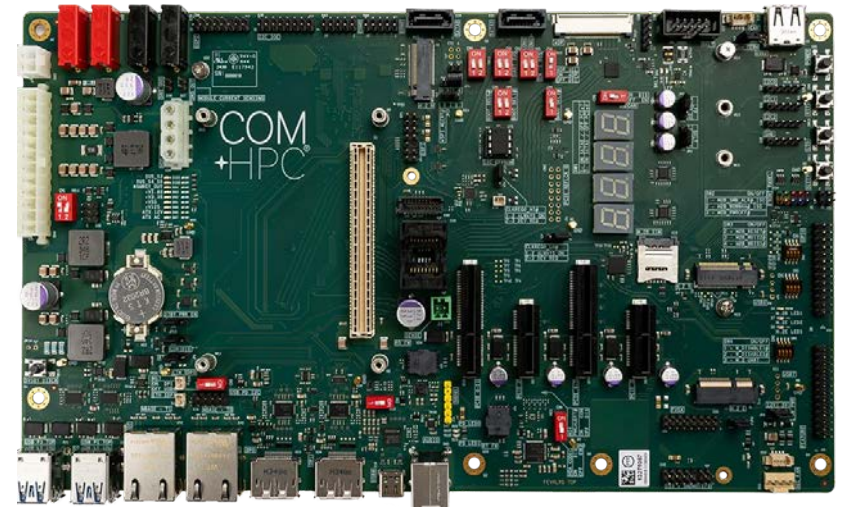


conga-HPC/EVAL-Mini

Detailed description of the congatec COM-HPC® evaluation carrier board for Mini modules



User's Guide

Revision 0.01 (Preliminary)

Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
0.01	2025-07-08	RVI	Preliminary release

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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 connector that must be used with the congatec evaluation carrier board, not the connector found on the congatec evaluation carrier board.



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 12 of this document.

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Terminology

Term	Description
CB	Carrier Board
DDC	Display Data Channel
DMIC	Digital Microphone Interface
eDP	Embedded DisplayPort
GbE	Gigabit Ethernet
GPIO	General Purpose Input/Output
HBR3	High Bit Rate 3
HDA	High Definition Audio
I ² C Bus	Inter-Integrated Circuit Bus
LVDS	Low Voltage Differential Signaling
MDIO	Management Data Input/Output
MDC	Management Data Clock
NA	Not available
NC	Not connected
PCIe	Peripheral Component Interface Express
SATA	Serial AT Attachment
SDIO	Secure Digital Input Output
SM Bus	System Management Bus
SNDW	SoundWire
TBD	To be determined
USB	Universal Serial Bus

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1 Introduction

1.1 COM-HPC® Concept

COM-HPC® is an open standard defined specifically for high performance Computer-on-Modules (COMs) 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.

The COM-HPC® modules are available in the following form factors:

- Mini 95 mm x 70 mm
- Size A 95 mm x 120 mm
- Size B 120 mm x 120 mm
- Size C 160 mm x 120 mm
- Size D 160 mm x 160 mm
- Size E 200 mm x 160 mm

Table 1 COM-HPC® Interface Summary

Features	Classification	Mini Module Min/Max	Client Module Min/Max	Server Module Min/Max	Comment
Ethernet	NBASE-T	1 / 2	1 / 2	1 / 1	
	KR/KX	N.A	0 / 2	2 / 8	
	SGMII	0 / 2	N.A	N.A	
Storage	SATA	0 / 2	0 / 2	0 / 2	Pin is shared with PCIe on mini module
PCIe	Lane 0-47	1 / 16	4 / 48	8 / 48	Two PCIe reference clock output pairs required on mini module
	Lane 48-63	N.A	N.A	0 / 16	
	BMC	N.A	0 / 1	1 / 1	
USB	USB 2.0 Ports 0-7	6 / 8	4 / 8	4 / 8	Ports 0-5 (mini module) or ports 0-3 (server/client module) are used for USB 3.2 and USB4 if implemented.
	USB 3.2 Gen 1 or Gen 2	0 / 5	0 / 4	0 / 4	Requires one SuperSpeed Tx pair and one Rx pair per port
	USB 3.2 Gen 2x2	0 / 4	0 / 4	0 / 2	Requires two SuperSpeed Tx pairs and two Rx pairs per port
	USB4	0 / 4	0 / 4	0 / 2	USB4 ports use USB 3.2 Gen 2x2 ports
SPI	eSPI	0 / 1	0 / 1	0 / 1	
	Boot SPI	1 / 1	1 / 1	1 / 1	
	General Purpose SPI	1 / 1	1 / 1	1 / 1	
BIOS Select	-	1 / 1	1 / 1	1/1	

Features	Classification	Mini Module Min/Max	Client Module Min/Max	Server Module Min/Max	Comment
Display	DDI	0 / 2	1 / 3	N.A	Additional display outputs may be available on the USB4 interface. On mini module, DDI pins are shared with USB4.
	eDP	0 / 1	0 / 1	N.A	
MIPI	DSI	0 / 1	0 / 1	N.A	¹ Optional FFC connectors for MIPI-CSI on the mini module.
	CSI	N.A ¹	0 / 2	N.A	
Audio	Soundwire	0 / 2	0 / 2	N.A	I2S pins may be used for one HDA port or two additional SoundWire ports for a total of up to four SoundWire ports.
	I2S	0 / 1	0 / 1	N.A	
Other Serial Ports	I2C	2 / 3	2 / 2	2 / 2	I2C0 and I2C1 for client and server modules. The mini module supports a third I2C port (I2C2/MDIO for SGMII PHY setup).
	SMBus	1 / 1	1 / 1	1 / 1	
	IPMB	N.A	0 / 1	0 / 1	
	UART	0 / 2	0 / 2	1 / 2	
GPIO	-		12 / 12	12 / 12	
Miscellaneous	Watchdog Timer	0 / 1	0 / 1	0 / 1	
	Fan (PWM and tachometer)	1 / 1	1 / 1	1 / 1	
FuSa	FuSa set of signals	0 / 1	0 / 1	0 / 1	
Power Rails	VCC	12 / 12	28 / 28	28 / 28	
	VCC_5V-SBY	N.A	0 / 2	0 / 2	The mini module does not have 5V standby pins.
	VCC_RTC	1 / 1	1 / 1	1 / 1	
	GND	All	All	All	All available GND pins shall be used.
Connector	J1	1 / 1	1 / 1	1 / 1	
	J2	N.A	0 / 1	1 / 1	

1.2 conga-HPC/EVAL-Mini

The conga-HPC/EVAL-Mini carrier board is designed for COM-HPC® Mini modules.

The conga-HPC/EVAL-Mini provides most of the functional requirements for any embedded PC application. These functions include, but are not limited to a rich complement of contemporary high bandwidth serial interfaces such as PCI Express, Serial ATA, USB4, and Gigabit Ethernet. To ensure stable data throughput, the carrier board is equipped with high performance connectors in accordance with the COM-HPC® specification.

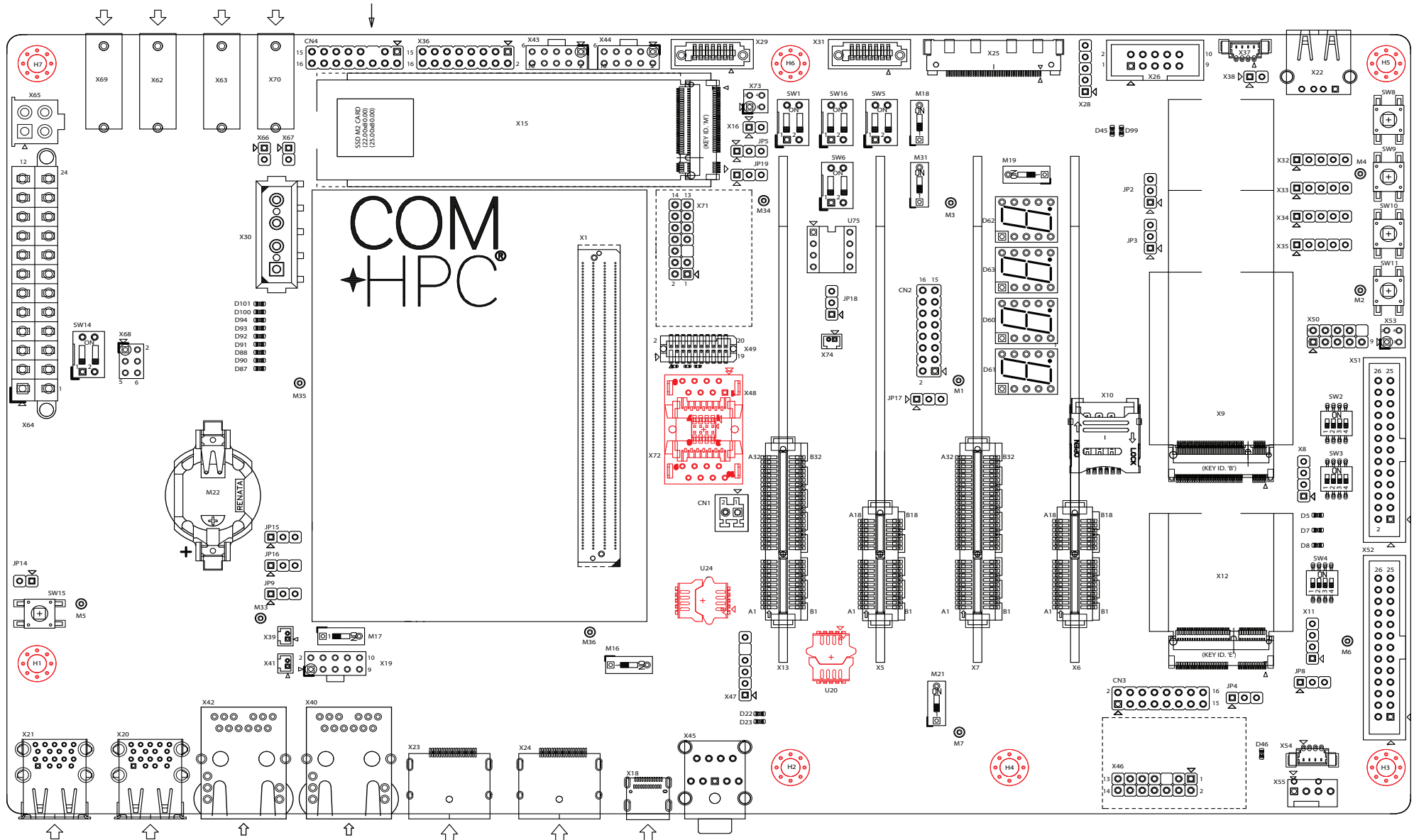
By combining the scalability of COM-HPC® Mini Modules, the conga-HPC/EVAL-Mini carrier board provides manufacturers and developers with a platform to jump-start the development of systems and applications based on COM-HPC® specification. This helps to reduce product design cycle and encourages rapid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

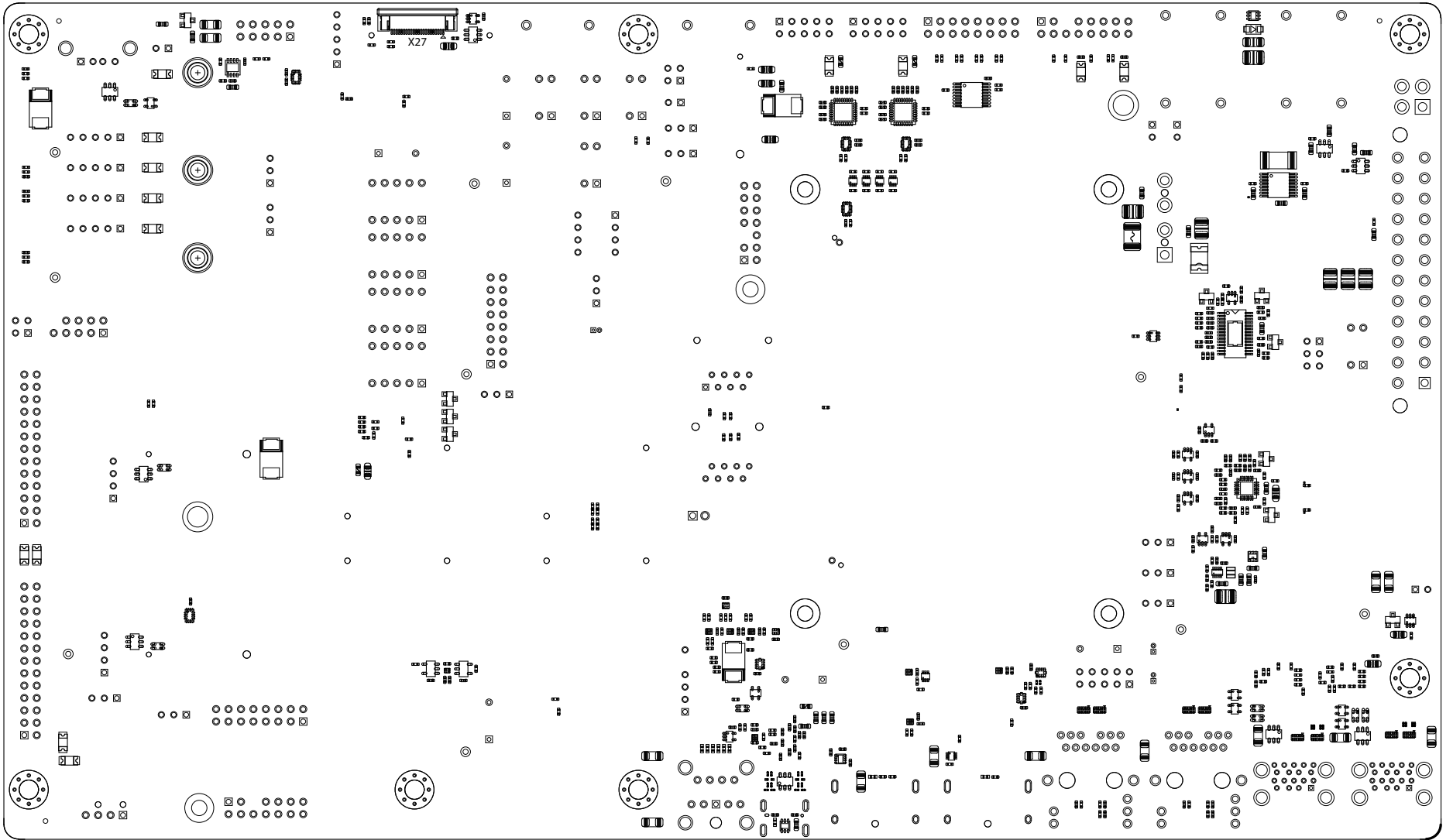
1.3 Order Number

Table 2 Order Description

Part Number	Product Name	Description
065640	conga-HPC/EVAL-Mini	Evaluation Carrier Board for COM-HPC® Mini modules
065645	conga-ASNDW	SoundWire® Adapter

2 Connector Layout





3 Specifications

3.1 Feature List

Table 3 Feature Summary

Board Variant	Evaluation Carrier Board for COM-HPC Mini Type Modules	
Internal IO	PCIe Gen4 x4 socket (shared with SATA 0/1) PCIe Gen4 x4 socket 2x PCIe Gen4 x1 socket M.2 Key M 2280 PCIe Gen4 x4 M.2 Key E 2230 (PCIe, USB 2) M.2 Key B 2242/3042, 2280, 2260 (PCIe, USB 2) with SIM card slot connected to UIM interface USB 2 Type-A 2x SATA III (shared with PCIe 6/7) eDP/MIPI DSI SoundWire 0/2/3 shared with I2S on pin header or HDA CODEC SoundWire 1 on pin header Power button / Reset button / Sleep button / LID button	Feature Connector 12x GPIO header SMB header 3x I2C headers eSPI header General Purpose SPI header 2x UART CAN header FUSA header System Fan PWM controlled SPI flash socket RTC CMOS battery holder
External IO	2x 10GbE RJ45 4x USB 3.2 Gen2 x1 Type-A 10Gb/s double stacked USB 2.0 Type-A connector USB 4 Type-C 2x DP++ (one DP++ shared with USB4 Type-C) Audio HDA	
Postcode	4x 7-segment displays for POST code information connected to PD I2C	
Power Input	1x ATX standard power input 24pin 1x ATX12V power input 4pin 1x AT power input DC In 8-20Vmax (via 4x Banana jacks)	
Operating Temperature	Operation -40°C to 85°C Storage -40°C to 85°C	
Humidity	Operating : 10% to 85% r. H. non cond. Storage : 5% to 95% r. H. non cond.	
Size	Approximately 294*172mm	
Order Information	conga-HPC/Eval-Mini Evaluation Carrier Board for COM-HPC Mini modules PN 065640	



Note
The module must also support the features for them to function. Refer to the module's user's guide for information about supported features.

3.2 Mechanical Dimensions

- 293.4mm x 171.5mm
- Height approximately 43.0 mm (top side)



Note

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 Environmental Specifications

Temperature Operation: -40°C to +85°C Storage: -40°C to +85°C

Relative Humidity Operation: 10% to 85% Storage: 5% to 85%



Caution

The above operating temperatures must be strictly adhered to at all times. When using a congatec heat spreader, the maximum operating temperature refers to any measurable spot on the heat spreader's surface.

Humidity specifications are for non-condensing conditions.

4 Connectors and Features

4.1 Primary Carrier Connector P1 (X1)

Table 4 Connector P1 (X1) Pinout X1A X1B X1C X1E

Pin	Row A	Pin	Row B	Pin	Row C	Pin	Row D
A1	VCC	B1	VCC	C1	VCC	D1	VCC
A2	VCC	B2	PWRBTN#	C2	RSTBTN#	D2	VCC
A3	VCC	B3	VCC	C3	VCC	D3	VCC
A4	VCC	B4	THERMTRIP#	C4	CARRIER_HOT#	D4	VCC
A5	RAPID_SHUTDOWN	B5	CAN_TX	C5	CAN_RX	D5	PLTRST#
A6	FUSA_SPI_ALERT	B6	TAMPER#	C6	VIN_PWR_OK	D6	FUSA_SPI_CS#
A7	FUSA_STATUS0	B7	PROCHOT#	C7	CATERR#	D7	FUSA_SPI_CLK
A8	FUSA_STATUS1	B8	SUS_S3#	C8	SUS_S4_S5#	D8	FUSA_SPI_MISO
A9	PCIe_PERST_IN0#	B9	FUSA_VOLTAGE_ERR#	C9	FUSA_ALERT#	D9	FUSA_SPI_MOSI
A10	GND	B10	WD_STROBE#	C10	BATLOW#	D10	WAKE0#
A11	PCIe_REFCLKIN0-	B11	WD_OUT	C11	FAN_PWMOUT	D11	WAKE1#
A12	PCIe_REFCLKIN0+	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	I2S_LRCLK/SNDW_CLK3/HDA_SYNC	C19	GND	D19	DDI0_SDA_AUX-
A20	SS23_SDA_AUX-	B20	I2S_DOUT/SNDW_DAT3/HDA_SDO	C20	SNDW_DMIC_CLK1	D20	SS01_SCL_AUX+
A21	SS23_SCL_AUX+	B21	I2S_MCLK/HDA_RST#	C21	SNDW_DMIC_DAT1	D21	GND
A22	GND	B22	I2S_DIN/SNDW_DAT2/HDA_SDI	C22	GND	D22	SS0_TX-
A23	SS2_TX-	B23	I2S_CLK/SNDW_CLK2/HDA_BCLK	C23	SNDW_DMIC_CLK0	D23	SS0_TX+
A24	SS2_TX+	B24	RSVD	C24	SNDW_DMIC_DAT0	D24	GND
A25	GND	B25	USB67_OC#	C25	GND	D25	SS0_RX-
A26	SS2_RX-	B26	USB45_OC#	C26	USB0_LSRX/DDI1_DDC_AUX_SEL	D26	SS0_RX+
A27	SS2_RX+	B27	USB23_OC#	C27	USB1_LSRX	D27	GND
A28	GND	B28	USB01_OC#	C28	USB0_LSTX/DDI1_HPD	D28	SS1_TX-
A29	SS3_TX-	B29	SML1_CLK	C29	USB1_LSTX	D29	SS1_TX+
A30	SS3_TX+	B30	SML1_DAT	C30	eDP_HPD	D30	GND

A31	GND	B31	PMCALERT#	C31	eDP_VDD_EN	D31	SS1_RX1-
A32	SS3_RX-	B32	SML0_CLK	C32	eDP_BKLT_EN	D32	SS1_RX+
A33	SS3_RX+	B33	SML0_DAT	C33	eDP_BKLTCTL	D33	GND
A34	GND	B34	USB_PD_ALERT#	C34	GND	D34	AC_PRESENT
A35	eDP_AUX-	B35	USB_PD_I2C_CLK	C35	USB3_AUX-	D35	NBASET1_SDP
A36	eDP_AUX+	B36	USB_PD_I2C_DAT	C36	USB3_AUX+	D36	GND
A37	GND	B37	USB_RT_ENA	C37	GND	D37	SS6_TX-
A38	eDP_TX0-	B38	USB3_LSRX	C38	SS6_RX-	D38	SS6_TX+
A39	eDP_TX0+	B39	USB3_LSTX	C39	SS6_RX+	D39	GND
A40	GND	B40	USB2_LSRX/DDIO_DDC_AUX_SEL	C40	GND	D40	SS7_TX-
A41	eDP_TX1-	B41	USB2_LSTX/DDIO_HPD	C41	SS7_RX-	D41	SS7_TX+
A42	eDP_TX1+	B42	GND	C42	SS7_RX+	D42	GND
A43	GND	B43	USB1_AUX-	C43	GND	D43	SS4_TX-
A44	eDP_TX2-	B44	USB1_AUX+	C44	SS4_RX-	D44	SS4_TX+
A45	eDP_TX2+	B45	LID#	C45	SS4_RX+	D45	GND
A46	GND	B46	SLEEP#	C46	GND	D46	SS5_TX-
A47	eDP_TX3-	B47	VCC_BOOT_SPI	C47	SS5_RX-	D47	SS5_TX+
A48	eDP_TX3+	B48	BOOT_SPI_CS#	C48	SS5_RX+	D48	GND
A49	GND	B49	BSEL0	C49	GND	D49	NBASET1_MDI0-
A50	eSPI_IO0	B50	BSEL1	C50	BOOT_SPI_IO0	D50	NBASET1_MDI0+
A51	eSPI_IO1	B51	BSEL2	C51	BOOT_SPI_IO1	D51	GND
A52	eSPI_IO2	B52	eSPI_ALERT0#	C52	BOOT_SPI_IO2	D52	NBASET1_MDI1-
A53	eSPI_IO3	B53	eSPI_ALERT1#	C53	BOOT_SPI_IO3	D53	NBASET1_MDI1+
A54	eSPI_CLK	B54	eSPI_CS0#	C54	BOOT_SPI_CLK	D54	GND
A55	GND	B55	eSPI_CS1#	C55	GND	D55	NBASET1_MDI2-
A56	PCIe_CLKREQ0_LO#	B56	eSPI_RST#	C56	PCIe_REFCLK0_HI-	D56	NBASET1_MDI2+
A57	PCIe_CLKREQ0_HI##	B57	PCIe_WAKE_OUT0#	C57	PCIe_REFCLK0_HI+	D57	GND
A58	PCIe_CLKREQ_OUT0#	B58	NBASET1_LINK_MID#	C58	GND	D58	NBASET1_MDI3-
A59	NBASET1_LINK_MAX#	B59	NBASET1LINK_ACT#	C59	PCIe_REFCLK0_LO-	D59	NBASET1_MDI3+
A60	NBASET1_CTREF	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-/SGMII1_TX-
A68	PCIe10_TX-	B68	PCIe10_RX+	C68	PCIe02_RX-/SGMII1_RX-	D68	PCIe02_TX+/SGMII1_TX+
A69	PCIe10_TX+	B69	GND	C69	PCIe02_RX+/SGMII1_RX+	D69	GND
A70	GND	B70	PCIe11_RX-	C70	GND	D70	PCIe03_TX-/SGMII0_TX-
A71	PCIe11_TX-	B71	PCIe11_RX+	C71	PCIe03_RX-/SGMII0_RX-	D71	PCIe03_TX+/SGMII0_TX+

A72	PCle11_TX+	B72	GND	C72	PCle03_RX+/SGMII0_RX+	D72	GND
A73	GND	B73	PCle12_RX-	C73	GND	D73	PCle04_TX-
A74	PCle12_TX-	B74	PCle12_RX+	C74	PCle04_RX-	D74	PCle04_TX+
A75	PCle12_TX+	B75	GND	C75	PCle04_RX+	D75	GND
A76	GND	B76	PCle13_RX-	C76	GND	D76	PCle05_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-/SATA1_TX-
A80	PCle14_TX-	B80	PCle14_RX+	C80	PCle06_RX-/SATA1_RX-	D80	PCle06_TX+/SATA1_TX+
A81	PCle14_TX+	B81	GND	C81	PCle06_RX+/SATA1_RX+	D81	GND
A82	GND	B82	PCle15_RX-	C82	GND	D82	PCle07_TX-/SATA0_TX-
A83	PCle15_TX-	B83	PCle15_RX+	C83	PCle07_RX-/SATA0_RX-	D83	PCle07_TX+/SATA0_TX+
A84	PCle15_TX+	B84	GND	C84	PCle07_RX+/SATA0_RX+	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#	C89	UART0_TX	D89	NBASET0_MDI1+
A90	GPIO_02	B90	UART1_CTS#	C90	UART0_RX	D90	GND
A91	GPIO_03	B91	I2C2_CLK/ETH_MDIO_CLK	C91	UART0_RTS#	D91	NBASET0_MDI2-
A92	GPIO_04	B92	I2C2_DAT/ETH_MDIO_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	PINOUT_TYPE0	B100	GP_SPI_ALERT#	C100	PINOUT_TYPE1	D100	PINOUT_TYPE2

4.2 Power Supply Connectors

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

- standard 24-pin ATX power connector (X64)
- additional 4-pin ATX12V power connector (X65)
- 8-20V DC banana jacks (X62, X69 and X63, X70)



Note

1. Do not supply power via the DC banana jacks and the ATX connectors at the same time.
2. In ATX mode, power must be supplied to the 24-pin ATX (X64) and the 4-pin ATX12V (X65) power connectors.
3. In ATX mode, the 5V SBY and 12V are derived from the ATX power supply. The voltages 1.8V, 3.3V, 5V and 12V are generated by onboard OR-RING +VIN8-20 domain in both ATX and DC jack options. The onboard buck-boost converter generates the 12V from 8-20Vmax.



Caution

The 5V standby rail may be discharged using SW15 following a power-down, particularly during unplug events shortly after the module has been turned off, to minimize the risk of damage due to residual charge.

4.2.1 ATX Power Connectors

The conga-HPC/EVAL-Mini provides a standard 24-pin ATX power connector (X64) and 4-pin ATX12V power connector (X65) for an ATX power supply. Power must be supplied to both connectors.

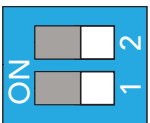
The COM-HPC® module starts immediately after power is connected in both ATX and AT power modes. For ATX mode, this immediate power up can be disabled by setting the DIP switch SW14.1 to OFF. In this case, the PS_ON# signal need to be pulled down manually at the Feature Connector (X52) for the module to start.

Whenever the system enters the S5 (soft off), S4 or S3 states, the power-button (SW8) can be used to wake up the system.

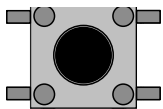
Table 5 SW14.1 - ATX/AT PSU Settings

Switch	Setting	Configuration
SW 14.1	OFF ¹	Disable auto power-on in ATX mode when mains switch is switched on
	ON	Enable auto power-on in ATX mode when mains switch is switched on (default)

SW14



SW8



SW14.2	OFF	Enable type detection (default)
	ON	Bypass type detection



Note

^{1.} Module type detection is not active in this mode as the PS_ON# signal is pulled low.

Jumper JP15 can be used to enable standby power on the carrier board.

Table 6 JP15 - Standby Power Settings

Pin	Description
1-2	Enabled with RSMRST_OUT# from the module (default)
2-3	Enabled after the fixed time delay set as td2 on carrier board



Connector Type

JP15: 2.54 mm, 2-pin jumper

JP15

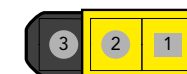
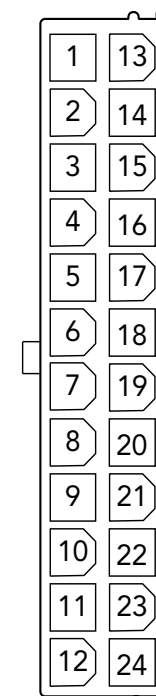


Table 7 X64 - 24-Pin ATX Power Pinout

Pin	Signal	Description	Pin	Signal	Description
1	+3.3V	Power supply +3.3 VDC ¹	13	+3.3V	Power supply +3.3 VDC ¹
2	+3.3V	Power supply +3.3 VDC ¹	14	-12V	Power supply -12 VDC ¹
3	GND	Power ground	15	GND	Power ground
4	+5V	Power supply +5 VDC ¹	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 ¹	18	GND	Power ground
7	GND	Power ground	19	GND	Power ground
8	VIN_ PWR_OK	Power Ok - it's called ATX_PG	20	N.C	
9	5V_SB	Standby power supply +5 VDC	21	+5V	Power supply +5 VDC ¹
10	+12V	Power supply +12 VDC	22	+5V	Power supply +5 VDC ¹
11	+12V	Power supply +12 VDC	23	+5V	Power supply +5 VDC ¹
12	+3.3V	Power supply +3.3 VDC ¹	24	GND	Power ground

X64



Connector Type

X64: Standard 24-pin ATX Power connector

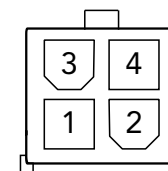
Note

¹ Pins 1, 2, 4, 6, 12, 13, 14, 21, 22, 23 of the ATX power supply are not used on conga-HPC/EVAL-Mini.

Table 8 X65 - 4-Pin ATX12V Power Pinout

Pin	Signal	Description	Pin	Signal	Description
1	GND	Power ground	2	GND	Power ground
3	+12 V	Power supply +12VDC	4	+12V	Power supply +12VDC

X65



Connector Type

X65: Standard 4-pin ATX12V power connector

4.2.2 DC Banana Jacks

The conga-HPC/EVAL-Mini provides four banana jacks (X62, X69 and X63, X70) for a DC power supply to power both the module and the voltage regulators on the carrier board. The maximum power rating per banana jack is 16A (at approx. 25 °C). Depending on the power requirements of the system, use one or two pairs of banana jacks to power the system.



Caution

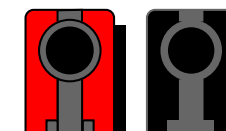
1. Do not exceed the voltage rating of the COM-HPC® Mini module. Doing so will damage the module.
2. Only cables with a maximum length of 3 meters shall be used with DC banana jacks due to possible EMC issues.

Table 9 X62, X69, X63, X70 - DC Banana Jacks Pinout

Connector	Description
X62, X69	Input voltage for module and carrier board (8 - 20 V)
X63, X70	Ground

X62
X69

X63
X70



Connector Type

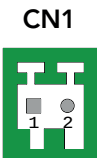
X62, X69, X63, X70: 4 mm diameter banana plug (max. 16A)

4.2.3 Input Voltage Sense Connector

The conga-HPC/EVAL-Mini provides a connector (CN1) to monitor the input voltage of the main power rail (+VIN8-20_M) of the module.

Table 10 CN1 - Power Sense Connector

Pin	Description
1	+VIN8-20_M (Main power rail)
2	Ground



Connector Type

CN1: Phoenix Contact 1881558 with 2-positions; Possible mating connector Phoenix Contact 1881325

4.2.4 Power States LEDs

The LEDs D87 D90, D88, D91, D92, D93, D94, D100, D101 indicate the different power states of the conga-HPC/EVAL-Mini as described in the table below.



Table 11 Power LEDs Status

LED	Status	Description
All	Off	No power applied.
All	On	ATX PSU is connected, active and stable and the module is in Runtime state.
D87	On	The yellow LED indicates that 5V ATX PSU standby power is applied to the conga-HPC/EVAL-Mini
D90	On	The yellow LED indicates that 12V ATX PSU power is applied to the conga-HPC/EVAL-Mini
D88	On	The green LED indicates that 12V power is present ¹
D91	On	The green LED indicates that 5V power is present ¹
D92	On	The green LED indicates that 3.3V power is present ¹
D93	On	The green LED indicates that 1.8V power is present ¹
D94	On	The red LED indicates that the RSMRST_OUT# signal is active
D100	On	The green LED indicates the status of SUS_S4# / SUS_S5#
D101	On	The green LED indicates the status of SUS_S3#



Note

¹. This is a carrier-board generated voltage and is not supplied by the ATX PSU.

4.2.5 VIN_PWR_OK Signal

The VIN_PWR_OK signal is a high-active input to the module. It indicates whether the power provided to the module is good.

Use jumper X68 to configure the VIN_PWR_OK signal.

Table 12 X68 - VIN_PWR_OK Signal Settings

Pin	Description
1 - 2	ATX PSU triggered
3 - 4	AT VIN Window detector triggered
5 - 6	CB Runtime Power triggered
None	PU resistor on PWR_OK signal of the Mini modules (default)

X68

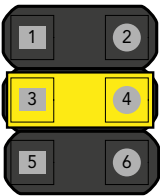
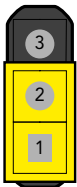


Table 13 JP16 - On-Module VIN_PWROK usage

Pin	Description
1-2	Hold-off Run Time state (default)
2-3	Hold-off STBY state

JP16



Connector Type

X68: 2.54 mm, 2-pin jumper

JP16: 2.54 mm, 2-pin jumper

4.2.6 Power-Up Control

Unlike other COM-HPC variants, the COM-HPC Mini always keeps the PS_ON# signal low and the ATX power supply ON because of having a single voltage rail.

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).

4.2.7 Module Type Detection

The signals PINOUT_TYPE0, PINOUT_TYPE1, and PINOUT_ TYPE2 indicate the pinout type of the module connected to the carrier board. These pins may either be open (NC) or strapped to ground (GND) by the module.

conga-HPC/EVAL-Mini only supports the COM-HPC Mini type modules.

Table 14 Module Type Detection Pinout Description

TYPE2	TYPE1	TYPE0	Meaning
NC	NC	NC	COM-HPC Mini Module - wide range 8V to 20V input



Note

conga-HPC/EVAL-Mini is not compatible with any other COM-HPC product.

4.2.8 Module Current Sensing

The conga-HPC/EVAL-Mini provides two connectors X66 and X67 for module current sensing.

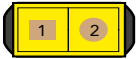
Table 15 X66 - Module Current Sense (200mV/A) Pinout

Pin	Description
1	GND
2	GND

Table 16 X67 - Module Current Sense (200mV/A) Pinout

Pin	Description
1	IS_OUT_M
2	IS_OUT_M

X66, X67



Connector Type

X66 / X67: 2.54 mm, 2-pin female connector



Note

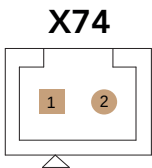
The accuracy of the readings can be limited due to multiple factors and as a result, these readings should not take precedence over readings taken from an external measurement equipment for applications requiring higher precision.

4.2.9 Module Present Detect

The conga-HPC/EVAL-Mini provides connector X74 which can be used to detect the presence of a physically connected module on the carrier board.

Table 17 Module Present Detection Pinout Description

Pin	Description
1	MPD#
2	GND



Connector Type

X74: 1.25 mm, 2-pin female connector

4.3 CMOS Battery Holder

The conga-HPC/EVAL-Mini provides a BR2032 battery holder M22. The battery supplies power to the RTC and CMOS memory.



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.

Jumper JP9 can be used to disconnect the battery.

Table 18 JP9 - Battery Settings

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

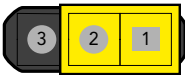


Connector Type

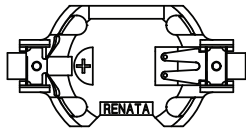
JP9: 2.54 mm, 2-pin jumper

M22: BR2032 compatible battery

JP9



M22



4.4 PCIe Connectors

The conga-HPC/EVAL-Mini provides seven PCIe® connectors listed in the table below:

Table 19 Required Module PCIe® Link Configurations

Connector	X9 M.2 B	X12 M.2 E	X5 x1	X6 x1	X7 (lanes 06, 07 muxed with SATA 1/0, x4)				X13 x4				X15 M.2 M			
Lane	01	00	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Link	x1	x1	x1	x1	x4				x4				x4			
Group	Group Low A				Group 0 Low B				Group 0 High							
Gen	4		4		4				4				4			



Note

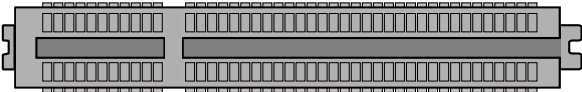
For each required connector, check the module’s user guide to identify supported link configurations. Configure the corresponding PCIe® lanes as highlighted above.

4.4.1 PCIe x4 Slots

The conga-HPC/EVAL-Mini provides two standard PCIe® x4 slots:

- PCIe® lanes [04:07] on connector X7
- PCIe® lanes [08:11] on connector X13

X7, X13



PCIe lanes 06 and 07 are muxed with SATA 1/0. Use switch SW1 to select between PCIe and SATA.

Table 20 SW1 - PCIe 06 and 07 Muxing

Switch	Configuration	Description
SW1.1	OFF	Enable PCIe lane 07 (default)
	ON	Enable SATA0
SW1.2	OFF	Enable PCIe lane 06 (default)
	ON	Enable SATA1

SW1

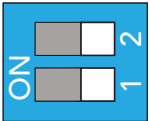


Table 21 JP20 - PCIe® [8:11] Clock Request Signal Settings

Pin	Configuration
1-2	Force CLKREQ#
2-3	CLK requested by device (default)



Connector Type

X7, X13: PCIe® x4 card

JP20: 2.54 mm, 2-pin jumper

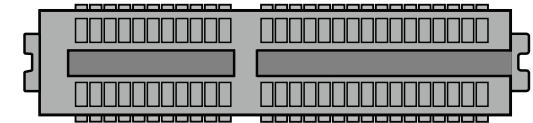
4.4.2 PCIe x1 Slots

The conga-HPC/EVAL-Mini provides two standard PCIe® x1 slots (X5, X6).

Connector Type

X5, X6: PCIe x1 card

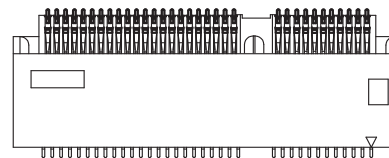
X5, X6



4.4.3 M.2 Key E

The conga-HPC/EVAL-Mini provides a standard M.2 Key E socket X12. The socket is routed to the module's PCIe® lane 00, USB Port 7, and UART1 port. LED D7 is connected to the LED2# signal of the M.2 Key E socket. LED D8 is connected to the LED1# signal of the M.2 Key E socket.

X12



D7, D8



Connector Type

X12: M.2 Key E card size 2230

Use DIP SW4 to configure the M.2 Key E settings as described in the table below.

Table 22 SW4 - M.2 Key E Control

Switch	Configuration	Description
SW4.1	OFF	Wireless 1 features active (default)
	ON	Disable wireless 1 features (M.2 WDIS1# control)
SW4.2	OFF	Wireless 2 features active (default)
	ON	Disable wireless 2 features (M.2 WDIS2# control)
SW4.3	OFF	Deactivate UART (default)
	ON	Activate UART
SW4.4	N.C	N.C

SW4



Note

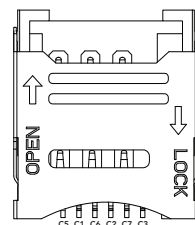
The UART signals are shared with the UART1 signals on connector X44 and X52. For more information, see section 4.16.2 “COM Port 1 Header” and section 4.19 “Feature Connector”.

4.4.4 M.2 Key B + micro-SIM Card Slot

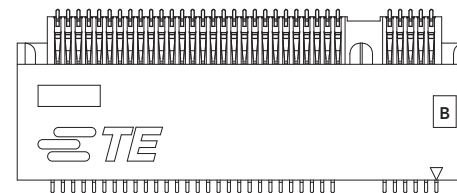
The conga-HPC/EVAL-Mini provides one standard M.2 Key B socket connector X9 for 2242, 2260, 3042, and 2280 cards. The socket is routed to the module’s PCIe® lane 01 and the USB 2.0 port 6. It supports PCIe® based WWAN with the M.2 Key E socket (X12).

The UIM interface of the M.2 Key B (X9) socket is connected to micro-SIM card slot X10.

X10



X9



Note

The congatec Application Note 43 “M.2™ Pinout Descriptions and Reference Designs” provides the pinout description, reference design and design notes for each of the three M.2™ sockets commonly implemented on embedded systems (Socket 1 – Key E, Socket 2 – Key B, and Socket 3 – Key M).



Connector Type

X9: M.2 Key B card size 3042, 2242, 2280, 2260

X10: micro-SIM card

Table 23 SW2 - M.2 Key B Settings

Switch	Configuration	Description
SW2.1	OFF	Disconnect M.2 SMB_ALERT# (default)
	ON	Connect M.2 SMB_ALERT#
SW2.2	OFF	Disconnect WOWWAN# (default)
	ON	Connect WOWWAN#
SW2.3	OFF	M.2 card power is on (default)
	ON	M.2 card power is off
SW2.4	OFF	N.C
	ON	N.C

SW2

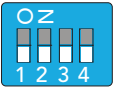
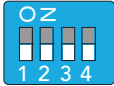


Table 24 SW3 - M.2 Key B Settings

Switch	Configuration	Description
SW3.1	OFF	N.C
	ON	N.C
SW3.2	OFF	Deactivate M.2 reset control (default)
	ON	Activate M.2 reset control
SW3.3	OFF	Wireless 2 features active (default)
	ON	Disable wireless 2 features (M.2 WDIS2# control)
SW3.4	OFF	Wireless 1 features active (default)
	ON	Disable wireless 1 features (M.2 WDIS1# control)

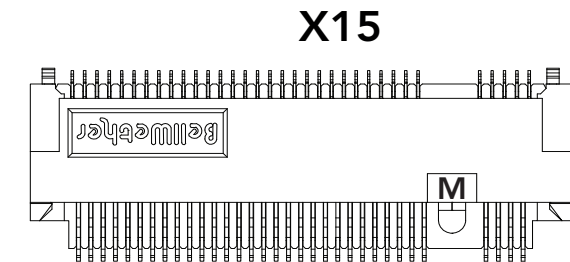
SW3



4.4.5 M.2 Key M

The conga-HPC/EVAL-Mini provides one standard M.2 Key M socket connector X15.

The socket is routed to the module's PCIe® lanes [12:15].



Note

The congatec Application Note 43 “M.2™ Pinout Descriptions and Reference Designs” provides the pinout description, reference design and design notes for each of the three M.2™ sockets commonly implemented on embedded systems (Socket 1 – Key E, Socket 2 – Key B, and Socket 3 – Key M).



Connector Type

X15: M2 Key M card

4.4.6 PCIe Clock Request Signals

The clock request signal (PCIe_CLKREQ0_LO#) can be permanently enabled via jumper JP17 for:

- PCIe® x4 slots (X7, X13)
- M.2 Key E (X12)
- M.2 Key B (X9)
- PCI Express x1 (X5, X6)

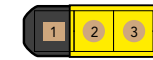
The clock request signal (PCIe_CLKREQ0_HI#) can be permanently enabled via jumper JP18 for:

- PCIe® x4 slot (X13)
- M.2 Key M (X15)

Table 25 JP17, JP18 - PCIe® Clock Request Signal Settings

Pin	Description
1 - 2	Enable permanently
2 - 3	On device request (default)

JP17, JP18



Connector Type

JP17, JP18: 2.54 mm, 2-pin jumper

4.5 Display Interfaces

4.5.1 DP++

The conga-HPC/EVAL-Mini provides two DP++ ports on connectors X23 (DP++(0)) and X24 (DP++(1)). The two DP++ ports are routed through a TI SN65DP141 DisplayPort re-driver that supports data rates (up to 12 Gbps).

DP++(1) is multiplexed with USB Type-C port and DIP switch M17 can be used to select the intended functionality. The DP++(1) can be selected by setting the DIP switch M17 to ON.

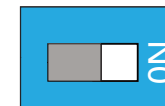
Table 26 M17 - DP++/USB Selection

Setting	Description
OFF	USB (default)
ON	DP++

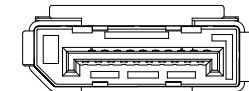
Connector Type

X23, X24: Standard DP plug

M17



X23, X24



4.5.2 eDP/DSI

The conga-HPC/EVAL-Mini connects the module's eDP/DSI interface to:

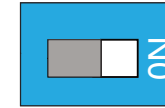
- eDP panel on connector X25
- DSI panel on connector X27

Use DIP switch M18 to select eDP or DSI functionality.

Table 27 M18 - eDP/DSI Settings

Setting	Description
OFF	DSI
ON	eDP (default)

M18

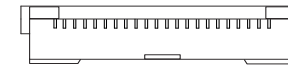


4.5.2.1 DSI

Table 28 X27 - DSI Pinout

Pin	Signal	Pin	Signal
1	+VDD_LFP	2	+VDD_LFP
3	DSI_TX0+_CON	4	DSI_TX0-_CON
5	GND	6	DSI_TX1+_CON
7	DSI_TX1-_CON	8	GND
9	DSI_TX2+_CON	10	DSI_TX2-_CON
11	DSI_RST#-_CON	12	DSI_TX3+_CON
13	DSI_TX3-_CON	14	GND
15	DSI_CLK+_CON	16	DSI_CLK-_CON
17	GND	18	I2C0_CLK_DSI_CON
19	I2C0_DAT_DSI_CON	20	DSI_ENA#_CON
21	DSI_CON_TP	22	DSI_TE_CON

X27



Connector Type

X27: 22-pin flatfoil connector with 0.5mm pitch, RA, Bottom Contact (Mates with Wurth Elektronik 687622152002)

Note

1. For DSI functionality, set DIP switch M18 to OFF.
2. The exposed conductive traces of the flat-foil cable must face down (Bottom Contact).

4.5.2.2 DSI Backlight

The DSI Backlight signals are available on connector X28.

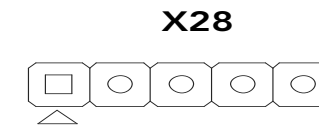
Table 29 X28 - DSI Backlight Pinout

Pin	Signal
1	+V1.8S
2	eDP_DSI_BKLT_EN_1V8
3	eDP_DSI_BKLT_CTRL_1V8
4	eDP_DSI_VDD_EN_1V8
5	GND



Connector Type

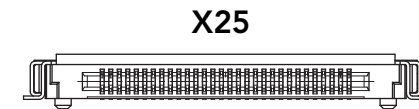
X28: 2.54 mm, 5 pin female connector



4.5.2.3 eDP

Table 30 X25 - eDP Pinout

Pin	Signal	Pin	Signal
1	N.C.	21	PANEL_PWR
2	GND	22	N.C.
3	eDP_TX3-	23	GND
4	eDP_TX3+	24	GND
5	GND	25	GND
6	eDP_TX2-	26	GND
7	eDP_TX2+	27	eDP_HPD_CON
8	GND	28	GND
9	eDP_TX1-	29	GND
10	eDP_TX1+	30	GND
11	GND	31	GND
12	eDP_TX0-	32	eDP_BKLT_EN_CON
13	eDP_TX0+	33	eDP_BKLTCTRL_CON
14	GND	34	N.C.
15	eDP_AUX+	35	N.C.
16	eDP_AUX-	36	N.C.
17	GND	37	BKLT_PWR
18	PANEL_PWR	38	BKLT_PWR



19	PANEL_PWR	39	BKLT_PWR
20	PANEL_PWR	40	N.C.

Connector Type

X25: 0.5 mm, 40 Pos. (ACES 50203-04001-001 or compatible)

Note

For eDP functionality, set DIP switch M18 to ON.

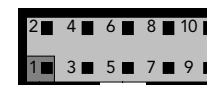
4.5.2.4 eDP Panel and Backlight Power Supply

The power supply for eDP panels and backlight inverter is available on connector X26. LED D99 lights red when power for the flat panel is on. LED D45 lights red when power for the backlight is on.

Table 31 X26 - eDP Panel and Backlight Power Supply Pinout

Pin	Signal	Pin	Signal
1	VDD_LFP (Switched by EDP_VDD_EN)	2	VDD_BKLT (Switched by EDP_BKLT_EN)
3	+5VS_BKLT (2.0 A fuse)	4	+12V (1.5 A fuse)
5	EDP_VDD_EN	6	EDP_BKLT_EN
7	N.C	8	EDP_BKLT_CTRL_R
9	GND	10	GND

X26



D45, D99



Connector Type

X26: 2.54 mm, 2x5 pin female connector

4.5.2.5 Flat Panel and Backlight Voltage Selection

The conga-HPC/EVAL-Mini supports different voltages for the panel and backlight. Follow the descriptions in the tables below to set the panel and backlight voltages.

Table 32 JP2 - Flat Panel Voltage Settings

Pin	Description
1-2	5 V panel power (default)
2-3	3.3 V panel power

JP2



Table 33 JP3 - Backlight Voltage Settings

Pin	Description
1-2	12 V backlight power (default)
2-3	5 V backlight power



Connector Type

JP2, JP3: 2.54 mm grid jumper

4.6 Universal Serial Bus (USB)

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

- One USB Type-C
 - USB4 port 0 connector X18
- Up to four USB 3.2 Gen 2x1 Type-A (dual-stacked)
 - ports 0 (bottom) and 1 (top) on connector X20
 - ports 2 (bottom) and 3 (top) on connector X21
- One USB 2.0 Type-A
 - port 2 on connector X22
- USB 2.0 @ M.2 Key B
 - port 6 on connector X9
- USB 2.0 @ M.2 Key E
 - port 7 on connector X12

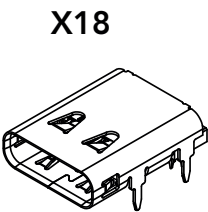
4.6.1 USB Type-C Port

The conga-HPC/EVAL-Mini provides one USB Type-C port X18. This port can support up to USB 40Gbps (depending on the module) and USB Power Delivery (PD) up to 5V @ 3A.

The port is connected to an onboard Intel® JHL9040RIT Thunderbolt™ 4 re-timer. The firmware of the re-timer is stored in a separate SPI flash (U20). The table below provides an overview of the relevant USB Type-C devices, interfaces and addresses:

Table 34 USB Type-C Port Devices, Interfaces and Addresses

	Port 4
USB Type-C Connector	X18
USB PD Controller:	
- EEPROM Socket	U24
- Debugging Header	X19
- SML1 Address	0x48
Thunderbolt Re-Timer:	
- Flash Socket	U20
- SML0 Address (7-bit)	0x55
-I2C Slave Address	0x40



Connector Type

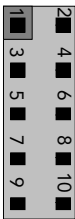
X18: USB Type-C plug

The port is connected to the onboard USB PD controller (TI TPS65991BH). The firmware of the USB PD controller is stored in a separate EEPROM (U24). The socketed EEPROM can be programmed externally with an EEPROM programmer.

Table 35 X19 - Aardvark Connector Pinout

Pin	Signal	Pin	Signal
1	USB_PD_I2C_CLK	2	GND
3	USB_PD_I2C_DAT	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	GND

X19



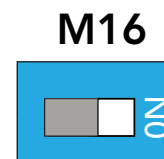
Connector Type

X19: 2.54 mm, 2x5 pin female connector

Use the DIP switch M16 to disconnect PMCALERT# from the COM-HPC® connector for the USB PD controller.

Table 36 M16 - PMCALERT# USB PD Setting

Setting	Description
OFF	PMCALERT# disconnected
ON	PMCALERT# connected (default)



Connector Type

M16: 2.54 mm, 1-bit DIP Switch

Note

1. USB port 4 is multiplexed with DP++(1). Set the DIP switch M17 to OFF for USB functionality.
2. Disconnect the PMCALERT# by setting the switch M16 OFF, if the module or the module BIOS configuration does not support USB4 port.

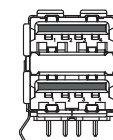
4.6.2 Dual Stacked USB 3.0 Type-A Ports

The conga-HPC/EVAL-Mini provides four USB 3.2 Gen 2x1 ports via two dual-stacked USB Type-A connectors (X20, X21). Each port provides up to 0.98A nominal current.

Connector Type

X20, X21: Dual stacked USB Type-A plug

X20, X21



4.6.3 USB 2.0 Ports

The conga-HPC/EVAL-Mini provides three USB 2.0 connections. Two USB 2.0 connections are implemented internally through port 6 and port 7 via the M.2 Key B and E sockets respectively (X9 and X12). One USB 2.0 port is implemented as port 2 via a physical USB 2.0 Type-A connector (X22) and supports up to 0.67 A.

Connector Type

X22: USB 2.0 Type-A plug

4.7 SATA

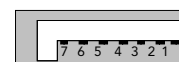
The conga-HPC/EVAL-Mini provides two standard SATA connectors (X29, X31):

- SATA0 port on connector X29
- SATA1 port on connector X31

Connector Type

X29, X31: Standard SATA plug

X29, X31



Note

SATA0 and SATA1 are multiplexed with PCIe06 and PCIe 07 respectively. Please refer to “Table 20 SW1 - PCIe 06 and 07 Muxing” on page 28 for more information.

4.7.1 Disk Drive Power Connector

The conga-HPC/EVAL-Mini provides connector X30, a 4-pin connector for powering disk drives.



Caution

Do not connect more than one device to connector X30. Otherwise, the device may get damaged.

Table 37 X30 - Disk Drive Power Pinout

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

Connector Type

X30: Standard 4-pin disk drive power plug

4.8 Ethernet Ports

The conga-HPC/EVAL-Mini provides RJ45 ethernet ports X40 and X42. The NBASE-T Ethernet Controller [0:1] Software-Definable Pins (SDP) NBASET[0:1]_SDP are provided on pin headers X39 and X41:

- NBASET0 port on connector X40
 - NBASET0_SDP on connector X39
- NBASET1 port on connector X42
 - NBASET1_SDP on connector X41

Depending on the module being used, the SDP pins can also be used for IEEE1588 support (e.g. 1PPS signal).

Table 38 X40, X42 - Ethernet Status LEDs Description

Color (LED)	Description
Green (right LED)	LINK_ACT# / Link activity
Off (left bicolor LED)	100 Mbit
Green (left bicolor LED)	LINK_MID# / Half speed (Module specific)
Yellow (left bicolor LED)	LINK_MAX# / Full speed (Module specific)

X40, X42

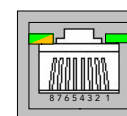


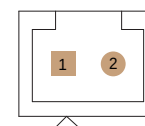
Table 39 X39 - NBASET0_SDP Header Pinout

Pin	Description
1	NBASET0_SDP signal
2	Ground

Table 40 X41 - NBASET1_SDP Header Pinout

Pin	Description
1	NBASET1_SDP signal
2	Ground

X39, X41



Connector Type

X40, X42: RJ45 plug

X39, X41: 1.25 mm, 2-pin female connector

4.9 Audio Interfaces

The conga-HPC/EVAL-Mini features the following audio interfaces:

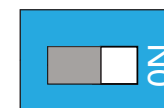
- HD audio codec TSI 92HD91B which provides:
 - Line-Out signals on connector X45 (upper jack)
 - MIC-In signals on connector X45 (lower jack)
- I2S/SoundWire header on connector X46
- SoundWire/DMIC header on connector X47

The onboard HDA codec can be disabled via DIP switch M21.

Table 41 M21 - Disable Onboard HDA Codec

Setting	Description
OFF	HDA codec enabled (default)
ON	HDA codec disabled

M21



4.9.1 MIC-In

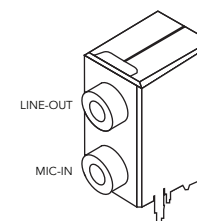
Table 42 X45 - MIC-In Pinout Description

Pin	Jack	Signal	Description
1	Tip	MIC_L	Microphone - left channel
2	Ring	MIC_R	Microphone - right channel
3	Sleeve	A_GND	Analog ground

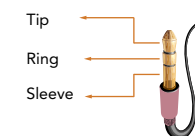
Connector Type

X45 Lower Jack: 3-pin, 3.5 mm single audio jack

X45



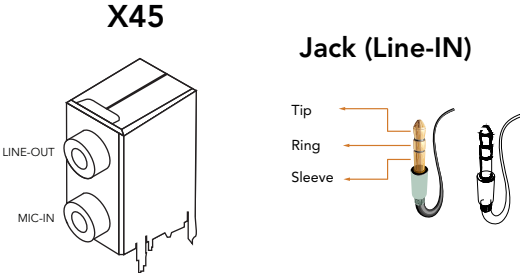
Jack (MIC-IN)



4.9.2 Line-Out

Table 43 X45 - Line-Out Pinout Description

Pin	Jack	Signal	Description
1	Tip	LINE_L	Line-OUT - left channel
2	Ring	LINE_R	Line-OUT - right channel
3	Sleeve	A_GND	Analog ground



 Connector Type

X45 Upper Jack: 3-pin, 3.5 mm single audio jack

4.9.3 I²S/SoundWire

The conga-HPC/EVAL-Mini features header X46 to connect a card with an external I²S or SoundWire® codec.

Table 44 X46 - I²S/SoundWire Header Pinout

Pin	Signal	Pin	Signal
1	GND	2	I2S_LRCLK/SNDW_CLK3
3	CODECSET_HDR	4	I2S_CLK/SNDW_CLK2
5	Key	6	I2S_DIN/SNDW_DAT2
7	PLTRST#_AH	8	I2S_DOUT/SNDW_DAT3
9	+3.3V Standby (0.75A fused)	10	I2S_MCLK
11	NC	12	SNDW_DAT0
13	NC	14	SNDW_CLK0

X46



 Connector Type

X46: 2.54 mm, 2x7pin female connector

4.9.4 SoundWire/DMIC

The conga-HPC/EVAL-Mini features SNDW1/DMIC signals on connector X47.

Table 45 X47 - SNDW1/DMIC Header Pinout

Pin	Signal
1	+V1.8 (0.75 A fused)
2	SNDW_DAT1
3	GND
4	SNDW_CLK
5	Key
6	NC

X47



Connector Type

X47: 2.54 mm, 6-pin female connector

4.10 I²C Buses

The COM-HPC® Specification defines two general purpose I²C buses (I2C[0:1]) for other COM-HPC® variants. For COM-HPC® Mini and hence in Conga-HPC/EVAL-Mini, a third I²C bus I2C2 is provided which is also shared with MDIO/MDC.

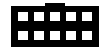
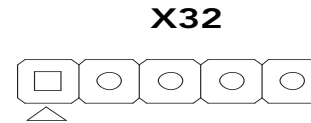
4.10.1 I2C0 Bus

The conga-HPC/EVAL-Mini provides the I2C0 signals on connector X32. Additionally, conga-HPC/EVAL-Mini provides an I/O expander connected to I2C0. For more information, see section 4.10.4 "I2C0 I/O Expander Pin Header".

The conga-HPC/EVAL-Mini provides an EEPROM 24C32 on the 8-pin DIL socket U75 for test purposes during system development. This EEPROM is connected to the I2C0 bus and has the I²C address 0x57 (7-bit). Use the I²C control commands implemented in the congatec CGOS API driver to access the EEPROM. For more information, refer to the CGOS manual and the user's guide of the COM-HPC® module.

Table 46 X32 - I2C0 Bus Pinout

Pin	Signal
1	+V1.8 standby (0.75 A fused)
2	I2C0_DAT_1V8
3	I2C0_CLK_1V8
4	I2C0_ALERT#_1V8
5	GND

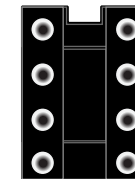


Connector Type

X32: 2.54 mm, 5-pin female connector

U75: 2-wire 1.8V Serial EEPROMS in 8-pin DIL package

U75

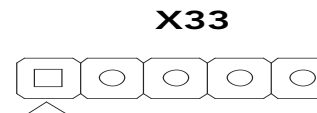


4.10.2 I2C1 Bus

The conga-HPC/EVAL-Mini provides the I2C1 signals on connector X33.

Table 47 X33 - I2C1 Bus Pinout

Pin	Signal
1	+V1.8 standby (0.75 A fused)
2	I2C1_DAT_1V8
3	I2C1_CLK_1V8
4	+V1.8 standby ¹
5	GND



Note

¹. Not used, PU only



Connector Type

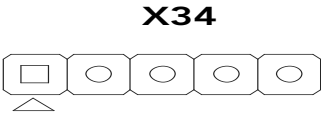
X33: 2.54 mm, 5-pin female connector

4.10.3 I2C2 Bus

The conga-HPC/EVAL-Mini provides the I2C2 signals on connector X34. The connector is also shared with MDIO/MDC signals.

Table 48 X34 - I2C2 Bus Pinout

Pin	Signal
1	+V1.8 standby (0.75 A fused)
2	I2C1_DAT_1V8_MDIO
3	I2C1_CLK_1V8_MDC
4	+V1.8 standby ¹
5	GND



Note

¹. Not used, PU only



Connector Type

X34: 2.54 mm, 5-pin female connector

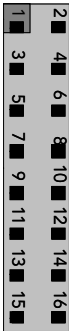
4.10.4 I2C0 I/O Expander Pin Header

The conga-HPC/EVAL-Mini provides eight GPIOs on header X36 via an I/O expander (TI TCA9554). The I/O expander is connected to I2C0.

Table 49 X36 - I2C0 I/O Expander Header Pinout

Pin	Signal	Pin	Signal
1	I2C_IOE_B0	2	GND
3	I2C_IOE_B1	4	GND
5	I2C_IOE_B2	6	GND
7	I2C_IOE_B3	8	GND
9	I2C_IOE_B4	10	GND
11	I2C_IOE_B5	12	GND
13	I2C_IOE_B6	14	GND
15	I2C_IOE_B7	16	GND

X36



Connector Type

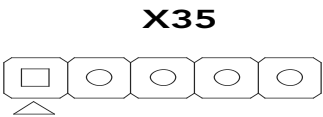
X36: 2.54 mm, 2x8 pin female connector

4.11 SMBus Pin Header

The conga-HPC/EVAL-Mini provides SMBus pins on header X35.

Table 50 X35 - SMBus Header Pinout

Pin	Signal
1	+V1.8 standby (0.75 A fuse)
2	SMB_DAT_1V8
3	SMB_CLK_1V8
4	SMB_ALERT#_1V8
5	GND



Connector Type

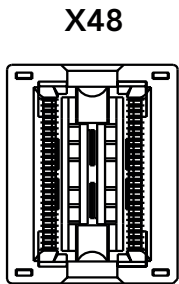
X35: 2.54 mm, 5-pin female connector

4.12 SPI Flash Socket

The conga-HPC/EVAL-Mini provides a 16-pin SOIC16 socket (X48) for an SPI flash.

Connector Type

X48: SPI flash in 16-pin SOIC16 package



The boot select pins BSEL[2:0] are routed to DIP SW6 and M31:

- BSEL0 to DIP SW6.1
- BSEL1 to DIP SW6.2
- BSEL2 to DIP M31

For the BIOS select options via these DP switches, refer to the table below.

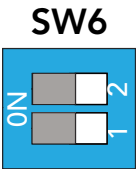
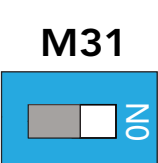


Table 51 BIOS Select Options

BSEL [2:0]	Chipset eSPI1_CS0# (If Available on chipset)	Chipset eSPI_CS1# (If Available on chipset)	Chipset SPI_CS0#	Chipset SPI_CS1#	Boot Option	Use Case	Boot Option and CS# Routing Details
111	Module	Carrier J1.B55 COM-HPC eSPI_CS1#	Module	Module	MAFS on Module	Most Common Usage	CSME / DT on Chipset SPI0 device on Module BIOS on SPI0 or SPI1 on Module eSPI_CS0# on Module
					SAFS on Module	Module BMC with SAFS BIOS on far side of BMC	CSME / DT on Slave Attached Flash on Module BIOS on Module SAFS eSPI_CS0# on Module
110	Module	Carrier J1.B55	Carrier J1.B48	Module	MAFS on Carrier	Casino Gaming Removable BIOS option (on Carrier)	CSME / DT on Chipset SPI0 device on Carrier BIOS on SPI0 on Carrier or on SPI1 on Module eSPI_CS0# on Module
101	Module	Carrier J1.B55	Module	Carrier J1.B48	MAFS on Module	Casino Gaming Removable BIOS option Alternate version	CSME / DT on Chipset SPI0 device on Module BIOS on SPI0 on Module or on SP1 on Carrier eSPI_CS0# on Module
100		Carrier J1.B55					Spare - reserved for future use
011	Carrier J1.B54	Carrier J1.B55	Module	Module	MAFS on Module	Same as 111 except eSPI_CS0# routing	CSME / DT on Chipset SPI0 device on Module BIOS on SPI0 or on SPI1 on Module eSPI_CS0# on Carrier
010	Carrier J1.B54	Carrier J1.B55	Carrier J1.B48	Module	MAFS on Carrier	Same as 110 except eSPI_CS0# routing	CSME / DT on Chipset SPI0 device on Carrier BIOS on SPI0 on Carrier or on SPI1 on Module eSPI_CS0# on Carrier
001	Carrier J1.B54	Carrier J1.B55	Module	Carrier J1.B48	MAFS on Module	Same as 101 except eSPI_CS0# routing	CSME / DT on Chipset SPI0 device on Module BIOS on SPI0 on Module or on SPI1 on Carrier eSPI_CS0# on Carrier
000	Carrier J1.B54	Carrier J1.B55	Module	Module	SAFS on Carrier	Carrier BMC with SAFS BIOS on far side of BMC	CSME / DT on Slave attached Flash on Carrier BIOS on Carrier SAFS

4.13 Intel ISP Adaptor-C2 Connector

The conga-HPC/EVAL-Mini provides connector X49 for an Intel ISP Adaptor-C2.

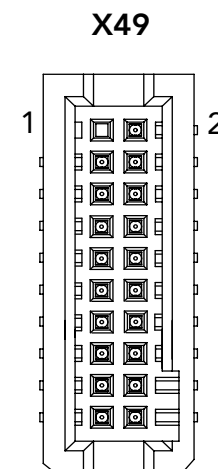
Table 52 X49 - Intel ISP Adaptor-C2 Connector Pinout

Pin	Signal	Pin	Signal
1	Key	2	BOOT_SPI_CS0#
3	SYS_RST#_1V8	4	NC
5	GND	6	VCC_BOOT_SPI
7	SPI_CLK_ISP	8	SPI_IO2_ISP
9	SPI_IO3_ISP	10	SPI_IO1_ISP
11	NC	12	SPI_IO0_ISP
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC



Connector Type

X49: 1.27 mm, 2x10 pin female connector (For a matching connector, see www.dediprog.com/product/ISP-ADP-INTEL-C2)

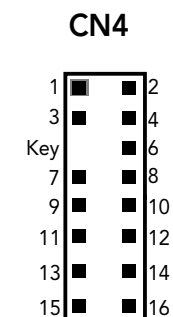


4.14 General Purpose SPI Port

The conga-HPC/EVAL-Mini provides a general purpose SPI port (CN4).

Table 53 CN4 - 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_GSPI	8	GP_SPI_MISO
9	+V3.3S	10	GP_SPI_MOSI
11	PLTRST_GSPI	12	GP_SPI_CS1#
13	+V3.3A	14	GP_SPI_ALERT#
15	GP_SPI_CS2#	16	GP_SPI_CS3#





Note

The I/O voltage level for the GP_SPI signals is 1.8 V.



Connector Type

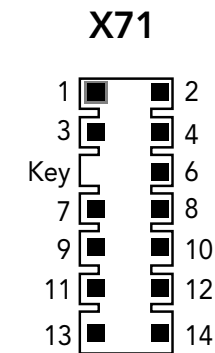
CN4: 2.54 mm, 2x8 pin female connector

4.15 eSPI Header

The conga-HPC/EVAL-Mini provides eSPI signals on header X71.

Table 54 X71 - 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#_3V3	8	ESPI_IO1
9	+V3.3S	10	ESPI_IO0
11	ESPI_RST#	12	ESPI_CS1#
13	+V3.3A	14	ESPI_ALERT (controlled by JP19)



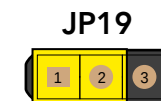
Connector Type

X71: 2.54 mm, 2x7 pin female connector

Use jumper JP19 to select the eSPI ALERT# setting of the connector X71.

Table 55 JP19 - eSPI ALERT# Settings

Pin	Description
1-2	eSPI ALERT#0 (default)
2-3	eSPI ALERT#1



4.16 Serial Ports

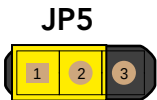
The conga-HPC/EVAL-Mini supports up to two serial ports:

- Module UART0 on connector X43 (COM0)
- Module UART1 on connector X44 (COM1)

Use jumper JP5 to select the voltage setting for single ended UART TX/RX signals on the Feature Connector (X52).

Table 56 JP5 - UART0 and UART1 Signal Voltage Settings

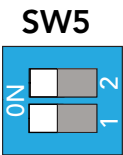
Pin	Description
1-2	3.3V
2-3	1.8V (default)



Use DIP SW5 to enable/disable COM ports.

Table 57 SW5 - UART I/O Settings

Switch	Configuration	Description
SW5.1	OFF	COM0 enabled (default)
	ON	COM0 disabled
SW5.2	OFF	COM1 enabled (default)
	ON	COM1 disabled

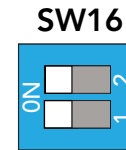


Both SW5.1 and SW5.2 shall be ON and COMs disabled, in case single ended version of UART is being used on the Feature Connector (X52).

Use DIP SW16 to control RX/CTS on UART ports.

Table 58 SW16 - UART RX/CTS relaying

Switch	Configuration	Description
SW16.1	OFF	POR configuration (default)
	ON	Enable relaying in deep standby power states of UART0
SW16.2	OFF	POR configuration (default)
	ON	Enable relaying in deep standby power states of UART1



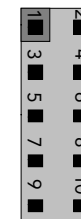
4.16.1 COM Port 0 Header

The conga-HPC/EVAL-Mini provides COM port 0 on connector X43 (UART0). The port supports RS-232 I/O voltage levels. UART0 is also connected to pins 19 and 21 of the feature connector X52. For more information, see section 4.19 "Feature Connector".

Table 59 X43 - COM 0 Pinout

Pin	Signals	Pin	Signals
1	NC	2	NC
3	RX	4	RTS#
5	TX	6	CTS#
7	NC	8	NC
9	GND	10	+5V (750mA fuse)

X43



Connector Type

X43: 2.54 mm, 2x5 pin female connector

4.16.2 COM Port 1 Header

The conga-HPC/EVAL-Mini provides COM port 1 on connector X44 (UART1). The port supports RS-232 I/O voltage levels. UART1 is also connected to pins 20 and 22 of the feature connector X52. For more information, see section 4.19 "Feature Connector".

Table 60 X44 - COM 1 Header Pinout

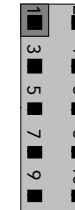
Pin	Signals	Pin	Signals
1	NC	2	NC
3	RX	4	RTS#
5	TX	6	CTS#
7	NC	8	NC
9	GND	10	+5V (750 mA fuse)



Connector Type

X44: 2.54 mm, 2x5 pin female connector

X44



4.17 CAN Header

The conga-HPC/EVAL-Mini provides a CAN Bus header on the connector X37.

Table 61 X37 - CAN Header Pinout

Pin	Signal
1	+V12S
2	CAN_H
3	CAN_L
4	GNC

X37

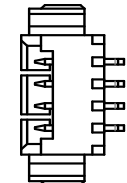
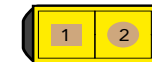


Table 62 X38 - CAN Bus Termination

Pin	Configuration
1	CAN_CT_T
2	GND

X38



Note

Place Jumper X38 to enable split termination with two 60 Ohm resistors and capacitor to GND.



Connector Type

X37: 1.25 mm, PicoBlade 4-pin header (Molex 53261-0471); Possible Mating Connector: Molex 51021-0400

X38: 2.54 mm grid jumper

4.18 CPU Fan Header

The conga-HPC/EVAL-Mini provides two different 4-pin fan connectors X54 and X55 that share the same signals.

Table 63 X54/X55 - CPU Fan Header Pinout

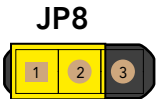
Pin	Signal
1	GND
2	+VDD (12V/5V)
3	FAN_TACH
4	FAN_PWM



Use jumper JP8 to set the fan’s supply voltage level.

Table 64 JP8 - CPU Fan Voltage Control

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



Connector Type

X54: 1.25 mm, PicoBlade 4-pin fan plug (Molex 53261-0471); Possible Mating Connector: Molex 51021-0400
X55: 2.54 mm, standard 4-pin fan plug
JP10: 2.54 mm grid jumper

4.19 Feature Connector

Table 65 X52 - Feature Connector Pinout

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	32.768 kHz low frequency suspend clock	4	RAPID_SHUTDOWN	Trigger for Rapid Shutdown. Must be driven to 5V though a ≤ 50 ohm source impedance for ≥ 20 μ s.
5	TAMPER#	Tamper or Intrusion detection line on VCC_RTC power well.	6	SUS_S4_S5#_1V8	Indicates system is in Suspend to Disk (S4) or Soft Off (S5) state. Active low output.
7	ATX_PS_ON#	Power supply on (active low).	8	CARRIER_HOT#_1V8	Input from off -Module temp sensor indicating an over-temp situation.
9	SUS_S3#_1V8	Suspend to RAM state. Active low output.	10	LID#_EXT	Module input signal, generation a LID close or open event.
11	THERMTRIP#_1V8	Active low output indicating that the CPU has entered thermal shutdown.	12	WAKE1#_1V8	General purpose wake up signal. May be used to implement wake-up on PS2 keyboard or mouse activity.
13	WD_OUT_1V8	Output indicating that a watchdog time-out event has occurred.	14	RSMRST_OUT#_1V8	Resume Reset signal with active low output. When it transitions from low to high it indicates that the suspend well power rails are stable and also VIN_PWR_OK signals are high.
15	WDTRIG#_1V8	Watchdog Trigger	16	VIN_PWR_OK#_1V8	Power OK from main power supply. A high value indicates that the power is good.
17	BATLOW#_1V8	Indicates that external battery is low.	18	SLEEP#_EXT	Sleep button. Low active signal used by the ACPI operating system to bring the system to sleep state or to wake it up again.
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	TESTCHPC#_1V8	Module input for vendor specific module test mode(s).	24	AC_PRESENT_1V8	Driven hard low on Carrier if system AC power is not present.
25	GND	Power ground	26	GND	Power ground

X52



Connector Type

X52: 2.54 mm, 2x13 pin female connector

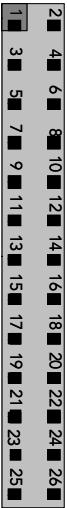
4.20 GPIO Pin Header

The conga-HPC/EVAL-Mini provides 12 GPIO pins on header X51.

Table 66 X51 - GPIO Header Pinout

Pin	Signal	Pin	Signal
1	+V1.8 standby (0.75 A fuse)	2	+V1.8 main (0.75 A fuse)
3	GPIO_00_1V8	4	GND
5	GPIO_01_1V8	6	GND
7	GPIO_02_1V8	8	GND
9	GPIO_03_1V8	10	GND
11	GPIO_04_1V8	12	GND
13	GPIO_05_1V8	14	GND
15	GPIO_06_1V8	16	GND
17	GPIO_07_1V8	18	GND
19	GPIO_08_1V8	20	GND
21	GPIO_09_1V8	22	GND
23	GPIO_10_1V8	24	GND
25	GPIO_11_1V8	26	GND

X51



Connector Type

X51: 2.54 mm, 2x13 pin female connector



Note

1. Additional PUs connected to GPIOs must be higher than 100 kΩ.
2. Drive strength of at least +(-) 2 mA is required.

4.21 Debug Header

The conga-HPC/EVAL-Mini provides pin header X53 for measuring or debugging PCIE_WAKE# and PLTRST# signals.

Table 67 X53 - Debug Header Pinout

Pin	Signal	Pin	Signal
1	PLTRST#_1V8	2	GND
3	PCIE_WAKE#_1V8	4	GND



Connector Type

X53: 2.54 mm, 2x2 pin female connector

X53



4.22 FuSa Header

The conga-HPC/EVAL-Mini provides FuSa pins on header CN3. LED D46 is connected to CATERR#, indicating a catastrophic error occurred on the COM-HPC CPU or COM-HPC SOC.

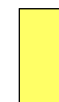
Table 68 CN3 - FuSa Header Pinout

Pin	Signal	Pin	Signal
1	+3.3V (Resettable Fuse)	2	FUSA_SPI_MISO _1V8
3	FUSA_STATUS0 _1V8	4	FUSA_SPI_MOSI _1V8
5	FUSA_STATUS1 _1V8	6	FUSA_SPI_ALERT _1V8
7	FUSA_ALERT# _1V8	8	FUSA_VOLTAGE_ERR# _1V8
9	FUSA_SPI_CS# _1V8	10	PROCHOT# _1V8
11	FUSA_SPI_CLK _1V8	12	CATERR# _1V8
13	NC	14	NC
15	GND	16	GND

CN3



D46



JP4 can be used to configure the behaviour of the CATERR LED D46.

Table 69 JP4 - CATERR LED Configuration

Pin	Configuration
1-2	Active after PLTRST# (default)
2-3	Active during boot-up

JP4





Connector Type

CN3: 2.54 mm, 2x8 pin female connector

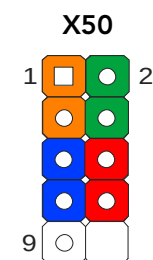
JP4: 2.54 mm grid jumper

4.23 Front Panel Pin Header

The conga-HPC/EVAL-Mini provides front panel pins on header X50.

Table 70 X50 - Front Panel Pin Header Pinout

Pin	Signal	Pin	Signal
1	NC	2	+V5
3	NC	4	GND
5	GND	6	PWRBTN#_EXT
7	SYS_RST#_EXT	8	GND
9	NC	10	No pin



Connector Type

X50: 2.54 mm, 2x5 pin female connector

5 Additional Features

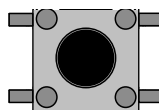
5.1 Buttons

The conga-HPC/EVAL-Mini features power, reset, LID and sleep buttons.

5.1.1 Power

When you press the power button SW8, it triggers the module's PWRBTN# signal. The triggered event usually initiates a transition from one power state to another (for example, from S5 to S0). However, the system's behavior depends on the ACPI settings of the Operating System.

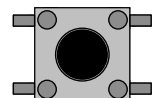
SW8



5.1.2 Reset

When you press the reset button SW9, it triggers the module's RSTBTN# signal. The triggered event usually invokes a system warm reset. This behavior however depends on the configuration of the module.

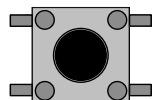
SW9



5.1.3 LID

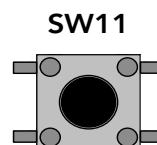
When you press the lid button SW10, it triggers the module's LID# signal. The system's behavior depends on the ACPI settings of the Operating System.

SW10



5.1.4 Sleep

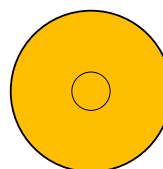
When you press the sleep button SW11, it triggers the module's SLEEP# signal. The system's behavior depends on the ACPI settings of the Operating System.



5.2 Ground Test Points

The conga-HPC/EVAL-Mini provides 11 test points (M1-M7 and M33-M36). These test points are connected to ground and they make it easier to connect oscilloscope probes or multimeter lines or both to ground during measurements.

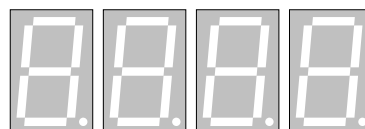
**M1-M7
M33-M36**



5.3 Debug Display

The conga-HPC/EVAL-Mini provides four 7-segment displays (D60-D63) via USB_PD_I2C 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.

D60-D63



6 Mechanical Dimensions

