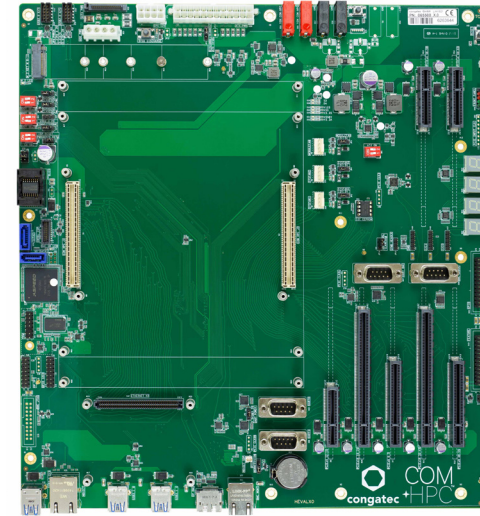

conga-HPC/EVAL-Server

Detailed Description of the congatec COM-HPC® Evaluation Carrier Board for Server Modules



User's Guide

Revision 1.04

Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
1.00	2022-10-26	AEM	• Official release
1.01	2024-01-10	AEM	• Updated the RoHS statement • Added note about PCIe slots X12, X13 and X14 to section 4.2 "Extension Slots" • Added note about USB ports X19 and X76 to section 4.5 "USB Connectors"
1.02	2025-01-10	AEM	• Added the WEEE directive to the preface section • Added a note about PCIe Gen 4 to section 4.2.1 "PCIe x16 Slot" • Updated the footer
1.03	2025-05-23	RVI	• Corrected the orientation of SW1, SW2-4 and SW8 in the connector layout and descriptions
1.04	2025-11-13	RVI	• Corrected the caution in the section 3.4 "Environmental Specifications" • Added a note to the section 4.1.8 "CMOS Battery Connector" clarifying the functionality of jumper JP7 • Added the functionality of switch SW9 and pin connector X81 to the section 4.2 "Extension Slots" • Added a note explaining the functionality of jumper X83 to the section 4.2 "Extension Slots" • Added Table 33 "MDIO Path Selection" for the section 4.7.3 "Mezzanine Card Connector" • Added a note regarding the pull-down resistor added on ESPI_RST signal in section 4.9 "eSPI Header" • Added a note to section 4.16 "SPI Flash Socket", explaining a possible customization

Preface

This user's guide provides information about the components, features and connectors available on the congatec COM-HPC® carrier board.

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Warning

Warnings indicate conditions that, if not observed, can cause personal injury.



Caution

Cautions warn the user about how to prevent damage to hardware or loss of data.



Note

Notes call attention to important information that should be observed.



Connector Type

Describes the mating connector for the congatec COM-HPC® carrier board connectors.



Link to connector layout diagram

This link icon is located in the top left corner of each page. It provides a direct link to the connector layout diagram on page 8 of this document.

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Terminology

Term	Description
BMC	Board Management Controller
CSME	Converged Security and Management Engine
DT	Descriptor Table
GbE	Gigabit Ethernet
HDA	High Definition Audio
IPMI	Intelligent Platform Management interface
I ² C Bus	Inter-Integrated Circuit Bus
KCS	Keyboard Controller Style
KVM	Keyboard, Video and Mouse
MAC	Media Access Control
N.A	Not available
N.C	Not connected
NCSI	Network Controller Sideband Interface
PCIe	Peripheral Component Interface Express (PCI Express)
SATA	Serial AT Attachment
SFP+	Enhanced Small Form-factor Pluggable
SNMP	Simple Network Management Protocol
SMBus	System Management Bus
SoL	Serial Over LAN
T.B.D	To be determined
USB	Universal Serial Bus

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1 Introduction

1.1 COM-HPC® Concept

COM-HPC® is an open industry standard defined specifically for high performance COMs (computer on modules) for embedded systems. The defined module types are client module with fixed input voltage, client module with variable input voltage and server module with fixed input voltage.

A Computer On Module integrates all the core components and standard I/O interfaces of a common PC onto an application specific carrier board. The key advantage of the COM in the embedded computer industries is that all the highly-integrated, high-speed components such as CPU, chipsets and memory are combined on a small module form factor for easy adaptation into different applications across multiple market segments.

COM-HPC® modules have standardized form factors and specified pinouts on the two system connectors that remain the same regardless of the vendor. The COM-HPC® module reflects the functional requirements for a wide range of embedded applications. These functions include, but are not limited to PCI Express, graphics, high definition audio, SATA, gigabit Ethernet and USB ports. Two ruggedized, shielded connectors provide the carrier board interface and carry all the I/O signals to and from the COM-HPC® module.

Carrier board designers can use as little or as many of the I/O interfaces as deemed necessary. The carrier board can therefore provide all the interface connectors required to attach the system to the application specific peripherals. This versatility allows the designer to create a dense and optimized package. The result is a more reliable product with simplified system integration.

Most importantly, COM-HPC® modules are scalable. Once an application has been created, the product range can be diversified by using different performance class or form factor size modules. Simply unplug one module and replace it with another; no redesign is necessary.

1.2 conga-HPC/EVAL-Server

The conga-HPC/EVAL-Server carrier board design is based on COM-HPC® server pinout definition and it complies with COM-HPC® Specification 1.0. The carrier board supports all congatec size-D and size-E COM-HPC® server modules.

The conga-HPC/EVAL-Server provides most of the functional requirements for server application. These functions include, but are not limited to a rich complement of contemporary high bandwidth interfaces such as PCI Express, Serial ATA, USB 3.0/2.0, and 10 Gb SFP+.

By combining the scalability of congatec COM-HPC® modules, the conga-HPC/EVAL-Server carrier board provides manufacturers and developers with a platform to jump-start the development of systems and applications based on COM-HPC® specification. This helps to reduce product design cycle and encourages rapid innovation in system design, to meet the ever-changing needs of the market.



1.2.1 Order Information

The tables below show the part numbers and descriptions of the carrier board and its accessories.

Table 1 Order Description

Part Number	Product Name	Description
065500	conga-HPC/EVAL-Server	Evaluation carrier board for COM-HPC® Server modules (size D and E)

Table 2 Optional Accessories

Part Number	Product Name	Description
065505	conga-HPC/LEK-C827-IM 4SFP28	COM-HPC® Mezzanine card with Intel C827-IM (4xSFP28)
065506	conga-HPC/LEK-XL827-AM 8SFP+	COM-HPC® Mezzanine card with 2x Intel XL827-AM (8xSFP+)
065507	conga-HPC/LEK-QSFP	COM-HPC® Mezzanine card with direct connection adapter (4x SFP28 and 1x QSFP)
065508	conga-HPC/LEK-C827-IM 2QSFP28	COM-HPC® Mezzanine card with Intel C827-IM (2xQSFP28)
065550	conga-HPC/HEVA LEK1 1 IO Shield	IO Shield for conga-HPC/LEK-C827-IM 4SFP28 (LEK1)
065551	conga-HPC/HEVA LEK1 2 IO Shield	IO Shield for conga-HPC/LEK-XL827-AM 8SFP+ (LEK1)
065552	conga-HPC/HEVA LEK2 IO Shield	IO Shield for conga-HPC/LEK-QSFP (LEK2)
065553	conga-HPC/HEVA LEK3 IO Shield	IO Shield for conga-HPC/LEK-C827-IM 2QSFP28 (LEK3)

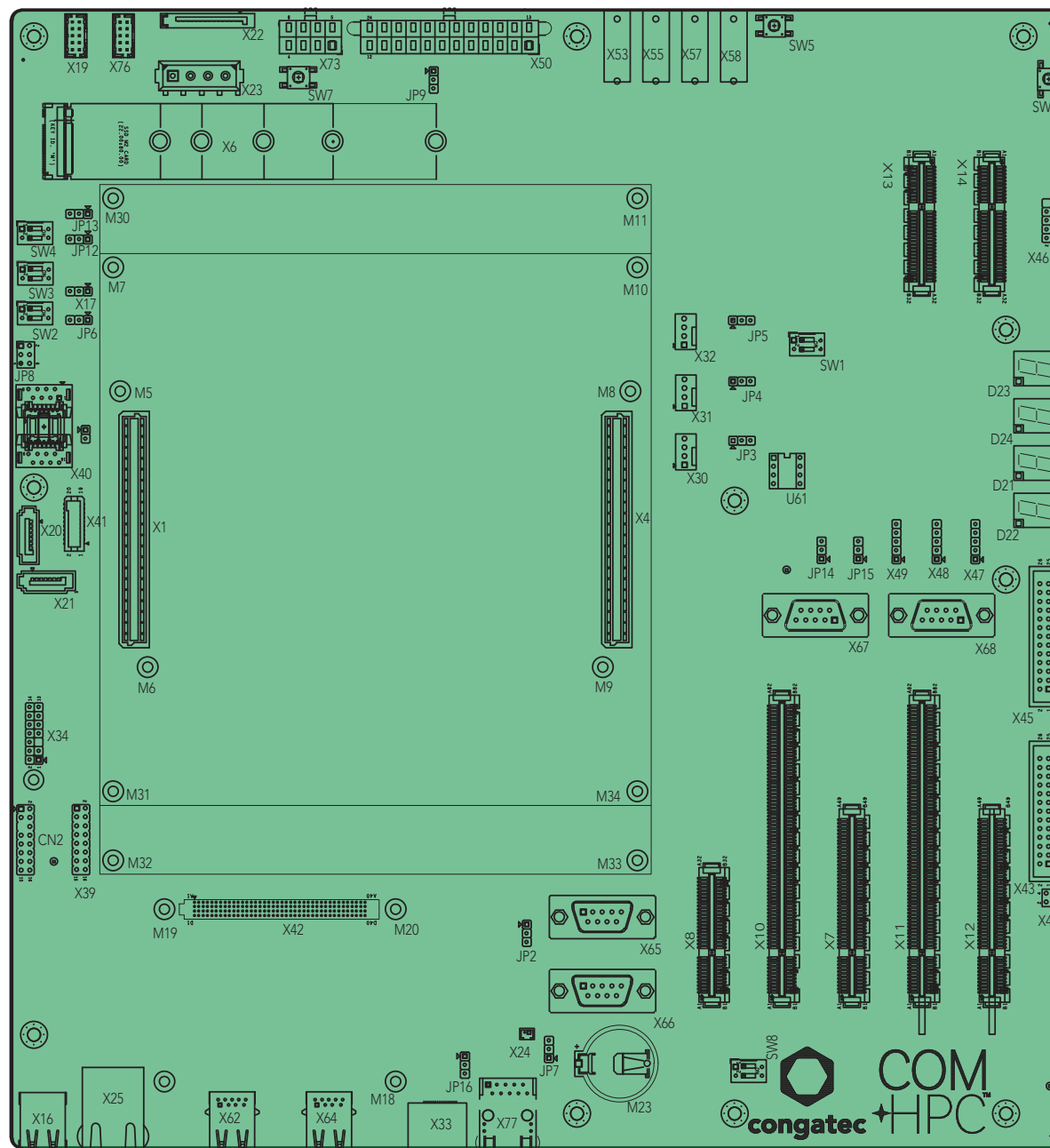


2 Connector Layout

The connector layout picture shows each connector and its designator.

Hover over any component. When the mouse icon changes, click on the link to go to the area in the document where the component is described.

Use the mouse icon in the top left hand corner of the destination page to return to the connector layout picture.





3 Specifications

3.1 Feature List

Table 3 Feature Summary

Form Factor	Extended ATX (305 mm by 330 mm)	
Supported Modules	congatec COM-HPC® size D and size E server modules	
Operating Temperature Range	-40°C to 85°C	
BMC	ASPEED AST2600 (IPMI 2.0)	
Internal Connectors	1x ATX 12 V standard power connector 1x EPS 12 V 3x PCIe x4 2x PCIe x8 2x PCIe x16 1x M.2 Key M, socket 3 (2230/2242/2260/2280/22110) 1x KR connector for Ethernet Mezzanine cards 2x SATA 1x SATA power 2x Dual USB 2.0 header (USB ports 4-7) 1x eSPI header 1x General Purpose SPI header 2x Module UART	2x BMC UART 2x System fan (BMC) 1x System fan (module) 1x I2C0 header 1x I2C1 header 1x I2C0 I/O expander header 1x Intel ISP adapter header 1x SMB header 1x GPIO header 1x Front panel header 1x Feature header 2x COM-HPC® connectors
External Connectors	1x Dual USB 3.1 (USB ports 2-3) 1x 10 GbE RJ45 2x USB 3.1 (Port 0 & 1)	1x DisplayPort (BMC) 1x 1 GbE RJ45 (BMC Management) ¹
Software	AMI Megarc SPX BMC firmware ASPEED Video BIOS	
Other Features	Thermal and voltage monitoring CMOS Battery Boot from external BIOS flash	



¹. The 1 GbE port X77 supports only BMC management (no support for network connectivity)



3.2 Mechanical Dimensions

The conga-HPC/EVAL-Server has the following dimensions:

- length of 304.8 ± 0.1 mm
- width of 330.2 ± 0.1 mm
- height of 21.6 ± 0.1 mm (17 mm top-side, 1.6 mm PCB and 3 mm bottom-side)



Note

The 3D models of congatec products are available at www.congatec.com/login. These models indicate the overall length, height and width of each product. If you need login access, contact your local sales representative.

3.3 Supply Voltage Power

The conga-HPC/EVAL-Server supports 12 V DC $\pm 5\%$.

3.4 Environmental Specifications

Temperature	Operation: -40°C to 85°C	Storage: -40° to $+85^{\circ}\text{C}$
Relative Humidity	Operation: 10% to 90%	Storage: 5% to 95%



Caution

The above operating temperatures must be strictly adhered to at all times. The maximum operating temperature refers to any measurable spot on the carrier board's surface.

Humidity specifications are for non-condensing conditions.



4 Connector Description

Table 4 Primary Connector X1 Pinout (J1)

Pin	Row A	Pin	Row B	Pin	Row C	Pin	Row D
A01	VCC	B01	VCC	C01	VCC	D01	VCC
A02	VCC	B02	PWRBTN#	C02	RSTBTN#	D02	VCC
A03	VCC	B03	VCC	C03	VCC	D03	VCC
A04	VCC	B04	THERMTRIP#	C04	CARRIER_HOT#	D04	VCC
A05	VCC	B05	VCC	C05	VCC	D05	VCC
A06	VCC	B06	TAMPER#	C06	VIN_PWROK	D06	VCC
A07	VCC	B07	VCC	C07	VCC	D07	VCC
A08	VCC	B08	SUS_S3#	C08	SUS_S4_S5#	D08	VCC
A09	VCC	B09	VCC	C09	VCC	D09	VCC
A10	GND	B10	WD_STROBE#	C10	GND	D10	WAKE0#
A11	BATLOW#	B11	WD_OUT	C11	FAN_PWMOUT	D11	WAKE1#
A12	PLTRST#	B12	GND	C12	FAN_TACHIN	D12	GND
A13	GND	B13	USB5-	C13	GND	D13	USB1-
A14	USB7-	B14	USB5+	C14	USB3-	D14	USB1+
A15	USB7+	B15	GND	C15	USB3+	D15	GND
A16	GND	B16	USB4-	C16	GND	D16	USB0-
A17	USB6-	B17	USB4+	C17	USB2-	D17	USB0+
A18	USB6+	B18	GND	C18	USB2+	D18	GND
A19	GND	B19	RSVD ¹	C19	GND	D19	ETH0_RX-
A20	ETH4_RX-	B20	RSVD ¹	C20	ETH0_TX-	D20	ETH0_RX+
A21	ETH4_RX+	B21	RSVD ¹	C21	ETH0_TX+	D21	GND
A22	GND	B22	RSVD ¹	C22	GND	D22	ETH1_RX-
A23	ETH5_RX-	B23	RSVD ¹	C23	ETH1_TX-	D23	ETH1_RX+
A24	ETH5_RX+	B24	VCC_5V_SBY	C24	ETH1_TX+	D24	GND
A25	GND	B25	USB67_OC#	C25	GND	D25	ETH2_RX-
A26	ETH6_RX-	B26	USB45_OC#	C26	ETH2_TX-	D26	ETH2_RX+
A27	ETH6_RX+	B27	USB23_OC#	C27	ETH2_TX+	D27	GND
A28	GND	B28	USB01_OC#	C28	GND	D28	ETH3_RX-
A29	ETH7_RX-	B29	SML1_CLK	C29	ETH3_TX-	D29	ETH3_RX+
A30	ETH7_RX+	B30	SML1_DAT	C30	ETH3_TX+	D30	GND
A31	GND	B31	PMCALERT#	C31	GND	D31	USB3_SSTX-
A32	RSVD ¹	B32	SML0_CLK	C32	USB3_SSRX-	D32	USB3_SSTX+
A33	RSVD ¹	B33	SML0_DAT	C33	USB3_SSRX+	D33	GND
A34	GND	B34	USB_PD_ALERT# ²	C34	GND	D34	USB2_SSTX-
A35	ETH4_TX-	B35	USB_PD_I2C_CLK	C35	USB2_SSRX-	D35	USB2_SSTX+



A36	ETH4_TX+	B36	USB_PD_I2C_DAT	C36	USB2_SSRX+	D36	GND
A37	GND	B37	USB_RT_ENA ²	C37	GND	D37	USB1_SSTX0-
A38	ETH5_TX-	B38	USB1_LSRX	C38	USB1_SSRX0-	D38	USB1_SSTX0+
A39	ETH5_TX+	B39	USB1_LSTX	C39	USB1_SSRX0+	D39	GND
A40	GND	B40	USB0_LSRX	C40	GND	D40	USB1_SSTX1-
A41	ETH6_TX-	B41	USB0_LSTX	C41	USB1_SSRX1-	D41	USB1_SSTX1+
A42	ETH6_TX+	B42	GND	C42	USB1_SSRX1+	D42	GND
A43	GND	B43	USB0_AUX-	C43	GND	D43	USB0_SSTX0-
A44	ETH7_TX-	B44	USB0_AUX+	C44	USB0_SSRX0-	D44	USB0_SSTX0+
A45	ETH7_TX+	B45	RSVD ¹	C45	USB0_SSRX0+	D45	GND
A46	GND	B46	RSVD ¹	C46	GND	D46	USB0_SSTX1-
A47	USB1_AUX-	B47	VCC_BOOT_SPI	C47	USB0_SSRX1-	D47	USB0_SSTX1+
A48	USB1_AUX+	B48	BOOT_SPI_CS#	C48	USB0_SSRX1+	D48	GND
A49	GND	B49	BSEL0	C49	GND	D49	SATA0_RX-
A50	eSPI_IO0	B50	BSEL1	C50	BOOT_SPI_IO0	D50	SATA0_RX+
A51	eSPI_IO1	B51	BSEL2	C51	BOOT_SPI_IO1	D51	GND
A52	eSPI_IO2	B52	eSPI_ALERT0#	C52	BOOT_SPI_IO2	D52	SATA0_TX-
A53	eSPI_IO3	B53	eSPI_ALERT1#	C53	BOOT_SPI_IO3	D53	SATA0_TX+
A54	eSPI_CLK	B54	eSPI_CS0#	C54	BOOT_SPI_CLK	D54	GND
A55	GND	B55	eSPI_CS1#	C55	GND	D55	SATA1_RX-
A56	PCIe_CLKREQ0_LO#	B56	eSPI_RST#	C56	PCIe_REFCLK0_HI-	D56	SATA1_RX+
A57	PCIe_CLKREQ0_HI#	B57	GND	C57	PCIe_REFCLK0_HI+	D57	GND
A58	GND	B58	PCIe_BMC_RX-	C58	GND	D58	SATA1_TX-
A59	PCIe_BMC_TX-	B59	PCIe_BMC_RX+	C59	PCIe_REFCLK0_LO-	D59	SATA1_TX+
A60	PCIe_BMC_TX+	B60	GND	C60	PCIe_REFCLK0_LO+	D60	GND
A61	GND	B61	PCIe08_RX-	C61	GND	D61	PCIe00_TX-
A62	PCIe08_TX-	B62	PCIe08_RX+	C62	PCIe00_RX-	D62	PCIe00_TX+
A63	PCIe08_TX+	B63	GND	C63	PCIe00_RX+	D63	GND
A64	GND	B64	PCIe09_RX-	C64	GND	D64	PCIe01_TX-
A65	PCIe09_TX-	B65	PCIe09_RX+	C65	PCIe01_RX-	D65	PCIe01_TX+
A66	PCIe09_TX+	B66	GND	C66	PCIe01_RX+	D66	GND
A67	GND	B67	PCIe10_RX-	C67	GND	D67	PCIe02_TX-
A68	PCIe10_TX-	B68	PCIe10_RX+	C68	PCIe02_RX-	D68	PCIe02_TX+
A69	PCIe10_TX+	B69	GND	C69	PCIe02_RX+	D69	GND
A70	GND	B70	PCIe11_RX-	C70	GND	D70	PCIe03_TX-
A71	PCIe11_TX-	B71	PCIe11_RX+	C71	PCIe03_RX-	D71	PCIe03_TX+
A72	PCIe11_TX+	B72	GND	C72	PCIe03_RX+	D72	GND
A73	GND	B73	PCIe12_RX-	C73	GND	D73	PCIe04_TX-
A74	PCIe12_TX-	B74	PCIe12_RX+	C74	PCIe04_RX-	D74	PCIe04_TX+
A75	PCIe12_TX+	B75	GND	C75	PCIe04_RX+	D75	GND
A76	GND	B76	PCIe13_RX-	C76	GND	D76	PCIe05_TX-



A77	PCle13_TX-	B77	PCle13_RX+	C77	PCle05_RX-	D77	PCle05_TX+
A78	PCle13_TX+	B78	GND	C78	PCle05_RX+	D78	GND
A79	GND	B79	PCle14_RX-	C79	GND	D79	PCle06_TX-
A80	PCle14_TX-	B80	PCle14_RX+	C80	PCle06_RX-	D80	PCle06_TX+
A81	PCle14_TX+	B81	GND	C81	PCle06_RX+	D81	GND
A82	GND	B82	PCle15_RX-	C82	GND	D82	PCle07_TX-
A83	PCle15_TX-	B83	PCle15_RX+	C83	PCle07_RX-	D83	PCle07_TX+
A84	PCle15_TX+	B84	GND	C84	PCle07_RX+	D84	GND
A85	GND	B85	RSVD	C85	GND	D85	NBASET0_MDI0-
A86	VCC_RTC	B86	RSMRST_OUT#	C86	SMB_CLK	D86	NBASET0_MDI0+
A87	SUS_CLK	B87	UART1_TX	C87	SMB_DAT	D87	GND
A88	GPIO_00	B88	UART1_RX	C88	SMB_ALERT#	D88	NBASET0_MDI1-
A89	GPIO_01	B89	UART1_RTS#	C89	UART0_TX	D89	NBASET0_MDI1+
A90	GPIO_02	B90	UART1_CTS#	C90	UART0_RX	D90	GND
A91	GPIO_03	B91	IPMB_CLK	C91	UART0_RTS#	D91	NBASET0_MDI2-
A92	GPIO_04	B92	IPMB_DAT	C92	UART0_CTS#	D92	NBASET0_MDI2+
A93	GPIO_05	B93	GP_SPI_MOSI	C93	I2C0_CLK	D93	GND
A94	GPIO_06	B94	GP_SPI_MISO	C94	I2C0_DAT	D94	NBASET0_MDI3-
A95	GPIO_07	B95	GP_SPI_CS0#	C95	I2C0_ALERT#	D95	NBASET0_MDI3+
A96	GPIO_08	B96	GP_SPI_CS1#	C96	I2C1_CLK	D96	GND
A97	GPIO_09	B97	GP_SPI_CS2#	C97	I2C1_DAT	D97	NBASET0_LINK_MAX#
A98	GPIO_10	B98	GP_SPI_CS3#	C98	NBASET0_SDP	D98	NBASET0_LINK_MID#
A99	GPIO_11	B99	GP_SPI_CLK	C99	NBASET0_CTREF	D99	NBASET0_LINK_ACT#
A100	TYPE0	B100	GP_SPI_ALERT#	C100	TYPE1	D100	TYPE2



Note

^{1.} Not connected

^{2.} Not supported



Table 5 Secondary Connector X4 Pinout (J2)

Pin	Row E	Pin	Row F	Pin	Row G	Pin	Row H
E1	RAPID_SHUTDOWN	F1	ETH2_SDP	G1	RSVD ¹	H1	RSVD ¹
E2	GND	F2	ETH3_SDP	G2	RSVD ¹	H2	RSVD ¹
E3	RSVD ¹	F3	ETH4_SDP	G3	RSVD ¹	H3	RSVD ¹
E4	RSVD ¹	F4	ETH5_SDP	G4	RSVD ¹	H4	RSVD ¹
E5	GND	F5	ETH6_SDP	G5	RSVD ¹	H5	RSVD ¹
E6	RSVD ¹	F6	ETH7_SDP	G6	RSVD ¹	H6	RSVD ¹
E7	RSVD ¹	F7	ETH4-7_I2C_CLK	G7	RSVD ¹	H7	RSVD ¹
E8	GND	F8	ETH4-7_I2C_DAT	G8	RSVD ¹	H8	RSVD ¹
E9	RSVD ¹	F9	ETH4-7_INT#	G9	RSVD ¹	H9	RSVD ¹
E10	RSVD ¹	F10	ETH4-7_MDIO_CLK	G10	RSVD ¹	H10	RSVD ¹
E11	GND	F11	ETH4-7_MDIO_DAT	G11	RSVD ¹	H11	RSVD ¹
E12	RSVD ¹	F12	ETH4-7_PHY_INT#	G12	RSVD ¹	H12	RSVD ¹
E13	RSVD ¹	F13	ETH4-7_PHY_RST#	G13	RSVD ¹	H13	RSVD ¹
E14	GND	F14	ETH4-7_PRSENT#	G14	GND	H14	RSVD ¹
E15	RSVD ¹	F15	RSVD ¹	G15	RSVD ¹	H15	RSVD ¹
E16	RSVD ¹	F16	RSVD ¹	G16	RSVD ¹	H16	RSVD ¹
E17	GND	F17	RSVD ¹	G17	RSVD ¹	H17	RSVD ¹
E18	RSVD ¹	F18	RSVD ¹	G18	RSVD ¹	H18	RSVD ¹
E19	RSVD ¹	F19	GND	G19	RSVD ¹	H19	GND
E20	GND	F20	PCle32_RX-	G20	GND	H20	PCle40_TX-
E21	PCle32_TX-	F21	PCle32_RX+	G21	PCle40_RX-	H21	PCle40_TX+
E22	PCle32_TX+	F22	GND	G22	PCle40_RX+	H22	GND
E23	GND	F23	PCle33_RX-	G23	GND	H23	PCle41_TX-
E24	PCle33_TX-	F24	PCle33_RX+	G24	PCle41_RX-	H24	PCle41_TX+
E25	PCle33_TX+	F25	GND	G25	PCle41_RX+	H25	GND
E26	GND	F26	PCle34_RX-	G26	GND	H26	PCle42_TX-
E27	PCle34_TX-	F27	PCle34_RX+	G27	PCle42_RX-	H27	PCle42_TX+
E28	PCle34_TX+	F28	GND	G28	PCle42_RX+	H28	GND
E29	GND	F29	PCle35_RX-	G29	GND	H29	PCle43_TX-
E30	PCle35_TX-	F30	PCle35_RX+	G30	PCle43_RX-	H30	PCle43_TX+
E31	PCle35_TX+	F31	GND	G31	PCle43_RX+	H31	GND
E32	GND	F32	PCle36_RX-	G32	GND	H32	PCle44_TX-
E33	PCle36_TX-	F33	PCle36_RX+	G33	PCle44_RX-	H33	PCle44_TX+
E34	PCle36_TX+	F34	GND	G34	PCle44_RX+	H34	GND
E35	GND	F35	PCle37_RX-	G35	GND	H35	PCle45_TX-
E36	PCle37_TX-	F36	PCle37_RX+	G36	PCle45_RX-	H36	PCle45_TX+
E37	PCle37_TX+	F37	GND	G37	PCle45_RX+	H37	GND
E38	GND	F38	PCle38_RX-	G38	GND	H38	PCle46_TX-



E39	PCle38_TX-	F39	PCle38_RX+	G39	PCle46_RX-	H39	PCle46_TX+
E40	PCle38_TX+	F40	GND	G40	PCle46_RX+	H40	GND
E41	GND	F41	PCle39_RX-	G41	GND	H41	PCle47_TX-
E42	PCle39_TX-	F42	PCle39_RX+	G42	PCle47_RX-	H42	PCle47_TX+
E43	PCle39_TX+	F43	GND	G43	PCle47_RX+	H43	GND
E44	GND	F44	PCle16_RX-	G44	GND	H44	PCle24_TX-
E45	PCle16_TX-	F45	PCle16_RX+	G45	PCle24_RX-	H45	PCle24_TX+
E46	PCle16_TX+	F46	GND	G46	PCle24_RX+	H46	GND
E47	GND	F47	PCle17_RX-	G47	GND	H47	PCle25_TX-
E48	PCle17_TX-	F48	PCle17_RX+	G48	PCle25_RX-	H48	PCle25_TX+
E49	PCle17_TX+	F49	GND	G49	PCle25_RX+	H49	GND
E50	GND	F50	PCle18_RX-	G50	GND	H50	PCle26_TX-
E51	PCle18_TX-	F51	PCle18_RX+	G51	PCle26_RX-	H51	PCle26_TX+
E52	PCle18_TX+	F52	GND	G52	PCle26_RX+	H52	GND
E53	GND	F53	PCle19_RX-	G53	GND	H53	PCle27_TX-
E54	PCle19_TX-	F54	PCle19_RX+	G54	PCle27_RX-	H54	PCle27_TX+
E55	PCle19_TX+	F55	GND	G55	PCle27_RX+	H55	GND
E56	GND	F56	PCle20_RX-	G56	GND	H56	PCle28_TX-
E57	PCle20_TX-	F57	PCle20_RX+	G57	PCle28_RX-	H57	PCle28_TX+
E58	PCle20_TX+	F58	GND	G58	PCle28_RX+	H58	GND
E59	GND	F59	PCle21_RX-	G59	GND	H59	PCle29_TX-
E60	PCle21_TX-	F60	PCle21_RX+	G60	PCle29_RX-	H60	PCle29_TX+
E61	PCle21_TX+	F61	GND	G61	PCle29_RX+	H61	GND
E62	GND	F62	PCle22_RX-	G62	GND	H62	PCle30_TX-
E63	PCle22_TX-	F63	PCle22_RX+	G63	PCle30_RX-	H63	PCle30_TX+
E64	PCle22_TX+	F64	GND	G64	PCle30_RX+	H64	GND
E65	GND	F65	PCle23_RX-	G65	GND	H65	PCle31_TX-
E66	PCle23_TX-	F66	PCle23_RX+	G66	PCle31_RX-	H66	PCle31_TX+
E67	PCle23_TX+	F67	GND	G67	PCle31_RX+	H67	GND
E68	GND	F68	PCle48_RX-	G68	GND	H68	PCle56_TX-
E69	PCle48_TX-	F69	PCle48_RX+	G69	PCle56_RX-	H69	PCle56_TX+
E70	PCle48_TX+	F70	GND	G70	PCle56_RX+	H70	GND
E71	GND	F71	PCle49_RX-	G71	GND	H71	PCle57_TX-
E72	PCle49_TX-	F72	PCle49_RX+	G72	PCle57_RX-	H72	PCle57_TX+
E73	PCle49_TX+	F73	GND	G73	PCle57_RX+	H73	GND
E74	GND	F74	PCle50_RX-	G74	GND	H74	PCle58_TX-
E75	PCle50_TX-	F75	PCle50_RX+	G75	PCle58_RX-	H75	PCle58_TX+
E76	PCle50_TX+	F76	GND	G76	PCle58_RX+	H76	GND
E77	GND	F77	PCle51_RX-	G77	GND	H77	PCle59_TX-
E78	PCle51_TX-	F78	PCle51_RX+	G78	PCle59_RX-	H78	PCle59_TX+
E79	PCle51_TX+	F79	GND	G79	PCle59_RX+	H79	GND



E80	GND	F80	PCle52_RX-	G80	GND	H80	PCle60_TX-
E81	PCle52_TX-	F81	PCle52_RX+	G81	PCle60_RX-	H81	PCle60_TX+
E82	PCle52_TX+	F82	GND	G82	PCle60_RX+	H82	GND
E83	GND	F83	PCle53_RX-	G83	GND	H83	PCle61_TX-
E84	PCle53_TX-	F84	PCle53_RX+	G84	PCle61_RX-	H84	PCle61_TX+
E85	PCle53_TX+	F85	GND	G85	PCle61_RX+	H85	GND
E86	GND	F86	PCle54_RX-	G86	GND	H86	PCle62_TX-
E87	PCle54_TX-	F87	PCle54_RX+	G87	PCle62_RX-	H87	PCle62_TX+
E88	PCle54_TX+	F88	GND	G88	PCle62_RX+	H88	GND
E89	GND	F89	PCle55_RX-	G89	GND	H89	PCle63_TX-
E90	PCle55_TX-	F90	PCle55_RX+	G90	PCle63_RX-	H90	PCle63_TX+
E91	PCle55_TX+	F91	GND	G91	PCle63_RX+	H91	GND
E92	GND	F92	PCle_REFCLK2-	G92	GND	H92	PCle_REFCLKIN0-
E93	PCle_REFCLK1-	F93	PCle_REFCLK2+	G93	PCle_REFCLK3-	H93	PCle_REFCLKIN0+
E94	PCle_REFCLK1+	F94	GND	G94	PCle_REFCLK3+	H94	GND
E95	GND	F95	PCle_CLKREQ3#	G95	GND	H95	PCle_REFCLKIN1-
E96	PCle_CLKREQ1#	F96	ETH0-3_PRST#	G96	ETH0-3_I2C_CLK	H96	PCle_REFCLKIN1+
E97	PCle_CLKREQ2#	F97	ETH0-3_PHY_RST#	G97	ETH0-3_I2C_DAT	H97	GND
E98	PCle_CLKREQ_OUT0#	F98	ETH0_SDP	G98	ETH0-3_PHY_INT#	H98	ETH0-3_MDIO_CLK
E99	PCle_CLKREQ_OUT1#	F99	ETH1_SDP	G99	ETH0-3_INT#	H99	ETH0-3_MDIO_DAT
E100	PCle_PERST_IN0#	F100	PCle_PERST_IN1#	G100	PCle_WAKE_OUT0#	H100	PCle_WAKE_OUT1#



Note

^{1.} Not connected



4.1 Power Supply Connectors

The conga-HPC/EVAL-Server provides the following power supply connectors:

- standard 24-pin ATX power connector (X50)
- standard 8-pin EPS power connector (X73)
- DC banana jacks (X53, X55, X57 and X58)



1. Do not supply power via the DC banana jacks and the ATX connectors at the same time.
2. In ATX mode, the 3.3 V, 5 V, and 12 V are derived from the ATX power supply. If power is supplied via the DC banana jacks, the onboard DC/DC regulators generate the 3.3 V and 5 V.

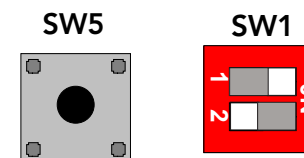
4.1.1 ATX Power Connector

The conga-HPC/EVAL-Server provides a standard 24-pin connector X50 for ATX power supply. With an ATX power supply, the COM-HPC® module starts after you press the power-on button SW5 (ATX mode).

To operate the power supply in AT mode, set DIP SW1.2 to ON and jumper JP9 to pin 2-3 . In this mode, the module starts after the power switch on the power supply is turned on.

Table 6 SW1.2 - ATX PSU Control

Setting	Configuration
OFF	ATX mode (default)
ON	AT mode



1. For high-TDP modules, you must supply power to both the ATX connector X50 and EPS connector X74.
2. The carrier board supports only 24-pin ATX power supply
3. The -12 V power output of the ATX power supply is not used.



To disconnect the 5 V standby voltage from the whole system, use jumper JP9.

Table 7 JP9 - ATX 5V Standby Connection

Pin	Description
1-2	5V standby connected (default)
2-3	5V standby disconnected

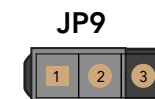
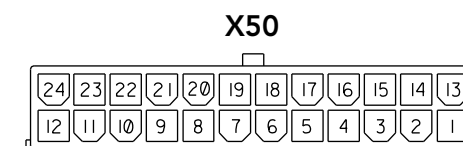


Table 8 X50 - ATX Power Pinout

Pin	Signal	Description	Pin	Signal	Description
1	+3.3V	Power supply +3.3 VDC	13	+3.3V	Power supply +3.3 VDC
2	+3.3V	Power supply +3.3 VDC	14	-12V	Power supply -12 VDC
3	GND	Power ground	15	GND	Power ground
4	+5V	Power supply +5 VDC	16	PS_ON#	Power Supply On (active low). Short this pin to GND to switch power supply ON; disconnect from GND to switch OFF.
5	GND	Power ground	17	GND	Power ground
6	+5V	Power supply +5 VDC	18	GND	Power ground
7	GND	Power ground	19	GND	Power ground
8	PWR_OK	Power Ok	20	N.C	
9	5V_SB	Standby power supply +5 VDC	21	+5V	Power supply +5 VDC
10	+12V	Power supply +12 VDC	22	+5V	Power supply +5 VDC
11	+12V	Power supply +12 VDC	23	+5V	Power supply +5 VDC
12	+3.3V	Power supply +3.3 VDC	24	GND	Power ground



Connector Type

X50: Standard 24-pin ATX connector

JP9: 2.54 mm, 2-pin jumper



4.1.2 EPS Power Connector

The conga-HPC/EVAL-Server provides a standard 8-pin EPS connector X73 for additional 12 V power supply to the module. With an ATX power supply, the COM-HPC® module starts after you press the power-on button SW5 (ATX mode).



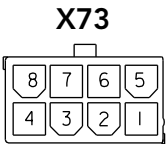
Note

For high-TDP modules, you must supply power to both the ATX connector X50 and EPS connector X73.



Connector Type

X73: Standard 8-pin EPS connector



4.1.3 DC Banana Jack

The conga-HPC/EVAL-Server provides four banana jacks (X53, X55, X57 and X58) for DC power supply to both the module and the voltage regulators on the carrier board. Each banana jack has a maximum power rating of 16 A.

Depending on the power requirements of the system, use one or two pairs of banana jacks to power the system.



Caution

Do not exceed the voltage rating of the COM-HPC® module. Doing so will damage the module.

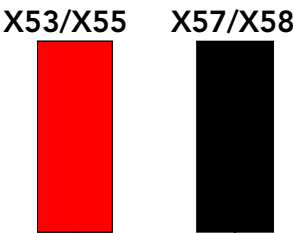
Table 9 X53/X55 and X57/X58 - DC Banana Jacks

Connector	Description
X53/X55	Input voltage for module and carrier board (+12 V)
X57/X58	Ground



Connector Type

X53, X55, X57, X58: 4 mm diameter banana plug (maximum 16 A)





4.1.4 Status LEDs

The table below describes the conga-HPC/EVAL-Server status LEDs.

Table 10 Status LED Description

	LED	Color	Status	Description
Power	All		Off	No power applied to board and BMC
M.2	D4	Red	On	Activity detected
BMC Heatbeat	D17	Green	On (blinking)	BMC activity is detected. Normal operation: LED blinks at ON/OFF interval of 0.5s and 1s (0.5s ON, 0.5s OFF and 1s ON, 1s OFF) Abnormal operation: LED blinks once at ON/OFF interval of 2.5s and then four times at ON/OFF interval of 0.1s (Once for 2.5s ON, 2.5s OFF and then four times for 0.1s ON, 0.1s OFF)
			Off	BMC is not active
Power rail	D28	Green	On	Indicates the status of SUS_S4#
	D29	Green	On	Indicates the status of SUS_S3#
	D31	Yellow	On	Indicates that 5 V standby power is applied to the COM-HPC®/EVAL-Server. If only D31 lights, it indicates that the ATX power supply is mechanically switched on and only 5 V standby power is applied to the carrier board
	D32	Yellow	On	Indicates that the onboard 3.3 V standby power is present
	D33	Green	On	Indicates that the onboard 12 V main power is present
	D34	Green	On	Indicates that the onboard 5 V main power is present
	D35	Green	On	Indicates that the onboard 3.3 V main power is present
LAN 1 (1 GbE)	Left	Off Orange/Green	Off On (orange/green)	10 Mb link speed 100 Mb/1 Gb link speed
	Right	Off Green	Off On (steady/blinking)	No link established Link without activity/ Link established, activity detected
LAN 2 (10 GbE)	Left	Off Orange/Green	Off On (green/orange)	Below half link speed Half speed/full link speed(module specific)
	Right	Off Green	Off On (steady/blinking)	No link established Link without activity/ Link established, activity detected

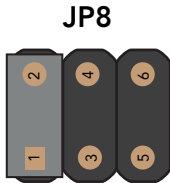


4.1.5 VIN_PWR_OK Signal

The VIN_PWR_OK signal is a high-active input from the main power supply to the module. The signal indicates whether the power is good. Use jumper JP8 to configure the module's VIN_PWR_OK signal.

Table 11 JP8 - VIN_PWR_OK Signal Settings

Pin	Description
1 - 2	Pull-up the VIN_PWR_OK signal to 3.3 V with a 1 K resistor for debug purposes (default)
3 - 4	Connect VIN_PWR_OK signal from ATX power supply
5 - 6	Connect VIN_PWR_OK signal from onboard DC/DC regulator (only in single 12 V mode)



Connector Type

JP8: 2.54 mm, 2-pin jumper

4.1.6 Power-Up Control

The module's SUS_S3# signal controls the ATX power supply control signal (PS_ON#). When the system goes to Suspend to RAM (S3) or Soft Off (S5), the module's chipset asserts the 'SUS_S3#' signal. Through the use of an inverter, the low active 'PS_ON#' signal goes high and switches off the ATX power supply.

When the system is in a power-down system state, any system wake-up event invokes the chipset of the module to deassert the 'SUS_S3#' signal. With the deassertion, the system transitions to Full-On state (S0).

4.1.7 Module Type Detection

The signals TYPE0, TYPE1, and TYPE2 indicate the pinout type of the module connected to the carrier board. These pins are either open (NC) or strapped to ground (GND) by the module as shown in the table below.

Table 12 Module Type Detection Pinout Description

TYPE2	TYPE1	TYPE0	Meaning
N.C	N.C	N.C	Reserved
N.C	N.C	GND	Reserved
N.C	GND	N.C	Reserved
N.C	GND	GND	Server module - fixed 12 V input



GND	N.C	N.C	Reserved
GND	N.C	GND	Reserved
GND	GND	N.C	Client module - wide range 8 V to 20 V input
GND	GND	GND	Client module - fixed 12 V input



If the conga-HPC/EVAL-Server detects an incompatible module pinout, an onboard logic prevents the board from powering up the whole system by controlling the 'PS_ON#' signal of the ATX power supply. This feature works only in ATX mode.

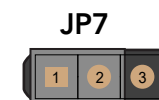
4.1.8 CMOS Battery Connector

The conga-HPC/EVAL-Server provides battery holder M23 for BR2032 CMOS battery. The battery supplies power for CMOS settings and real time clock.

To disconnect the CMOS battery, set jumper JP7 to position 2-3.

Table 13 JP7 Pinout Description

Pin	Description
1-2	Connect battery (default)
2-3	Disconnect battery ¹



Warning

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.



Connector Type

M23: BR2032 battery

JP7: 2.54 mm, 2-pin jumper



Note

^{1.} JP7 only disconnects the module from the backup battery power. The BMC on the carrier board will remain connected to the battery and retain its settings and functionality.



4.2 Extension Slots

The conga-HPC/EVAL-Server provides the following extension slots:

- eight PCIe slots
 - two PCIe x16 slots (lanes 16-31 on X10 and lanes 32-47 on X11)
 - two PCIe x8 slots (lanes 0-7 on X7 and lanes 48-55 on X12)
 - three PCIe x4 slots (lanes 12-15 on X8, lanes 56-59 on X13 and lanes 60-63 on X14)
 - one M.2 key M, socket 3, type 2230/2242/2260/2280/22110 (PCIe lanes 8-11 on X6)
- one KR connector for Ethernet Mezzanine cards



Note

1. The PCIe slots X12, X13 and X14 were not tested during congatec Design Verification Test because the current congatec COM-HPC Server modules do not support PCIe lanes 48 - 63.
2. Jumper X83 forces the PCIe reset signal low on the BMC when connected.

Jumpers for PCIe Clock Requests

To permanently enable the clock request signals from the module up to the clock buffers, use the jumpers described in the table below.

Table 14 Enable Clock Request Signals From the Module

Jumper	Connector	Socket
JP12	X7	PCIe x8
JP13	X8	PCIe x4
JP13	X6	M.2
JP14	X13	PCIe x4
JP14	X14	PCIe x4
JP14	X12	PCIe x8

To permanently enable the clock request signals all the way up to the PCIe slots, use the switch SW9 or pin header X81 as described in the table below.



Table 15 PCIe Clock Request Configuration (Force Low)

Switch / Pin header ¹	Connector	Socket
SW 9.1	X7	PCIe x8
SW 9.2	X8	PCIe x4
SW 9.3	X12	PCIe x8
SW 9.4	X13	PCIe x4
X81	X14	PCIe x4



Note

¹ The switches SW9.1-SW9.4 are set to OFF by default. To enable each signal the respective switch has to be set to ON.

4.2.1 PCIe x16 Slot

The conga-HPC/EVAL-Server provides two standard PCIe x16 slots:

- PCIe lanes 16-31 on connector X10
- PCIe lanes 32-47 on connector X11



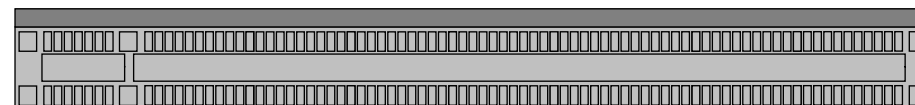
PCIe Gen 4 speed is currently not supported.



Connector Type

X10, X11: PCIe x16 card

X10, X11

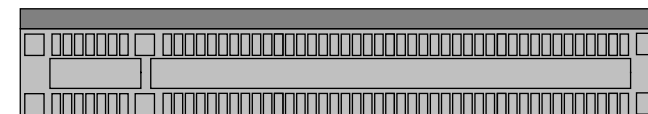


4.2.2 PCIe x8 Slot

The conga-HPC/EVAL-Server provides two standard PCIe x8 slots:

- PCIe lanes 00-07 on connector X7
- PCIe lanes 48-55 on connector X12

X7, X12



With jumper JP12, you can permanently enable the clock request (PCIe_CLKREQ0_LO#) for connector X7. For connector X12, use jumper JP14 to permanently enable its clock request (PCIe_CLKREQ3#).



Table 16 JP12/JP14 - PCIe Clock Request Configuration

Pin	Signal
1-2	Enable clock request permanently
2-3	Enable (default)



Connector Type

X7, X12: PCIe x8 card

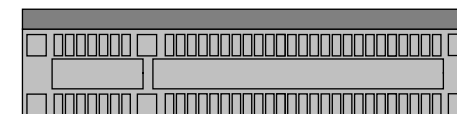
JP12, JP14: 2.54 mm, 2-pin jumper

4.2.3 PCIe x4 Slot

The conga-HPC/EVAL-Server provides three standard PCIe x4 slots:

- PCIe lanes 12-15 on connector X8
- PCIe lanes 56-59 on connector X13
- PCIe lanes 60-63 on connector X14

X8, X13, X14



With jumper JP14, you can permanently enable the clock request (PCIe_CLKREQ3#) for connectors X13 and X14. For connector X8, use jumper JP13 to permanently enable its clock request (PCIe_CLKREQ0_HI#).

Table 17 JP13/JP14 - PCIe Clock Request Configuration

Pin	Signal
1-2	Enable clock request permanently
2-3	Enable (default)



Connector Type

X8, X13, X14: PCIe x4 card

JP13, JP14: 2.54 mm, 2-pin jumper



4.2.4 M.2 Key M Socket

The conga-HPC/EVAL-Server provides a standard M.2 key M, socket X6. The socket is routed to the module's PCIe lanes 8-11 and it supports 2230, 2243, 2260, 2280 and 22110 M.2 card sizes. The red LED D4 lights when there is an activity on this socket.



With jumper JP12, you can permanently enable the socket's clock request signal (PCIe_CLKREQ3#).

Table 18 JP12 - PCIe Clock Request Configuration

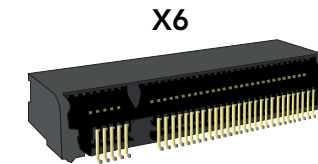
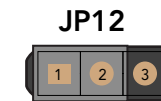
Pin	Signal
1-2	Enable clod request permanently
2-3	Enable (default)



Connector Type

X6: PCIe M.2 key M card

JP12: 2.54 mm, 2-pin jumper

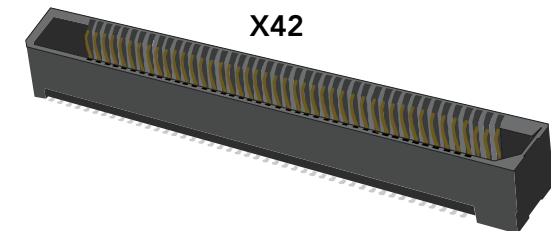


4.2.5 Board to Board Connector

The conga-HPC/EVAL-Server provides a board to board connector X42 for connecting congatec KR Ethernet adapters (LEK1, LEK2 and LEK3). For more information about the congatec KR Ethernet adapters, see the congatec LEK Quick Start Guide.

Table 19 X42 - Ethernet Mezzanine Card Connector Pinout

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	GND	B1	ETH0_RX+	C1	GND	D1	GND
A2	GND	B2	ETH0_RX-	C2	GND	D2	ETH0_SDP
A3	ETH0_TX+	B3	GND	C3	NC	D3	GND
A4	ETH0_TX-	B4	GND	C4	NC	D4	ETH0-3_INT
A5	GND	B5	ETH1_RX+	C5	GND	D5	GND
A6	GND	B6	ETH1_RX-	C6	GND	D6	ETH1_SDP
A7	ETH1_TX+	B7	GND	C7	NC	D7	GND
A8	ETH1_TX-	B8	GND	C8	NC	D8	ETH0-3_I2C_DAT
A9	GND	B9	ETH2_RX+	C9	GND	D9	ETH0-3_I2C_CLK
A10	GND	B10	ETH2_RX-	C10	GND	D10	ETH2_SDP
A11	ETH2_TX+	B11	GND	C11	NC	D11	GND
A12	ETH2_TX-	B12	GND	C12	NC	D12	ETH0-3_MDIO_DAT
A13	GND	B13	ETH3_RX+	C13	GND	D13	ETH0-3_MDIO_CLK
A14	GND	B14	ETH3_RX-	C14	GND	D14	ETH3_SDP
A15	ETH3_TX+	B15	GND	C15	NC	D15	ETH0-3_PHY_INT#





A16	ETH3_TX-	B16	GND	C16	NC	D16	ETH0-3_PHY_RST#
A17	GND	B17	ETH4_RX+	C17	GND	D17	ETH0-3_PRST#
A18	GND	B18	ETH4_RX-	C18	GND	D18	ETH4_SDP
A19	ETH4_TX+	B19	GND	C19	NC	D19	GND
A20	ETH4_TX-	B20	GND	C20	NC	D20	ETH4-7_INT#
A21	GND	B21	ETH5_RX+	C21	GND	D21	GND
A22	GND	B22	ETH5_RX-	C22	GND	D22	ETH5_SDP
A23	ETH5_TX+	B23	GND	C23	NC	D23	GND
A24	ETH5_TX-	B24	GND	C24	NC	D24	ETH4-7_I2C_DAT
A25	GND	B25	ETH6_RX+	C25	GND	D25	ETH4-7_I2C_CLK
A26	GND	B26	ETH6_RX-	C26	GND	D26	ETH6_SDP
A27	ETH6_TX+	B27	GND	C27	NC	D27	GND
A28	ETH6_TX-	B28	GND	C28	NC	D28	ETH4-7_MDIO_DAT
A29	GND	B29	ETH7_RX+	C29	GND	D29	ETH4-7_MDIO_CLK
A30	GND	B30	ETH7_RX-	C30	GND	D30	ETH7_SDP
A31	ETH7_TX+	B31	GND	C31	NC	D31	ETH4-7_PHY_INT#
A32	ETH7_TX-	B32	GND	C32	NC	D32	ETH4-7_PHY_RST#
A33	GND	B33	NC	C33	NC	D33	GND
A34	GND	B34	NC	C34	NC	D34	ETH4-7_PRST#
A35	GND	B35	GND	C35	GND	D35	GND
A36	GND	B36	GND	C36	GND	D36	GND
A37	GND	B37	GND	C37	GND	D37	GND
A38	+V12S	B38	+V12S	C38	+V12S	D38	+V12S
A39	+V12S	B39	+V12S	C39	+V12S	D39	+V12S
A40	+V12S	B40	+V12S	C40	+V12S	D40	+V12S



Connector Type

X42: congatec Ethernet Mezzanine Card

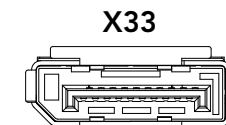
4.3 DisplayPort

The conga-HPC/EVAL-Server provides a DisplayPort connector (X33) via the BMC—providing display capability without an additional cost for DP add-on-card. The BMC controls the graphic output via PCIe_BMC_TX and PCIe_BMC_RX pins.



The DisplayPort supports:

- VESA DisplayPort specification version 1.1a
- data rate of 2.7 or 1.62 Gbps per lane
- AUX channel transceiver
- video compression of high graphics display resolution modes up to 1920x1200x32bpp
- maximum display resolution of 1920x1200 at 60 Hz and 32 bpp



DisplayPort++ is not supported.



Connector Type

X33: Standard DP plug

4.4 UART

The conga-HPC/EVAL-Server provides four UART ports:

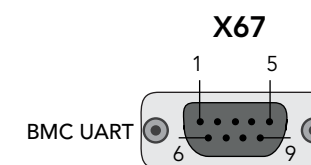
- two BMC UARTs (X67 and X68)
- two module UARTs (X65 and X66)

4.4.1 BMC UART

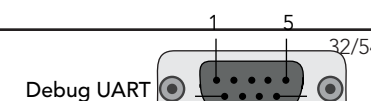
The conga-HPC/EVAL-Server provides two RS232 compliant UARTs on D-SUB9 connectors X67 and X68 from the BMC. Connector X67 supports full flow control and functions as a BMC UART port while connector X68 functions as a BMC debug console port.

Table 20 X67/X68 Pinout Description

X67		X68		Description
Pin	Signals	Pin	Signals	
1	COM1_DCD1#	1	N.C	Data Carrier Detect/Not connected
2	COM1_RXD1	2	COM5_RXD5	Receive Data
3	COM1_TXD1	3	COM5RXD5	Transmit Data
4	COM1_DTR1#	4	N.C	Data Terminal Ready/Not connected
5	GND	5	GND	Ground



X68





6	COM1_DSR1	6	N.C	Data Set Ready/Not connected
7	COM1_RTS1#	7	N.C	Request to Send/Not connected
8	COM1_CTS1#	8	N.C	Clear to Send/Not connected
9	RI1#	9	N.C	Ring Indicator/Not connected

Connector Type

X67, X68: D-SUB9 plug

4.4.2 Module UART

The conga-HPC/EVAL-Server provides two RS232 UARTs (UART0 and UART1) via the COM-HPC® module. The UART0 is on D-SUB9 connector X65 while the UART1 is on D-SUB9 connector X66. The transmit and receive signals of both UARTs are also routed to the feature connector X43 (pins19-22).

Use switch SW8 to enable or disable the UART ports from the COM-HPC® module. To set the power rail of the module UART0, use jumper JP2. For module UART1, use jumper JP16 to set the power rail.

Table 21 X65/X66 Pinout Description

X65		X66		Description
Pin	Signals	Pin	Signals	
1	N.C	1	N.C	Not connected
2	COM0_RXD0	2	COM1_RXD1	Receive Data
3	COM0_TXD0	3	COM1_RXD1	Transmit Data
4	N.C	4	N.C	Not connected
5	GND	5	GND	Ground
6	N.C	6	N.C	Not connected
7	COM0_RTS0#	7	COM1_RTS1#	Request to Send
8	COM0_CTS0#	8	COM1_CTS1#	Clear to Send
9	N.C	9	N.C	Not connected

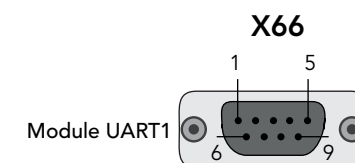
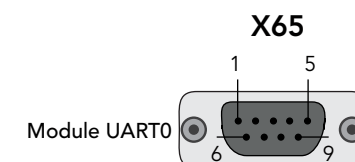




Table 22 SW8 Pinout Description

Switch	Configuration	Description
SW8, switch 1 (for X65)	ON	Disable UART0 on X65
	OFF	Enable UART0 on X65 (default)
SW8, switch 2 (for X66)	ON	Disable UART 1 on X66
	OFF	Enable UART 1 on X66 (default)

SW8

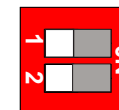


Table 23 JP2 - UART0 Power Rail Configuration

Pin	Signal
1-2	UART0 is powered by 3.3 V in S0 mode (default)
2-3	UART0 is powered by 3.3 V in standby mode

JP2

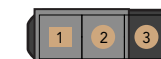
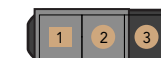


Table 24 JP16 - UART1 Power Rail Configuration

Pin	Signal
1-2	UART1 is powered by 3.3 V in S0 mode (default)
2-3	UART1 is powered by 3.3 V in standby mode

JP16



Connector Type

X65, X66: D-SUB9 plug

JP2, JP16: 2.54 mm, 2-pin jumper



4.5 USB Connectors

The conga-HPC/EVAL-Server provides the following USB connectors:

- two USB 3.1 Type-A
 - port 0 on connector X62
 - port 1 on connector X64
- one dual-stacked USB 3.1 Type-A (ports 2 and 3 on connector X16)
- two USB 2.0 headers
 - ports 4 and 5 on header X76
 - ports 6 and 7 on header X19



The USB connectors X19 and X76 were not tested during congatec Design Verification Test because the current congatec COM-HPC Server modules do not support USB 2.0 ports 4 - 7.

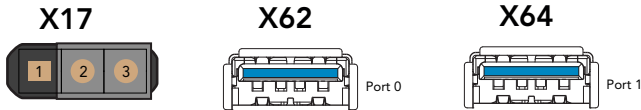
4.5.1 USB 3.1 Type-A

The conga-HPC/EVAL-Server provides two USB 3.1 Type-A connectors X62 (USB port 0) and X64 (USB port 1). Each USB port supports a maximum current of 1 A.

Connector X62 shares its USB 2.0 port differential pairs with the BMC via a multiplexer. Use jumper X17 to route the module’s USB 2.0 port 0 differential pairs

Table 25 X17 - USB 2.0 Port 0 Routing

Pin	Signal
1-2	Route differential pairs to BMC
2-3	Route differential pairs to X62 (default)



Connector Type

X62, X64: USB Type-A plug
X17: 2.54, 2-pin jumper



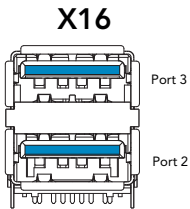
4.5.2 Dual-stacked USB 3.1 Type-A

The conga-HPC/EVAL-Server provides two USB 3.1 ports—port 2 on the lower slot and port 3 on the upper slot via a dual-stacked USB Type-A connector X16. Each port supports a maximum current of 1 A.



Connector Type

X16: USB Type-A plug



4.5.3 USB 2.0 Headers

The conga-HPC/EVAL-Server provides two USB 2.0 headers (X76 and X19). USB ports 4 and 5 are provided via connector X76 while USB ports 6 and 7 are provided via header X19.

Table 26 X76 Pinout Description

USB Port 4			USB Port 5		
Pin	Signal	Description	Pin	Signal	Description
1	+5V	+5V supply	2	+5V	+5V supply
3	USB4-	USB Port 4, Data-	4	USB5-	USB Port 5, Data-
5	USB4+	USB Port 4, Data+	6	USB5+	USB Port 5, Data+
7	GND	Ground	8	GND	Ground
9	SHLD	Cable shield	10	SHLD	Cable shield

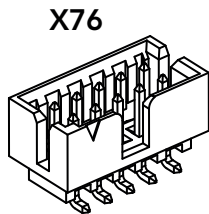
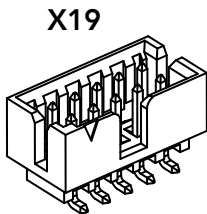


Table 27 X19 Pinout Description

USB Port 6			USB Port 7		
Pin	Signal	Description	Pin	Signal	Description
1	+5V	+5V supply	2	+5V	+5V supply
3	USB6-	USB Port 6, Data-	4	USB7-	USB Port 7, Data-
5	USB6+	USB Port 6, Data+	6	USB7+	USB Port 7, Data+
7	GND	Ground	8	GND	Ground
9	SHLD	Cable shield	10	SHLD	Cable shield



Connector Type

X76, X19: 2 mm pitch, 2 x 5-pin connector
Possible Mating Connector: Molex 511101051





4.6 SATA

The conga-HPC/EVAL-Server provides two standard SATA connectors—port 0 via connector X20 and port 1 via connector X21.



Connector Type

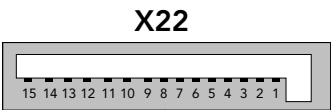
X20, X21: Standard SATA plug

4.6.1 SATA Power

The conga-HPC/EVAL-Server provides a standard 15-pin SATA power connector (X22). This connector supplies 3.3 V, 5 V and 12 V.

Table 28 X22 - SATA Power Pinout Description

Pin	Signal	Pin	Signal	Pin	Signal
1	3.3 V	6	GND	11	GND
2	3.3 V	7	5 V	12	GND
3	3.3 V	8	5 V	13	12 V
4	GND	9	5 V	14	12 V
5	GND	10	GND	15	12 V



Connector Type

X22: Standard 15-pin SATA power connector

4.6.2 Disk Drive Power Connector

The conga-HPC/EVAL-Server provides connector X23, a 4-pin connector for powering disk drives.



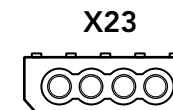
Caution

Do not connect more than one peripheral device to connector X23. The peripherals may damage if you do so.



Table 29 X23 - Disk Drive Power Pinout

Pin	Description
1	12 V (1.5 A resettable fuse; shared with X22)
2	GND
3	GND
4	5 V (2 A resettable fuse; shared with X22)



Connector Type

X23: Standard 4-pin disk drive power plug

4.7 Ethernet Connectors

The conga-HPC/EVAL-Server provides the following Ethernet connectors:

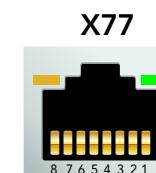
- two RJ45 Ethernet connector
 - a 1 Gb BMC management interface (X77)
 - up to 10 Gb standard NBASE-T network interface from COM-HPC® module (X25)
- Mezzanine card connector for congatec Ethernet adapters (LEK1, LEK2 and LEK3)

4.7.1 RJ45-BMC Management Interface

The conga-HPC/EVAL-Server provides a 1 Gb BMC management interface on standard RJ45 connector (X77). The BMC management interface does not support network connectivity.

Table 30 X77 Status LED Description

LED Left Side	Description	LED Right Side	Description
Off	10 Mbps link speed	Off	No link
Green	100 Mbps link speed	Steady On	Link established, no activity detected
Orange	1000 Mbps link speed	Blinking	Link established, activity detected



Connector Type

X77: 8-pin RJ45 plug



4.7.2 RJ45 (10 Gb NBASE-T)

The conga-HPC/EVAL-Server provides a standard NBASE-T network interface (up to 10 Gb) from the COM-HPC® module on standard RJ45 connector (X25). The module's NBASET0_SDP pin is provided on header X24.

Table 31 X24 Pinout Description

Pin	Signal
1	NBASET0_SDP signal
2	Ground

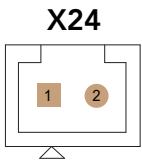
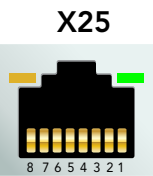


Table 32 X25 Status LED Description

LED Left Side	Description	LED Right Side	Description
Off	Below half link speed	Off	No link
Green	Half link speed (module specific)	Steady On	Link established, no activity detected
Orange	Full link speed (module specific)	Blinking	Link established, activity detected



Connector Type

- X24: 1.25 mm, 2-pin female connector
- X25: 8-pin RJ45 plug

4.7.3 Mezzanine Card Connector

The conga-HPC/EVAL-Server provides a board to board connector X42 for connecting congatec KR Ethernet adapters (LEK1, LEK2 and LEK3). For pinout description, see section 4.2.5 "Board to Board Connector".

Switches SW10, SW11 and SW12 can be used to select the MDIO path as described in the table below.

Table 33 MDIO Path Selection

MDIO Path	SW10	SW11	SW12
ETH0-3 to QUAD0/1 ETH4-7 to N.C. (Default)	1-ON 2-ON	1-OFF 2-ON 3-OFF 4-ON	1-OFF 2-OFF
ETH0-3 to QUAD0 ETH4-7 to QUAD1	1-OFF 2-OFF	1-ON 2-OFF 3-ON 4-OFF	1-ON 2-ON





4.8 System Fan Headers

The conga-HPC/EVAL-Server provides the following headers for connecting a 3-pin or 4-pin fan:

- two system fan headers via the BMC (X30 and X31)
- one system fan header via the module (X32)

4.8.1 BMC System Fan

The conga-HPC/EVAL-Server provides two 4-pin system fan headers (X30/X31) via the BMC. The BMC controls the speed of the system fans. Use jumper:

- JP3 to set the fan’s supply voltage on header X30
- JP4 to set the fan’s supply voltage on header X31

Table 34 JP3/JP4 - BMC Fan Voltage Configuration

Pin	Signal
1-2	12 V supply voltage (default)
2-3	5 V supply voltage

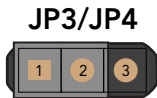


Table 35 X30/X31 Pinout Description

Pin	Signal
1	GND
2	+12 VDC
3	FAN_TACHOIN
4	FAN_CTRL



Note

1. The connector and pinout complies with 4-Wire Pulse PWM Controlled Fans Specification, Revision 1.3
2. FAN_TACHOIN fan output shall provide two pulses per revolution.
3. The fan must pull up the FAN_CTRL signal to high logic level.
4. Recommended maximum power rating for the fan is 9 W



Connector Type

JP3, JP4: 2.54 mm, 2-pin jumper

X36, X38: 2.54 mm, 4-pin grid fan connector



4.8.2 Module System Fan

The conga-HPC/EVAL-Server provides a 4-pin system fan header (X32) via the module. The COM-HPC® module controls the speed of the fan. Use jumper JP5 to set the fan’s supply voltage level on header X32.

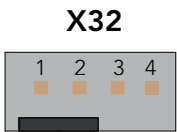
Table 36 JP5 - Module Fan Voltage Configuration

Pin	Signal
1-2	12 V supply voltage (default)
2-3	5 V supply voltage



Table 37 X32 Pinout Description

Pin	Signal
1	GND
2	+12 VDC
3	FAN_TACHOIN
4	FAN_CTRL



Note

1. The connector and pinout complies with 4-Wire Pulse PWM Controlled Fans Specification, Revision 1.3
2. FAN_TACHOIN fan output shall provide two pulses per revolution.
3. The fan must pull up the FAN_CTRL signal to high logic level
4. Recommended maximum power rating for the fan is 9 W



Connector Type

JP5: 2.54 mm, 2-pin jumper
X32: 2.54 mm, 4-pin grid fan connector



4.9 eSPI Header

On the conga-HPC/EVAL-Server, the eSPI signals of the COM-HPC® module are routed to the BMC and header X34. Use DIP switch 2.1 to select the eSPI alert and chip select signals for the BMC.

Table 38 SW2 Pinout Description

Switch	Configuration	Description
SW2.1	ON	Enable ESPI_CS0# and ESPI_ALERT0# for the BMC (default)
	OFF	Enable ESPI_CS1# and ESPI_ALERT1# for the BMC
SW2.2	N.A	Not used
	N.A	Not used

SW2

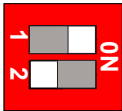
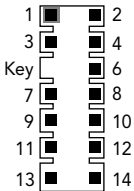


Table 39 X34 - eSPI Header Pinout

Pin	Signals	Pin	Signals
1	GND	2	ESPI_CS0#
3	ESPI_CLK	4	ESPI_IO3
5	KEY	6	ESPI_IO2
7	PLTRST#	8	ESPI_IO1
9	+V3.3S	10	ESPI_IO0
11	ESPI_RST# ¹	12	ESPI_CS1#
13	+V3.3A	14	ESPI_ALERT0#

X34



Connector Type

X34: 2.54 mm, 2x7-pin female connector



Note

^{1.} ESPI_RST# is connected with a 100kΩ pull-down resistor.



4.10 I²C Header

The conga-HPC/EVAL-Server provides the following general purpose I²C ports:

- I2C0 on I2C header X47
- I2C0 on I/O expander header X39
- I2C1 on header X48

4.10.1 I2C0 Header

The conga-HPC/EVAL-Server features ATMEL AT24C32E—a 2-wire serial EEPROM with I²C device address 0xAE via I2C0 bus. You can access the EEPROM by using the I²C control commands implemented in the congatec CGOS API driver. Refer to the user’s guide of the COM-HPC® module and the congatec CGOS manual for more information.

The conga-HPC/EVAL-Server also provides I2C0 signals on header X47. I2C0 operates with 3.3 V.

Table 40 X47 - I2C0 Pinout Description

Pin	Signal
1	+V3.3 standby (0.75 A fuse)
2	I2C0_DAT
3	I2C0_CLK
4	I2C0_ALERT#
5	GND



Connector Type

X47: 2.54 mm, 5-pin female connector

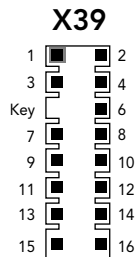


4.10.2 I2C0 I/O Expander Header

The conga-HPC/EVAL-Server provides eight I2C0 signals on header X39 via an I/O expander (TI PCA9554). The I²C address of the I/O Expander is 0x48.

Table 41 X39 - I2C0 Expander Pinout Description

Pin	Signal	Pin	Signal
1	I2C0_IO0	2	GND
3	I2C0_IO1	4	GND
5	I2C0_IO2	6	GND
7	I2C0_IO3	8	GND
9	I2C0_IO4	10	GND
11	I2C0_IO5	12	GND
13	I2C0_IO6	14	GND
15	I2C0_IO7	16	GND



Connector Type

X39: 2.54 mm, 2x8-pin female connector

4.10.3 I2C1 Pin Header

The conga-HPC/EVAL-Server provides I2C1 signals on header X48. I2C1 operates with 1.8 V.

Table 42 X48 - I2C1 Pinout Description

Pin	Signal
1	+V1.8 standby (0.75 A fuse)
2	I2C1_DAT
3	I2C1_CLK
4	Pull-up to +V1.8 standby
5	GND



Connector Type

X48: 2.54 mm, 5-pin female connector



4.11 SMBus Header

The conga-HPC/EVAL-Server provides SMBus signals on header X49.

Table 43 X49 - SMBus Pinout Description

Pin	Signal
1	+V3.3 standby (0.75 A fuse)
2	SMB_DAT
3	SMB_CLK
4	SMB_ALERT#
5	GND



Connector Type

X49: 2.54 mm, 5-pin female connector



4.12 GPIO Header

The conga-HPC/EVAL-Server provides 12 GPIOs on header X45.

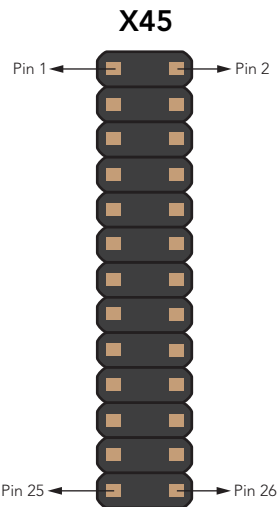
Table 44 X45 - GPIO Pinout Description

Pin	Signal	Pin	Signal
1	+V3.3 standby (0.75 A fuse)	2	+V3.3 main (0.75 A fuse)
3	GPIO_00	4	GND
5	GPIO_01	6	GND
7	GPIO_02	8	GND
9	GPIO_03	10	GND
11	GPIO_04	12	GND
13	GPIO_05	14	GND
15	GPIO_06	16	GND
17	GPIO_07	18	GND
19	GPIO_08	20	GND
21	GPIO_09	22	GND
23	GPIO_10	24	GND
25	GPIO_11	26	GND



Connector Type

X45: 2.54 mm, 2x13-pin female connector





4.13 Front Panel Header

The conga-HPC/EVAL-Server provides power button and reset button for front panels on pin header X46.

Table 45 X46 - Front Panel Pinout Description

Pin	Signal	Pin	Signal
1	N.C	2	5 V supply
3	N.C	4	GND
5	GND	6	PWRBTN#
7	RSTBTN#	8	GND
9	N.C	10	No pin



Connector Type

X46: 2.54 mm, 2x5-pin female connector



4.14 Intel ISP Adaptor-C2 Connector

The conga-HPC/EVAL-Server provides connector X41 for attaching Intel ISP Adaptor-C2. Use jumper JP6 to select the reset trigger signal (RESET_TRIGGER#) for X41.

Table 46 X41 - Intel ISP Adaptor-C2 Pinout

Pin	Signal	Pin	Signal
1	Key	2	BOOT_SPI_CS#
3	RESET_TRIGGER#	4	NC
5	GND	6	VCC_BOOT_SPI
7	BOOT_SPI_CLK	8	BOOT_SPI_IO2
9	BOOT_SPI_IO3	10	BOOT_SPI_IO1
11	NC	12	BOOT_SPI_IO0
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	PLTRST#	20	NC

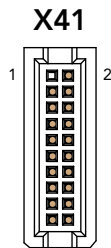
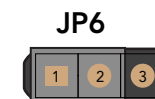




Table 47 JP6 - X41 Reset Trigger Signal

Pin	Description
1-2	RSTBTN# triggers reset (default)
2-3	VIN_PWROK triggers reset



Connector Type

X41: 1.27 mm, 2x10-pin female connector

Possible mating connector: Samtec ASP-159358-02, TFM-110-02-S-D-A

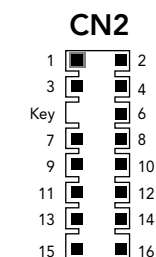
JP6: 2.54 mm grid jumper

4.15 General Purpose SPI Header

The conga-HPC/EVAL-Server provides header CN2 for general purpose SPI.

Table 48 CN2 - General Purpose SPI Port Pinout

Pin	Signals	Pin	Signals
1	GND	2	GP_SPI_CS0#
3	GP_SPI_CLK	4	NC
5	KEY	6	NC
7	PLTRST#	8	GP_SPI_MISO
9	+V3.3S	10	GP_SPI_MOSI
11	PLTRST#	12	GP_SPI_CS1#
13	+V3.3A	14	GP_SPI_ALERT#
15	GP_SPI_CS2#	16	GP_SPI_CS3#



Connector Type

CN2: 2.54 mm, 2x8-pin female connector



4.16 SPI Flash Socket

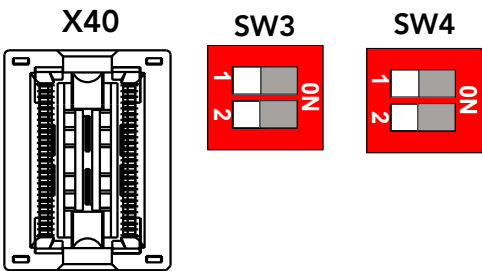
With conga-HPC/EVAL-Server, you can boot the COM-HPC® module from either the module’s onboard BIOS or from an external BIOS. The option to boot from an external BIOS is useful for evaluating a customized BIOS.

The conga-HPC/EVAL-Server provides a 16-pin SOIC16 socket (X40) for an SPI flash. Boot select pins BSEL0 and BSEL1 are routed to DIP switch SW3 while boot select pin BSEL2 is routed to DIP switch SW4.

Use DIP switch SW3 and SW4 to select the flash boot device. The table below shows the available configurations.

Table 49 BIOS Select Configurations

	DIP Switch SW4		DIP Switch SW3		Description
	BSEL [2:0]	SW 1 (BSEL2)	SW 2 (BSEL1)	SW 1 (BSEL0)	
111	OFF	-	OFF	OFF	Boot from on-module firmware (default)
110	OFF	-	OFF	ON	Boot from carrier board SPI flash
101	OFF	-	ON	OFF	CSME/DT on chipset SPI0 device on module. BIOS on SPI0 on module or on SPI1 on carrier
011	ON	-	OFF	OFF	CSME/DT on chipset SPI0 device on module. BIOS on SPI0 or SPI1 on module
010	ON	-	OFF	ON	Not supported
001	OFF	-	OFF	ON	Not supported



Connector Type

X40: SPI flash in 16-pin SOIC package



Note

1. "OFF" = Logic 1; "ON" = Logic 0
2. Through customization BSEL0 can be controlled using GPIO10 and GPIO11 (assembly option/requires BOM change).

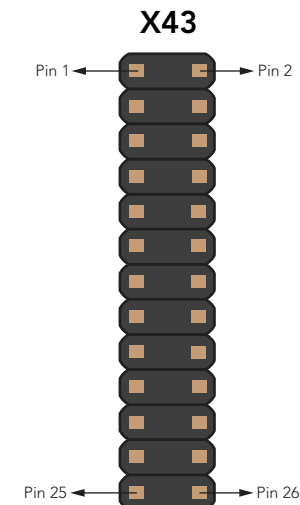


4.17 Feature Connector

The conga-HPC/EVAL-Server provides feature connector X43. The pinout is described below:

Table 50 X43 Pinout Description

Pin	Signal	Description	Pin	Signal	Description
1	+V5S	5V main supply (0.75 A fuse)	2	+V5A	5V standby supply (0.75 A fuse)
3	SUS_CLK	Clock used by carrier board peripherals such as M.2 cards in their low power modes.	4	RAPID_SHUTDOWN	Trigger for rapid shutdown. Must be driven to 5V through a ≤ 50 ohm source impedance for ≥ 20 μ s. Pull-down or disable on module if pin is not asserted.
5	TAMPER#	Tamper or intrusion detection line on VCC_RTC power well. Carrier hardware pulls this low on a Tamper event.	6	SUS_S4_S5#	Active low output that indicates the system is in Suspend to Disk (S4) or Soft Off (S5) state.
7	PS_ON#	ATX power supply on (active low)	8	CARRIER_HOT#	Input from off-module temperature sensor indicating an over-temperature situation.
9	SUS_S3#	Suspend to RAM state (active low output)	10	N.C	Not connected
11	THERMTRIP#	Active low output indicating that the CPU has entered thermal shutdown.	12	WAKE1#	General purpose wake up signal. It may be used to implement wake-up on PS2 keyboard or mouse activity.
13	WD_OUT	Output indicating that a watchdog time-out event has occurred.	14	N.C	Not connected
15	WD_STROBE#	Strobe input to watchdog timer.	16	VIN_PWROK	Power OK from main power supply. A high value indicates that the power is good.
17	BATLOW#	Indicates that external battery is low.	18	N.C	Not connected
19	UART0_TX	COM module's serial port 0 transmit line	20	UART1_TX	COM module's serial port 1 transmit line
21	UART0_RX	COM module's serial port 0 receive line.	22	UART1_RX	COM module's serial port 1 receive line
23	TEST#	Module input for vendor-specific module test mode(s).	24	N.C	Not connected
25	GND	Power ground	26	GND	Power ground



Connector Type

X43: 2 mm, 2 x 25-pin header



5 BMC Overview

BMCs are used in servers for remote administration, thereby reducing the need for onsite administration of the servers. Some of the more common use cases are:

- power cycling a server
- monitoring fan speeds and component temperatures
- monitoring hardware failures

The BMC (Aspeed AST2600) on the conga-HPC/EVAL-Server is for proof of concept only. Carrier board designers can use it as a hardware design guide or to test the physical interfaces of system firmware (BIOS) or remote system management software. The BMC functionality is application-specific and not part of the COM-HPC® specification

The conga-HPC/EVAL-Server supports HTML5-based browsers for remote monitoring.

5.1 Firmware

Some of the features the BMC firmware support are:

- KVM/media redirection support via BMC's video and USB
 - redirection with H5View
- media redirection
 - CD redirection
 - secure authentication and encryption for remote KVM or H5Viewer
- remote server power control
 - server's power status report
 - support for server power-up, power-down, power cycle, reset and ACPI shutdown
- IPMI message interface support via communication interfaces such as:
 - Keyboard Controller Style (KCS)
 - LAN (IPMI over LAN)
 - serial interface (access through a serial port. Supports basic and terminal connection modes)



- IPMI event log and alerting
 - event logs reading
 - sensor readings (5 VSB, 12 V, RTC and thermal sensors)
 - LAN
- Web-based configuration
 - full configuration using GUI
 - fail-safe BMC firmware upgrade
- SSH-based Serial Over LAN (SoL) ¹
 - power control of the server
 - complete command support
 - firmware update
 - role-based authentication and authorization
- dedicated gigabit network controller
- remote BIOS update of the SPI flash on the carrier board



Note

^{1.} *Requires correct SoL settings in the BIOS setup menu*



6 Additional Features

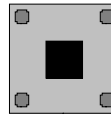
6.1 Buttons

The conga-HPC/EVAL-Server features two push buttons—power and reset buttons.

6.1.1 Power

When using an ATX power supply, the COM-HPC® module starts after the power-on button SW5 is pressed.

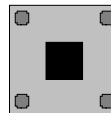
SW5



6.1.2 Reset

The COM-HPC® module and all connected components will perform a hard reset when this button is pressed. The reset button SW6 is connected to the COM-HPC® module's RSTBTN# signal.

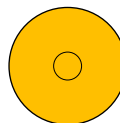
SW6



6.2 Ground Test Points

The conga-HPC/EVAL-Server provides four test points (M1-M4). These test points make it easier to connect oscilloscope probes or multimeter to ground during measurements on the COM-HPC® module.

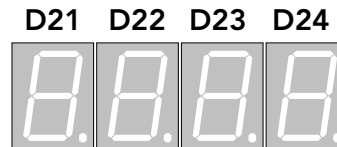
M1-M5





6.3 Debug Display

The conga-HPC/EVAL-Server provides four 14-segment displays (D21-D24) for post code or debug information. A list of the BIOS POST codes and associated POST test and initialization routines for congatec COM-HPC® modules is available at www.congatec.com.





7 Mechanical Dimensions

