The Aurora switch installation guide.

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Chapter 1. Introduction

This guide is to assist the reader with the most basic form of installation and cable connection to our switches. As there is more than one switch in the Aurora series, the actual port placement might slightly differ, however, the installation and connection logic are the same for all Netberg switches.

Package Contents:

• One Netberg Aurora Switch

• Two AC power cords.

• One RS-232-to-RJ45 console cable.

• One pair of frontal rack-mount brackets.

• Four rubber feet with adhesive patches.

• Eight Phillips-head frontal rack-mount bracket screws.

If any of the above mention items was not found inside the package contents of this switch or are damaged in any way, contact your reseller immediately.

Chapter 2. Hardware Installation

2.1. Installation Guidelines

This section will discuss the hardware installation guidelines that administrators must follow in order to properly and safely install this switch into the appropriate environment.

2.2. Installation using the Rubber Feet

When installing the switch in an area other than inside a switch rack, like on a desktop, rubber feet can be attached to the bottom panel of the switch. The rubber feet cushion the switch, protecting the casing from scratches, preventing it from scratching other surfaces, and preventing it from slipping.

1. Install the switch on a flat surface that can safely support its weight.

2. The adhesive material is included on the rubber feet. Pull away the protective sticker of each rubber foot and attach them to the switch bottom.

3. Make sure that there is proper heat dissipation from and adequate ventilation around the switch. Leave at least 15 cm (6 inches) of space at the rear and 5 cm (2 inches) at the front of the switch for ventilation.

Figure 2.1. Rubber standoffs placement
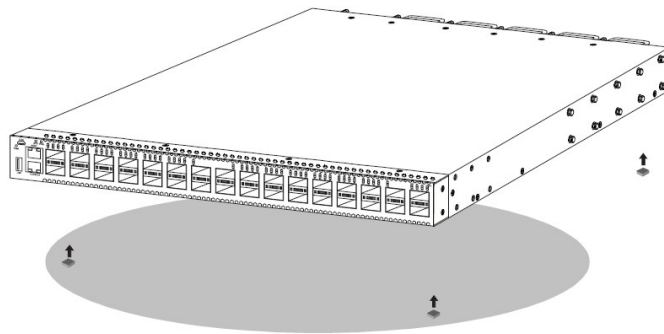
Do not place any heavy objects on the switch.

2.3. Installation into a Rack

The switch can be mounted in a standard 19"(1U) rack using the provided mounting brackets. The following section will explain how to install the rack-mount brackets onto the switch and then mount the switch into a standard 1U rack-mount unit.

1. Use the supplied screws to attach a mounting bracket to each side of the Switch.

2. Align the holes in the mounting bracket with the holes in the rack.

3. Insert and tighten screws through each of the mounting brackets.

Figure 2.2. Front brackets installation
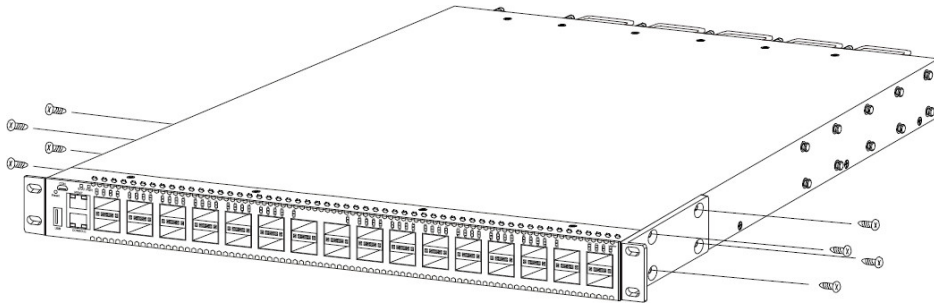
The switch can be installed directly on the rack without the use of the rail.

1. Align the built-in mounting ear to the rack holes.

2. Tighten the screws to secure the switch.

Figure 2.3. Front brackets installation
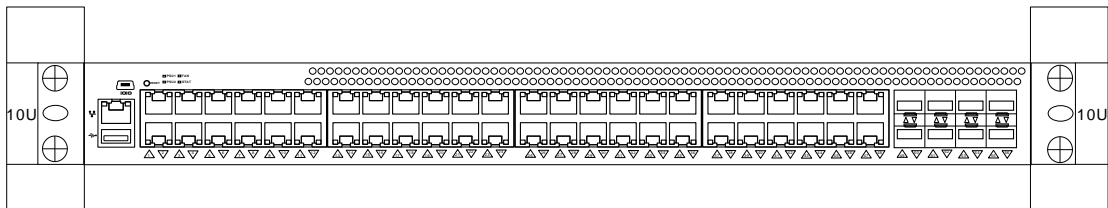
2.3.1. Using the rackmount kit

An optional rackmount kit is recommended when the switch is installed without a shelf.

The rackmount kit support 600~900mm cabinet.

1. Use the supplied screws to attach a rear mounting bracket to each side of the Switch.

2. Align the mounting bracket with the rear posts in the rack.

3. Insert and tighten screws through each of the mounting brackets.

4. Tighten screws on each mounting bracket.

Figure 2.4. Rackmount kit installation

2.4. Installing Transceivers and cables into the Switch Ports

Figure 2.5. Transceivers and cables
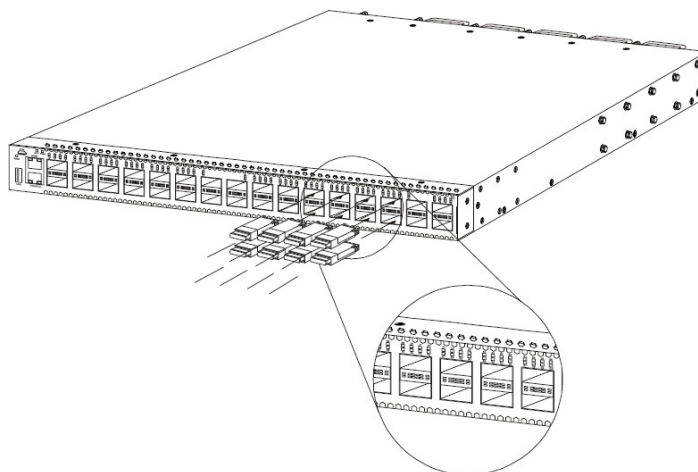
2.4.1. SFP+/SFP28 Port Connection (LC Type Connector)

The Small Form-Factor Pluggable Plus (SFP+) port is the second generation of the SFP interconnect system designed for 10Gb/s data rate. The SFP+ ports support 10-gigabit IEEE 802.3ae Ethernet for fiber mediums.

The Small Form-Factor Pluggable 28 (SFP28) port is the next generation of the SFP interconnect system designed for 25Gb/s data rate. The SFP28 ports enables error-free transmission of 25 Gb/s over 100 meters of OM4 multimode fiber.

The SFP+/SFP28 ports are numbered and have corresponding SFP port LEDs.

To install an SFP module, do the following:

1. Slide the SFP module into an SFP port.

   Ensure the SFP module is positioned correctly before installing it into the port.

2. Push completely until the module locks into place.

3. Repeat the above procedures to install additional SFP+ modules.

The SFP port LED lights green when the network link is established.

2.4.2. QSFP+/QSFP28 Port Connection

QSFP+ (Quad SFP) ports which support 40G/per port or fan out to 4x10G by using the fan out DAC cable.

QSFP28 (Quad SFP) ports which support 100G/per port or fan out to 4x25G by using the fan out DAC cable.

1. Slide the QSFP module into a QSFP port.

Ensure the QSFP module is positioned correctly before installing it into the port.

2. Push completely until the module locks into place.

3. Repeat the above procedures to install additional QSFP modules.

The QSFP port LED lights green when the network link is established.

2.5. Power supply

Equipped with two supply modules, the switch can operate with either one or two power supply modules. If the switch uses two power supply modules, you can hot-swap one of the PSU during the operations.

One PSU is enough for a fully loaded chassis.

Figure 2.6. Power supply
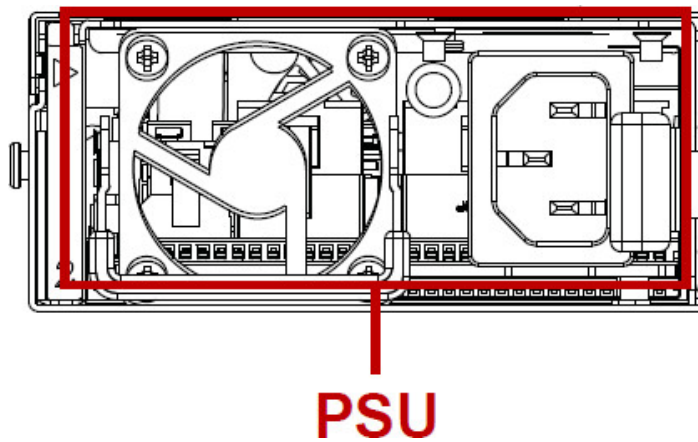
The AC power connector is a standard three-pronged connector. The switch automatically adjusts its power setting to any supply voltage in the range from 100-240 VAC at 50-60 Hz.

2.6. Connect the Power Cable

Connect one end of the AC power cord, included in the package, into the grounded electrical outlet at the site and insert the other end of the AC power cord into the AC power receptacle of the AC power supply module on the back panel of the switch. The switch will automatically adjust the voltage supplied to the voltage needed as this power supply supports any voltage power supply in the range from 100VAC to 240VAC at 50Hz to 60Hz.

The LED indicators on the front panel of the switch should lights green after power-on.

2.7. Rack-mount Safety Precautions

For your protection, observe the following rack-mount safety precautions when setting up your equipment:

- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

- For safety, equipment should always be loaded from the bottom up. That is, install the equipment that will be mounted in the lowest part of the rack first, then the next higher systems, etc.

- To prevent the rack from tipping during equipment installation, the anti-tilt bar on the rack must be deployed.

- The mounting brackets provided must be used to securely mount the device in a rack-mount unit.

2.8. Console port

The console port is used for setting up and managing the switch via a connection to a console terminal or PC using a terminal emulation program. You can connect the switch to a terminal or PC using the supplied console cable (RJ-45 male to RS-232 female cable) for serial communication.

Below is the console cable wiring specification table:

Table 2.1. Console cable pin definition

RJ-45 Port of Switch	DB9 Female Port of PC	Abbreviation	Description
3	2	RD	Received Data
6	3	TD	Transmit Data
1	8	CTS	Clear To Send
8	7	RTS	Request To Send

Using the console port, you can perform the following:

• Configure, manage and monitor the switch using the CLI commands

• Manage and monitor network activity by Simple Network Management Protocol (SNMP) management

• Upgrade the firmware

To connect to the console, do the following:

1. Connect the RJ-45 connector to the console port (|o|o) of the switch.

2. Connect the RS-232 end to a terminal or PC.

3. Manage the switch using the CLI commands (refer to the CLI User Manual for more information).

The switch uses the following default settings:

• Baud rate: 115200

• Data width: 8 bits

• Parity: None

• Stop bits: 1

• Flow control: None

Chapter 3. Netberg Aurora 720 switch

The switch chassis is equipped with the following ports:

- 32 QSFP28 ports (100-Gigabit Ethernet ports) supporting an optical transceiver, active optical cables, or direct-attached cable to connect the QSFP28 port to the hosts (uplink connections).

- 1 Management ports enables you to manage the switch operation using an RJ-45 Ethernet cable

- 1 Console port to perform the initial configuration by connecting to a PC with the RJ-45 to DB-9 serial adapter cable

- 1 USB port to load the configuration files or OS from a USB storage device to the switch's flash/ SSD memory

Figure 3.1. Aurora 720 front view
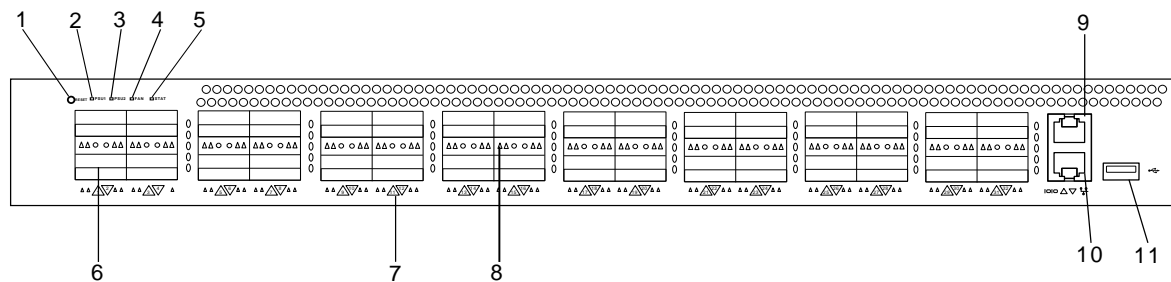
Table 3.1. Front panel features

No	Description	No	Description
1	Reset button	7	Port location and number
2	PSU1 status LED	8	Port activity LED
3	PSU2 status LED	9	RJ45 console port
4	FAN status LED	10	OOB management port
5	System status LED	11	USB port
6	QSFP28 port		

Figure 3.2. Aurora 720 rear view
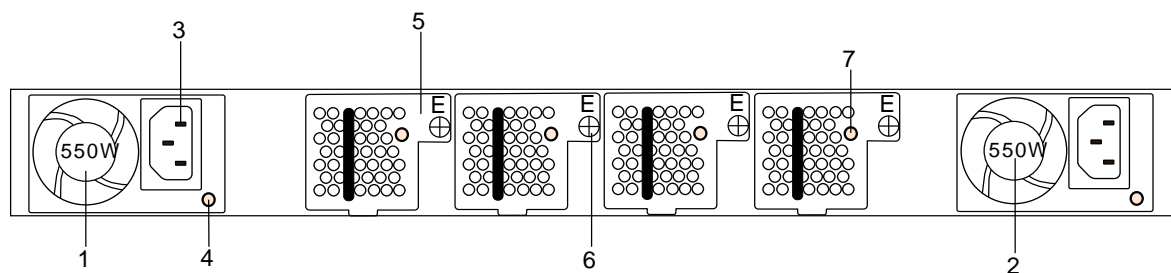
Table 3.2. Rear panel features

No	Description	No	Description
1	PSU1	5	Hot-swappable FAN module
2	PSU2	6	FAN module screw
3	AC Power Connector (with Plug Retainer)	7	Fan status LED
4	PSU status LED		

Table 3.3. LED function description

LED Function/State	Meaning/Control	
Power LED status for PSU1 and PSU2	OFF	Power is not supplied to the device
	Steady Green	PSU is operating normally
	Amber	Possible issues: • PSU is present, but no AC supplied • Fan Lock • OTP: Over Temperature Protection • OCP: Over Current Protection • OVP: Over Voltage Protection • UVP: Under Voltage Protection
FAN LED status	Green	FAN is operating normally.
	Steady Amber	FAN is fault. Check LED of Fan tray in rear panel side to know which one is fault.
System LED status	Green	System function properly
	Amber	System fail
Link/Speed/ACT LED mode for port 0 to 31	OFF	No 100Gbps link is established on the port.
	Steady Green	A valid 100Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 100Gbps
	Steady Yellow	A valid 40Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 40Gbps

3.1. Specification

System specification

Ports	• 32x 100/40GbE QSFP28 ports in 1 RU • Up to 128x 25/10G SFP28 port via break-out cables • 1x RJ-45 out-of-band (10/100/1000) management • 1x RJ-45 console (RS232) • 1x USB
Front IO	• Fan LED • System status LED • PSU1 status LED • PSU2 status LED • Reset button
Performance	• Switching silicon: 3.2Tbps Broadcom Tomahawk BCM56960 • Forwarding rate: 4400Mpps • Latency: <500 нс (PHY-less) • Layer 2: 136K MAC addresses, 4K Vlans • Layer 3: 128K IPv4 host routes, 72K IPv4/36K IPv6 routes, 64K IPv4/32K IPv6 Mroutes • Redundancy: 256 x 802.3ad groups; 32-way ECMP • Packet Buffer: 16MB • Intel® Atom™ Processor C2558 • 8GB DDR3 ECC (up to 16GB) • 64GB SSD

Power	• 550W 1+1 RPSU 80+ Platinum
	
	  • 100V-240V AC / 50-60Hz
	
	  • 240V DC
	
	• 800W 1+1 -40V~-60V DC RPSU (option)
	
	• Up to 300 W (full load)
	
	• Typical power - 330W

	• Maximum power - 480W • Maximum heat dissipation 1650 BTU/hr
Cooling	• 4 N+1 redundant fans • Front-to-Back/Back-to-Front airflow
Dimensions (DxWxH)	410 x 440 x 44 mm
Environment	Operating temperature: 0~45°C
Operating humidity	20-95% maximum relative humidity (non-condensing)
Compatible NOS	• Open Network Linux with OpenNSL and OF-DPA • Broadcom ICOS • OpenSwitch

3.2. Port groups

In chipset, ports are organized as groups of four signal pairs into one SerDes block. All four ports in the group must have the same speed. If you change speed for one of four ports, other ports will be a malfunction.

One 100G port is equal to a port group.

Table 3.4. Port groups

Group	Ports	Group	Ports	Group	Ports
1	1	12	12	23	23
2	2	13	13	24	24
3	3	14	14	25	25
4	4	15	15	26	26
5	5	16	16	27	27
6	6	17	17	28	28
7	7	18	18	29	29
8	8	19	19	30	30
9	9	20	20	31	31
10	10	21	21	32	32
11	11	22	22		

3.3. Supported Cables and Transceivers

See the following table for the list of supported cables and transceivers.

Distance	Description	Note
1m	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
3m	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
5m	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
7-100m	100G Active Optical Cable (AOC)	QSFP28 to QSFP28 850 nm, MMF
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
Up to 100m	100GBASE-SR4 QSFP28 Transceiver Optic (MPO)	QSFP28, 850nm, MMF
Up to 10km	100GBASE-LR4 QSFP28 Transceiver Optic (LC)	QSFP28, 1290-1310nm, SMF

Chapter 4. Netberg Aurora 630 switch

The switch chassis is equipped with the following ports:

- 48 SFP28 (25 Gigabit Ethernet ports) and 16 QSFP28 ports (100-Gigabit Ethernet ports) supporting an optical transceiver, active optical cables, or direct-attached cable to connect the port to the hosts or uplink connections.

- 1 Management ports enables you to manage the switch operation using an RJ-45 Ethernet cable

- 1 Console port to perform the initial configuration by connecting to a PC with the RJ45 to DB-9 serial adapter cable

- 1 USB port to load the configuration files or OS from a USB storage device to the switch's flash/SSD memory

Figure 4.1. Aurora 630 front view
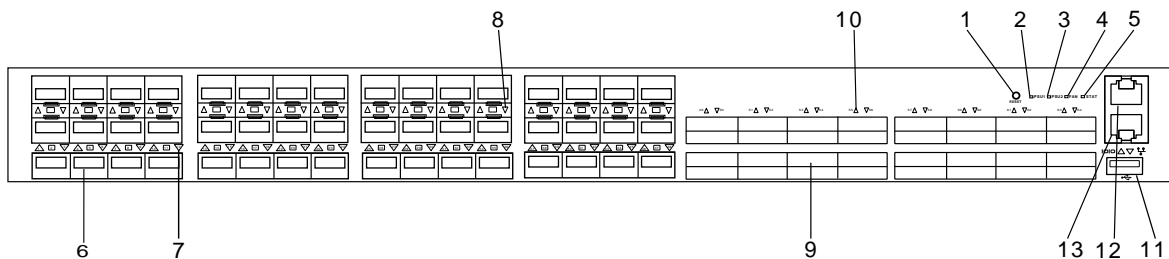
Table 4.1. Front panel features

No	Description	No	Description
1	Reset button	8	SFP28 port activity LED
2	PSU1 status LED	9	QSFP28 port
3	PSU2 status LED	10	QSFP28 port activity LED
4	FAN status LED	11	USB port
5	System status LED	12	RJ-45 console port
6	SFP28 port	13	OOB management port
7	Port location and number		

Figure 4.2. Aurora 630 rear view
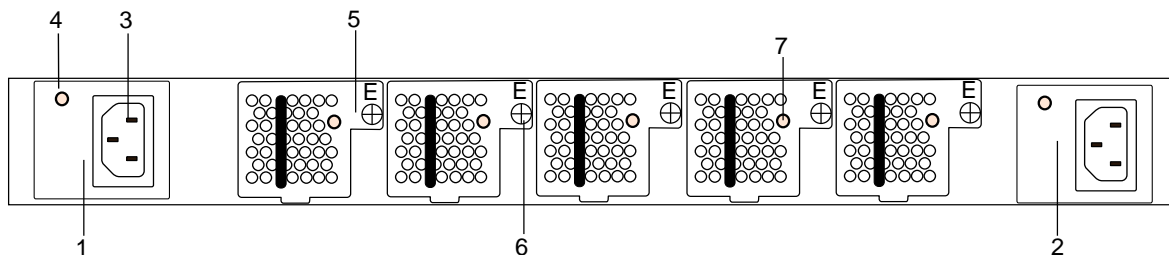
Table 4.2. Rear panel features

No	Description	No	Description
1	PSU1	5	Hot-swappable FAN module
2	PSU2	6	FAN module screw
3	AC Power Connector (with Plug Retainer)	7	Fan status LED
4	PSU status LED		

Table 4.3. LED function description

LED Function/State	Meaning/Control	
Power LED status for PSU1 and PSU2	OFF	Power is not supplied to the device
	Steady Green	PSU is operating normally
	Amber	Possible issues: • PSU is present, but no AC supplied • Fan Lock • OTP: Over Temperature Protection • OCP: Over Current Protection • OVP: Over Voltage Protection • UVP: Under Voltage Protection
FAN LED status	Green	FAN is operating normally.
	Steady Amber	FAN is fault. Check LED of Fan tray in rear panel side to know which one is fault.
System LED status	Green	System function properly
	Amber	System fail
Link/Speed/ACT LED mode for port 0 to 48	OFF	No link is established on the port.
	Steady Green	A valid 25Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 25Gbps
	Steady Yellow	A valid 10Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 10Gbps
Link/Speed/ACT LED mode for port 49 to 54	OFF	No link is established on the port.
	Steady Green	A valid 100Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 100Gbps

LED Function/State	Meaning/Control	
	Steady Yellow	A valid 40Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 40Gbps

4.1. Specification

System specification

Ports	• 48x 25/10GbE QSFP28 ports in 1 RU
	• 16x 100/40GbE QSFP28 ports in 1 RU
	• Up to 112x 25/10G SFP28 port via break-out cables
	• 1x RJ-45 out-of-band (10/100/1000) management
	• 1x RJ-45 console (RS232)
	• 1x USB
Front IO	• Fan LED
	• System status LED
	• PSU1 status LED
	• PSU2 status LED
	• Reset button
Performance	• Switching silicon: 3.2Tbps Broadcom Tomahawk BCM56960
	• Forwarding rate: 4400Mpps
	• Latency: <500 нс (PHY-less)
	• Layer 2: 136K MAC addresses, 4K Vlans
	• Layer 3: 128K IPv4 host routes, 72K IPv4/36K IPv6 routes, 64K IPv4/32K IPv6 Mroutes
	• Redundancy: 256 x 802.3ad groups; 32-way ECMP
	• Packet Buffer: 16MB
	• Intel® Atom™ Processor C2558
	• 8GB DDR3 ECC (up to 16GB)
	• 64GB SSD
Power	• 650W 1+1 RPSU 80+ Platinum
	• 100V-240V AC / 50-60Hz
	• 190V-310V DC
	• Up to 300 W (full load)
	• Typical power - 210W

	• Maximum power - 480W • Maximum heat dissipation 1650 BTU/hr
Cooling	• 5 N+1 redundant fans • Front-to-Back/Back-to-Front airflow
Dimensions (DxWxH)	410 x 440 x 44 mm
Environment	Operating temperature: 0~45°C
Operating humidity	20-95% maximum relative humidity (non-condensing)
Compatible NOS	• Open Network Linux with OpenNSL and OF-DPA • Broadcom ICOS • OpenSwitch

4.2. Port groups

In chipset, ports are organized as groups of four signal pairs into one SerDes block. All four ports in the group must have the same speed. If you change speed for one of four ports, other ports will be a malfunction.

One 100G port is equal to a port group.

Table 4.4. Port groups

Group	Ports	Group	Ports	Group	Ports
1	1-4	11	41-44	21	57
2	5-8	12	45-48	22	58
3	9-12	13	49	23	59
4	13-16	14	50	24	60
5	17-20	15	51	25	61
6	21-24	16	52	26	62
7	25-28	17	53	27	63
8	29-32	18	54	28	64
9	33-36	19	55		
10	37-40	20	56		

4.3. Supported Cables and Transceivers

See the following table for the list of supported cables and transceivers.

Distance	Description	Note
1m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
3m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
5m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
7-100m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	100G Active Optical Cable (AOC)	QSFP28 to QSFP28 850 nm, MMF
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
10G up to 20m	10GBASE-T Transceiver	SFP+
Up to 100m	25GBASE-SR SFP28 Transceiver Optic	SFP28, 850nm, LC
	100GBASE-SR4 QSFP28 Transceiver Optic (MPO)	QSFP28, 850nm, MMF
Up to 10km	25GBASE-LR SFP28 Transceiver Optic	SFP28, 1310nm, LC
	100GBASE-LR4 QSFP28 Transceiver Optic (LC)	QSFP28, 1290-1310nm, SMF

Chapter 5. Netberg Aurora 620 switch

The switch chassis is equipped with the following ports:

- 48 SFP28 (25 Gigabit Ethernet ports) and 6 QSFP28 ports (100-Gigabit Ethernet ports) supporting an optical transceiver, active optical cables, or direct-attached cable to connect the port to the hosts or uplink connections.

- 1 Management ports enables you to manage the switch operation using an RJ-45 Ethernet cable

- 1 Console port to perform the initial configuration by connecting to a PC with the mini-USB to DB-9 serial adapter cable

- 1 USB port to load the configuration files or OS from a USB storage device to the switch's flash/SSD memory

Figure 5.1. Aurora 620 front view
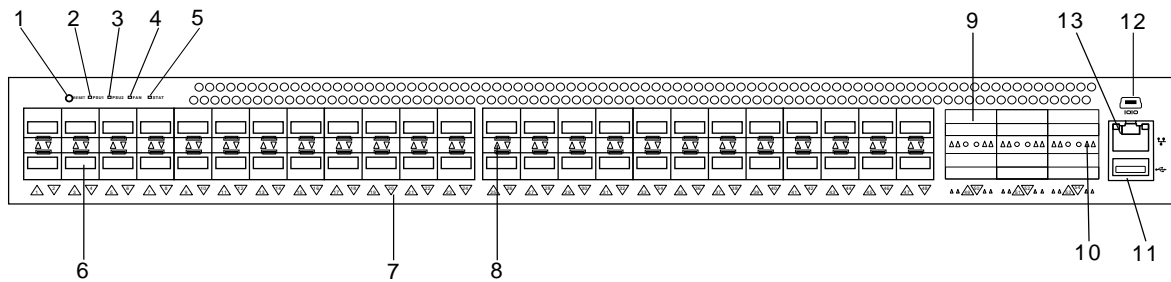
Table 5.1. Front panel features

No	Description	No	Description
1	Reset button	8	SFP28 port activity LED
2	PSU1 status LED	9	QSFP28 port
3	PSU2 status LED	10	QSFP28 port activity LED
4	FAN status LED	11	USB port
5	System status LED	12	mini-USB console port
6	SFP28 port	13	OOB management port
7	Port location and number		

Figure 5.2. Aurora 620 rear view
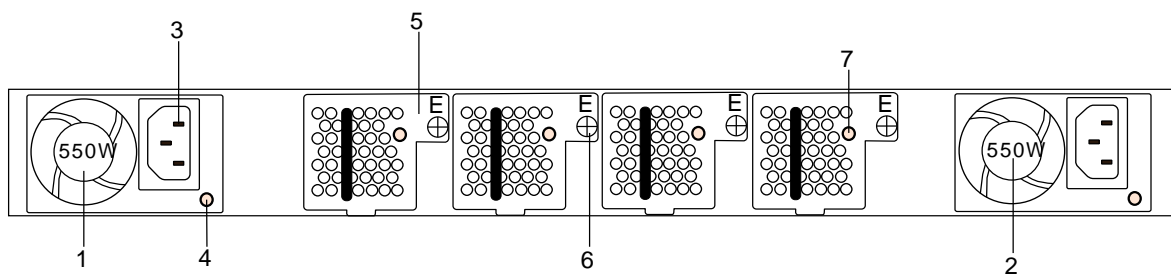
Table 5.2. Rear panel features

No	Description	No	Description
1	PSU1	5	Hot-swappable FAN module
2	PSU2	6	FAN module screw
3	AC Power Connector (with Plug Retainer)	7	Fan status LED
4	PSU status LED		

Table 5.3. LED function description

LED Function/State	Meaning/Control	
Power LED status for PSU1 and PSU2	OFF	Power is not supplied to the device
	Steady Green	PSU is operating normally
	Amber	Possible issues: • PSU is present, but no AC supplied • Fan Lock • OTP: Over Temperature Protection • OCP: Over Current Protection • OVP: Over Voltage Protection • UVP: Under Voltage Protection
FAN LED status	Green	FAN is operating normally.
	Steady Amber	FAN is fault. Check LED of Fan tray in rear panel side to know which one is fault.
System LED status	Green	System function properly
	Amber	System fail
Link/Speed/ACT LED mode for port 0 to 48	OFF	No link is established on the port.
	Steady Green	A valid 25Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 25Gbps
	Steady Yellow	A valid 10Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 10Gbps
Link/Speed/ACT LED mode for port 49 to 54	OFF	No link is established on the port.
	Steady Green	A valid 100Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 100Gbps

LED Function/State	Meaning/Control	
	Steady Yellow	A valid 40Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 40Gbps

5.1. Specification

System specification

Ports	• 48x 25/10GbE SFP28 ports in 1 RU
	• 6x 100/40GbE QSFP28 ports in 1 RU
	• Up to 72x 25/10G SFP28 port via break-out cables
	• 1x RJ-45 out-of-band (10/100/1000) management
	• 1x mini-USB console (RS232)
	• 1x USB
Front IO	• Fan LED
	• System status LED
	• PSU1 status LED
	• PSU2 status LED
	• Reset button
Performance	• Switching silicon: 1.8Tbps Broadcom Tomahawk BCM56960
	• Forwarding rate: 2500Mpps
	• Latency: <500 нс (PHY-less)
	• Layer 2: 136K MAC addresses, 4K Vlans
	• Layer 3: 128K IPv4 host routes, 72K IPv4/36K IPv6 routes, 64K IPv4/32K IPv6 Mroutes
	• Redundancy: 256 x 802.3ad groups; 32-way ECMP
	• Packet Buffer: 16MB
	• Intel® Atom™ Processor C2558
	• 8GB DDR3 ECC (up to 16GB)
	• 64GB SSD
Power	• 550W 1+1 RPSU 80+ Platinum
	• 100V-240V AC / 50-60Hz
	• 240V DC
	• 800W 1+1 -40V~-60V DC RPSU (option)
	• Up to 300 W (full load)

	• Typical power - 210W • Maximum power - 480W • Maximum heat dissipation 1650 BTU/hr
Cooling	• 4 N+1 redundant fans • Front-to-Back/Back-to-Front airflow
Dimensions (DxWxH)	410 x 440 x 44 mm
Environment	Operating temperature: 0~45°C
Operating humidity	20-95% maximum relative humidity (non-condensing)
Compatible NOS	• Open Network Linux with OpenNSL and OF-DPA • Broadcom ICOS • OpenSwitch

5.2. Port groups

In chipset, ports are organized as groups of four signal pairs into one SerDes block. All four ports in the group must have the same speed. If you change speed for one of four ports, other ports will be a malfunction.

One 100G port is equal to a port group.

Table 5.4. Port groups

Group	Ports	Group	Ports	Group	Ports
1	1-4	7	25-28	13	49
2	5-8	8	29-32	14	50
3	9-12	9	33-36	15	51
4	13-16	10	37-40	16	52
5	17-20	11	41-44	17	53
6	21-24	12	45-48	18	54

5.3. Supported Cables and Transceivers

See the following table for the list of supported cables and transceivers.

Distance	Description	Note
1m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
3m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
5m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	40/100G Direct Attach Copper (DAC) cable	QSFP28 to QSFP28
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
7-100m	10/25G Direct Attach Copper (DAC) cable	SFP28 to SFP28
	100G Active Optical Cable (AOC)	QSFP28 to QSFP28 850 nm, MMF
	40/100G DAC Fan Out cable	QSFP28 to 4 SFP28
10G up to 20m	10GBASE-T Transceiver	SFP+
Up to 100m	25GBASE-SR SFP28 Transceiver Optic	SFP28, 850nm, LC
	100GBASE-SR4 QSFP28 Transceiver Optic (MPO)	QSFP28, 850nm, MMF
Up to 10km	25GBASE-LR SFP28 Transceiver Optic	SFP28, 1310nm, LC
	100GBASE-LR4 QSFP28 Transceiver Optic (LC)	QSFP28, 1290-1310nm, SMF

Chapter 6. Netberg Aurora 420 switch

The switch chassis is equipped with the following ports:

- 48 SFP+ (10 Gigabit Ethernet ports) and 6 QSFP6 ports (40-Gigabit Ethernet ports) supporting an optical transceiver, active optical cables, or direct-attached cable to connect the port to the hosts or uplink connections.

- 1 Management ports enables you to manage the switch operation using an RJ-45 Ethernet cable

- 1 Console port to perform the initial configuration by connecting to a PC with the mini-USB to DB-9 serial adapter cable

- 1 USB port to load the configuration files or OS from a USB storage device to the switch's flash/SSD memory

Figure 6.1. Aurora 420 front view
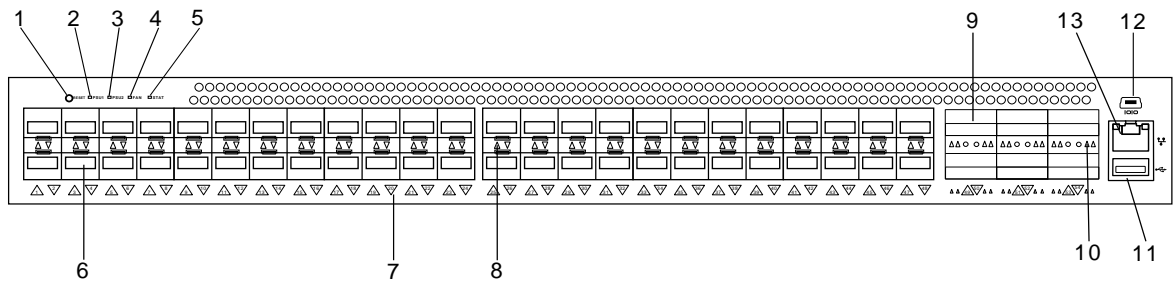
Table 6.1. Front panel features

No	Description	No	Description
1	Reset button	8	SFP+ port activity LED
2	PSU1 status LED	9	QSFP+ port
3	PSU2 status LED	10	QSFP+ port activity LED
4	FAN status LED	11	USB port
5	System status LED	12	mini-USB console port
6	SFP+ port	13	OOB management port
7	Port location and number		

Figure 6.2. Aurora 420 rear view
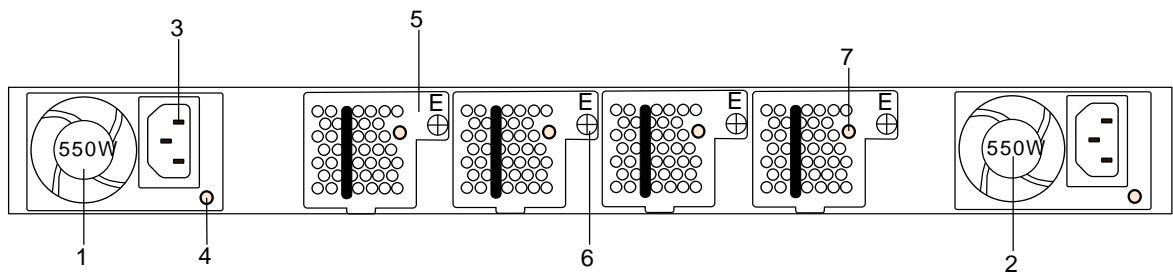
Table 6.2. Rear panel features

No	Description	No	Description
1	PSU1	5	Hot-swappable FAN module
2	PSU2	6	FAN module screw
3	AC Power Connector (with Plug Retainer)	7	Fan status LED
4	PSU status LED		

Table 6.3. LED function description

LED Function/State	Meaning/Control	
Power LED status for PSU1 and PSU2	OFF	Power is not supplied to the device
	Steady Green	PSU is operating normally
	Amber	Possible issues: • PSU is present, but no AC supplied • Fan Lock • OTP: Over Temperature Protection • OCP: Over Current Protection • OVP: Over Voltage Protection • UVP: Under Voltage Protection
FAN LED status	Green	FAN is operating normally.
	Steady Amber	FAN is fault. Check LED of Fan tray in rear panel side to know which one is fault.
System LED status	Green	System function properly
	Amber	System fail
Link/Speed/ACT LED mode for port 0 to 48	OFF	No link is established on the port.
	Steady Green	A valid 10Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 10Gbps
	Steady Yellow	A valid 1Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 1Gbps
Link/Speed/ACT LED mode for port 49 to 54	OFF	No link is established on the port.
	Steady Green	A valid 40Gbps link is established
	Blinking Green	Packets transmitting/receiving is occurring at 40Gbps

LED Function/State	Meaning/Control	
	Steady Yellow	A valid 10Gbps link is established
	Blinking Yellow	Packets transmitting/receiving is occurring at 10Gbps

6.1. Specification

System specification

Ports	• 48x 10/1GbE SFP+ ports in 1 RU
	• 6x 40GbE QSFP+ ports in 1 RU
	• Up to 72x 10/1G SFP+ port via break-out cables
	• 1x RJ-45 out-of-band (10/100/1000) management
	• 1x mini-USB console (RS232)
	• 1x USB
Front IO	• Fan LED
	• System status LED
	• PSU1 status LED
	• PSU2 status LED
	• Reset button
Performance	• Switching silicon: 1.8Tbps Broadcom Trident2 BCM56854
	• Forwarding rate: 1071Mpps
	• Latency: <700 нс (PHY-less)
	• MAC table: Unified Forwarding Table (UFT)
	• Redundancy: 256 x 802.3ad groups; 32-way ECMP
	• Packet Buffer: 12MB
	• Intel® Atom™ Processor C2558
	• 8GB DDR3 ECC (up to 16GB)
	• 64GB SSD
Power	• 550W 1+1 RPSU 80+ Platinum
	• 100V-240V AC / 50-60Hz
	• 240V DC
	• 800W 1+1 -40V~-60V DC RPSU (option)
	• Up to 190 W (full load)
	• Typical power - 210W

	• Maximum power - 280W without optics • Maximum heat dissipation 1650 BTU/hr
Cooling	• 4 N+1 redundant fans • Front-to-Back/Back-to-Front airflow
Dimensions (DxWxH)	410 x 440 x 44 mm
Environment	Operating temperature: 0~45°C
Operating humidity	20-95% maximum relative humidity (non-condensing)
Compatible NOS	• Open Network Linux with OpenNSL and OF-DPA • Broadcom ICOS • OpenSwitch

6.2. Supported Cables and Transceivers

See the following table for the list of supported cables and transceivers.

Distance	Description	Note
1m	10G Direct Attach Copper (DAC) cable	SFP+ to SFP+
	40G Direct Attach Copper (DAC) cable	QSFP+ to QSFP+
	40G DAC Fan Out cable	QSFP+ to 4 SFP+
3m	10G Direct Attach Copper (DAC) cable	SFP+ to SFP+
	40G Direct Attach Copper (DAC) cable	QSFP+ to QSFP+
	40G DAC Fan Out cable	QSFP+ to 4 SFP+
5m	10/25G Direct Attach Copper (DAC) cable	SFP+ to SFP+
	40G Direct Attach Copper (DAC) cable	QSFP+ to QSFP+
	40G DAC Fan Out cable	QSFP+ to 4 SFP+
7-100m	10G Direct Attach Copper (DAC) cable	SFP+ to SFP+
	40G Active Optical Cable (AOC)	QSFP+ to QSFP+ 850 nm, MMF
	40G DAC Fan Out cable	QSFP+ to 4 SFP+
1G	1000BASE-SX, 1000BASE-LX, 100/1000BASE-T Transceiver Optic	SFP
Up to 100/300m	10GBASE-SR SFP+ Transceiver Optic	SFP+, 850nm, LC
	40GBASE-SR4 QSFP+ Transceiver Optic (MPO)	QSFP+, 850nm, MMF
Up to 10km	10GBASE-LR SFP+ Transceiver Optic	SFP+, 1310nm, LC
	40GBASE-LR4 QSFP+ Transceiver Optic (LC)	QSFP+, 1290-1310nm, SMF

Chapter 7. Netberg Aurora 220 switch

The switch chassis is equipped with the following ports:

- 48 1G Base-T ports

- 8 SFP+ 10G ports supporting an optical transceiver, active optical cables, or direct-attached cable to connect the SFP+ port to the hosts (uplink connections).

- 1 Management ports enables you to manage the switch operation using an RJ-45 Ethernet cable

- 1 Console port to perform the initial configuration by connecting to a PC with the mini-USB to DB-9 serial adapter cable

- 1 USB port to load the configuration files or OS from a USB storage device to the switch's flash/SSD memory

Figure 7.1. Aurora 220 front view
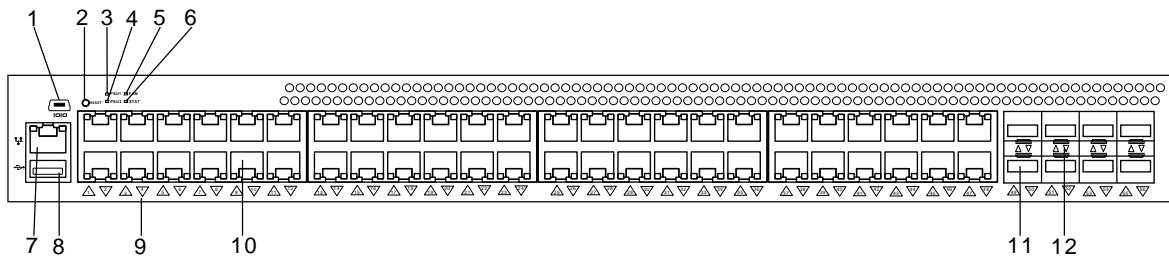
Table 7.1. Front panel features

No	Description	No	Description
1	Mini-USB console port	7	OOB management port
2	Reset button	8	USB port
3	PSU1 status LED	9	Port location and number
4	PSU2 status LED	10	1G Base-T port
5	FAN status LED	11	10G SFP+ port
6	System status LED	12	10G activity LEDs

Figure 7.2. Aurora 220 rear view
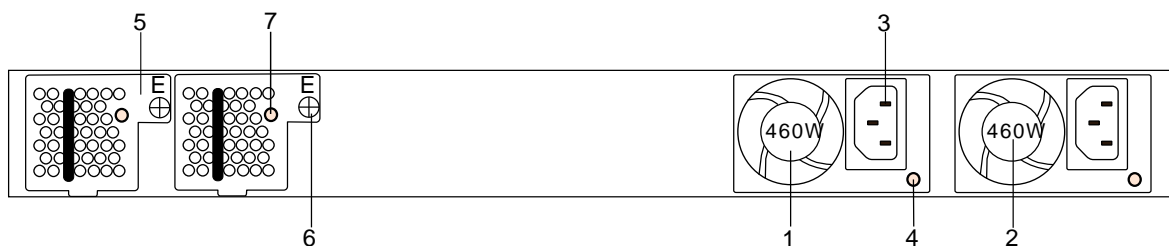
Table 7.2. Rear panel features

No	Description	No	Description
1	PSU2	5	Hot-swappable FAN module
2	PSU1	6	FAN module screw
3	AC Power Connector (with Plug Retain-er)	7	Fan status LED
4	PSU status LED		

Table 7.3. LED function description

LED Function/State	Meaning/Control	
Power LED status for PSU1 and PSU2	OFF	Power is not supplied to the device
	Steady Green	PSU is operating normally
	Amber	Possible issues: • PSU is present, but no AC sup-plied • Fan Lock • OTP: Over Temperature Protec-tion • OCP: Over Current Protection • OVP: Over Voltage Protection • UVP: Under Voltage Protection
FAN LED status	Green	FAN is operating normally.
	Steady Amber	FAN is fault. Check LED of Fan tray in rear panel side to know which one is fault.
System LED status	Green	System function properly
	Amber	System fail
Speed LED mode for port 0 to 48	OFF	A valid 10Mbps link is established
	Green on	A valid 100Mbps link is established
	Amber on	A valid 1Gbps link is established
Link/ACT LED mode for port 0 to 48	OFF	No link is established on the port.
	Green on	A valid network link is established.
	Flashing Green	Network transmission and receiv-ing packet in progress
Link/Speed/ACT LED mode for port 49 to 56	OFF	No link is established on the port.
	Green on	A valid 1Gbps link is established
	Green on	A valid 10Gbps link is established

7.1. Specification

System specification

Ports	• 48x 100Base-TX/1000Base-T
	• 8x 1/10G SFP+
	• 1x RJ-45 out-of-band (10/100/1000) management
	• 1x mini-USB console (RS232)
	• 1x USB
Front IO	• Fan LED
	• System status LED
	• PSU1 status LED
	• PSU2 status LED
	• Reset button
Performance	• Switching silicon: 150Gbps Broadcom Helix4 BCM56344
	• Forwarding rate: 190Mpps
	• ARM embedded CPU, 1 GHz
	• 2GB DDR3 ECC
	• 2GB NAND flash
Power	• 460W 1+1 RPSU 80+ Platinum
	• 100V-240V AC / 50-60Hz
Cooling	• 2 redundant fans
	• Front-to-Back/Back-to-Front airflow
Dimensions (DxWxH)	400 x 440 x 44 mm
Environment	Operating temperature: 0~45°C
Operating humidity	20-95% maximum relative humidity (non-condensing)
Compatible NOS	• Broadcom ICOS

7.2. Supported Cables and Transceivers

See the following table for the list of supported cables and transceivers.

Distance	Description	Note
1m	10G Direct Attach Copper (DAC) cable	SFP+
2m	10G Direct Attach Copper (DAC) cable	SFP+
3m	10G Direct Attach Copper (DAC) cable	SFP+
4m	10G Direct Attach Copper (DAC) cable	SFP+
5m	10G Direct Attach Copper (DAC) cable	SFP+
Up to 100m	10GBASE-SR SFP+ Transceiver Optic	SFP+, 850nm, MMF
Up to 10km	10GBASE-LR SFP+ Transceiver Optic (LC)	SFP+, 1310nm, SMF

Chapter 8. ICOS quick start guide

On Aurora 220, ICOS is running as standalone NOS, booting right into CLI interface.

On Aurora 720, ICOS is running as an application on top of Linux. To get access to CLI you need to perform several steps below.

8.1. ICOS boot

Upon powering up the system, the ONIE menu would eventually show up from switch console port.

8.2. Linux booting up process


```
                         Loading ICOS ...

                           Loading ICOS initial ramdisk ...


                                              Loading, please wait...
Begin: Loading essential drivers ... done.
Begin: Running /scripts/init-premount ... done.
Begin: Mounting root file system ... Begin: Running /scripts/local-top ... done.
Begin: Running /scripts/local-premount ... done.
Begin: Running /scripts/local-bottom ... done.
done.
Begin: Running /scripts/init-bottom ... done.
 * Starting Mount filesystems on boot                        [ OK ]
 * Starting Populate /dev filesystem                         [ OK ]
 * Starting Populate and link to /run filesystem             [ OK ]
 * Stopping Populate /dev filesystem                         [ OK ]
 * Stopping Populate and link to /run filesystem             [ OK ]
 * Stopping Track if upstart is running in a container       [ OK ]
 * Starting Initialize or finalize resolvconf                [ OK ]
 * Starting Signal sysvinit that the rootfs is mounted       [ OK ]
 * Starting set console keymap                               [ OK ]
 * Starting Signal sysvinit that virtual filesystems are mounted    [ OK ]
 * Starting Signal sysvinit that virtual filesystems are mounted    [ OK ]
```

8.3. Access Linux

Login Prompt Up on boot up, switch with an ICOS image will show a Linux login prompt. At this moment ICOS application is running in background as a Linux service. User can login to the switch using Linux login credentials. Use "sudo" for any admin type activities.

```
* Starting OpenSSH server                                          [ OK ]
* Not starting fancontrol; run pwmconfig first.
* Starting automatic crash report generation                       [ OK ]
* Stopping save kernel messages                                    [ OK ]
* Starting NTP server ntpd                                         [ OK ]
* Stopping System V runlevel compatibility                         [ OK ]

Ubuntu 14.04 LTS localhost ttyS1

localhost login: 
```

- Username: admin

- Password: admin

User now has access to Linux shell while ICOS application is running in background.

```
Ubuntu 14.04 LTS localhost ttyS1

localhost login: admin
Password: admin
Last login: Thu Apr  7 09:20:42 UTC 2016 from 192.168.10.101 on pts/2
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.16.0-29-generic x86_64)

Documentation:  https://help.ubuntu.com/
admin@localhost:~$ sudo -s
[sudo] password for admin: admin
root@localhost:~#
```

8.4. Running ICOS via icos-console

```
root@localhost:~# icos-console

Initializing console session. Press ^z to exit
Connecting to /dev/pts/0
<9> Apr 11 06:13:49 localhost SIM[Cnfgr_Thread ]: sim_util.c(3868) 6 %% Switch was reset due to operator intervention.
(Unit 1)>

Applying Global configuration, please wait ...

Applying Interface configuration, please wait ...


(localhost) #
```

```
root@localhost:~# icos-console

Initializing console session. Press ^z to exit
Connecting to /dev/pts/0
s   Apr 11 06:13:49 localhost SIM[Cnfgr_Thread ]: sim_util.c(3868) 6
%% Switch was reset due to operator intervention.
(Unit 1)>

Applying Global configuration, please wait ...

Applying Interface configuration, please wait ...
(localhost) #
```

8.5. Running ICOS via icos-cli

```
root@localhost:~# icos-cli
Initializing console session. Press ^z to exit.
(localhost) #
```

```
root@localhost:~# icos-cli -h
```

```
Usage: icos-cli [-f<session-id>] [-s] [-h]
This command opens a connection to icos and provides CLI access to the
user.
If icos service is not running, this command will wait for service to
start.
User can come out of the command by pressing ^z at any point of time.
```

```
COMMAND LINE OPTIONS
```

```
    -f<Session-id>
Detect and close if particular session already open. The command option
    also creates a new session.
```

```
    -s
Displays existing sessions.
```

```
    -h
Help. Prints this text.
```

```
root@localhost:~#
```

8.6. How to login ICOS via Linux SSH

Due to the way that x86 ICOS operates, the service port related commands were being removed; user should configure the service port via Linux prompt on Eth0 port.

1. Login the switch Linux in console

```
Ubuntu 14.04 LTS localhost ttyS1

localhost login: admin
Password: admin
Last login: Thu Apr  7 09:20:42 UTC 2016 from 192.168.10.101 on pts/2
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.16.0-29-generic x86_64)

Documentation:  https://help.ubuntu.com/
admin@localhost:~$ sudo -s
[sudo] password for admin: admin
root@localhost:~#
root@localhost:~# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:05:64:2f:3c:7c
  inet addr:192.168.0.73  Bcast:192.168.0.255  Mask:255.255.255.0
  inet6 addr: fe80::205:64ff:fe2f:3c7c/64 Scope:Link
  UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
  RX packets:517 errors:0 dropped:0 overruns:0 frame:0
  TX packets:116 errors:0 dropped:0 overruns:0 carrier:0
  collisions:0 txqueuelen:1000
  RX bytes:39588 (39.5 KB)  TX bytes:8936 (8.9 KB)

root@localhost:~#
```

2. Login the switch Linux via SSH

3. Run ICOS

```
root@localhost:~# icos-cli
```

```
Initializing console session. Press ^z to exit.
(localhost) #
```

8.7. How to reload ICOS

This command resets the ICOS application without powering system off.

```
(localhost) #
(localhost) #reload
The system has unsaved changes.
Would you like to save them now? (y/n) n
Configuration Not Saved!
Are you sure you would like to reset the system? (y/n) y
Reference platform resetting ...
Console session closed by foreign host.
root@localhost:~#
```

8.8. How to reload OS

This command enables the user to boot system back into ONIE menu.

```
(localhost) #reload os

WARNING: All configuration will be lost.
Are you sure you would like to reload the network operating system? (y/n) y

!!!!!!!!!!!!!!!
!   WARNING   !
!!!!!!!!!!!!!!!
!  You are about to remove existing icos operating system image.
!  All system data will be lost and cannot be recovered.

Updating ONIE GRUB configuration to reinstall icos OS
Reboot for changes to take effect

Broadcast message from root@localhost
            (/dev/ptmx) at 7:04 ...

The system is going down for reboot NOW!
Reference platform resetting ...
```

```
                GNU GRUB  version 2.02~beta2+e4a1fe391

+------------------------------------------------------------------------+
|*ICOS                                                                   |
| ONIE                                                                   |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
|                                                                        |
+------------------------------------------------------------------------+

     Use the ^ and v keys to select which entry is highlighted.
     Press enter to boot the selected OS, `e' to edit the commands
     before booting or `c' for a command-line.
   The highlighted entry will be executed automatically in 4s.
```