conga-HPC/uATX-Server

Detailed Description of the congatec COM-HPC® Application Carrier Board for Server Size D Modules

User's Guide

Revision 0.01 (Preliminary)

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Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
0.01	2024-12-02	AEM	• Preliminary release

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Preface

This user's guide provides information about the components, features and connectors available on the congatec COM-HPC carrier board. It is one of the documents that should be referred to when designing a COM Express™ application. The other reference documents that should be used include the following:

- COM-HPC Design Guide
- COM-HPC Specification

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The following symbols are used in this user's guide:

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
I²C 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)
PN	Part Number
SATA	Serial AT Attachment
SFP+	Enhanced Small Form-factor Pluggable
SNMP	Simple Network Management Protocol
SMBus	System Management Bus
SoL	Serial Over LAN
SOIC	Small Outline Integrated Circuit
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/uATX-Server

The conga-HPC/uATX-Server carrier board design is based on COM-HPC server pinout definition and it complies with COM-HPC Specification 1.2. The carrier board supports all congatec size-D server modules.

The conga-HPC/uATX-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, SATA, USB 3.0/2.0, and 10 Gb SFP+.

By combining the scalability of congatec COM-HPC modules, the conga-HPC/uATX-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.

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1.2.1 Order Information

The table below shows the part numbers and descriptions of the carrier board variants.

Table 1 Order Description

Part Number	Product Name	Description
065520	conga-HPC/uATX-Server	Carrier board for COM-HPC Server modules with commercial temperature
065521	conga-HPC/i-uATX-Server	Carrier board for COM-HPC Server modules with industrial temperature

1.2.2 Compatible Modules

Table 2 Order Description

Carrier Board	Part Number	Compatible congatec Module	Description
conga-HPC/uATX-Server	065520	conga-HPC/sILL commercial variants conga-HPC/sILH commercial variants	Carrier board for COM-HPC Server modules with commercial temperature
conga-HPC/i-uATX-Server	065521	conga-HPC/sILL industrial variants conga-HPC/sILH industrial variants	Carrier board for COM-HPC Server modules with industrial temperature

1.2.3 Optional Accessories

Table 3 I/O Shield

I/O Shield	Part No.	Description
conga-HPC/uATX-Server I/O shield	065529	I/O shield accesory for COM-HPC/uATX-Server carrier board

Table 4 Cables

Cables	Part No.	Connector on conga-HPC/uATX-Server	Description
cab-RS232-EVAL	14000200	X24, X25	20 cm RS-232 cable adapter with 2x5-pin, 2.54 mm pitch female header and a D-sub 9 male connector

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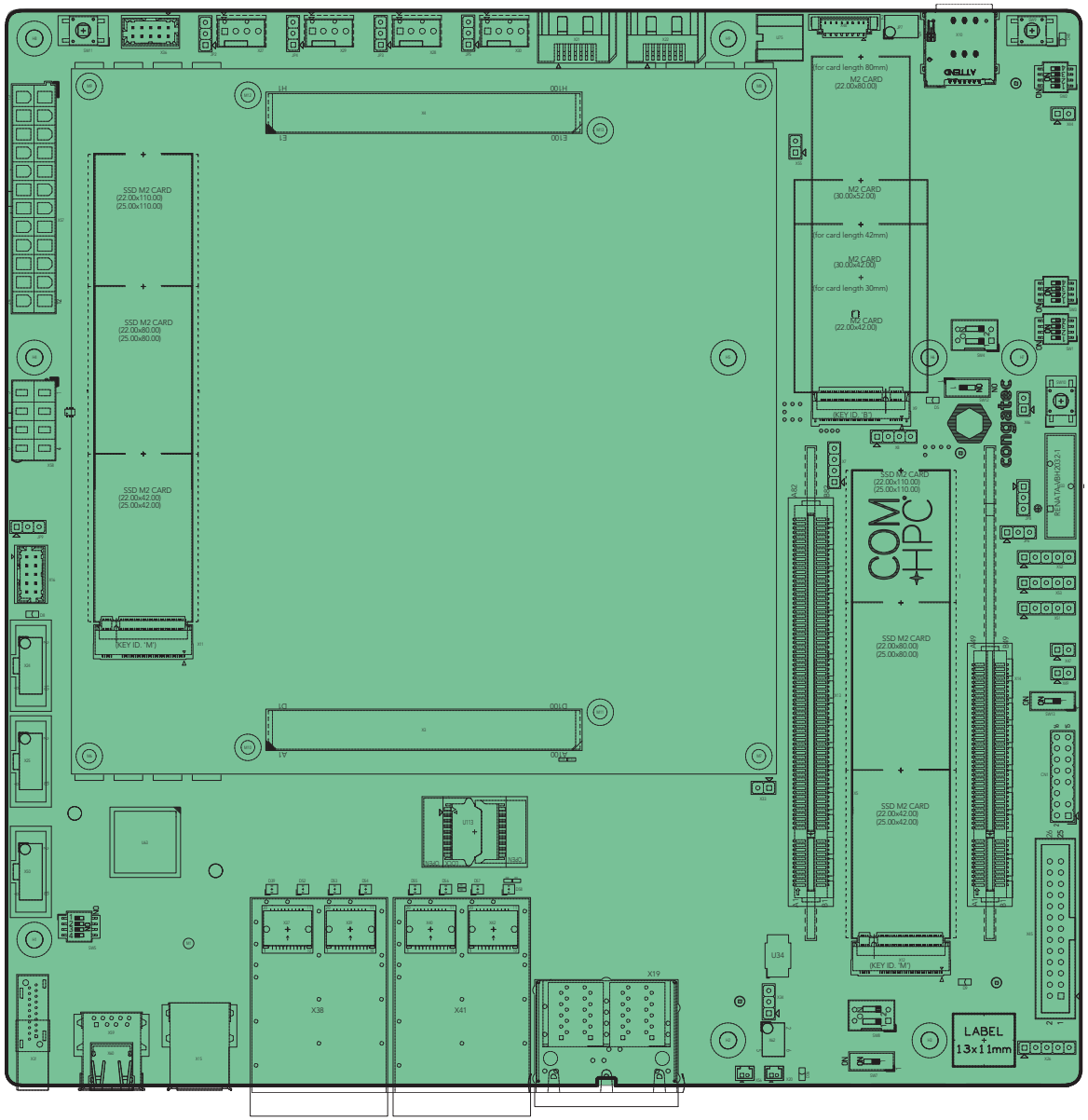
2 Connector Layout

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 5 Feature Summary

Form Factor	Standard Micro-ATX
Supported Modules	congatec COM-HPC size D server modules
Onboard Connectors and Features	1x PCIe Gen4 x16 1x PCIe Gen4 x8 (with open slot to support x16 PCIe cards) 1x M.2 Key B 2242/3042/3052/2280 (1x USB 3.0, 1x USB 2.0, PCIe Gen 3 x1 and nano SIM slot by default) [1] 2x M.2 Key M 2230/2242/2280/22110 (PCIe x4) 1x BMC UART (RS232/RS422/RS485) 1x UART for BMC management 1x IPMB header (JP6) 2x SATA 1x GPIO header 1x General Purpose SPI header 1x USB 2.0 header (USB ports 4 and 5) 1x SMBus header 1x I2C0 header 1x I2C1 header 4x System fan (via the BMC) 1x SPI boot flash socket 1x Test header 1x ATX 24-pin power connector 1x EPS 8-pin power connector 1x RTC CMOS battery holder 1x Nano SIM card 1x External power button header (X44) 1x External reset button header (X46) 1x Runtime power LED header (X47) 1x S3 state LED header (X49) 1x Power button (SW9) 1x Reset button (SW10) 1x COM-HPC type detection header (2-pin)
External IO	4x SFP28/SFP+ cages for various transceiver technologies 1x 1 GbE RJ45 (BMC Management) [2] 3x 2.5 GbE RJ45 with IEEE1588 support 1x DisplayPort (BMC) 3x USB 3.1 Gen1 (Type A) 1x USB 3.1 Gen1 (Type C)

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BMC	Aspeed AST2600
Power Management	ACPI 6.0
Software	AMI Megarc SPX BMC firmware ASPEED Video BIOS
Other Features	Thermal and voltage monitoring CMOS Battery Boot from external BIOS flash

Note

1. *M.2 key B supports PCIe Gen 3 x2, 1x USB 2.0 and nano SIM slot instead with a custom variant (BOM option)*
2. *The 1 GbE port X19B supports only BMC management (without network connectivity)*

3.2 Mechanical Dimensions

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

- lenght of 243.84 ± 0.1 mm
- width of 243.84 ± 0.1 mm
- height of 30.57 ± 0.1 mm mm (25.27mm top-side, 2.00 mm PCB and 3.30 mm bottom-side)

3.3 Supply Voltage Power

The conga-HPC/uATX-Server supports 12 V DC ± 5 %.

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3.4 Environmental Specifications

Temperature (commercial):	Operation: 0°C to 60°C	Storage: -20° to +70°C
Temperature (industrial):	Operation: -40°C to 85°C	Storage: -40° to +85°C
Relative Humidity:	Operation: 10% to 90%	Storage: 5% to 95%

Note

1. *The above operating temperatures must be strictly adhered to at all times. The maximum operating temperature refers to any measurable spot on the modules surface.*
2. *Humidity specifications are for non-condensing conditions.*

3.5 Storage Specifications

This section describes the storage conditions that must be observed for optimal performance of congatec products.

3.5.1 The conga-HPC/uATX-Server

For long term storage of the conga-HPC/uATX-Server (more than six months), keep the conga-HPC/uATX-Server in a climate-controlled building at a constant temperature between 5°C and 40°C, with humidity of less than 65% and at an altitude of less than 3000 m. Also ensure the storage location is dry and well ventilated.

Note

We do not recommend storing the conga-HPC/uATX-Server for more than five years under these conditions.

3.5.2 Cooling Solution

The heatpipes of congatec heatspreaders/cooling solutions are filled with water by default. For optimal cooling performance, do not store the heatspreaders/cooling solutions at temperatures below -20°C.

Caution

1. *For temperatures between -10°C and -20°C, preheat the heatpipes before operation. Optionally, fill the heatpipes with acetone.*
2. *For optimal thermal dissipation, do not store the congatec cooling solutions for more than six months.*

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4 Connector Description

Table 6 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_PWR_OK	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- [1]	B14	USB5+	C14	USB3-	D14	USB1+
A15	USB7+ [1]	B15	GND	C15	USB3+	D15	GND
A16	GND	B16	USB4-	C16	GND	D16	USB0-
A17	USB6- [1]	B17	USB4+	C17	USB2-	D17	USB0+
A18	USB6+ [1]	B18	GND	C18	USB2+	D18	GND
A19	GND	B19	RSVD [1]	C19	GND	D19	ETH0_RX-
A20	ETH4_RX- [1]	B20	RSVD [1]	C20	ETH0_TX-	D20	ETH0_RX+
A21	ETH4_RX+ [1]	B21	RSVD [1]	C21	ETH0_TX+	D21	GND
A22	GND	B22	RSVD [1]	C22	GND	D22	ETH1_RX-
A23	ETH5_RX- [1]	B23	RSVD [1]	C23	ETH1_TX-	D23	ETH1_RX+
A24	ETH5_RX+ [1]	B24	VCC_5V_SBY	C24	ETH1_TX+	D24	GND
A25	GND	B25	USB67_OC# [1]	C25	GND	D25	ETH2_RX-
A26	ETH6_RX- [1]	B26	USB45_OC#	C26	ETH2_TX-	D26	ETH2_RX+
A27	ETH6_RX+ [1]	B27	USB23_OC#	C27	ETH2_TX+	D27	GND
A28	GND	B28	USB01_OC#	C28	GND	D28	ETH3_RX-
A29	ETH7_RX- [1]	B29	SML1_CLK [1]	C29	ETH3_TX-	D29	ETH3_RX+
A30	ETH7_RX+ [1]	B30	SML1_DAT [1]	C30	ETH3_TX+	D30	GND
A31	GND	B31	PMCALERT# [1]	C31	GND	D31	USB3_SSTX-
A32	RSVD [1]	B32	SML0_CLK [1]	C32	USB3_SSRX-	D32	USB3_SSTX+
A33	RSVD [1]	B33	SML0_DAT [1]	C33	USB3_SSRX+	D33	GND
A34	GND	B34	USB_PD_ALERT# [2]	C34	GND	D34	USB2_SSTX-
A35	ETH4_TX- [1]	B35	USB_PD_I2C_CLK	C35	USB2_SSRX-	D35	USB2_SSTX+
A36	ETH4_TX+ [1]	B36	USB_PD_I2C_DAT	C36	USB2_SSRX+	D36	GND

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A37	GND	B37	USB_RT_ENA [2]	C37	GND	D37	USB1_SSTX0-
A38	ETH5_TX- [1]	B38	USB1_LSRX [1]	C38	USB1_SSRX0-	D38	USB1_SSTX0+
A39	ETH5_TX+ [1]	B39	USB1_LSTX [1]	C39	USB1_SSRX0+	D39	GND
A40	GND	B40	USB0_LSRX [1]	C40	GND	D40	USB1_SSTX1- [1]
A41	ETH6_TX- [1]	B41	USB0_LSTX [1]	C41	USB1_SSRX1- [1]	D41	USB1_SSTX1+ [1]
A42	ETH6_TX+ [1]	B42	GND	C42	USB1_SSRX1+ [1]	D42	GND
A43	GND	B43	USB0_AUX- [1]	C43	GND	D43	USB0_SSTX0-
A44	ETH7_TX- [1]	B44	USB0_AUX+ [1]	C44	USB0_SSRX0-	D44	USB0_SSTX0+
A45	ETH7_TX+ [1]	B45	RSVD [1]	C45	USB0_SSRX0+	D45	GND
A46	GND	B46	RSVD [1]	C46	GND	D46	USB0_SSTX1- [1]
A47	USB1_AUX- [1]	B47	VCC_BOOT_SPI	C47	USB0_SSRX1- [1]	D47	USB0_SSTX1+ [1]
A48	USB1_AUX+ [1]	B48	BOOT_SPI_CS#	C48	USB0_SSRX1+ [1]	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- [1]
A68	PCIe10_TX-	B68	PCIe10_RX+	C68	PCIe02_RX- [1]	D68	PCIe02_TX+ [1]
A69	PCIe10_TX+	B69	GND	C69	PCIe02_RX+ [1]	D69	GND
A70	GND	B70	PCIe11_RX-	C70	GND	D70	PCIe03_TX- [1]
A71	PCIe11_TX-	B71	PCIe11_RX+	C71	PCIe03_RX- [1]	D71	PCIe03_TX+ [1]
A72	PCIe11_TX+	B72	GND	C72	PCIe03_RX+ [1]	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- [1]
A77	PCIe13_TX-	B77	PCIe13_RX+	C77	PCIe05_RX- [1]	D77	PCIe05_TX+ [1]

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A78	PCIe13_TX+	B78	GND	C78	PCIe05_RX+ [1]	D78	GND
A79	GND	B79	PCIe14_RX-	C79	GND	D79	PCIe06_TX-
A80	PCIe14_TX-	B80	PCIe14_RX+	C80	PCIe06_RX-	D80	PCIe06_TX+
A81	PCIe14_TX+	B81	GND	C81	PCIe06_RX+	D81	GND
A82	GND	B82	PCIe15_RX-	C82	GND	D82	PCIe07_TX- [1]
A83	PCIe15_TX-	B83	PCIe15_RX+	C83	PCIe07_RX- [1]	D83	PCIe07_TX+ [1]
A84	PCIe15_TX+	B84	GND	C84	PCIe07_RX+ [1]	D84	GND
A85	GND	B85	TEST#	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# [1]	C89	UART0_TX	D89	NBASET0_MDI1+
A90	GPIO_02	B90	UART1_CTS# [1]	C90	UART0_RX	D90	GND
A91	GPIO_03	B91	IPMB_CLK	C91	UART0_RTS# [1]	D91	NBASET0_MDI2-
A92	GPIO_04	B92	IPMB_DAT	C92	UART0_CTS# [1]	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 7 Secondary Connector X4 Pinout (J2)

Pin	Row E	Pin	Row F	Pin	Row G	Pin	Row H
E1	RAPID_SHUTDOWN	F1	ETH2_SDP	G1	VCC_5V_SBY	H1	RSVD [1]
E2	GND	F2	ETH3_SDP	G2	FUSA_STATUS0 [1]	H2	RSVD [1]
E3	RSVD [1]	F3	ETH4_SDP	G3	FUSA_STATUS1 [1]	H3	RSVD [1]
E4	RSVD [1]	F4	ETH5_SDP	G4	FUSA_ALERT# [1]	H4	RSVD [1]
E5	GND	F5	ETH6_SDP	G5	FUSA_SPI_CS# [1]	H5	RSVD [1]
E6	RSVD [1]	F6	ETH7_SDP	G6	FUSA_SPI_CLK [1]	H6	RSVD [1]
E7	RSVD [1]	F7	ETH4-7_I2C_CLK	G7	FUSA_SPI_MISO [1]	H7	RSVD [1]
E8	GND	F8	ETH4-7_I2C_DAT	G8	FUSA_SPI_MOSI [1]	H8	RSVD [1]
E9	RSVD [1]	F9	ETH4-7_INT#	G9	FUSA_SPI_ALERT [1]	H9	RSVD [1]
E10	RSVD [1]	F10	ETH4-7_MDIO_CLK [1]	G10	FUSA_VOLTAGE_ERR# [1]	H10	RSVD [1]
E11	GND	F11	ETH4-7_MDIO_DAT [1]	G11	PROCHOT# [2]	H11	RSVD [1]
E12	RSVD [1]	F12	ETH4-7_PHY_INT# [1]	G12	CATERR# [2]	H12	RSVD [1]
E13	RSVD [1]	F13	ETH4-7_PHY_RST#	G13	RSVD [1]	H13	RSVD [1]
E14	GND	F14	ETH4-7_PRSNT# [2]	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	PCIe32_RX- [1]	G20	GND	H20	PCIe40_TX- [1]
E21	PCIe32_TX- [1]	F21	PCIe32_RX+ [1]	G21	PCIe40_RX- [1]	H21	PCIe40_TX+ [1]
E22	PCIe32_TX+ [1]	F22	GND	G22	PCIe40_RX+ [1]	H22	GND
E23	GND	F23	PCIe33_RX- [1]	G23	GND	H23	PCIe41_TX- [1]
E24	PCIe33_TX- [1]	F24	PCIe33_RX+ [1]	G24	PCIe41_RX- [1]	H24	PCIe41_TX+ [1]
E25	PCIe33_TX+ [1]	F25	GND	G25	PCIe41_RX+ [1]	H25	GND
E26	GND	F26	PCIe34_RX- [1]	G26	GND	H26	PCIe42_TX- [1]
E27	PCIe34_TX- [1]	F27	PCIe34_RX+ [1]	G27	PCIe42_RX- [1]	H27	PCIe42_TX+ [1]
E28	PCIe34_TX+ [1]	F28	GND	G28	PCIe42_RX+ [1]	H28	GND
E29	GND	F29	PCIe35_RX- [1]	G29	GND	H29	PCIe43_TX- [1]
E30	PCIe35_TX- [1]	F30	PCIe35_RX+ [1]	G30	PCIe43_RX- [1]	H30	PCIe43_TX+ [1]
E31	PCIe35_TX+ [1]	F31	GND	G31	PCIe43_RX+ [1]	H31	GND
E32	GND	F32	PCIe36_RX- [1]	G32	GND	H32	PCIe44_TX- [1]
E33	PCIe36_TX- [1]	F33	PCIe36_RX+ [1]	G33	PCIe44_RX- [1]	H33	PCIe44_TX+ [1]
E34	PCIe36_TX+ [1]	F34	GND	G34	PCIe44_RX+ [1]	H34	GND
E35	GND	F35	PCIe37_RX- [1]	G35	GND	H35	PCIe45_TX- [1]
E36	PCIe37_TX- [1]	F36	PCIe37_RX+ [1]	G36	PCIe45_RX- [1]	H36	PCIe45_TX+ [1]
E37	PCIe37_TX+ [1]	F37	GND	G37	PCIe45_RX+ [1]	H37	GND
E38	GND	F38	PCIe38_RX- [1]	G38	GND	H38	PCIe46_TX- [1]

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E39	PCIe38_TX- [1]	F39	PCIe38_RX+ [1]	G39	PCIe46_RX- [1]	H39	PCIe46_TX+ [1]
E40	PCIe38_TX+ [1]	F40	GND	G40	PCIe46_RX+ [1]	H40	GND
E41	GND	F41	PCIe39_RX- [1]	G41	GND	H41	PCIe47_TX- [1]
E42	PCIe39_TX- [1]	F42	PCIe39_RX+ [1]	G42	PCIe47_RX- [1]	H42	PCIe47_TX+ [1]
E43	PCIe39_TX+ [1]	F43	GND	G43	PCIe47_RX+ [1]	H43	GND
E44	GND	F44	PCIe16_RX-	G44	GND	H44	PCIe24_TX-
E45	PCIe16_TX-	F45	PCIe16_RX+	G45	PCIe24_RX-	H45	PCIe24_TX+
E46	PCIe16_TX+	F46	GND	G46	PCIe24_RX+	H46	GND
E47	GND	F47	PCIe17_RX-	G47	GND	H47	PCIe25_TX-
E48	PCIe17_TX-	F48	PCIe17_RX+	G48	PCIe25_RX-	H48	PCIe25_TX+
E49	PCIe17_TX+	F49	GND	G49	PCIe25_RX+	H49	GND
E50	GND	F50	PCIe18_RX-	G50	GND	H50	PCIe26_TX-
E51	PCIe18_TX-	F51	PCIe18_RX+	G51	PCIe26_RX-	H51	PCIe26_TX+
E52	PCIe18_TX+	F52	GND	G52	PCIe26_RX+	H52	GND
E53	GND	F53	PCIe19_RX-	G53	GND	H53	PCIe27_TX-
E54	PCIe19_TX-	F54	PCIe19_RX+	G54	PCIe27_RX-	H54	PCIe27_TX+
E55	PCIe19_TX+	F55	GND	G55	PCIe27_RX+	H55	GND
E56	GND	F56	PCIe20_RX-	G56	GND	H56	PCIe28_TX-
E57	PCIe20_TX-	F57	PCIe20_RX+	G57	PCIe28_RX-	H57	PCIe28_TX+
E58	PCIe20_TX+	F58	GND	G58	PCIe28_RX+	H58	GND
E59	GND	F59	PCIe21_RX-	G59	GND	H59	PCIe29_TX-
E60	PCIe21_TX-	F60	PCIe21_RX+	G60	PCIe29_RX-	H60	PCIe29_TX+
E61	PCIe21_TX+	F61	GND	G61	PCIe29_RX+	H61	GND
E62	GND	F62	PCIe22_RX-	G62	GND	H62	PCIe30_TX-
E63	PCIe22_TX-	F63	PCIe22_RX+	G63	PCIe30_RX-	H63	PCIe30_TX+
E64	PCIe22_TX+	F64	GND	G64	PCIe30_RX+	H64	GND
E65	GND	F65	PCIe23_RX-	G65	GND	H65	PCIe31_TX-
E66	PCIe23_TX-	F66	PCIe23_RX+	G66	PCIe31_RX-	H66	PCIe31_TX+
E67	PCIe23_TX+	F67	GND	G67	PCIe31_RX+	H67	GND
E68	GND	F68	PCIe48_RX- [1]	G68	GND	H68	PCIe56_TX- [1]
E69	PCIe48_TX- [1]	F69	PCIe48_RX+ [1]	G69	PCIe56_RX- [1]	H69	PCIe56_TX+ [1]
E70	PCIe48_TX+ [1]	F70	GND	G70	PCIe56_RX+ [1]	H70	GND
E71	GND	F71	PCIe49_RX- [1]	G71	GND	H71	PCIe57_TX- [1]
E72	PCIe49_TX- [1]	F72	PCIe49_RX+ [1]	G72	PCIe57_RX- [1]	H72	PCIe57_TX+ [1]
E73	PCIe49_TX+ [1]	F73	GND	G73	PCIe57_RX+ [1]	H73	GND
E74	GND	F74	PCIe50_RX- [1]	G74	GND	H74	PCIe58_TX- [1]
E75	PCIe50_TX- [1]	F75	PCIe50_RX+ [1]	G75	PCIe58_RX- [1]	H75	PCIe58_TX+ [1]
E76	PCIe50_TX+ [1]	F76	GND	G76	PCIe58_RX+ [1]	H76	GND
E77	GND	F77	PCIe51_RX- [1]	G77	GND	H77	PCIe59_TX- [1]
E78	PCIe51_TX- [1]	F78	PCIe51_RX+ [1]	G78	PCIe59_RX- [1]	H78	PCIe59_TX+ [1]
E79	PCIe51_TX+ [1]	F79	GND	G79	PCIe59_RX+ [1]	H79	GND

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E80	GND	F80	PCIe52_RX- [1]	G80	GND	H80	PCIe60_TX- [1]
E81	PCIe52_TX- [1]	F81	PCIe52_RX+ [1]	G81	PCIe60_RX- [1]	H81	PCIe60_TX+ [1]
E82	PCIe52_TX+ [1]	F82	GND	G82	PCIe60_RX+ [1]	H82	GND
E83	GND	F83	PCIe53_RX- [1]	G83	GND	H83	PCIe61_TX- [1]
E84	PCIe53_TX- [1]	F84	PCIe53_RX+ [1]	G84	PCIe61_RX- [1]	H84	PCIe61_TX+ [1]
E85	PCIe53_TX+ [1]	F85	GND	G85	PCIe61_RX+ [1]	H85	GND
E86	GND	F86	PCIe54_RX- [1]	G86	GND	H86	PCIe62_TX- [1]
E87	PCIe54_TX- [1]	F87	PCIe54_RX+ [1]	G87	PCIe62_RX- [1]	H87	PCIe62_TX+ [1]
E88	PCIe54_TX+ [1]	F88	GND	G88	PCIe62_RX+ [1]	H88	GND
E89	GND	F89	PCIe55_RX- [1]	G89	GND	H89	PCIe63_TX- [1]
E90	PCIe55_TX- [1]	F90	PCIe55_RX+ [1]	G90	PCIe63_RX- [1]	H90	PCIe63_TX+ [1]
E91	PCIe55_TX+ [1]	F91	GND	G91	PCIe63_RX+ [1]	H91	GND
E92	GND	F92	PCIe_REFCLK2- [2]	G92	GND	H92	PCIe_REFCLKIN0-
E93	PCIe_REFCLK1-	F93	PCIe_REFCLK2+ [2]	G93	PCIe_REFCLK3- [2]	H93	PCIe_REFCLKIN0+
E94	PCIe_REFCLK1+	F94	GND	G94	PCIe_REFCLK3+ [2]	H94	GND
E95	GND	F95	PCIe_CLKREQ3# [2]	G95	GND	H95	PCIe_REFCLKIN1-
E96	PCIe_CLKREQ1#	F96	ETH0-3_PRSNT#	G96	ETH0-3_I2C_CLK	H96	PCIe_REFCLKIN1+
E97	PCIe_CLKREQ2# [2]	F97	ETH0-3_PHY_RST#	G97	ETH0-3_I2C_DAT	H97	GND
E98	PCIe_CLKREQ_OUT0#	F98	ETH0_SDP	G98	ETH0-3_PHY_INT# [2]	H98	ETH0-3_MDIO_CLK
E99	PCIe_CLKREQ_OUT1#	F99	ETH1_SDP	G99	ETH0-3_INT#	H99	ETH0-3_MDIO_DAT
E100	PCIe_PERST_IN0#	F100	PCIe_PERST_IN1#	G100	PCIe_WAKE_OUT0#	H100	PCIe_WAKE_OUT1#

Note

1. *Not connected*

2. *Not supported*

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4.1 Power Supply Connectors

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

- standard 24-pin ATX power connector (X57)
- standard 8-pin EPS power connector (X58)

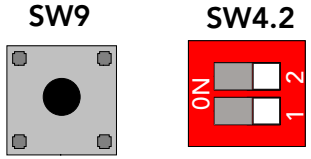
4.1.1 ATX Power Connector

The conga-HPC/uATX-Server provides a standard 24-pin connector X57 for ATX power supply. With an ATX power supply, the COM-HPC module starts after you press the power-on button SW9 (ATX mode).

To operate the power supply in AT mode, set DIP SW4.2 to ON and jumper JP9 to pin 2-3 . In this mode, the module starts immediately you turn on the power supply.

Table 8 ATX Power Control

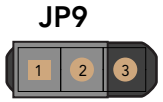
Switch	Configuration	Description
SW4.2	OFF	ATX mode (default)
	ON	AT mode



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

Table 9 JP9 - ATX 5V Standby Connection

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



Note

1. *For high-TDP modules, you must supply power to both the ATX connector X57 and EPS connector X58.*
2. *The carrier board supports only 24-pin ATX power supply*
3. *The ATX pin for -12 V power output is not connected.*

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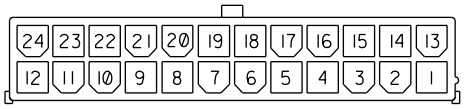
Table 10 X57 - ATX Power Pinout

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 (not connected)
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

X57



Connector Type

X57: Standard 24-pin ATX connector

JP9: 2.54 mm, 2-pin jumper

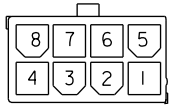
4.1.2 EPS Power Connector

The conga-HPC/uATX-Server provides a standard 8-pin EPS connector X58 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 SW9 (ATX mode).

Note

For high-TDP modules, supply power to both the ATX connector X57 and EPS connector X58.

X58



Connector Type

X58: Standard 8-pin EPS connector

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4.1.3 Status LEDs

The conga-HPC/uATX-Server provides LEDs to indicate the power and network status. The table below describes the various status LEDs onboard the conga-HPC/uATX-Server.

For the external runtime power status LED, use pin header X47. For the external S3 status LED, use pin header X49.

Table 11 Status LED Description

	LED	Color	Status	Description
Power	All		Off	No power applied to board and BMC
M.2	D5	Red	On	Indicates the status of M.2 key B (connector X9)
	D8	Red	On	Indicates the status of M.2 key M (connector X11)
	D9	Red	On	Indicates the status of M.2 key M (connector X12)
BMC Heartbeat	D36	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	D41	Green	On	Indicates that the system is in S3 state
	D40	Green	On	Indicates that runtime power is present
LAN 1 - 1 GbE (Upper Left Port)	Left	Yellow/Green	Yellow Green Off	1 Gb link speed 100 Mb link speed 10 Mb link speed
	Right	Off Green	Off On (steady) On (blinking))	No link established Link without activity Link established, activity detected
LAN 2/3 - 2.5 GbE (Lower Left and Upper Right Ports)	Left	Yellow/Green	Yellow Green Off	2.5 Gb link speed 1 Gb link speed 10 Mb/100 Mb link speed
	Right	Green	Off On (steady) On (blinking)	No link established Link without activity Link established, activity detected
LAN 4 - 2.5 GbE (Lower Right Port)	Left	Yellow/Green	Yellow Green Off	Full link speed (module-specific speed) Half link speed (module-specific speed) Below half link speed (module-specific speed)
	Right	Green	Off On (steady) On (blinking)	No link established Link without activity Link established, activity detected

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SFP28 Ports 1 - 4 (D39, D52 - D58)	Left	Yellow/Green	Yellow Green Off	Full link speed (module-specific speed) Half link speed (module-specific speed) Below half link speed (module-specific speed)
	Right	Green	Off On (steady) On (blinking)	No link established Link without activity Link established, activity detected

Table 12 X47 - External Runtime Status LED

Pin	Description
1	5V
2	GND

X47

Table 13 X49 - External S3 Status LED

Pin	Description
1	5V Standby
2	GND

X49

Connector Type

X47, X49: 2.54 mm, 2-pin connector

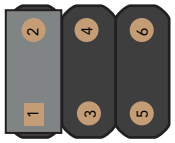
4.1.4 VIN_PWR_OK Signal

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 JP7 to configure the module's VIN_PWR_OK signal.

Table 14 JP7 - 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)

JP7



Connector Type

JP7: 2.54 mm, 2-pin jumper

4.1.5 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).

4.1.6 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 15 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

Note

1. *If the conga-HPC/uATX-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.*

2. *Pin header X56 is for congatec internal use only.*

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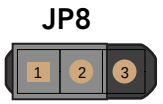
4.1.7 CMOS Battery Connector

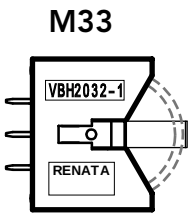
The conga-HPC/uATX-Server provides battery holder M33 for BR2032 CMOS battery. The battery supplies power for CMOS settings and real time clock.

To disconnect the CMOS battery, set jumper JP8 to position 2-3.

Table 16 JP8 Pinout Description

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





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

M33: BR2032 battery

JP8: 2.54 mm, 2-pin jumper

4.2 Extension Slots

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

- one PCIe x16 slot (lanes 16-31 on X13)
- one PCIe x8 slot (lanes 24-31 on X14)
- two M.2 key M, socket 3, type 2242/2280/22110 (PCIe lanes 8-11 on X11 and PCIe lanes 12-15 on X12)
- one M.2 key B socket 2, type 2242/2280/3042/3052 (PCIe lane 0 on X9)

Note

PCIe x8 slot (X14) shares lanes 24-31 with PCIe x16 slot (X13). Therefore, if you connect a PCIe card to PCIe x8 slot (X14), the PCIe x16 slot (X13) will be restricted to x8 link width.

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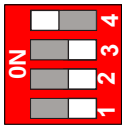
DIP Switch for PCIe Clock Requests

To enable the clock request for the PCIe slots without connecting a PCIe device, use DIP switch SW1 as described in the table below.

Table 17 SW1 - PCIe Clock Request Configuration

Switch	Configuration	Description
SW1.1	ON	Enable clock request immediately for M.2 key M (X11)
	OFF	Enable clock request only when an M.2 card is connected (default)
SW1.2	ON	Enable clock request immedately for M.2 key M (X12)
	OFF	Enable clock request only when an M.2 card is connected (default)
SW1.3	ON	Enable clock request immediately for M.2 key B (X9)
	OFF	Enable clock request only when a PCIe card is connected (default)
SW1.4	ON	Enable clock request immediately for PCIe x16 slot (X13)
	OFF	Enable clock request only when a PCIe card is connected (default)

SW1



4.2.1 PCIe x16 Slot

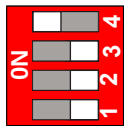
The conga-HPC/uATX-Server provides a standard PCIe x16 slot on connector X13. The slot is routed to the module's PCIe lanes 16–31 and it shares PCIe lanes 24–31 with PCIe x8 slot (connector X14) via a multiplexer.

With DIP SW1.4, you can enable the clock request (PCIE_CLKREQ1#) for PCIe x16 slot without connecting a PCIe device.

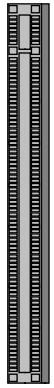
Table 18 SW1.4 - X13 PCIe Clock Request Configuration

Switch	Configuration	Description
SW1.4	ON	Enable the PCIe x16 slot (X13) clock request immediately
	OFF	Enable clock request only when a PCIe card is connected (default)

SW1.4



X13



Connector Type

X13: PCIe x16 card

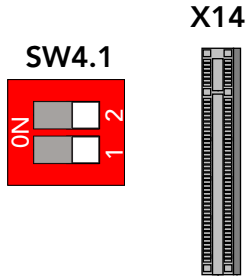
4.2.2 PCIe x8 Slot

The conga-HPC/uATX-Server provides a standard PCIe x8 slot on connector X14. The slot is routed to the module's PCIe lanes 24–31 and it shares these lanes with PCIe x16 slot (connector X13).

Connector X13 is an open-ended PCIe connector configured with a default x8 link width. To support a PCIe card with a wider lane width, set SW4 to the ON position.

Table 19 SW4.1 - PCIe Multiplexer Configuration

Switch	Configuration	Description
SW4.1	ON	Enable support for PCIe cards with wider lane width
	OFF	Detect PCIe cards with up to x8 lane width automatically (default)



Note

If you connect a PCIe card to X14 (x8 slot), the link width of PCIe x16 slot (X13) will be restricted to a x8 link width.

Connector Type

X14: PCIe x8 card

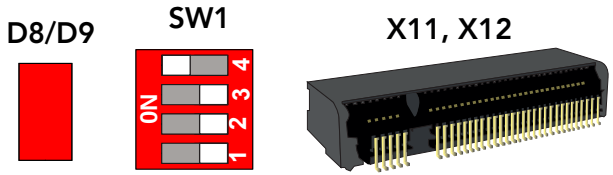
4.2.3 M.2 Key M Socket

The conga-HPC/uATX-Server provides two standard M.2 key M sockets (X11 and X12). The X11 socket is routed to the module's PCIe lanes 8-11 while the X12 socket is routed to the module's PCIe lanes 12-15. The sockets support 2242, 2280 and 22110 M.2 card sizes.

The red LED D8 lights when an activity occurs on socket X11. When an activity occurs on socket X12, the red LED D9 lights. With DIP switch SW1.1 and SW1.2, you can enable clock request signal for X11 and X12 respectively without connecting an M.2 card.

Table 20 X11/X12 PCIe Clock Request Configuration

Switch	Configuration	Description
SW1.1	ON	Enable clock request immediately for M.2 key M (X11)
	OFF	Enable clock request only when a PCIe Card is connected (default)
SW1.2	ON	Enable clock request immedately for M.2 key M (X12)
	OFF	Enable clock request only when a PCIe Card is connected (default)



Connector Type

X11, X12: PCIe M.2 key M card

4.2.4 M.2 Key B Socket

The conga-HPC/uATX-Server provides a standard M.2 key B socket (X9). The X9 socket is routed to the module's PCIe lane 0 and also to the USB port 3 via a USB hub. The socket supports WWAN devices in 2242, 2280, 3042 and 3052 M.2 card sizes. For M.2 modules that support 3.7 V, set DIP switch SW12 to OFF.

The red LED D5 lights when an activity occurs on socket X9. With DIP switch SW1.3, you can enable the clock request signal for X9 without connecting an M.2 card. For additional M.2 key B configurations, see tables 23 "SW2 - M.2 key B Configuration" and 24 "SW3 - M.2 WWAN Configuration".

The UIM interface of the M.2 socket is connected to a nano SIM card slot (X10).

Table 21 X9 PCIe Clock Request Configuration

Switch	Configuration	Description
SW1.3	ON	Enable clock request immediately for M.2 key B (X9)
	OFF	Enable clock request only when a PCIe card is connected (default)

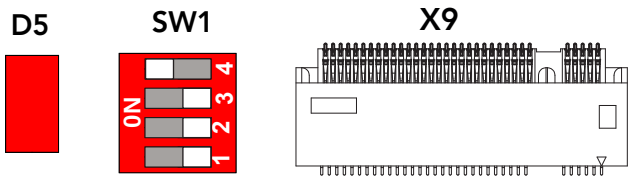
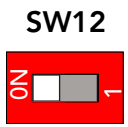


Table 22 SW12 - M.2 Key B Voltage Selection

Switch	Configuration	Description
SW12	ON	Set voltage to 3.3 V (default)
	OFF	Set voltage to 3.7 V

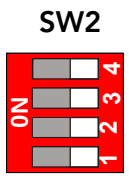


Caution

Do not change SW12 default setting (3.3 V) unless your M.2 module operates with 3.7 V.

Table 23 SW2 - M.2 Key B Configuration

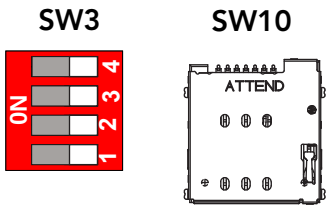
Switch	Configuration	Description
SW2.1	OFF	Disconnect M.2 SMB_ALERT# (default)
	ON	Connect M.2 SMB_ALERT#
SW2.2	OFF	Disconnect WOWWAN# from WAKE0 (default)
	ON	Connect WOWWAN# to WAKE0



SW2.3	OFF	Disconnect WOWWAN# from WAKE1 (default)
	ON	Connect WOWWAN# to WAKE1
SW2.4	OFF	Disconnect M.2 SMB_DAT/CLK (default)
	ON	Connect M.2 SMB_DAT/CLK

Table 24 SW3 - M.2 WWAN Configuration

Switch	Configuration	Description
SW3.1	OFF	Deactivate M.2 WDIS1# control - wireless 1 (default)
	ON	Activate M.2 WDIS1# control
SW3.2	OFF	Deactivate M.2 WDIS2# control - wireless 2 (default)
	ON	Activate M.2 WDIS2# control
SW3.3	OFF	Deactivate M.2 reset control (default)
	ON	Activate M.2 reset control
SW3.4	OFF	Deactive M.2 full card power-off control (default)
	ON	Activate M.2 full card power-off control



Connector Type

X9: PCIe M.2 key B card size 2242, 2280, 3042, 3052
X10: Nano SIM card

4.3 Ethernet Connectors

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

- four RJ45 gigabit Ethernet connectors
  - a gigabit BMC management interface (X19B)
  - two 2.5 GbE via onboard Intel i226 Ethernet controller (X19A and X19D)
  - a 2.5 GbE from COM-HPC module (X19C)
- four SFP28 (10 GbE or 25 GbE) connectors

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4.3.1 BMC Gigabit Ethernet

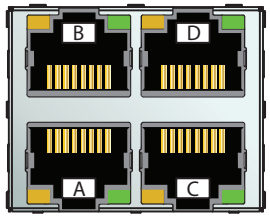
The conga-HPC/uATX-Server provides a gigabit BMC management interface on standard RJ45 connector (X19B). The BMC management interface does not support network connectivity.

Table 25 X19B Status LED

Left LED	Description
Off	10 Mbps link speed
Green	100 Mbps link speed
Yellow	1000 Mbps link speed

Right LED	Description
Off	No link
Steady on (green)	Link established but no activity detected
Blinking (green)	Link established and activity is detected

X19



Connector Type

X19: 8-pin RJ45 plug

4.3.2 Onboard Gigabit Ethernet

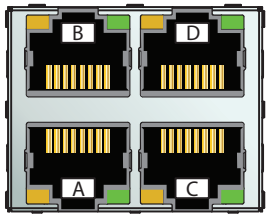
The conga-HPC/uATX-Server provides two 2.5 GbE interface on standard RJ45 connectors (X19A and X19D) via the Intel i226 Ethernet controller.

Table 26 X19A/X19D Status LED

Left LED	Description
Off	10/100 Mbps link speed
Green	1 Gbps link speed
Yellow	2.5 Gbps link speed

Right LED	Description
Off	No link
Steady on (green)	Link established but no activity detected
Blinking (green)	Link established and activity is detected

X19



Connector Type

X19: 8-pin RJ45 plug

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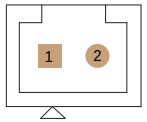
4.3.3 Module Gigabit Ethernet (COM-HPC Module)

The conga-HPC/uATX-Server provides a 2.5 GbE interface on standard RJ45 connector (X19C) from the COM-HPC module. The module's NBASET0_SDP pin is provided on header X20.

Table 27 X20 Pinout Description

Pin	Signal
1	NBASET0_SDP signal
2	Ground

X20



X19

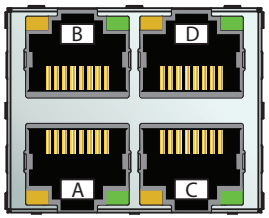


Table 28 X19C Status LED

Left LED	Description
Off	Below half link speed
Green	Half link speed (module specific)
Yellow	Full link speed (module specific)

Right LED	Description
Off	No link
Steady on (green)	Link established but no activity detected
Blinking (green)	Link established and activity is detected

Connector Type

X19: 8-pin RJ45 plug

4.3.4 SFP28 Connector

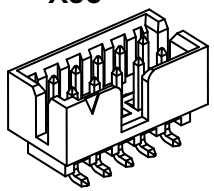
The conga-HPC/uATX-Server provides four SFP28 ports (X37, X39, X40, X42) for up to 25 Gigabit Ethernet. The ports are enclosed in two EMI-shielded SFP28 cages (X38 and X41).

The Software Definable Pins of ETH0 - ETH7 are available on pin header X36.

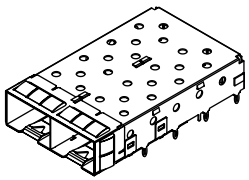
Table 29 X36 - Ethernet Software Definable Pins

Pin	Signal	Pin	Signal
1	ETH0_SDP	2	ETH4_SDP
3	ETH1_SDP	4	ETH5_SDP
5	ETH2_SDP	6	ETH6_SDP
7	ETH3_SDP	8	ETH7_SDP
9	GND	10	GND

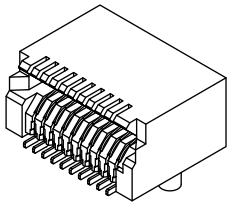
X36



X38/X41



X37/X39/X40/X42



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Connector Type

X37, X39, X40, X42: 20-pin SFP+ connector
X38, X41: SFP28 1x2 cage with EMI shield
X36: 2 mm pitch, 2x5-pin connector (Possible Mating Connector: Molex 511101051)

4.4 Serial Port

The conga-HPC/uATX-Server provides two serial ports:

- COM port 0 on pin header X25
- COM port 1 on pin header X24

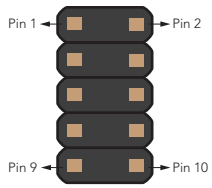
4.4.1 COM Port 0 (BMC UART)

The conga-HPC/uATX-Server provides COM port 0 on pin header X25. The port is sourced from the BMC via a serial transceiver and supports RS-232, RS-422 and RS-485 I/O voltage levels. COM port 0 is legacy compatible, functions as BMC UART port and supports up to 1 Mbps.

Table 30 X25 - COM 0 Pinout Description

Pin	Signals	Description	Pin	Signals	Description
1	DCD#	Data Carrier Detect	2	DSR	Data Set Ready
3	RXD	Receive Data	4	RTS#	Request to Send
5	TXD	Transmit Data	6	CTS#	Clear to Send
7	DTR#	Data Terminal Ready	8	RI#	Ring Indicator
9	GND	Ground	10	+5V (750 mA fuse)	+5V (750 mA fuse)

X25



To configure COM port 0 communication mode, slew rate and termination:

- set DIP SW5 switches to ON position
- navigate to “Advanced -> Board Controller GPIO Expander Configuration” in the BIOS setup menu

SW5

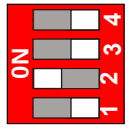
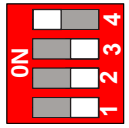


Table 31 "COM Port 0 BIOS Configuration" lists the various options available in the BIOS setup menu.

Table 31 COM Port 0 BIOS Configuration

SW5	Option	Description
Set all switches to ON	Mode	RS-234 (default)
		Loopback
		RS-422 full duplex
	Slew Rate	1 Mbps (default)
		250 kbps
	TERM (RS-422 Termination)	Disabled (default)
		Enabled

SW5



Alternatively, congatec offers custom variants (assembly option) that support hardware configuration of COM port 0 communication mode, slew rate and termination using the DIP switch SW5.

Table 32 "COM Port 0 Communication Mode" lists the options for configuring COM port 0 on a custom variant using SW5.

Table 32 COM Port 0 Communication Mode

SW5.1	SW5.2	Description
ON	ON	Loopback
ON	OFF	RS-232 (default)
OFF	ON	RS-485 half duplex
OFF	OFF	RS-422/RS-485 full duplex

SW5

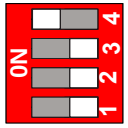


Table 33 COM Port 0 Slew Rate and Termination

Switch	Configuration	Description
SW5.3	OFF	1 Mbps Slew rate (default)
	ON	250 kbps Slew rate
SW5.4	OFF	Enable RS-422/RS-485 termination
	ON	Disable RS-422/RS-485 termination (default)

Connector Type

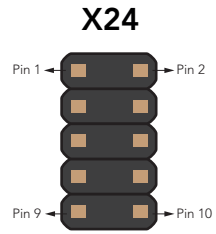
X25: 2.54 mm, 2x5-pin female connector

4.4.2 COM Port 1 (BMC Debug)

The conga-HPC/uATX-Server provides COM port 1 on pin header X24. The port is sourced from the BMC via a serial transceiver and supports RS-232 I/O voltage levels only. COM port 1 is legacy compatible, functions as a BMC debug console port and supports up to 1 Mbps.

Table 34 X24 - COM 1 Pinout Description

Pin	Signals	Description	Pin	Signals	Description
1	N.C	Not connected	2	N.C	Not connected
3	RXD	Receive Data	4	N.C	Not connected
5	TXD	Transmit Data	6	N.C	Not connected
7	N.C	Not connected	8	N.C	Not connected
9	GND	Ground	10	N.C	Not connected



Connector Type

X24: 2.54 mm, 2x5-pin female connector

4.5 USB Connectors

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

- one dual-stacked USB 3.1 Type-A connector X15
  - USB port 0 on the lower slot
  - USB port 1 on the upper slot
- one high-rise USB 3.1 Type-A connector X59 (USB port 2)
- one USB 3.1 Type-C connector X60 (USB port 3)
- one USB 2.0 header X16 (USB ports 4 and 5)

The USB signals from the COM-HPC module are routed as shown below:

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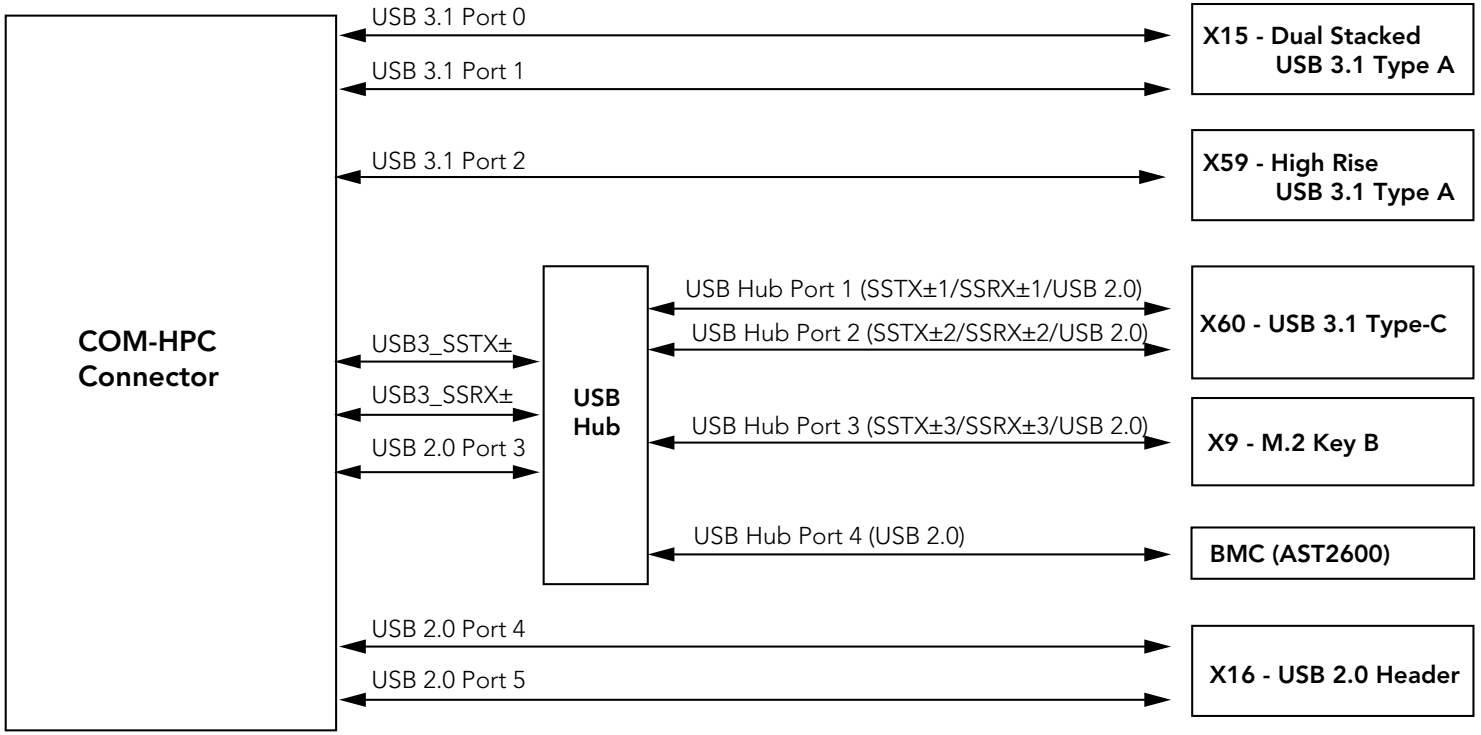
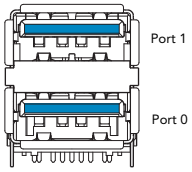


4.5.1 Dual-stacked USB 3.1 Type-A

The conga-HPC/uATX-Server provides two USB 3.1 ports via a dual-stacked USB Type-A connector X15. Port 0 is on the lower slot while port 1 is on the upper slot. Each port supports a maximum current of one ampere.

X15



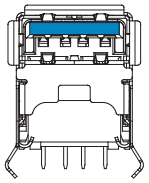
Connector Type

X15: USB Type-A plug

4.5.2 High Rise USB 3.1 Type-A

The conga-HPC/uATX-Server provides a USB 3.1 port via a high rise USB 3.1 Type-A connector X59. The port supports a maximum current of one ampere.

X59



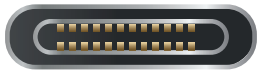
Connector Type

X59: USB Type-A plug

4.5.3 USB 3.1 Type-C

The conga-HPC/uATX-Server provides a USB 3.1 port on USB Type-C connector X60. The port supports a maximum current of three ampere (S0 mode).

X60



Note

The USB Type-C port supports only USB 3.1 Gen 1 (5 Gb/s).

Connector Type

X60: USB Type-C plug

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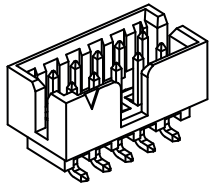
4.5.4 USB 2.0 Headers

The conga-HPC/uATX-Server provides two USB 2.0 ports (USB port 4 and USB port 5) via pin header X16. Each port support a maximum of 0.5 ampere.

Table 35 X16 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

X16



Connector Type

X16: 2 mm pitch, 2 x 5-pin connector

Possible Mating Connector: Molex 511101051

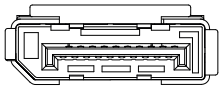
4.6 DisplayPort

The conga-HPC/uATX-Server provides a DisplayPort connector (X31) 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

X31



Note

DisplayPort++ is not supported.

Connector Type

X31: Standard DP plug

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4.7 SATA

The conga-HPC/uATX-Server provides two standard SATA connectors:

- SATA port 0 on connector X21
- SATA port 1 on connector X22

The ports are routed via a dual-channel linear redriver.

Connector Type

X21, X22: Standard SATA plug

4.8 System Fan Headers

The conga-HPC/uATX-Server provides four 4-pin system fan headers (X27 - X30) via the BMC. The BMC controls the speed of the fans. The system fans comply with the 4-wire Pulse Width Modulation (PWM) Controlled Fans Specification 1.3.

Use the following jumpers to set the supply voltage for the system fans:

- JP2 for pin header X27 (system fan 1)
- JP4 for pin header X29 (system fan 2)
- JP3 for pin header X28 (system fan 3)
- JP5 for pin header X30 (system fan 4)

With the default BMC firmware, the system fans:

- X27 and X28 operate at the same speed. However, only X27 supports RPM monitoring (TACHOIN). [1, 2]
- X29 and X30 operate at the same speed. However, only X29 supports RPM monitoring (TACHOIN). [1, 2]

Note

1. *For independent speed control, you need a modified congatec BMC firmware. For more information, contact your local sales representative.*
2. *System fans 3 and 4 (X28, X30) do not support RPM monitoring with the default BMC firmware.*

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Table 36 JP2/JP3/JP4/JP5 Fan Voltage Configuration

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

JP2/JP3/JP4/JP5

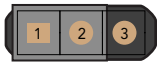
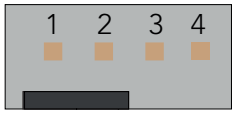


Table 37 System Fan Pinout

Pin	Signal
1	GND
2	+12 VDC
3	Sense (TACHOIN)
4	Control (PWM)

X27/X28/X29/X30



Connector Type

JP3, JP4: 2.54 mm, 2-pin jumper

X27, X28, X29, X30: 2.54 mm, 4-pin grid fan connector

4.9 eSPI Chip Select

On the conga-HPC/uATX-Server, the eSPI signals of the COM-HPC module are routed to the BMC. To select the chip select signals for the BMC, use pin header X33.

Table 38 X33 Pinout Description

Jumper	Description
1-2	Select ESPI_CS0# for the BMC (default)
N.C	Select ESPI_CS1# for the BMC

X33

Connector Type

X33: 2.54 mm jumper

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4.10 I²C Header

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

- I2C0 on pin header X51
- I2C1 on pin header X52

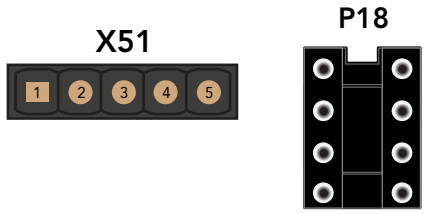
4.10.1 I2C0 Header

The conga-HPC/uATX-Server provides I2C0 signals through pin header X51. The I2C0 port operates at 3.3 V. The conga-HPC/uATX-Server includes an ATMEL AT24C32E EEPROM, a 2-wire serial EEPROM, connected to an 8-pin DIL socket (P18). The P18 socket is designed for testing during system development and supports various 2-wire serial EEPROMs. The I2C device address of the EEPROM is 0xAE.

To access the I2C EEPROM, use the I2C control commands provided in the congatec CGOS API driver. For more information, see the user's guide of the COM-HPC module and the congatec CGOS manual.

Table 39 X51 - 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

X51: 2.54 mm, 5-pin female connector

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4.10.2 I2C1 Pin Header

The conga-HPC/uATX-Server provides I2C1 signals on header X52. The I2C1 port operates with 1.8 V.

Table 40 X52 - I2C1 Pinout Description

Pin	Signal
1	+V1.8 standby (0.75 A fuse)
2	I2C1_DAT
3	I2C1_CLK
4	+V1.8 standby (with a pull-up resistor)
5	GND

X52

Connector Type

X52: 2.54 mm, 5-pin female connector

4.11 SMBus Header

The conga-HPC/uATX-Server provides SMBus signals on pin header X53.

Table 41 X53 - SMBus Pinout Description

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

X53

Connector Type

X53: 2.54 mm, 5-pin female connector

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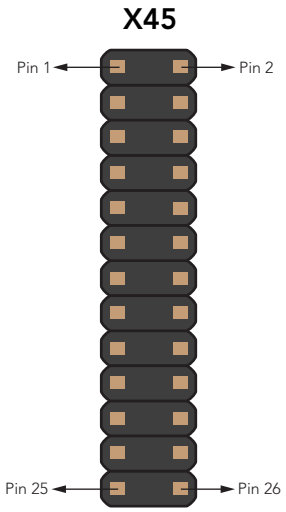
4.12 GPIO Header

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

Table 42 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

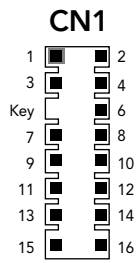
X45: 2.54 mm, 2x13-pin female connector

4.13 General Purpose SPI Header

The conga-HPC/uATX-Server provides header CN1 for general purpose SPI.

Table 43 CN1 - 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



Pin	Signals	Pin	Signals
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

CN1: 2.54 mm, 2x8-pin female connector

4.14 SPI Flash Socket

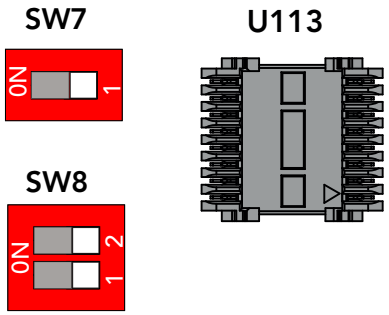
The conga-HPC/uATX-Server provides a 16-pin SOIC16 socket (U113) for an SPI flash. Boot select pins BSEL0 is routed to DIP switch SW7 while boot select pins BSEL1 and BSEL2 are routed to DIP switch SW8.

With conga-HPC/uATX-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.

Use SW7 and SW8 to select the flash boot device. The table below shows the available configurations.

Table 44 BIOS Select Configurations

	DIP Switch SW8		DIP Switch SW7	Description
BSEL [2:0]	SW8.1 (BSEL2)	SW8.2 (BSEL1)	SW 7 (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



Note

"OFF" = Logic 1; "ON" = Logic 0

Connector Type

U113: SPI flash in 16-pin SOIC package

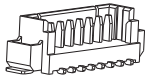
4.15 Debug Connector (Internal Use Only)

The conga-HPC/uATX-Server provides connector X48 for congatec internal use only. The connector is used for programming and debugging the congatec board.

Table 45 X48 Pinout

Pin	Signals
1	BATLOW#
2	3.3 VSB (standby voltage)
3	THRMTRIP#
4	USB_PD_I2C_CLK
5	USB_PD_I2C_DAT
6	GND
7	WDTRIG#
8	WD_OUT

X48



Connector Type

X48:8-pin, 1.25 mm pitch picoblade connector

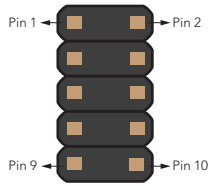
4.16 Feature Connector

The conga-HPC/uATX-Server provides additional signals on pin header X50 (feature connector).

Table 46 X50 Pinout Description

Pin	Signal	Description	Pin	Signal	Description
1	PLTRST#	Plaform reset issued by module chipset.	2	GND	Ground
3	WAKE0#	PCIe Express wake up signal	4	GND	Ground
5	TAMPER#	Tamper or intrusion detection line on VCC_RTC power well. Carrier hardware pulls this low on a Tamper event.	6	RAPID_SHUTDOWN	Trigger for rapid shutdown. Must be driven to 5V through a <=50 ohm source impedance for ≥ 20 µs. Pull-down or disable on module if pin is not asserted.
7	PS_ON#	ATX power supply on (active low)	8	SUS_S4_S5#	Active low output that indicates the system is in Suspend to Disk (S4) or Soft Off (S5) state.
9	SUS_S3#	Suspend to RAM state (active low output)	10	TEST#	Module input for vendor-specific module test mode(s).

X50



Connector Type

X50: 2.54 mm, 2 x 5-pin header

5 Additional Features

5.1 Buttons

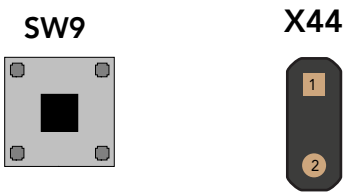
The conga-HPC/uATX-Server features two push buttons—power and reset buttons.

5.1.1 Power

When using an ATX power supply, the COM-HPC module starts after you press the power-on button SW9. Pressing the power button triggers the module's PWRBTN# signal.

The triggered event usually transitions the system from one power state to another. The system behaviour however, depends on the ACPI settings of the Operating System.

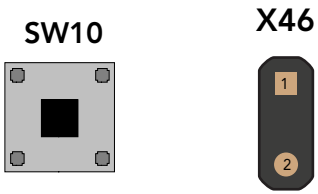
For external power button, use pin header X44.



5.1.2 Reset

Press the reset button (SW10) to trigger a hard reset of the COM-HPC module and all connected components. The reset button is connected to the RSTBTN# signal on the COM-HPC module.

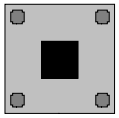
For external reset button, use pin header X46.



5.2 Fast Standby Discharge

Press SW11 to quickly discharge the 5 V standby power.

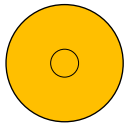
SW11



5.3 Ground Test Points

The conga-HPC/uATX-Server provides five test points (M1-M5). These test points make it easier to connect oscilloscope probes or multimeter to ground during measurements on the COM-HPC module.

M1-M5



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6 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/uATX-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/uATX-Server supports HTML5-based browsers for remote monitoring.

6.1 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 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)
- dedicated gigabit network controller

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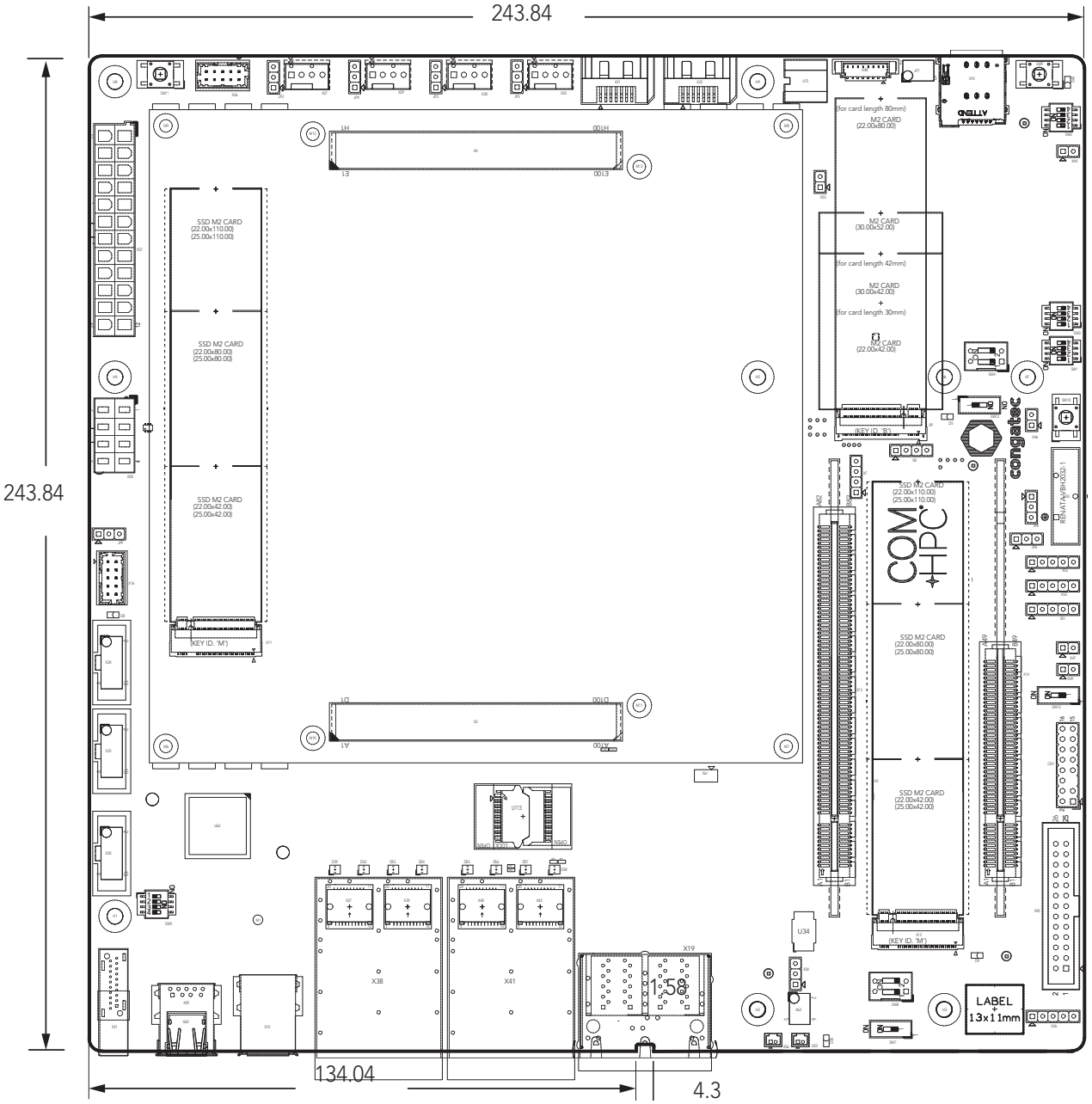
- redfish message interface
- IPMI event log and alerting
  - event logs reading
  - sensor readings (5 VSB, 12 V, RTC and thermal sensors)
  - LAN
- Web-based configuration
  - full configuration using GUI
  - fail-safe BMC firmware upgrade
- SSH-based Serial Over LAN (SoL) [1]
  - power control of the server
  - complete command support
  - firmware update
  - role-based authentication and authorization
- system inventory data via IPMI FRU
- system fan control
- remote BIOS update of the SPI flash on the carrier board

6.2 IPMB Header

The conga-HPC/uATX-Server provides IPMB signals on pin header JP6.

Table 47 JP6 - IPMB Header

Pin	Description
1	IPMB_CLK
2	IPMB_DAT
3	GND

JP6

7 Mechanical Dimensions