



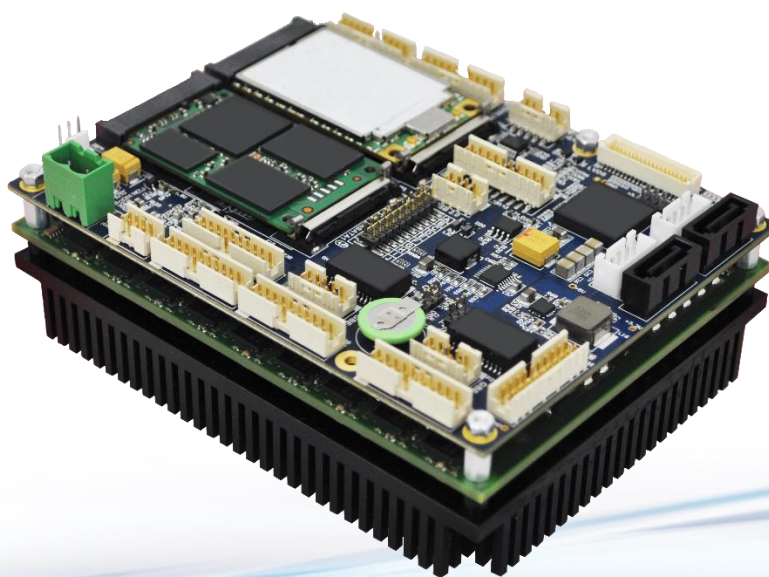
Connect Tech Inc.

Embedded Computing Experts

www.connecttech.com

USERS GUIDE

COM Express Type 6 Rugged Ultra-Lite Carrier



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Preface

Disclaimer

The information contained within this user's guide, including but not limited to any product specification, is subject to change without notice.

Connect Tech assumes no liability for any damages incurred directly or indirectly from any technical or typographical errors or omissions contained herein or for discrepancies between the product and the user's guide.

Customer Support Overview

If you experience difficulties after reading the manual and/or using the product, contact the Connect Tech reseller from which you purchased the product. In most cases the reseller can help you with product installation and difficulties.

In the event that the reseller is unable to resolve your problem, our highly qualified support staff can assist you. Our support section is available 24 hours a day, 7 days a week on our website at: www.connecttech.com/sub/support/support.asp. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

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Note:

Please go to the [Download Zone](#) or the [Knowledge Database](#) in the [Support Center](#) on the Connect Tech website for product manuals, installation guides, device driver software and technical tips. Submit your technical support questions to our customer support engineers via the [Support Center](#) on the Connect Tech website.

Telephone/Facsimile

Technical Support representatives are ready to answer your call Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time. Our numbers for calls are:

Toll Free: 800-426-8979 (North America only)

Telephone: 519-836-1291 (Live assistance available 8:30 a.m. to 5:00 p.m. EST, Monday to Friday)

Facsimile: 519-836-4878 (on-line 24 hours)



Limited Product Warranty

Connect Tech Inc. provides a two-year Warranty for the COM Express® Type 6 Rugged Ultra-Lite Carrier Board. Should this product, in Connect Tech Inc.'s opinion, fail to be in good working order during the warranty period, Connect Tech Inc. will, at its option, repair or replace this product at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster or non-Connect Tech Inc. authorized modification or repair.

You may obtain warranty service by delivering this product to an authorized Connect Tech Inc. business partner or to Connect Tech Inc. along with proof of purchase. Product returned to Connect Tech Inc. must be pre-authorized by Connect Tech Inc. with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured and packaged for safe shipment. Connect Tech Inc. will return this product by prepaid ground shipment service.

The Connect Tech Inc. Limited Warranty is only valid over the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, Connect Tech Inc. reserves the right to substitute an equivalent product if available or to retract the Warranty if no replacement is available.

The above warranty is the only warranty authorized by Connect Tech Inc. Under no circumstances will Connect Tech Inc. be liable in any way for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use of, or inability to use, such product.

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ESD Warning



Electronic components and circuits are sensitive to ElectroStatic Discharge (ESD). When handling any circuit board assemblies including Connect Tech COM Express carrier assemblies, it is recommended that ESD safety precautions be observed. ESD safe best practices include, but are not limited to:

- Leaving circuit boards in their antistatic packaging until they are ready to be installed.
- Using a grounded wrist strap when handling circuit boards, at a minimum you should touch a grounded metal object to dissipate any static charge that may be present on you.
- Only handling circuit boards in ESD safe areas, which may include ESD floor and table mats, wrist strap stations and ESD safe lab coats.
- Avoiding handling circuit boards in carpeted areas.
- Try to handle the board by the edges, avoiding contact with components.

Revision History

Revision	Date	Changes
0.00	2013-09-11	Preliminary Release
0.01	2013-11-27	Updated Cable Drawings and Listings
0.02	2013-12-09	Added CCG011 and CCG012 part info
0.03	2013-12-20	Further Cable Drawing Updates
0.04	2014-02-03	Added PCIe Allocations, Mech Drawings, and updated Cable PN info
0.05	2014-02-18	Correct GBE Cable Drawing (CBG117)
0.06	2014-06-19	Added Appendix A – COM Express Signal/Pinout Connection Details
0.07	2014-08-11	Updated GPIO Pinout Table on pg.41
0.08	2014-09-03	Correct Typos in DisplayPort and Power Input connector sections Updated GBE connector section
0.09	2015-03-23	Added 2D Mechanical Plan View Drawing, Added MTBF data, Updated CBG117 Drawing
0.10	2015-08-19	Correct DisplayPort++ Connector Pinout for AUX signals
0.11	2016-06-07	Revised Warranty Policy
0.12	2016-10-27	Updated images
0.13	2016-11-25	Added RTC battery information, updated format
0.14	2017-07-12	Added cable drawing links, removed drawings from doc
0.15	2018-01-05	Revised cable information

Introduction

Connect Tech's COM Express® Type 6 Rugged Ultra Lite Carrier Board is a compact carrier board which matches the dimensions of a COM Express® Basic module and offers the ultimate durability with locking, rugged pin headers.

COM Express® Type 6 Rugged Ultra Lite Carrier Board is ideal for space constrained applications, harsh environments, demanding conditions and supports extended temperature ranges of -40°C to +85°C.

Product Features and Specifications

Specifications	
Compatibility	COM Express Type 6 Modules PICMG COM Express® COM.0 R2.0
Mini PCIe Expansion	2 x half or full length cards Both sockets have PCIe, USB and SATA signaling for mSATA operation 1 x SIM Card Expansion
Storage	4 x SATA ports: 2 x mSATA 2 x External Vertical Locking Connector
Network	2 x Gigabit Ethernet (10/10/1000) Ports 1 from COM Express 1 from on-board Intel 82574I PHY/Controller
GPIO	8-bit GPIO
USB	4 x USB 3.0 Ports (available only on the CCG012 model) 8 x USB 2.0 Ports (2 used for miniPCIe)
Display	2 x DisplayPort++ (DDI) interface Which can be used for DisplayPort, HDMI, DVI or VGA 1 x VGA (Analog/CRT) 1 x LVDS interface (single ch 24-bit, dual ch 48-bit)
Audio	HD Audio (Cirrus Logic CS4207 codec) 1 x stereo input 1 x stereo output
Serial	1 x Console RS-232 port (TX/RX) 2 x RS-232 (w/ full modem signals) 2 x RS-422/485
Misc External Interfaces	SMBus, I2C, Battery Low Indication, PC speaker Interface System Status (S3 and Reset Outputs)
Power	Input: Single +12V input +/- 5% (5mm pitch terminal connector)
RTC Battery	On-board 3V 48mAh (BR1125A) Option to connect external RTC battery.
I/O Connectors	All low-profile shrouded locking ruggedized 2mm pitch headers. Can be mated to panel mountable cable set or MIL type connectors.
Detailed Mechanical Information	125mm x 95mm (x-y dims) Tallest top side component: 12mm Download 3D model here
Weight	96g
MTBF / FR	717128hrs / 1394 FITs
Operating Temperature	-40°C to +85°C
Warranty and Support	Limited two-year Warranty and Free Technical Support

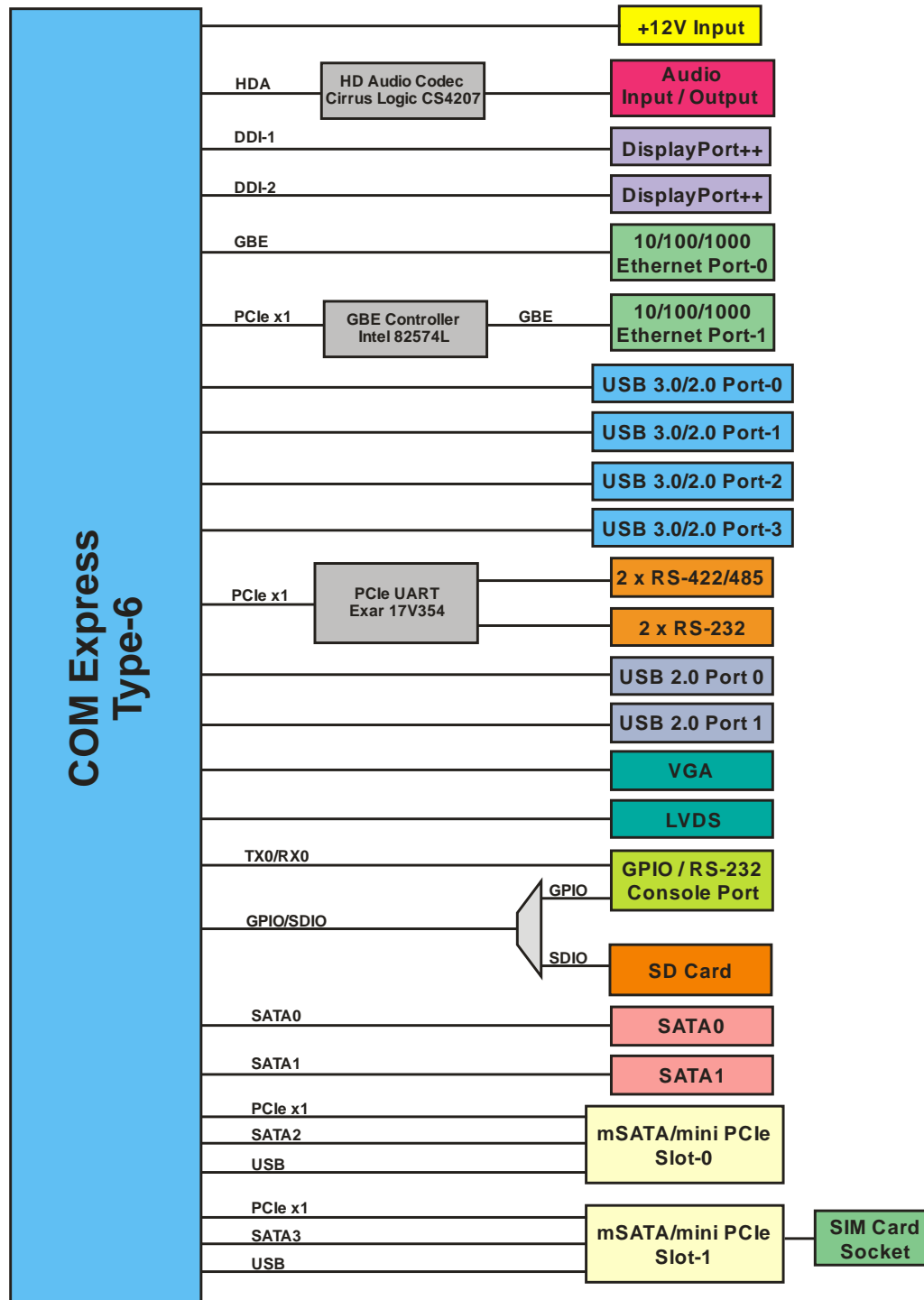
Part Numbers / Ordering Information

Part Number	
CCG011	USB 2.0 Only Model (Lower overall mated cable assembly heights)
CCG012	USB 3.0 Model



Product Overview

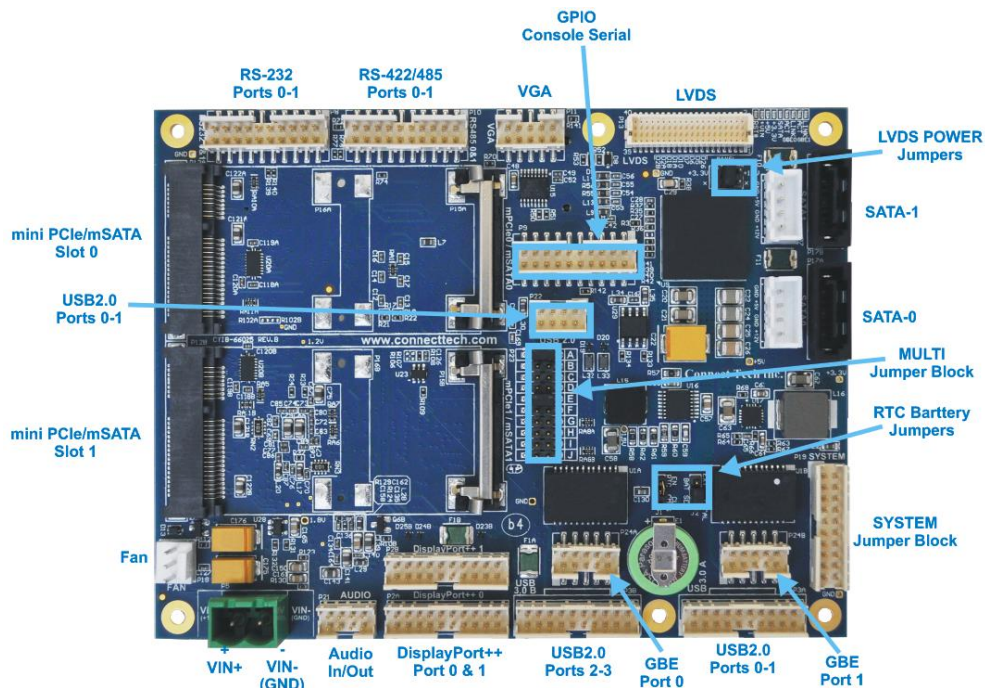
Block Diagram



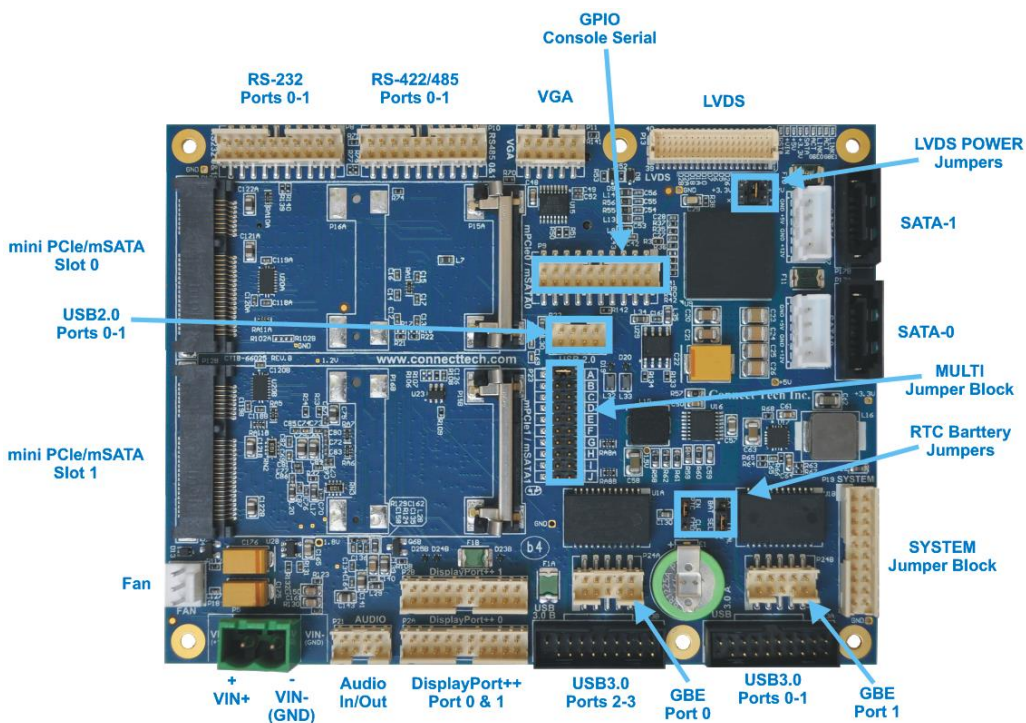


Connector Locations

CCG011 - Top View



CCG012 - Top View

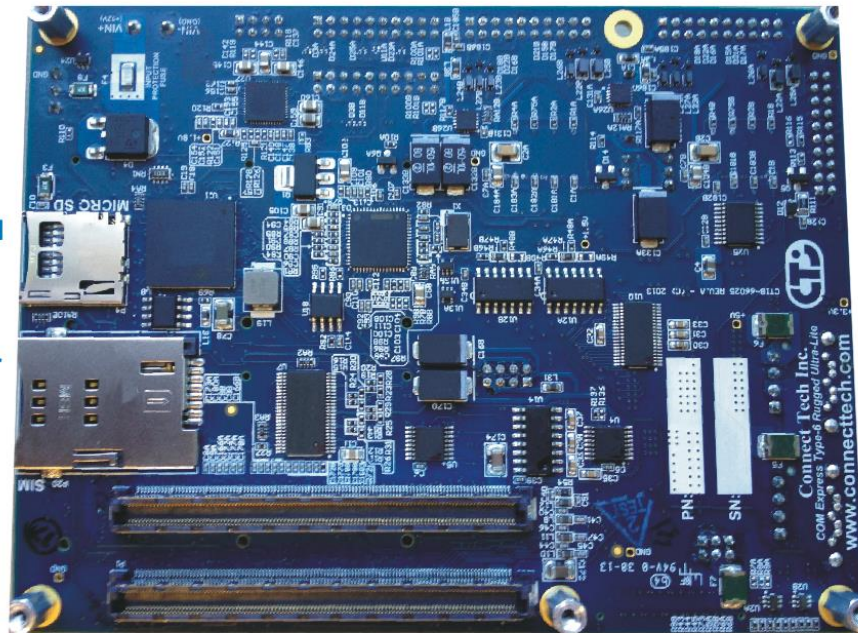




Bottom View

micro SD Card
Slot

SIM Card Socket for
mini PCIe/mSATA
Slot 1



COM Express Type-6


Jumper and Connector Summary

Designator	Description
P1	COM Express Connector,
P2A P2B	Display Port
P3A P3B	USB 3.0 Ports 0,1 USB 3.0 Ports 2,3
P4	Micro SD card.
P5	+12VDC Power In
P6, P7	SATA Power
P8	RS232 Ports 1&2
P9	GPIO and COM Express Type 6 simple serial
P10	RS485 Ports 3&4
P11	VGA
P12A, P12B	Dual mode MiniPCle / mSATA
P13	LVDS
P14	-
P15,P16	Mini PCle Retention Latches
P17A, P17B	SATA Signal Ports 1&2
P18	CPU FAN Power
P19	Reset, #S3, I2C, Power Button Misc
P20	Mini SIM card connector
P21	Stereo Audio In and Out
P22	2 x USB2.0 Internal Connector
P23	Misc Controls
J1	RTC Clear
J2	RTC Selection
J3	LVDS power selection

Detailed Feature Pinouts and Descriptions

COM Express Module Connector [P1]

The processor and chipset are implemented on the COM Express Type 6 CPU module, which connects to the COM Express carrier via a Tyco fine pitch stacking connector.

Function	COM Express interface	
Location	P1	
Type	Tyco fine pitch stacking connector, part number: 3-5353652-6 8mm stack height.	
Pinout	Refer to COM Express R2.0 specification, Type-6.	

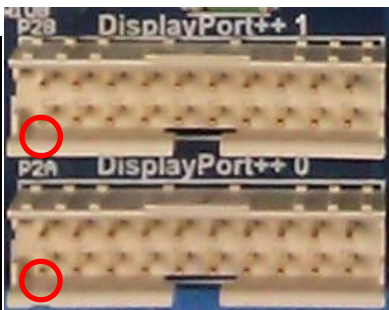
Note: 8mm standoffs are required to mount COM Express module.

DisplayPort ++ Video [P2A,P2B]

The *COM Express Type 6 Rugged Ultra-Lite Carrier* features two DisplayPort++ connectors. This can be configured to output DisplayPort, HDMI/DVI or even VGA through the use of a dongle.

The configuration of each interface is setup via the COM Express module's BIOS settings. Refer to the COM Express module's documentation for more details.

Function	DisplayPort++ Video Output Connectors			
Location	P2A, P2B			
Type	FCI 98414-G06-20LF, 2x10 2mm			
Cable	CBG113			
Pinout	Pin	Description	Pin	Description
	1	DP0+	2	DP3+
	3	DP0-	4	DP3-
	5	GND	6	GND
	7	DP1+	8	DPAUX-
	9	DP1-	10	DPAUX+
	11	GND	12	GND
	13	DP2+	14	DP Hot Plug Detect
	15	DP2-	16	GND
	17	GND	18	GND
	19	DP Power	20	DP AUX SEL ^[1]



P2	
1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20

[1] – For **DP_AUX_SEL** – Cable assembly must tie high (+3.3V) for HDMI/DVI output and low (GND) for DisplayPort output.

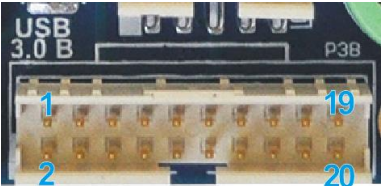
HDMI / DVI / VGA from DisplayPort++

The *COM Express Type 10 Mini Carrier*'s DisplayPort++ connector can be used for display outputs other than DisplayPort. The use of HDMI, DVI or VGA can be done through a simple dongle or cable assembly like the ones shown below. These can be purchased from any OEM vendor (such as www.startech.com) or directly through Connect Tech.



CCG011 - USB 2.0 Ports [P3A,P3B]

The CCG011 board houses 4 x USB 2.0 ports on 20-pin headers and 2 x USB 2.0 ports on 8-pin headers. Below is a description of the 20-pin USB 2.0 headers on the CCG011 carrier.

Function	Dual, USB 2.0			
Locations	P3A, P3B			
Type	FCI 98414-G06-20LF, 2x10 2mm			
Cable	CBG130			
Pinout	Pin	Description	Pin	Description
	1	PORT A, VBUS	2	-
	3	-	4	PORT B, VBUS
	5	-	6	-
	7	PORT A, GND	8	-
	9	-	10	PORT B, GND
	11	-	12	-
	13	PORT A, GND	14	-
	15	PORT A, D-	16	PORT B, GND
	17	PORT A, D+	18	PORT B, D-
	19	-	20	PORT B, D+
				

CCG012 - USB 3.0 Ports [P3A,P3B]

The CCG012 carrier implements four USB 3.0 connections via two 19-pin Locking Intel Motherboard style USB connectors. Over current protection, power supply filtering and ESD protection is provided.

Each USB 3.0 port is capable of bitrates of up to 5Gbps, as well as accepting USB2.0 and below connections.

Function	Dual, USB 3.0																																															
Locations	P3A, P3B																																															
Type	Intel Locking Motherboard Style 19-pin USB3.0 connector																																															
Cable	CBG131 (Or any Standard USB 3.0 "Internal" 19-pin Motherboard Cable.) http://www.intel.com/content/www/us/en/io/universal-serial-bus/usb3-internal-connector-cable-specification.html																																															
Pinout	<table><thead><tr><th>Pin</th><th>Description</th><th>Pin</th><th>Description</th></tr></thead><tbody><tr><td>-</td><td>-</td><td>1</td><td>P1-VBUS</td></tr><tr><td>19</td><td>P2-VBUS</td><td>2</td><td>P1-SSRX-</td></tr><tr><td>18</td><td>P2-SSRX-</td><td>3</td><td>P1-SSRX+</td></tr><tr><td>17</td><td>P2-SSRX+</td><td>4</td><td>GND</td></tr><tr><td>16</td><td>GND</td><td>5</td><td>P1-SSTX-</td></tr><tr><td>15</td><td>P2-SSTX-</td><td>6</td><td>P1-SSTX+</td></tr><tr><td>14</td><td>P2-SSTX+</td><td>7</td><td>GND</td></tr><tr><td>13</td><td>GND</td><td>8</td><td>P1-D-</td></tr><tr><td>12</td><td>P2-D-</td><td>9</td><td>P1-D+</td></tr><tr><td>11</td><td>P2-D+</td><td>10</td><td>-</td></tr></tbody></table>				Pin	Description	Pin	Description	-	-	1	P1-VBUS	19	P2-VBUS	2	P1-SSRX-	18	P2-SSRX-	3	P1-SSRX+	17	P2-SSRX+	4	GND	16	GND	5	P1-SSTX-	15	P2-SSTX-	6	P1-SSTX+	14	P2-SSTX+	7	GND	13	GND	8	P1-D-	12	P2-D-	9	P1-D+	11	P2-D+	10	-
Pin	Description	Pin	Description																																													
-	-	1	P1-VBUS																																													
19	P2-VBUS	2	P1-SSRX-																																													
18	P2-SSRX-	3	P1-SSRX+																																													
17	P2-SSRX+	4	GND																																													
16	GND	5	P1-SSTX-																																													
15	P2-SSTX-	6	P1-SSTX+																																													
14	P2-SSTX+	7	GND																																													
13	GND	8	P1-D-																																													
12	P2-D-	9	P1-D+																																													
11	P2-D+	10	-																																													



MicroSD Card [P4]

The COM Express Ultra-Lite carrier provides a Micro SD Card Slot at P4. This Micro SD Card slot sources the SDIO interface from the COM Express modules GPIO pins.

** Note this SD card slot will ONLY operate if the COM Express module provides the SDIO interface over the GPIO pins. See below for the SDIO / GPIO mapping **

Also ensure **MULTI-JUMPER position “B”** is installed to select the SDIO interface.

Function	Micro SD Card Slot		
Locations	P4		
Type	Micro SD Card Socket Molex 502570-0893		
Pinout	Pin	SDIO Signal	COM Express GPIO Mapping
	1	SD_D2	GPI2
	2	SD_D3	GPI3
	3	SD_CMD	GPO1
	4	SD_VCC (+3.3V)	-
	5	SD_CLK	GPO0
	6	GND	-
	7	SD_D0	GPI0
	8	SD_D1	GPI1
	9	GND	-
	10	SD_CD#	GP03

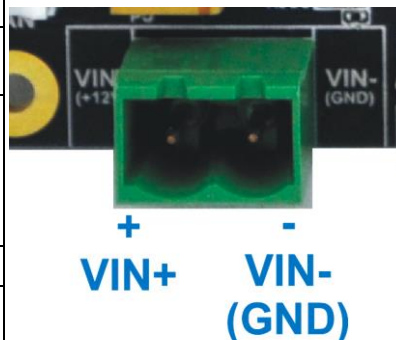
micro SD Card
Slot



Input Power [P5]

The COM Express carrier is designed to be powered from a regulated single +12V power supply. The carrier board features a 5mm screw terminal style connector. The COM Express carrier generates all of the necessary voltages on board from this single input.

Function	Main Input Power		
Location	P5		
Range	11.4 VDC to 12.6 VDC (+/-5%). Recommend no less than 12VDC at terminal block input.		
Type	2 Position 5mm pitch terminal connector Mating Connector: PN: 796634-2 MFG: TE Connectivity		
Fuse	+12V is protected with a one-time 10A fuse, at F4.		
Pinout	Pin	Signal	Description
	1	+12V	Power In
	2	GND	Power Return
	*DO NOT REVERSE POLARITY!		




RTC Battery

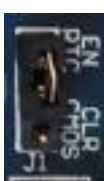
This carrier has a Panasonic BR1225A/FA Lithium battery providing 3V@ 48mAh to VBAT. VBAT is the supply for the RTC Clock of the COM Express module.

If the BR1225A is not sufficient for the application, an external battery can be connected to P19 with J2 selection jumper set appropriately.

For further information about RTC battery selection and life time estimation, see Application Note 00009 CTIN-00009 <http://connecttech.com/pdf/CTIN-00009.pdf>

Note: the battery ships with a non-conductive label to prevent accidental discharge. It can be removed before installation.

Function	RTC Battery Selection		
Location	J2		
Type	1x3		
Pinout	Location	Description	
	1-2	External battery	
	2-3	Local On-board Battery	

Function	RTC Clear		
Location	J1		
Type	1x3		
Pinout	Location	Description	
	1-2	Enable RTC	
	2-3	Clear CMOS	

Asynchronous Serial Ports [P8, P10]

The COM Express Ultra-Lite carrier features four “external” serials ports. Port1 and Port2 are standard RS-232 and Port3 and Port4 can be configured as RS-422/485. These serial ports are generated from on-board PCIe 4-port UART the Exar 17V358 (Connect Tech’s BlueStorm/Express Circuitry).

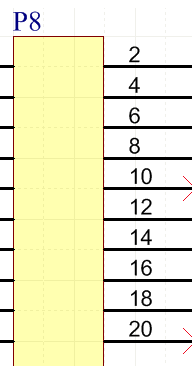
Software Support for the Exar 17V358

Additional drivers will be needed to properly operate the 4 additional serial ports on the COM Express carrier. Drivers for this functionality can be found on Connect Tech’s website:

<http://connecttech.com/resource-center/drivers-for-pci-express-bluestormexpress/>


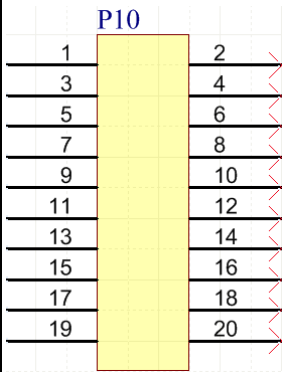
Serial Connector RS-232

Function	RS232 Serial			
Location	P8			
Type	FCI 98424-G52-20LF, 2x10 2mm			
Cable	CBG121			
Pinout	Pin	Description	Pin	Description
	1	Port A, DCD	2	Port A, DSR
	3	Port A, RXD	4	Port A, RTS
	5	Port A, TXD	6	Port A, CTS
	7	Port A, DTR	8	Port A, RI
	9	GND	10	-
	11	Port B, DCD	12	Port B,DSR
	13	Port B,RXD	14	Port B,RTS
	15	Port B,TXD	16	Port B,CTS
	17	Port B,DTR	18	Port B,RI
	19	GND	20	-



Serial Connector RS-422/485

Function	RS485 Serial	
Location	P10	
Type	FCI 98424-G52-20LF, 2x10 2mm	
Pinout	Pin	Description
	1	Port A, RXD+
	3	Port A, TXD+
	5	Port A, TXD-
	7	Port A, RXD-
	9	GND
	11	Port B, RXD+
	13	Port B, TXD+
	15	Port B, TXD-
	17	Port B, RXD-
	19	GND

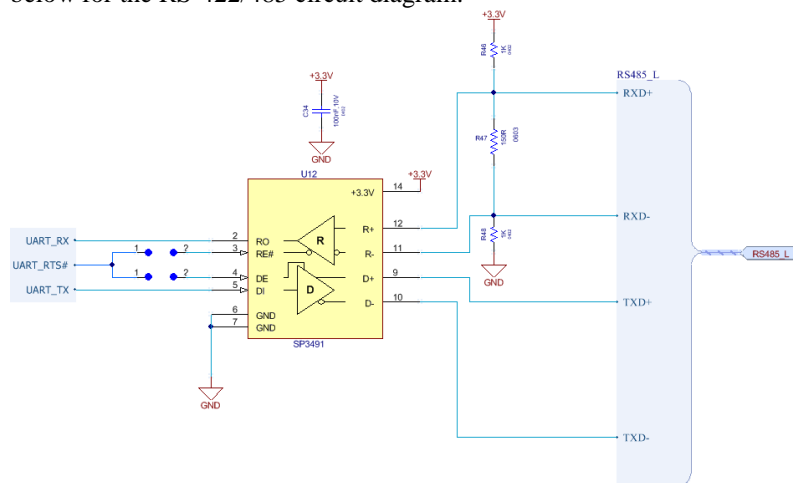



RS485 Control Jumpers

The RS485 Control Jumpers are used for implementing the following RS485 modes of operations:

- ½ Duplex Multidrop
- Full Duplex Multidrop

The UART RTS signals can be used for TX/RX control and can be enable via the MULTI jumper block. See below for the RS-422/485 circuit diagram.



sample circuit shown (not exact circuit that is on-board)

GPIO and Console Serial Port [P9]

The COM Express Ultra-Lite carrier provides additional functionality of COM Express Type-6 specification.


Function	Console RS-232 / GPIO			
Locations	P9			
Type	FCI 98424-G52-20LF			
Cable	CBG121			
Pinout	Pin	Description	Pin	Description
	1	GPIO Input 0	2	GPIO Output 3
	3	GPIO Input 1	4	GPIO Output 2
	5	GPIO Input 2	6	GPIO Output 1
	7	GPIO Input 3	8	GPIO Output 0
	9	GND	10	-
	11	-	12	-
	13	RS-232 RX	14	-
	15	RS-232 TX	16	-
	17	-	18	-
	19	GND	20	-

P9

1	2
3	4
5	6
7	8
9	10
11	12
13	14
15	16
17	18
19	20

VGA Video [P11]

Function	Standard VGA			
Location	P11			
Type	FCI 98424-G52-10LF, 2x5 2mm header			
Cable	CBG120			
Pinout				
	Pin	Description	Pin	Description
	1	Red	2	GND
	3	Green	4	-
	5	Blue	6	SC DDC
	7	HSYNC	8	SD DDC
	9	VSYNC	10	GND



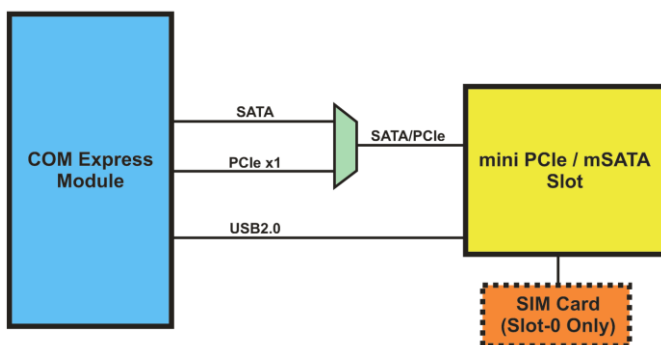
1		2
3		4
5		6
7		8
9		10

miniPCIe & mSATA Slots [P12A, P12B]

Dual Function miniPCIe mSATA Slots

The COM Express Ultra-Lite has two special dual purpose functionality mini PCIe / mSATA slots. Each of these slots can accept either a mini PCIe module or a mSATA SSD module. These slots have special circuitry that allows for the selection between connecting PCIe lanes or SATA lanes.

Each of these slots are also provided with a USB 2.0 in addition to the PCIe as per the mini PCIe specification, see below for a block diagram of the slots functionality.



PCIe / SATA Dual Functionality Diagram

Selection between mSATA and miniPCIe is done on the MULTI-JUMPER block (P23)

Position	Jumper ON	Jumper OFF
C	Slot-0 miniPCIe selected	Slot-0 mSATA selected
D	Slot-1 miniPCIe selected	Slot-1 mSATA selected

Half and Full Length mini PCIe / mSATA module Installation

The COM Express Ultra-Lite come populated by default with its latches in the full length position. If you wish install a half-length module you must use a half-to-full length bracket like shown below. If you would prefer to have a slot or both populated with half at the time of your production order please contact sales@connecttech.com for further details.



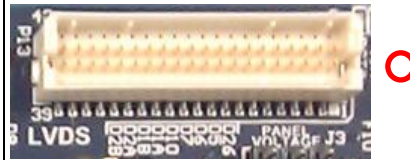
Function	mini PCIe / mSATA Slots	
Locations	P12A, P12B	
Type	Standard miniPCIe Slots	



Pinout	mSATA Pinout		miniPCle Pinout	
	Pin Number	Description	Pin Number	Description
	1	NC	1	NC
	2	+3.3V	2	+3.3V
	3	NC	3	NC
	4	GND	4	GND
	5	NC	5	NC
	6	+1.5V	6	+1.5V
	7	NC	7	CLKREQ#
	8	NC	8	UIM_PWR
	9	GND	9	GND
	10	NC	10	UIM_DATA
	11	NC	11	PCle CLK+
	12	NC	12	UIM_CLK
	13	NC	13	PCle CLK-
	14	NC	14	UIM_RESET
	15	GND	15	GND
	16	NC	16	UIM_VPP
	17	NC	17	NC
	18	GND	18	GND
	19	NC	19	NC
	20	NC	20	W_DISABLE#
	21	RESV	21	RESV
	22	NC	22	NC
	23	SATA TX+ To Host System	23	PCle RX+ To Host System
	24	+3.3V	24	+3.3V
	25	SATA TX- To Host System	25	PCle RX- To Host System
	26	GND	26	GND
	27	GND	27	GND
	28	+1.5V	28	+1.5V
	29	GND	29	GND
	30	NC	30	SMB_CLK
	31	SATA RX- From Host System	31	PCle TX- From Host System
	32	NC	32	SMB_DATA
	33	SATA RX+ From Host System	33	PCle TX+ From Host System
	34	GND	34	GND
	35	GND	35	GND
	36	NC	36	USB D-
	37	GND	37	GND
	38	NC	38	USB D+
	39	+3.3V	39	+3.3V
	40	GND	40	GND
	41	+3.3V	41	+3.3V
	42	NC	42	NC
	43	RESV	43	RESV
	44	NC	44	NC
	45	NC	45	NC
	46	NC	46	NC
	47	NC	47	NC
	48	+1.5V	48	+1.5V
	49	NC	49	NC
	50	GND	50	GND
	51	NC	51	NC
	52	+3.3V	52	+3.3V

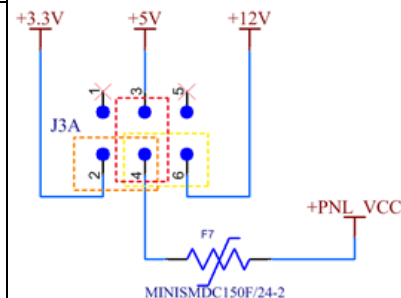
LVDS Video [P13]

Function	LVDS Video
Location	P11
Type	Hirose DF20G-40DP-1V(56)
Pinout	



The LVDS Panel VCC voltage is selected via the J3 jumper block. The current is limited to 1.5A


Function	LVDS Panel VCC voltage								
Location	J3								
Type	2x3								
Pinout	<table border="1"> <thead> <tr> <th>Location</th><th>Description</th></tr> </thead> <tbody> <tr> <td>2-4</td><td>3.3V</td></tr> <tr> <td>3-4</td><td>5V</td></tr> <tr> <td>5-6</td><td>12V</td></tr> </tbody> </table>	Location	Description	2-4	3.3V	3-4	5V	5-6	12V
Location	Description								
2-4	3.3V								
3-4	5V								
5-6	12V								



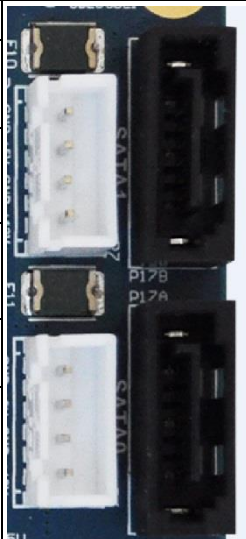
External SATA Ports [P17A,P17B]

The COM Express carrier provides two SATA HDD connections as well as external power connectors for each drive.

Function	SATA host																		
Locations	P17A – SATA – 0 P17B – SATA - 1																		
Type	Industry standard vertical entry SATA host connector with locking.																		
Cable	CBG090																		
Pinout	<table><tr><th>Pin</th><th>Description</th></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>SATA_TX_P</td></tr><tr><td>3</td><td>SATA_TX_N</td></tr><tr><td>4</td><td>GND</td></tr><tr><td>5</td><td>SATA_RX_N</td></tr><tr><td>6</td><td>SATA_RX_P</td></tr><tr><td>7</td><td>GND</td></tr></table>			Pin	Description	1	GND	2	SATA_TX_P	3	SATA_TX_N	4	GND	5	SATA_RX_N	6	SATA_RX_P	7	GND
Pin	Description																		
1	GND																		
2	SATA_TX_P																		
3	SATA_TX_N																		
4	GND																		
5	SATA_RX_N																		
6	SATA_RX_P																		
7	GND																		



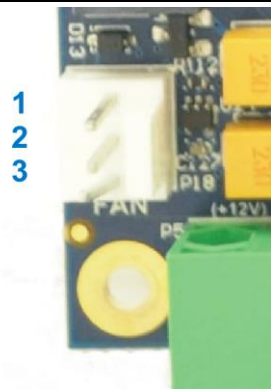
Function	SATA HDD Power											
Locations	P6, P7											
Carrier Connector PN	B4B-XH-AM(LF)(SN)(P) Manufacturer: JST											
Mating Connector PN	XHP-4 Manufacturer: JST											
Mating CTI Cable PN	CBG090											
Pinout	<table><thead><tr><th>Pin</th><th>Description</th></tr></thead><tbody><tr><td>1</td><td>GND (Black)</td></tr><tr><td>2</td><td>+5V (Red)</td></tr><tr><td>3</td><td>GND (Black)</td></tr><tr><td>4</td><td>+12V (Yellow)</td></tr></tbody></table> <p>+12V and +5V are protected with 1200mA Raychem Poly fuses.</p>		Pin	Description	1	GND (Black)	2	+5V (Red)	3	GND (Black)	4	+12V (Yellow)
Pin	Description											
1	GND (Black)											
2	+5V (Red)											
3	GND (Black)											
4	+12V (Yellow)											



Note: The SATA power connectors are fused independently from the main +12V fuse that provides +12V power to the board, i.e. the SATA power connectors are not double fused.

CPU Fan [P18]

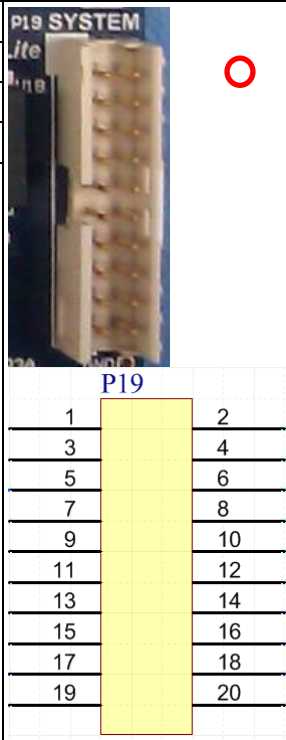
Function	Fan Power		
Location	P18		
Type	Molex 22-23-2031		
Pinout	Pin	Signal	
	1	Fan Tach	
	2	+V	
	3	GND	



Miscellaneous Control [P19]

This misc header can be used to connect power button, reset button, PC speaker, I2C device and monitor other power rails. Aswell it provides the option of jumpering the +5V rail to the +5VSB rail which may be needed by some modules.

Function	Miscellaneous Control Header			
Location	P19			
Type	FCI 98414-G06-20LF, 2x10 2mm			
Cable	CBG116			
Pinout	Pin	Description	Pin	Description
	1	+5V	2	Speaker
	3	+5V	4	+5VSB
	5	Ext CMOS Bat	6	GND
	7	System Reset	8	GND
	9	Power Button	10	GND
	11	Batlow#	12	GND
	13	Sus_S3#	14	GND
	15	I2C.CLK	16	GND
	17	I2C.DAT	18	GND
	19	+5V	20	GND





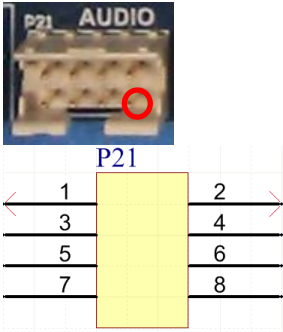
SIM Socket [P20]

Function	SIM Socket	
Location	P20	
Type	Molex 0475530001	
Pinout	<div><p>P20</p><p>SIM 6</p></div>	

Audio Interface [P21]

The *COM Express Type 10 Mini Carrier* features HD Audio capabilities care of the Cirrus Logic CS4207 Codec device. From the codec 1 input (microphone) and 1 output (headphone) are available.

Function	Audio Connector			
Locations	P21			
Type	FCI 98424-G52-10LF			
Cable	CBG118			
Pinout	Pin	Description	Pin	Description
	1	-	2	-
	3	Mic R	4	Mic L
	5	GND	6	GND
	7	Head Phone R	8	Head Phone L



Software Support for the CS4207

The audio codec used on the carrier board is the CS4207 from Cirrus Logic.

Additional drivers will be needed to properly operate audio on the COM Express carrier. Some downloadable links can be found below.

Windows XP Driver: http://www.cirrus.com/en/pubs/software/CS4207_WinXP_1-0-0-38.zip


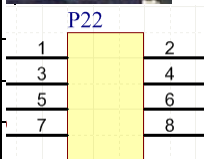
Windows 7/Vista Driver: http://www.cirrus.com/en/pubs/software/CS4207_WinVista_Win7_32-64-bit_6-6001-1-30.zip

Linux Driver: Included in kernels 2.6.30 and up.

USB 2.0 Ports [P22]

The *COM Express Type 10 Mini Carrier* has 6 external USB 2.0 ports. Each of these are directly sourced from the COM Express Type 10 module and do not go through any external hubs or bridges.

Function	USB 2.0			
Locations	P22			
Type	FCI 98414-G06-08LF, 2x4 2mm			
Cable	CBG104			
Pinout	Pin	Description	Pin	Description
	1	Port A-VBUS	2	Port B-VBUS [1]
	3	Port A-D-	4	Port B-D-
	5	Port A-D+	6	Port B-D+
	7	Port A-GND	8	Port B-GND

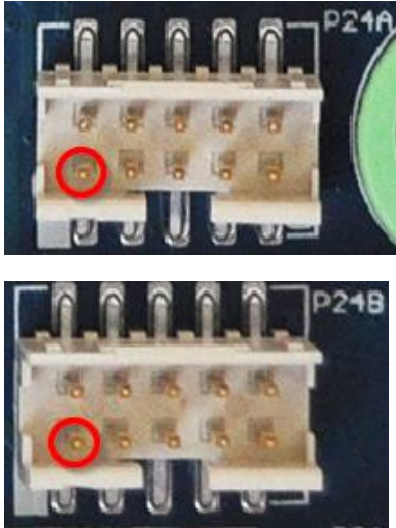



[1] – **B-VBUS** – This voltage can be disabled for USB Client mode on USB port 6, by un-installing jumper J23 position A.

10/100/1000 Ethernet (GBE) [P24A, P24B]

The COM Express carrier features dual 10/100/1000 Ethernet Ports.
GBE Port 0 is coming from an Intel 82574 PCIe PHY Controller located on the carrier.
GBE Port 1 is coming directly from the COM Express module.

Function	LAN Connector			
Locations	P24A, P24B			
Type	FCI 98424-G52-10LF			
Cable	CBG128			
Pinout	Pin	Description	Pin	Description
	1	MX1-	2	MX1+
	3	MX2-	4	MX2+
	5	SHELL	6	SHELL
	7	MX3-	8	MX3+
	9	MX4-	10	MX4+



Software Support for the Intel 82574

Additional drivers will be needed to properly operate the GBE Port 0 on the COM Express carrier.

These drivers can be downloaded directly from Intel website from the below link:

<http://downloadcenter.intel.com/SearchResult.aspx?lang=eng&ProductFamily=Ethernet+Components&ProductLine=Ethernet+Controllers&Product=Intel%C2%AE+82574+Gigabit+Ethernet+Controller>

Multifunction Jumper Block

The COM Express Type-6 Ultra-Lite Carrier has a multi-function jumper that provides control for various interfaces and features. The “MULTI” jumper is located at P23.



Below are the full details of the MULTI jumper block functionality.

Position	Description	JUMPER IN	JUMPER OFF
A	USB Port-7 Client/Host	Port-7 USB Host enabled. Power connected	Port-7 USB Client enabled. Power Disconnected
B	SD Card / GPIO Mux	SD Card Functionality is enabled	GPIO Functionality is enabled
C	mSATA / miniPCle Slot-0 Selection	miniPCle enabled	mSATA enabled
D	mSATA / miniPCle Slot-1 Selection	miniPCle enabled	mSATA enabled
E	PCle UART EEPROM	Enable PCle UART EEPROM	Disable PCle UART EEPROM
F	PCle UART - TRI State Enable	Enable TRI-State control for PCle UART	Disable TRI-State control for PCle UART
G	PCle UART - 485 Port 0 - RTS-TX Control	Enable RS-485 Port-0 RTS-TX Control	Disable RS-485 Port-0 RTS-TX Control
H	PCle UART - 485 Port 0 - RTS-RX Control	Enable RS-485 Port-0 RTS-RX Control	Disable RS-485 Port-0 RTS-RX Control
I	PCle UART - 485 Port 1 - RTS-TX Control	Enable RS-485 Port-1 RTS-TX Control	Disable RS-485 Port-1 RTS-TX Control
J	PCle UART - 485 Port 1 - RTS-RX Control	Enable RS-485 Port-1 RTS-RX Control	Disable RS-485 Port-1 RTS-RX Control

Note: Highlighted cell are the recommended default settings



Typical Hardware Installation for +12V power input

1. Ensure all external system power supplies are off.
2. Install the COM Express module into P1. Be sure to follow the manufacturer's direction for proper heatsink/heatspreader installation and any other cooling instructions from the manufacturer.
3. Install the necessary cables for the application. At a minimum, this would include:
 - a) +12V Power cable to the input power connector.
 - b) Connect a video display cable VGA, HDMI, DisplayPort or LVDS.
 - c) Keyboard and mouse via USB
 - d) SATA Power and Signal to SATA HDD

For the relevant cables, see the Cables & Interconnect section of this manual

4. Connect the power cable to power supply
5. Switch on the power supply. DO NOT power up your COM Express system by plugging in live power.

Current Consumption Details

Below are the maximum ratings of the carrier.

Maximums	Amps	Watts
Theoretical absolute maximum total draw of all functionality on the carrier board (this value excludes current draw from module)	4.00 A	48 W
Safety Protected Maximum Current Draw Rating for Module and Carrier (from in-line fuse)	10.00 A	120 W

Below are some examples of actual measurements taken with the COM Express Ultra-Lite Carrier running in various test setups. Some values will change depending on what COM Express module is installed, please refer to the module manufactures manual for full details on the current consumption of the particular module you are using.

Actual Measurements	Amps	Watts
Carrier standalone no module installed, powered ON, with no loads	0.16 A	1.92 W
Module Installed ^[1] , single DDI video output, USB keyboard with system sitting in BIOS	1.29 A	15.48 W
Module Installed ^[1] , single DDI video output, USB keyboard, booted Linux running CPU stress test	2.60 A	31.20 W
Module Installed ^[1] , dual DDI video output, 4 x USB 3.0 devices installed, 2 x USB2.0 devices installed, mSATA installed, miniPCle installed, audio in/out running, dual GBE running and CPU stress test	3.10 A	37.2 W

Note [1] : COM Express Type-6 Module used for measurements - Intel Core i5 Ivy Bridge 2700MHz Quad-Core Processor with QM77 chipset.

PCI Express Allocation Details

Below is a listing of how the PCI Express Links are allocated on the carrier board.

COM Express PCI Express Link	Peripheral Connection
PCIe x1 - 0	PCIe UART (Exar 17V354)
PCIe x1 - 1	miniPCIe / mSATA Slot 0
PCIe x1 - 2	miniPCIe / mSATA Slot 1
PCIe x1 - 3	PCIe GBE PHY (Intel 82574)
PCIe x1 - 4	No Connect
PCIe x1 - 5	No Connect
PCIe x1 - 6	No Connect
PCIe x1 - 7	No Connect
PEG /PCIe x16	No Connect

USB Allocation Details

Below is a listing of how the USB Ports are allocated on the carrier board.

COM Express USB Port	Peripheral Connection
USB 3.0 Port 0	USB 3.0 A Connector (P3A)
USB 3.0 Port 1	USB 3.0 A Connector (P3A)
USB 3.0 Port 2	USB 3.0 B Connector (P3B)
USB 3.0 Port 3	USB 3.0 B Connector (P3B)
USB 2.0 Port 0	USB 3.0 A Connector (P3A)
USB 2.0 Port 1	USB 3.0 A Connector (P3A)
USB 2.0 Port 2	USB 3.0 B Connector (P3B)
USB 2.0 Port 3	USB 3.0 B Connector (P3B)
USB 2.0 Port 4	miniPCIe / mSATA Slot 0
USB 2.0 Port 5	miniPCIe / mSATA Slot 1
USB 2.0 Port 6	USB 2.0 Connector (P22)
USB 2.0 Port 7	USB 2.0 Connector (P22)

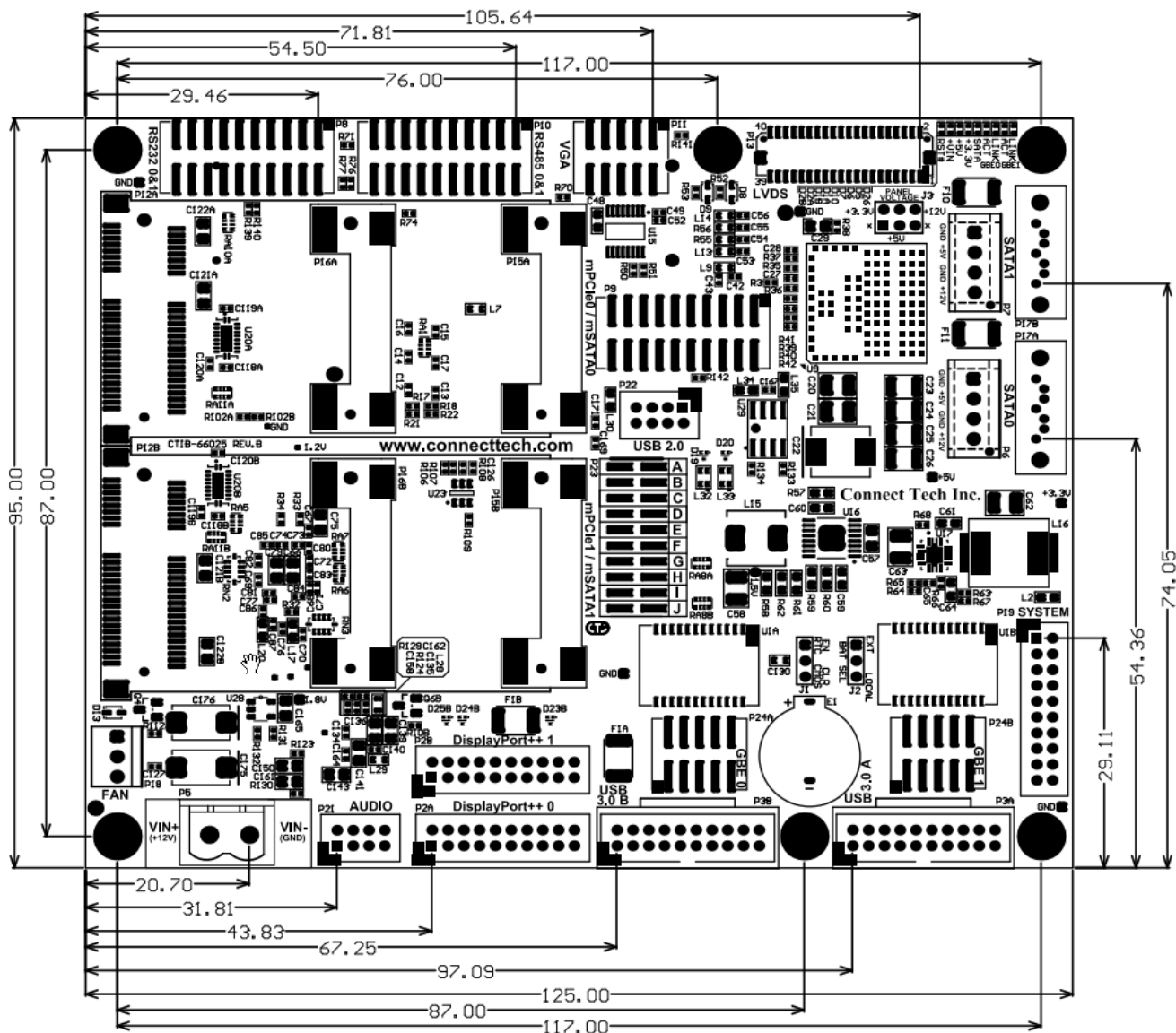
Mechanical Details

A complete **3D STEP Model** file of carrier board can be downloaded here:

http://www.connecttech.com/ftp/3d_models/CCG011_3D_MODEL.zip

2D Mechanical Top Down Dimensioned Drawing

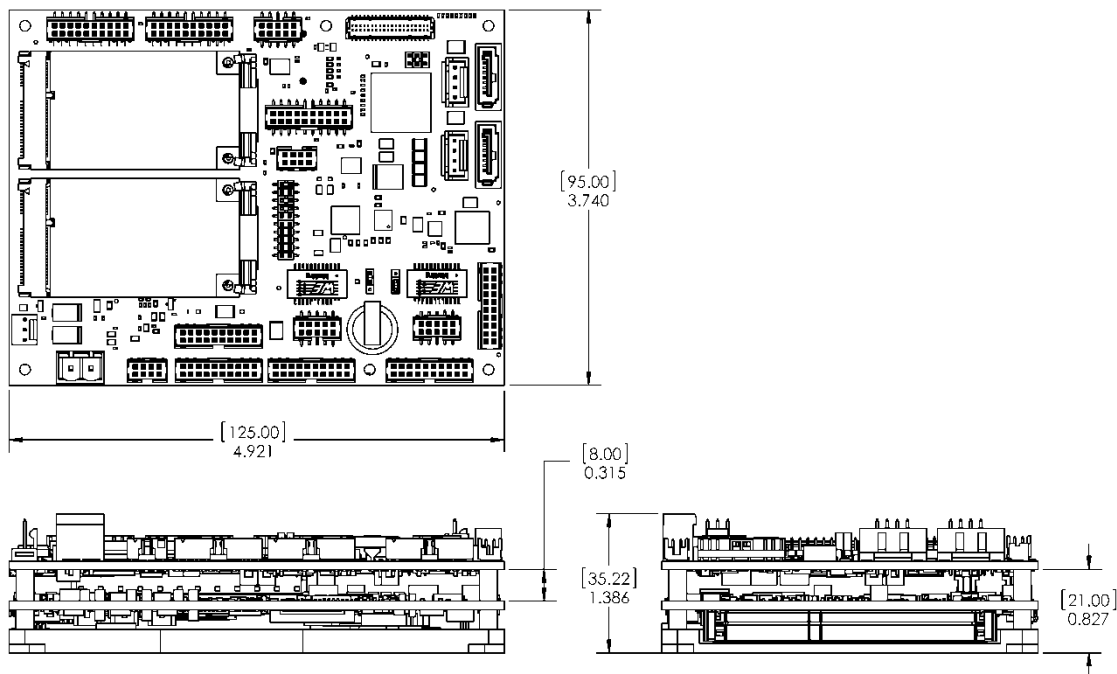
All dimension are in (mm)



2D Plan View Drawing

This drawing shows the CCG011/12 board mated with a COM Express module with a standard conductive cooled heatplate installed.

All dimensions are in (mm)





Cables and Cable Kit Information

Drawing No.	Part No.	Description	CKG020 CCG011 Full Kit	CKG055 CCG012 Full Kit	CKG021 CCG011 / CCG012 Starter Kit
CTIC-00347	CBG090	SATA HDD + Power cable	2	2	1
CTIC-00379	CBG120	VGA to 10-pin Minitex Cable	1	1	1
CTIC-00380	CBG121	Dual DB9 to 20-pin Minitex Cable	3	3	-
CTIC-00429	CBG104	Dual USB 2.0 to 8-Pin Minitex Cable	1	1	1
CTIC-00432	CBG113	DisplayPort to 20-pin Minitex Cable	2	2	-
CTIC-00433	CBG117	RJ-45 to 10-pin Minitex Cable	2	2	1
CTIC-00434	CBG118	Dual Audio to 8-Pin Minitex Cable	1	1	-
CTIC-00435	CBG116	System-Misc to 20-pin Minitex Cable	1	1	-
CTIC-00488	CBG130	Dual USB 2.0 to 20-pin Minitex Cable	2	-	-
N/A	CBG160	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Inner Exit	-	2	-
N/A	CBG287	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Outer Exit	-	2	-
N/A	CBG288	Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Vertical Exit	-	2	-

Cable Kits

Convenient cable kits are available. View drawings below:

- [CKG020: CCG011 Full Kit](#)
- [CKG055: CCG012 Full Kit](#)
- [CKG021: CCG011 / CCG012 Starter Kit](#)

Appendix A – COM Express Signal/Pinout Connection Details

The following table summarizes the COM Express Type-6 Ultra-Lite's COM Express signal/pinout utilization. From this table you will be able to see which COM Express signals have been used and where they are connected to on the carrier. As well No Connection pins are noted as "NC", pull-ups as "PU" and pull-downs as "PD".

COM Express Signal	COM Express Pin	CCG011/12 Connection
GND (FIXED)	A1	GND
GBE0_MDI3-	A2	GBE Port 0 (P24A)
GBE0_MDI3+	A3	GBE Port 0 (P24A)
GBE0_LINK100#	A4	GBE Port 0 (P24A)
GBE0_LINK1000#	A5	GBE Port 0 (P24A)
GBE0_MDI2-	A6	GBE Port 0 (P24A)
GBE0_MDI2+	A7	GBE Port 0 (P24A)
GBE0_LINK#	A8	GBE Port 0 (P24A)
GBE0_MDI1-	A9	GBE Port 0 (P24A)
GBE0_MDI1+	A10	GBE Port 0 (P24A)
GND (FIXED)	A11	GND
GBE0_MDI0-	A12	GBE Port 0 (P24A)
GBE0_MDI0+	A13	GBE Port 0 (P24A)
GBE0_CTREF	A14	GBE Port 0 (P24A)
SUS_S3#	A15	System Header
SATA0_TX+	A16	SATA-0 (P17A)
SATA0_TX-	A17	SATA-0 (P17A)
SUS_S4#	A18	NC
SATA0_RX+	A19	SATA-0 (P17A)
SATA0_RX-	A20	SATA-0 (P17A)
GND (FIXED)	A21	GND
SATA2_TX+	A22	mini-PCle/mSATA Slot-0
SATA2_TX-	A23	mini-PCle/mSATA Slot-0
SUS_S5#	A24	NC
SATA2_RX+	A25	mini-PCle/mSATA Slot-0
SATA2_RX-	A26	mini-PCle/mSATA Slot-0
BATLOW#	A27	System Header



SATA_ACT#	A28	LED
AC/HDA_SYNC	A29	HD Audio
AC/HDA_RST#	A30	HD Audio
GND (FIXED)	A31	GND
AC/HDA_BITCLK	A32	HD Audio
AC/HDA_SDOUT	A33	HD Audio
BIOS_DIS0#	A34	PU
THRMTRIP#	A35	NC
USB6-	A36	USB2.0 Port 6 (P22)
USB6+	A37	USB2.0 Port 6 (P22)
USB_6_7_OC#	A38	USB2.0 Port 6 (P22)
USB4-	A39	miniPCle Slot-0 (P12A)
USB4+	A40	miniPCle Slot-0 (P12A)
GND (FIXED)	A41	GND
USB2-	A42	USB3.0 Port-2 (P3B)
USB2+	A43	USB3.0 Port-2 (P3B)
USB_2_3_OC#	A44	USB3.0 Port-2/3
USB0-	A45	USB3.0 Port-0 (P3A)
USB0+	A46	USB3.0 Port-0 (P3A)
VCC_RTC	A47	RTC Battery
EXCD0_PERST#	A48	NC
EXCD0_CPPE#	A49	NC
LPC_SERIRQ	A50	NC
GND (FIXED)	A51	GND
PCIE_TX5+	A52	NC
PCIE_TX5-	A53	NC
GPI0	A54	GPI0 (P9) OR SD Card (P4)
PCIE_TX4+	A55	NC
PCIE_TX4-	A56	NC
GND	A57	GND
PCIE_TX3+	A58	GBE PHY Controller
PCIE_TX3-	A59	GBE PHY Controller



GND (FIXED)	A60	GND
PCIE_TX2+	A61	miniPCle Slot-1
PCIE_TX2-	A62	miniPCle Slot-1
GPI1	A63	GPIO (P9) OR SD Card (P4)
PCIE_TX1+	A64	miniPCle Slot-0
PCIE_TX1-	A65	miniPCle Slot-0
GND	A66	GND
GPI2	A67	GPIO (P9) OR SD Card (P4)
PCIE_TX0+	A68	4-Port PCle UART
PCIE_TX0-	A69	4-Port PCle UART
GND (FIXED)	A70	GND
LVDS_A0+	A71	LVDS Video (P13)
LVDS_A0-	A72	LVDS Video (P13)
LVDS_A1+	A73	LVDS Video (P13)
LVDS_A1-	A74	LVDS Video (P13)
LVDS_A2+	A75	LVDS Video (P13)
LVDS_A2-	A76	LVDS Video (P13)
LVDS_VDD_EN	A77	LVDS Video (P13)
LVDS_A3+	A78	LVDS Video (P13)
LVDS_A3-	A79	LVDS Video (P13)
GND (FIXED)	A80	GND
LVDS_A_CK+	A81	LVDS Video (P13)
LVDS_A_CK-	A82	LVDS Video (P13)
LVDS_I2C_CK	A83	LVDS Video (P13)
LVDS_I2C_DAT	A84	LVDS Video (P13)
GPI3	A85	GPIO (P9) OR SD Card (P4)
RSVD	A86	NC
RSVD	A87	NC
PCIE_CLK_REF+	A88	Main Carrier PCle Clock
PCIE_CLK_REF-	A89	Main Carrier PCle Clock
GND (FIXED)	A90	GND
SPI_POWER	A91	NC



SPI_MISO	A92	NC
GPO0	A93	GPIO (P9) OR SD Card (P4)
SPI_CLK	A94	NC
SPI_MOSI	A95	NC
TPM_PP	A96	NC
TYPE10#	A97	NC
SER0_TX	A98	GPIO Ser Connector (P9)
SER0_RX	A99	GPIO Ser Connector (P9)
GND (FIXED)	A100	GND
SER1_TX	A101	NC
SER1_RX	A102	PU
LID#	A103	NC
VCC_12V	A104	Input Power +VIN (P5)
VCC_12V	A105	Input Power +VIN (P5)
VCC_12V	A106	Input Power +VIN (P5)
VCC_12V	A107	Input Power +VIN (P5)
VCC_12V	A108	Input Power +VIN (P5)
VCC_12V	A109	Input Power +VIN (P5)
GND (FIXED)	A110	GND
GND (FIXED)	B1	GND
GBE0_ACT#	B2	GBE Port 0 (P24A)
LPC_FRAME#	B3	NC
LPC_AD0	B4	NC
LPC_AD1	B5	NC
LPC_AD2	B6	NC
LPC_AD3	B7	NC
LPC_DRQ0#	B8	PU
LPC_DRQ1#	B9	PU
LPC_CLK	B10	NC
GND (FIXED)	B11	GND
PWRBTN#	B12	System Header
SMB_CK	B13	System Header



SMB_DAT	B14	System Header
SMB_ALERT#	B15	System Header
SATA1_TX+	B16	SATA-1 (P17B)
SATA1_TX-	B17	SATA-1 (P17B)
SUS_STAT#	B18	NC
SATA1_RX+	B19	SATA-1 (P17B)
SATA1_RX-	B20	SATA-1 (P17B)
GND (FIXED)	B21	GND
SATA3_TX+	B22	miniPCle/mSATA Slot-1
SATA3_TX-	B23	miniPCle/mSATA Slot-1
PWR_OK	B24	System Header
SATA3_RX+	B25	miniPCle/mSATA Slot-1
SATA3_RX-	B26	miniPCle/mSATA Slot-1
WDT	B27	NC
AC/HDA_SDIN2	B28	PD
AC/HDA_SDIN1	B29	PD
AC/HDA_SDIN0	B30	HD Audio
GND (FIXED)	B31	GND
SPKR	B32	System Header
I2C_CK	B33	System Header
I2C_DAT	B34	System Header
THRM#	B35	PU
USB7-	B36	USB2.0 Port 7 (P22)
USB7+	B37	USB2.0 Port 7 (P22)
USB_4_5_OC#	B38	USB2.0 Port 7 (P22)
USB5-	B39	miniPCle Slot-1 (P12B)
USB5+	B40	miniPCle Slot-1 (P12B)
GND (FIXED)	B41	GND
USB3-	B42	USB3.0 Port-3 (P3A)
USB3+	B43	USB3.0 Port-3 (P3A)
USB_0_1_OC#	B44	USB3.0 Port-0/1
USB1-	B45	USB3.0 Port-1 (P3A)



USB1+	B46	USB3.0 Port-1 (P3A)
EXCD1_PERST#	B47	NC
EXCD1_CPPE#	B48	NC
SYS_RESET#	B49	System Header
CB_RESET#	B50	Carrier Board Internal Circuitry
GND (FIXED)	B51	GND
PCIE_RX5+	B52	NC
PCIE_RX5-	B53	NC
GPO1	B54	GPIO (P9) OR SD Card (P4)
PCIE_RX4+	B55	NC
PCIE_RX4-	B56	NC
GPO2	B57	GPIO (P9) OR SD Card (P4)
PCIE_RX3+	B58	GBE PHY Controller
PCIE_RX3-	B59	GBE PHY Controller
GND (FIXED)	B60	GND
PCIE_RX2+	B61	miniPCle Slot-1
PCIE_RX2-	B62	miniPCle Slot-1
GPO3	B63	GPIO (P9) OR SD Card (P4)
PCIE_RX1+	B64	miniPCle Slot-0
PCIE_RX1-	B65	miniPCle Slot-0
WAKE0#	B66	NC
WAKE1#	B67	NC
PCIE_RX0+	B68	4-Port PCle UART
PCIE_RX0-	B69	4-Port PCle UART
GND (FIXED)	B70	GND
LVDS_B0+	B71	LVDS Video (P13)
LVDS_B0-	B72	LVDS Video (P13)
LVDS_B1+	B73	LVDS Video (P13)
LVDS_B1-	B74	LVDS Video (P13)
LVDS_B2+	B75	LVDS Video (P13)
LVDS_B2-	B76	LVDS Video (P13)
LVDS_B3+	B77	LVDS Video (P13)



LVDS_B3-	B78	LVDS Video (P13)
LVDS_BKLT_EN	B79	LVDS Video (P13)
GND (FIXED)	B80	GND
LVDS_B_CK+	B81	LVDS Video (P13)
LVDS_B_CK-	B82	LVDS Video (P13)
LVDS_BKLT_CTRL	B83	LVDS Video (P13)
VCC_5V_SBY	B84	System Header (Ferrite Connected to +5V)
VCC_5V_SBY	B85	System Header (Ferrite Connected to +5V)
VCC_5V_SBY	B86	System Header (Ferrite Connected to +5V)
VCC_5V_SBY	B87	System Header (Ferrite Connected to +5V)
BIOS_DIS1#	B88	PU
VGA_RED	B89	VGA Video
GND (FIXED)	B90	GND
VGA_GRN	B91	VGA Video
VGA_BLU	B92	VGA Video
VGA_HSYNC	B93	VGA Video
VGA_VSYNC	B94	VGA Video
VGA_I2C_CK	B95	VGA Video
VGA_I2C_DAT	B96	VGA Video
SPI_CS#	B97	NC
RSVD	B98	NC
RSVD	B99	NC
GND (FIXED)	B100	GND
FAN_PWMOUT	B101	NC
FAN_TACHOIN	B102	Fan Connector
SLEEP#	B103	NC
VCC_12V	B104	Input Power +VIN (P5)
VCC_12V	B105	Input Power +VIN (P5)
VCC_12V	B106	Input Power +VIN (P5)
VCC_12V	B107	Input Power +VIN (P5)
VCC_12V	B108	Input Power +VIN (P5)
VCC_12V	B109	Input Power +VIN (P5)



GND (FIXED)	B110	GND
GND (FIXED)	C1	GND
GND	C2	GND
USB_SSRX0-	C3	USB3.0 Port-0 (P3A)
USB_SSRX0+	C4	USB3.0 Port-0 (P3A)
GND	C5	GND
USB_SSRX1-	C6	USB3.0 Port-1 (P3A)
USB_SSRX1+	C7	USB3.0 Port-1 (P3A)
GND	C8	GND
USB_SSRX2-	C9	USB3.0 Port-2 (P3B)
USB_SSRX2+	C10	USB3.0 Port-2 (P3B)
GND (FIXED)	C11	GND
USB_SSRX3-	C12	USB3.0 Port-2 (P3B)
USB_SSRX3+	C13	USB3.0 Port-2 (P3B)
GND	C14	GND
DDI1_PAIR6+	C15	NC
DDI1_PAIR6-	C16	NC
RSVD	C17	NC
RSVD	C18	NC
PCIE_RX6+	C19	NC
PCIE_RX6-	C20	NC
GND (FIXED)	C21	GND
PCIE_RX7+	C22	NC
PCIE_RX7-	C23	NC
DDI1_HPD	C24	DisplayPort++ Channel 1 (P2A)
DDI1_PAIR4+	C25	NC
DDI1_PAIR4-	C26	NC
RSVD	C27	NC
RSVD	C28	NC
DDI1_PAIR5+	C29	NC
DDI1_PAIR5-	C30	NC
GND (FIXED)	C31	GND



DDI2_CTRLCLK_AUX+	C32	DisplayPort++ Channel 2 (P2A)
DDI2_CTRLDATA_AUX-	C33	DisplayPort++ Channel 2 (P2A)
DDI2_DDC_AUX_SEL	C34	DisplayPort++ Channel 2 (P2A)
RSVD	C35	NC
DDI3_CTRLCLK_AUX+	C36	NC
DDI3_CTRLDATA_AUX-	C37	NC
DDI3_DDC_AUX_SEL	C38	NC
DDI3_PAIR0+	C39	NC
DDI3_PAIR0-	C40	NC
GND (FIXED)	C41	GND
DDI3_PAIR1+	C42	NC
DDI3_PAIR1-	C43	NC
DDI3_HPD	C44	NC
RSVD	C45	NC
DDI3_PAIR2+	C46	NC
DDI3_PAIR2-	C47	NC
RSVD	C48	NC
DDI3_PAIR3+	C49	NC
DDI3_PAIR3-	C50	NC
GND (FIXED)	C51	GND
PEG_RX0+	C52	NC
PEG_RX0-	C53	NC
TYPE0#	C54	NC
PEG_RX1+	C55	NC
PEG_RX1-	C56	NC
TYPE1#	C57	NC
PEG_RX2+	C58	NC
PEG_RX2-	C59	NC
GND (FIXED)	C60	GND
PEG_RX3+	C61	NC
PEG_RX3-	C62	NC
RSVD	C63	NC



RSVD	C64	NC
PEG_RX4+	C65	NC
PEG_RX4-	C66	NC
RSVD	C67	NC
PEG_RX5+	C68	NC
PEG_RX5-	C69	NC
GND (FIXED)	C70	GND
PEG_RX6+	C71	NC
PEG_RX6-	C72	NC
GND	C73	GND
PEG_RX7+	C74	NC
PEG_RX7-	C75	NC
GND	C76	GND
RSVD	C77	NC
PEG_RX8+	C78	NC
PEG_RX8-	C79	NC
GND (FIXED)	C80	GND
PEG_RX9+	C81	NC
PEG_RX9-	C82	NC
RSVD	C83	NC
GND	C84	GND
PEG_RX10+	C85	NC
PEG_RX10-	C86	NC
GND	C87	NC
PEG_RX11+	C88	NC
PEG_RX11-	C89	NC
GND (FIXED)	C90	GND
PEG_RX12+	C91	NC
PEG_RX12-	C92	NC
GND	C93	GND
PEG_RX13+	C94	NC
PEG_RX13-	C95	NC



GND	C96	GND
RSVD	C97	NC
PEG_RX14+	C98	NC
PEG_RX14-	C99	NC
GND (FIXED)	C100	GND
PEG_RX15+	C101	NC
PEG_RX15-	C102	NC
GND	C103	GND
VCC_12V	C104	Input Power +VIN (P5)
VCC_12V	C105	Input Power +VIN (P5)
VCC_12V	C106	Input Power +VIN (P5)
VCC_12V	C107	Input Power +VIN (P5)
VCC_12V	C108	Input Power +VIN (P5)
VCC_12V	C109	Input Power +VIN (P5)
GND (FIXED)	C110	GND
GND (FIXED)	D1	GND
GND	D2	GND
USB_SSTX0-	D3	USB3.0 Port-0 (P3A)
USB_SSTX0+	D4	USB3.0 Port-0 (P3A)
GND	D5	GND
USB_SSTX1-	D6	USB3.0 Port-1 (P3A)
USB_SSTX1+	D7	USB3.0 Port-1 (P3A)
GND	D8	GND
USB_SSTX2-	D9	USB3.0 Port-2 (P3B)
USB_SSTX2+	D10	USB3.0 Port-2 (P3B)
GND (FIXED)	D11	GND
USB_SSTX3-	D12	USB3.0 Port-2 (P3B)
USB_SSTX3+	D13	USB3.0 Port-2 (P3B)
GND	D14	GND
DDI1_CTRLCLK_AUX+	D15	DisplayPort++ Channel 1 (P2A)
DDI1_CTRLDATA_AUX-	D16	DisplayPort++ Channel 1 (P2A)
RSVD	D17	NC



RSVD	D18	NC
PCIE_TX6+	D19	NC
PCIE_TX6-	D20	NC
GND (FIXED)	D21	GND
PCIE_TX7+	D22	NC
PCIE_TX7-	D23	NC
RSVD	D24	NC
RSVD	D25	NC
DDI1_PAIR0+	D26	DisplayPort++ Channel 1 (P2A)
DDI1_PAIR0-	D27	DisplayPort++ Channel 1 (P2A)
RSVD	D28	NC
DDI1_PAIR1+	D29	DisplayPort++ Channel 1 (P2A)
DDI1_PAIR1-	D30	DisplayPort++ Channel 1 (P2A)
GND (FIXED)	D31	GND
DDI1_PAIR2+	D32	DisplayPort++ Channel 1 (P2A)
DDI1_PAIR2-	D33	DisplayPort++ Channel 1 (P2A)
DDI1_DDC_AUX_SEL	D34	PU
RSVD	D35	NC
DDI1_PAIR3+	D36	DisplayPort++ Channel 1 (P2A)
DDI1_PAIR3-	D37	DisplayPort++ Channel 1 (P2A)
RSVD	D38	NC
DDI2_PAIR0+	D39	DisplayPort++ Channel 2 (P2A)
DDI2_PAIR0-	D40	DisplayPort++ Channel 2 (P2A)
GND (FIXED)	D41	GND
DDI2_PAIR1+	D42	DisplayPort++ Channel 2 (P2A)
DDI2_PAIR1-	D43	DisplayPort++ Channel 2 (P2A)
DDI2_HPD	D44	DisplayPort++ Channel 2 (P2A)
RSVD	D45	NC
DDI2_PAIR2+	D46	DisplayPort++ Channel 2 (P2A)
DDI2_PAIR2-	D47	DisplayPort++ Channel 2 (P2A)
RSVD	D48	NC
DDI2_PAIR3+	D49	DisplayPort++ Channel 2 (P2A)



DDI2_PAIR3-	D50	DisplayPort++ Channel 2 (P2A)
GND (FIXED)	D51	GND
PEG_TX0+	D52	NC
PEG_TX0-	D53	NC
PEG_LANE_RV#	D54	NC
PEG_TX1+	D55	NC
PEG_TX1-	D56	NC
TYPE2#	D57	NC
PEG_TX2+	D58	NC
PEG_TX2-	D59	NC
GND (FIXED)	D60	GND
PEG_TX3+	D61	NC
PEG_TX3-	D62	NC
RSVD	D63	NC
RSVD	D64	NC
PEG_TX4+	D65	NC
PEG_TX4-	D66	NC
GND	D67	GND
PEG_TX5+	D68	NC
PEG_TX5-	D69	NC
GND (FIXED)	D70	GND
PEG_TX6+	D71	NC
PEG_TX6-	D72	NC
GND	D73	GND
PEG_TX7+	D74	NC
PEG_TX7-	D75	NC
GND	D76	GND
RSVD	D77	NC
PEG_TX8+	D78	NC
PEG_TX8-	D79	NC
GND (FIXED)	D80	GND
PEG_TX9+	D81	NC



PEG_TX9-	D82	NC
RSVD	D83	NC
GND	D84	GND
PEG_TX10+	D85	NC
PEG_TX10-	D86	NC
GND	D87	GND
PEG_TX11+	D88	NC
PEG_TX11-	D89	NC
GND (FIXED)	D90	GND
PEG_TX12+	D91	NC
PEG_TX12-	D92	NC
GND	D93	GND
PEG_TX13+	D94	NC
PEG_TX13-	D95	NC
GND	D96	GND
RSVD	D97	NC
PEG_TX14+	D98	NC
PEG_TX14-	D99	NC
GND (FIXED)	D100	GND
PEG_TX15+	D101	NC
PEG_TX15-	D102	NC
GND	D103	GND
VCC_12V	D104	Input Power +VIN (P5)
VCC_12V	D105	Input Power +VIN (P5)
VCC_12V	D106	Input Power +VIN (P5)
VCC_12V	D107	Input Power +VIN (P5)
VCC_12V	D108	Input Power +VIN (P5)
VCC_12V	D109	Input Power +VIN (P5)
GND (FIXED)	D110	GND