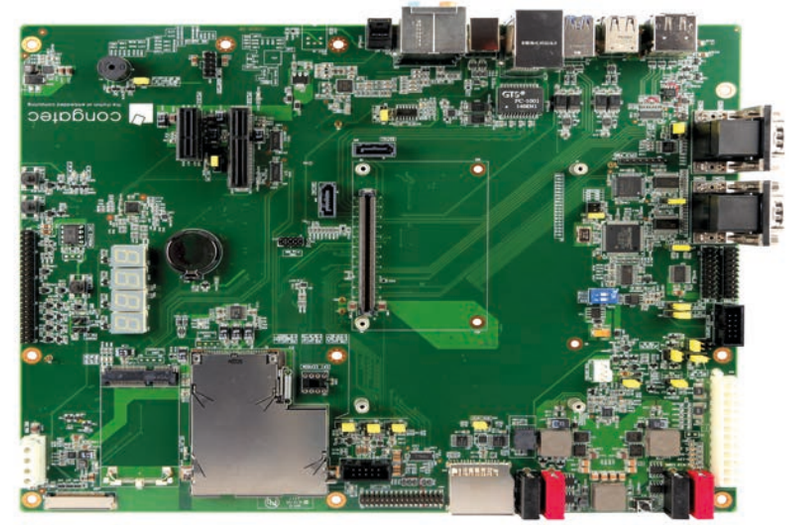

COM Express™ conga-MEVAL

Detailed description of the congatec COM Express™ Type 10 evaluation carrier board

User's Guide

Revision 1.1

Revision History

Revision	Date (yyyy.mm.dd)	Author	Changes
1.0	2014.10.03	AEM	• Official release.
1.1	2016.03.30	AEM	• Corrected DIP M13 table in section 5.2.5 “SPI Flash”. • Updated the whole document.

Preface

This user's guide provides information about the components, features and connectors available on the congatec COM Express™ Type 10 evaluation carrier board.

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Symbols

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

Warning

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

Caution

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

Note

Notes call attention to important information that should be observed.

Connector Type

Describes the connector that must be used with the conga-MEVAL evaluation carrier board, not the connector found on the conga-MEVAL 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 conga-MEVAL connector layout diagram.

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Terminology

Term	Description
GB	Gigabyte (1,073,741,824 bytes)
GHz	Gigahertz (one billion hertz)
kB	Kilobyte (1024 bytes)
MB	Megabyte (1,048,576 bytes)
Mbit	Megabit (1,048,576 bits)
kHz	Kilohertz (one thousand hertz)
MHz	Megahertz (one million hertz)
I²C Bus	Inter-Integrated Circuit Bus
PCIe	PCI Express
SATA	Serial ATA
DDC	Display Data Channel
SPI Bus	Serial Peripheral Bus
LVDS	Low-Voltage Differential Signaling
Gbe	Gigabit Ethernet
eMMC	Embedded Multi-media Controller
SM Bus	System Management Bus
LPC	Low Pin-Count Interface
HDA	High Definition Audio
cBC	congatec Board Controller
I/F	Interface
N.C.	Not connected
N.A.	Not available
TBD	To be determined

Contents

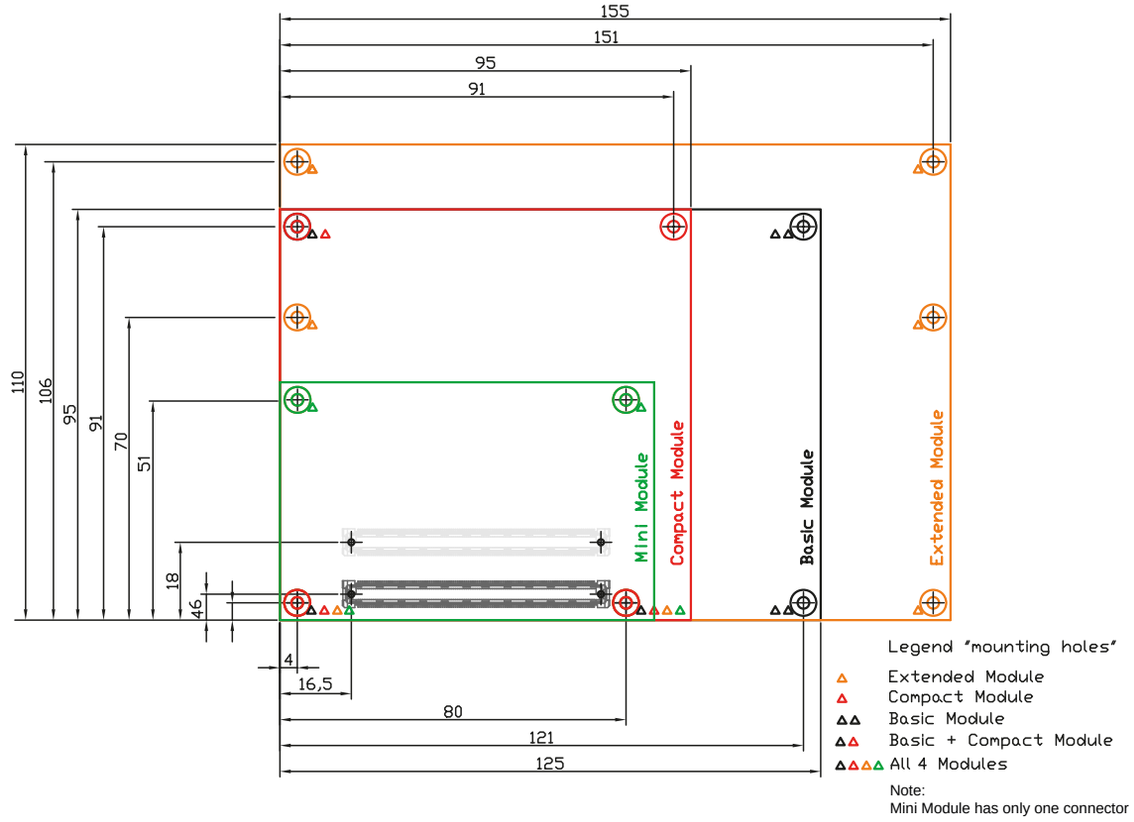
1 COM Express™ Specification Overview

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. COM Express™ modules are available in following form factors:

- Mini 84mm x 55mm
- Compact 95mm x 95mm
- Basic 125mm x 95mm
- Extended 155mm x110mm

Compact, Basic and Extended Form Factor



The COM (computer on module) integrates all the core components and is mounted onto an application specific carrier board. COM modules are legacy-free design (no Super I/O, PS/2 keyboard and mouse) and provide 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 2.0, and Gigabit Ethernet. The Type 10 pinout provides the ability to offer PCI Express, Serial ATA, and LPC options thereby expanding the range of potential peripherals. The robust thermal and mechanical concept, combined with extended power-management capabilities, is perfectly suited for all applications.

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 Module Types Overview

The COM Express™ specification 2.1 defines seven different pinout types.

COM Express™ Specification 2.1 Pinout Types Definitions

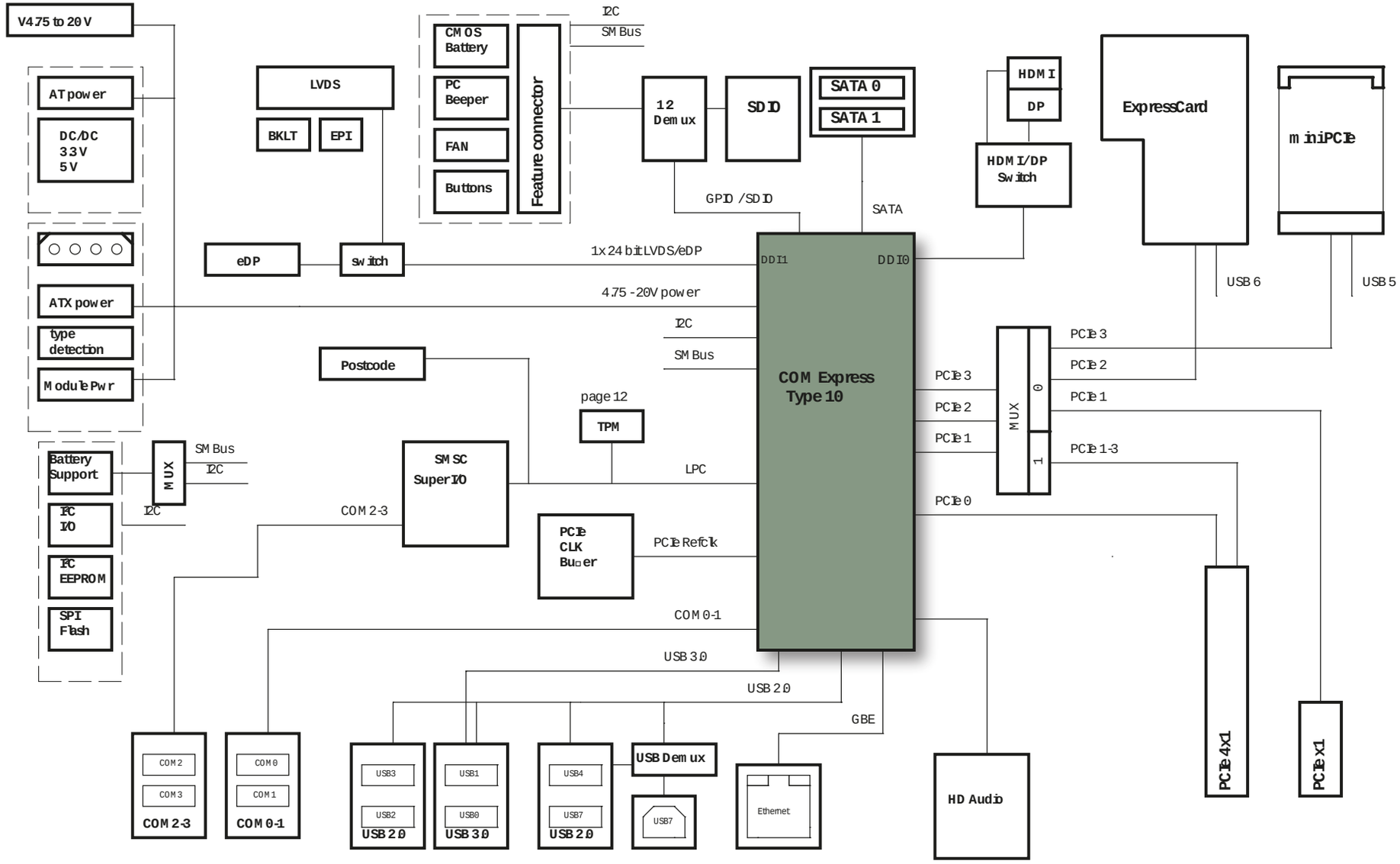
Types	Connector Rows	PCI Express Lanes	PEG/ SDVO	PCI	IDE Ports	SATA Ports	LAN Ports	USB 2.0/ SuperSpeed USB	Display Interfaces
Type 1	A-B	Up to 6				4	1	8/0	VGA, LVDS
Type 2	A-B C-D	Up to 22	1/2	32 bit	1	4	1	8/0	VGA, LVDS, PEG/SDVO
Type 3	A-B C-D	Up to 22	1/2	32 bit		4	3	8/0	VGA, LVDS, PEG/SDVO
Type 4	A-B C-D	Up to 32	1/2		1	4	1	8/0	VGA, LVDS, PEG/SDVO
Type 5	A-B C-D	Up to 32	1/2			4	3	8/0	VGA, LVDS, PEG/SDVO
Type 6	A-B C-D	Up to 24	1/-			4	1	8/4	3xDDI, PEG, VGA, LVDS/eDP
Type 10	A-B	Up to 4	-/1			2	1	8/0	1xDDI, LVDS/eDP

The conga-MEVAL evaluation board uses the Type 10 pinout definition. The Type 10 pinout features the following:

- Single 220 pin connector (A-B)
- Up to 8 USB 2.0 ports
- Up to 2 USB 3.0 ports

- Up to 2 Serial ATA
- Up to 4 PCI Express lanes (Gen1/Gen2)
- Support pins for up to 2 ExpressCards
- Single 24-bit LVDS channels with option to overlay with eDP
- 1 DDI interface
- HDA/AC ‘97 digital audio interface
- Gigabit Ethernet
- LPC interface
- 2 TX/RX serial pairs
- SPI
- Fan control
- TPM support
- 8 GPIO pins or 4 bit SDIO card interface

2 Block Diagram

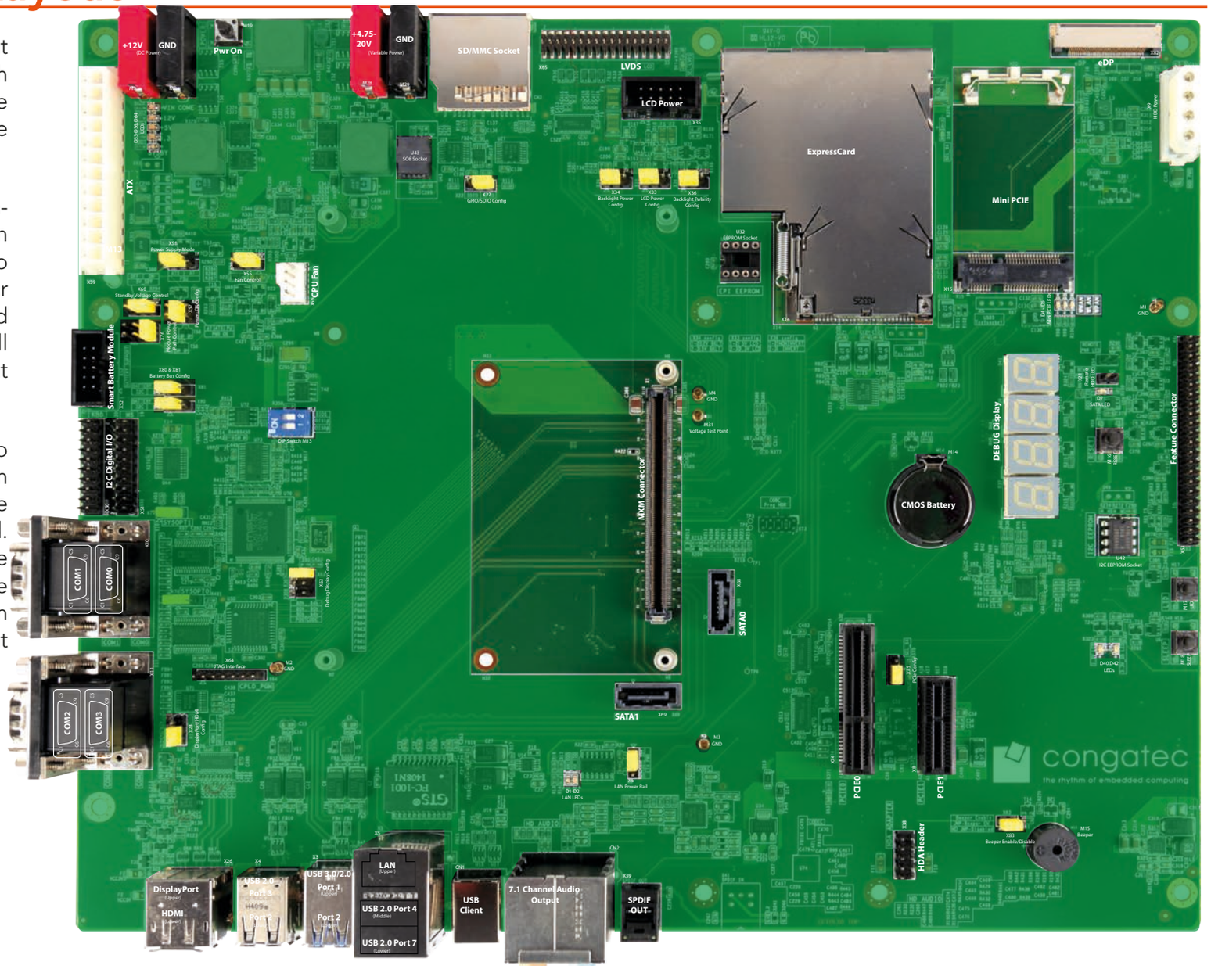


3 Connector Layout

The connector layout picture shows each connector and its name designator. Jumpers 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 that 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.



4 Specifications

4.1 Mechanical Dimensions

- 294mm x 244mm
- Height approximately 43mm (top side)

4.2 Environmental Specifications

Temperature	Operation: -40° to +85°C	Storage: -45° to +85°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 board's surface.

Humidity specifications are for non-condensing conditions.

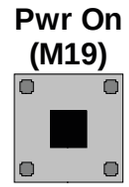
4.3 Power Supply

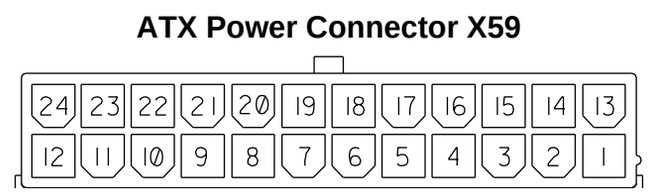
You can power the conga-MEVAL with a standard 24 pin ATX power supply (Connector X59), a 12V DC power supply (connector M22 and M23) or a variable input power supply (connector M29 and M30)

4.3.1 AT/ATX Power Supply

When the conga-MEVAL is powered with an ATX power supply, the COM Express™ module starts after the power-on button M19 is pressed. The ATX power supply can also be used in AT mode. In this case the module starts after the power switch on the power supply is turned on. To run the ATX power supply in AT mode, set Jumper X58 to position 2-3.

Jumper X58	Configuration
1-2	ATX Power supply (default)
2-3	ATX Power supply runs in AT mode





Connector Type

X58: 2.54mm grid jumper

X5: 24-pin ATX 2.0 power connector

When using an ATX power supply, the +3.3V and +5V used by some devices on the COM Express™ evaluation carrier board are derived from the ATX power supply. If a 12V DC power supply is used via connectors M22 and M23, the onboard DC/DC regulator will generate the 3.3V and 5V. The -5V power output of the ATX power supply is not used.

With jumper X60, you can disconnect the 5V standby voltage from the whole system.

Jumper X60	Configuration
1-2	5V Standby Connected (Default)
2-3	5V Standby Disconnected

Standby Voltage Control
Jumper X60

Connector Type

X60: 2.54mm grid jumper

Even though it is strongly recommended to use an ATX 2.0 compliant with a 24 pin power connector, usage of ATX 1.1 compliant power supplies with 20 pin connector is still possible.

The following table lists the pinout for connector X59.

Pin	Signal	Description	Pin	Signal	
1	+3.3V	Power Supply +3.3VDC	13	+3.3V	Power Supply +3.3VDC
2	+3.3V	Power Supply +3.3VDC	14	-12V	Power Supply -12VDC
3	GND	Power Ground	15	GND	Power Ground
4	+5V	Power Supply +5VDC	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 +5VDC	18	GND	Power Ground
7	GND	Power Ground	19	GND	Power Ground
8	PWR_OK	Power Ok: A status signal generated by the power supply to notify the computer that the DC operating voltages are within the ranges required for proper computer operation.	20	N.C.	Not Connected
9	5V_SB	Standby Power Supply +5VDC	21	+5V	Power Supply +5VDC

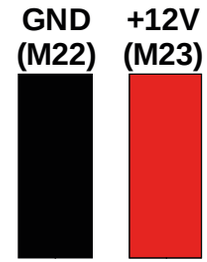
10	+12V	Power Supply +12VDC	22	+5V	Power Supply +5VDC
11	+12V	Power Supply +12VDC	23	+5V	Power Supply +5VDC
12	+3.3V	Power Supply +3.3VDC	24	GND	Power Ground

Note

Do not use both the 12V DC and the ATX power supplies at the same time

4.3.2 DC Power Supply

The conga-MEVAL can also be powered with a 12V DC power supply (connector M22 and M23).



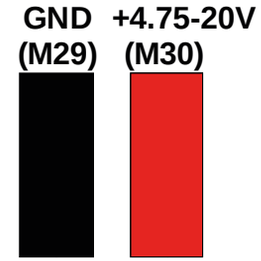
Connector	Configuration
M22	Ground
M23	+12VDC (11,4 – 12,6V)

Connector Type

4mm diameter plug

4.3.3 Variable Power Input

The conga_MEVAL is capable of supplying separate variable power to the module. The input voltage varies between +4.75V and 20V.



Connector	Configuration
M29	Ground
M30	+4.75 - 20V

Connector Type

4mm diameter plug

With Jumper X76, you can select the input voltage of the COM Express module. Set the jumper to position 1-2 to run the COM Express module on 12V supply from the carrier board. Set the jumper to position 2-3 to run the COM Express module on the variable voltage from connectors M29 and M30. Module standby voltage if available is supplied by conga-MEVAL.

Jumper X76	Configuration
1-2	Force COM Express module to run on the on-carrier 12V supply (Default)
2-3	Force COM Express module to run on external 4.75 - 20 V supply

Module Power Path Control

Jumper X76

Connector Type

X76: 2.54mm grid jumper

Note

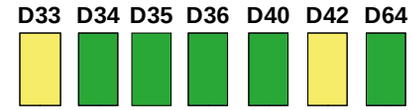
With variable power input, you can easily measure the module power. To enable variable voltage power to the module, the conga-MEVAL power must be on.

4.3.4 Status LEDs

The status LEDs indicate the different power states of the conga-MEVAL. Refer to the following table for detailed information:

D33= standby 5V, D34= 12 V, D35= 5V, D36= 3.3V, D40= 1.5V, D42= 3.3V Standby, D64 =Vin_CA

LEDs	Power state
All Off	No power applied.
D33 and D42	The yellow LEDs D33 and D42 indicate that the ATX power supply is mechanically switched on. D33 indicates that 5V standby power is applied to the conga-MEVAL. D42 indicates that 3.3V standby power is applied to the conga-MEVAL
D34, D35, D36, D40	D34 indicates that 12V is present. D35 indicates that 5V is present D36 indicates that 3.3V is present D40 indicates that 1.5V is present
D42	D42 indicates that onboard 3.3V standby is present.
D64	Indicates that power is delivered to the COM Express module
All On	ATX power supply is running and 1.5V, 3.3V, 3.3V Standby, 5V, 5V Standby and 12V are present.

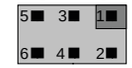


4.3.5 PWR_OK Signal

The COM Express™ specification defines the signal PWR_OK, which is a HIGH active input from the main power supply to the module and indicates whether the power is good.

Jumper X57	Configuration
1 - 2	Add 3.3V Pullup with 1kΩ to signal PWR_OK.
3 - 4	PWR_OK of ATX power supply. (default)
5 - 6	PWR_OK of onboard DC/DC regulator (only in single 12V mode)

PWR_OK Config. (X57)



Connector Type

X57: 2.54mm grid jumper

4.3.6 Power-Up Control

The Power-up control switches the ATX power supply on or off. The native system power-up support of congatec modules uses the 'SUS_S3#' signal to control the 'PS_ON#' signal, which is used to switch the ATX power supply on or off. The COM Express™ module is can support Suspend to RAM (S3) when SUS_S3#' signal is used.

When the system goes to Suspend to RAM (S3) or Soft Off (S5), the chipset of the module asserts the 'SUS_S3#' signal. Through the use of an inverter, the low active 'PS_ON#' signal goes high and switches off the ATX power supply. Vice versa, if the system resides in a power-down system state, any system wake-up event invokes the chipset of the module to deassert the 'SUS_S3#' signal. This transitions the system to Full On (S0).

4.3.7 Module Type Detection

The COM Express™ Specification includes four signals to determine the pinout type of the module connected to the carrier board. The pins 'TYPE0#', 'TYPE1#', 'TYPE2#' and 'TYPE10#' are either left open (N.C.), strapped to ground (GND) or connected to 12V by the module to encode the pinout type according to the following table. For more information about this subject refer to the COM Express™ Specification.

Module	Pin TYPE0#	Pin TYPE1#	Pin TYPE2#	Pin TYPE1 #	Comment
Module Type 1	X (don't care)	X (don't care)	X (don't care)	12V / N.C.	COM.0 Rev 1.0 / 2.0
Module Type 10	X (don't care)	X (don't care)	X (don't care)	47k PD	COM.0 Rev 2.0
Module Type 2	N.C.	N.C.	N.C.	12V / N.C.	COM.0 Rev 1.0 / 2.0
Module Type 3	N.C.	N.C.	GND	12V / N.C.	COM.0 Rev 1.0 / 2.0
Module Type 4	N.C.	GND	N.C.	12V / N.C.	COM.0 Rev 1.0 / 2.0

Module Type 5	N.C.	GND	GND	12V / N.C.	COM.0 Rev 1.0 / 2.0
Module Type 6	GND	N.C.	N.C.	N.C.	COM.0 Rev 2.0

Note

If an incompatible module pinout type is detected on the conga-MEVAL, an onboard logic will prevent the board from powering up the whole system by controlling the 'PS_ON#' signal of the ATX power supply.

4.4 CMOS Battery

The conga-MEVAL includes a battery that supplies the RTC and CMOS memory of the COM Express™ CPU module. The battery needs to provide a 3V of power. The specified battery type is BR2032.

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.

To fulfill the requirements of the EN60950, the conga-MEVAL incorporates two current-limiting devices (resistor and diode) in the battery power supply path.

CMOS Battery Holder (M14)

5 Connector Descriptions

5.1 Connector Pinout Rows A and B

Module Type 10 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	RSVD	B56	RSVD
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	eDP_TX2+/LVDS_A0+	B71	DDI0_PAIR0+
A17	SATA0_TX-	B17	SATA1_TX-	A72	eDP_TX2-/LVDS_A0-	B72	DDI0_PAIR0-
A18	SUS_S4#	B18	SUS_STAT#	A73	eDP_TX1+/LVDS_A1+	B73	DDI0_PAIR1+
A19	SATA0_RX+	B19	SATA1_RX+	A74	eDP_TX1-/LVDS_A1-	B74	DDI0_PAIR1-
A20	SATA0_RX-	B20	SATA1_RX-	A75	eDP_TX0+/LVDS_A2+	B75	DDI0_PAIR2+
A21	GND(FIXED)	B21	GND(FIXED)	A76	eDP_TX0-/LVDS_A2-	B76	DDI0_PAIR2-
A22	USB_SSRX0-	B22	USB_SSTX0-	A77	eDP/LVDS_VDD_EN	B77	DDI0_PAIR4+ (*)
A23	USB_SSRX0+	B23	USB_SSTX0+	A78	LVDS_A3+	B78	DDI0_PAIR4- (*)
A24	SUS_S5#	B24	PWR_OK	A79	LVDS_A3-	B79	eDP/LVDS_BKLT_EN
A25	USB_SSRX1-	B25	USB_SSTX1-	A80	GND(FIXED)	B80	GND(FIXED)
A26	USB_SSRX1+	B26	USB_SSTX1+	A81	eDP_TX3+/LVDS_A_CK+	B81	DDI0_PAIR3+

Pin	Row A	Pin	Row B	Pin	Row A	Pin	Row B
A27	BATLOW#	B27	WDT	A82	eDP_TX3-/LVDS_A_CK-	B82	DDI0_PAIR3-
A28	(S)ATA_ACT#	B28	AC/HDA_SDIN2 (*)	A83	eDP_AUX+/LVDS_I2C_CK	B83	eDP/LVDS_BKLT_CTRL
A29	AC/HDA_SYNC	B29	AC/HDA_SDIN1 (*)	A84	eDP_AUX-/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	eDP_HPD	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	DD0_HPD
A35	THRMTRIP#	B35	THRM#	A90	GND(FIXED)	B90	GND(FIXED)
A36	USB6-	B36	USB7-	A91	SPI_POWER	B91	DDI0_PAIR5+ (*)
A37	USB6+	B37	USB7+	A92	SPI_MISO	B92	DDI0_PAIR5- (*)
A38	USB_6_7_OC#	B38	USB_4_5_OC#	A93	GPO0	B93	DDI0_PAIR6+ (*)
A39	USB4-	B39	USB5-	A94	SPI_CLK	B94	DDI0_PAIR6- (*)
A40	USB4+	B40	USB5+	A95	SPI_MOSI	B95	DDI0_DDC_AUX_SEL
A41	GND(FIXED)	B41	GND(FIXED)	A96	TPM_PP	B96	RSVD
A42	USB2-	B42	USB3-	A97	TYPE10#	B97	SPI_CS#
A43	USB2+	B43	USB3+	A98	SER0_TX	B98	DDI0_CTRLCLK_AUX+
A44	USB_2_3_OC#	B44	USB_0_1_OC#	A99	SER0_RX	B99	DDI0_CTRLDATA_AUX-
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	RSVD	B52	RSVD	A107	VCC_12V	B107	VCC_12V
A53	RSVD	B53	RSVD	A108	VCC_12V	B108	VCC_12V
A54	GPI0	B54	GPO1	A109	VCC_12V	B109	VCC_12V
A55	RSVD	B55	RSVD	A110	GND(FIXED)	B110	GND(FIXED)

5.2 COM Express™ Connector Rows A&B

5.2.1 SM Bus

The SM Bus signals are available on the feature connector (X53) described in section 6.9 of this document.

On the COM Express™ module, the System Management Bus (SMB) is powered by the standby power rail in order to have control over the system during the system states S0-S5. The devices on the conga-MEVAL (e.g. PCI Express clock buffer or PCI Express connectors) using the SMB are normally powered by the 3.3V main power. To avoid current leakage between the main power of the carrier board and the standby power of the module, the SMB on the conga-MEVAL is separated by a FET switch from the SMB of the module.

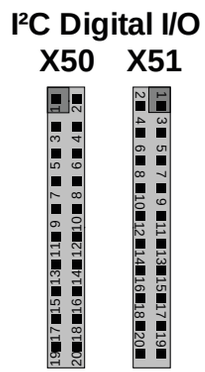
5.2.2 I²C Bus

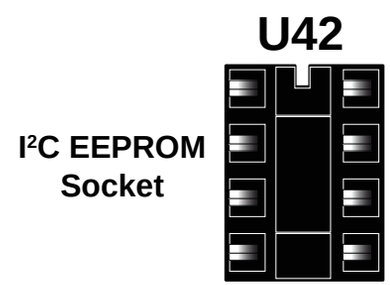
The I²C signals are available in different locations on the conga-MEVAL including the feature connector (X53) described in section 6.9 of this document.

The conga-MEVAL includes a socket for an I²C EEPROM (U42) that can be used for test purposes during the system development. This 8 pin DIP socket can be used with different 2-wire serial EEPROMS (for example 24C04 / 08 / 16 ...) and can be accessed easily by using the I²C control commands implemented in the congatec CGOS API driver. Refer to the COM Express™ module's user's guide and CGOS manual for details.

Furthermore, the conga-MEVAL includes an I²C application implemented by a PCA9555 device from Philips, a 16-bit I²C I/O port with interrupt. This device provides 16 bits of general purpose parallel Input/Output (GPIO) expansion for I²C applications. It provides the ability to read different byte configurations via the I²C digital I/O jumper connectors X50 and X51.

Contact the congatec AG support team for more information.





5.2.3 AC'97/HDA Audio

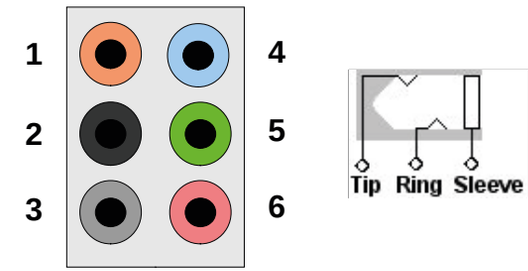
COM Express™ modules can support up to 3 audio codecs in parallel. The onboard audio codec is connected to AC_SDIN0. AC_SDIN2 is available at the HDA header (X38).

The conga-MEVAL has a HDA audio codec (Cirrus CS4207) mounted on it. The 7.1 audio output interface of this codec is available on connector CN2 described below. The Windows driver for this audio codec can be found at www.congatec.com in the 'Products' section under 'Accessories'.

Connector CN2 Pinout

Stereo Jack 1	Signal	Stereo Jack 4	Signal
Tip	Microphone Input 1 with Power (Left)	Tip	Line Input 1 Left
Ring	Microphone Bias Voltage	Ring	Line Input 1 Right
Sleeve	Analog Ground	Sleeve	Analog Ground
Stereo Jack 2	Signal	Stereo Jack 5	Signal
Tip	Line Output 2 Left	Tip	Line Output 1 Left
Ring	Line Output 2 Right	Ring	Line Output 1 Right
Sleeve	Analog Ground	Sleeve	Analog Ground
Stereo Jack 3	Signal	Stereo Jack 6	Stereo Mode
Tip	Headphone Output Left	Tip	Microphone Input 1 Left
Ring	Headphone Output Right	Ring	Microphone Input 1 Right
Sleeve	Analog Ground	Sleeve	Analog Ground

Audio (CN2)



Connector Type

CN2: 6 dedicated 3.5mm audio jacks (7.1 channel)

With connector X39, you can connect the conga-MEVAL to an audio system that has an optical S/PDIF interface.

Connector Type

X39: S/PDIF optical audio output

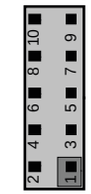
S/PDIF OUT (X39)

5.2.3.1 HDA Header

The conga-MEVAL provides an HDA header (X38) for connecting AC'97/HDA modules. By attaching a module to this connector, the onboard codec switches off and the connected application begins operation.

Connector X38 Pinout

HDA Header (X38)



Pin	Signal	Description	Pin	Signal	Description
1	+12V (750 mA fuse)	Power Supply +12VDC	2	+3.3V (750 mA fuse)	Power Supply +3.3VDC
3	HDA/AC_SYNC	48kHz fixed-rate, sample-synchronization signal to the CODEC(s).	4	HDA/AC_RST#	Reset output to AC'97 CODEC, active low.
5	HDA/AC_SDIN2	Serial TDM data inputs from up to 3 CODECs.	6	HDA/AC_BITCLK	12.228 MHz serial data clock generated by the external CODEC(s).
7	HDA/AC_SDOUT	Serial TDM data output to the CODEC.	8	N.C.	Not Connected
9	GND	Power Ground	10	GND	Power Ground

Connector Type

X38: 10 pin, 2 row 2.54mm grid female

5.2.4 LPC Super I/O Device

The conga-MEVAL integrates a Super I/O controller that provides fully featured serial ports. The controller (SMSC SCH3114) is connected to the LPC Bus of the COM Express™ module. The COM Express module must however support these additional features in order for them to function. Refer to the module's user's guide for information about supported features.

The conga-MEVAL also supports a TPM module (Atmel AT97SC3204) on the LPC bus.

5.2.4.1 COM Ports

The conga-MEVAL offers four serial ports via connector X10 (COM 0-1) and connector X11 (COM 2-3). The COM ports on connector X10 are fully featured COM ports (with control signals) and are routed from the Super I/O on the carrier board. The COM ports on connector X11 are partially featured COM ports (without control signals) and are routed from the COM Express module.

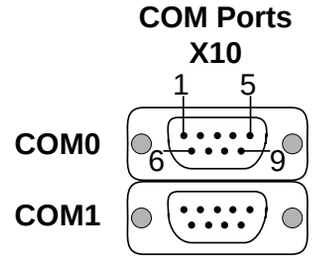
The pinouts of the serial ports are shown below:

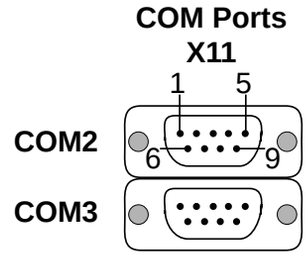
Connector X10

Pin	COM1	Pin	COM0
1	DCD#	1	DCD#
2	RXD	2	RXD
3	TXD	3	TXD
4	DTR#	4	DTR#
5	GND	5	GND
6	DSR#	6	DSR#
7	RTS#	7	RTS#
8	CTS#	8	CTS#
9	RI#	9	RI#

Connector X11

Pin	COM3	Pin	COM2
1	NC	1	NC
2	RXD	2	RXD
3	TXD	3	TXD
4	NC	4	NC
5	GND	5	GND
6	NC	6	NC
7	NC	7	NC
8	NC	8	NC
9	NC	9	NC





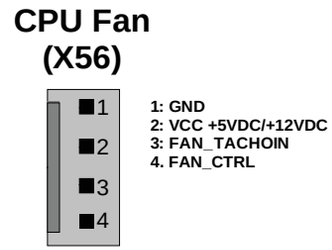
Connector Type

X10, X11: 2x 9 pin D-SUB female

5.2.4.2 Fan Control

The 4-pin fan connector (X56) on the conga-MEVAL provides users with the ability to connect cooling fan for the module. With Jumper X55, you can set the supply voltage of the attached cooling fan to 5V or 12V.

Pin	Signal
1	GND
2	+VDD (12V*/5V)
3	Sense
4	PWM



Jumper 55 auxiliary fan voltage configuration.

Jumper X55	Configuration
1-2	12 V supply voltage for CPU fan (default)
2-3	5 V supply voltage for CPU fan

Jumper X55

Connector Type

X56: 2.54mm Standard 4-pin Fan Housing.

X55: 2.54mm grid jumper

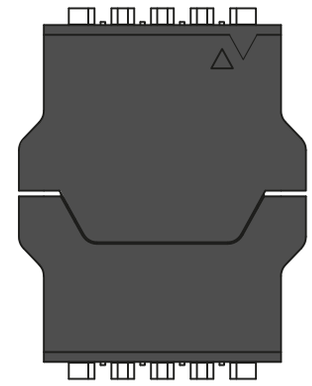
5.2.5 SPI Flash

On the conga-MEVAL, you can boot the COM Express™ CPU module with an external BIOS instead of the module's onboard BIOS. This can be useful when the user plans to evaluate a customized BIOS.

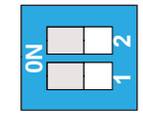
Located on the conga-MEVAL is an 8-pin SOIC8 socket for SPI flash (socket U43). With DIP Switch M13, you can select whether to boot from the attached module's SPI flash or from the carrier board's SPI flash. The table below shows the different M13 DIP switch settings that are necessary to either boot from the off-board SPI flash on the conga-MEVAL or from the onboard flash on the COM Express™ CPU module. An example of an SPI flash is the Winbond W25Q64FVSSIG

Dip Switch M13		Configuration
SW 1	SW 2	
OFF	OFF	Boot from on-module firmware (default)
OFF	ON	Boot from carrier board SPI firmware
ON	OFF	Boot from carrier board LPC firmware (not supported)
ON	ON	Boot from on-module firmware, but load management data from carrier board SPI

SO8W Socket (U43)



M13



Connector Type

M13: DIP Switch

5.2.6 Universal Serial Bus (USB)

The conga-MEVAL supports up to 8 USB ports on the COM Express connector. Six of these ports (ports 0-4 and port 7) are routed to onboard USB connectors while ports 5 and 6 are routed to mini PCIe and ExpressCard connectors respectively. The USB port 7 shares its signals with a USB Client (Type B port) found on connector CN1 via a demultiplexer.

The conga-MEVAL has seven USB connectors onboard - six Type A connectors (4x USB 2.0 and 2x USB 3.0) and one Type B connector (1x USB 2.0). The Type B connector (CN1) shares its signals with USB port 7 of connector X5.

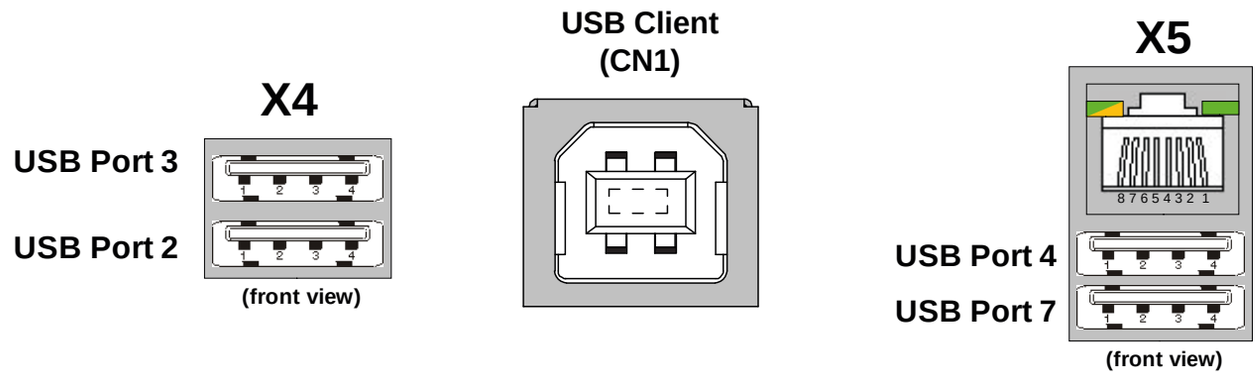
5.2.6.1 USB 2.0 Ports

The conga-MEVAL provides five USB 2.0 connectors onboard- four Type A connectors and one Type B connector. The Type A connectors are X4 (port 2-3) and X5 (port 4 and 7). The Type B connector CN1 (USB Client) shares its signals via a demultiplexer with USB port 7 on connector X5. The demultiplexer automatically routes the USB data signals from USB port 7 to connector CN1 when the conga-MEVAL is connected as a client device to a USB host; otherwise the USB data signals are available at connector X5 (USB port 7).

Ports 4 and 7 on connector X5 are supplied by suspend power and can be used to test “wake up via USB” functionality..

USB 2.0 Pin Description

Pin	Signal
1	+5V
2	DATA-
3	DATA+
4	GND

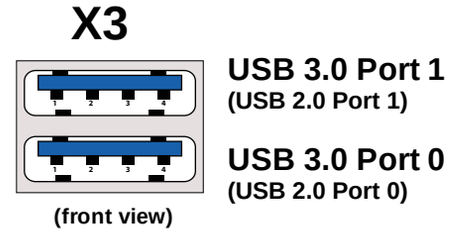


5.2.6.2 USB 3.0 Ports

The conga-MEVAL is designed to support up to 2 USB 3.0 ports - the maximum count specified by the COM Express™ specification for Type 10 modules. The two USB 3.0 ports (connector X3) also support USB 2.0 devices

USB 3.0 Pin Description

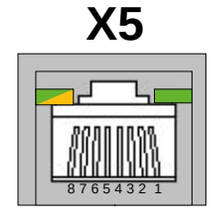
Pin	Signal	Pin	Signal
1	+5V	5	USB_SSRX-
2	DATA-	6	USB_SSRX+
3	DATA+	7	GND
4	GND	8	USB_SSTX-
		9	USB_SSTX+



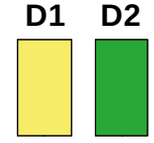
5.2.7 LAN 10/100/1000

The conga-MEVAL provides a Gigabit Ethernet port on connector X5. The yellow and green LEDs indicate the Activity and Link Status respectively.

Pin	Signal	Pin	Signal
1	MDI0+	2	MDI0-
3	MDI1+	4	MDI2+
5	MDI2-	6	MDI1-
7	MDI3+	8	MDI3-



LEDs	Description
Yellow	Activity
Green	Link
D1	LINK1000#
D2	LINK100#

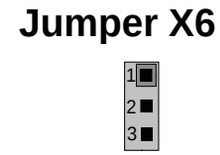


Connector Type

8 pin RJ45 plug

Jumper X6 sets the Gigabit Ethernet power rail.

Jumper X6	Configuration
1-2	LAN controller is powered from standby voltage (default)
2-3	LAN controller is powered from main voltage



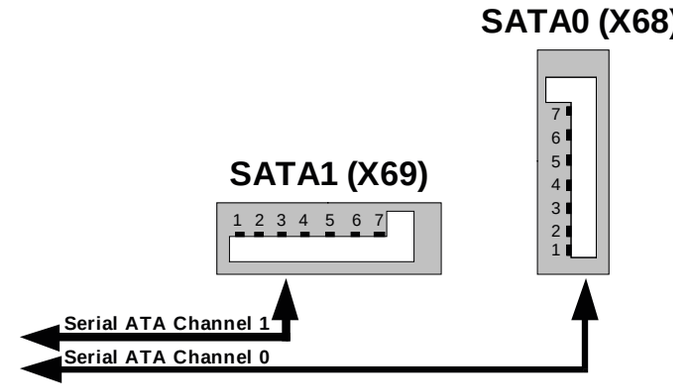
Connector Type

X6: 2.54mm grid jumper

5.2.8 Serial ATA™

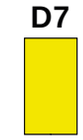
The conga-MEVAL provides two SATA ports on connectors X68 and X69.

Pin	Signal
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



The yellow LED D7 indicates activity on each SATA interface. An external HDD LED can be connected to pin header X21.

Pin	Signal
1	Anode
2	Cathode



Connector Type

X21: 2.54mm grid jumper

5.2.9 Digital Display Interface (DDI)

The conga-MEVAL supports one Digital Display Interface (DDI0) on connector X26. This connector has two receptacles - the bottom receptacle for HDMI and the top receptable for DisplayPort. Connector X26 supports either DisplayPort or HDMI but not both at the same time. The connector supports DisplayPort by default. To support HDMI, set Jumper X28 to position “2-3”.

Jumper X28 configuration is shown below:

Jumper X28	Configuration
1-2	Select DisplayPort (default)
2-3	Select HDMI

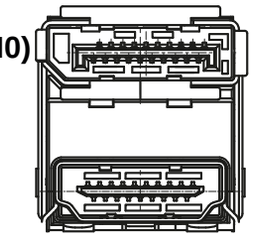
Jumper X28

Connector Type

X28: 2.54mm grid jumper

X26

DisplayPort (DDI0)



HDMI (DDI0)

5.2.10 eDP/LVDS

The conga-MEVAL is designed to support eDP or LVDS signals. The eDP/LVDS signals are routed to either eDP connector (X82) or LVDS connectors (X65 and CN6) via a high performance differential switch

5.2.10.1 Embedded Display Port (eDP)

The conga-MEVAL provides eDP interface on connector X82 - a standard 40 pin DisplayPort connector. The eDP signals which are overlayed on LVDS channel A of the COM Express connector are routed via a high performance differential switch.

The overlayed signals are switched to eDP when an eDP display is connected to X82. If a module with LVDS interface is attached to conga-MEVAL, the module then overrides the eDP interface by forcing pin A87 low.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	N.C.	11	GND	21	VCC_EDP_FILT	31	GND	43	GND
2	GND	12	eDP_TX0-	22	N.C.	32	eDP_LVDS_BKLT_EN	44	GND
3	eDP_TX3-	13	eDP_TX0+	23	GND	33	eDP_LVDS_BKLT_CTRL	45	GND
4	eDP_TX3+	14	GND	24	GND	34	N.C.	46	GND
5	GND	15	eDP_AUX+	25	GND	35	N.C.	47	GND

6	eDP_TX2-	16	eDP_AUX-	26	GND	36	VDD_BKLT	48	GND
7	eDP_TX2+	17	GND	27	eDP_DETECT	37	VDD_BKLT		
8	GND	18	VCC_EDP_FILT	28	GND	38	VDD_BKLT		
9	eDP_TX1-	19	VCC_EDP_FILT	29	GND	39	VDD_BKLT		
10	eDP_TX1+	20	VCC_EDP_FILT	30	GND	40	N.C.		

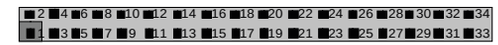
5.2.10.2 LVDS Flat Panel Interface

The conga-MEVAL provides two different connectors for LVDS interface - connectors X65 and CN6 (CN6 is located on the bottom side of the conga-MEVAL). The LVDS/eDP signals on the COM Express connector are routed to the LVDS or eDP connector via a high performance differential switch. The switch by default routes the LVDS/eDP signals to the LVDS connectors.

The LVDS interface supports single channel 24 bit LVDS. The pinout descriptions of connectors X65 and CN6 are shown below:

Pin	LVDS Output	Description	Pin	LVDS Output	Description
1	LVDS_I2C_DAT	I²C data line for LVDS display use	2	LVDS_I2C_CK	I²C clock output for LVDS display use
3	N.C.	Not Connected	4	N.C.	Not Connected
5	GND	Power Ground	6	LVDS_A0-	LVDS Channel A differential pairs
7	LVDS_A0+	LVDS Channel A differential pairs	8	LVDS_VDD_EN	LVDS panel power enable
9	LVDS_A1-	LVDS Channel A differential pairs	10	LVDS_A1+	LVDS Channel A differential pairs
11	LVDS_BKLT_EN	LVDS panel backlight enable. (see jumper X4)	12	LVDS_A2+	LVDS Channel A differential pairs
13	LVDS_A2-	LVDS Channel A differential pairs	14	N.C.	Not Connected
15	LVDS_A_CK-	LVDS Channel A differential clock	16	LVDS_A_CK+	LVDS Channel A differential clock
17	N.C.	Not Connected	18	LVDS_A3+	LVDS Channel A differential pairs
19	LVDS_A3-	LVDS Channel A differential pairs	20	GND	
21	N.C.	Not Connected	22	N.C.	Not Connected
23	GND	Power Ground	24	N.C.	Not Connected
25	N.C.	Not Connected	26	GND	Power Ground
27	N.C.	Not Connected	28	N.C.	Not Connected
29	GND	Power Ground	30	N.C.	Not Connected
31	N.C.	Not Connected	32	N.C.	Not Connected
33	N.C.	Not Connected	34	N.C.	Not Connected

LVDS Connector (Top Side) (X65)



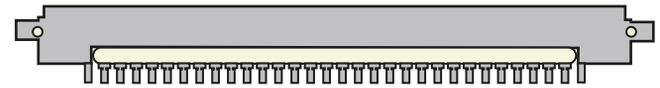
Connector Type

X65: 34 pin, 2 row 2mm grid female.

Connector CN6 Pin Description

Pin	LVDS Output	Pin	LVDS Output	Pin	LVDS Output	Pin	LVDS Output
1	GND	11	LVDS_A3-	21	N.C.	31	VDD_LCD
2	LVDS_A0-	12	LVDS_A3+	22	N.C.	32	GND
3	LVDS_A0+	13	N.C.	23	N.C.		
4	LVDS_A1-	14	N.C.	24	N.C.		
5	LVDS_A1+	15	GND	25	GND		
6	LVDS_A2-	16	N.C.	26	LVDS_I2C_DAT		
7	LVDS_A2+	17	N.C.	27	eDP_LVDS_VDD_EN		
8	GND	18	GND	28	LVDS_I2C_CLK		
9	LVDS_A_CLK-	19	N.C.	29	VDD_LCD		
10	LVDS_A_CLK+	20	N.C.	30	VDD_LCD		

LVDS Connector (Bottom Side) (CN6)



Connector Type

CN6: JAE FI-X30SSL-HF, 32 pin, single row, 1mm pitch spacing (compatible with JILI30)

With jumper X36, you can set the polarity of the backlight enable signal LVDS_BKLT_EN from the COM Express™ module.

Jumper X36	Configuration
1-2	Backlight enable HIGH active (default)
2-3	Backlight enable LOW active

Jumper X36

Connector Type

X36: 2.54mm grid jumper

Note

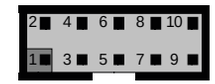
See section 5.2.10.4 "Flat Panel and Backlight Power Supply Connection" for more information.

5.2.10.3 Flat Panel and Backlight Power Supply

The power supply for flat panels and their backlight inverter is available on connector X35. See section 5.2.10.4 “Flat Panel and Backlight Power Supply Connection” for more information.

Pin	Signal	Pin	Signal
1	VDD_LCD (1.5A Fuse)	2	VDD_BKLT (2.0A Fuse)
3	+5V (1.5A Fuse)	4	+12V (2.0A Fuse)
5	LVDS_VDD_EN	6	LVDS_BKLT_EN
7	LVDS_BKLT_VREF	8	LVDS_BKLT_CTRL
9	GND	10	GND

LCD Power (X35)



Connector Type

X35: 10 pin, 2 row 2.54 mm grid female.

Jumper X33	Configuration
1-2	5V LCD supply voltage (default)
2-3	3.3V LCD supply voltage

Jumper X33

Jumper X34	Configuration
1-2	12V backlight voltage (default)
2-3	5V backlight voltage

Jumper X34

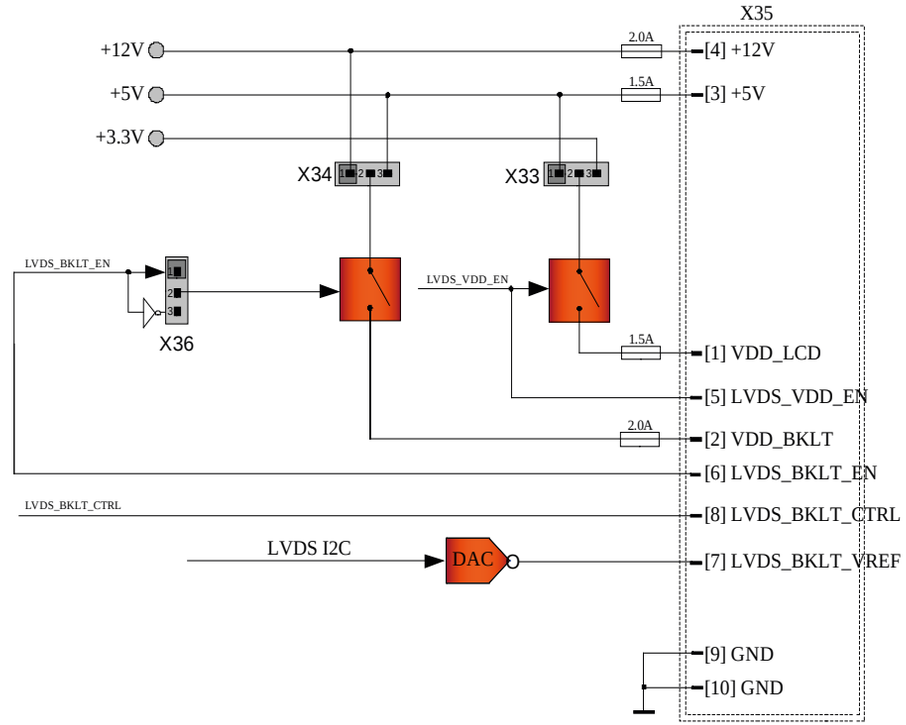
Connector Type

X33, X34: 2.54mm grid jumper

5.2.10.4 Flat Panel and Backlight Power Supply Connection

The following diagram shows a typical connection possibility for powering panel/backlight by either the VDD_LCD/VDD_BKLT signals or by using LVDS_VDD_EN/LVDS_BKLT_EN for external power switches.

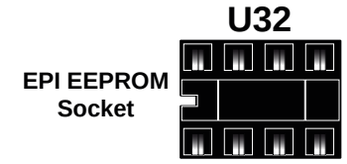
- Signals 1-10 correspond to signals 1-10 found on the X35 connector.
- X33, X34 and X36 represent jumpers X33, X34 and X36 found on the conga-MEVAL.
- The conga-MEVAL carrier board is equipped with a Maxim MAX5362 device referred to in the diagram below as “DAC”.



5.2.10.5 Flat Panel Configuration Data

The flat panel configuration data (EPI extended EDID™ 1.3 file) for most common displays is included in the congatec COM Express™ CPU module’s system BIOS. The customer also has the possibility to use a customized EPI extended EDID™ 1.3 file that can be stored in a serial EEPROM located on the conga-MEVAL (DIL 8 socket U32).

Supported EEPROMs: 24C02, 24C04 and 24C16 at address A0h

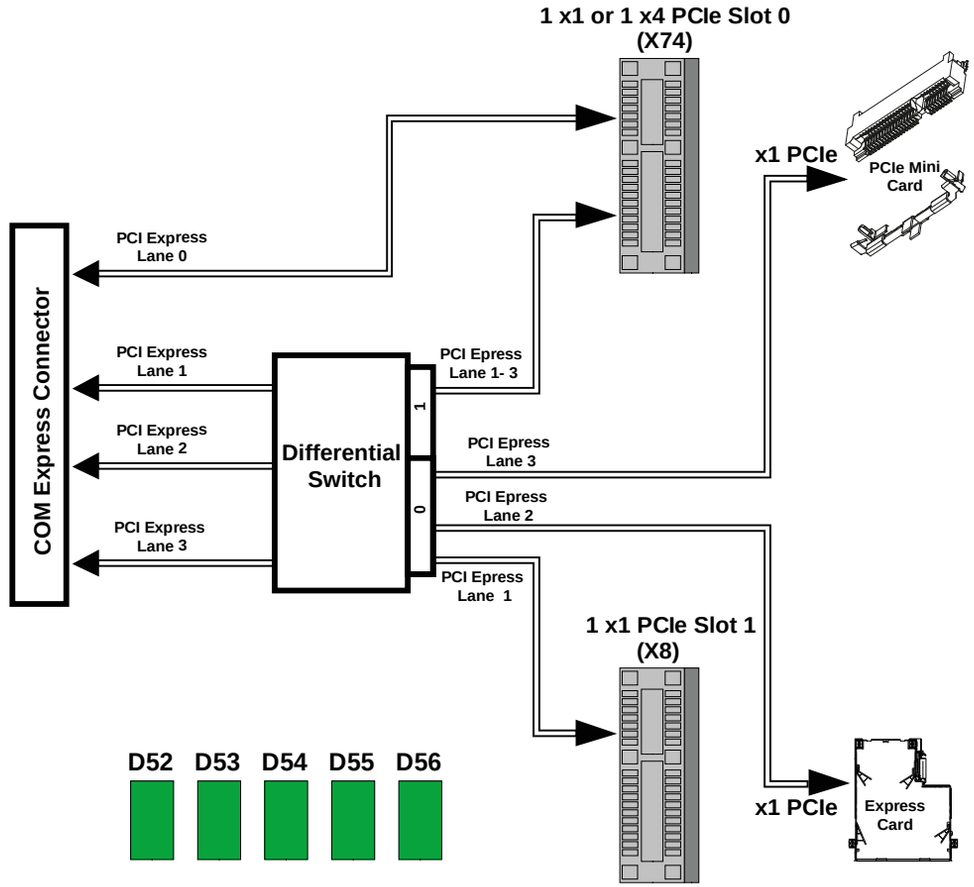


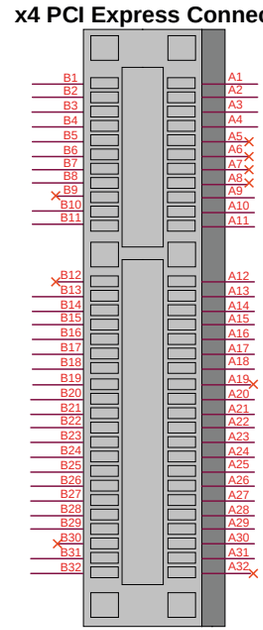
5.2.11 PCI Express Connectors

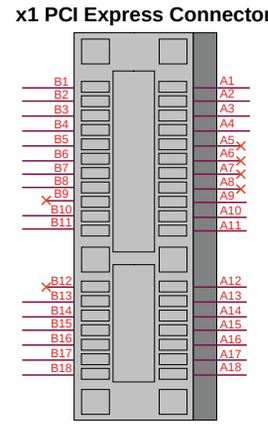
The conga-MEVAL supports up to 4 PCI Express lanes on the COM Express connector. PCIe lane 0 is routed directly to PCIe Slot 0 (X74) while Lanes 1-3 are routed via a differential switch. The output of the differential switch depends on the configuration of Jumper X75. When the Jumper is set to position 1-2, the switch routes lane 1 to PCIe Slot 1 (X8), lane 2 to ExpressCard and lane 3 to miniPCIe. With this setup, the conga-MEVAL is configured to support 4 x1 PCIe links and the green LEDs D52, D53, D55, D56 are lit when the four x1 PCIe links are active.

When the Jumper is set to position 2-3, the switch routes PCIe lanes 1-3 to PCIe Slot 0. This setting configures the conga-MEVAL to support a 1 x4 PCIe link on Slot 0. LED D54 is lit when the X4 PCIe link is active.

The illustration below depicts the PCI Express routing from the COM Express connector.







Jumper X75

Jumper X75	
1-2	4 x1 configuration(default)
2-3	1 x4 configuration

The table below lists the pinouts for each of these slots.

PCI Express Slot 0/Lane 0 Connector X74				PCI Express Slot 1/Lane 1 Connector X8			
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
B1	+12V	A1	GND	B1	+12V	A1	GND
B2	+12V	A2	+12V	B2	+12V	A2	+12V
B3	+12V	A3	+12V	B3	N.C.	A3	+12V
B4	GND	A4	GND	B4	GND	A4	GND
B5	SMB_CK	A5	N.C.	B5	SMB_CK	A5	N.C.
B6	SMB_DAT	A6	N.C.	B6	SMB_DAT	A6	N.C.
B7	GND	A7	N.C.	B7	GND	A7	N.C.
B8	+3.3V	A8	N.C.	B8	+3.3V	A8	N.C.
B9	N.C.	A9	+3.3V	B9	N.C.	A9	+3.3V
B10	+3.3V Standby	A10	+3.3V	B10	+3.3V Standby	A10	+3.3V
B11	WAKE0#	A11	PCIE_RST#	B11	WAKE0#	A11	PCIE_RST#
B12	N.C.	A12	GND	B12	N.C.	A12	GND
B13	GND	A13	PCIE0_CLK+	B13	GND	A13	PCIE1_CLK+
B14	PCIE_TX0+	A14	PCIE0_CLK-	B14	PCIE_TX1+	A14	PCIE1_CLK-
B15	PCIE_TX0-	A15	GND	B15	PCIE_TX1-	A15	GND
B16	GND	A16	PCIE_RX0+	B16	GND	A16	PCIE_RX1+
B17	PCIE0_CLKREQ#	A17	PCIE_RX0-	B17	PCIE1_CLKREQ#	A17	PCIE_RX1-
B18	GND	A18	GND	B18	GND	A18	GND
B19	PCIE_TX1+	A19	N.C				
B20	PCIE_TX1-	A20	GND				
B21	GND	A21	PCIE_RX1+				
B22	GND	A22	PCIE_RX1-				
B23	PCIE_TX2+	A23	GND				
B24	PCIE_TX2-	A24	GND				
B25	GND	A25	PCIE_RX2+				
B26	GND	A26	PCIE_RX2-				
B27	PCIE_TX3+	A27	GND				
B28	PCIE_TX3-	A28	GND				
B29	GND	A29	PCIE_RX3+				
B30	N.C	A30	PCIE_RX3-				
B31	PCIE0_CLKREQ#	A31	GND				

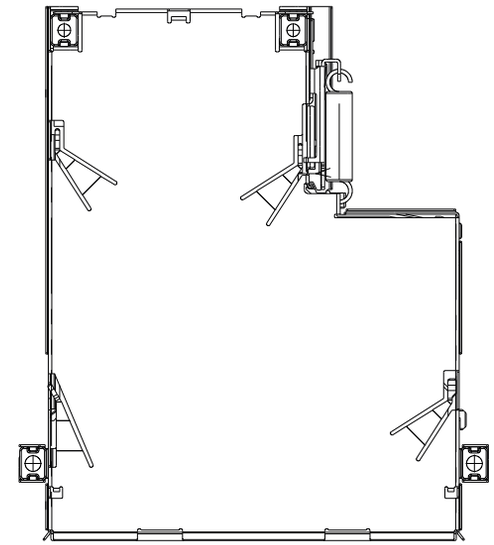
B32	GND	A32	N.C			

5.2.11.1 ExpressCard

ExpressCard® is a small, modular add-in card designed to replace common PCMCIA and PC Cards. It takes advantage of the scalable, high-bandwidth serial PCI Express and USB 2.0 interfaces to provide much higher data rates. More information about the ExpressCard Standard can be found at http://www.expresscard.org.

The conga-MEVAL is equipped with an ExpressCard slot (connector X14). The ExpressCard slot uses PCI Express lane 2 and USB port 6. The table below lists the pinout of the ExpressCard slot.

Pin	Signal	Pin	Signal
1	GND	14	+3.3V
2	USB6-	15	+3.3V
3	USB6+	16	PCIE2_CLKREQ#
4	CPUSB#	17	EXCD0_CPPE#
5	N.C	18	PCIE_CLK-
6	N.C	19	PCIE_CLK+
7	SMB_CLK	20	GND
8	SMB_DAT	21	PCIE_RX2-
9	+1.5V	22	PCIE_RX2+
10	+1.5V	23	GND
11	WAKE0#	24	PCIE_TX2-
12	+3.3V Standby	25	PCIE_TX2+
13	EXCD0_PERST#	26	GND



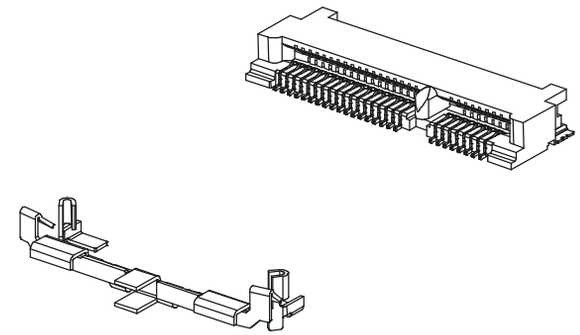
LED D3 is a red LED that indicates that an 'Overcurrent Event' has occurred in the ExpressCard slot.

5.2.11.2 PCI Express® Mini Card

PCI Express® Mini Card is a unique small size form factor optimized for mobile computing platforms equipped with communication applications such as Wireless LAN. The small footprint connector can be implemented on carrier board designs providing the ability to insert different removable PCI Express® Mini Cards. Using this approach gives the flexibility to mount an upgradable, standardized PCI Express® Mini Card device to the carrier board without additional expenditure of a redesign.

The conga-MEVAL is equipped with a PCI Express® Mini Card socket (X15). The PCI Express® Mini Card uses PCI Express lane 3 and USB port 5. The following table lists the pinout of the PCI Express Mini Card socket.

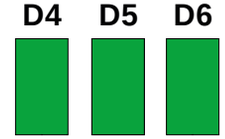
Pin	Signal	Pin	Signal
1	WAKE0#	2	+3.3V
3	N.C	4	GND
5	N.C	6	+1.5V
7	PCIE3_CLKREQ#	8	N.C.
9	GND	10	N.C.
11	PCIE3_CLK-	12	N.C.
13	PCIE3_CLK+	14	N.C.
15	GND	16	N.C.
17	N.C	18	GND
19	N.C	20	N.C
21	GND	22	PCIE_RST#
23	PCIE_RX3-	24	+3.3V Standby
25	PCIE_RX3+	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TX3-	32	SMB_DAT
33	PCIE_TX3+	34	GND
35	GND	36	USB5-
37	GND	38	USB5+
39	+3.3V Standby	40	GND
41	+3.3V Standby	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	N.C	46	LED_WPAN#
47	N.C	48	+1.5V
49	N.C	50	GND



Pin	Signal	Pin	Signal
51	N.C	52	+3.3V

The PCI Mini Card socket has three green LEDs to indicate the presence of certain area network types. They are as follows:

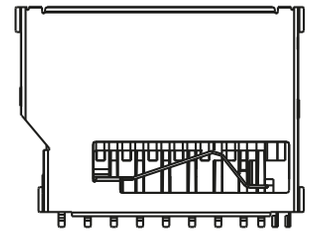
LED	Indicates
D4	Wireless Wide Area Network
D5	Wireless Local Area Network
D6	Wireless Personal Area Network



5.2.12 SDIO

The GPIOs on a COM Express™ Type 10 modules may also be used as SDIO signals. The de-multiplexing is handled on conga-MEVAL by Jumper X22, connecting GPIOs to either SD/MMC slot (CN3) or feature connector (X53).

Jumper X22	Configuration
1-2	Use GPIO as SDIO
2-3	Use GPIO as GPIO (default)



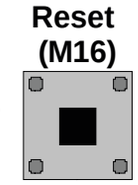
Connector Type

X22: 2.54mm grid jumper

6 Additional Features

6.1 Reset

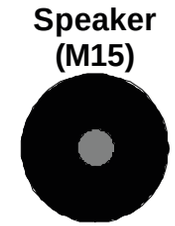
When the Reset button (M16) is pressed, the COM Express™ module and all connected components performs a hard reset. The Reset button is connected to the SYS_RESET# signal of the COM Express™ module.



6.2 PC Speaker

The board-mounted speaker provides audible error code (beep code) information during POST. The speaker (M15) is connected to the SPKR signal of the COM Express™ module and can be disabled via Jumper X83.

Jumper X83	Configuration
1-2	Enable beeper (default)
1-X	Disable beeper

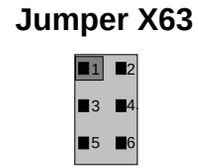


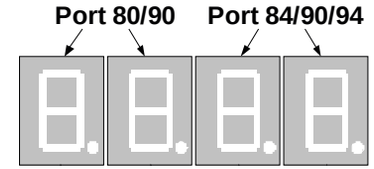
6.3 Debug Display

During the POST (Power On Self Test), the BIOS generates diagnostic progress codes (POST-codes) to different I/O ports (usually port 80h). If the POST fails, execution stops and the last POST code generated is left at the respective port. This code is useful for determining the point where an error occurred. The conga-MEVAL decodes these ports and displays their contents on a 4 seven-segment display (D37- D39, D41).

A list of the POST codes and associated POST test and initialization routines for the BIOS used on congatec COM Express™ modules is available at www.congatec.com.

Jumper X63	Configuration
1 - 2	Port 80h and port 84h output (default)
3 - 4	Port 80h and port 90h output
5 - 6	Port 90h and port 94h output





Connector Type

X63: 2.54mm grid jumper

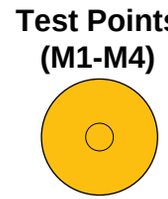
6.4 JTAG Interface

The conga-MEVAL provides a JTAG interface on connector X64. The interface is used for in-circuit testing.

Pin	Signal
1	3.3V
2	GND
3	TCK
4	N.C
5	TDO
6	TDI
7	TMS

6.5 Ground Test Points

The conga-MEVAL provides four test points that are connected to Ground Potential (M1 to M4). These test points make it easier to connect oscilloscope probes and/or multimeter lines to ground when performing measurements on the COM Express™ module.



6.6 Voltage Test Point

The conga-MEVAL provides a voltage test point M31 (+VIN_COME) near the COM Express connector to measure the input voltage on the module.

Caution

Do not use this point as a ground connection.

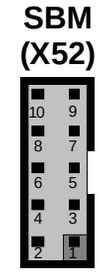
6.7 LID and Sleep

LID# and SLEEP# signals can be easily triggered by pressing the LID button (M17) or the SLEEP button (M18). The system's behavior depends on the ACPI settings of the operating system.

6.8 Smart Battery Management Module

Connector X52 provides the ability to connect the conga-MEVAL to a congatec SMART Battery Management Module evaluation kit. The following table describes the pinout of the X52 connector.

Pin	Signal	Pin	Signal
1	I2C_CLK	2	I2C_DAT
3	PWRBTN#	4	BATLOW#
5	PS_ON#	6	*SUS_S45# (see note below)
7	VCC (5V)	8	5V_SB
9	SUS_STAT#	10	GND



Connector Type

X52: 10 pin, 2 row 2.54 mm grid female

Note

**Signal SUS_S45# is a logical ANDing of both signals SUS_S4# and SUS_S5#.*

6.8.1 Battery Communication Selection

The conga-MEVAL provides two Jumpers (X80 and X81) for selecting the smart battery communication bus. Set both Jumpers X80 and X81 to position 1-2 for I2C bus communication or 2-3 for SM bus communication.

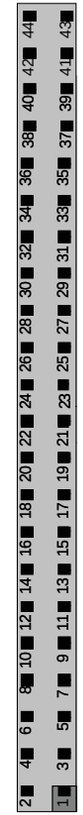
Jumper X80	Configuration
1-2	Select I2C Bus for battery data signal(default)
2-3	Select SM Bus for battery data signal

Jumper X81	Configuration
1-2	Select I2C Bus for battery clock signal (default)
2-3	Select SM Bus for battery clock signal

6.9 Feature Connector

Pin	Signal	Description	Pin	Signal	Description
1	+5V (750 mA fuse)		2	5V_SB (750 mA fuse)	
3	+5V		4	Hard Disk Activity	Shows activity on hard disk interface
5	I2C_DAT	General purpose I²C port data I/O line.	6	SMB_CLK	System Management Bus bidirectional clock line.
7	I2C_CLK	General purpose I²C port clock output.	8	SMB_DATA	System Management Bus bidirectional data line.
9	Internal use		10	GPO0	General Purpose Output 0
11	Internal use		12	GPO1	General Purpose Output 1
13	PS_ON#	Power Supply On (active low).	14	GPO2	General Purpose Output 2
15	SUS_S3#	Indicates system is in Suspend to RAM state. Active low output.	16	GPO3	General Purpose Output 3
17	GND	Power Ground	18	GND	Power Ground
19	THRMTRIP#	Active low output indicating that the CPU has entered thermal shutdown.	20	SMB_ALERT#	System Management Bus Alert – active low input can be used to generate an SMI# (System Management Interrupt) or to wake the system.
21	GPI1	General Purpose Input 1	22	SUS_S4#	Indicates systems is in Suspend to Disk state. Active low output.
23	SUS_STAT#	Indicates imminent suspend operation; used to notify LPC devices.	24	GPI0	General Purpose Input 0
25	GPI2	General Purpose Input 2	26	SUS_S5#	Indicates systems is in Soft Off state.
27	WDT	Watch Dog Timer	28	THRM#	Input from off-module temp sensor indicating an over-temp situation.
29	GPI3	General Purpose Input 3	30	LID#	Module input signal, generation a LID close or open event
31	BATLOW#	Indicates that external battery is low.	32	WAKE1#	General purpose wake up signal. May be used to implement wake-up on PS2 keyboard or mouse activity.

Feature (X53)



33	TPM_PP	Physical presence pin, indication signal to TPM chip	34	N.C	Not Connected
35	SLEEP#	Sleep signal, to bring system to a predefined sleep state	36	SYS_RESET#	Reset Button Input. Active low input. System is held in hardware reset while this input is low and comes out of reset upon release.
37	GND	Power Ground	38	GND	Power Ground
39	PWBTN#	Power Button to bring system out of S5 (soft off), active on rising edge.	40	PWR_OK	Power OK from main power supply. A high value indicates that the power is good. For additional information refer to PWRGOOD Config connector X11.
41	N.C	Not Connected	42	N.C	Not Connected
43	N.C	Not Connected	44	N.C	Not Connected

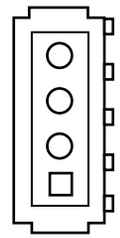
Connector Type

X53: 44 pin, 2 row 2.54 mm grid female

6.10 Disk Drive Power Connector

When powering a system with a single voltage source, it's very helpful to be able to reuse the onboard generated voltages to power peripherals such as hard disks or optical drives. The Disk Drive Power Connector X9 provides the ability to do this. Simply connect a standard extension cable from conga-MEVAL to your hard drive/optical drive. Do not connect more than one peripheral device to X9.

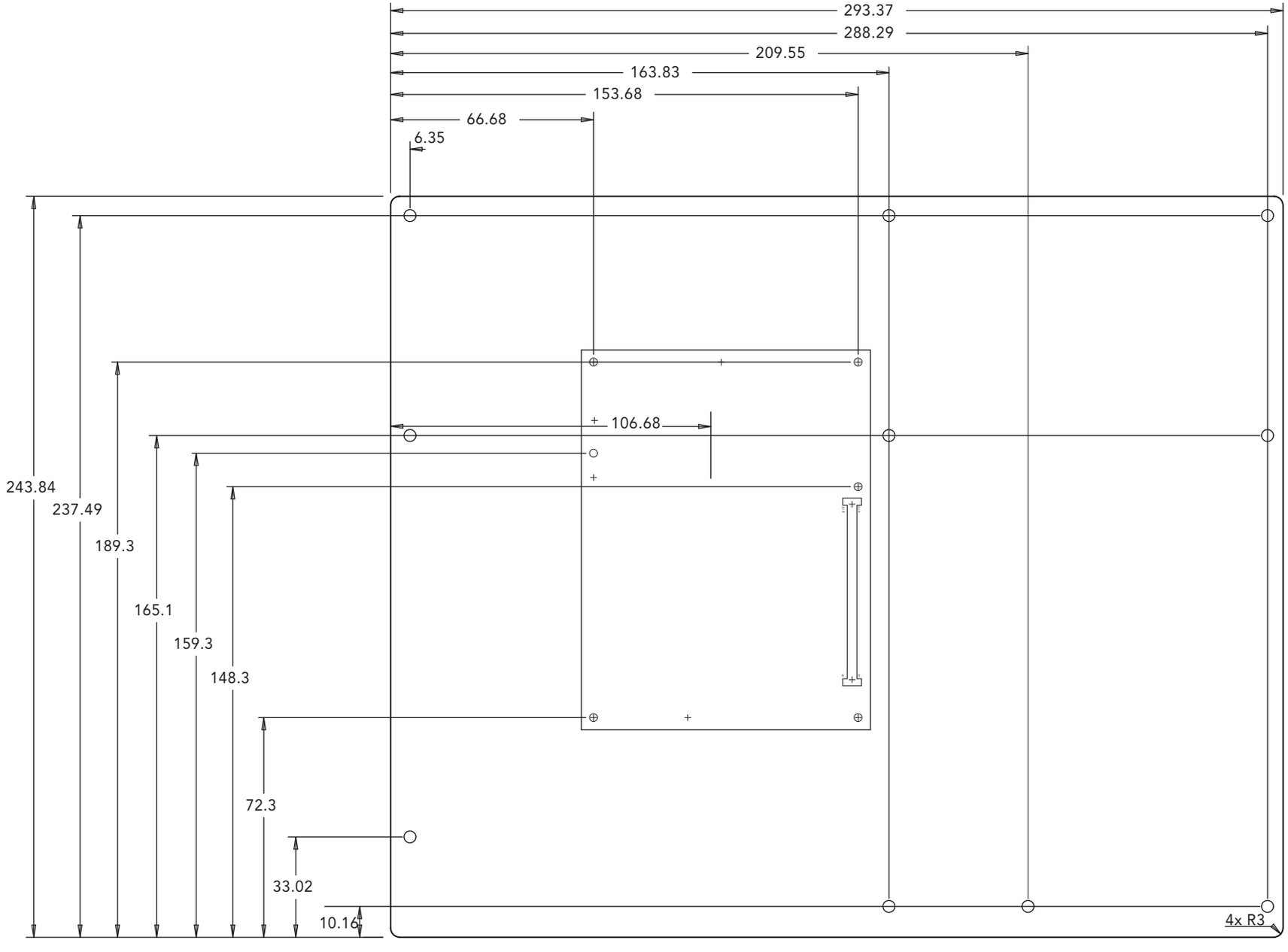
X9
HDD Power



Caution

The 12V supply on connector X9 is directly connected to M23. Over-voltage can damage the connected peripheral.

7 Mechanical Dimensions



8 Industry Specifications

The list below provides links to industry specifications that should be used as reference material when designing a COM Express™ carrier board.

Specification	Link
PICMG® COM Express Module™ Base Specification	http://www.picmg.org/
PCI Express Base Specification, Revision 2.0	http://www.pcisig.com/specifications
Universal Serial Bus (USB) Specification, Revision 2.0	http://www.usb.org/home
ExpressCard Standard Release 1.0	http://www.expresscard.org/
Serial ATA Specification, Revision 1.0a	http://www.serialata.org
Low Pin Count Interface Specification, Revision 1.0 (LPC)	http://developer.intel.com/design/chipsets/industry/lpc.htm
High Definition Audio Specification, Rev. 1.0	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 Version 1.3 (EDID™)	http://www.vesa.org
Enhanced Display Data Channel Specification Version 1.1 (DDC)	http://www.vesa.org
IEEE standard 802.3ab 1000BASE T Ethernet	http://www.ieee.org/portal/site
Advanced Configuration and Power Interface Specification Rev. 3.0a	http://www.acpi.info/

The following reference materials are recommended for use by congatec AG:

Title	Author
PCI Express System Architecture	Ravi Budruk, Don Anderson, Tom Shanley
Universal Serial Bus System Architecture	Don Anderson
SATA Storage Technology	Don Anderson
Protected Mode Software Architecture (The PC System Architecture Series)	Tom Shanley

Additional reference materials covering various PC architecture subjects can be found at www.intel.com/intelpress.