OPEN
Compute Project

Alpha Networks Inc

SNX-60x0-486T

48-port 10G BASE-T & 2-port 40G QSFP+ +
4-port 100G QSFP28 Switch
(ToR/Aggregation Switch)

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Revision History

Version	Revised Date	Author	Content Revised
0.1	16/01/16	Alex Chen	Initial Version

Scope

This documents defines the technical specification for SNX-60x0-486T used in the Open Compute Project as 10G Top of the Rack (ToR) or as an aggregation switch

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Overview

The SNX-60x0-486T Series Data Center, Top-of-Rack (ToR)/aggregation switches, with a total combined bandwidth of 720 Gbps, feature 48 ports of 10 Gbps and 6 ports of 40 Gbps Ethernet wire-speeds. The Layer 3 capable, bare metal system also provides an RJ-45 console port and an Out-Of-Band (OOB) management port. It also provides a micro USB interface in the front panel for the administrators to upgrade code by using an extended cable. The SNX-60x0-486T switch is a PHY-less design with BASE-T and QBASE-T connections directly attached to the SERDES interface of Broadcom BCM56854.

License

Items		Detailed Description
MAC Controller		BCM56860*1
PHY for 10G		BCM84868*12 or BGM84858*12
PHY for 100G		BCM82792*2
10G NIC		BCM57810S*1 (Optional)
CPU Subsystem		
Modular CPU board	CPU	Intel Rangeley C2558 4 Cores/2.4GHz
	RAM	DDR3 4GB for Intel Rangeley CPU (reserved up to 32G)
	Flash	SSD 16GB for Intel Rangeley CPU (reserved up to 64G)
	Boot Flash	8MB for Intel Rangeley CPU (reserved up to 16MB)
PHY for CPU Management Port		MVL88E1112*1

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1 Feature Highlights

The SNX-60x0-486T Series Data Center, leaf/ToR switches, with a total combined bandwidth of 960 Gbps, feature 48 ports of 10 Gbps RJ-45, 2 ports of 40 Gbps QSFP+ and 4 ports of 100Gbps QSFP28 at Ethernet wire-speeds. The Layer 3 capable, bare metal system also provides a RJ-45 and micro USB console port, an Out-Of-Band (OOB) management port using RJ-45 and an USB type A port for storage.

- OCP micro server modular CPU board with large flash and memory
- Temperature warning
- Software-readable thermal monitor
- Real time clock (RTC) support
- Two Hot-swappable redundant power supply
- Four redundant (4+1) fan modules
- The following are supported
- Front panel
  - One Reset Button
  - One Locator LED
  - Micro USB console port
- Rear panel
  - One Out-Of-Band (OOB) 10/100/1000 Mbps RJ-45 management port
  - One RJ-45 type console port
  - One USB (Type A) port for storage device
  - Two BNC ports for IEEE 1588 clock sync (Optional)

2 Physical Overview

2.1 Mechanical Dimension

Dimension	
Height x Width x Depth	44mm(H)440mm(W) x 487.4 mm(D)

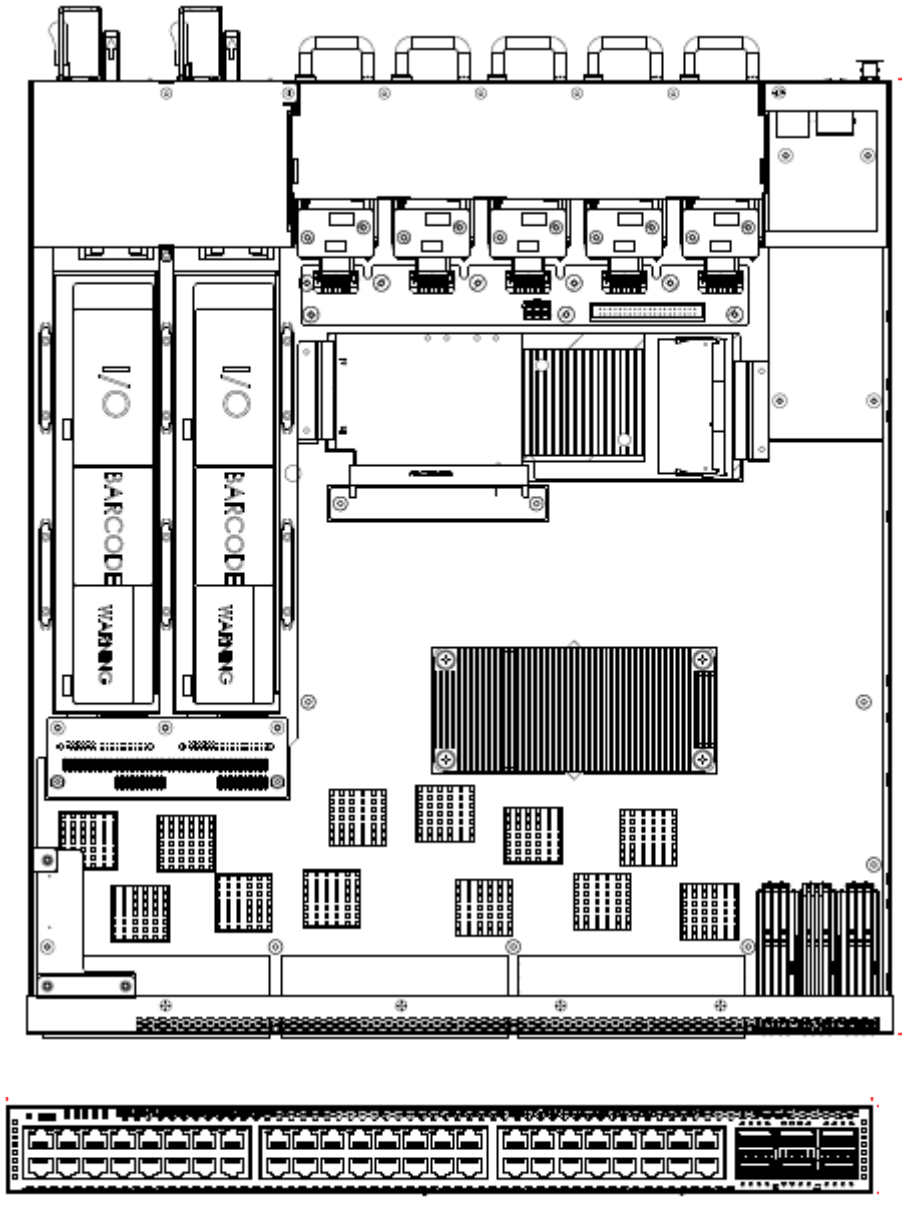
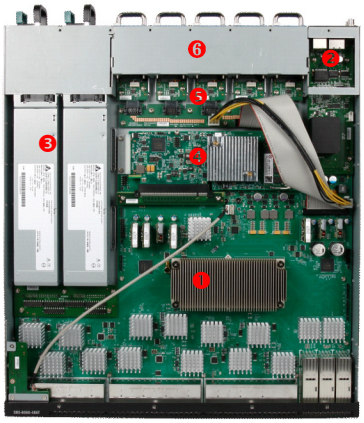


Figure 1: SNX-60x0-486T Chassis dimension

2.2 Top View



❶: Main Board
❷: Management board
❸: PSU modules
❹: Micro server CPU module
❺: Fan extender
❻: Fan modules

Figure 2: SNX-60x0-486T top view

2.3 Front View

❶: Reset button
❷: Micro USB console port
❸: 48* 10G Base-T ports
❹: 2* 40G QSFP+ ports
❺: 4* 100G QSFP28 ports

Figure 3: SNX-60x0-486T front view

2.4 Rear View

❶: Hot swappable fan modules
❷: Hot swappable power supply
❸: Console Port
❹: BMC port
❺ : Type A USB storage port
❻ : Out of band management port
1588 BNC port Design Reserved

Figure 4: SNX-60x0-486T rear view

3 LED Definition

The following table defines the per device LEDs' behaviors:

Items	LED Indication	Color	Behavior	Description
1	Locator	Blue	Blinking	Locator function is enable
			Off	Locator function is disable
2	STAT	Green	Solid Light	POST Passed, normal operation
			Blinking	POST in progress
			Light off	System No power
		Amber	Blinking	POST failed or overheat or power supply failed or Fan module fail or over temperature
3	MGMT	Green	Solid Light	Link up
			Blinking	Packet transmitting or receiving
			Light off	No link up or port disable
4	FAN 1	Green	Solid Light	All diagnostics pass. The module is operational.

	FAN 2 FAN 3 FAN 4 FAN 5		Off	The module is not receiving power
		Amber	Blinking	Failure
5	PWR (P1, P2)	Green	Solid Light	Power On
			Off	Power Off and no power attached
		Amber	Blinking	Power supply failures, over voltage, over current, over temperature

Table 1: LED behavior for system

The following defines the 10G BASE-T Ethernet port LEDs' behaviors:

Location	Speed	LED Indication	Color	Behavior	Description
LED Port 1~48	10G bps(high speed) LED	Link/Act	Green	Solid Light	The port has a link and is operating at 10Gbps
				Blinking	
	5, 2.5,1 G bps(low speed)		Amber	Solid Light	The port has a link and is operating at 5/2.5/1Gbps
				Blinking	The port is sending or receiving data at 5/2.5/1Gbps
	Off			Light off	Link down or no link

Table 2: LED behavior for Port 1~48 10G Ethernet Port

The following table defines the 40G QBASE-T Ethernet port LEDs' behaviors:

Location	Speed	LED Indication	Color	Behavior	Description
LED number 49~56 in group of 4 (40Gbps)	40G	Link/Act/Speed	Green	Solid Light	When there is a secure 40G connection (or link)
				Blinking	Packet transmitting or receiving
				Light off	No link up or port disable
LED number 57~72, group of	100G	Link/Act/Speed	Green	Solid Light	When there is a secure 100G connection (or link)

4				Blinking	Packet transmitting or receiving
	40G		Amber	Solid Light	When there is a secure 40G connection (or link)
				Blinking	Packet transmitting or receiving
	Off			Light off	No link up or port disable

Table 3: LED behavior for Port 49~50 40G, 51~54 100G Ethernet Port

Each power supply module has a bi-color LED, which behavior is descript in the following:

LED Color	Behavior	Description
Green	Solid Light	Output ON and OK
	Blinking	AC present / AC Line 12VSB Holdup
	Light off	No AC power to all power supplies
Amber	Solid Light	Power supply critical event causing a shutdown; failure, Fan Fail
	Blinking	Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan.

Table 4: Power supply LED definition

4 Field Replaceable Components

4.1 Power Supply Modules

The switch is powered through one or two internal power supply modules.

Supported power supply modules:

- AC-770-12-FB
- AC-770-12-BF
- DC-1100-12-FB
- DC-1100-12-BF

The switch requires only one power supply for its operations, but you can include a second one for redundancy. By default the switch is installed one power supply in the second power supply slot, and filled the first slot with a filler panel. You can order extra power supplies with forward airflow or reverse airflow. Be sure to order the

same direction of airflow as is used with the switch. Never leave a power supply slot empty. Please fill the slot with a filler panel.

Please refer to **錯誤! 找不到參照來源。** for the recommended power supply usage for each switch model.

Switch Model Number	Equipped CPU Model	Power Supply Model Number	Minimum Number of Power Supply Need
SNX-60X0-486T-AF-B	Intel Rangely C2558	AC-770-12-FB	1
SNX-60X0-486T-AB-B	Intel Rangely C2558	AC-770-12-BF	1
SNX-60X0-486T-DF-B	Intel Rangely C2558	DC-1100-12-FB	1
SNX-60X0-486T-DB-B	Intel Rangely C2558	DC-1100-12-BF	1

Table 5: Power supplies usage

Power Supply connector: Molex 45984-4343

Pin #	Descriptin	Pin #	Descriptin3
S1	+12VRS+	**S13**	N/A
S2	+12VRS-	**S14**	SGND
S3	12LS	**S15**	A0
S4	SMB ALERT	**S16**	N/A
S5	SDA	**S17**	Vs
S6	SCL	**S18**	N/A
S7	PSKILL	**S19**	N/A
S8	PSON	**S20**	N/A
S9	PWOK	**S21**	N/A
S10	A1	**S22**	N/A
S11	5VSB	**S23**	+5VSB
S12	5VSB	**S24**	+5BSB
P1	+12_VOUT	**P3**	GND
P2	+12_VOUT	**P4**	GND

Table 6: Power supply connector pin out

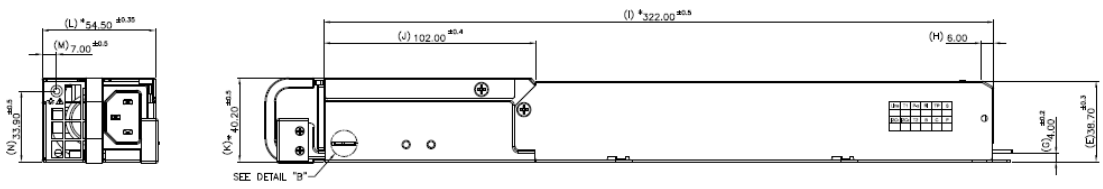


Figure 5: Power Supply Mechanical specification

LED definition on power supply

Power Supply Condition	LED Status
PSU is switched on and is running (Output ON and OK)	Green
No AC power to all power supplies or PSU is ON but with warning events	Off
PSU is OFF but 5VSB is on	1Hz on Blink Green
PSU critical event causing a shutdown: failure, OCP, OTP, OVP, UVP, Fan Fail	Amber
PSU warning events: high temp, high power, high current, slow fan, under input voltage	1Hz on Blink Amber

Table 7: LED definition on power supply

FRU

FRU data format compliant with IPMI ver 1.0 (per rev 1.1 from Sept. 25, 1999) specification. The FRU device will implement the same protocols as the commonly used AT24C02 device, including the Byte Read, Sequential Read, Byte Write and Page Read protocols.

The EEPROM content is as following

Area Type	Description
Common Header	Format Version Number
Internal Use Area	Not required, do not reserve
Chassis Info Area	Not applicable, do not reserve
Board Info Area	Not applicable, do not reserve
Product Info Area	As defined by the IPMI FRU document. Product information is defined as following
Field name	Field Description
Manufacturer Name	{Formal name of manufacturer}
Product Name	{Manufacturer's model number}
Product part/model number	Customer part number
Product Version	Customer current revision
Product Serial Number	{Defined at time of manufacture}
Asset Tag	{Not used, code is zero length byte}
FRU File ID	{Not required}
PAD Bytes	{Added as necessary to allow for 8-bype offset to next area}

Mulit-Record Area	As defined by the IPMI FRU documentation. The following information shall be used by this power supply: Power Supply Information (Record type 0x00) DC Output (Record Type 0x01) No other record types are required for power supply Multi-Record information shall be defined as following
Field Name (PS Info)	Field Information Definition
Overall Capacity (watts)	770
Peak VA	770
Inrush current (A)	40
Inrush interval (msec)	5
Low end input voltage range 1	100
High end input voltage range 1	127
Low end input voltage range 2	200
High end input voltage range 2	240
Low End Input Frequency Range	47
High End Input Frequency Range	63
Holdup Time (msec)	12
Binary flags	Set for: Hot Swap support, Auto switch and PFC
Peak Wattage	839 Watts
Peak Wattage Time in seconds	12
Combined wattage	770
Predictive fail tach support	Supported
Field Name (Output)	Field Description : Two output are to be defined from #1 to #2, as follows: +12V and +5VSB
Output Information	Set for: Standby on +5VSB, no 5VSB on all others
All other output fields	Format per IPMI specification , using parameters in this specification

Table 8: Power Supply EEPROM FRU data format

4.2 Fan Modules

The SNX-60x0-486T supports up to 5 fan modules. For front to rear and rear to front air flow, different types of fan modules are required.

Air Flow Direction	Part Number
Front to Rear	AVC DFTA0456B2UP057
Rear to Front	AVC DFTA0456B2UP058

Table 9: Fan Modules part number

Fan module connector: LCU SM401V-20P

#	NAME	Description	#	NAME	Description
1	FAN_CON_TACH_0	FAN tachometer 0	**11**	FAN_DIR	FAN Direction
2	GND	GND	**12**	GND	GND
3	FAN_12VIN	12V	**13**	FAN_12VIN	12V
4	FAN_CON_PWM_0	PWM control for FAN0	**14**	EE_GND	EEPROM GND
5			**15**	EE_SDA	EEPROM SDA
6	EE_SCL	EEPROM SCL	**16**	EE_VDD	EEPROM VDD
7	EE_A0	EEPROM ADDR_0	**17**	FAN_CON_PWM_1	PWM control for FAN1
8	FAN_12VIN	12V	**18**	FAN_12VIN	12V
9	GND	GND	**19**	GND	GND
10	FAN_PRESENT#	Exist FAN module	**20**	FAN_CON_TACH_1	FAN tachometer 0

Table 10: Fan Modules connector pin out

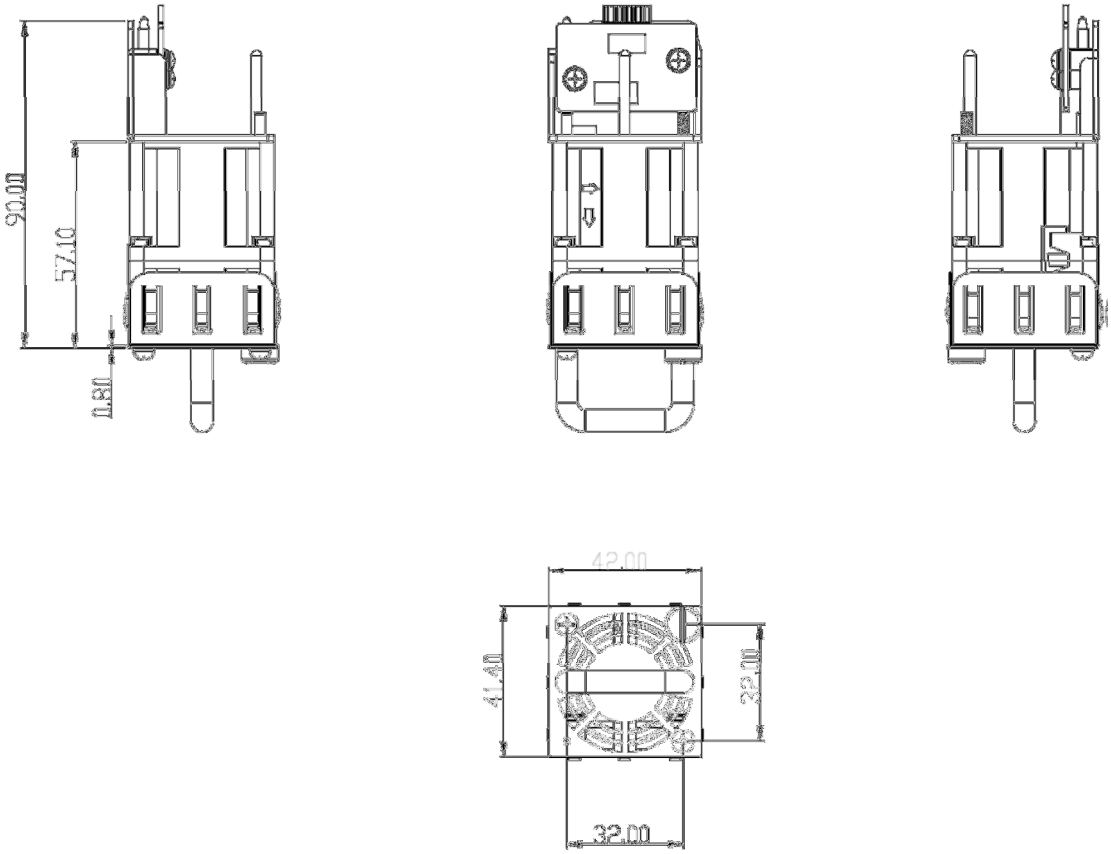


Figure 6: Fan module mechanical specification

5 System Overview

The SNX-60x0-486T comprised of the following PCB

PCB Function	PCB Layer	Dimension (mmxmm)
Main board	14	431*326.3
FAN module	2	38.5*29
FAN Adapter	2	228*30
LED board	2	50*91.5
PCIE Adapter	4	135.5*16
PSU Adapter	4	132.4*41.3
CPU board	12	210*73.8
Management board	4	58*180

Table 11: PCBs for SNX-60x0-486T

5.1 Main PCB

The main PCB is a 12 layer PCB where the switch MAC resides. It also supports the

following functions:

- Networking I/O ports
- Management ports
- LED
- Connectivity to power supply and fan
- Power conversion circuit
- Etcs

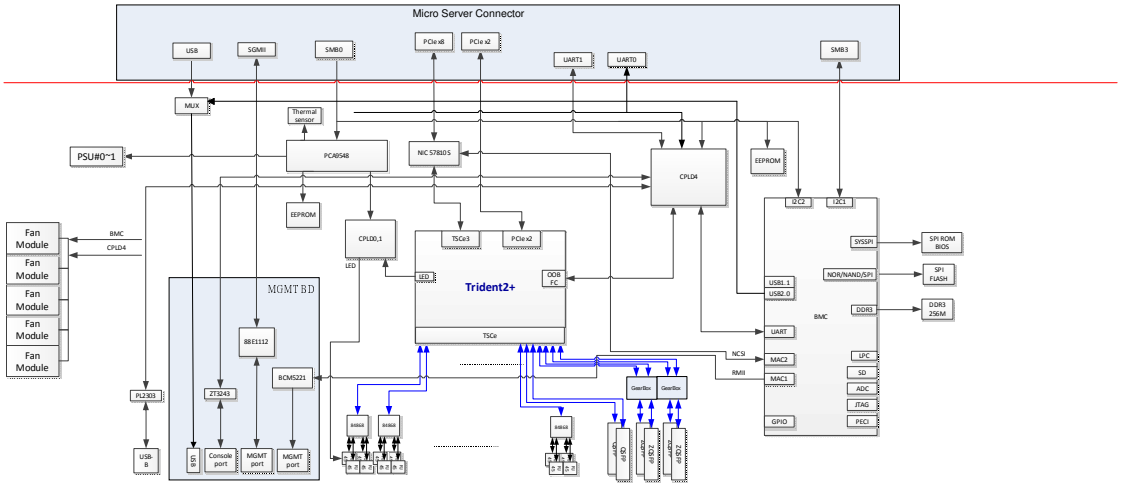
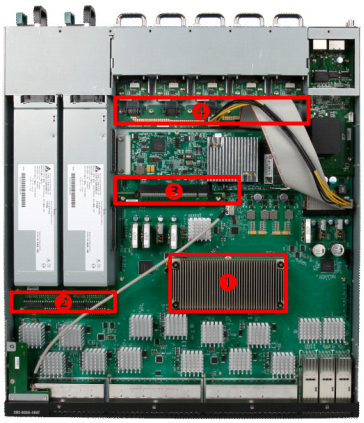


Figure 7: Main board block diagram



❶: MAC BMC56860
❷: Power supply connector
❸: Connector for CPU module
❹: Fan module connector

Figure 8: Main PCB top view

5.1 CPU Subsystem

The following Table is the list of key components used in SNX-60x0-486T

Items		Detailed Description
Intel		
Modular CPU board (Option 2)	CPU	Intel Rangeley C2558 4 Cores/2.4G
	RAM	DDR3 4GB for Intel Rangeley CPU
	Flash	SSD 8GB for Intel Rangeley CPU
	Boot Flash	8MB for Intel Rangeley CPU

Table 12: CPU subsystem key Components

5.1.1 Intel CPU (C2558)

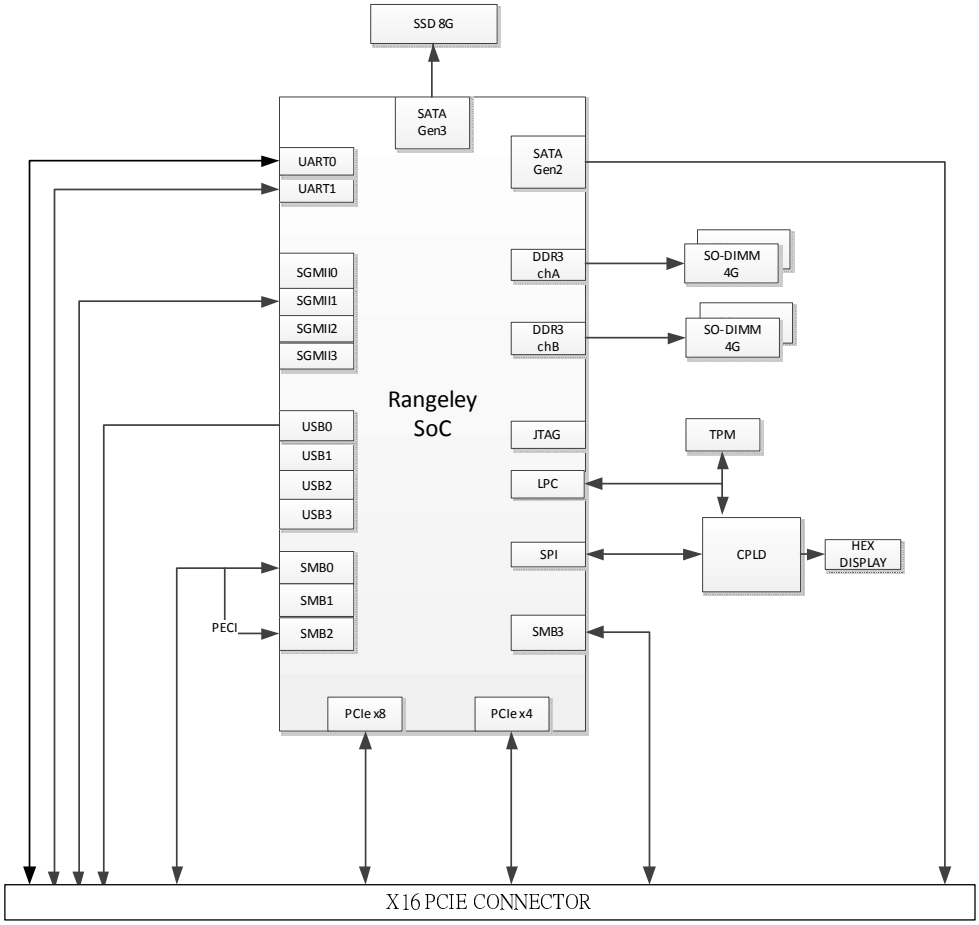


Figure 9: Intel CPU board block diagram

Intel CPU module connector: x16 PCIe Edge Connector

For 80 PIN connector			
#	**Pin Name**	**#**	**Pin Name**
B1	P12V	**A1**	PRSNT#
B2	P12V	**A2**	P12V
B3	P12V	**A3**	P12V
B4	GND	**A4**	GND
B5	I2C_SCL	**A5**	RFU
B6	I2C_DATA	**A6**	RFU
B7	GND	**A7**	COM_TX
B8	PWR_BTN#	**A8**	COM_RX
B9	USB_P	**A9**	GE0_MDC
B10	USB_N	**A10**	GE0_MDIO
B11	SYS_RESET#	**A11**	PCIE0_RESET#

KEY			
B12	I2C_ALERT#	**A12**	GND
B13	GND	**A13**	PCIE0_REFCLK_P
B14	GND	**A14**	PCIE0_REFCLK_N
B15	PCIE0_TX0_P	**A15**	GND
B16	PCIE0_TX0_N	**A16**	GND
B17	GND	**A17**	PCIE0_RX0_P
B18	GND	**A18**	PCIE0_RX0_N
B19	PCIE0_TX1_P	**A19**	GND
B20	PCIE0_TX1_N	**A20**	GND
B21	GND	**A21**	PCIE0_RX1_P
B22	GND	**A22**	PCIE0_RX1_N
B23	PCIE0_TX2_P	**A23**	GND
B24	PCIE0_TX2_N	**A24**	GND
B25	GND	**A25**	PCIE0_RX2_P
B26	GND	**A26**	PCIE0_RX2_N
B27	PCIE0_TX3_P	**A27**	GND
B28	PCIE0_TX3_N	**A28**	GND
B29	GND	**A29**	PCIE0_RX3_P
B30	GND	**A30**	PCIE0_RX3_N
B31	UART0_TXD	**A31**	GND
B32	UART0_RXD	**A32**	GND
B33	GND	**A33**	RFU
B34	GND	**A34**	RFU
B35	PCIE1_REFCLK_P	**A25**	GND
B36	PCIE1_REFCLK_N	**A36**	GND
B37	GND	**A37**	RFU
B38	GND	**A38**	RFU
B39	PCIE1_RESET#	**A39**	GND
B40	RFU	**A40**	GND
B41	GND	**A41**	RFU
B42	GND	**A42**	NIC_SMBUS_ALERT#
B43	NIC_SMBUS_SCL	**A43**	GND
B44	NIC_SMBUS_SDA	**A44**	GND
B45	GND	**A45**	GE0_RX_P
B46	GND	**A46**	GE0_RX_N
B47	GE0_TX_P	**A47**	GND
B48	GE0_TX_N	**A48**	GND
B49	GND	**A49**	RFU
B50	GND	**A50**	RFU
B51	RFU	**A51**	GND
B52	RFU	**A52**	GND
B53	GND	**A53**	RFU
B54	GND	**A54**	RFU

B55	RFU	**A55**	GND
B56	RFU	**A56**	GND
B57	GND	**A57**	RFU
B58	GND	**A58**	RFU
B59	RFU	**A59**	GND
B60	RFU	**A60**	GND
B61	GND	**A61**	RFU
B62	GND	**A62**	RFU
B63	RFU	**A63**	GND
B64	RFU	**A64**	GND
B65	GND	**A65**	PCIE1_RX0_P
B66	GND	**A66**	PCIE1_RX0_N
B67	PCIE1_TX0_P	**A67**	GND
B68	PCIE1_TX0_N	**A68**	GND
B69	GND	**A69**	PCIE1_RX1_P
B70	GND	**A70**	PCIE1_RX1_N
B71	PCIE1_TX1_P	**A71**	GND
B72	PCIE1_TX1_N	**A72**	GND
B73	GND	**A73**	PCIE1_RX2_P
B74	GND	**A74**	PCIE1_RX2_N
B75	PCIE1_TX2_P	**A75**	GND
B76	PCIE1_TX2_N	**A76**	GND
B77	GND	**A77**	PCIE1_RX3_P
B78	GND	**A78**	PCIE1_RX3_N
B79	PCIE1_TX3_P	**A79**	GND
B80	PCIE1_TX3_N	**A80**	GND
B81	GND	**A81**	P12V
B82	GND	**A82**	P12V

Table 13: Intel CPU module connector pin out

Intel CPU module pin definitions

#	Pin	Direction (from CPU side)	Required/ Configurable	Pin Definition
	P12V	Input	Required	12 V-AUX power
	I2C_SCL	Input/Output	Required	I2C clock signal. I2C is the primary sideband interface for server management functionality. 3.3 VAUX signal. Pull-up is provided on the baseboard.

	I2C_SDA	Input/Output	Required	I2C data signal. I2C is the primary sideband interface for server management functionality. 3.3 VAUX signal. Pull-up is provided on the baseboard.
	I2C_ALERT#	Output	Required	I2C alert signal. Alerts the Baseboard Management Controller (BMC) that an event has occurred that must be processed. 3.3 V-AUX signal. Pull-up is provided on the baseboard.
	NIC_SMBUS_SCL	Input/Output	Required	Dedicated SMBus clock signal for network traffic between the BMC and the NIC. 3.3 V-AUX signal. Pullup is provided on the baseboard.
	NIC_SMBUS_SDA	Input/Output	Required	Dedicated SMBus data signal for network traffic between the BMC and the NIC. 3.3 V-AUX signal. Pullup is provided on the baseboard.
	NIC_SMBUS_ALERT#	Output	Required	Dedicated SMBus alert signal for network traffic between the BMC and the NIC. 3.3 V-AUX signal. Pullup is provided on the baseboard.
	PWR_BTN#	Input	Required	Power on signal. When driven low, it indicates that the server will begin its power-on sequence. 3.3 VAUX signal. Pull-up is provided on the baseboard. If PWR_BTN# is held low for < 4 seconds, then this indicates a soft (graceful) power off. Otherwise, a hard shutdown is initiated.
	SYS_RESET#	Input	Required	System reset signal. When driven low, it indicates that the server will begin its warm reboot process. 3.3 V-AUX signal. Pull-up is provided on the baseboard.
	PRSNT#	Output	Required	Present signal. This is pulled low on the card to indicate that a card is installed. 3.3 V-AUX signal. Pull-up is provided on the baseboard.
	COM_TX	Output	Required	Serial transmit signal. Data is sent from the

				micro-server module to the BMC. 3.3 V-AUX signal.
	COM_RX	Input	Required	Serial receive signal. Data is sent from the BMC to the micro-server module. 3.3 V-AUX signal.
	UART0_TXD	Output	Required	Serial transmit signal. Data is sent from the micro-server module to the BMC. 3.3 V-AUX signal.
	UART0_RXD	Input	Required	Serial receive signal. Data is sent from the BMC to the micro-server module. 3.3 V-AUX signal.
	GE0_TX_P/N	Output	Required	Primary Ethernet transmit signal. Data is sent from the micro-server module to the baseboard.
	GE0_RX_P/N	Input	Required	Primary Ethernet receive signal. Data is sent from the baseboard to the micro-server module.
	GE0_MDC	Output	Required	Primary Ethernet management interface clock signal.
	GE0_MDIO	Input/Output	Required	Primary Ethernet management interface data signal.
	PCIE0_RESET#	Output	Required	PCIe reset signal. If a PCIe bus is connected, this signal provides the reset signal indicating the card VRs and clocks are stable when driven high to 3.3V.
	PCIE0_TX0/1/2/3_P/N	Output	Configurable	PCIe x4 bus-transmit signals. Data is sent from the micro-server module to the baseboard. These signals may or may not be connected on the baseboard.
	PCIE0_RX0/1/2/3_P/N	Input	Configurable	PCIe x4 bus-receive signals. Data is sent from the baseboard to the micro-server module. These signals may or may not be connected on the baseboard.
	PCIE0_REFCLK_P/_N	Output	Configurable	PCIe reference clock. This signal may or may not be connected on the baseboard.

	PCIE1/2_RESET#	Output	Configurable	PCIe reset signals for to 2x additional PCIe buses. If a PCIe bus is connected, this signal provides the reset signal indicating the card VRs and clocks are stable when driven high to 3.3V.
	PCIE1_TX0/1/2/3_P/N	Output	Configurable	Second set of PCIe x4 bus-transmit signals. Data is sent from the microserver module to the baseboard. These signals may or may not be connected on the baseboard.
	PCIE1_RX0/1/2/3_P/N	Input	Configurable	Second set of PCIe x4 bus-receive signals. Data is sent from the baseboard to the micro-server module. These signals may or may not be connected on the baseboard.
	PCIE1_REFCLK_P/_N	Output	Configurable	Two additional PCIe reference clocks. These signals may or may not be connected on the baseboard.
	USB_P/N	Input/Output	Configurable	USB 2.0 differential pair.
	RSVD	Input/Output	Configurable	Available differential pairs that could be configured as PCIe, SATA, SAS, Ethernet, or other high-speed interfaces.
	RFU	Input/Output	Not connected	These pins are reserved for future use and are not used.

Table 14: Intel CPU module connector Pin Definitions

5.1.1.1 DDR3 SDRAM

The Rangeley Memory Controller supports up to 64 GB. The memory controller supports a 64-bit data bus with 8-bit ECC. When only one of the two memory channels is used in a platform board design, Channel 0 must be used. In all designs, Channel 0 must be populated by DRAM devices. Within each memory channel DIMMs are populated in slot order; slot 0 is populated first and slot 1 last. If a DIMM has two ranks, the ranks must be symmetrical (same chip width, same chip density, and same total memory size per rank). If both memory channels of the memory controller are used, then both channels must be populated identically. The CPU board is used a DDR3-1333 4GB SO-DIMM.

5.1.1.2 PCIe Interface

The Rangeley has up to 16 PCIe ports. Each port consists of a Transmitter differential pair and a Receiver differential pair which are in the 1.0-Volt Core power well of the SoC. The Rangeley supports devices with 5.0 GT/s and 2.5 GT/s capabilities.

6 IO and Connectors

6.1 RS232 Interface

- Baud Rate: s/w define
- Data bits: 8
- Stop Bit: 1
- Parity: None
- Flow control: None

6.2 Management Ethernet Interfaces

There are one single PHY on front panel PCBA, use SGMII interface from CPU module convert to 10/100/1000 RJ-45 GbE Management port. The PHY used is Marvell 88E1112.

6.3 USB Interface

The CPU contains one Enhanced Host Controller Interface (EHCI) and complies to the EHCI 1.0 Specification. The EHCI supports up to four USB 2.0 root ports. USB 2.0 allows data transfers up to 480 Mbps. The controller integrates a Rate-Matching Hub (RMH) to support USB 1.1 devices. The USB Port 1 interface is configured by the debug software to be a debug port.

7 Power/Environmental/Agency Certifications

Power	
Number of power supply	2
Power supply types	AC (forward and reversed airflow) DC (forward and reversed airflow)
Typical operating power	TBD
Maximum power	511W
AC PSUs ● **Input voltage** ● **Frequency** ● **Efficiency**	770W ● 100 to 240 VAC ● 50 to 60 Hz
DC PSUs ● **Input voltage range**	1100W

● **Efficiency**	● 40.5V/23.8A 48V/19.0A -60V/15.6
Environment	
Operating temperature	0 ~ 45°C (at sea level with Fan Failure condition)
Altitude	0 ~ 10,000ft at 40°C*
Storage temperature	-40~70°C
Operating relative humidity	0%-95% RH (non-condensing)
Storage relative humidity	0%~95% RH (non-condensing)
Dimensions (height x width x depth)	44mmx440mmx487.4mm
Weight	TBD

Table 15: Power consumption and environment table

Regulatory Standards Compliance	
Regulatory compliance Safety	Comply with CE markings per directives 2004/108/EC and 2006/95/EC FCC/IC Report Class A BSMI UL/cUL Listed Mark CCC
Safety	IEC60950-1 FCC/IC Report Class A EN 60950-1 FCC/IC Report Class A UL/CSA 60950-1 CNS 14336-1 GB4943.1
EMC: Emissions	IEC60950-1 FCC/IC Report Class A EN 60950-1 FCC/IC Report Class A UL/CSA 60950-1 CNS 14336-1 GB4943.1

RoHS Requirement			
Level	**#**	**Description**	**Limitation/ ppm**
A	**A1**	Cadmium/ Cadmium Compounds	80
	A2	Hexavalent Chromium/ Hexavalent Chromium Compounds	800
	A3	Lead/ Lead Compounds	800
	A4	Mercury/ Mercury Compounds	800
	A5	Polybrominated Biphenyls (PBBs)	800
	A6	Polybrominated Diphenylethers (PBDEs)	800
Reliability Test Reports			

Test Items	Standards	Remarks
MTBF Prediction Report	Telcordia SR-332, Issue 2	
Free Fall Test Report	**IEC 60068-2-32:** Basic Environmental Testing Procedures Part 2: Tests Test Ed: Free Fall-Second Edition; Incorporating Amendment 1; Amendment 2: 10-1990	• Drop Range:≦ 20Kg,1000mm; ≦50kg, 500mm; • Max. Load: 500 kg; • FCS: 1 carton.
Vibration Test Report	**IEC 60068-2-34:1973:** Environmental testing Test Fd: Random vibration wide band-General requirements	• Frequency: 20Hz ~500Hz; • Method: Random; • Test Time: 30 min/Per Axis; • FCS: 1 carton.
Storage Test Report	**IEC 60068-2-48:** Basic Environmental Testing Procedures Part 2: Tests Guidance on the Application of the Tests of IEC Publication 68 to Simulate the Effects of Storage-First Edition	• Low Temp.: -40℃,72Hours • High Temp. /Low Humidity : 70 ℃,25%R.H.,72Hours • High Temp. /High Humidity : 40 ℃,95%R.H.,96Hours • FCS: 1 carton
Cold Test Report	**IEC 60068-2-1**: Environmental Testing Part 2: Tests - Tests A: Cold-Fifth Edition; Amendment 1-1993; Amendment 2-1994	• Temperature: -10±3℃ • Humidity: Uncontrolled • Test Time: 72 Hours • FCS: 2 sets
Dry Heat Cyclic Test Report	**IEC 60068-2-2**: Basic Environmental Testing Procedures Part 2: Tests - Tests B: Dry Heat-Fourth Edition; Supplement A-1976; Amendment 1-1993; Amendment 2-1994	• Temperature: 55±2℃ • Humidity: 5%R.H. • Test Time: 72 Hours • FCS: 2 sets
Damp Heat Steady State Report	**IEC 60068-2-78:** Environmental Testing - Part 2-78: Tests - Test 2-78: Body Cab: Damp Heat, Steady State-First Edition; (Replaces IEC 60068-2-3 and 60068-2-56)	• Temperature: 40±2℃ • Humidity: 95+2-3%R.H. • Test time: 96 Hours • FCS: 2 sets
Damp Heat Cyclic Report	**IEC 60068-2-30:** Basic Environmental Testing Procedures Part 2: Tests - Test Db and Guidance: Damp Heat, Cyclic (12 + 12-Hour Cycle)-Second Edition; Amendment 1-08/1985	• Temperature: 40±2℃ • Humidity: 95+2-3%R.H. • Cycle Time: 24 Hours • Number of Cycle: 2 Cycles • FCS: 2 sets
ESD Simulation Test Report	**IEC 61000-4-2:** Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test-Edition 1.2; Edition 1:1995	• Air Discharge: ±8KV; • Contact Discharge: ±4KV; • FCS: 1 set.

	Consolidated with Amendments 1:1998 and 2:2000	
Electrical Isolation Test Report	**For Class I equipment only.**	• Primary (L-N) to Earth (Metal frame or Ground Pin): Minimum 1,5 kV ac, at least 60 seconds; • Lan Port (RJ-45) to Ground (Metal frame) Minimum 1,5 kV ac at least 60 seconds.

Table 16: Regulatory Standards Compliance table