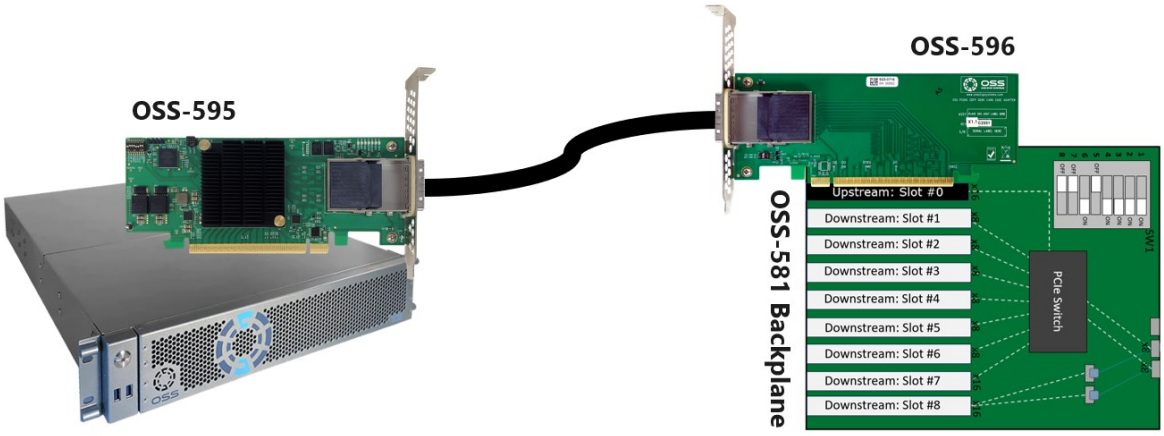
1.6.5 OSS-595 + Passive OSS-596 card & 580 Backplane

Using a 595 HBA as host card and a passive 596 as target card, and a cable connected between a host computer and a PCIe Gen5 5-slot backplane.



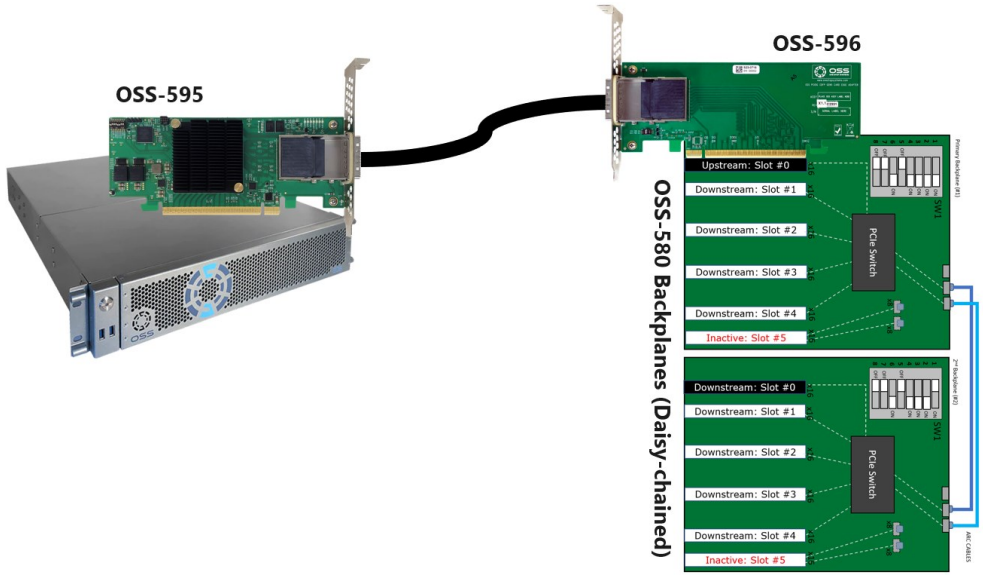
1.6.5 OSS-595 + Passive OSS-596 card & 580 Backplane

Using a 595 HBA as host card and a passive 596 as target card, and a cable connected between a host computer and a PCIe Gen5 8-slot backplane.



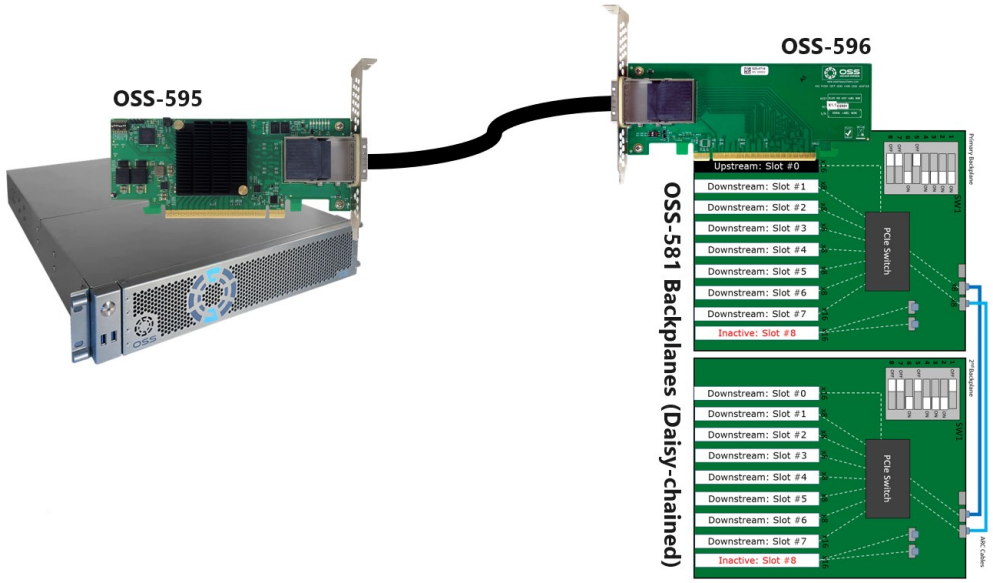
1.6.6 OSS-595 + Passive OSS-596 card & two 580 Backplanes

Using a 595 HBA as host card and a passive 5956 as target card, and a cable connected between a host computer and two PCIe Gen5 5-slot backplanes daisy-chained together .



1.6.7 OSS-595 + Passive OSS-596 card & two 580 Backplanes

Using a 595 HBA as host card and a passive 5956 as target card, and a cable connected between a host computer and two PCIe Gen5 8-slot backplanes daisy-chained together .



1.7 OSS-595 Card Dipswitch Settings

The following photos are the two different dipswitch-mode settings on the OSS-595 adapter cards.

1.7.1 Host mode

Figure 1 Host Mode switch setting Gen5 downstream

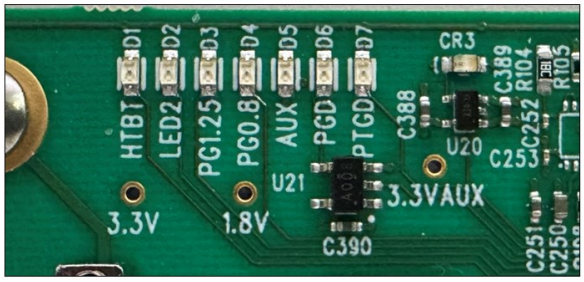
1	HOST Mode	OFF
2	Force Power On	OFF (Can be used to override control – Target only)
3	OSS or Magma PC	OFF assumes OSS power control signaling
4	PORTCFG0	ON
5	PORTCFG1	ON (for Host Gen5 (Region0)
6	PORTCFG2	ON
7	DBG2 (cable clock enable)	ON to enable optional cable clock – not used by OSS targets
8	SDB | Uart	OFF for SDB port

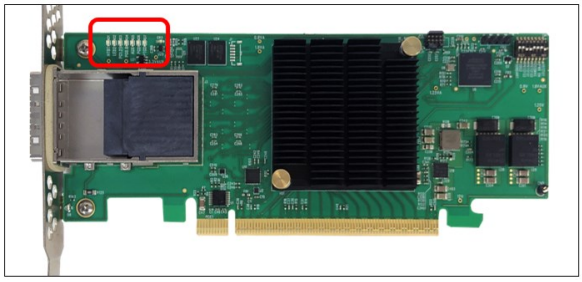
1.7.2 Target mode

Figure 2 Target Mode switch setting Gen5 downstream

1	Target Mode	ON
2	Force Power On	OFF (Can be used to override control – Target only)
3	OSS or Magma PC	OFF assumes OSS power control signaling
4	PORTCFG0	OFF- for Target Gen5 (Region 1)
5	PORTCFG1	ON
6	PORTCFG2	ON for Target Gen5 (Region 1)
7	DBG2 (cable clock enable)	ON to enable optional cable clock – not used by OSS targets
8	SDB | Uart	OFF for SDB port

1.8 LED Indicators

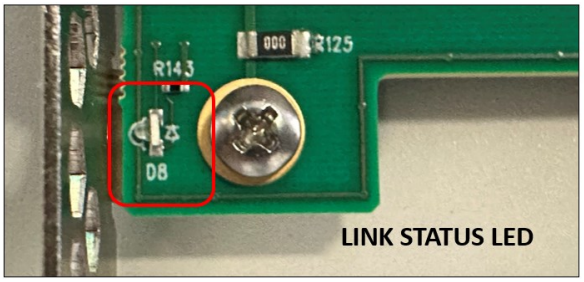


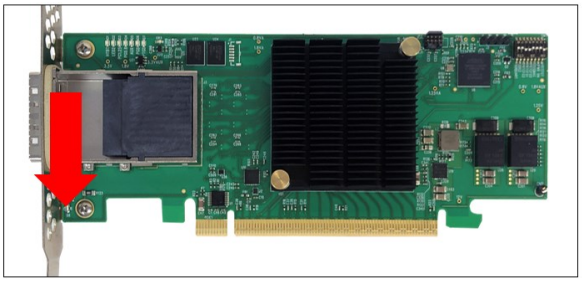


595 LED	Color	NAME	Normal State	Description
D1	Green	HTBT	ON	When this blinks it means the on-board FPGA is programmed.
D2	Green	Debug LED2	OFF	Unused – debug LED should remain OFF
D3	Green	PG1.25	ON	Power Good for 1.25v
D4	Green	PG0.8	ON	Power Good for 0.8v
D5	Green	AUX	ON	Power Good 3.3v standby
D6	Green	PGD	ON	Power Good – all on board regulators
D7	Green	PTGD (Port Good)	ON	Card Edge link status: solid on means Gen5 Card Edge Link status: --ON (steady state) indicates Gen5 link --Blink rate 2 Hz indicates Gen4 link --Blink rate 1 Hz indicates Gen3 link --Blink rate 0.5 Hz indicates Gen2 link --Blink rate 0.25 Hz indicates Gen1 link
CR3	Red	PEX Fatal Error	OFF	When ON= Error or Faulty

D8 LED--Solid is Gen5; Flashing or blink is Gen4 (lower speeds).

- When this is ON, it indicates a good connection and successful link between host and target.
- When OFF, no link between host and target, the host OSS will not be able to detect the OSS backplane.





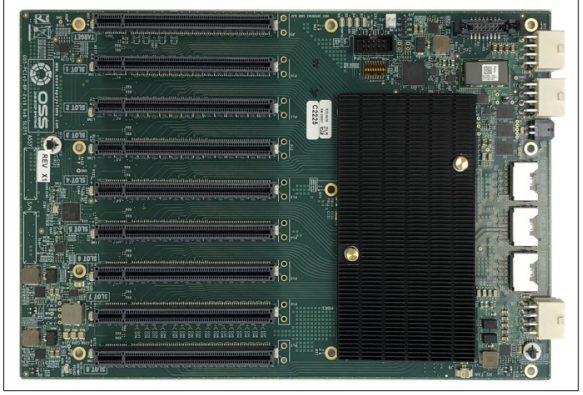
2 Hardware Requirements

This section provides the hardware parts needed for the OSS-595 adapter card to work. It is highly recommended to follow and use the hardware requirements below.

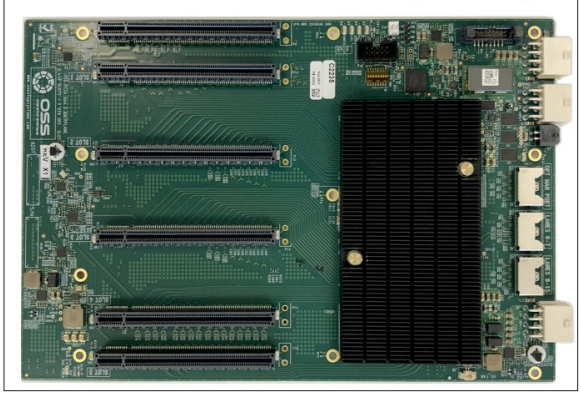
1. Two OSS-595 cards
    a. OSS-595 Configured as Target card
    b. OSS-595 Configured as Host card
2. Gen 5 CDFP Cable, qty 1
3. Gen 5 x16 PCIe slot (computer motherboard)
4. Gen 5 OSS backplane (OSS-580 or 580)
    a. Using a non-OSS backplane is not supported and will not work.
5. ATX Power Supply: Minimum of 400 Watt

To achieve superior performance, reliability, and stability it is recommended to use the OSS-595 Adapter cards with compatible OSS Gen5 backplane (OSS-580 or OSS-580), see photo below.

OSS-581 Backplane (8-Slot)



OSS-580 Backplane (5-Slot)



3 Software Requirements

The OSS-595 adapter card requires no driver installation in Windows OS and Linux.

Computer running the following operating systems:

a. Windows 10 or Windows 10 Pro
b. Server 12 and higher
c. Centos 7
d. Ubuntu 18 and higher

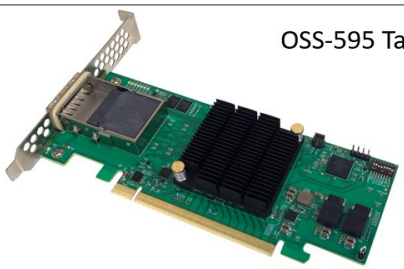
4 Unpacking

Check and identify the standard supplied item.

- Check the board make sure you have the correct OSS-595 Gen5 adapter card, see photo below.
- Inspect the board for physical defects and damages.

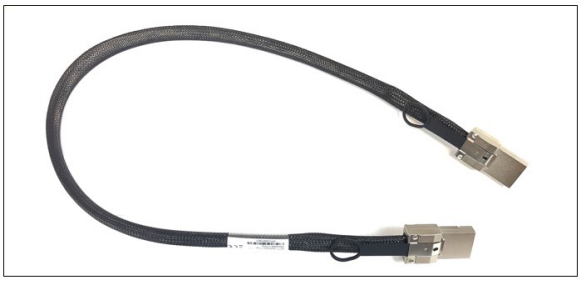
OSS-595 Host Card

OSS-595 Target Card



- If you ordered the OSS-595 adapter cards (host and target) with link cable(s), make sure the cables are included, see photo below.

The Gen5 CDFP is sold separately.



5 Setup / Installation

The following steps will guide you through the installation of your OSS-595 card.

5.1 Installation Overview

Follow the steps below, the recommended sequence that needs to be followed for setting up the OSS-595 adapter cards.

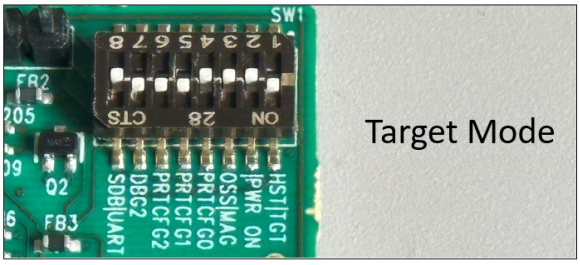
1. Set the Dipswitches
2. Prepare OSS backplane or expansion unit
3. Install the HBA cards
4. Install CDFP cable
5. Power UP the unit
6. Verify Installation

5.2 Set Dipswitches

Prior to installation, you must set the dipswitches on the OSS-595 adapter cards first.

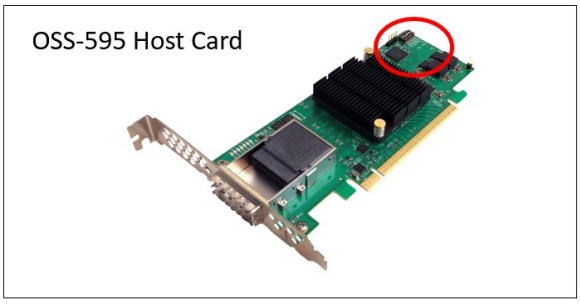
5.2.1 Set Target Card Dipswitches

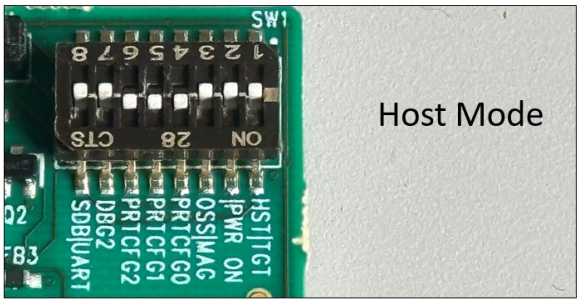
Set one 595 HBA card to Target mode, see photo below for correct dipswitch settings.



5.2.2 Set Host Card Dipswitches

Set the other 595 HBA card to host mode, see photo below for correct dipswitch settings.





5.3 Prepare OSS Backpklane

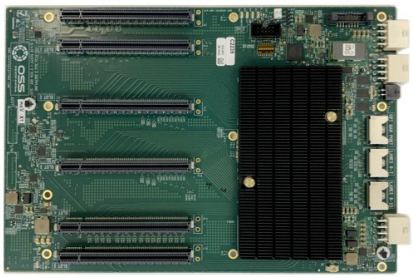
Prior to installation of the OSS-595 HBA card make sure the OSS backplane is properly configured.

- You can use an OSS-580 or OSS-580 Gen5 backplane or an expansion chassis equipped with Gen5 backplane, see photos below.

To setup and configure the Gen5 backplane, refer to the Gen5 backplane's installation guide.

Gen5 4UP with Gen5 Backplane

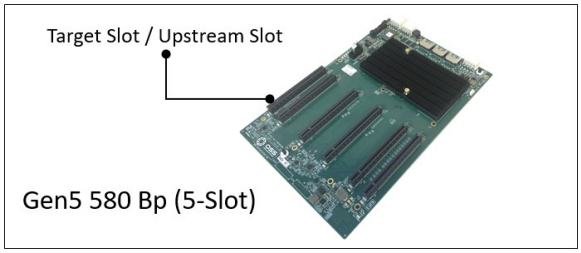
OSS Gen5 580 (5-Slot) Backplane

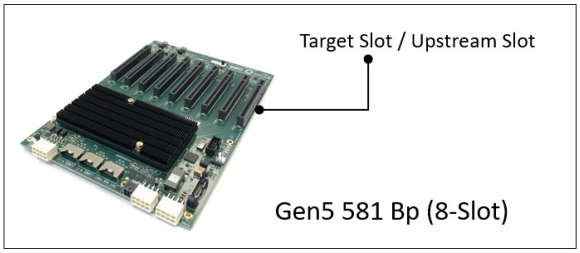


5.4 Install Target Card

Once the expansion backplane is ready, use the designated Target Slot / Upstream Slot on the backplane when installing the OSS-595 card.

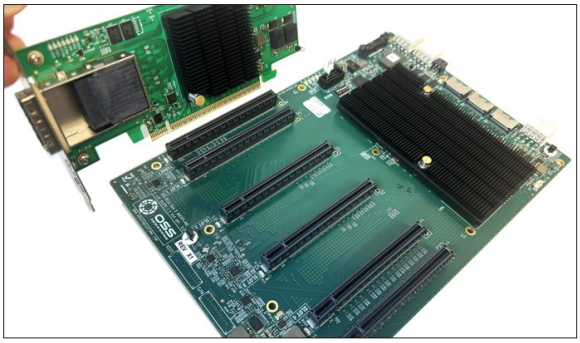
- Plugin the oss-595 target card in the upstream slot on the backplane.
- See photo below for the location of the upstream slot.





Align the OSS-595 card-edge connector on top of the PCIe slot # 0 (Target slot / Upstream slot).

- Slowly and gently push the card down until it is firmly seated and secure the card.



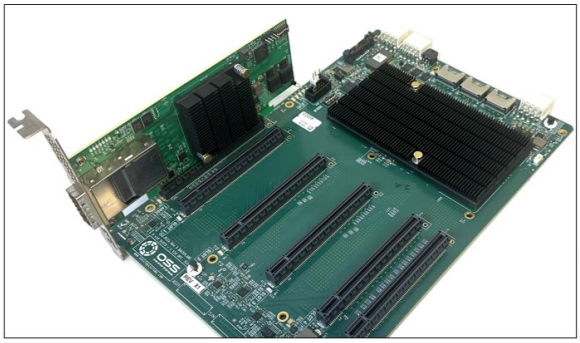
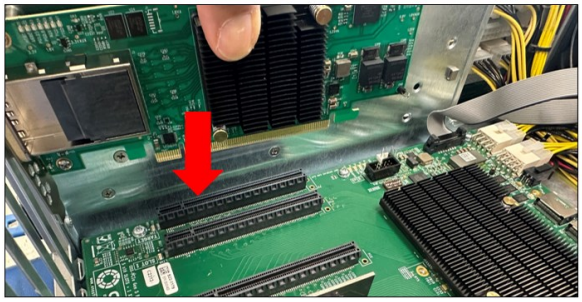


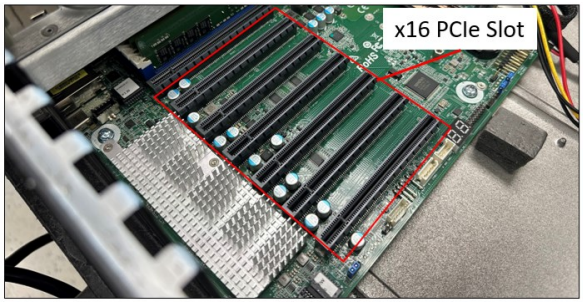
Photo below shows the OSS-595 Target card installation in the expansion chassis.



5.5 Install Host Card

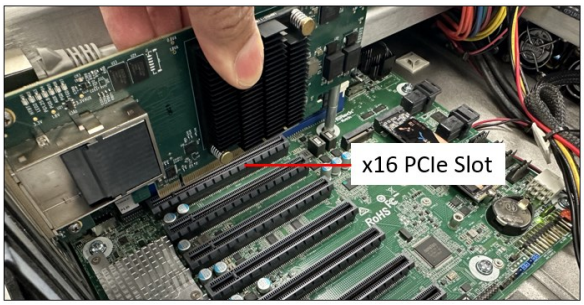
Install the OSS-595 host card in the computer / server.

- The OSS-595 configured as host card can only be installed in the computer.
- Install the OSS-595 Host card in any available x16 Gen5 PCIe slot, see photo below as reference for x16 PCIe slots.



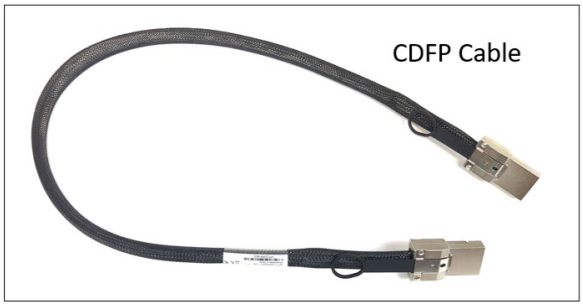
Align the OSS-595 host card edge connector on top of the PCIe slot.

- Gently push the card down until it is firmly seated, then secure the card.

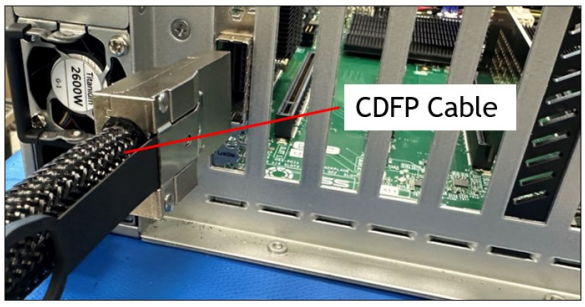


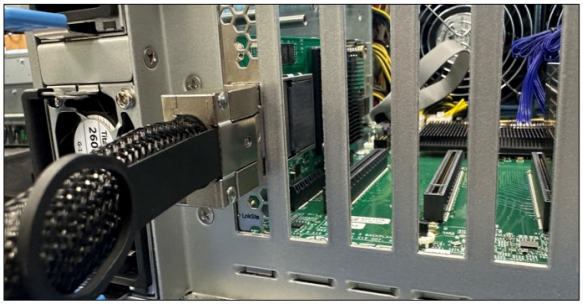
6 Cable Installation

Connect the CDFP cable to the target card. See photos below for the correct orientation of the cables when connecting to the card.

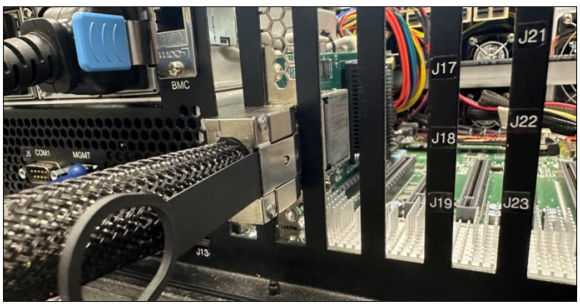


Align the CDFP cable end connector to the Target card port, gently insert the CDFP cable until it is firmly latched in.





Connect the other end of the cable to the host adapter card (in the computer). Make sure the cable is securely latched in.



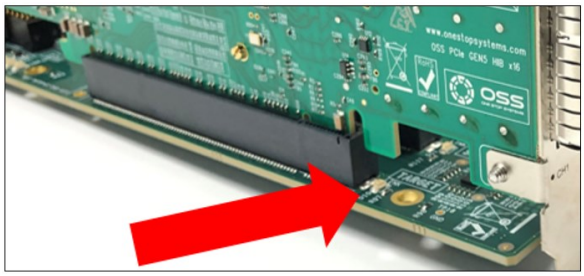
7 Powering UP the unit

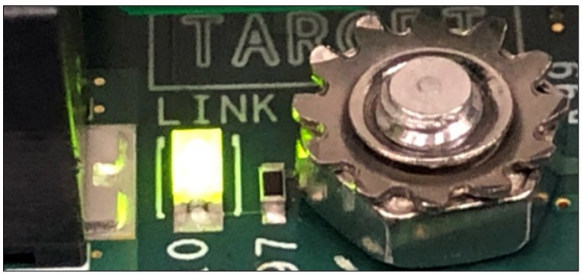
- Connect power cable to the power supply.
    - Upon connecting the power cable (power source is available), the expansion backplane or expansion unit goes to standby mode.
- Connect power cable to the host computer.
- Turn ON the host computer.
- Upon powering ON the host computer, the OSS-595 initializes and simultaneously turns ON the OSS expansion backplane / expansion unit.
    - The internal fans are activated concurrently.

8 Hardware Check

8.1 Verify Backplane LEDs

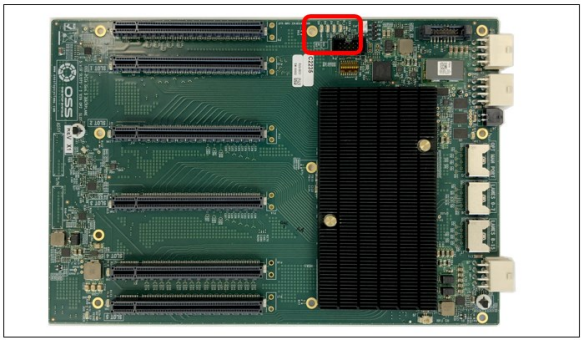
After powering UP the host computer, the Target SLOT LED on the backplane will illuminate as solid green as shown below.

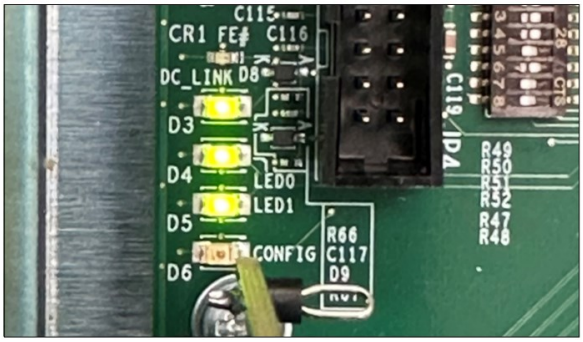




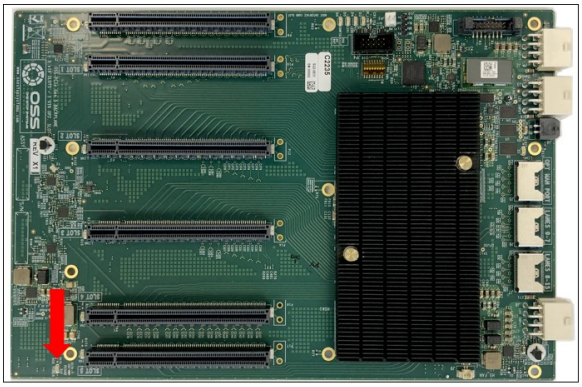
Check the board LEDS on the backplane. A fully operational backplane (OSS-580 or OSS-580) will illuminate the following LEDs.

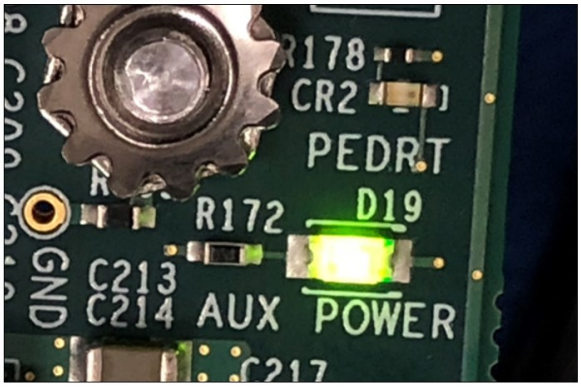
- D3 &D4, solid green and D5 is blinking green (8 heartbeats).
- D19: AUX power, solid green.





AUX Power LED



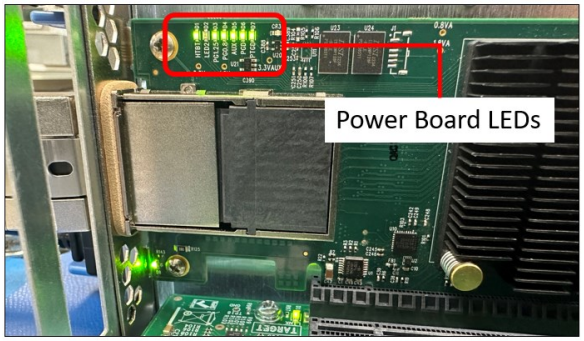


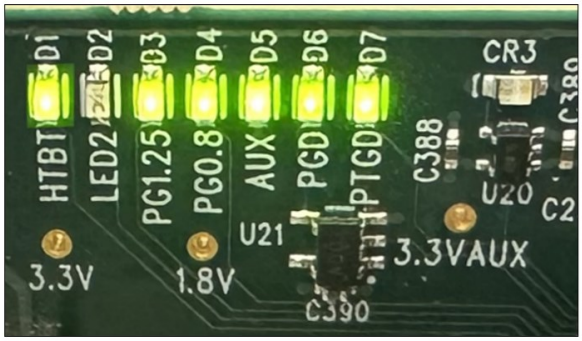
8.2 Verify OSS-595 Card LEDs

A fully operational OSS-595 adapter cards will illuminate the following LEDs (on both Host and Target cards).

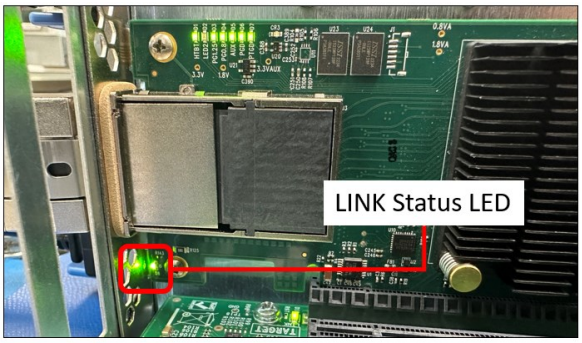
- HTBT: When this blinks it means the on-board FPGA is programmed. Blinks (8 heartbeats), pauses, blinks.
- LED2: Unused – debug LED should remain OFF.
- PG1.25: Power Good for 1.25v (SOLID GREEN).
- PG0.8: Power Good for 0.8v (SOLID GREEN).
- AUX: Power Good 3.3v standby (SOLID GREEN).
- PGD: Power Good – on-board regulators (SOLID GREEN).
- PTGD: Card Edge link status: solid on means Gen5 (SOLID GREEN). Blinking is Gen4 or lower speeds.
- D8 LED: Solid is Gen5; Flashing or blinking is Gen4 (lower speeds).

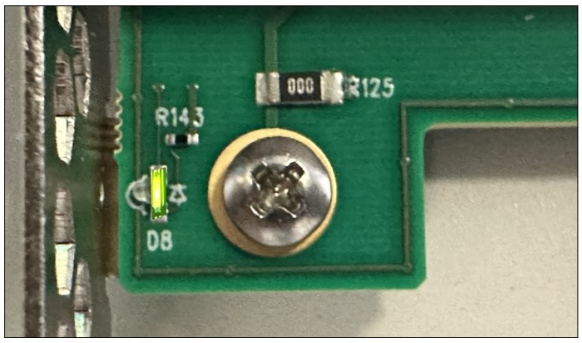
OSS-595 Power LEDs





LINK Status LED





The LINK Status LED indicates a good link between host and target card (computer and expansion unit).

- When the LINK Status LED is OFF: no communication or link between host and the target device.
  - The host computer Operating Systems will not be able to detect the OSS backplane.
  - It will not enumerate the PCIe cards in the downstream slots of the backplane / expansion board.
  - The application or program that runs the PCIe cards will fail and generate errors.

9 Post Installation

Verify the OSS hardware / devices after installation on Windows and Linux Operating Systems.

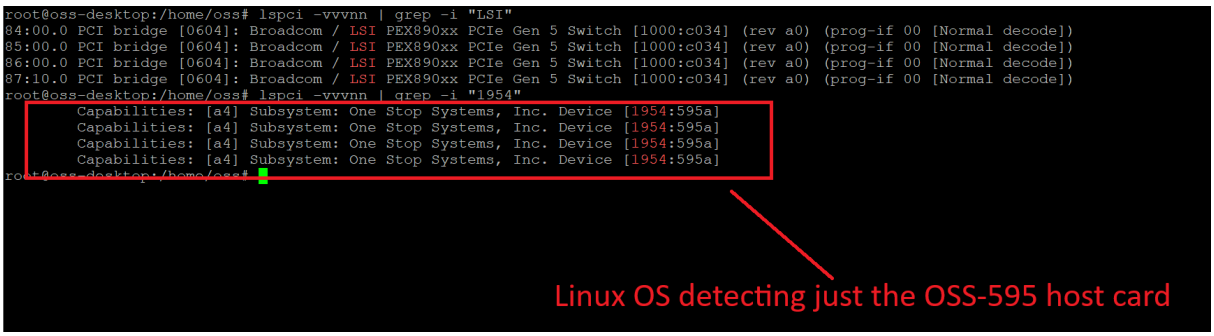
9.1 Linux

Checking OSS-595 HBA card.

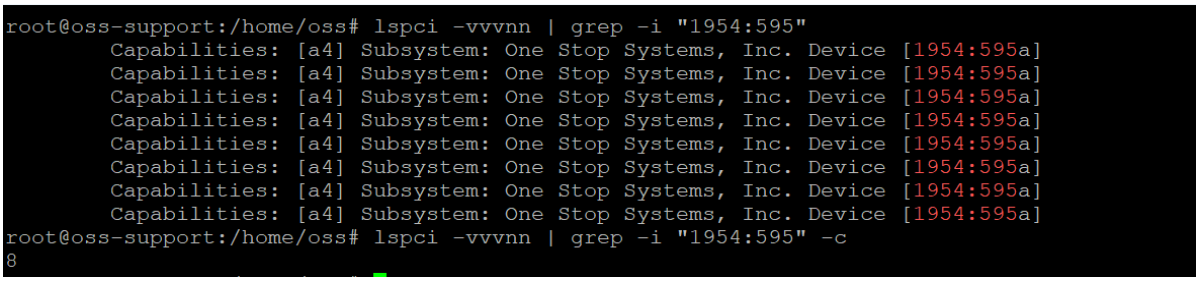
lspci -vvvnn | grep -i “LSI”

lspci -vvvnn | grep -i “1954” or #lspci -vvvvnn | grep -i “1954:595”.

- One Stop Systems vendor ID is 1954.
- 595 is the device ID for the HBA Gen5 OSS-595 card.
- 580 is the device ID for the Gen5 5-slot backplane (OSS-580).



Screenshot below shows 8 instances of 595a, this means both OSS-595 Target and Host cards are detected. Each OSS-595 will display 4 endpoints.



The screenshot below shows the output of “lspci -vvv |grep “1954”.

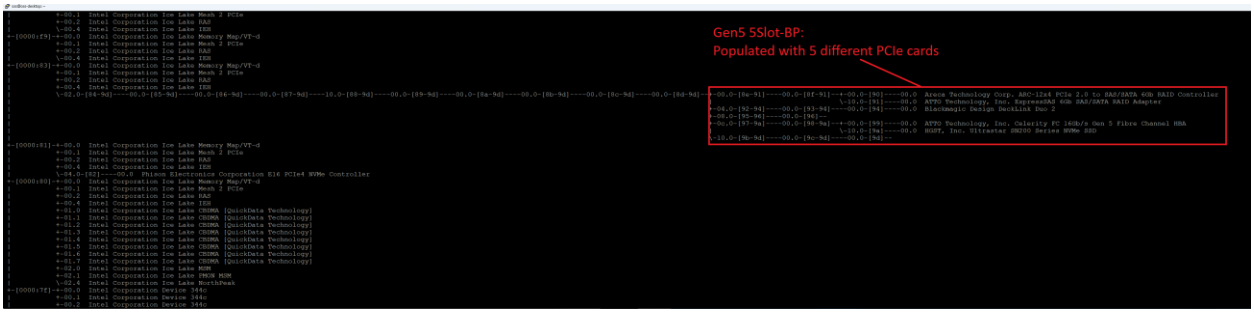
- Showing 42 instances of “1954”, combining both OSS-595 cards and OSS-580 backplane.

```
root@oss-support: /home/oss
root@oss-support:/home/oss# lspci -vvvnn | grep -i "1954"
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:595a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
        Capabilities: [a4] Subsystem: One Stop Systems, Inc. Device [1954:580a]
root@oss-support:/home/oss# lspci -vvvnn | grep -i "1954" -c
42
root@oss-support:/home/oss#
```

To check on the OSS-580 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_580 backplane without PCIe cards in the slots.

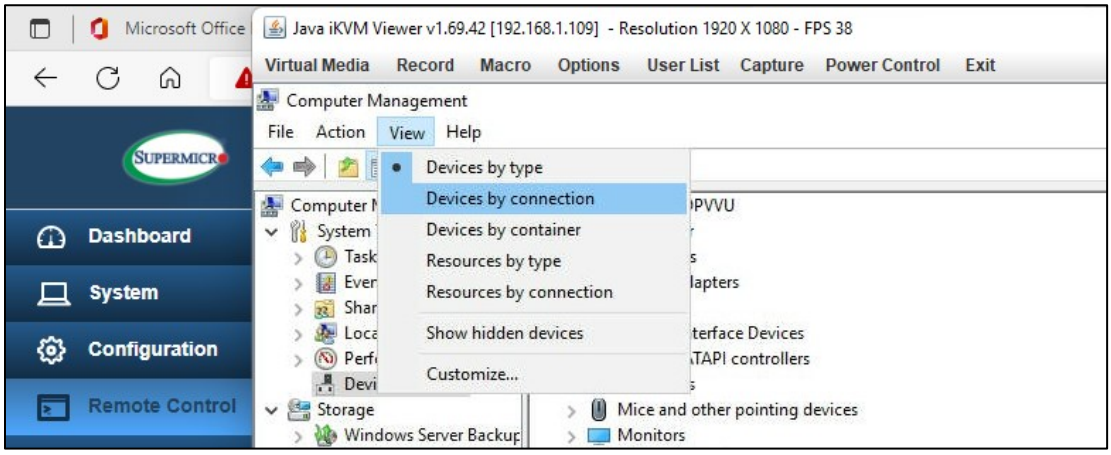
Below photo is the tree-like structure of the OSS_580 backplane with all 5 slots populated with different PCIe cards.

- Using the same command “lspci -vvtt”.



9.2 Windows

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



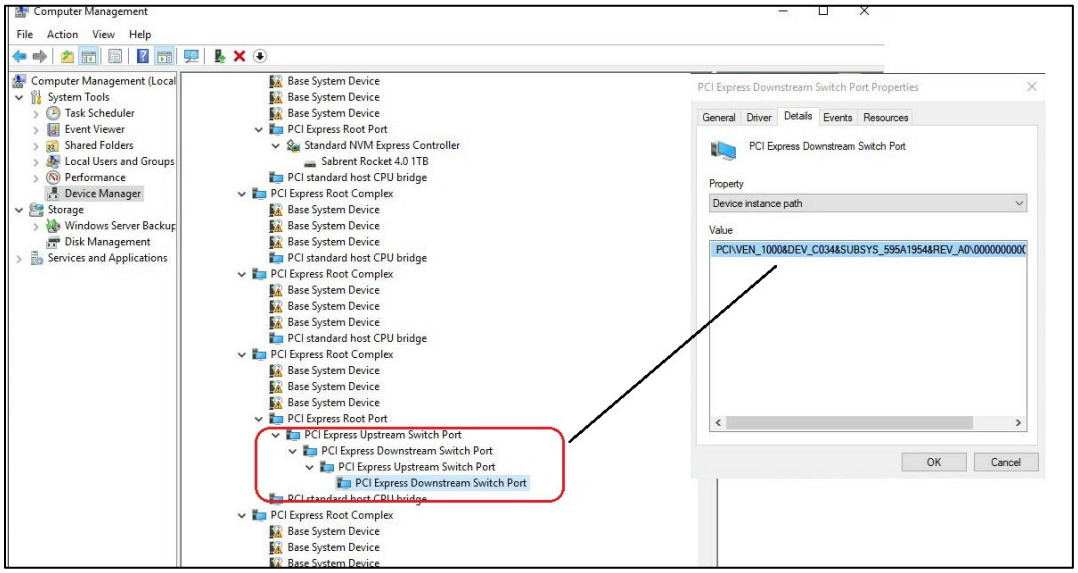
Select and expand PCI Express Root Port.

- Expand all arrow signs and you should see multiple instances of PCI Express Upstream Switch Ports and PCI Express Downstream Switch Ports.

OSS-595 Card only

The screenshot below shows only the OSS-595 Host card is detected, not connected to target card. The OSS-595 host card will display the following:

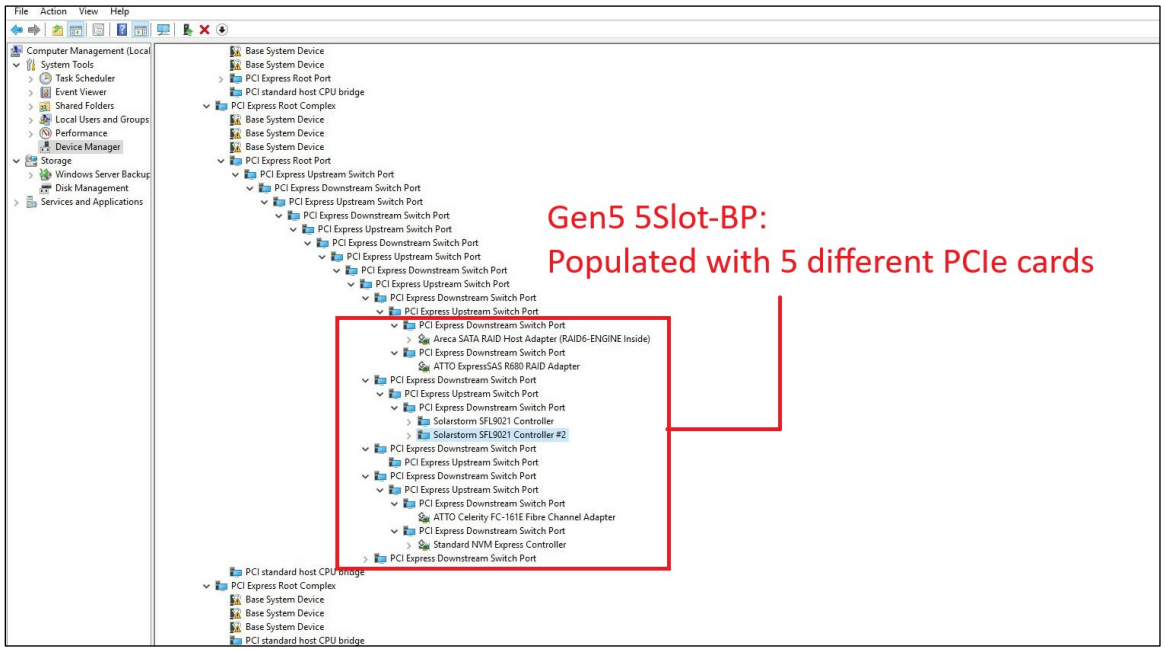
- Two instances of PCI Express Downstream Switch Ports.
- Two instances of PCI Express Upstream Switch Ports.



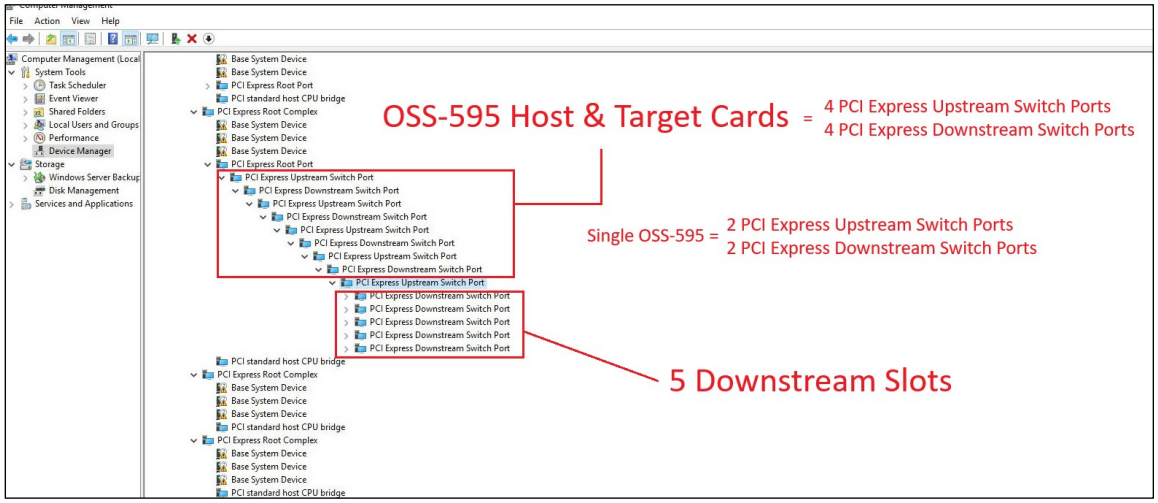
OSS-595 Host Card Linked up to OSS-595 Target card

The screenshot below displays the following:

- Fully expanded PCI Express Upstream and downstream Ports.
- The hierarchy of OSS 595 cards plus OSS_580 card slots populated with 5 different PCIe cards.

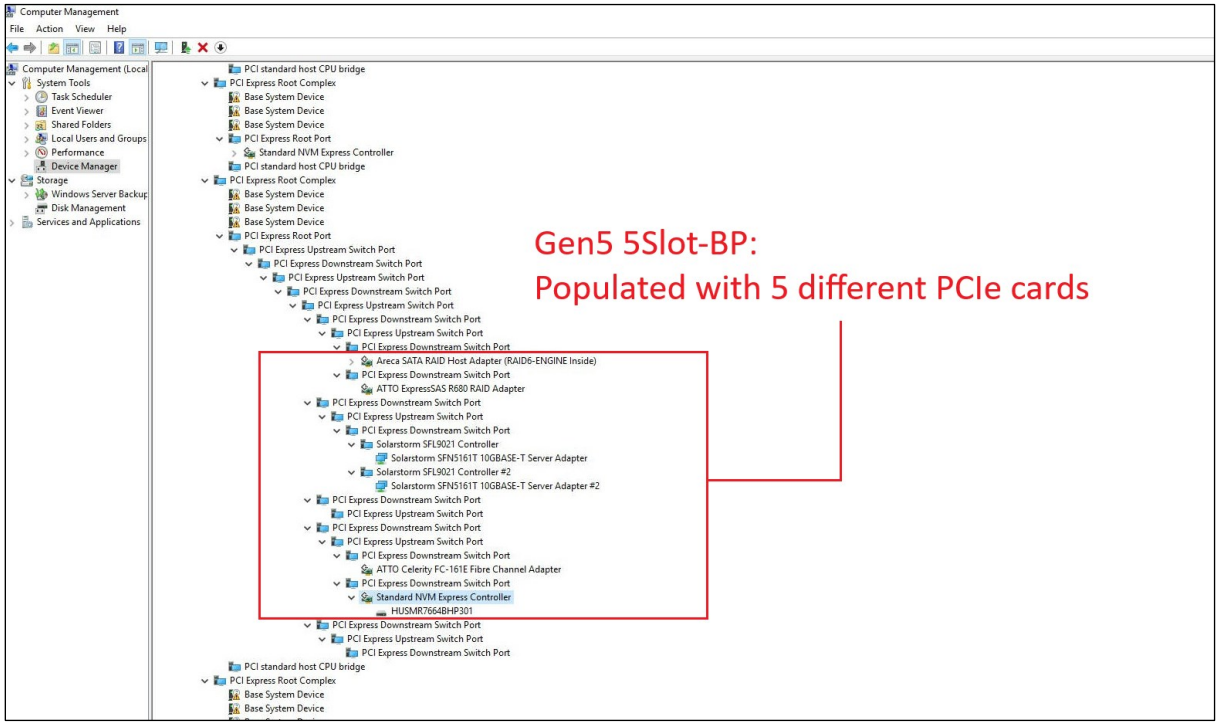


The screenshot below shows the hierarchy of OSS 595 cards plus OSS_580 backplane downstream slots without any PCIe cards.

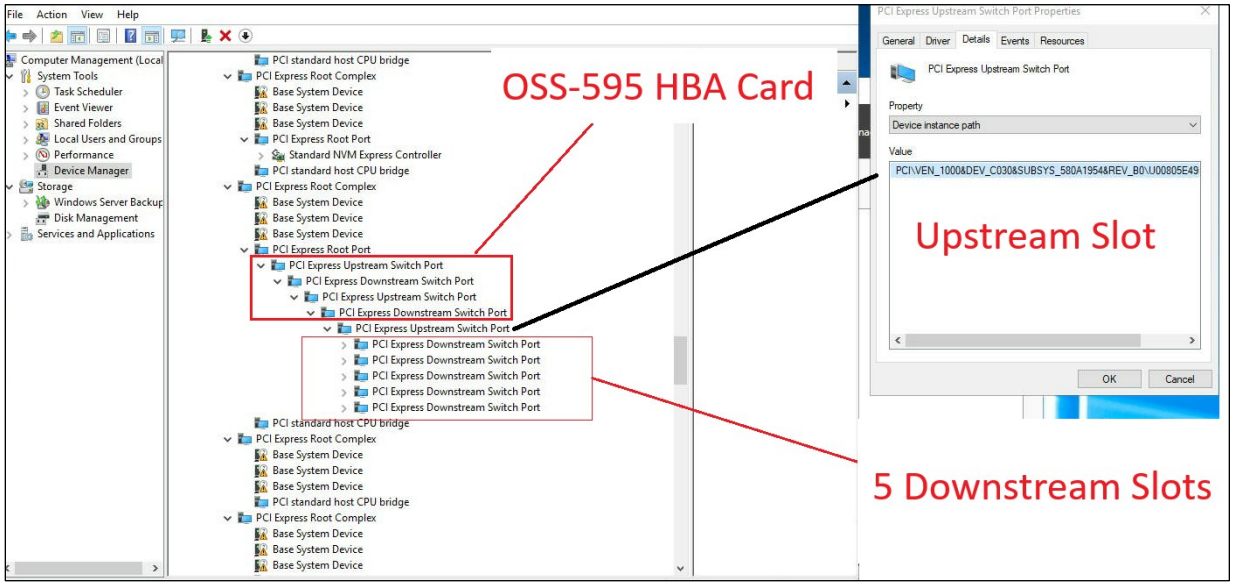


OSS-595 Host Card Linked up to OSS-596 Passive Target card

- The screenshot below shows the hierarchy of OSS 595 card + OSS-596 passive card plus OSS_580 backplane downstream slots populated with 5 different PCIe cards.



The screenshot below shows the hierarchy of OSS 595 card + OSS-596 passive card plus OSS_580 backplane downstream slots without PCIe cards.



10 How to Get More Help

10.1 Contacting Technical Support

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

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

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

10.2 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.

10.3 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.

10.4 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.

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