

Edgecore Networks Corporation

Edgecore ASXvOLT16

XGS-PON OLT Specification

Revision 1.1



OPEN
Compute Project

Revision History

Revision	Date	Author	Description
1.0	9/7/2017	Jeff Catlin	Initial Release
1.1	8/26/2019	Jeff Catlin	Minor Updates

Contents

Revision History.....	1
Licenses	4
Scope	6
Overview	6
Physical Overview.....	7
Dimensions.....	7
Top View.....	9
Front panel LED definitions	11
Port LEDs	12
System LEDs	13
QSFP28 Interface Module Support	13
XFP Module support.....	13
Console Port	13
Rear View	14
Field Replaceable Units	15
Power Supply Modules.....	15
PSU Pin-Out	17
Fan Modules.....	17
Fan Connector pinout.....	18
System Overview:.....	19
Main PCB Block Diagram	19
X86 Broadwell-DE CPU Module Block Diagram.....	20
PCB Board Set.....	21
Main Switch PCB.....	21
Main PCB Dimensions	21
Main PCB Top view.....	22
Main PCB Bottom View	23
Fan PCB.....	23
Fan PCB Dimensions	24
Fan PCB major components	24
Fan Cable Pinout.....	24
X86 Broadwell-DE CPU Module PCB	25

X86 Broadwell-DE CPU PCB Top side	26
X86 Broadwell-DE CPU PCB Bottom side	26
X86 Broadwell-DE CPU PCB Dimensions	27
X86 Broadwell-DE CPU PCB major components	27
BMC Module.....	27
I2C Bus Architecture.....	28
120 Pin CPU PCB to Main PCB Connector	29
Software Support	30
BIOS support.....	30
ONIE.....	30
Open Network Linux.....	30
System Software.....	30
Specifications	31
Power Consumption.....	31
Environmental	31
Safety.....	32
Electromagnetic Compatibility	32
ROHS.....	32

Licenses

All semiconductor devices that may be referred to in this specification, or required to manufacture products described in this specification, will be considered referenced only, and no intellectual property rights embodied in or covering such semiconductor devices shall be licensed as a result of this specification or such references. Notwithstanding anything to the contrary in the CLA, the licenses set forth therein do not apply to the intellectual property rights included in or related to the semi-conductor devices identifies in the specification. These references include without limitation the reference to devices listed below. For clarity, no patent claim that reads on such semiconductor devices will be considered a “Granted Claim” under the applicable Contributor License Agreement for this specification.

	ASFX816BBX-0716-EC
CPU subsystem	CPU: Intel Broadwell-DE XeonD-1518 2.2GHz (P/N:GG8067402569700) DDR SDRAM: 8GB x 2 2133MHz with ECC (DDR4 SO-DIMM, P/N:TS1GH72V1H) SPI Flash (Boot): 16MB (primary/2nd) SPI Flash (LAN): 4MB SPI Flash (for BCM5720: *2 PCIe dual port dual media gigabit Ethernet controller): 2Mb USB to NAND Flash memory : 8GB SLC (Reserve) mSATA: 32GB MLC (Reserve) m.2: 32GB MLC (TS32ZBTMM1600 TRANSCEND) CPLD: Altera 5M1270ZF256 TPM: ST33ZP24AR28PVSP ST
Management	UART RS232 console port (RJ45), Out-band Management Ethernet port (RJ45)
Switch MAC	Broadcom BCM88470, 300Gbs full duplex switching
PON MAC	Broadcom BCM68628
SATA CONN	Reserve mSATA connector
Ethernet Ports	16x XGS-PON ports + 4x QSFP28
CPLD	Altera 5M2210ZF324C5N (FPGA324 package)
FPGA	Altera 10M08DCU324C8G
PCB	20-Layers, TUC TU-883 for Mainboard 12-Layers, TUC, TU-872LK for CPU module 4-Layers, FR4, Tg 150 (TU662) FAN Board
Power Supply	650W PSU front to back airflow, AC to DC, 1+1 redundant load-sharing, hot swappable
Cooling	6 fan-tray modules with 6 pcs of 40mm x40mm x 56mm 12V fans, hot-swappable
Dimension	609 mm (L: Depth) x 438.4mm (W: Width) x 43.5 mm (H: Height maximum)

As of September 8, 2017 this specification is contributed under the OCP Contributor Licensing Agreement (OCP-CLA) by the following entities:
Acton Technology Corporation, through its subsidiary Edgecore Networks Corporation

Limitations of the OCP CLA license are noted below: No
Limitations

You can review the signed copies of the OCP-CLA for this specification on the OCP website.

<http://www.opencompute.org/products/specsanddesign>

Usage of this specification is governed by the OCPHL permissive. You can review this license at <http://www.opencompute.org/participate/legal-documents/>

Your use of this Specification may be subject to other third-party rights. THIS SPECIFICATION IS PROVIDED "AS IS." The contributors expressly disclaim any warranties (express, implied, or otherwise), including implied warranties of merchantability, non-infringement, fitness for a particular purpose, or title, related to the Specification. The entire risk as to implementing or otherwise using the Specification is assumed by the Specification implementer and user. IN NO EVENT WILL ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR LOST PROFITS OR ANY FORM OF INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER FROM ANY CAUSES OF ACTION OF ANY KIND WITH RESPECT TO THIS SPECIFICATION OR ITS GOVERNING AGREEMENT, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, AND WHETHER OR NOT THE OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Scope

This document outlines the technical specifications for the Edgecore ASXvOLT16 Open XGS-PON OLT platform submitted to the Open Compute Foundation.

Overview

This document describes the technical specifications of the ASXvOLT16 Open XGS-PON OLT Platform designed by Edgecore Networks. The ASXvOLT16 is a cost optimized XGS-PON OLT design focused on XGS-PON deployments. The ASXvOLT16 supports 16 XFP ports that support 10Gb XGS-PON and four QSFP28 ports that support 100G/50G/40G/25G/10G Ethernet connectivity.

The ASXVOLT16 supports traditional features found in OLT platforms such as:

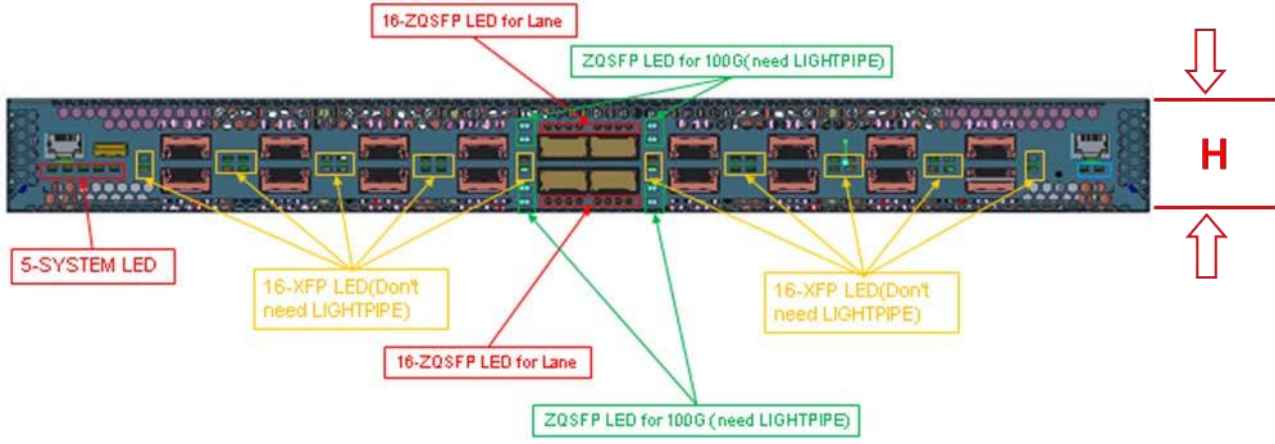
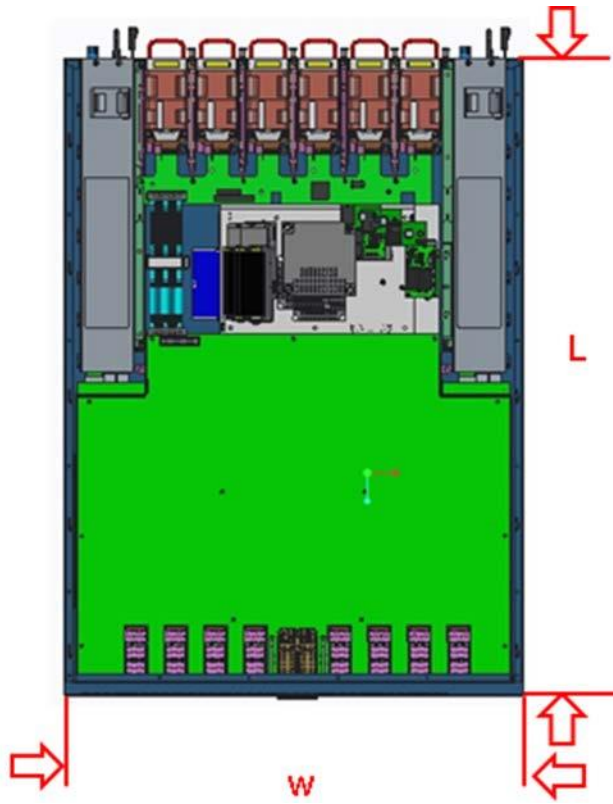
- Redundant field replaceable power supplies and fan units
- Support for “Front to Back” or “Back to Front” air flow direction
- Supports a modular CPU card that allows flexibility in the CPU and/or memory configurations that can be offered.
- The ASXvOLT16 is a 1RU design that supports standard 19” rack deployments as well as standard 21” Open Rack deployments.

Physical Overview

Dimensions

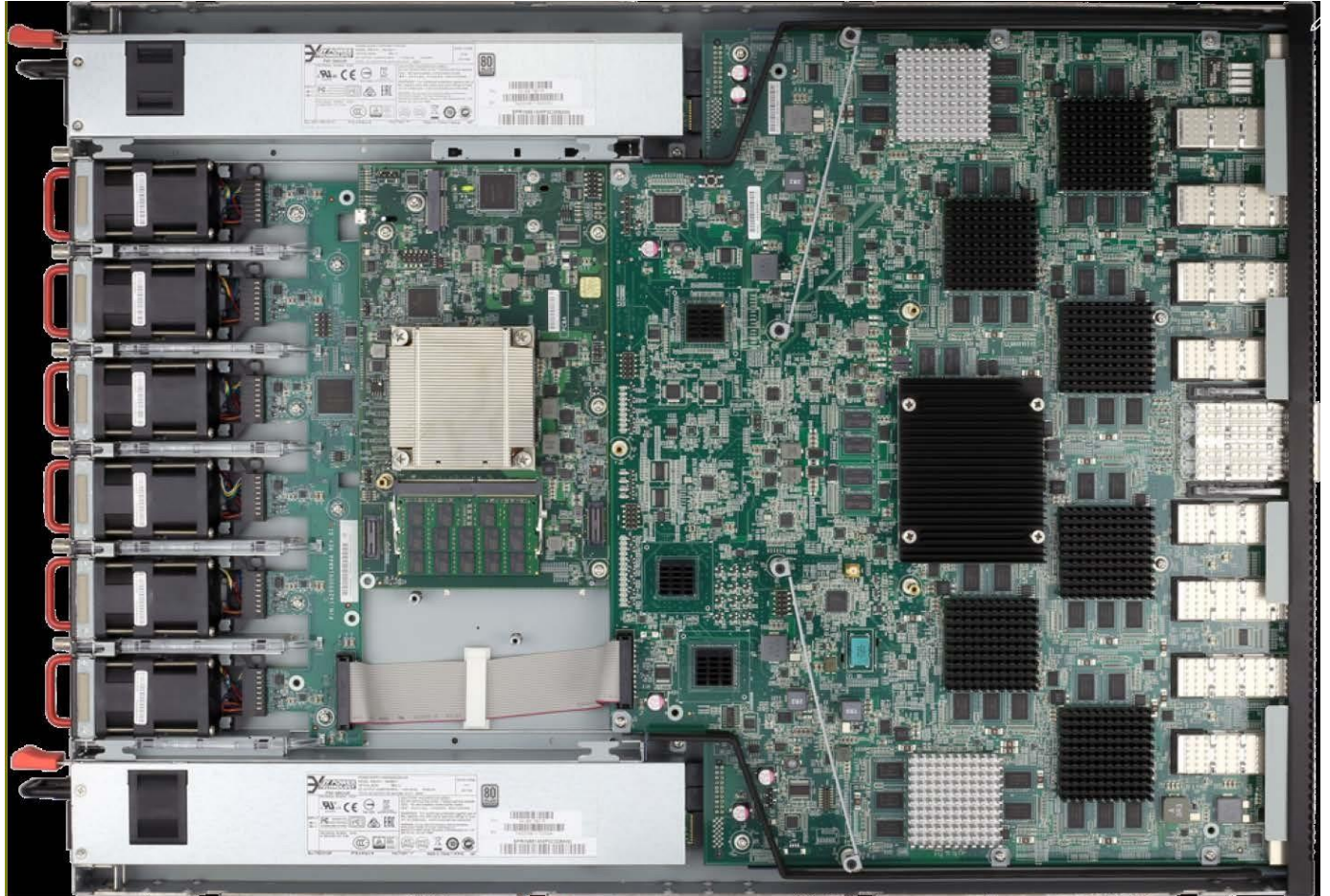
	Inches	Millimeters
Length	24	609
Width	17.26	438.4
Height	1.70	43.25

- **TOP VIEW**
- **L=609mm**
- **W=438.4mm**
- **H=43.25mm**



Top View

The top view of the ASXVOLT16 shows the PCBs and associated components in the ASXVOLT16 system



Front View



The front panel view of the ASXvOLT16 includes the following key components:

- Sixteen XFP XGS-PON Ports ○ Capable of operating at 10Gb XGS-PON with standard XFP XGS-PON modules
- Four QSFP28 ports ○ Capable of operating at 4x10Gb, 1x40Gb, 4x25Gb, 2x50Gb, or 1x 100Gb Ethernet with appropriate QSFP+/28 modules and/or break out cables.
- Five System LEDs
- Rest Switch
- Individual port LEDs
- USB 2.0 type “A” port ○ Used for optional external storage
- RJ45 RS232 Console management port ○ Supports asynchronous mode with the default being eight data bits, one stop bit, no parity
- RJ45 10/100/1000 Ethernet management port ○ Connected directly to the system CPU

Front panel LED definitions

The BCM884700 has two-wire (clock and data) LED interface is to control system LEDs. Both signals are held low during periods of inactivity. A single LED refresh cycle consists of clocking out a programmable number of LED data bits. The LED data signal is pulsed high at the start of each LED refresh cycle, this selection define the Led stream below.

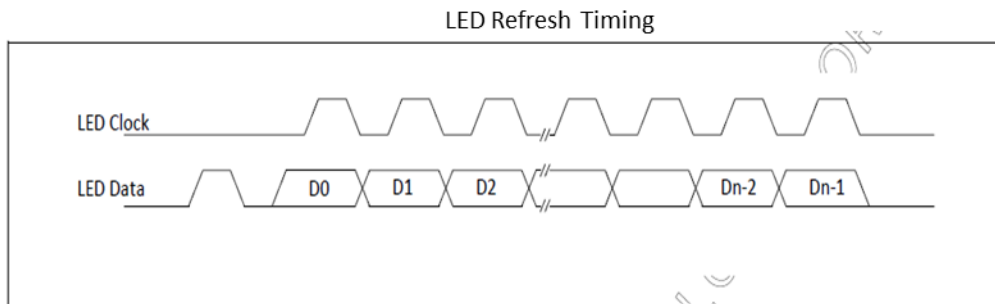
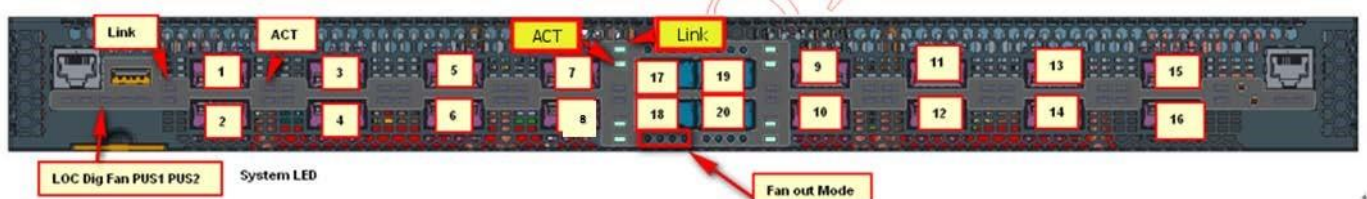
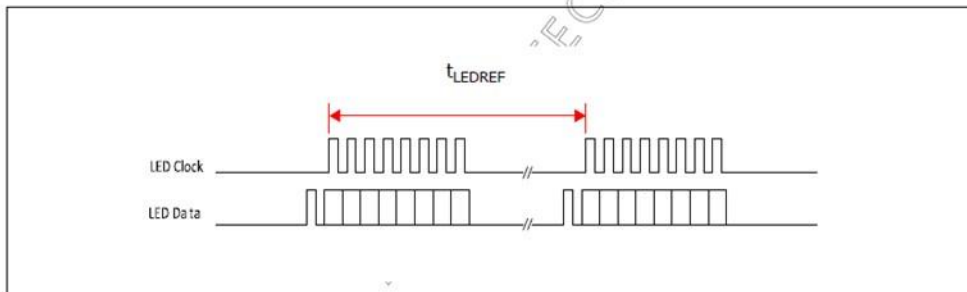


Figure 13: LED Refresh Timing



Each XFP port has two LEDs to indicate port link status and activity status.

Each QSFP28 port has six LEDs to indicate port link status and activity

- Two LEDs per port to indicate link status and activity when used as standard 40G/100G port
- Four LEDs per port to indicate link status/speed and activity when the port is used in fanout/breakout mode (4x25G, 4x10G)

Port LEDs

LED	CONDITION	STATUS
XGS-PON XFP Port LEDs <ul style="list-style-type: none"> • One Activity (ACT) LED per port • One Link (LNK) LED per port 	On Green (Act LED)	Port up with active ONTs The port is up and detect ONTs connected with it
	On Green Flashing (Act LED)	The port is up and detect traffic with ONTs is running on it. Flashing indicates activity.
	On Amber (Link LED)	Port up with no active ONTs
	Off	There is no link on the port.
QSFP28 Port LED in 100G Mode (Port 17~ 20)	On Green (Link LED)	QSFP28 port has a valid link at 100G.
	Off (Link LED)	QSFP28 port does not have a valid link.
	On/Flashing Orange (Activity LED)	Flashing indicates QSFP28 port activity.
	Off (Activity LED)	There is no activity on the port.
QSFP28 Port LED in 40G Mode (Port 17~ 20)	On Blue (Link LED)	QSFP28 port has a valid link at 40G .
	Off (Link LED)	QSFP28 port does not have a valid link.
	On/Flashing Orange (Activity LED)	Flashing indicates QSFP28 port activity.
	Off (Activity LED)	There is no activity on the port.
QSFP28 Port Break Out LEDs (4 LEDs per port) Port In 25G Breakout mode) (Port 17~ 20)	On Green	Indicates specific port channel has valid link
	On Green Blinking	Indicates specific port channel has link and activity
	Off	There is no link on the specific port channel
QSFP28 Port Break Out LEDs (4 LEDs per port) Port In 10G Breakout mode) (Port 17~ 20)	On Blue	Indicates specific port channel has valid link
	On Blue Blinking	Indicates specific port channel has link and activity

	Off	There is no link on the specific port channel
OOB Management LED (Link)	On	Port has a valid link
	Off	There is no link on the port
OOB Management LED (Activity)	Flashing	Flashing indicates activity
	Off	There is no link on the port

System LEDs

PS1 (Power Supply Status)	Green	This power is operating normally.
	Amber	PWR present but not power on or this power is fault.
	Off	Power supply not present.
PS2 (Power Supply Status)	Green	This power is operating normally.
	Amber	PWR present but not power on or this power is fault.
	Off	Power supply not present.
Diag (Diagnostic)	Green	System self-diagnostic test successfully completed.
	Amber	System self-diagnostic test has detected a fault. (Fan, thermal or any interface fault.)
FAN	Green	System FAN operating normally.
	Amber	Fan tray present but system FAN is fault.
	OFF	System OFF
LOC	Amber Flashing	Flashing by remote management command. Assists the technician in finding the right device for service in the rack.
	OFF	Not a particular switch that technician need to find

QSFP28 Interface Module Support

The ASXvOLT16 does not limit the QSFP 28 ports to vendor specific solutions and therefore will support any pluggable compliant to the QSFP+/QSFP28 MSA.

XFP Module support

The ASXvOLT16 does not limit the XFP ports to vendor specific pluggables and therefore will support any pluggable compliant to the XFP MSA.

Console Port

The console port interface conforms to the RJ45 electrical specification.

The interface supports asynchronous mode with default eight data bits, one stop bit, and no parity. The unit will operate at any one of the following baud rates:

•9600, 19200, 38400, 57600, **115200 (Default)**

Pin number	Pin name	Pin number	Pin name
1	RTS	2	UART_TXD
3		4	
5	GND	6	UART_RxD
7		8	CTS

Rear View



The rear view of the ASXvOLT16 includes the following key components:

- Six (5+1) redundant hot swappable fan modules
 - LED per fan module to indicate status
 - Color coding to indicate airflow direction
- Two redundant hot swappable power supply modules
 - LED per power supply to indicate status
 - Color coding to indicate airflow direction

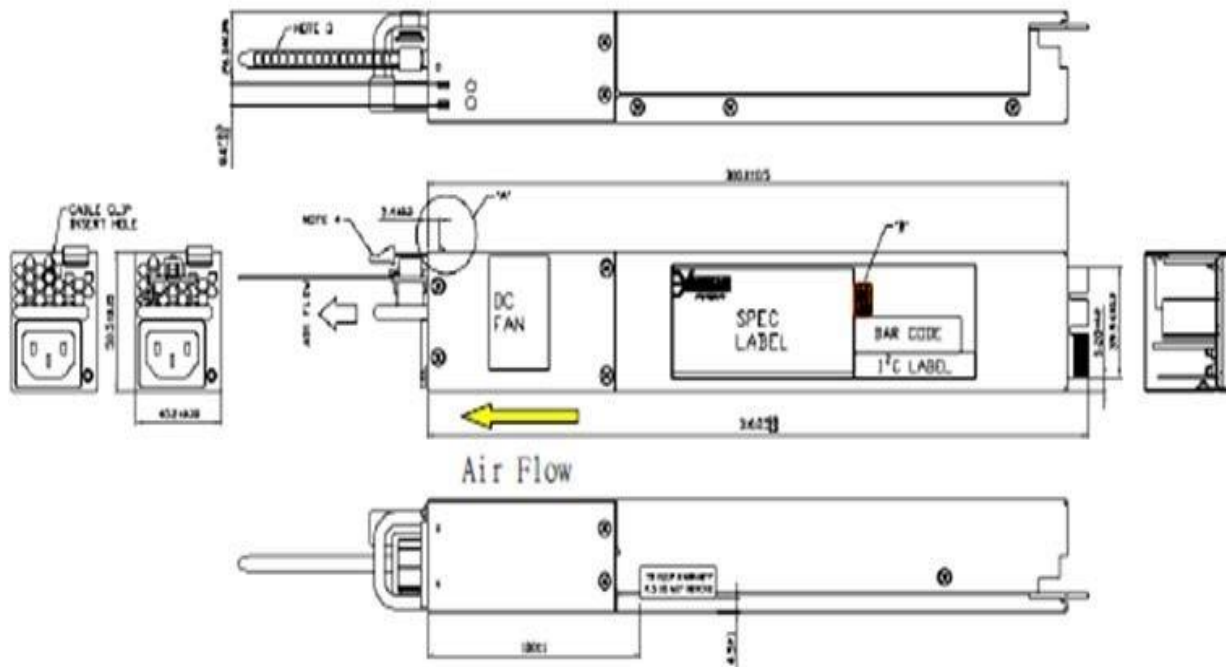
Field Replaceable Units

Power Supply Modules

The ASXVOLT16 supports two redundant power supply modules as listed below

3Y 650 Watt PSU: AC Input Range 90-264VAC / 47-63Hz		
<ul style="list-style-type: none">• YM-2651YBR Front to back airflow• YM-2651YCR Back to front airflow		
3Y 650W PSU: 48V DC Input range 36-75Vdc		
<ul style="list-style-type: none">• YM-2651VBR -Front to back airflow• YM-2651VCR -Back to front airflow		
Edge-Core 600 Watt 12V DC Module		
<ul style="list-style-type: none">• PSU-12V-600		
	<u>Inches</u>	<u>Millimeters</u>
Length	12.21	310.2
Width	1.58	50.5
Height	2.15	40

The casing dimension is W 50.5 mm x L 310.2 mm x H 40 mm(including gold finger)



3.

Figure 2: Outline drawing

3.

PSU Pin-Out

3.3. Pin assignment for DC output gold fingers

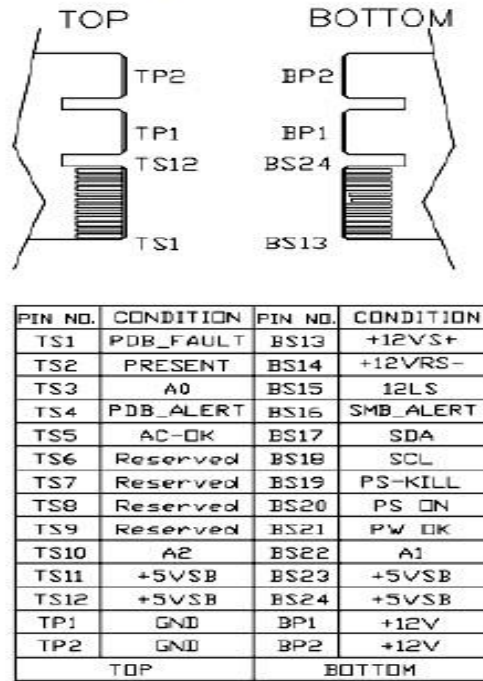
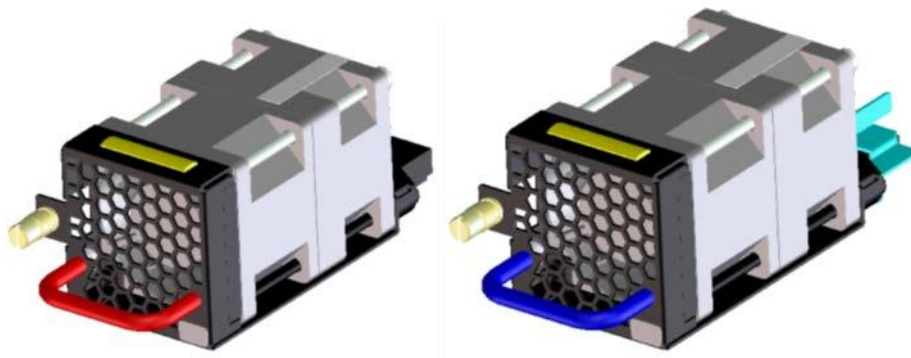


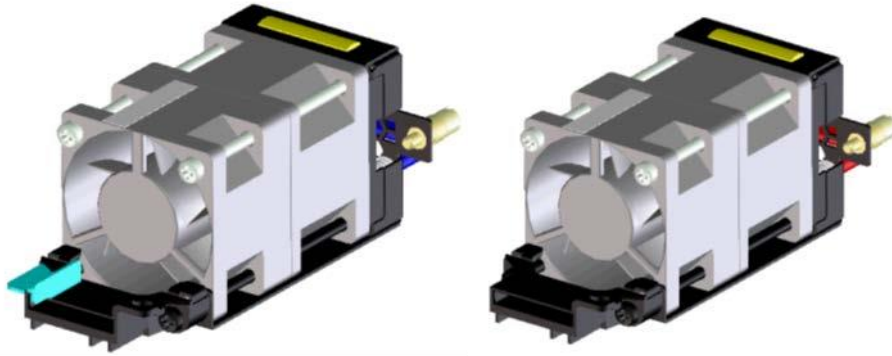
Figure 3: signal descriptions

Fan Modules

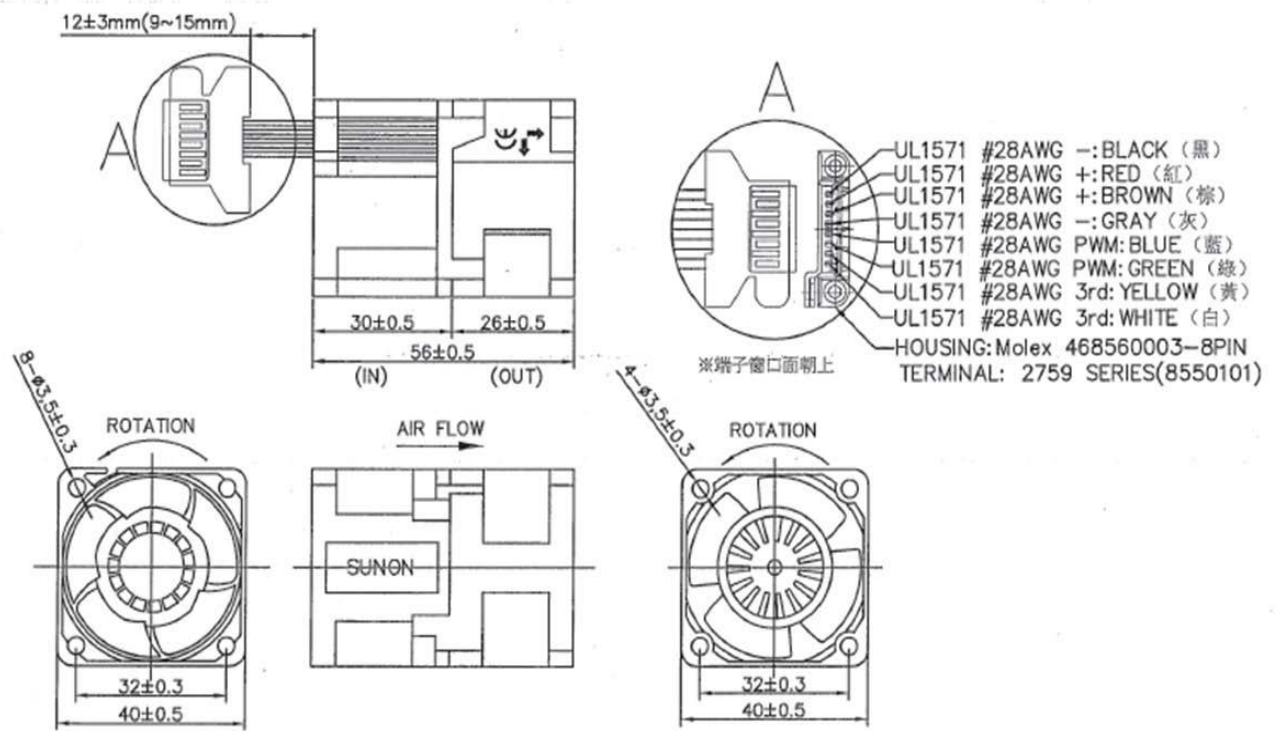
The ASXVOLT16 supports six individual fan modules. Each fan module supports two 40mmx40mmx54mm fans shown below.

Description	Manufacturer	Part Number
Fan – Front to back airflow	Sunon	PF40561BX-Q020-S99
Fan – Back to front airflow	Sunon	PF40561BX-Q010-S99



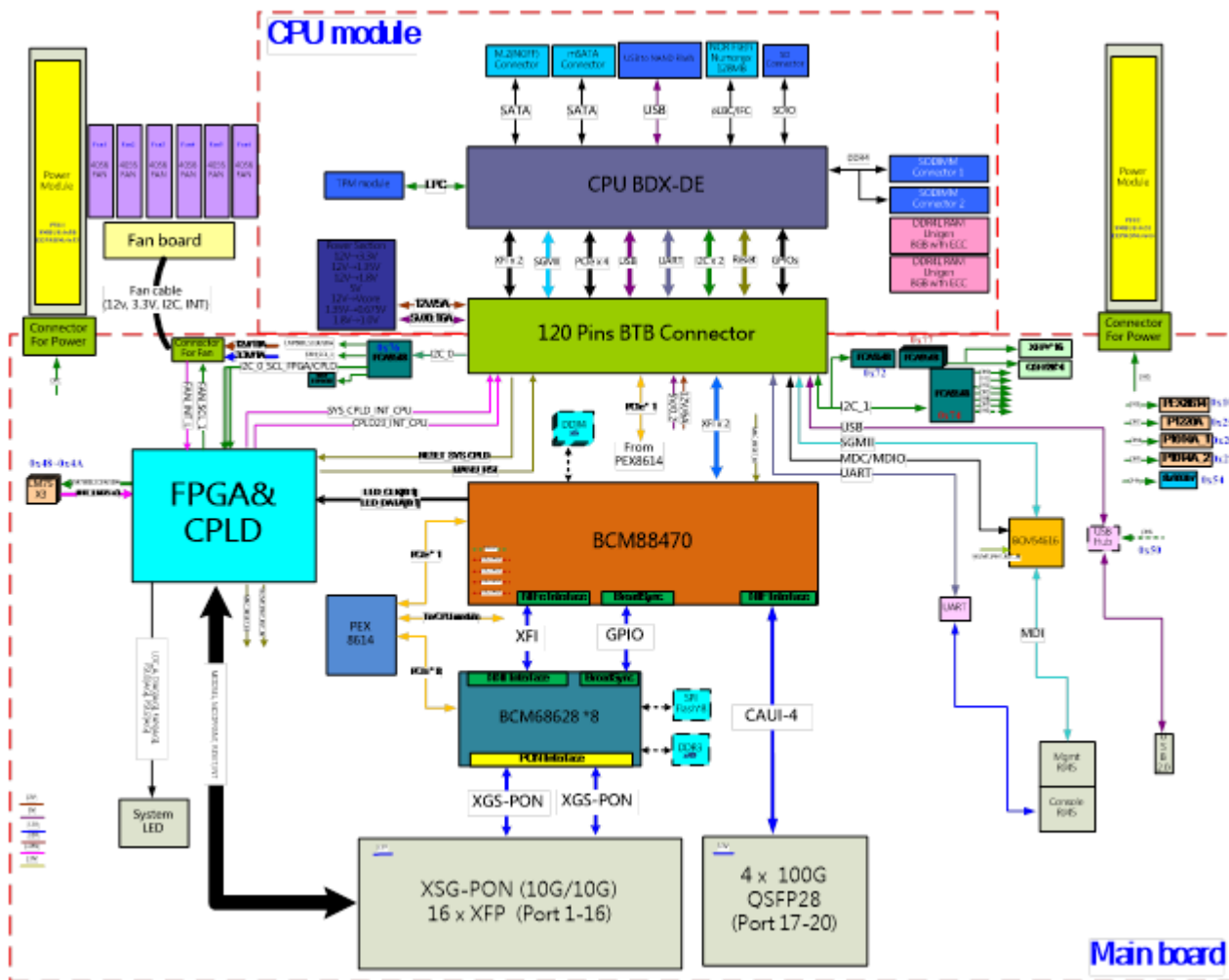


Fan Connector pinout

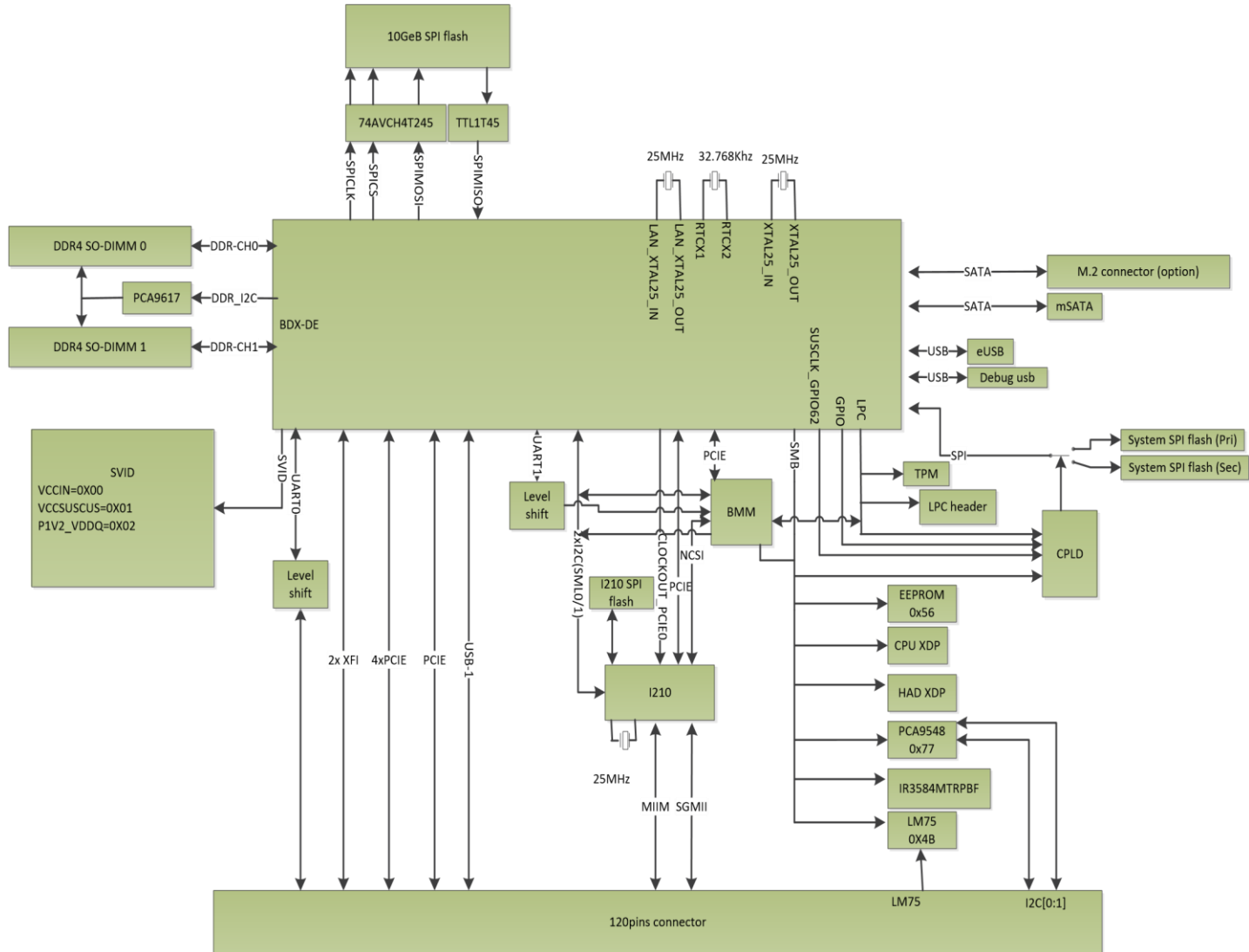


System Overview:

Main PCB Block Diagram



X86 Broadwell-DE CPU Module Block Diagram



PCB Board Set

The ASXVOLT16 is composed of 3 unique PCB assemblies as follows:

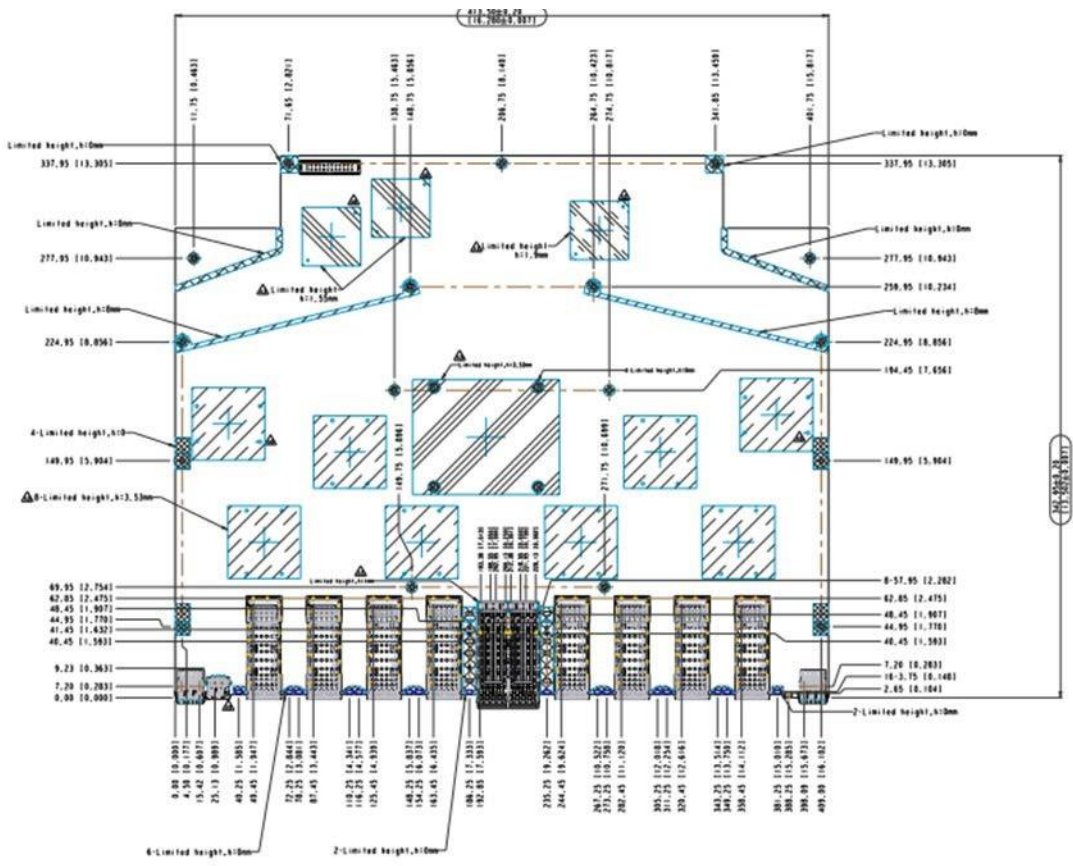
- Main switch PCB which supports the switching silicon and all front panel connections
- Broadwell-DE based X86 CPU module PCB which provides the control processor and associated components
- Fan PCB which provides connectivity for the 5 Fan modules in the system

Main Switch PCB

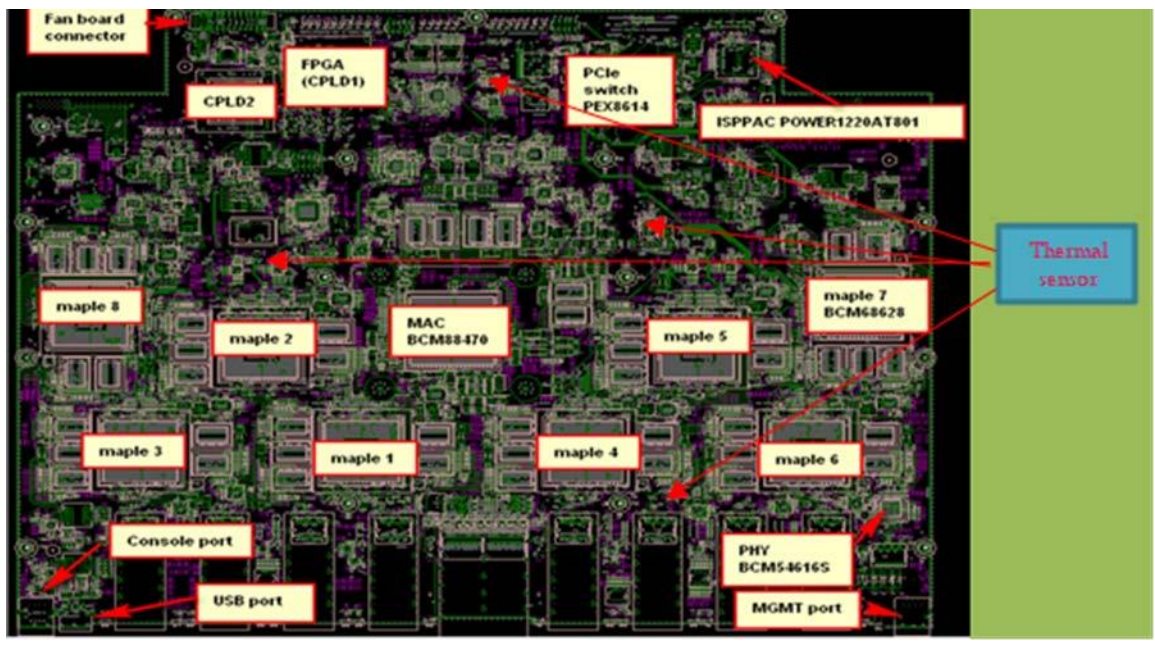
The Main Switch PCB is a twenty layer board supporting the switching silicon, front panel networking and management ports, LEDs, and connections to other PCBs required in building the system.

Main PCB Dimensions

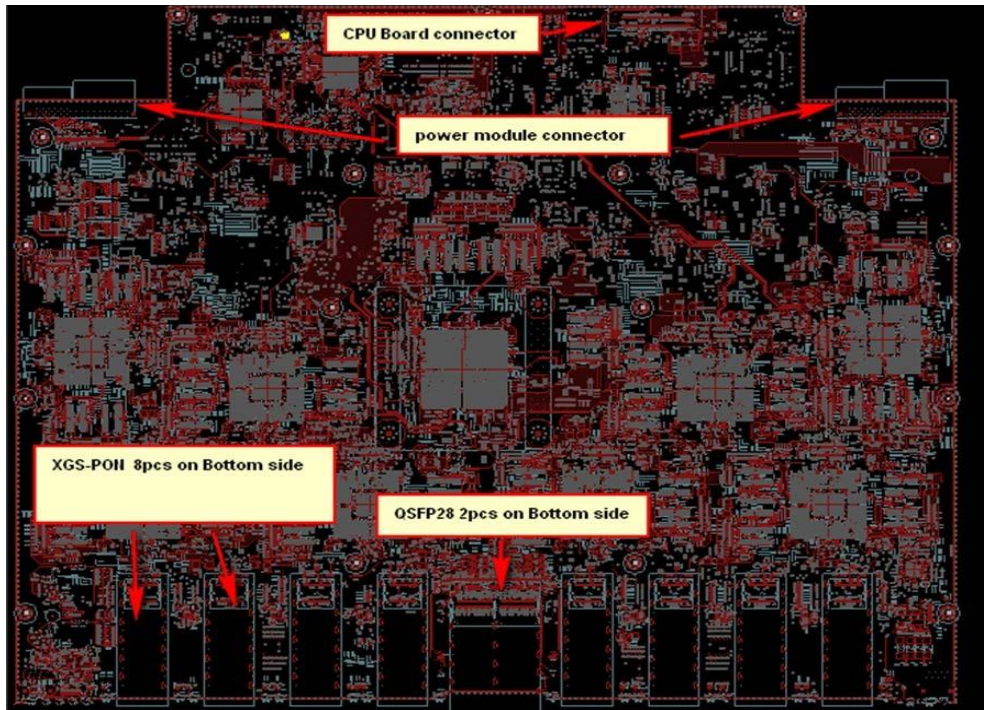
	Inches	Millimeters
Length	13.48	342.50
Width	16.28	413.50



Main PCB Top view



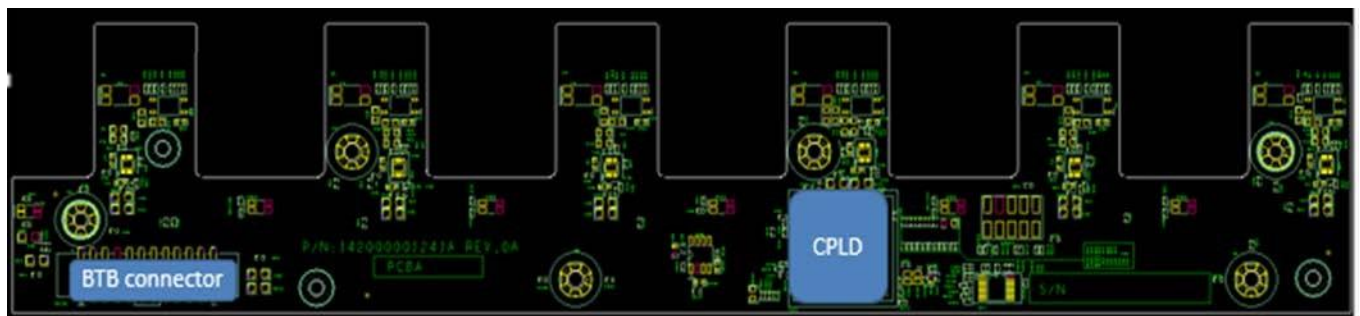
Main PCB Bottom View



Fan PCB

The Fan PCB is 4 layers and provides the power, management and connectivity for the 5 system fan modules. The Fan PCB connects to the Main Switch PCB via a small cable assembly for power and a small cable assembly for management signals.

The Fan board has a CPLD to do the fan controller function. The CPLD on the Fan board can control the Fan's PWM signal for adjust Fan speed and count the Fan's Tach signal for Fan speed reporting. CPU can read the thermal sensor to get thermal information, and then adjust Fan speed to reduce system's thermal. The Fan's CPLD had included I2C thermal watchdog to avoid system shutdown. If the register count to zero, the Fan speed will be set to high speed.



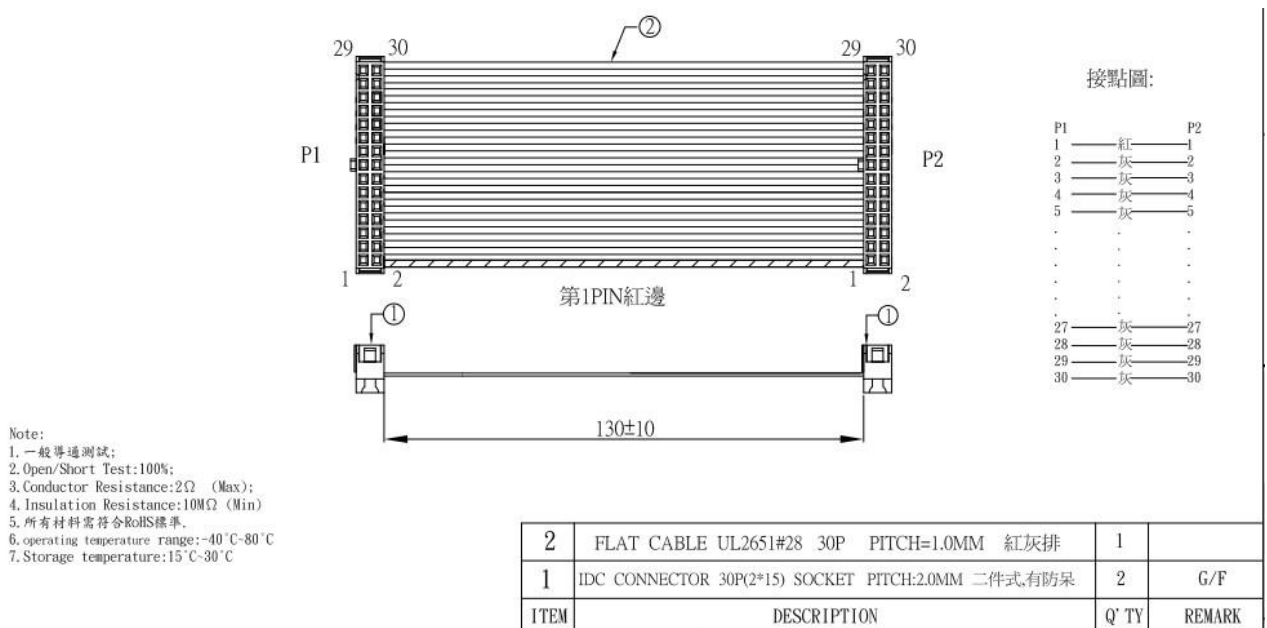
Fan PCB Dimensions

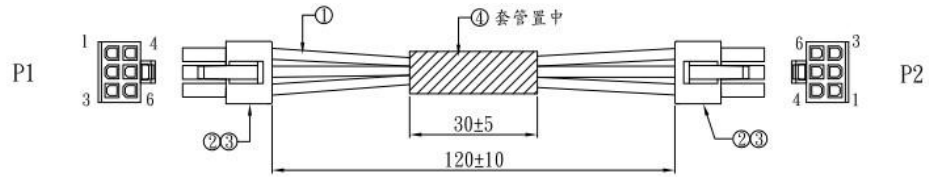
	<u>Inches</u>	<u>Millimeters</u>
Length	9.54	242.5
Width	2.40	60.9

Fan PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
B2B Connector	DONG-WEI	BHE6T0-224S4
CPLD	Altera	5M1270ZF256C5N 3.3V

Fan Cable Pinout





WIRE TABLE:

P1		P2
1	RED	3
2	WHITE	2
3	BLACK	1
4	GREEN	6
5	BLUE	5
6	YELLOW	4

4	H.S TUBE: $\phi 7*30\text{MM}$ 600V 黑色 WOER	1	EA
3	TERMINAL: I42002BS-2 WST	12	EA
2	HOUSING: P6-142002 WST	2	EA
1	WIRE: UL 1007#20 瑞興/聯電	6	EA
ITEM	DESCRIPTION	Q' TY	UNIT

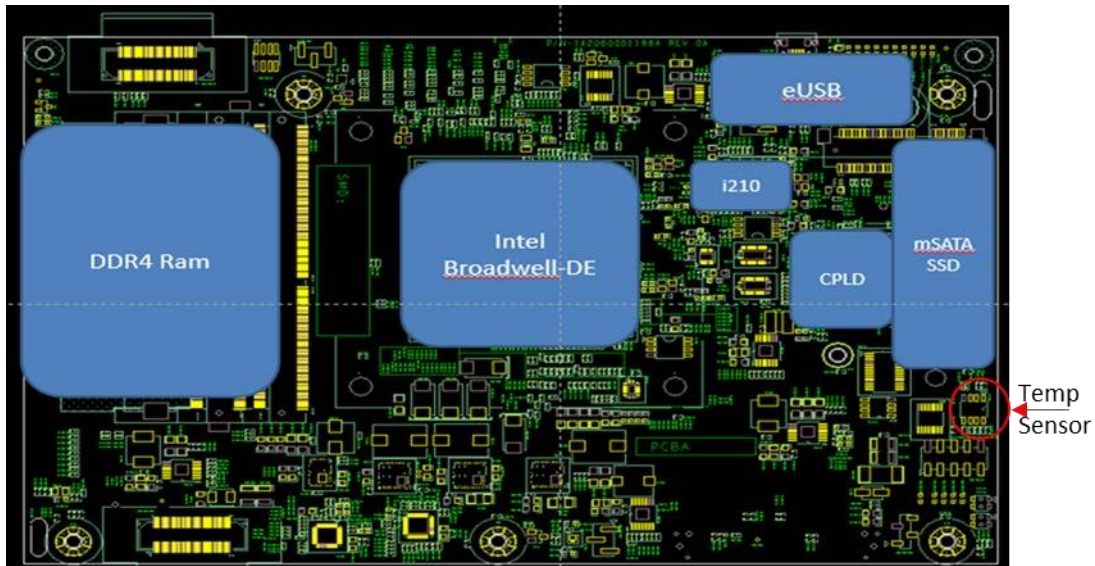
- Note:
1. 一般導通測試;
 2. Open/Short Test:100%;
 3. Conductor Resistance:2 Ω (Max);
 4. Insulation Resistance:10M Ω (Min)
 5. 所有材料需符合RoHS標準.
 6. operating temperature range:-10 $^{\circ}\text{C}$ -80 $^{\circ}\text{C}$
 7. Storage temperature:15 $^{\circ}\text{C}$ -30 $^{\circ}\text{C}$

X86 Broadwell-DE CPU Module PCB

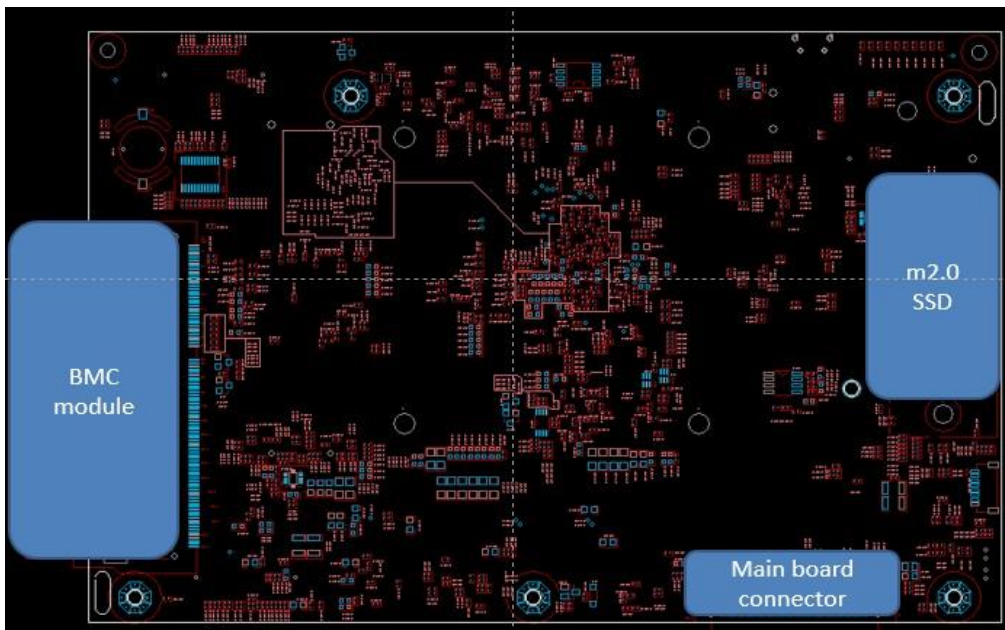
The x86 CPU module is a 12 layer PCB and supports the communication processor and associated components for the CPU subsystem. The communication processor utilized is an Intel® Xeon® processor D series communication processor. The Intel® Xeon® processor D product family is the first Intel® Xeon® SoC optimized to deliver Intel Xeon processor performance and enhanced total cost of ownership (TCO) for hyperscale workloads.

The Intel® Xeon® processor D product family supports high levels of I/O integrations, including 10GbE. The Intel Xeon processor D product family also includes data center processor features such as error correcting code (ECC). With high levels of I/O integration and energy efficiency.

X86 Broadwell-DE CPU PCB Top side



X86 Broadwell-DE CPU PCB Bottom side



X86 Broadwell-DE CPU PCB Dimensions

	<u>Inches</u>	<u>Millimeters</u>
Length	7.32	186.02
Width	4.86	123.5

X86 Broadwell-DE CPU PCB major components

<u>Description</u>	<u>Manufacturer</u>	<u>Part Number</u>
CPU	Intel	XeonD-1548
SDRAM 8GB per channel	Micron	MTA18ASF1G72HZ-2G1A1
USB to NAND Flash 8GB	ATP	AF8GSSGH-AC2
SPI NOR Flash	Winbond	W25Q128FVSIQ
Trusted Platform Module (TPM)	ST	ST33ZP24AR28PVSP
mSATA Connector	TE	1775838-2
M.2 connector	Concraft	213BAAA42FA
BMC Connector	FOXCONN	AS0A626-H2S6-7H
B2B Connector	SAMTEC	BTH-060-01-F-D-RA-WT-K
Ethernet Controller	Intel	WGI210AT
CPLD	Altera	5M1270ZF256C5N
10GeB SPI Flash	Winbond	W25Q32FVSSIQ
I210 SPI flash	Winbond	W25Q16DVSSIQ

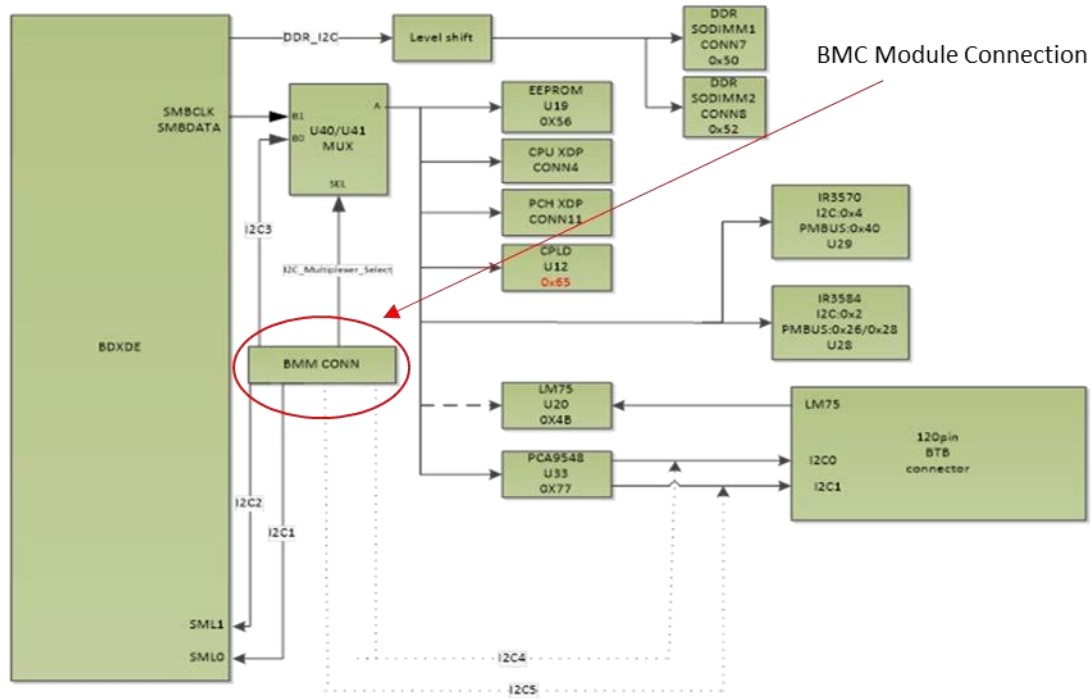
BMC Module

The Broadwell-DE CPU module can support an optional BMC plugin module if a BMC controller is desired. The BMC plugin module has full access to the system I2C busses and components and is capable monitoring various system attributes including but not limited to:

- System power management
- Temperature monitoring
- Fan control
- Illumination of system and locator LEDs
- Reset control

- Programming flash/BIOS
- Reading/writing information to system plugin module
- Serial number / unique identifier
- Board revision ID
- I2C interfaces to Host CPU, USB, temperature sensors, and voltage controllers.

I2C Bus Architecture



Note: I2C[1:5] are from the BMM point of view, not related to the I2C[0:1] through the B2B CONN

120 Pin CPU PCB to Main PCB Connector

ES7632BT 120 Pin	ES7632BT 120 Pin	General Function	CONNECTOR			General Function	ES7632BT 120 Pin	ES7632BT 120 Pin
			PIN #	PIN #				
(D)LM75BD_SCLK	IN	TEMP_ANODE	IN/OUT	119	120	OUT	I2C_2_SCL	I2C_1_SCL
(O)LM75BD_SDA	IN/OUT	TEMP_CATHODE	IN/OUT	117	118	IN	MGMT_RS232_DCD	CPU_PWDEN#
GND		GND	-	115	116	IN/OUT	GPIO	Not Used
CPU_MPHY_SGMII_TX_0_S_P	OUT	MPHY_SGMII_TX_P	OUT	113	114	IN/OUT	I2C_2_SDA	I2C_1_SDA
CPU_MPHY_SGMII_TX_0_S_N	OUT	MPHY_SGMII_TX_N	OUT	111	112	IN/OUT	GPIO	Not Used
GND		GND	-	109	110	IN	INTERRUPT	GND
MPHY_CPU_SGMII_RX_0_S_N	IN	MPHY_SGMII_RX_N	IN	107	108	IN	INTERRUPT	PCIE_OOB_TX_P
MPHY_CPU_SGMII_RX_0_S_P	IN	MPHY_SGMII_RX_P	IN	105	106	OUT	MGMT_RS232_DTR	PCIE_OOB_TX_N
GND		GND	-	103	104	IN/OUT	PROCHOT#	GND
CPU_MPHY_MDC	OUT	GPIO(MPHY_MDC)	OUT	101	102	IN/OUT	GPIO	PCIE_OOB_RX_P
Not Used		INTERRUPT(MPHY)	IN	99	100	OUT	THRMTRIP#	PCIE_OOB_RX_N
CPU_MPHY_MDIO	IN/OUT	GPIO(MPHY_MDIO)	IN/OUT	97	98	IN	INTERRUPT	GND
GND		GND	-	95	96	IN	MGMT_RS232_RXD	UART1_RX
IP_UART0_SOUT	IN	GPIO	IN/OUT	93	94	IN	MGMT_RS232_CTS	UART1_CTS
CHLD23_INT_CPU	IN		IN	91	92	IN	INTERRUPT	CPU_TDI
1PPS_CPU	IN	GPIO	IN/OUT	89	90	OUT	MGMT_RS232_TXD	UART1_TX
GND		GND	-	87	88	IN	INTERRUPT	MAC_INT_L
GND		GND	-	85	86	-	GND	GND
CPU_XFI_EC_TX_0P	OUT	DIFF_PAIR_TX_0_P	OUT	83	84	IN/OUT	MGMT_USB_N	USB2_N
CPU_XFI_EC_TX_0N	OUT	DIFF_PAIR_TX_0_N	OUT	81	82	IN/OUT	MGMT_USB_P	USB2_P
GND		GND	-	79	80	-	GND	GND
GND		GND	-	77	78	OUT	HWIO	UCD990U_ALERT_1
CPU_XFI_EC_RX_0P	IN	DIFF_PAIR_RX_0_P	IN	75	76	OUT	MGMT_RS232_RTS	UART1_RTS
CPU_XFI_EC_RX_0N	IN	DIFF_PAIR_RX_0_N	IN	73	74	OUT	HWIO	RESET_SYS_CPLD
GND		GND	-	71	72	IN/OUT	GPIO	CPU_TMS
GND		GND	-	69	70	OUT	JTAG_TRST#	CPU_JTAG_RST
CPU_XFI_EC_RX_2P	IN	DIFF_PAIR_RX_1_P	IN	67	68	OUT	HWIO	P1014_RST
CPU_XFI_EC_RX_2N	IN	DIFF_PAIR_RX_1_N	IN	65	66	IN/OUT	GPIO	CPU_TDO
GND		GND	-	63	64	IN/OUT	GPIO	CPU_TCK
GND		GND	-	61	62	IN/OUT	GPIO	IP_UART0_SIN
CPU_XFI_EC_TX_2P	OUT	DIFF_PAIR_TX_1_P	OUT	59	60	IN/OUT	I2C_0_SDA	Not Used
CPU_XFI_EC_TX_2N	OUT	DIFF_PAIR_TX_1_N	OUT	57	58	OUT	I2C_0_SCL	Not Used
GND		GND	-	55	56	IN	INTERRUPT	SYS_CPLD_INT_CPU
GND		GND	-	53	54	OUT	HWIO	USB1_PWRFAULT
CPU_PEX_PCIEA_TX_0_P	OUT	PCIE_TX_2_P	OUT	51	52	IN	RESET_MODULE_RBQ#	Manu_RST
CPU_PEX_PCIEA_TX_0_N	OUT	PCIE_TX_2_N	OUT	49	50	OUT	I2C_1_SCL	I2C_0_SCL
GND		GND	-	47	48	IN/OUT	I2C_1_SDA	I2C_0_SDA
GND		GND	-	45	46	OUT	RESET_SYS_REQ#	RESET_MAC
CPU_PEX_PCIEA_TX_1_N	OUT	PCIE_TX_3_P	OUT	43	44	IN	SYS_PWR_GOOD	CPU_THERMALTRIP
CPU_PEX_PCIEA_TX_1_P	OUT	PCIE_TX_3_N	OUT	41	42	OUT	HWIO	USB1_VBUS
GND		GND	-	39	40	-	GND	GND
GND		GND	-	37	38	-	GND	GND
PEX_CPU_PCIEA_RX_0_N	IN	PCIE_RX_2_P	IN	35	36	OUT	PCIE_TX_0_P	CPU_PEX_PCIEB_TX_0_P
PEX_CPU_PCIEA_RX_0_P	IN	PCIE_RX_2_N	IN	33	34	OUT	PCIE_TX_0_N	CPU_PEX_PCIEB_TX_0_N
GND		GND	-	31	32	-	GND	GND
GND		GND	-	29	30	-	GND	GND
PEX_CPU_PCIEA_RX_1_N	IN	PCIE_RX_3_P	IN	27	28	IN	PCIE_RX_0_P	PEX_CPU_PCIEB_RX_0_P
PEX_CPU_PCIEA_RX_1_P	IN	PCIE_RX_3_N	IN	25	26	IN	PCIE_RX_0_N	PEX_CPU_PCIEB_RX_0_N
GND		GND	-	23	24	-	GND	GND
GND		GND	-	21	22	-	GND	GND
CPU_PEX_PCIEB_TX_1_N	OUT	PCIE_TX_1_P	OUT	19	20	IN	PCIE_RX_1_P	PEX_CPU_PCIEB_RX_1_P
CPU_PEX_PCIEB_TX_1_P	OUT	PCIE_TX_1_N	OUT	17	18	IN	PCIE_RX_1_N	PEX_CPU_PCIEB_RX_1_N
GND		GND	-	15	16	-	GND	GND
GND		GND	-	13	14	-	GND	GND
GND		GND	-	11	12	-	GND	GND
VCC12		12VDC	-	9	10	-	12VDC	VCC12
VCC12		12VDC	-	7	8	-	12VDC	VCC12
VCC5P0		5VDC	-	5	6	-	12VDC	VCC12
VCC5P0		5VDC	-	3	4	-	12VDC	VCC12
VCC5P0		5VDC	-	1	2	-	12VDC	VCC12

Software Support

The ASXVOLT16 supports a base software package composed of the following components:

BIOS support

The ASXVOLT16 Supports AMI AptioV BIOS version A01 or greater with the x86 CPU module

ONIE

See <https://github.com/opencomputeproject/onie> for the latest version of ONIE

Open Network Linux

See <http://opennetlinux.org/> for latest supported version

System Software

See <http://opencord.org> for information and documentation

See <https://github.com/opencord/cord> for software source

Specifications

Power Consumption

The total estimated system power consumption of the AS5410-54X is ~574.5 Watts. This is based upon worst case power assumptions for traffic, optics used, and environmental conditions. Typical power consumption will be less.

Environmental

The ASXvOLT16 follows ATT-TP-76208_vOLT Equipment Standards, for detail design and test requirements should refer Appendix: Equipment Physical Design Standards GR-63/GR-1089 & GR-3108 design and test requirements as partially specified in Sections below and in Appendix, it is intended to follow the specifications which mentioned in this document and Appendix for conducting design and tests.

Temperature and Humidity Operating Requirements:

Conditions	Limits
Operating Temperature*	+5°C to 40°C*
Operating Temperature Shortterm*	-5°C to 55°C
Operating Temperature Fan-fail	-5°C to 40°C
Storage temperate range	-40 to 40°C
Rate of Temperature Change	30°C / hr
Operating Relative Humidity	5% to 85%
Operating Relative Humidity Shortterm*	5% to 93°C
Dew Point	17°C
Vibration	IEC 68-2-36, IEC 68-2-6
Shock	IEC 68-2-29
Acoustic Noise Level	Under 78dB in 26 degree C
Altitude	200ft (-60 meters) to 6000ft (1830 meters).

Notes:

* Clarified the Temperature and Humidity Operating Requirements for 16 port vOLT, equipment deployed in carrier communications locations, should follow GR-63, shelf-level product specification requirement. As per GR63-CORE Issue4:

~ 1800m (+40 / +55 °C)

1800m ~ 4000m (13,000ft) (+30 /+40 °C)

* Short-term refers to a time period of not greater than 96 consecutive hours, and a total of not more than 360 hours per year.

Safety

- UL/ Canada
- CB (Issued by TUV/RH)
- China CCC
- ATIS-0600319.2014

Electromagnetic Compatibility

- CE
- EN55022 Class A
- EN55024
- EN61000-3-2
- EN61000-3-3
- FCC Title 47, Part 15, Subpart B Class A
- VCCI Class A
- CCC
- GR-1089-CORE

ROHS

Restriction of Hazardous Substances (6/6)

Compliance with Environmental procedure 020499-00 primarily focused on Restriction of Hazardous Substances (ROHS Directive 2002/95/EC) and Waste and Electrical and Electronic Equipment (WEEE Directive 2002/96/EC)