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Compute Project

Hyve Solutions Ambient Series-E

Revision 1.1
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Author: Conor Malone, VP Engineering, Hyve Solutions
Author: Roy Lee, Director HW Engineering, Hyve Solutions
Author: Justin Quon, Technical Marketing, Hyve Solutions

1. Scope

This document defines the technical specifications for the Hyve Solutions Ambient Series-E server, including motherboard, chassis and power supply. The motherboard conforms to the existing Decathlete specification. Information about Intel's Decathlete server board can be found here (Decathlete Server Board Standard v2). The Decathlete standard provides board-specific information detailing the features and functionality of a general-purpose 2-socket server board for adoption by the Open Compute Project community.

2. Contents

3. Overview

When data center design and hardware design move in concert, they can improve efficiency and reduce power consumption. To this end, the Open Compute Project is a set of technologies that reduces energy consumption and cost, increases reliability and choice in the marketplace, and simplifies operations and maintenance. One key objective is openness – the project is starting with the opening of the specifications and mechanical designs for the major components of a data center, and the efficiency results achieved at facilities using Open Compute technologies.

The Hyve Solutions Ambient Series-E incorporates a dual-socket motherboard, a chassis and power supply. The Ambient Series-E was designed to fit into standard 19" rail racks, allowing customers to take advantage of the price and power efficiency benefits of OCP without major data center retrofitting. It is 1U in height and is designed to work in both traditional datacenters as well as those using elevated ambient inlet temperatures.

4. Conformance to Decathlete v2.1 Specification

The motherboard used in the Ambient Series-E servers conform to the existing Decathlete specification. Information about Intel's Decathlete server board can be found here (Decathlete Server Board Standard v2). The Decathlete standard provides board-specific information detailing the features and functionality of a general-purpose 2-socket server board for adoption by the Open Compute Project community.

5. Motherboard Introduction

The Hyve Solutions Ambient Series-E is based on the Intel C612 chipset. The motherboard is designed to support dual Intel Xeon E5-2600 v3 and v4 series processors and up to 2048GB LRDIMM 3DS/1024GB LRDIMM/ 512GB RDIMM DDR4 memory. Leveraging advanced technology from Intel, the motherboard is capable of offering scalable 32- and 64- bit computing, high-bandwidth memory design, and lightning-fast PCI-E bus implementation.

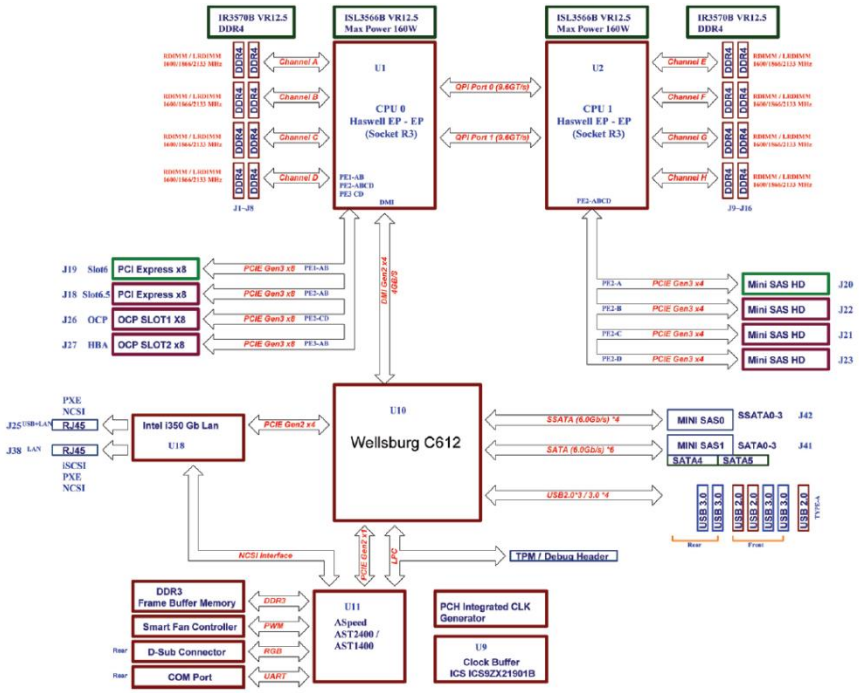


Figure 1: Motherboard block diagram

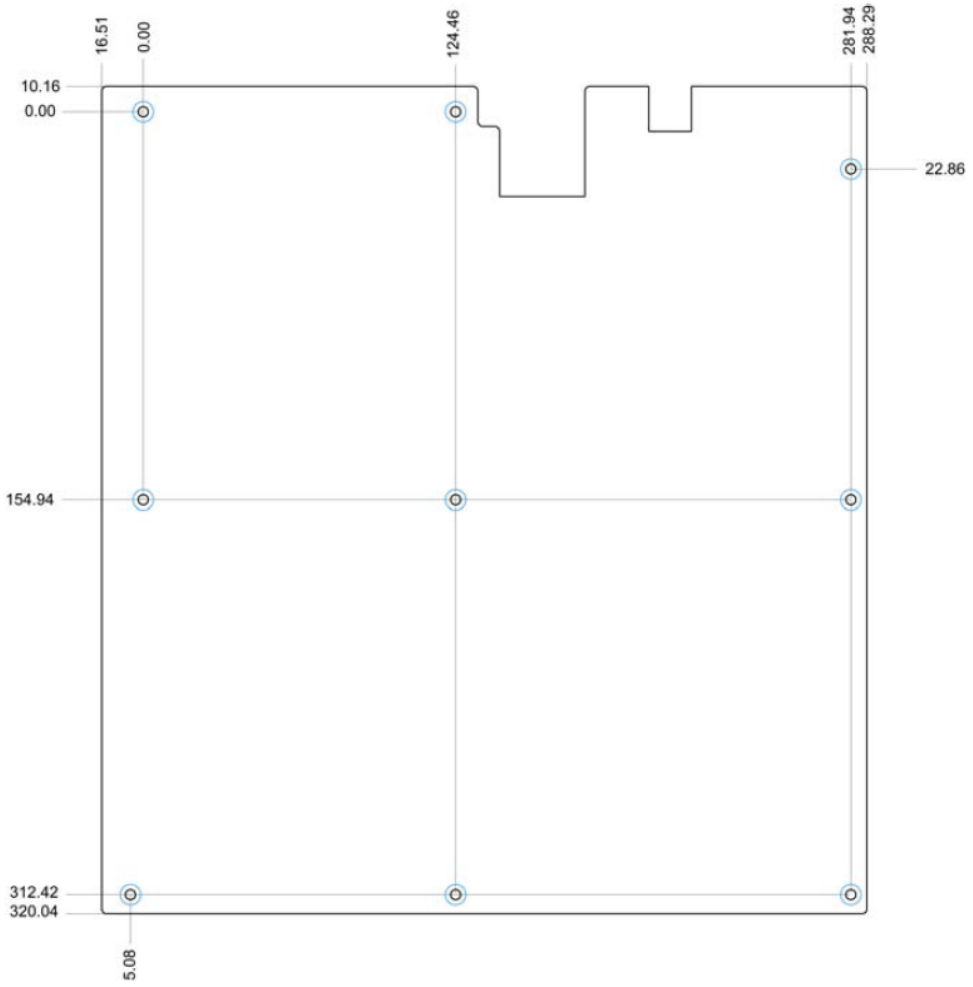


Figure 2: PCB Size – 12" W x 13" L

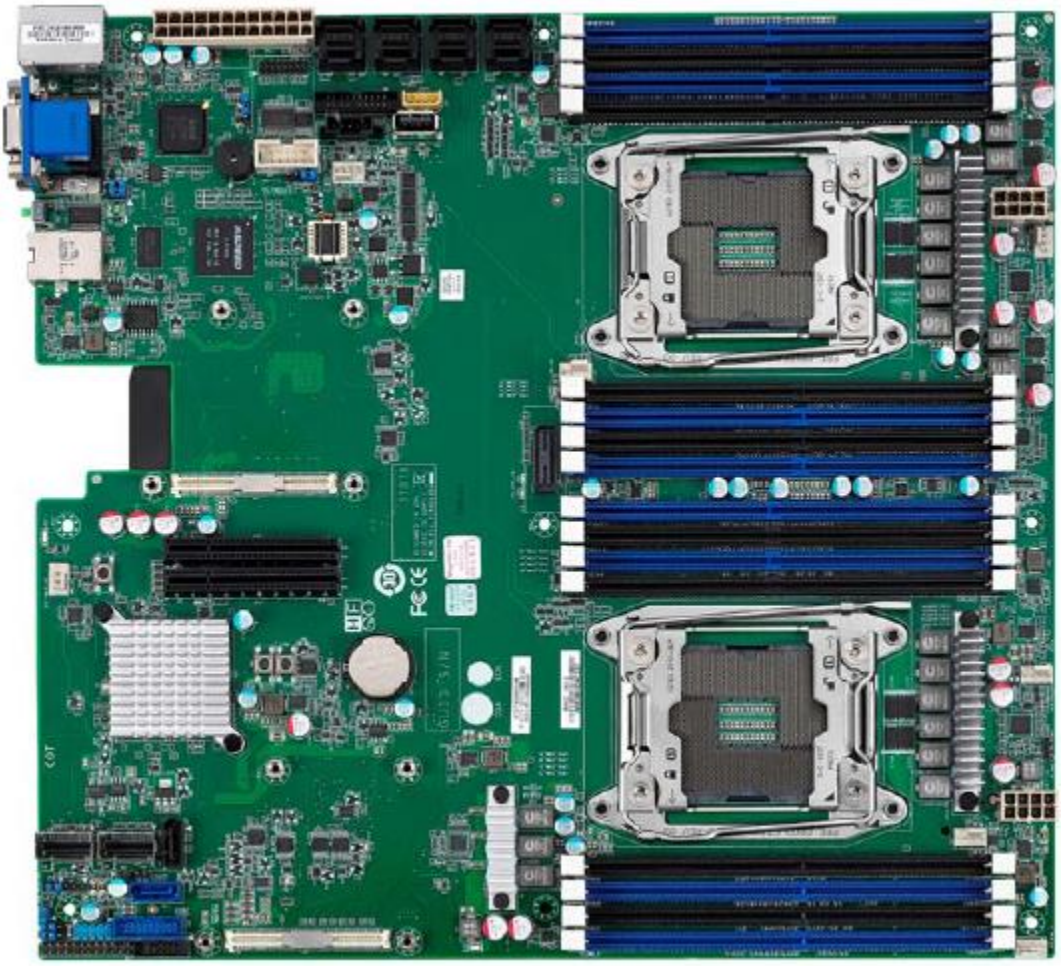


Figure 3: Board image

6. Motherboard Technical Specification

Form Factor	▪ EATX ▪ 12” x 13” (305x330mm)
Processor	▪ Intel Xeon E5-2600v3 & v4, specific DDR4 Models ▪ Socket-R3 (LGA2011) ▪ Count: 2 ▪ TDP=Max up to 160W ▪ Up to 9/6/8.0/6.4 GT/s with Intel QuickPath Interconnect (QPI) supported.
Chipset	▪ Intel C612 PCH
Memory	▪ DIMM Type: RDIMM DDR4, LRDIMM 3DS DDR4, LRDIMM DDR4 ▪ DIMM Socket Count: 16 @ 2 per Channel ▪ DIMM Operating Speed:
PCIe Port Assignments	P0 ▪ Port0 DMI2 = PCH ▪ Port 1A+1B=Primary PCIe v3.0 x8 slot ▪ Port 2A+2B=Primary PCIe v3.0 x8 slot

	RDIMM	LRDIMM 3DS DDR4	LRDIMM DDR4
Speed	2133/1866/1600	2133/1600	2133/1600

	▪ Port 2C+2D= Ethernet OCP Mezzanine v0.5 , x8 PCIe v3.0 ▪ Port 3A+3B=HBA Mezzanine, x8 PCIe v3.0 P1 ▪ Port 2A+2B+2C+2D= (4) Internal Mini SAS HD, Each w/ x4 PCIe v3.0
LAN	▪ Two GbE ports supported, LAN1 shared with IPMI ▪ Intel I350-AM2
Storage	▪ Intel C612 Controller ▪ (2) discrete SATA 7pin for SATA4 and SATA5 ▪ (2) MiniSAS SFF-8087 for SATA0~SATA3, sSATA0~sSATA3 ▪ 6.0Gb/s speed ▪ SATA SGPIO supported ▪ RAID 0/1/10/5 (Intel RST) ▪ (4) Internal MiniSASHD SFF-8643 connectors (Optional)
BMC	Type: ASPEED AST2400, Dedicated BMC Port, IPMI 2.0 or DCMI Compatible Console Port Speed: 115200 Console Port Mapping: ttyS1
Video	▪ Chipset ASPEED AST2400 ▪ Type: VGA, D-Sub 15 pin on board ▪ UP to 1920x1200
Periphery I/O	USB ▪ (3) USB2.0 ports (2 via cable, 1 vertical type-A connector ▪ (4) USB3.0 ports (2 at rear, 2 via cable) COM ▪ (2) ports (COM1 at rear, COM2 via cable) VGA ▪ (1) D-Sub 15 pin VGA port RJ-45 ▪ (2) GbE ports, LAN1 shared with IPMI Power ▪ SSI 24-pin + 8-pin + 8-pin power connector ▪ (1) PSMI 1x5-pin header SATA ▪ (2) SATA 7-pin connectors ▪ (2) MiniSAS (4-in-1) connectors
System Monitor & LED indicator	▪ ASPEED AST2400 ▪ Monitor voltage for CPU, Memory, Chipset and Power Supply ▪ (7) FAN 4-pin header ▪ Temperature Monitor temperature for CPU and System environment ▪ Temperature warning indicator (Optional on Front Panel Board) ▪ FAN and PSU fail LED indicator (Optional on Front Panel Board) ▪ Watchdog timer supported
System Management	▪ IPMI 2.0 compliant baseboard management controller ▪ Support storage over IP and remote platform flash ▪ USB2.0 virtual hub ▪ 24-bit high quality video compression ▪ 10/100 Mb/s MAC interface
BIOS	▪ AMI / 16MB ▪ User-configurable HW monitoring ▪ SMBIOS 2.7 / PnP / Wake on LAN / PXE boot supported / ACPI 3.0 / ACPI sleeping states S0, S4, S5

TPM	Type: Multi-Sourced, Modular
Operating System	▪ Windows 7 SP1 32-bits / Windows 7 SP1 64-bits / Windows 8 32-bits /Windows 8 64-bits / Windows 8.1 32-bits / Windows 8.1 64-bits / Windows Server 2008-R2 SP1 64-bits / Windows Server 2012-R2 SP1 64-bits ▪ RHEL 5 32-bits / RHEL 5 64-bits / RHEL 6 32-bits / RHEL 6 64-bits / RHEL 7 64-bits ▪ SLES 10 32-bits / SLES 10 64-bits / SLES 11 32-bits / SLES 11 64-bits
System Operating Environment	▪ Operating Temp 0-40° C ▪ Non-operating -40° C ~ 70° C (-40° F ~ 158° F) ▪ In/Non-operating Humidity 10% to 90% (non-condensing)
RoHS	▪ RoHS6/6 Compliant

7. Motherboard Features

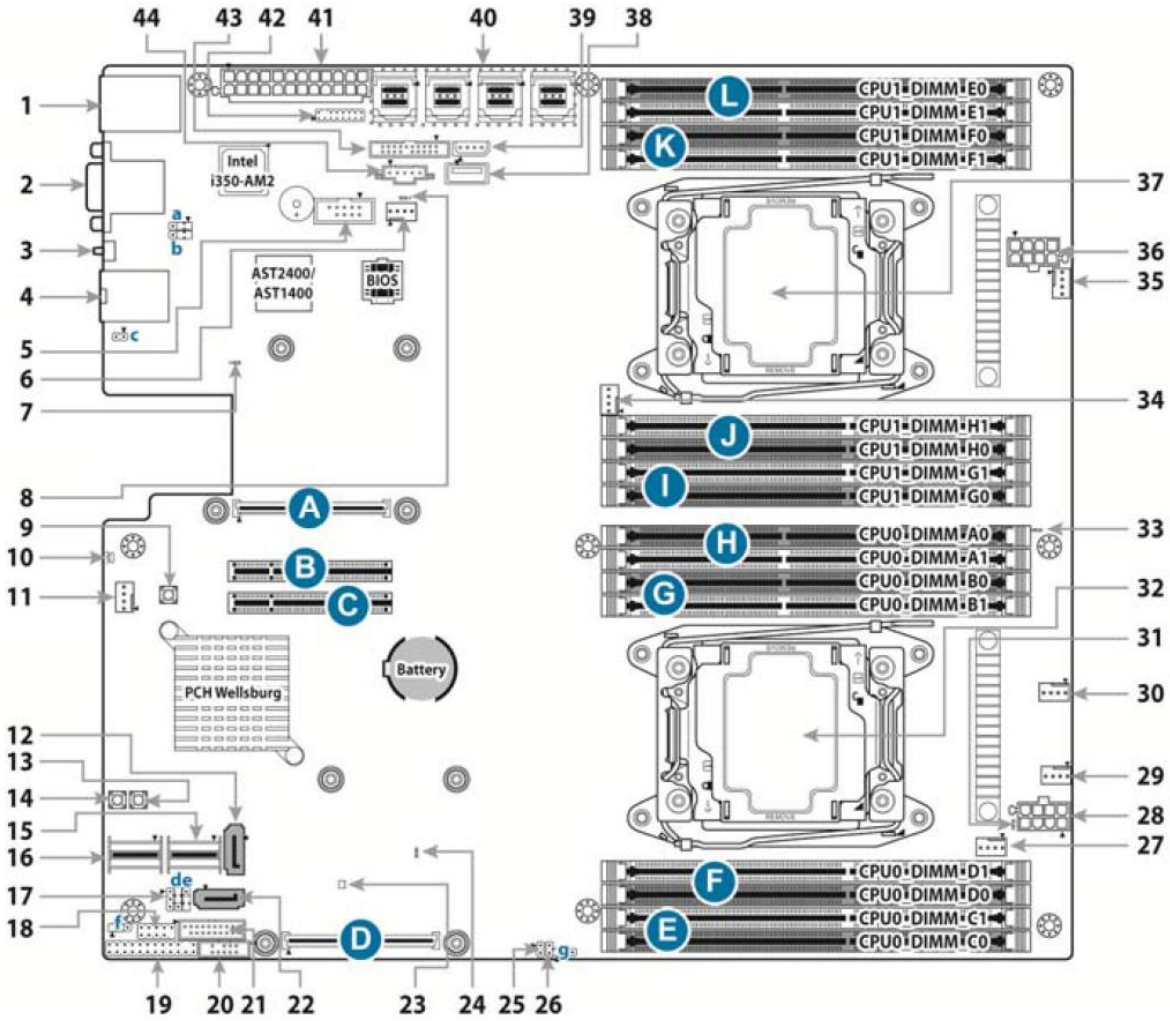
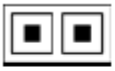


Figure 4: Board parts, jumpers & connectors

Connector/Jumper	
1 LAN2 + USB 3.0 x 2	23 PCH PWROK LED (LED2)
2 VGA / COM1	24 CAT Error LED (LED3)
3 ID LED Button (SW3)	25 ID LED Button Header (J56)
4 LAN1	26 Chassis Intrusion Header (J57)
5 COM2 Header (J68)	27 CPU0 FAN (J28)
6 SYS_FAN_4 (J31)	28 SSI 8-pin CPU0 Power Connector (PW1)
7 BMC LED (LED1)	29 SYS_FAN_3 (J35)
8 PSU Alert LED (LED10)	30 SYS_FAN_2 (J34)
9 Clear CMOS Button (SW4)	31 CPU0 PWOK LED (LED8)
10 Rear ID LED (LED7)	32 CPU0 Socket (U1)
11 SYS_FAN_5 (J32)	33 CPU1 PWOK LED (LED9)
12 7-pin Vertical SATA3.0 Connector (SATA5, J46)	34 CPU1 FAN (J30)
13 Reset Button (SW2)	35 SYS_FAN_1 (J33)
14 Power Button (SW1)	36 SSI 8-pin CPU1 Power Connector (PW3)
15 SATA0~SATA3 (J41)	37 CPU1 Socket (U2)
16 sSATA0~sSATA3 (J42)	38 Vertical Type-A USB2.0 Connector (J40)
17 HOST SMBUS Header (J61)	39 IPMB Pin Header (J51)
18 USB2.0 Header (J37)	40 Mini-SAS HD Connector (J20/J21/J22/J23)
19 Front Panel Header (J50)	41 ATX 24-pin Main Power Connector (PW2)
20 PCH SATA SGPIO Header for BB HD Board (J43)	42 TYAN Module Header (J48)
21 USB3.0 Header (J36)	43 FAN Header for BB FAN Board (J29)
22 7-pin Vertical SATA3.0 Connector (SATA4, J45)	44 PSMI Pin Header (J49)
Jumpers	**Slots**
a COM2 or COM5 Selected Jumper (J64)	A OCP Slot for OCP Mezz Card (J26)
b COM2 or COM5 Selected Jumper (J63)	B PCI-E 3.0x8 Slot (x8 link, open-end type, #PCIe-6.5)
c BMC Reset Header (J55)	C PCI-E 3.0x8 Slot (x8 link, open-end type, #PCIe-6)
d BIOS Recovery Mode Jumper (J58)	D Proprietary Slot for SAS Mezz Card (J27)

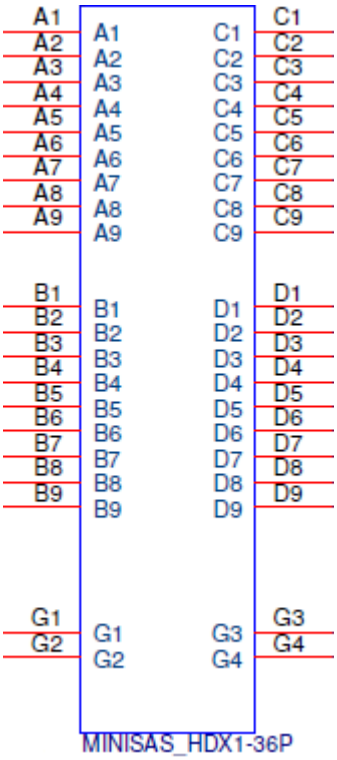
e NMI Jumper (J67)	E CPU0_DIMM_C0/C1
f ME Recovery Mode Jumper (J62)	F CPU0_DIMM_D0/D1
g ME Security Override Jumper (J60)	G CPU0_DIMM_B0/B1
	H CPU0_DIMM_A0/A1
	I CPU1_DIMM_G0/G1
	J CPU1_DIMM_H0/H1
	K CPU1_DIMM_F0/F1
	L CPU1_DIMM_E0/E1

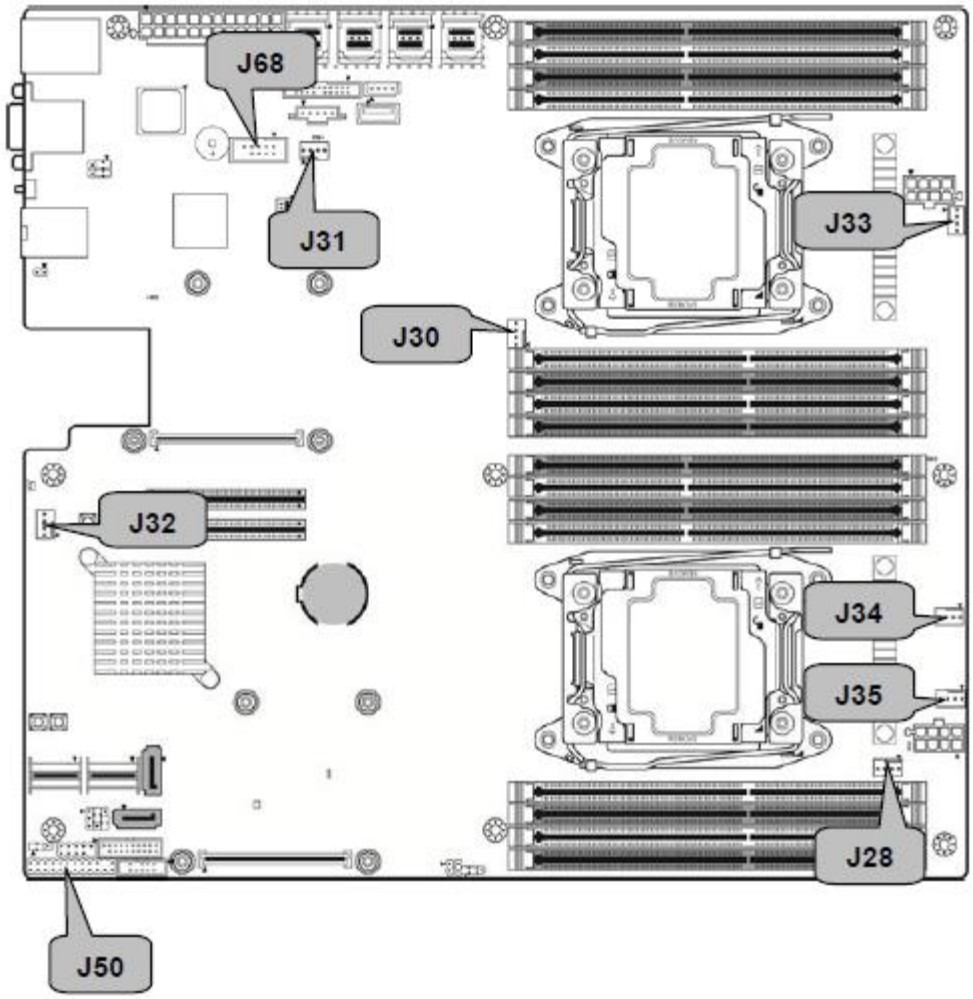
Jumper Legend:

	**OPEN - Jumper OFF**	Without jumper cover
	**CLOSED - Jumper ON**	With jumper cover

Pinout of J20-J23:

Description	Pin#		Description
100MHZ_CLK_P	A1	C1	SMB_SDA
100MHZ_CLK_N	A2	C2	SMB_SCL
GND	A3	C3	GND
PCIE_RX_P2	A4	C4	PCIE_TX_P2
PCIE_RX_N2	A5	C5	PCIE_TX_N2
GND	A6	C6	GND
PCIE_RX_P0	A7	C7	PCIE_TX_P0
PCIE_RX_N0	A8	C8	PCIE_TX_N0
GND	A9	C9	GND
PCIE_RESET_N	B1	D1	SB_SMB_SDA
NC	B2	D2	SB_SMB_SCL
GND	B3	D3	
PCIE_RX_P3	B4	D4	PCIE_TX_P3
PCIE_RX_N3	B5	D5	PCIE_TX_N3
GND	B6	D6	
PCIE_RX_P1	B7	D7	PCIE_TX_P1
PCIE_RX_N1	B8	D8	PCIE_TX_N1
GND	B9	D9	GND
MTG_GND	G1	G3	MTG_GND
MTG_GND	G2	G4	MTG_GND





J68: COM Port Header:

Signal	Pin	Pin	Signal
COM2_DCD	1	2	COM2_DSR
COM2_RXD	3	4	COM2_RTS
COM2_TXD	5	6	COM2_CTS
COM2_DTR	7	8	COM2_NRI
GND	9	10	NC

J28/J30/J31/J32/J33/J34/J35: 4-pin FAN Connector:

Pin	1	2	3	4
Signal	GND	VCC12	FAN_TACH	FAN_PWM

Use this header to connect the cooling fan to your motherboard to keep the system stable and reliable.

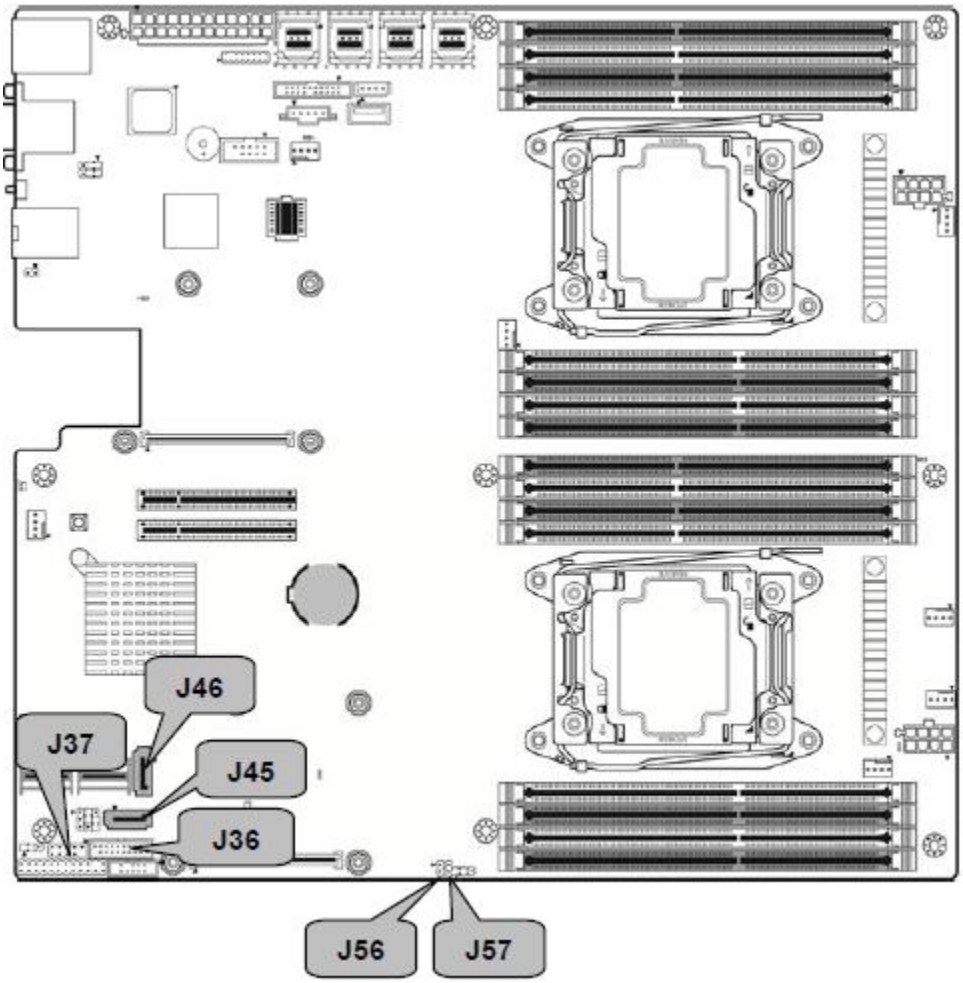
J28: CPU0 FAN J30: CPU1 FAN J31: SYS_FAN_4

J32: SYS_FAN_5 J33: SYS_FAN_1 J34: SYS_FAN_2

J35: SYS_FAN_3

J50: Front Panel Header:

Signal	Pin	Pin	Signal
FP_PW_LED_PW	1	2	FP_PWR
KEY	3	4	FP_ID_LED_PW
PWR_LED-	5	6	FP_ID_LED_N
HDD_LED+	7	8	LED_FAULT1
HDD_LED-	9	10	LED_FAULT2
FP_PWRSW#	11	12	LAN0_ACT_P
GND	13	14	LAN0_LED1_ACT#
FP_RSTSW#	15	16	FP_SMBDAT
GND	17	18	FP_SMBCLK
FP_IDLEDSW#	19	20	FP_INTRUSION#
NC	21	22	LAN1_ACT_P
FP_NMISW#	23	24	LAN1_LED1_ACT#



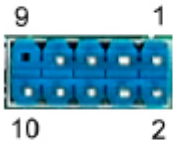
J56: Front Panel ID LED:

PIN1 ■ ■	Signal	Pin	Pin	Signal
	FP_IDLEDSW#	1	2	GND

J57: Chassis Intrusion Header:

PIN1 ■ ■	Signal	Pin	Pin	Signal
	INTRUDER#	1	2	GND

J37: Front USB2.0 Header (Blue):



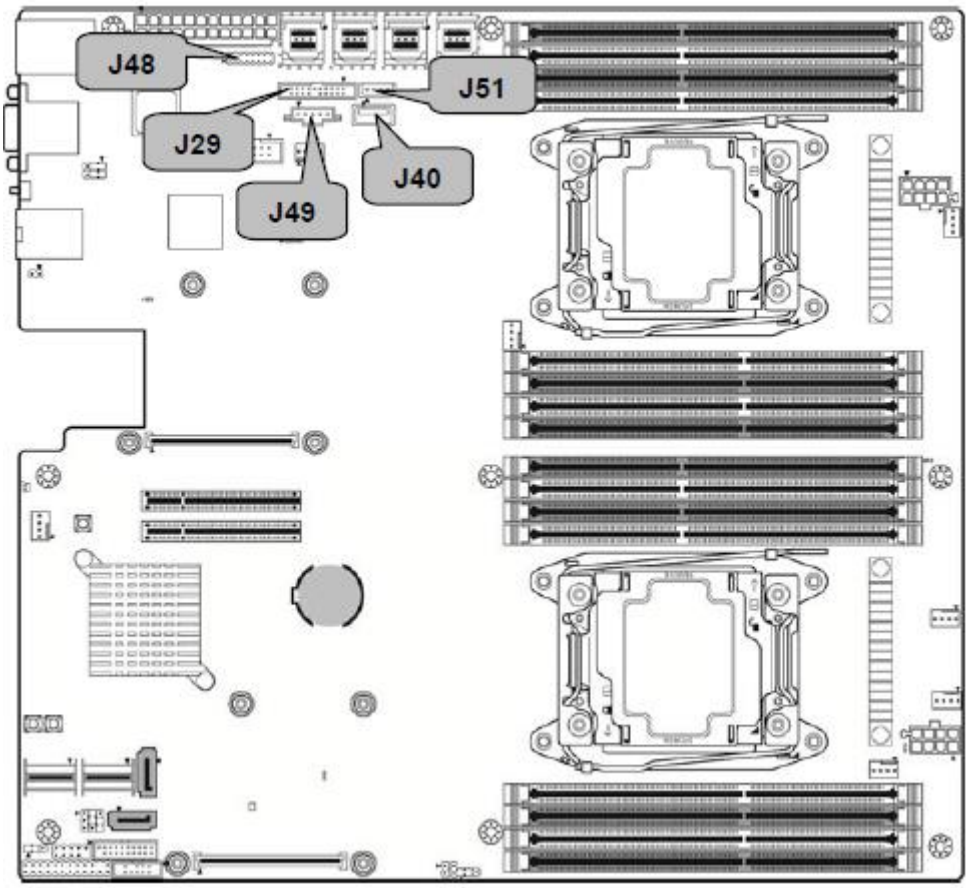
Signal	Pin	Pin	Signal
USB2_VCC_REAR_2	1	2	USB2_VCC_REAR_2
USB2_N3_REAR_3_R	3	4	USB2_N4_REAR_2_R
USB2_P3_REAR_3_R	5	6	USB2_P4_REAR_2_R
GND	7	9	GND
KEY	9	10	OPEN

J45/J46: 7-pin Vertical SATA3.0 Connector:

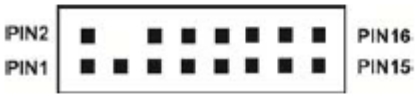
PIN Define	Pin	
1	GND	Connects to the Serial ATA ready drives via the Serial ATA cable. J45: SATA4 J46: SATA5
2	SATA_TXP_C	
3	SATA_TXN_C	
4	GND	
5	SATA_RXN_C	
6	SATA_RXP_C	
7	GND	

J36: USB3.0 Header:

Signal	Pin	Pin	Signal
USB3_VCC_FPB_01	1	20	KEY
USB3_N5_RX_FPB_N0	2	19	USB3_VCC_FPB_01
USB3_P5_RX_FPB_P0	3	18	USB3_N6_RX_FPB_N1
GND	4	17	USB3_P6_RX_FPB_P1
USB3_N5_TX_FPB_N0	5	16	GND
USB3_P5_TX_FPB_P0	6	15	USB3_N6_TX_FPB_N1
GND	7	14	USB3_P6_TX_FPB_P1
USB2_N12_FPB_N0_R	8	13	GND
USB2_P12_FPB_P0_R	9	12	USB2_N11_FPB_N1_R
OC_N	10	11	USB2_P11_FPB_P1_R



J48: TPM Module Header:



Signal	Pin	Pin	Signal
VCC3	1	2	DBG_LFRAME_N
DBG_LPC0	3	4	KEY
DBG_LPC1	5	6	TPM_RST#
DBG_LPC2	7	8	GND
DBG_LPC3	9	10	CLK_33M_TPM
DBG_SERIRQ	11	12	GND
DBG_PRES_N	13	14	VCC3_AUX
TPM_ADDR_MB	15	16	PCH_TPM_PP_EN

J40: Vertical Type-A USB Connector:

Signal	Pin	Pin	Signal
USB_VCC_TYPE_A	1	2	USB_N2_TYPE_A1_R
USB_P2_TYPE_A1_R	3	4	GND

J49: PSMI Connector:

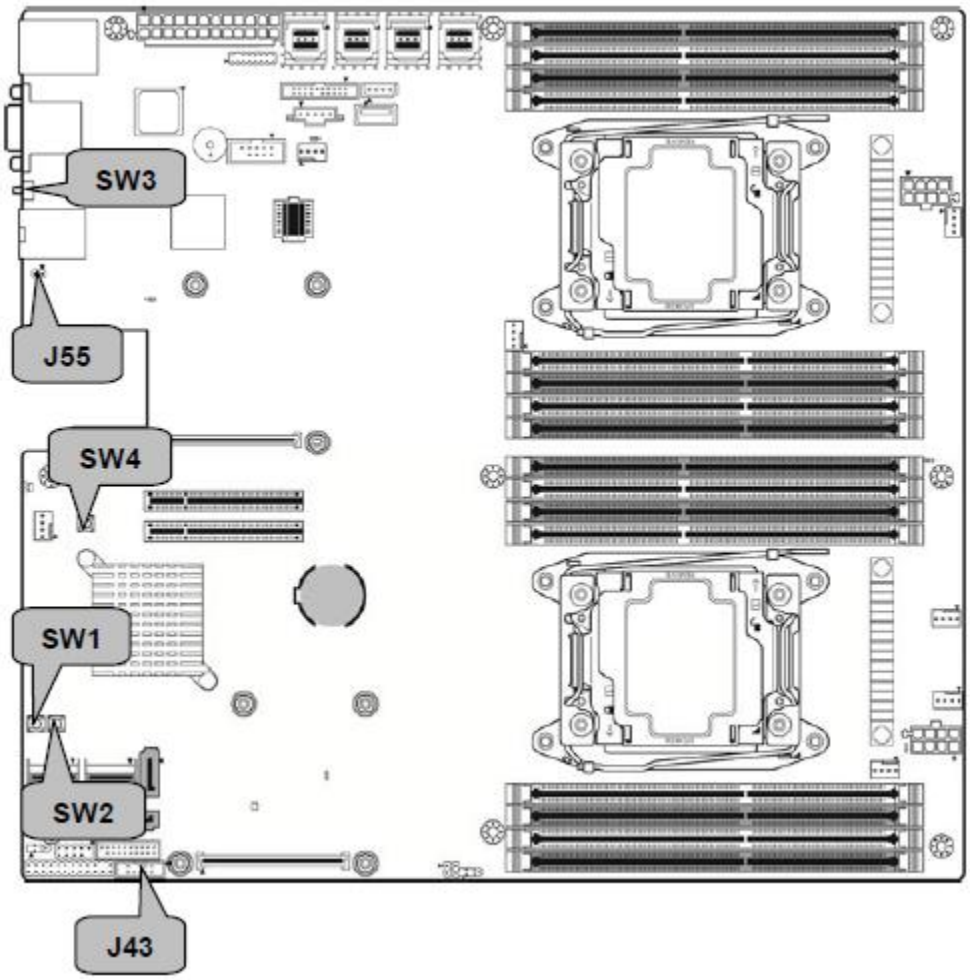
Signal	Pin	Pin	Signal
PSMI_5V_SMBCLK	1	2	PSMI_5V_SMBDATA
PSU_ALERT_N	3	4	GND
VCC3	5		

J51: IPMB PIN Header:

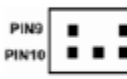
Pin	1	2	3	4
Signal	IPMB DATA	GND	IPMB CLK	VCC

J29: Fan Connector Reserved for Barebone:

Signal	Pin	Pin	Signal
FAN_T1	1	2	FAN_T6
FAN_T2	3	4	FAN_T7
FAN_T3	5	6	FAN_T8
FAN_T4	7	8	FAN_T9
FAN_T5	9	10	FAN_T10
GND	11	12	KEY
PWM_REAR12	13	14	PWM_FRONT3
FAN_T11	15	16	FAN_SDA
FAN_T12	17	18	FAN_SCK
VCC3_AUX	19	20	PWM_BB3



J43: PCH SGPIO PIN Header:



Signal	Pin	Pin	Signal
SATA4_5_SM_CLK	1	2	NC
SATA4_5_SM_DAT	3	4	SGPIO_SATA_DATAOUT0_R2
GND	5	6	SGPIO_SATA_LOAD_R2
KEY	7	8	SGPIO_SATA_CLK_R2
VCC3_AUX	9	10	SATA_ERR_P

J55: BMC Reset Header:

Signal	Pin	Pin	Signal
BMC_JP_N	1	2	GND

SW3 (J56): ID LED Switch Button:

	Signal	Pin	Pin	Signal
	FP_IDLED_BTN_N	1	2	GND
	GND	3	4	GND

SW1: Power Switch Button:

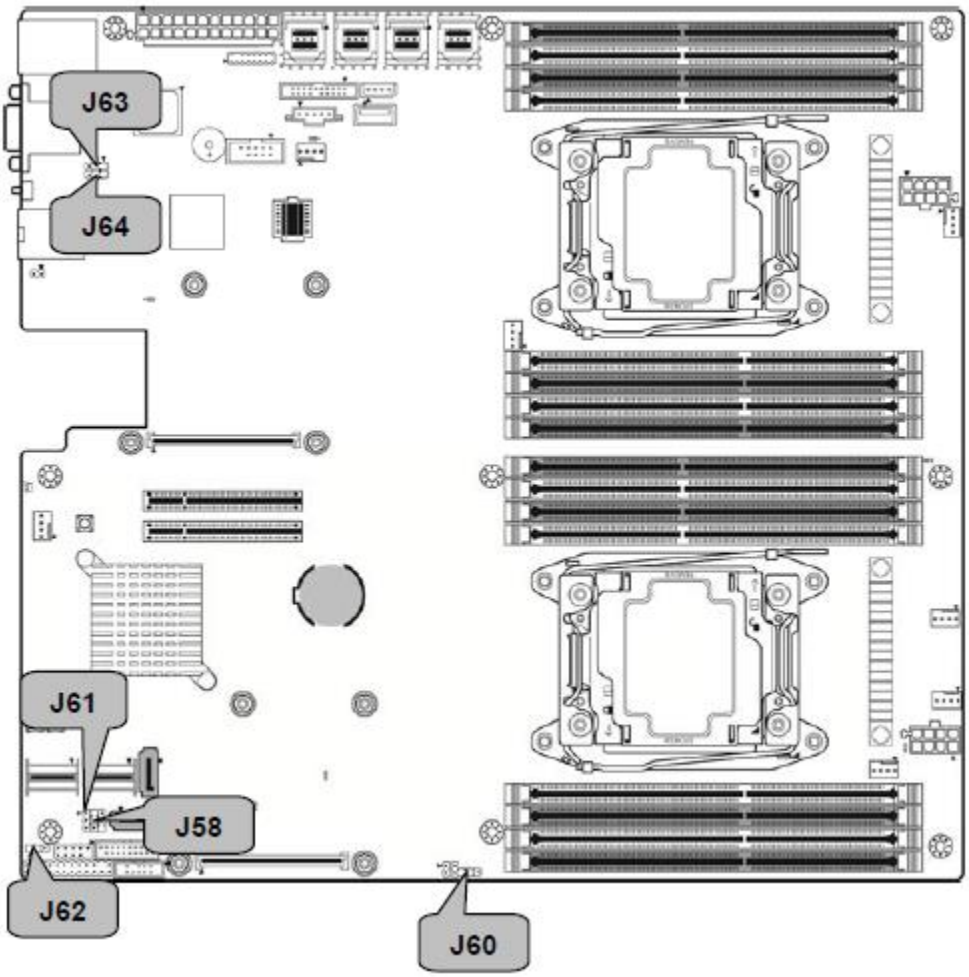
	Signal	Pin	Pin	Signal
 Normal (Default)	FP_PWR_BTN_N	1	2	FP_PWR_BTN_N
	GND	3	4	GND

SW2: Reset Switch Button:

	Signal	Pin	Pin	Signal
 Normal (Default)	FP_RST_BTN_N	1	2	FP_RST_BTN_N
	GND	3	4	GND

SW4: Clear CMOS Reset Button:

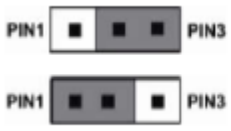
 Normal (Default)	You can reset the CMOS settings by using this button, if you have forgotten your system/setup password or need to clear system BIOS setting. 1. Power off the system and disconnect power connectors from the motherboard. 2. Press the button (Clear CMOS). 3. Reconnect power & power on the system. NOTE: After flashing new BIOS, do the following steps: a. Clear CMOS b. Enter BIOS setup menu and load Default Settings. Then do a Save and Exit from setup.



J61: HOST SMB Header:

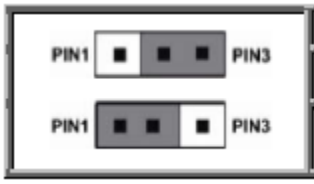
Signal	Pin	Pin	Signal
PCH_HOST_3V3STBY_ SMB_DAT	1	2	GND
PCH_HOST_3V3STBY_ SMB_CLK	3		

J58: BIOS Recovery Mode Jumper:



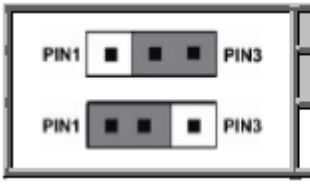
Pin	1	2	3
Signal	OPEN	BIOS_RCVR_BOOT_N	GND
Pin1-2 closed: Normal (Default) Pin2-3 closed: BIOS Recovery Mode			

J63: COM2 or COM5 Selected Jumper:



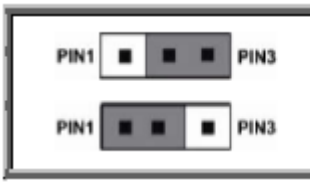
Pin	1	2	3
Signal	BMC_COM2_RXD	RXD_2	BMC_COM5_RXD
Pin1-2 closed: COM2 (Default) Pin2-3 closed: COM5			

J64: COM2 or COM5 Selected Jumper:



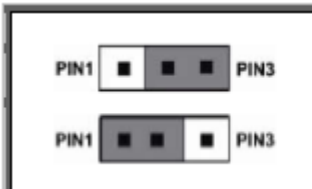
Pin	1	2	3
Signal	BMC_COM2_TXD	TXD_2	BMC_COM5_TXD
Pin1-2 closed: COM2 (Default) Pin2-3 closed: COM5			

J62: ME Firmware Recovery Mode Jumper:

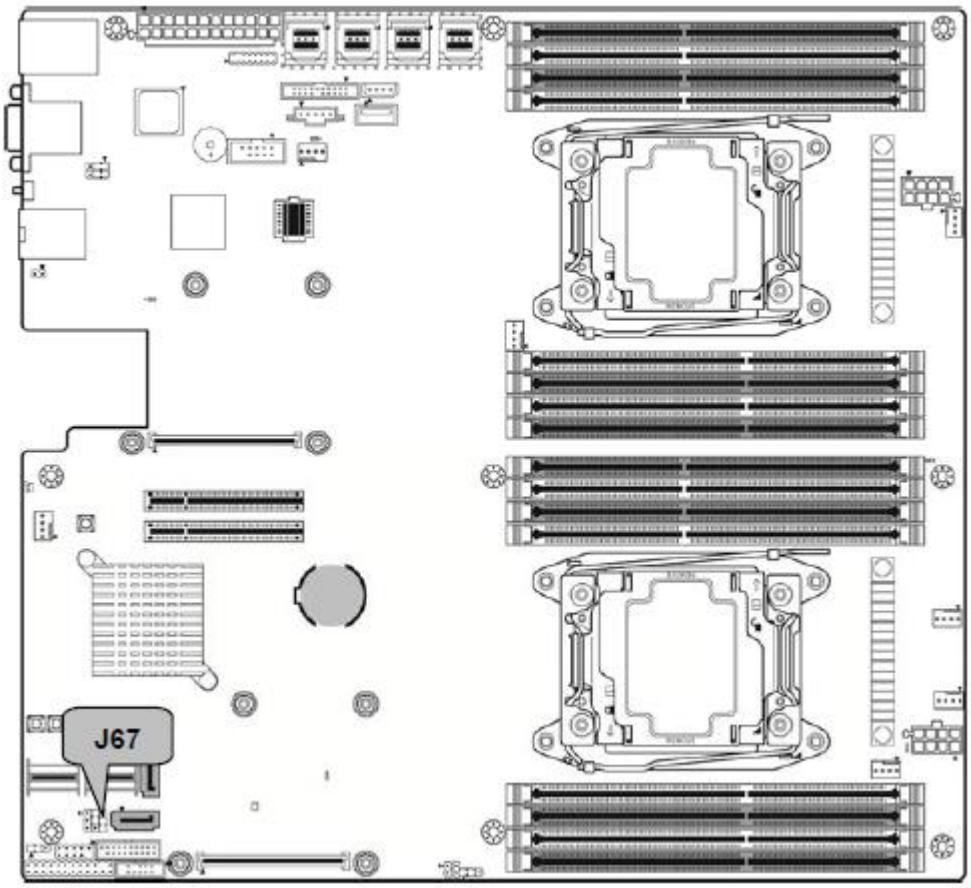


Pin	1	2	3
Signal	OPEN	FM_ME_RCVR_N	GND
Pin1-2 closed: Normal (Default) Pin2-3 closed: ME Firmware Recovery Mode			

J60: Flash Descriptor Security Override Header:



Pin	1	2	3
Signal	OPEN	MFG_MODE_N	GND
Pin1-2 closed: Enable security measures defined in the Flash Descriptor-Normal (Default) Pin2-3 closed: Disable Flash Descriptor Security (override)			

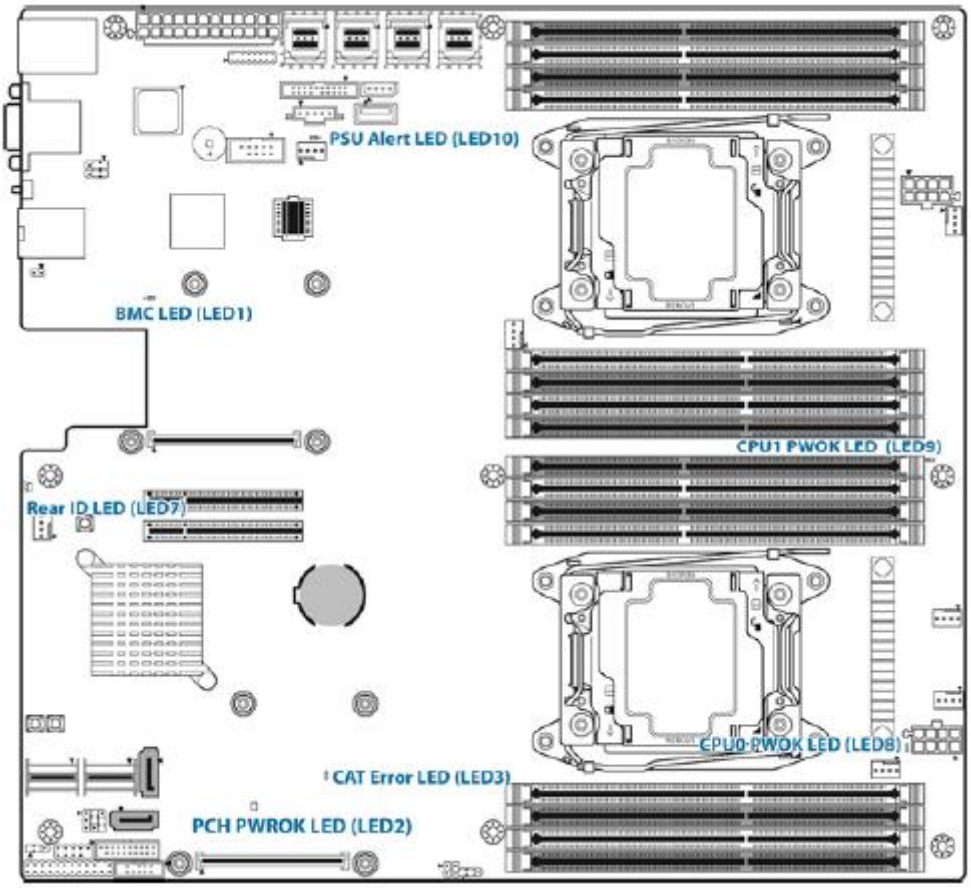


J67: NMI Jumper:

Signal	Pin	Pin	Signal
FP_NMI_BTN_N	1	2	FP_PIN23_N
FP_HD_FAULT_LED	3		

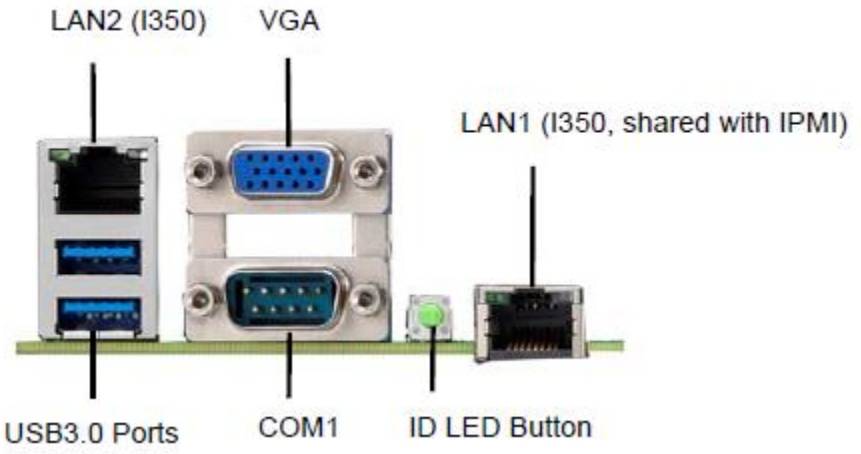
Pin1-2 closed: Normal (Default)
Pin2-3 closed: Remove NMI Button Function

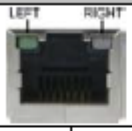
1.1. LED Definitions:



LED1	BMC Heart Beat LED	**Pin**	**Signal**	
		+	+3V_AUX	
		-	GND	
		State	**Description**	
		OFF	OFF	The LED shuts off when the BMC controller cannot be detected or properly initiated.
		Blinking	Green	The LED blinks per second to indicate that the BMC controller is working normally
LED2	PCH PWOK LED	**Pin**	**Signal**	
		+	+3V	
		-	GND	
		State	**Description**	
		OFF	OFF	The LED shuts off when the power of PCH is abnormal.
		ON	Amber	The amber LED lights up when the power of PCH is normal.
LED3	CAT Error LED	**Pin**	**Signal**	
		+	+3V	
		-	GND	
		State	**Description**	
		OFF	OFF	The LED shuts off when System is running normally.
		ON	Red	The LED lighted up when the system has experienced a fatal or catastrophic error and can not continue to operate.
LED7	Rear ID LED	**Pin**	**Signal**	
		+	+ VCC3_AUX	
		-	GND	
		State	**Description**	
		OFF	OFF	OFF
		ON	Green	ON
LED8	CPU0 PWOK LED	**Pin**	**Signal**	
		+	+3V	
		-	GND	
		State	**Description**	
		OFF	OFF	OFF
		ON	Green	ON

LED9	CPU1 PWOK LED	**Pin**	**Signal**	
		+	+ 3V	
		-	GND	
		State	**Description**	
		OFF	OFF	The LED shuts off when the power of CPU1 is abnormal.
		ON	Green	The LED lights up when the power of CPU1 is normally.
LED10	PSU Alert LED	**Pin**	**Signal**	
		+	+ VCC3_AUX	
		-	GND	
		State	**Description**	
		OFF	OFF	The LED shuts off when the PSU is normal.
		ON	Green	The LED lights up when the PSU is abnormally.



10/100/1000 Mbps LAN Link/Activity LED Scheme			
		**Left LED**	**Right LED**
10 Mbps	**Link**	Green	Off
	Active	Blinking Green	Off
100 Mbps	**Link**	Green	Solid Green
	Active	Blinking Green	Solid Green
1000 Mbps	**Link**	Green	Solid Yellow
	Active	Blinking Green	Solid Yellow
No Link		Off	Off

PW2: ATX 24-pin Main Power Connector

Signal	Pin	Pin	Signal
VCC3	1	13	VCC3
VCC3	2	14	-12V
GND	3	15	GND
VCC5	4	16	PS_ON#
GND	5	17	GND
5V	6	18	GND
GND	7	19	GND
PWR_OK	8	20	RES
5VSB	9	21	VCC5
VCC12	10	22	VCC5
VCC12	11	23	VCC5
VCC3	12	24	GND

PW1: SSI 8-PIN CPU0 Power Connector

Signal	Pin	Pin	Signal
GND	1	5	P0_P12V
GND	2	6	P0_P12V
GND	3	7	P0_MEM_P12V
GND	4	8	P0_MEM_P12V

PW3: SSI 8-PIN CPU1 Power Connector

Signal	Pin	Pin	Signal
GND	1	5	P1_P12V
GND	2	6	P1_P12V
GND	3	7	P1_MEM_P12V
GND	4	8	P1_MEM_P12V

8. PSU Module(s)

The power supply dimension is 73.5(W) x 40/39(H) x 196(L) mm, including the golden finger portion. The PSU form factor must have a lock mechanism and a line cord holder. The air intake is from the golden finger side with the exhaust is located on the AC connector side.

Input –The AC input is done via an IEC 320 C-14 power inlet. This inlet is rated for 10A / 250VAC. This connector is located at the front side of the power supply. The PSU is designed to enable system implementation that uses multiple-phase AC input power. In

this configuration, not all power supplies in a system are required to be on the same AC input phase.

Efficiency – The power supply has a minimum efficiency according to the below table. At zero load condition, the PSU must realize minimized losses. The fan losses are not included in the efficiency calculation and measurements.

	10% Load	20% Load	50% Load	100% Load
230VAC/50Hz	82%	90%	94%	91%

Fuse – The power supply has a 16A fast blow type fuse. The AC line fuse must be accepted by all safety agencies. AC inrush current and all protection circuits in the power supply do not cause the AC fuse to blow unless a component in the power supply has failed.

AC Line Dropout – An AC line dropout is defined to be when the AC input drops to 0VAC at any phase of the AC line for any length of time. During an AC dropout of 10ms or less at any phase of AC voltage, the power supply meets dynamic voltage regulation requirements over the rated load. An AC line dropout of 10ms or less does not cause any tripping of control signals or protection circuits. If the AC dropout lasts longer than 10ms, the power supply recovers and meets all turn-on requirements.

DC Output Connector – The output gold finger connector connects the power as well as the signal to the system or power backplane board. The Signal description is defined as follows:

Signal	Description
+12V	+ 12V output
+12VSB	+ 12V standby output
GND	0V ground
12LS	+ 12V load share bus
12VRS	+ 12V remote sense
RETURN_S	0V remote sense
PWOK	Power ok output
PSON	Power disable input
SCL	SMBus Clock

Voltage Regulation – The power supply voltage must stay within the following voltage limits when operating at steady state load conditions. These limits do not include the peak-peak ripple/noise. All outputs are measure with reference to the +12VRS and RETURN_S signal. The +12VSB is measured at the output connector.

Static Regulation				
	Min	**Nom**	**Max**	**Tolerance**
+12V	11.4V	12.0V	12.6V	+5% / -5%
+12VSB	11.4V	12.0V	12.6V	+5% / -5%

Dynamic Regulation			
	Min	**Max**	**Tolerance**
+12V	11.4V	12.6V	+5% / -5%
+12VSB	11.4V	12.6V	+5% / -5%

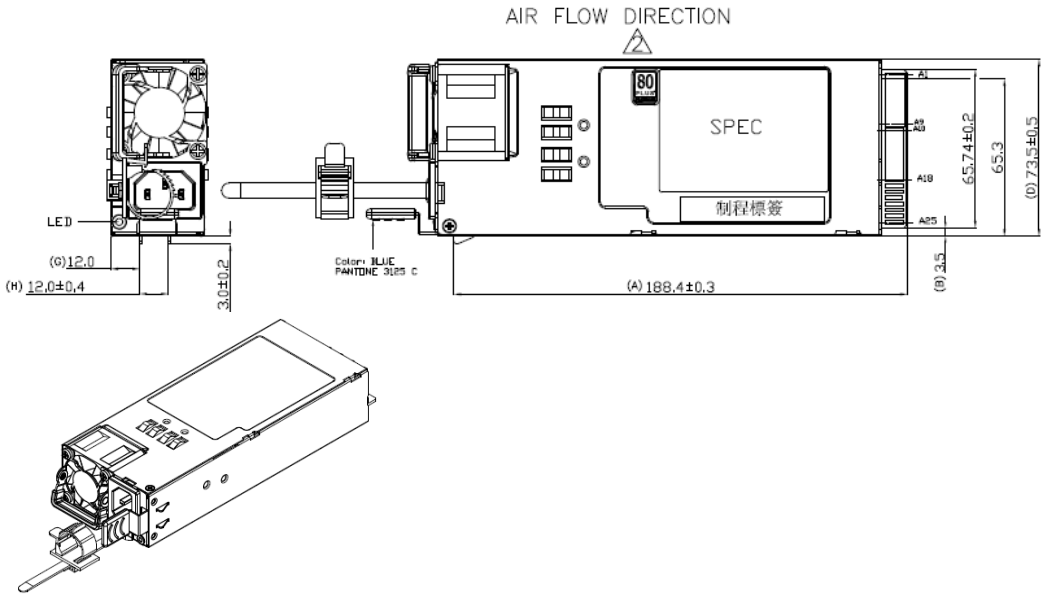
	Step Load Size	Slew Rate	Capacitive Load
+12V	60% of max load	0.5A/µsec	2200µF
+12VSB	0.5A	0.5A/µsec	22µF

Audible Noise – No abnormal audible noise is allowed to be generated by the power supply.

Residual Voltage – The PSU should be immune to be any residual voltage placed on its outputs (typically a leakage voltage through the system from standby output) up to 500mV. There shall be no additional heat generated, nor stressing of any internal components with this voltage applied to any individual or all outputs simultaneously.

Protection Circuits – Protection circuits inside the power supply cause only the power supply's main outputs to shut down. The +12VSB output remains powered on if the failure does not involve this output. When a protection circuit shuts down the power supply, the PWOK signal will go LOW, the bi-color LED will change from GREEN to YELLOW. If the power supply latches off due to a protection circuit tripping, an AC cycle OFF for less than 15sec initiated via PSON or PMBus Command ON/OFF for less than 2sec is able to reset the power supply.

PSU CAD Drawings –



PSU Part #s – Delta DPS-500AB-17 B, Delta DPS-650XB-2 G

9. Mechanical

The Hyve Solutions Ambient Series-E servers are configurable with single or redundant power supply. Both 3.5” and 2.5” drives are supported.

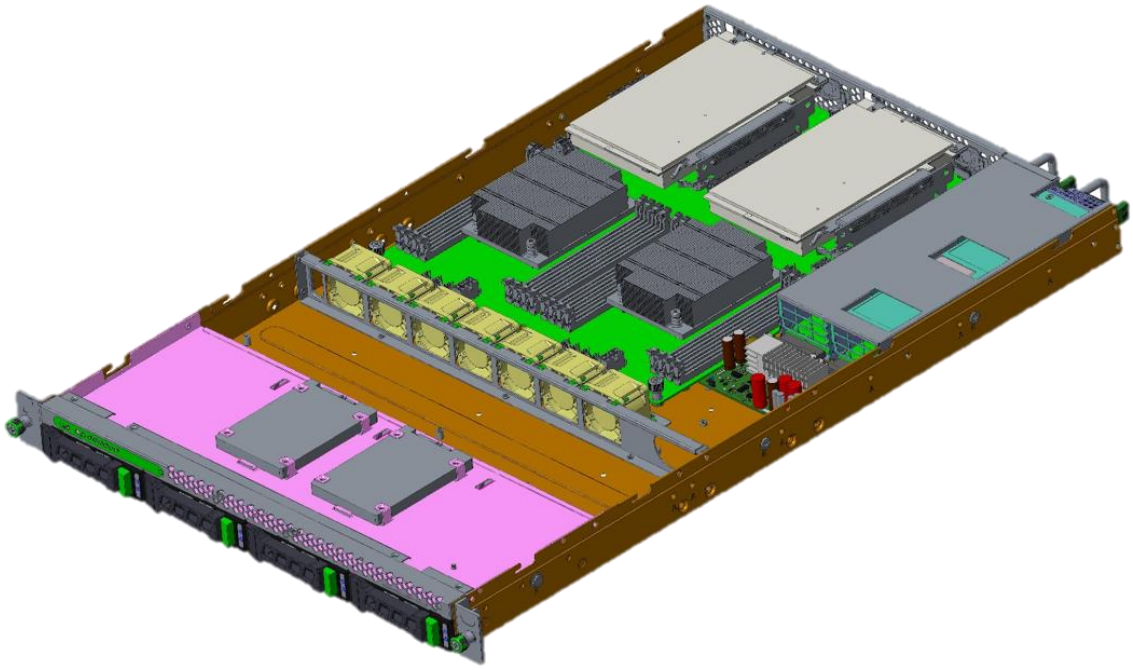


Figure 5: Ambient Series-E 1x4 with redundant PSU

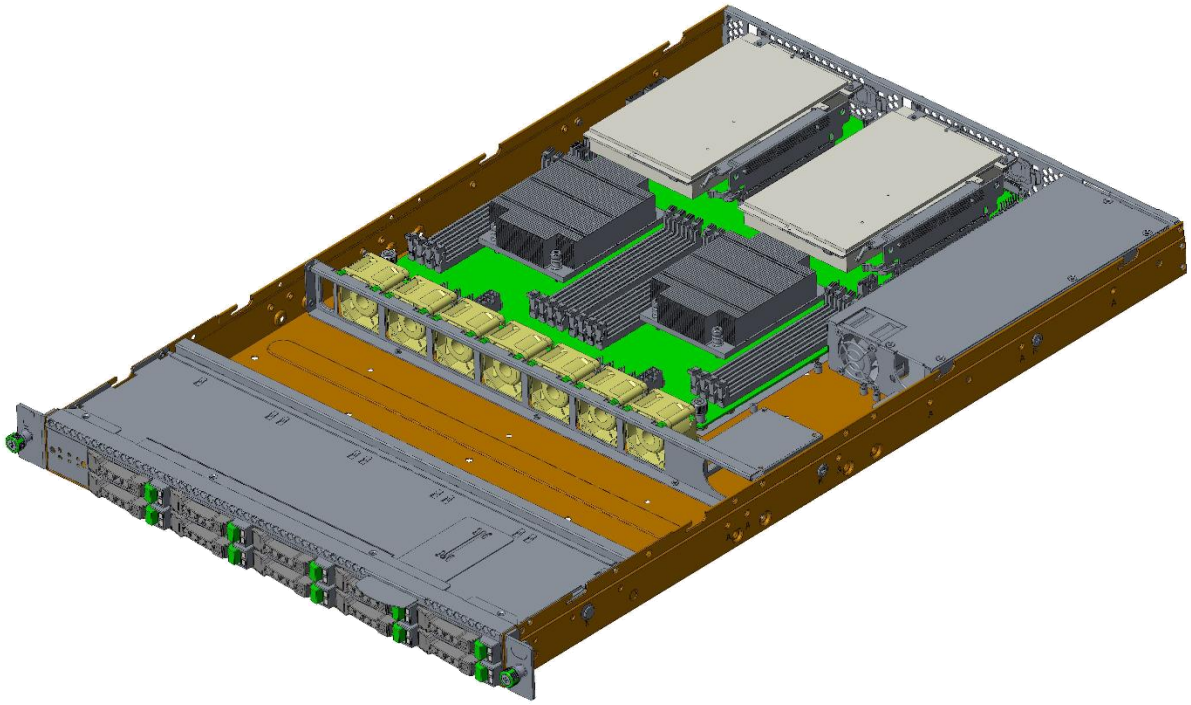


Figure 6: Ambient Series-E 1x10 with single PSU

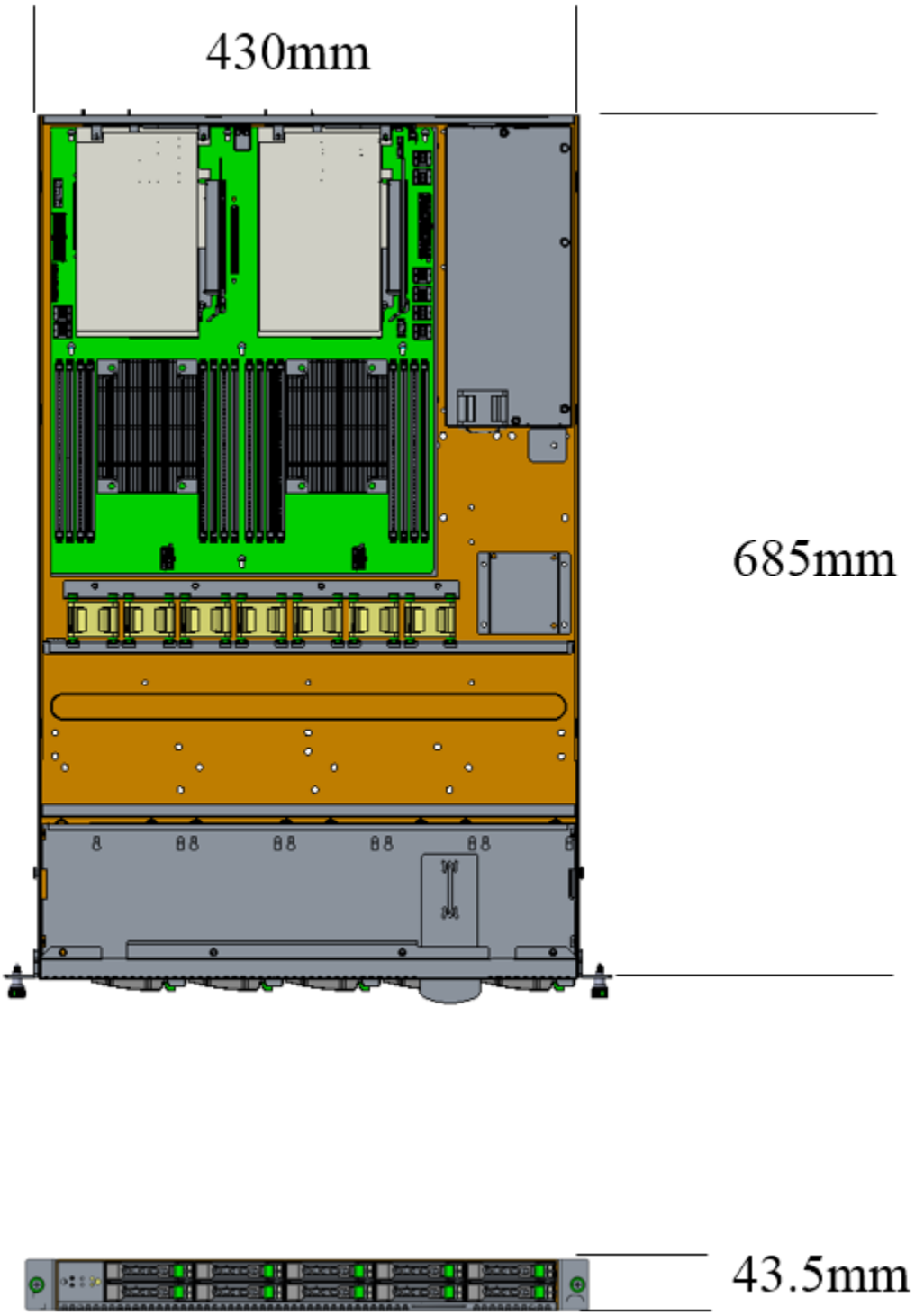
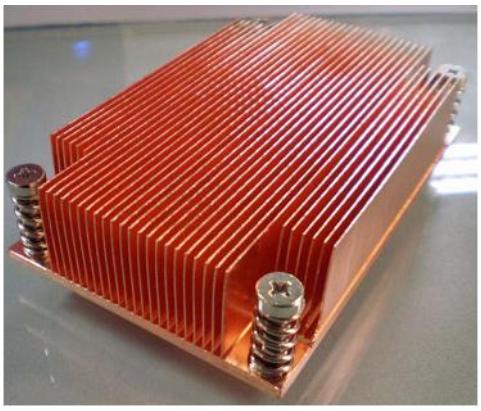
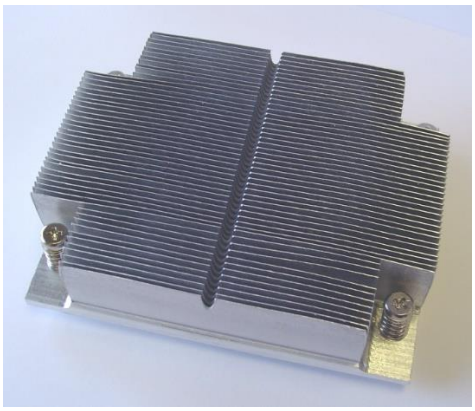


Figure 5:Ambient Series-E chassis dimensions

The Hyve Solutions Ambient Series-E servers make use of copper or aluminum passive heatsinks.





- Copper Dimensions: 104 mm (L) x 65 mm (W) x 24 mm (H)
- Aluminum Dimensions: 106mm (L) x 80mm (W) x 27 mm (H)
- Materials: Copper / Aluminum
- Fin Pitch: 1.9 mm
- Fin height: 21 mm
- Fin thickness: 0.4 mm
- Heatsink Base Thickness: 6 mm
- Weight: 425 g (Copper) 260g (Aluminum)

10. Environmental Requirements

The system meets the following environmental requirements:

- Gaseous Contamination: Severity Level G1 per ANSI/ISA 71.04-1985
- Ambient operating temperature range: -5°C to +45°C
- Operating and storage relative humidity: 10% to 90% (non-condensing)
- Storage temperature range: -40°C to +70°C
- Transportation temperature range: -55°C to +85°C (short-term storage)

The Hyve Solutions Ambient Series-E has an operating altitude with no de-ratings of 1000m (3300 feet).

11. Vibration and Shock

The system meets shock and vibration requirements according to ICE specifications: IEC7802 and IEC721-3 Standard & Levels. The testing requirements are listed below:

	Operating	Non-Operating
Vibration	0.5G acceleration, 1.5mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave / minute for each of the three axes	1g acceleration, 3mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave / minute for each of the three axes
Shock	6g, half-sine 11mS, 5 shocks for each of the 3 axes	12g, half-sine 11mS, 10 shocks for each of the three axes

12. Prescribed Materials

11.1 Disallowed Components

The following components are not used in the design of the motherboard:

- Components disallowed by the European Union's Restriction of Hazardous Substances Directive (RoHS 6)
- Trimmers and/or potentiometers
- Dip switches

11.2 Capacitors and Inductors

The following limitations apply to the use of capacitors:

- Only aluminum organic polymer capacitors made by high quality manufacturers are used; they must be rated at 105°C
- All capacitors have a predicted life of at least 50,000 hours at 45°C inlet air temperature, under worst conditions
- Tantalum capacitors using manganese dioxide cathodes are forbidden
- SMT ceramic capacitors with case size > 1206 are forbidden (size 1206 are still allowed when installed far from the PCB edge and with a correct orientation that minimizes risk of cracks)
- Ceramic material for SMT capacitors must be X7R or better material (COG or NPo type should be used in critical portions of the design)

Only SMT inductors may be used. The use of through-hole inductors is disallowed.