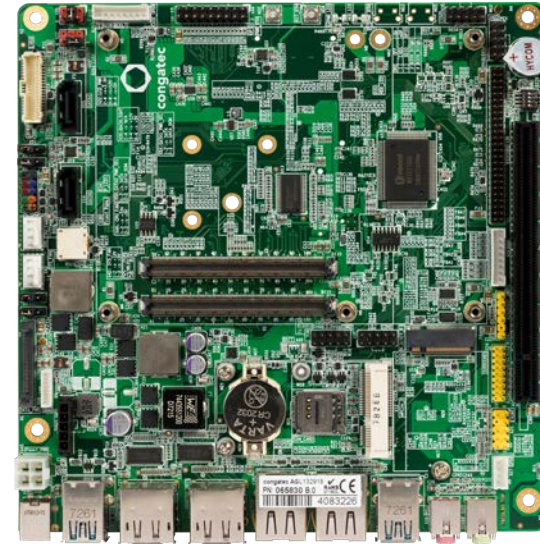


COM Express™ conga-IT6/COMe

Detailed description of the congatec COM Express™ Type 6 board based on Mini-ITX form factor



User's Guide

Revision 1.0

Revision History

Revision	Date (yyyy-mm-dd)	Author	Changes
0.1	2018-01-10	BEU	• Preliminary release
0.2	2018-02-12	BEU	• Corrected LVDS pinout table in section 5.8 "LVDS Header"
0.3	2018-07-06	BEU	• Updated information about electrostatic sensitive devices in the preface section • Updated sections 5.2.3 "Stereo Speakers Header", 5.2.4 "Digital MIC and S/PDIF Header", 5.2.6 "Surround Sound Header" and 5.3.1 "UART Headers" • Added possible mating connectors
1.0	2018-10-30	BEU	• Updated audio codec to ALC888S in table 4 and section 5.2 "Audio Connectors" • Corrected pinout description in table 17 • Updated LED status description in table 18 • Added information about feature connector UARTs to section 5.3.1 "UART Headers" • Changed one power button, one reset button, and a LED to optional in section 7.1 "Power Buttons" and 7.2 "Reset Buttons" • Corrected and added descriptions to section 7.7 "Feature Connector"

Preface

This user's guide provides information about the components, features and connectors available on the congatec COM Express™ Type 6 based Mini-ITX carrier board.

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Caution

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Note

Notes call attention to important information that should be observed.



Connector Type

Describes the connector on the congatec COM Express™ evaluation carrier board and may also describe a possible mating connector as an example.



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
Bit	Binary Digit
COM	Computer On Module
DIP	Dual In-line Package
DMIC	Digital Microphone
DP	DisplayPort
DP++	Dual-mode DisplayPort
eDP	Embedded DisplayPort
Gb/s	Gigabit per second
GbE	Gigabit Ethernet
HDA	High Definition Audio
HDMI	High-Definition Multimedia Interface
I ² C	Inter-Integrated Circuit
LPC	Low-Pin Count
LVDS	Low-Voltage Differential Signaling
M.2	Formerly known as the Next Generation Form Factor (NGFF)
mA	Milliampere
Mbyte	Megabyte
microSD	Micro Secure Digital
Micro-SIM	Micro Subscriber Identity Module
N.C	Not Connected
PCI Express® Mini	Peripheral Component Interface Express® Mini
PEG	PCI Express® for Graphics
RS-232	Recommended Standard 232
RS-422	Recommended Standard 422

RS-485	Recommended Standard 485
RTC	Real-Time Clock
S/PDIF	Sony/Philips Digital Interconnect Format
SATA	Serial Advanced Technology Attachment
SATADOM	Serial Advanced Technology Attachmen Disc On Module
SBM ³	Smart Battery Management
SD	Secure Digital
SPI	Serial Peripheral Interface
Super I/O	Super Input/Output
T.B.D	To Be Determined
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VGA	Video Graphics Array

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1 Introduction

1.1 COM Express™ Concept

COM Express™ is an open industry standard defined specifically for COMs (computer on modules). Its creation makes it possible to smoothly transition from legacy interfaces to the newest technologies available today.

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 Express™ modules have standardized form factors and specified pinouts on the two system connectors that remain the same regardless of the vendor. The COM Express™ module reflects the functional requirements for a wide range of embedded applications. These functions include, but are not limited to, PCI Express, PCI, Graphics, High Definition Audio, parallel ATA, serial ATA, 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 Express™ 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, which results in a more reliable product while simplifying system integration. Most importantly, COM Express™ modules are scalable, which means once an application has been created there is the ability to diversify the product range through the use of different performance class or form factor size modules. Simply unplug one module and replace it with another; no redesign is necessary.

1.2 conga-IT6/COMe

The conga-IT6/COMe carrier board is based on the Mini-ITX form factor and complies with COM Express™ Carrier Design Guide 2.0 specification. The carrier board supports COM Express™ Type 6 compact and basic format modules.

The conga-IT6/COMe provides most of the functional requirements for any application. These functions include, but are not limited to a rich complement of contemporary high bandwidth serial interfaces such as PCI Express, Serial ATA, USB 3.0, and Gigabit Ethernet.



1.2.1 Optional Accessories

Table 1 IO Shield

Accessories	Part No.	Description
conga-IT6/IO Shield Standard	065840	IO shield stanard size for conga-IT6 (height 40mm)

Table 2 Cables

Cables	Part No.	Description
cab-ThinMini-ITX-SATA-Power	14000120	Power cable for SATA and micro-SATA devices.
cab-ThinMini-ITX-UART	14000121	UART cable with 2x5-pin female housing and D-Sub male connector.
cab-ThinMini-ITX-LVDS-Open End	14000125	ACES 40 pin-LVDS cable with open end. Can only be used for eDP (X19).
cab-ThinMini-ITX-BKLT	14000127	CHYAO SHIUNN 8-pin backlight cable with open end.
cab-ThinMini-ITX-LVDS	14000129	ACES 50204-40 LVDS cable for Thin Mini-ITX.
cab-ThinMini-ITX-SATA-Power (50cm lenght)	14000135	50cm SATA power cable with 2x15-pin female connectors.
cab-ThinMini-ITX-SATA-Power (30cm length)	14000136	30cm SATA power cable with 2x15-pin female connectors.
cab-Pico-ITX-LVDS	14000211	50cm LVDS data cable (For Rev. A.0 and later)
VGA cable 30cm	14000216	30cm VGA cable
SATA III cable (straight/straight)	48000029	30cm SATA III data cable with straight connectors at both ends
SATA III cable (straight/right-angled)	48000030	30cm SATA III data cable with straight/right-angled connectors

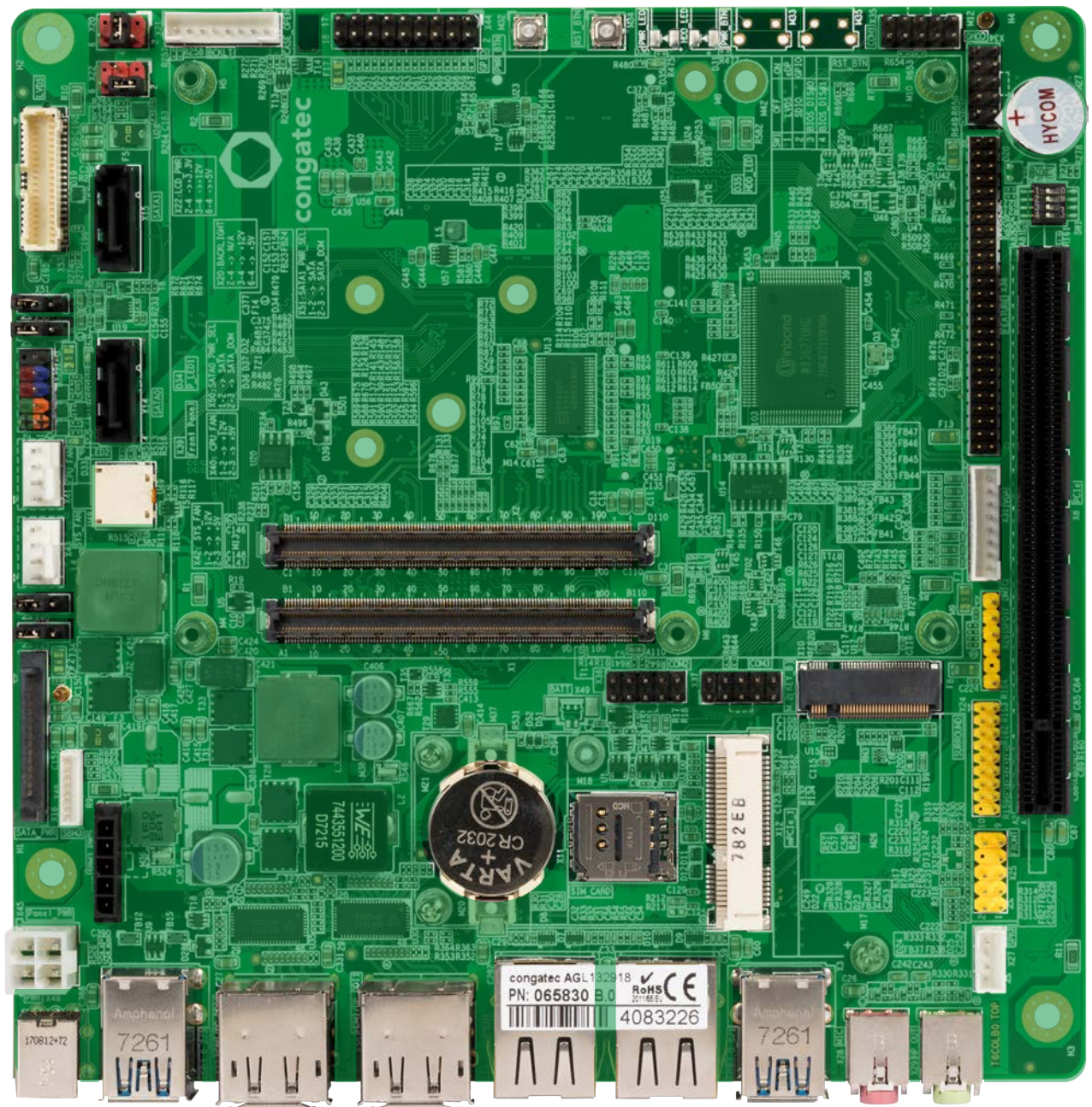
Table 3 Adapters

Adapters	Part No.	Description
conga-Thin MITX/eDP to DP adapter	052231	eDP to standard DP evaluation adapter
conga-Thin MITX/eDP to HDMI adapter	052232	eDP to standard HDMI evalutiona adapter



2 Connector Layout

The connector layout picture below shows each connector and its name designator. Jumpers and their respective pin 1 are also shown. Select the Adobe 'Zoom-In-Tool' and zoom in on a given component to see its designator. Hover over the component and the 'Zoom-In-Tool' will change indicating there is a link. Click on the link to navigate 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 4 Feature List

Form Factor	Based on Thin Mini-ITX form factor (170 mm x 170 mm)	
Supported Modules	COM Express™ Type 6 compact and basic form factor	
Audio	Realtek ALC888S High Definition Audio codec	
Ethernet	1x Gigabit Ethernet from module 1x Gigabit Ethernet from onboard Intel® Ethernet Controller i211 (optionally i210)	
Back Panel I/O Connectors	1x DC power jack 2x DP++ ports 2x HDMI ports 1x Microphone jack	1x Line-OUT jack 2x Gigabit Ethernet ports 4x USB 3.0 ports
Onboard I/O Connectors	1x ATX 4-pin connector 1x GPIO header 1x Stereo speakers header* 1x Digital MIC or S/PDIF-OUT header* 1x Front panel audio header 1x Surround sound header* 4x UART headers* 1x SPI flash socket 1x SATA 15-pin power connector 2x SATA / SATADOM 6Gb/s ports 1x LVDS header 1x eDP connector	1x Flat panel backlight header 1x VGA header 1x microSD or optionally full-size SD card slot 1x PCI Express® Graphics (PEG) card slot 1x Full/Half-size PCI Express® card slot 1x M.2 Key B 3042 / 2242 card slot 1x Micro-SIM card slot 1x Express® card slot 2x Fan headers 1x Front panel header 1x Feature header 2x Ground test points
Optional Onboard Interfaces	1x SBM ³ connectors 1x Header for a CR2032 cell or equivalent battery with a matching connector	
Other Features	1x CR2032 cell battery placed inside a battery holder 1x Beeper	



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

- 170.0 mm x 170.0 mm
- Height approximately 20 mm (top side)

3.3 Supply Voltage Power

- 12V - 24V DC $\pm$ 5%

3.4 Environmental Specifications

Temperature	Operation: 0° to 60°C	Storage: -20° to +70°C
Humidity	Operation: 10% to 90%	Storage: 5% to 95%



Note

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



4 Connector Description

4.1 Power Supply Connectors

The conga-IT6/COMe provides a DC power jack and a 4-pin ATX connector. Optionally, the conga-IT6/COMe can also provide SBM³ connectors.

4.1.1 DC Power Jack

The conga-IT6/COMe provides a DC power jack (X46). The supported power supply is defined in section 3.3 "Supply Voltage Power".

Table 5 X46 Pinout Description

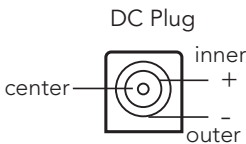
Pin	Function
Inner Shell	+12 - 24V
Outer Shell	GND



Connector Type

X46: DC power jack, 7.4x5.1 mm (Singatron 2DC1003-000111)

X46



4.1.2 ATX 4-Pin Connector

The conga-IT6/COMe provides an ATX 4-pin connector (X45). The supported power supply is defined in section 3.3 "Supply Voltage Power".

Table 6 X45 Pinout Description

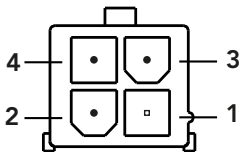
Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	3	+12V - 24V	Power supply +12V - 24V
2	GND	Ground	4	+12V - 24V	Power supply +12V - 24V



Connector Type

X45: 2x2 pins, 4.2 mm pitch (Molex 87427-0443); Possible Mating Connector: Molex 39-01-2040

X45





4.1.3 SBM³ Connectors

Optionally, the conga-IT6/COMe can also provide SBM³ connectors (X47, X48). Connect the power cable to connector X47. Connect the data control cable to header X48. The supported power supply is defined in section 3.3 "Supply Voltage Power".

Table 7 X47 Pinout Description

Pin	Function
1	+12V - 24V
2	+12V - 24V
3	GND
4	GND
5	N.C

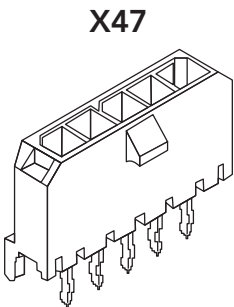
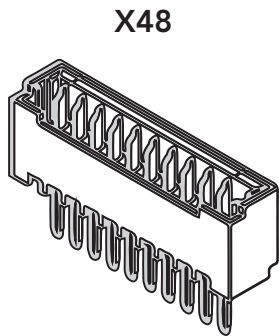


Table 8 X48 Pinout Description

Pin	Function	Pin	Function
1	GND	5	SUS_STAT#
2	I2C_DAT	6	PM_SLP_S3#
3	I2C_CLK	7	PM_SLP_S4#
4	BATLOW#	8	PWRBTN#



Connector Type

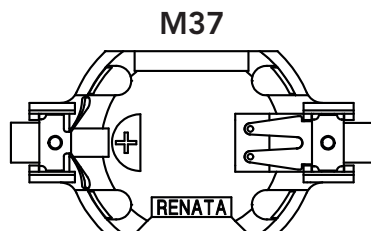
X47: 5x1 pins, 3.00 mm pitch (Molex 43650-0517); Possible Mating Connector: Molex 43645-0500

X48: 8x1 pins, 1.25 mm pitch (Molex 53047-1510); Possible Mating Connector: Molex: 51021-1500

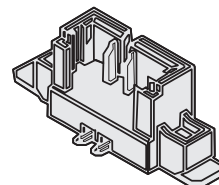


4.1.4 CR2032 Cell Battery Holder

The conga-IT6/COMe provides a CR2032 cell battery placed inside a battery holder (M37). The battery supplies power to the real-time clock (RTC). Optionally, the conga-IT6/COMe can provide a header (X49) for a CR2032 cell or equivalent battery with a matching connector.



X49



Connector Type

X49 : 2x1 pins, 1.25 mm pitch



Warning

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



5 Subsystems of COM Express™ Connector Rows A&B

5.1 Connector Pinout - Rows A and B

Table 9 Module Type 6 Connector Pinout - Rows A and B

Pin	Row A	Pin	Row B	Pin	Row A	Pin	Row B
A1	GND(FIXED)	B1	GND(FIXED)	A56	PCIE_TX4-	B56	PCIE_RX4-
A2	GBE0_MDI3-	B2	GBE0_ACT#	A57	GND	B57	GPO2
A3	GBE0_MDI3+	B3	LPC_FRAME#	A58	PCIE_TX3+	B58	PCIE_RX3+
A4	GBE0_LINK100#	B4	LPC_AD0	A59	PCIE_TX3-	B59	PCIE_RX3-
A5	GBE0_LINK1000#	B5	LPC_AD1	A60	GND(FIXED)	B60	GND(FIXED)
A6	GBE0_MDI2-	B6	LPC_AD2	A61	PCIE_TX2+	B61	PCIE_RX2+
A7	GBE0_MDI2+	B7	LPC_AD3	A62	PCIE_TX2-	B62	PCIE_RX2-
A8	GBE0_LINK#	B8	LPC_DRQ0#	A63	GPI1	B63	GPO3
A9	GBE0_MDI1-	B9	LPC_DRQ1#	A64	PCIE_TX1+	B64	PCIE_RX1+
A10	GBE0_MDI1+	B10	LPC_CLK	A65	PCIE_TX1-	B65	PCIE_RX1-
A11	GND(FIXED)	B11	GND(FIXED)	A66	GND	B66	WAKE0#
A12	GBE0_MDI0-	B12	PWRBTN#	A67	GPI2	B67	WAKE1#
A13	GBE0_MDI0+	B13	SMB_CK	A68	PCIE_TX0+	B68	PCIE_RX0+
A14	GBE0_CTREF	B14	SMB_DAT	A69	PCIE_TX0-	B69	PCIE_RX0-
A15	SUS_S3#	B15	SMB_ALERT#	A70	GND(FIXED)	B70	GND(FIXED)
A16	SATA0_TX+	B16	SATA1_TX+	A71	LVDS_A0+	B71	LVDS_B0+
A17	SATA0_TX-	B17	SATA1_TX-	A72	LVDS_A0-	B72	LVDS_B0-
A18	SUS_S4#	B18	SUS_STAT#	A73	LVDS_A1+	B73	LVDS_B1+
A19	SATA0_RX+	B19	SATA1_RX+	A74	LVDS_A1-	B74	LVDS_B1-
A20	SATA0_RX-	B20	SATA1_RX-	A75	LVDS_A2+	B75	LVDS_B2+
A21	GND(FIXED)	B21	GND(FIXED)	A76	LVDS_A2-	B76	LVDS_B2-
A22	SATA2_TX+	B22	SATA3_TX+	A77	LVDS_VDD_EN	B77	LVDS_B3+
A23	SATA2_TX-	B23	SATA3_TX-	A78	LVDS_A3+	B78	LVDS_B3-
A24	SUS_S5#	B24	PWR_OK	A79	LVDS_A3-	B79	LVDS_BKLT_EN
A25	SATA2_RX+	B25	SATA3_RX+	A80	GND(FIXED)	B80	GND(FIXED)
A26	SATA2_RX-	B26	SATA3_RX-	A81	LVDS_A_CK+	B81	LVDS_B_CK+



Pin	Row A	Pin	Row B	Pin	Row A	Pin	Row B
A27	BATLOW#	B27	WDT	A82	LVDS_A_CK-	B82	LVDS_B_CK-
A28	(S)ATA_ACT#	B28	AC/HDA_SDIN2	A83	LVDS_I2C_CK	B83	LVDS_BKLT_CTRL
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1	A84	LVDS_I2C_DAT	B84	VCC_5V_SBY
A30	AC/HDA_RST#	B30	AC/HDA_SDIN0	A85	GPI3	B85	VCC_5V_SBY
A31	GND(FIXED)	B31	GND(FIXED)	A86	RSVD	B86	VCC_5V_SBY
A32	AC/HDA_BITCLK	B32	SPKR	A87	RSVD	B87	VCC_5V_SBY
A33	AC/HDA_SDOUT	B33	I2C_CK	A88	PCIE_CLK_REF+	B88	BIOS_DIS1#
A34	BIOS_DIS0#	B34	I2C_DAT	A89	PCIE_CLK_REF-	B89	VGA_RED
A35	THRMTRIP#	B35	THRM#	A90	GND(FIXED)	B90	GND(FIXED)
A36	USB6-	B36	USB7-	A91	SPI_POWER	B91	VGA_GRN
A37	USB6+	B37	USB7+	A92	SPI_MISO	B92	VGA_BLU
A38	USB_6_7_OC#	B38	USB_4_5_OC#	A93	GPO0	B93	VGA_HSYNC
A39	USB4-	B39	USB5-	A94	SPI_CLK	B94	VGA_VSYNC
A40	USB4+	B40	USB5+	A95	SPI_MOSI	B95	VGA_I2C_CK
A41	GND(FIXED)	B41	GND(FIXED)	A96	TPM_PP	B96	VGA_I2C_DAT
A42	USB2-	B42	USB3-	A97	TYPE10#	B97	SPI_CS#
A43	USB2+	B43	USB3+	A98	SER0_TX	B98	RSVD
A44	USB_2_3_OC#	B44	USB_0_1_OC#	A99	SER0_RX	B99	RSVD
A45	USB0-	B45	USB1-	A100	GND(FIXED)	B100	GND(FIXED)
A46	USB0+	B46	USB1+	A101	SER1_TX	B101	FAN_PWMOUT
A47	VCC_RTC	B47	EXCD1_PERST#	A102	SER1_RX	B102	FAN_TACHIN
A48	EXCD0_PERST#	B48	EXCD1_CPPE#	A103	LID#	B103	SLEEP#
A49	EXCD0_CPPE#	B49	SYS_RESET#	A104	VCC_12V	B104	VCC_12V
A50	LPC_SERIRQ	B50	CB_RESET#	A105	VCC_12V	B105	VCC_12V
A51	GND(FIXED)	B51	GND(FIXED)	A106	VCC_12V	B106	VCC_12V
A52	PCIE_TX5+	B52	PCIE_RX5+	A107	VCC_12V	B107	VCC_12V
A53	PCIE_TX5-	B53	PCIE_RX5-	A108	VCC_12V	B108	VCC_12V
A54	GPI0	B54	GPO1	A109	VCC_12V	B109	VCC_12V
A55	PCIE_TX4+	B55	PCIE_RX4+	A110	GND(FIXED)	B110	GND(FIXED)



5.2 Audio Connectors

The audio signals of the following connectors are routed from a high definition audio (HDA) codec (Realtek ALC888S).

5.2.1 Microphone Jack

The conga-IT6/COMe provides a microphone jack (X28).

Table 10 X28 Pinout Description

Pin	Jack	Signal	Description
1	Tip	MIC1_L	Microphone - left channel
2	Ring	MIC1_R	Microphone - right channel
3	Sleeve	A_GND	Analog ground



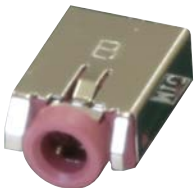
Connector Type

X28: 3-position, 3.5 mm single audio jack

Microphone Jack



X28



5.2.2 Line-OUT Jack

The conga-IT6/COMe provides a Lne-OUT jack (X29).

Table 11 X29 Pinout Description

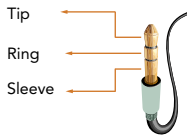
Pin	Jack	Signal	Description
1	Tip	LINE_L	Line-OUT - left channel
2	Ring	LINE_R	Line-OUT - right channel
3	Sleeve	A_GND	Analog ground



Connector Type

X29: 3-position, 3.5 mm single audio jack

Line-OUT Jack



X29



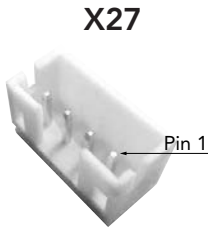


5.2.3 Stereo Speakers Header

The conga-IT6/COMe provides a stereo speakers header (X27). The signals are amplified (TI TPA2012D2), providing 2x 2.1W into 4ohm at 5V.

Table 12 X27 Pinout Description

Pin	Signal	Description
1	FRONT_L-	Analog front left (differential negative)
2	FRONT_L+	Analog front left (differential positive)
3	FRONT_R+	Analog front right (differential positive)
4	FRONT_R-	Analog front right (differential negative)



 Connector Type

X27: 4x1 pins, 2.00 mm pitch (JS 1125-04)

 Note

This header is not supported by the standard BIOS:

BIOS Version	Surround Audio (X24)	SPDIF/DMIC (X26)	Internal Speaker (X27)
Standard BIOS	N/A	N/A	N/A
Customized BIOS	Surround Out with Line-In	DMIC	N/A
Customized BIOS	Surround Out without Line-In	SPDIF Out	Supported

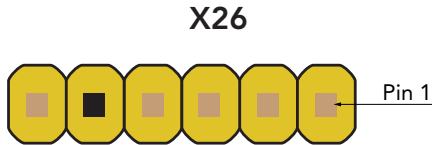
Contact congatec technical support for more information about a customized BIOS.

5.2.4 Digital MIC and S/PDIF Header

The conga-IT6/COMe provides a DMIC header (X26). Alternatively, it can be used as S/PDIF output.

Table 13 X26 Pinout Description

Pin	Signal	Description
1	+3.3V	3.3V supply
2	DMIC_DATA	Serial data from DMIC
3	GND	Ground
4	SPDIFO2/DMIC_CLK	S/PDIF output or DMIC serial clock (configurable)
5	KEY	No pin
6	+5V	5V supply





Connector Type

X26: 6x1 pins, 2.54 mm pitch (keyed at pin 5)



Note

This header is not supported by the standard BIOS:

BIOS Version	Surround Audio (X24)	SPDIF/DMIC (X26)	Internal Speaker (X27)
Standard BIOS	N/A	N/A	N/A
Customized BIOS	Surround Out with Line-In	DMIC	N/A
Customized BIOS	Surround Out without Line-In	SPDIF Out	Supported

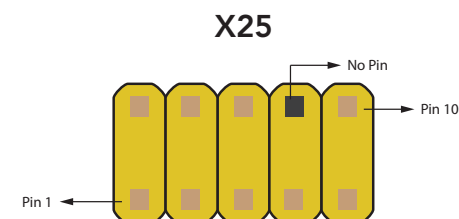
Contact congatec technical support for more information about a customized BIOS.

5.2.5 Front Panel Audio Header

The conga-IT6/COMe provides a front panel audio header (X25).

Table 14 X25 Pinout Description

Pin	Signal	Description
1	MIC2_L	2nd analog stereo microphone input - left channel
2	GND_HDA	Audio ground
3	MIC2_R	2nd analog stereo microphone input - right channel
4	N.C	Not connected
5	LINE2_R	2nd analog line output - right channel (headphone)
6	MIC2_JD	Microphone jack detection
7	SENSE	Jack detection for HDA codec
8	KEY	No pin
9	LINE2_L	2nd analog line output - left channel (headphone)
10	LINE2_JD	Line output jack detection



Connector Type

X25: 2x5 pins, 2.54 mm pitch

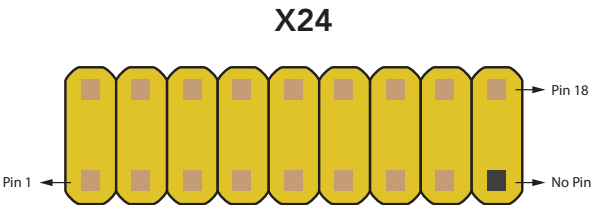


5.2.6 Surround Sound Header

The conga-IT6/COMe provides a surround sound header (X24).

Table 15 X24 Pinout Description

Pin	Signal	Description	Pin	Signal	Description
1	LINE1_L	1st Analog line input left channel	2	A_GND	Analog ground
3	A_GND	Analog ground	4	LINE1_R	1st Analog line input right channel
5	SIDE_L	Analog side output left channel	6	A_GND	Analog ground
7	A_GND	Analog ground	8	SIDE_R	Analog side out right channel
9	SURR_L	Analog surround out left channel	10	A_GND	Analog ground
11	A_GND	Analog ground	12	SURR_R	Analog surround out right channel
13	CENTER	Analog center output	14	A_GND	Analog ground
15	A_GND	Analog ground	16	LFE	Analog low frequency output
17	-	No pin	18	SENSE	Jack detection for HDA codec



Connector Type

X24: 9x2 pins, 2.00 mm pitch



Note

This header is not supported by the standard BIOS:

BIOS Version	Surround Audio (X24)	SPDIF/DMIC (X26)	Internal Speaker (X27)
Standard BIOS	N/A	N/A	N/A
Customized BIOS	Surround Out with Line-In	DMIC	N/A
Customized BIOS	Surround Out without Line-In	SPDIF Out	Supported

Contact congatec technical support for more information about a customized BIOS.

5.3 LPC Interfaces

The interfaces in the following subsections are routed from an LPC Super I/O controller (Winbond W83627UHG).



Note

The module must also support the interfaces for them to function.



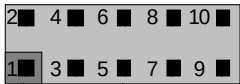
5.3.1 UART Headers

The conga-IT6/COMe provides four UART headers (X34, X35, X36, X37) via a Super I/O and transceiver. In addition, the feature connector X38 provides pins for two UART ports routed from the module. See section 7.7 "UART Feature Connector" for the pinout description.

Table 16 X34, X35, X36, X37 Pinout Description

Pin	RS-232	RS-422/485 Full Duplex	RS-485 Half Duplex
1	DCD	TX-	DATA-
2	RXD	TX+	DATA+
3	TXD	RX-	
4	DTR	RX+	
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		
9	RI		
10			

X34, X35, X36, X37



Connector Type

X34, X35, X36, X37: 5x2 pins, 2.54 mm pitch



Note

Not all UART headers are supported by the standard BIOS:

conga-IT6/COMe Rev. A.2	COM0 (X34)	COM1 (X35)	COM2 (X36)	COM3 (X37)
Standard BIOS	RS-232	N/A	N/A	N/A
Customized BIOS	RS-232	RS-232	RS-232	RS-232

conga-IT6/COMe Rev. B.X	COM0 (X34)	COM1 (X35)	COM2 (X36)	COM3 (X37)
Standard BIOS	RS-232	RS-232	N/A	N/A
Customized BIOS	RS-232 RS-422 RS-485	RS-232 RS-422 RS-485	RS-232 RS-422 RS-485	RS-232 RS-422 RS-485

Contact congatec technical support for more information about a customized BIOS.

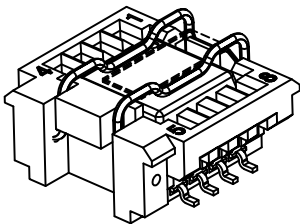


5.3.2 SPI 8-Pin Socket

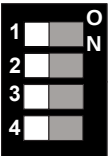
The conga-IT6/COMe provides an 8-pin SOIC8 socket (U48) for an SPI flash chip. Use DIP switch 3 and 4 to select a BIOS to boot from.

DIP Switch		BIOS Entry / SPI_CS#
SW 3	SW 4	
OFF	OFF	Boot from on-module firmware (default)
ON	OFF	Not supported
OFF	ON	Boot from carrier board SPI Flash
ON	ON	Boot from on-module firmware, but load management data from carrier SPI

U48



DIP Switch



Connector Type

U48: SPI flash SOIC8 socket (WIESON G6179-10)

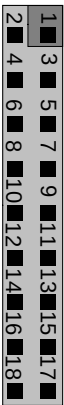
5.4 GPIO Header

The conga-IT6/COMe provides a GPIO header (X44). The signals are routed from a 16-bit I/O expander (NXP PCA9555).

Table 17 X44 Pinout Description

Pin	X44 Signals	Pin	X44 Signals
1	I2C_IO_00	2	I2C_IO_10
3	I2C_IO_01	4	I2C_IO_11
5	I2C_IO_02	6	I2C_IO_12
7	I2C_IO_03	8	I2C_IO_13
9	I2C_IO_04	10	I2C_IO_14
11	I2C_IO_05	12	I2C_IO_15
13	I2C_IO_06	14	I2C_IO_16
15	I2C_IO_07	16	I2C_IO_17
17	VCC5V_SBY	18	GND

X44



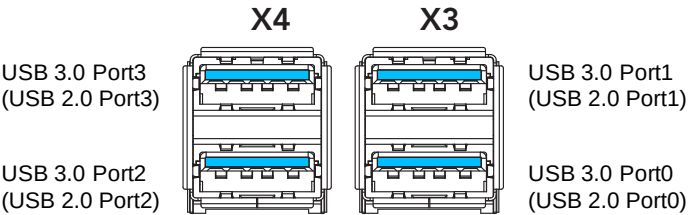
Connector Type

X44: 9x2 pins, 2.54 mm pitch



5.5 USB 3.0 Type A Ports

The conga-IT6/COMe provides four USB 3.0 Type A ports (X3 and X4).



Connector Type

X3, X4: USB 3.0 Type A stacked ports

5.6 Gigabit Ethernet Ports

The conga-IT6/COMe provides two Gigabit Ethernet (GbE) ports (X5, X6). The GbE port X5 signals are routed from the module. The GbE port X6 signals are routed from the Intel® GbE controller I211 (or optionally I210) on the conga-IT6/COMe.

X5, X6

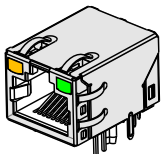


Table 18 X5, X6 LEDs Status Description

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

Connector Type

X5, X6: RJ45 port with Gigabit 12 core magnetic and two LEDs (Green, Green/Orange)



5.7 SATA Connectors

5.7.1 SATA Power Connector

The conga-IT6/COMe provides a SATA 15-pin power connector (X16). The 3.3V pins provide up to 500mA. The 5V and 12V pins provide up to 1A.

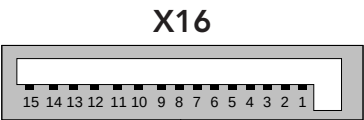


Table 19 X16 Pinout Description

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



Connector Type

X16: 15-pin SATA power connector

5.7.2 SATA / SATADOM Ports

The conga-IT6/COMe provides two SATA 6Gb/s ports (X14 and X15). You can enable SATADOM on SATA0 port (X14) with jumper X50. You can enable SATADOM on SATA1 port (X15) with jumper X51.

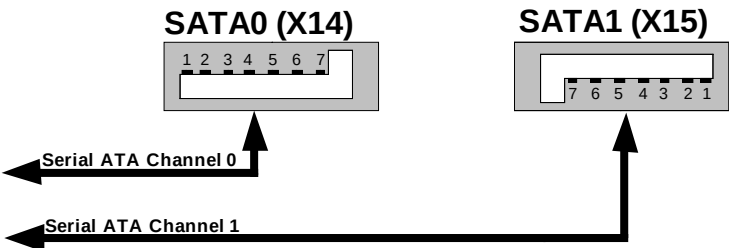




Table 20 Jumper X50, X51 Settings

Pin	Mode
1 - 2	SATA (default)
2 - 3	SATADOM

X50, X51



Caution

Do not connect a SATA device to a connector set to SATADOM. Otherwise, this will cause a short, possibly damaging the hardware.



Connector Type

X14, X15: SATA port

X50, X51: 3x1 pins, 2.54 mm pitch

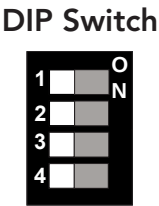
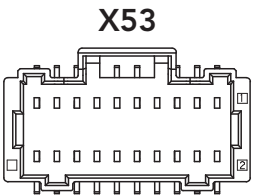


5.8 LVDS Header

The conga-IT6/COMe provides an LVDS header (X53). You can enable LVDS by setting DIP switch 1 to OFF.

Table 21 X53 Pinout Description

Pin	Signal	Pin	Signal
1	GND	2	GND
3	LVDS_A3-P	4	LVDS_B3-P
5	LVDS_A3-N	6	LVDS_B3-N
7	GND	8	GND
9	LVDS_A2-P	10	LVDS_B2-P
11	LVDS_A2-N	12	LVDS_B2-N
13	GND	14	GND
15	LVDS_A1-P	16	LVDS_B1-P
17	LVDS_A1-N	18	LVDS_B1-N
19	GND	20	GND
21	LVDS_A0-P	22	LVDS_B0-P
23	LVDS_A0-N	24	LVDS_B0-N
25	GND	26	GND
27	LVDS_CLK-P	28	LVDS_CLK-P
29	LVDS_CLK-N	30	LVDS_CLK-N
31	GND	32	GND
33	LVDS_I2C_CLK	34	LVDS_I2C_DAT
35	LVDS_PWR	36	LVDS_PWR
37	LVDS_PWR	38	GND
39	N.C.	40	LVDS_VDD_EN



Note

You can use either LVDS or eDP.



Connector Type

X53: 40 pins, 1.00 mm pitch (Molex 501190-4017); Possible Mating Connector: Molex 501189-4010

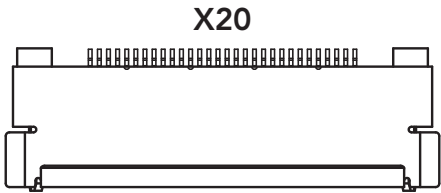


5.9 eDP Connector

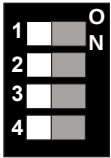
The conga-IT6/COMe provides an eDP connector (X19) at the bottom of the board. You can enable eDP by setting DIP switch 1 to ON.

Table 22 X20 Pinout Description

Pin	Signal	Pin	Signal
1	N.C	21	VCC_LCD
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
8	GND	28	GND
9	eDP_TX1-	29	GND
10	eDP_TX1+	30	GND
11	GND	31	GND
12	eDP_TX0-	32	eDP_LVDS_BKLT_EN
13	eDP_TX0+	33	eDP_LVDS_BKLT_CTRL
14	GND	34	N.C
15	eDP_AUX+	35	N.C
16	eDP_AUX-	36	N.C
17	GND	37	BKLT_PWR
18	VCC_LCD	38	BKLT_PWR
19	VCC_LCD	39	BKLT_PWR
20	VCC_LCD	40	N.C



DIP Switch



Note

You can use either LVDS or eDP.



Connector Type

X20: 40 pins, 0.5 mm pitch (ACES 50203-040); Possible Mating Connector: ACES 50204-40-0500LI



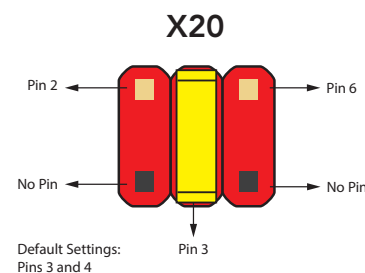
Table 25 X20 Pinout Description

Jumper Position	Backlight Voltage
2-4	N.A
3-4	+12V
4-6	+5V



Connector Type

X22, X20: 3x2 pins (keyed at pins 1 and 5), 2.54 mm pitch



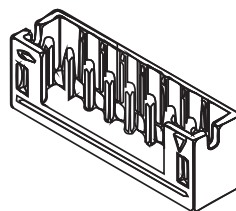
5.10 VGA Header

The conga-IT6/COMe provides a VGA header (X31). The signals are routed from a DP to VGA adapter (NXP PTN3392BS). Optionally, the signals can be routed from the module.

Table 26 X31 Pinout Description

Pin	Signal
1	VGA_CLK_B
2	VGA_DAT_B
3	VGA_HS_B
4	VGA_VS_B
5	GND
6	VGA_BLU_B
7	VGA_GRN_B
8	VGA_RED_B

X31



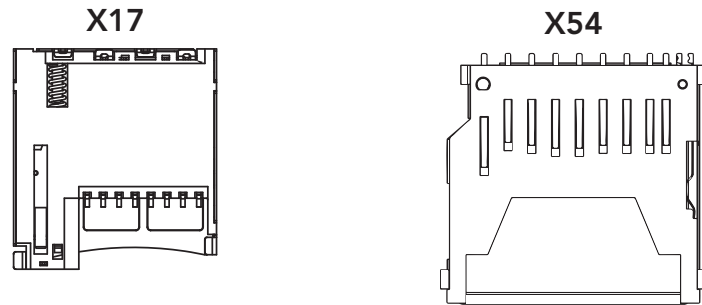
Connector Type

X31: 8x1 pins, 2.00 mm pitch (JS 1125-08)



5.11 microSD Card Slot

The conga-IT6/COMe provides a microSD card slot (X17) at the bottom of the board. You can enable it by setting DIP switch 2 to OFF. Optionally, a full-size SD card slot (X54) can be placed instead.



Connector Type

X17: microSD card slot

X54: Full-size SD card slot



6 Subsystems of COM Express™ Connector Rows C&D

6.1 Connector Pinout - Rows C and D

Table 27 Module Type 6 Connector Pinout Rows C and D

Pin	Row C	Pin	Row D	Pin	Row C	Pin	Row D
C1	GND(FIXED)	D1	GND(FIXED)	C56	PEG_RX1-	D56	PEG_TX1-
C2	GND	D2	GND	C57	TYPE1#	D57	TYPE2#
C3	USB_SSRX0-	D3	USB_SSTX0-	C58	PEG_RX2+	D58	PEG_TX2+
C4	USB_SSRX0+	D4	USB_SSTX0+	C59	PEG_RX2-	D59	PEG_TX2-
C5	GND	D5	GND	C60	GND(FIXED)	D60	GND(FIXED)
C6	USB_SSRX1-	D6	USB_SSTX1-	C61	PEG_RX3+	D61	PEG_TX3+
C7	USB_SSRX1+	D7	USB_SSTX1+	C62	PEG_RX3-	D62	PEG_TX3-
C8	GND	D8	GND	C63	RSVD	D63	RSVD
C9	USB_SSRX2-	D9	USB_SSTX2-	C64	RSVD	D64	RSVD
C10	USB_SSRX2+	D10	USB_SSTX2+	C65	PEG_RX4+	D65	PEG_TX4+
C11	GND(FIXED)	D11	GND(FIXED)	C66	PEG_RX4-	D66	PEG_TX4-
C12	USB_SSRX3-	D12	USB_SSTX3-	C67	RSVD	D67	GND
C13	USB_SSRX3+	D13	USB_SSTX3+	C68	PEG_RX5+	D68	PEG_TX5+
C14	GND	D14	GND	C69	PEG_RX5-	D69	PEG_TX5-
C15	DDI1_PAIR6+	D15	DDI1_CTRLCLK_AUX+	C70	GND(FIXED)	D70	GND(FIXED)
C16	DDI1_PAIR6-	D16	DDI1_CTRLDATA_AUX-	C71	PEG_RX6+	D71	PEG_TX6+
C17	RSVD	D17	RSVD	C72	PEG_RX6-	D72	PEG_TX6-
C18	RSVD	D18	RSVD	C73	GND	D73	GND
C19	PCIE_RX6+	D19	PCIE_TX6+	C74	PEG_RX7+	D74	PEG_TX7+
C20	PCIE_RX6-	D20	PCIE_TX6-	C75	PEG_RX7-	D75	PEG_TX7-
C21	GND(FIXED)	D21	GND(FIXED)	C76	GND	D76	GND
C22	PCIE_RX7+	D22	PCIE_TX7+	C77	RSVD	D77	RSVD
C23	PCIE_RX7-	D23	PCIE_TX7-	C78	PEG_RX8+	D78	PEG_TX8+
C24	DDI1_HPD	D24	RSVD	C79	PEG_RX8-	D79	PEG_TX8-
C25	DDI1_PAIR4 +	D25	RSVD	C80	GND(FIXED)	D80	GND(FIXED)
C26	DDI1_PAIR4-	D26	DDI1_PAIR0+	C81	PEG_RX9+	D81	PEG_TX9+

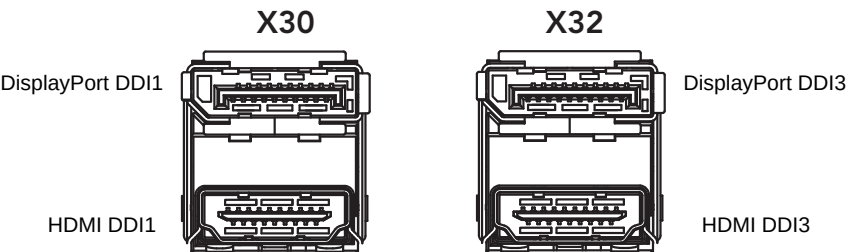


Pin	Row C	Pin	Row D	Pin	Row C	Pin	Row D
C27	RSVD	D27	DDI1_PAIR0-	C82	PEG_RX9-	D82	PEG_TX9-
C28	RSVD	D28	RSVD	C83	TPM_PP	D83	RSVD
C29	DDI1_PAIR5+	D29	DDI1_PAIR1+	C84	GND	D84	GND
C30	DDI1_PAIR5-	D30	DDI1_PAIR1-	C85	PEG_RX10+	D85	PEG_TX10+
C31	GND(FIXED)	D31	GND(FIXED)	C86	PEG_RX10-	D86	PEG_TX10-
C32	DDI2_CTRLCLK_AUX+	D32	DDI1_PAIR2+	C87	GND	D87	GND
C33	DDI2_CTRLDATA_AUX-	D33	DDI1_PAIR2-	C88	PEG_RX11+	D88	PEG_TX11+
C34	DDI2_DDC_AUX_SEL	D34	DDI1_DDC_AUX_SEL	C89	PEG_RX11-	D89	PEG_TX11-
C35	RSVD	D35	RSVD	C90	GND(FIXED)	D90	GND(FIXED)
C36	DDI3_CTRLCLK_AUX+	D36	DDI1_PAIR3+	C91	PEG_RX12+	D91	PEG_TX12+
C37	DDI3_CTRLDATA_AUX-	D37	DDI1_PAIR3-	C92	PEG_RX12-	D92	PEG_TX12-
C38	DDI3_DDC_AUX_SEL	D38	RSVD	C93	GND	D93	GND
C39	DDI3_PAIR0+	D39	DDI2_PAIR0+	C94	PEG_RX13+	D94	PEG_TX13+
C40	DDI3_PAIR0-	D40	DDI2_PAIR0-	C95	PEG_RX13-	D95	PEG_TX13-
C41	GND(FIXED)	D41	GND(FIXED)	C96	GND	D96	GND
C42	DDI3_PAIR1+	D42	DDI2_PAIR1+	C97	RSVD	D97	RSVD
C43	DDI3_PAIR1-	D43	DDI2_PAIR1-	C98	PEG_RX14+	D98	PEG_TX14+
C44	DDI3_HPD	D44	DDI2_HPD	C99	PEG_RX14-	D99	PEG_TX14-
C45	RSVD	D45	RSVD	C100	GND(FIXED)	D100	GND(FIXED)
C46	DDI3_PAIR2+	D46	DDI2_PAIR2+	C101	PEG_RX15+	D101	PEG_TX15+
C47	DDI3_PAIR2-	D47	DDI2_PAIR2-	C102	PEG_RX15-	D102	PEG_TX15-
C48	RSVD	D48	RSVD	C103	GND	D103	GND
C49	DDI3_PAIR3+	D49	DDI2_PAIR3+	C104	VCC_12V	D104	VCC_12V
C50	DDI3_PAIR3-	D50	DDI2_PAIR3-	C105	VCC_12V	D105	VCC_12V
C51	GND(FIXED)	D51	GND(FIXED)	C106	VCC_12V	D106	VCC_12V
C52	PEG_RX0+	D52	PEG_TX0+	C107	VCC_12V	D107	VCC_12V
C53	PEG_RX0-	D53	PEG_TX0-	C108	VCC_12V	D108	VCC_12V
C54	TYPE0#	D54	PEG_LANE_RV#	C109	VCC_12V	D109	VCC_12V
C55	PEG_RX1+	D55	PEG_TX1+	C110	GND(FIXED)	D110	GND(FIXED)



6.2 DP++ and HDMI Ports

The conga-IT6/COMe provides two stacked connectors (X30, X32) with one DP++ and HDMI port each.



You can only use one port of each stacked connector. If your BIOS does not support auto selection, you must set the active port in BIOS.

6.3 PCI Express® Interfaces

The conga-IT6/COMe provides the following options for the PCI Express® lanes:

Table 28 PCI Express® Lane Assembly Options

Interface	PCI Express® Lanes							
	PCIe 0	PCIe 1	PCIe 2	PCIe 3	PCIe 4	PCIe 5	PCIe 6	PCIe 7
Gigabit Ethernet			x1				x1	
M.2 Key B 2242 / 3042 Slot					x2			
PCI Express® Mini Card Slot (Top)	x1							
PCI Express® Graphics (PEG) Card Slot	x4							



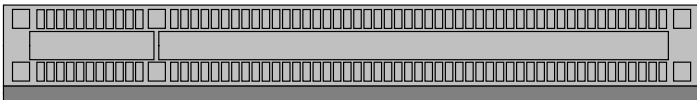
Interfaces with overlapping PCI Express® lanes are mutually exclusive.



6.3.1 PCI Express® Graphics (PEG) Card Slot

The conga-IT6/COMe provides a PCI Express® Graphics (PEG) x16 card slot (X8).

X8



Connector Type

X8: PCI Express® 3.0 x16 card slot

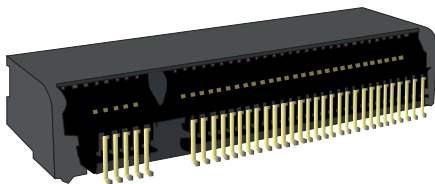
6.3.2 M.2 Card Slot

The conga-IT6/COMe provides an M.2 Key B 3042 / 2242 card slot (X10).

Table 29 X10 Pinout Description

Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_PWROFF#
7	USB_D+	8	W_DISABLE_1#
9	USB_D-	10	LED1 (optional)
11	GND	12	Key
13	Key	14	
15		16	
17		18	
19		20	N.C
21	CONFIG_0	22	N.C
23	WoWWAN#	24	N.C
25	N.C	26	W_DISABLE_2#
27	GND	28	N.C

X10





Pin	Signal	Pin	Signal
29	PER1-	30	UIM_RESET
31	PER1+	32	UIM_CLK
33	GND	34	UIM_DATA
35	PET1-	36	UIM_PWR
37	PET1+	38	DEVSLP
39	GND	40	GNSS_SCL
41	PER0-/SATA_B+	42	GNSS_SDA
43	PER0+/SATA_B-	44	GNSS_IRQ
45	GND	46	N.C
47	PET0-/SATA_A-	48	N.C
49	PET0+/SATA_A+	50	RESET#
51	GND	52	CLKREQ#
53	REFCLK-	54	PEWAKE#
55	REFCLK+	56	N.C
57	GND	58	N.C
59	N.C	60	N.C
61	N.C	62	N.C
63	N.C	64	N.C
65	N.C	66	N.C
67	RESET#	68	SUSCLK
69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		



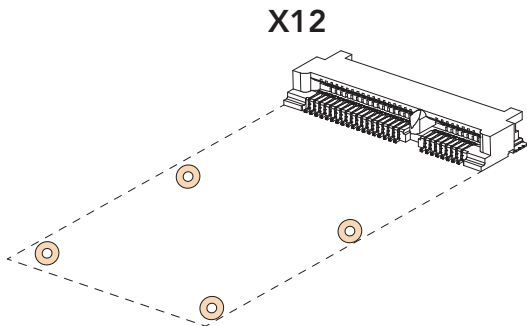
Connector Type

X10: M.2 Key B 3042 / 2242 card slot



6.3.3 PCI Express® Mini Card Slots

The conga-IT6/COMe provides one PCI Express® Mini card slot (X12).



Connector Type

X12: PCI Express® Mini card slot

6.3.4 Micro-SIM Card Slot

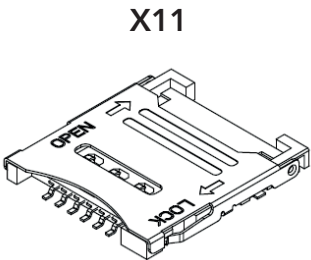
The conga-IT6/COMe provides a micro-SIM card slot (X11) routed to the M.2 card slot (X10) by default. Optionally, the micro-SIM card slot (X11) can be routed to the PCI Express® Mini card slot (X12) instead.

Table 30 X11 Pinout Description

Pin	Signal	Description
C1	PWR	Power
C2	RST	Reset
C3	CLK	Clock
C4	N.A	Not available
C5	GND	Ground
C6	VPP	Programming voltage input
C7	I/O	Data
C8	N.A	Not available

Connector Type

X11: Micro-SIM card slot

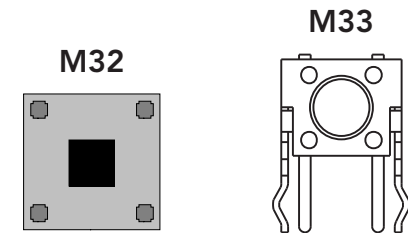




7 Additional Features

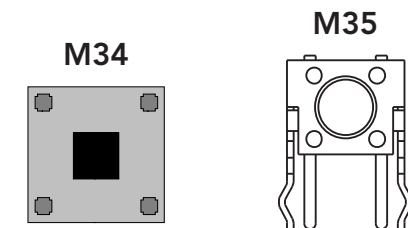
7.1 Power Buttons

The conga-IT6/COMe provides one power button (M32) by default. Optionally, the conga-IT6/COMe can provide an additional power button (M33). The optional LED D30 at the board edge is lit when the system is powered on.



7.2 Reset Buttons

The conga-IT6/COMe provides one reset button (M34). Optionally, the conga-IT6/COMe can provide an additional reset button (M35). The COM Express™ module and all connected components will perform a hard reset when either button is pressed. The reset buttons are connected to the COM Express™ module's SYS_RESET# signal.



7.3 Beeper

The conga-IT6/COMe provides a beeper (M27). It provides audible error code (beep code) information during POST. The beeper is connected to the COM Express™ module's SPEAKER signal.

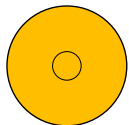




7.4 Ground Potential Test Points

The conga-IT6/COMe provides two ground potential test points (M12, M13). These test points make it easier to connect oscilloscope probes and/or multimeter lines to ground when performing measurements on the COM Express™ module.

M12, M13



7.5 Fan Headers and Power Selection Jumpers

The conga-IT6/COMe provides a CPU fan header (X41) and system fan header (X43). Use jumper X40 to set the voltage of the CPU fan. Use jumper X42 to set the voltage of the system fan. You can select either 5 V or 12 V for each fan.

Table 31 X41, X43 Pinout Description

X41, X43 Pin	Signal
1	GND
2	VCC +5VDC/+12VDC
3	FAN_TACHOIN
4	FAN_CTRL

X41, X43

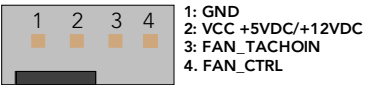


Table 32 X40, X42 Pinout Description

Jumper X40, X42	Configuration
1 - 2	FAN +12VDC (default)
2 - 3	FAN +5VDC

X40 , X42



Connector Type

X41, X43: 4x1 pins, 2.54 mm pitch

X40, X42: 3x1 pins, 2.54 mm pitch



7.6 Front Panel Header

The conga-IT6/COMe provides a front panel header (X39).

Table 33 X39 Pinout Description

Pin	Signal	Description
1	HDD_POWER_LED+	Hard disk activity LED (anode)
2	FP_LED+	Power LED (main color)
3	HDD_LED	Hard disk activity LED (cathode)
4	FP_LED-	Power LED (alternate color)
5	GND	Ground
6	PWRBTN#	Power Button
7	SYS_RST#	Reset Button
8	GND	Ground
9	+V5S	+5V power supply (500mA power budget)
10	KEY	No pin



Connector Type

X39: 5x2 pins, 2.54 mm pitch





7.7 Feature Connector

Table 34 X38 Pinout Description

Pin	Signal	Description	Pin	Signal	Description
1	+V5	5V supply	2	GND	Power Ground
3	LAD0	LPC command, address, data 0	4	LAD1	LPC command, address, data 1
5	LAD2	LPC command, address, data 2	6	LAD3	LPC command, address, data 3
7	LFRAME#	LPC frame (start of cycle)	8	SERIRQ	Serial Interrupt Request
9	LPC_CLK	25MHz clock signal for external LPC device	10	BUF_PLT_RST#	
11	SMB_DATA	System Management Bus bidirectional data line.	12	SMB_CLK	System Management Bus bidirectional clock line.
13	SMB_ALERT#	System Management Bus Alert.	14	GND	Power Ground
15	internal use		16	internal use	
17	GPO0	General Purpose Output 0	18	GPO1	General Purpose Output 1
19	GPO2	General Purpose Output 2	20	GPO3	General Purpose Output 3
21	SER0_TX	COM module's serial port 0 transmit line	22	N.C	Not Connected
23	SER1_TX	COM module's serial port 1 transmit line	24	N.C	Not Connected
25	GPI0	General Purpose Input 0	26	GPI1	General Purpose Input 1
27	GPI2	General Purpose Input 2	28	GPI3	General Purpose Input 3
29	SER0_RX	COM module's serial port 0 receive line	30	N.C	Not Connected
31	SER1_RX	COM module's serial port 1 receive line	32	N.C	Not Connected
33	PM_SLP_S3#	Suspend to RAM state. Active low output.	34	PM_SLP_S5#	Indicates systems is in soft off state.
35	PM_SLP_S4#	Suspend to Disk state. Active low output.	36	LID_BTN#	Module input signal, generation a LID close or open event.
37	SLP_BTN#	Sleep signal, to bring system to a predefined sleep state	38	PM_THRM#	Input from off-module temp sensor indicating an over-temp situation.
39	WDOUT	Watchdog event output	40	N.C	Not Connected
41	I2C_DAT	General purpose I ² C port data I/O line	42	PWR_OK	Power OK from main power supply. A high value indicates that the power is good.
43	SPI_CS#	SPI chip select	44	I2C_CLK	General purpose I ² C port clock output
45	SPI_SO	SPI serial output	46	BIOS_DISABLE#	Determine the boot device.
47	SPI_CLK	SPI flash clock input	48	SPI_MOSI	SPI flash data input
49	+V5_SBY	5V standby supply	50	GND	Power Ground

X38

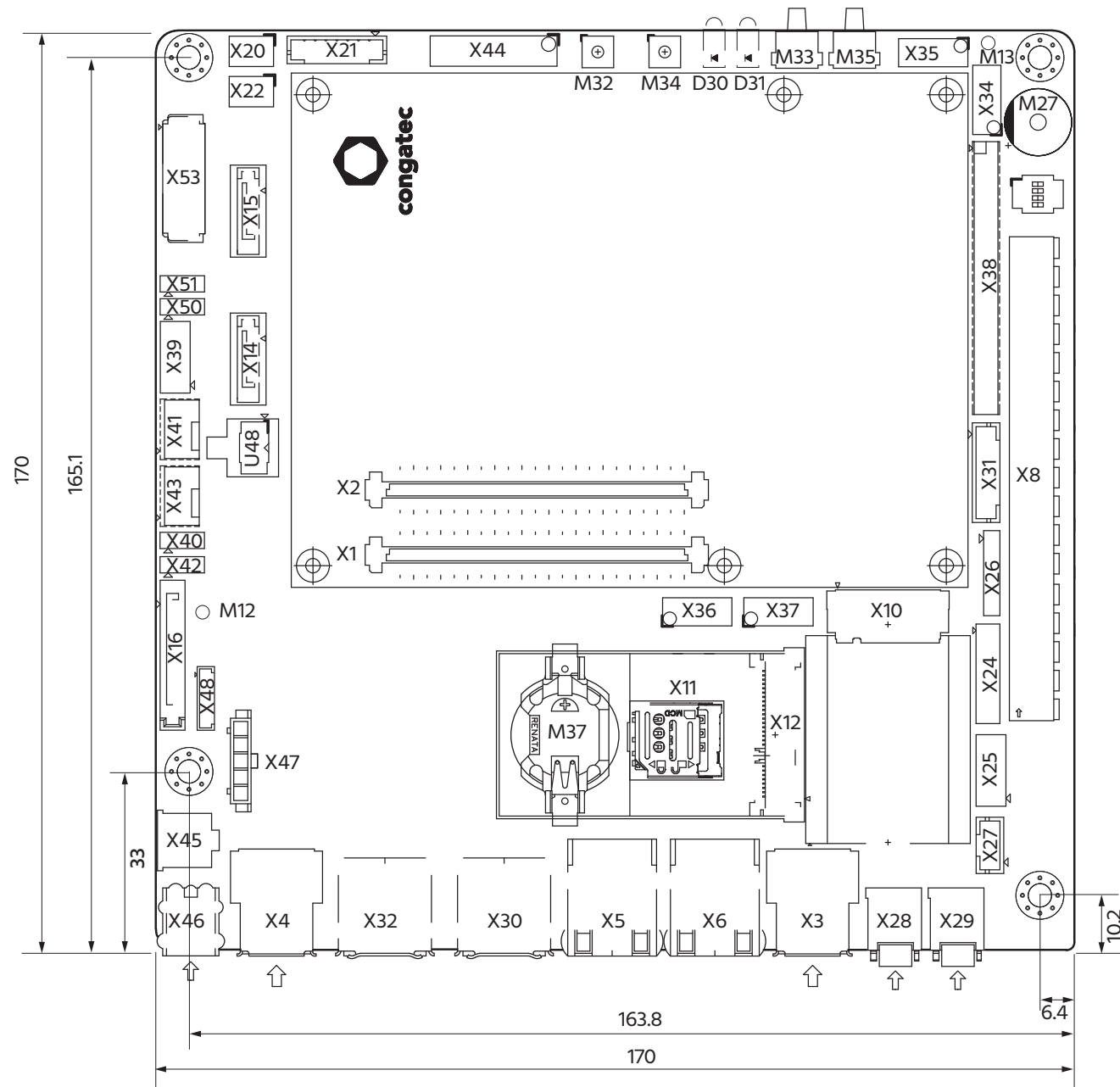


Connector Type

X38: 22x2 pins, 2.54 mm pitch



8 Mechanical Dimensions





9 Industry Specifications

The list below provides links to industry specifications as reference material.

Specification	Link
PICMG® COM Express Module™ Base Specification	http://www.picmg.org/
PCI Express Base Specification	http://www.pcisig.com/specifications
Universal Serial Bus (USB) Specification	http://www.usb.org/home
Serial ATA Specification	http://www.serialata.org
Low Pin Count Interface Specification (LPC)	http://developer.intel.com/design/chipsets/industry/lpc.htm
High Definition Audio Specification	http://www.intel.com/content/www/us/en/standards/high-definition-audio-specification.html
LVDS Owner's Manual	http://www.ti.com/lit/ml/snla187/snla187.pdf
Extended Display Identification Data Standard (EDID™)	http://www.vesa.org
Enhanced Display Data Channel Specification (DDC)	http://www.vesa.org
IEEE standard 802.3ab 1000BASE T Ethernet	http://www.ieee.org/portal/site
Advanced Configuration and Power Interface Specification	http://www.acpi.info/