Connect Tech Inc.

COM Express Type 6
PMC/XMC Carrier
Users Guide

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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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www.connecttech.com

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 Lifetime Warranty

Connect Tech Inc. provides a Lifetime Warranty for all Connect Tech Inc. products. 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. Lifetime Warranty is defined as 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 Lifetime 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.

Copyright Notice

Trademark Acknowledgment

Revision History

Revision	Date	Changes
0.00	04/02/2013	Original
0.01	04/30/2013	Added Scew / Standoff Assembly Drawing

Introduction

Connect Tech's COM Express Carrier Boards are small feature rich, super flexible carrier boards that integrate with any industry standard Type 6 COM Express module. These bus-independent carrier boards offer easy connection to SATA HDD, USB 2 and USB 3, Audio, Dual Ethernet, HDMI , Display Port Video, LVDS Video, VGA video, RS232 and RS485 serial.

Connect Tech's COM Express carrier boards are ideal for compact and high performance computing applications in mobile entertainment, kiosks, digital signage, automation, ROVs and gaming applications.

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:

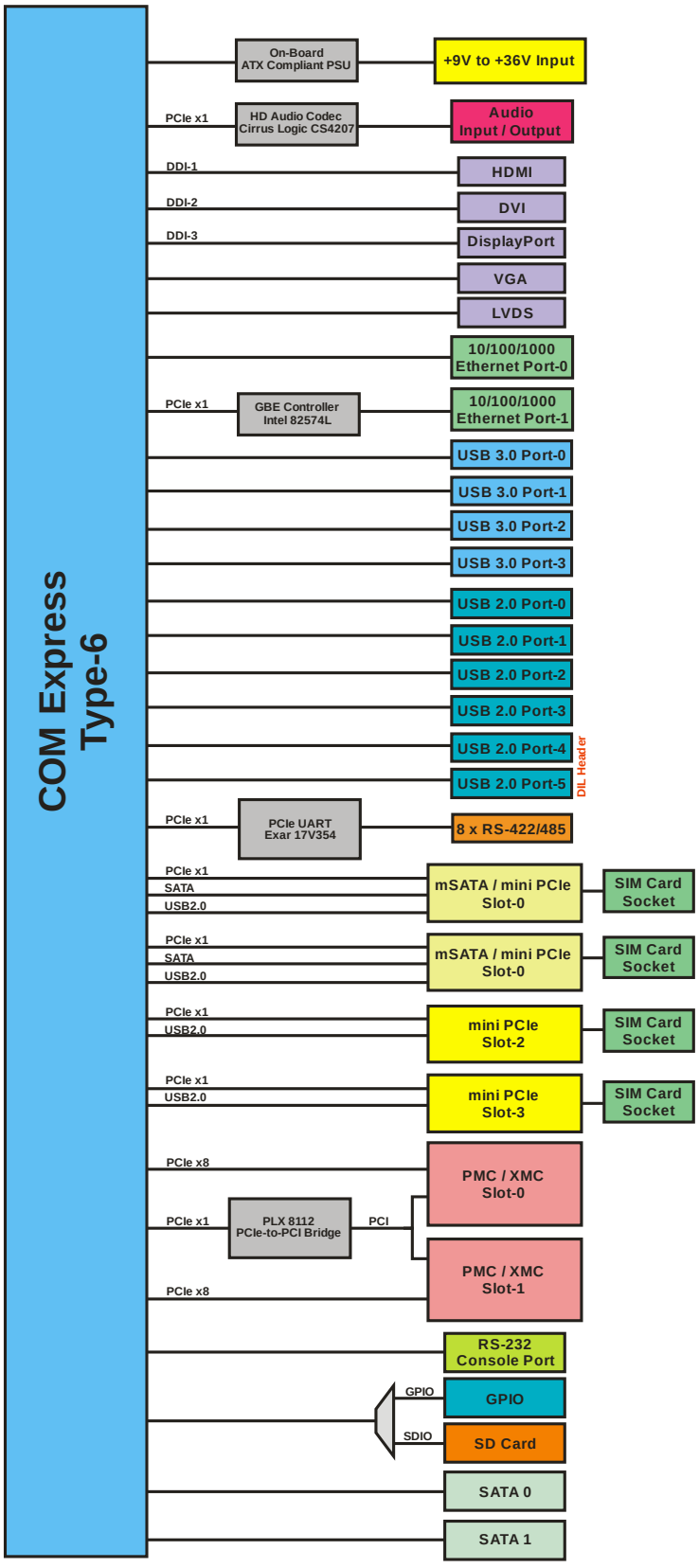
- Leaving circuit boards in their antistatic packaging until they are ready to be installed.
- Using a grounded wrist strap when handling circuit boards, at a minimum you should touch a grounded metal object to dissipate any static charge that may be present on you.
- Only handling circuit boards in 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.

Product Features and Specifications

Feature	Part Number: CCG007
PCB Size / Overall Size	15.000” x 7.500” Maximum Top Side Component Height: 1.259” 3D STEP Model: **download here**
Gigabit Ethernet	2
LVDS Video & Backlight power	Y
HDMI Video	Y
DisplayPort Video	Y
DVI Video	Y
VGA	Y
3.5mm Audio Connector	1 Stereo Input / 1 Stereo Output
PMC / XMC Slots	2
Dual mode mSATA/MiniPCIe	2
MiniPCIe Only Slots	2
SIM Card Slots	4
USB 3.0 Ports	4
USB 2.0 Ports	6
SATA HDD connector	2
SATA HDD power connector	2
GPIO or Micro SD	Y [1]
Power Connector	4 Position screw terminal
Standard Serial	8 x RS-232/485 [1]
Console Serial Port	1x RS232 basic port [1]
CMOS / RTC 3.3V Battery	Y
Accessories	Optional Cable Kit (SATA HDD/Power Cable, VGA, Serial)
Operating Temperature	-40 to +85 Celsius
Power Input	Wide Input (+6V to +36V)
Warranty and Support	Lifetime warranty and free technical support

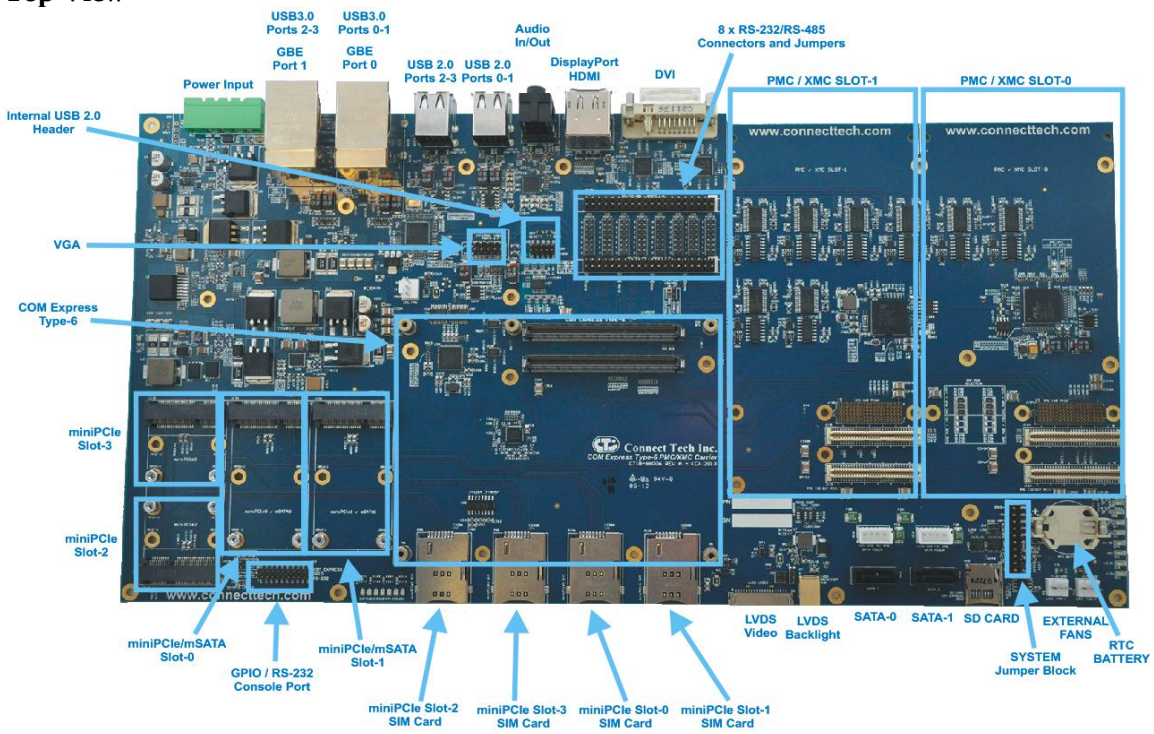
[1] Jumper Selectable.

Block Diagram

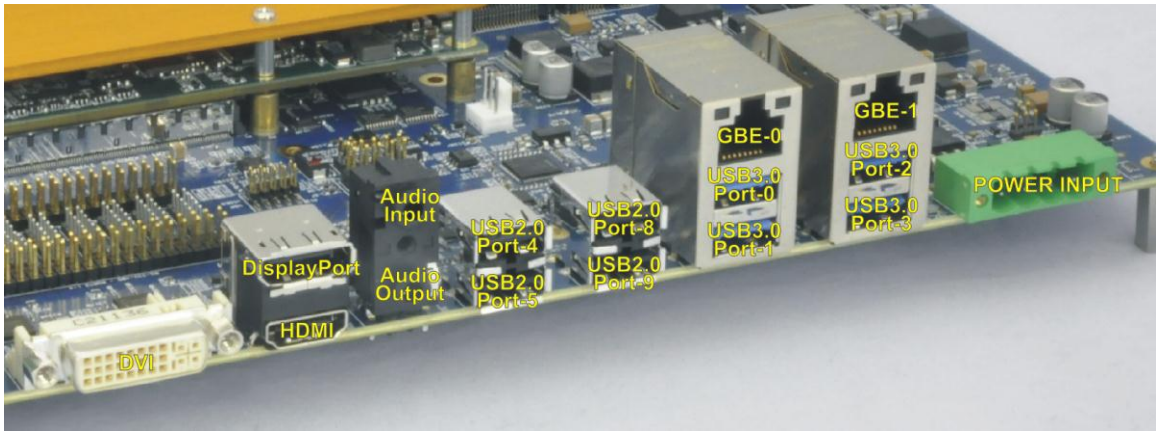


Connector Locations

Top View



Front View



Connector Summary

Designator	Connector	Description
J11A, J12A	PMC	PMC Slot-0 Connector
J11B, J12B	PMC	PMC Slot-1 Connector
J15A	XMC	XMC Slot-0 Connector
J15B	XMC	XMC Slot-1 Connector
P1	440-pin Board Stacking Connector	COM Express Type-6 Connector
P2A	SATA Vertical Locking	SATA Channel 2
P2B	SATA Vertical Locking	SATA Channel 3
P3A	4-pin 0.1" keyed header	SATA Power Channel 2
P3B	4-pin 0.1" keyed header	SATA Power Channel 3
P4	DVI D-Sub	DVI Video
P5	2 x 3.5mm Phono Jack	Audio Input/Output
P6	20-pin 1mm pitch Hirose DF19G	LVDS Video Connector
P7	2-pin JST SM02B	LVDS Backlight Power Connector
P8	3-pin 0.1" keyed header	Case Fan-1 (+12V)
P9A	SIM Card Socket	miniPCIe Slot-2 SIM Card Socket
P9B	SIM Card Socket	miniPCIe Slot-3 SIM Card Socket
P10A	SIM Card Socket	miniPCIe Slot-0 SIM Card Socket
P10B	SIM Card Socket	miniPCIe Slot-1 SIM Card Socket
P11	2 x 20-pin 0.1" header	RS-232/485 - PORTS 1-4
P12	2 x 20-pin 0.1" header	RS-232/485 - PORTS 5-8
P13	2 x 5-pin 2mm header	VGA Video Connector
P14	2 x 10-pin 2mm header	GPIO / RS-232 Console Connector
P16	4-pin 5mm Pitch Terminal Block	Input Power Connector
P17	2032 Coin Batter Socket	RTC Battery Socket
P18	3-pin 0.1" keyed header	CPU Fan Connector (+12V)
P20	2 x 5-pin 0.1" header	Internal USB 2.0 Ports 6 & 7
P21A	USB / RJ45	USB3.0 Ports 0&1 and GBE 0
P21B	USB / RJ45	USB3.0 Ports 2&3 and GBE 1
P22	DP / HDMI	Display Port and HDMI
P23A	USB	USB 2.0 Ports
P23B	USB	USB 2.0 Ports
P24	3-pin 0.1" keyed header	Case Fan-2 (+12V)
U11A	miniPCIe	miniPCIe-2 Connector
U11B	miniPCIe	miniPCIe-3 Connector
U13A	miniPCIe	miniPCIe-0 / mSATA-0 Connector
U13B	miniPCIe	miniPCIe-1 / mSATA-1 Connector

Jumper Summary

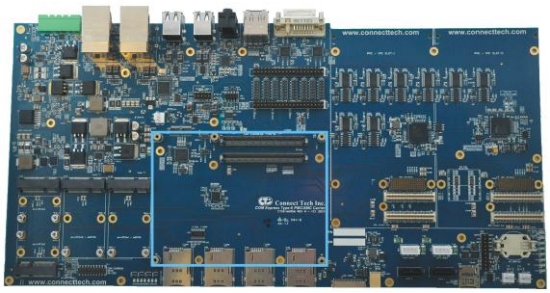
Designator	Jumper	Description
J1A	7-position 2mm Jumper Block	RS-232/RS-485 Port 1 Settings
J1B	7-position 2mm Jumper Block	RS-232/RS-485 Port 2 Settings
J1C	7-position 2mm Jumper Block	RS-232/RS-485 Port 3 Settings
J1D	7-position 2mm Jumper Block	RS-232/RS-485 Port 4 Settings
J1E	7-position 2mm Jumper Block	RS-232/RS-485 Port 5 Settings
J1F	7-position 2mm Jumper Block	RS-232/RS-485 Port 6 Settings
J1G	7-position 2mm Jumper Block	RS-232/RS-485 Port 7 Settings
J1H	7-position 2mm Jumper Block	RS-232/RS-485 Port 8 Settings
J3	2 x 2 2mm Jumper Block	LVDS Backlight Power Enable
J4	1 x 3 2mm Jumper Block	LVDS Backlight Control Enable
J6A	2mm Jumper	miniPCIe / mSATA Slot-0 Selection
J6B	2mm Jumper	miniPCIe / mSATA Slot-1 Selection
J7	2mm Jumper	PCIe UART EEPROM Enable
J8	2mm Jumper	PCIe UART Line Tri-State Control
J9	2mm Jumper	SD / GPIO Selection
J10	2mm Jumper	SD Card Write Enable
J13	2mm Jumper	S3 State Shutdown Enable
J14	1 x 3 2mm Jumper Block	Power Good Selection
J16	2mm Jumper	Internal USB2.0 Port 7 Power Enable
J17	2mm Jumper	Internal USB2.0 Port 6 Power Enable

Detailed Feature Pinouts and Functional Descriptions

COM Express Module Connector

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.

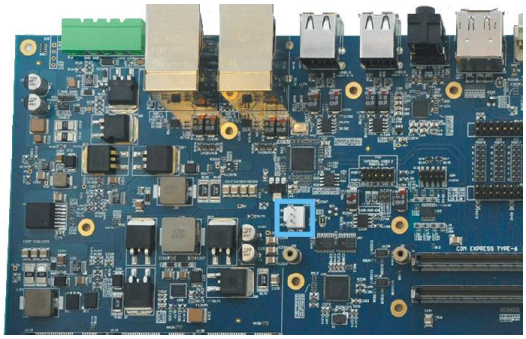
Function	**COM Express interface**
Location	P1
Type	Tyco fine pitch stacking connector Part Number: 3-5353652-6 8mm stack height.
Pinout	Refer to COM Express R2.0 specification, Type-6.



CPU Fan Connector

Function	Fan Power
Location	P18
Type	Molex: 22-23-2031
Pinout	

Pin	Signal
1	Fan Tach
2	+V
3	GND

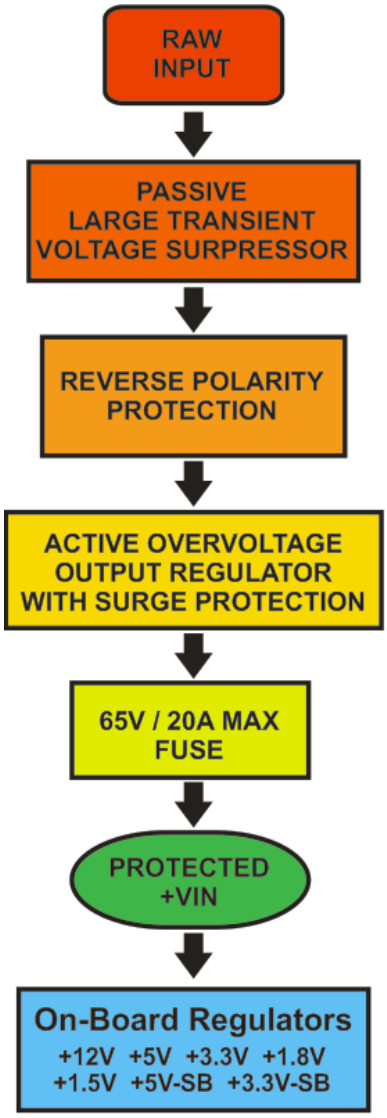


Input Power

The *COM Express Type-6 PMC/XMC Carrier* is designed to be powered from any DC input power source in the rage of **+6V to +36V DC**, which is ideal for many vehicle or rugged applications, but also many industrial power solutions as well.

Input Power Diagram

Below is diagram of the flow of the input power on the *COM Express Type-6 PMC/XMC Carrier*. The input power goes through various protection, safety and filtering components before connecting to the main on board regulators.

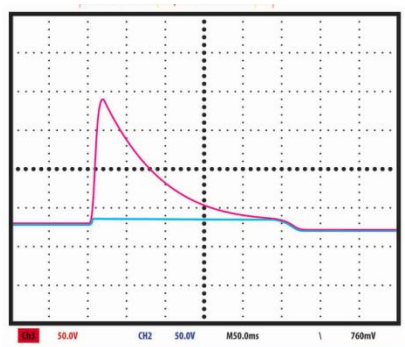


Active Input Power Protection Details

A benefit to using the *COM Express Type-6 PMC/XMC Carrier* is that it protects loads from high voltage input transients. It regulates the output during an overvoltage event, such as load dump in vehicles, by controlling the gate of an external N-channel MOSFET. The output is limited to a safe value allowing the loads to continue functioning.

The *COM Express Type-6 PMC/XMC Carrier* also monitors the voltage drop to protect against overcurrent faults. In either fault condition, a timer is started inversely proportional to MOSFET stress. If a fault condition persists, the supply is turned off.

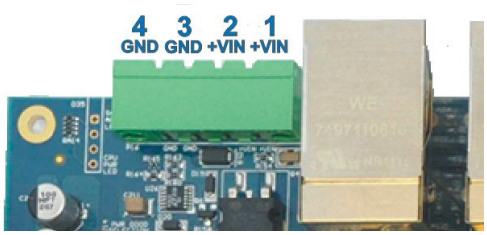
Two precision comparators monitor the input supply for overvoltage (OV) and undervoltage (UV) conditions. When the potential is below the UV threshold, the external MOSFET is kept off. If the input supply voltage is above the OV threshold, the MOSFET is not allowed to turn back on. Back-to-back MOSFETs are used for reverse input protection, reducing voltage drop and power loss.



Input Power Connector Details

Function	Main Input Power
Location	P5
Range	+6 VDC to +36 VDC
Type	4 Position 5mm pitch terminal connector Mating Connector PN: 20020003-G041B01LF
Pinout	

Pin	Signal	Description
1	+VIN	Power In
2	+VIN	Power In
3	GND	Ground / Return
4	GND	Ground / Return

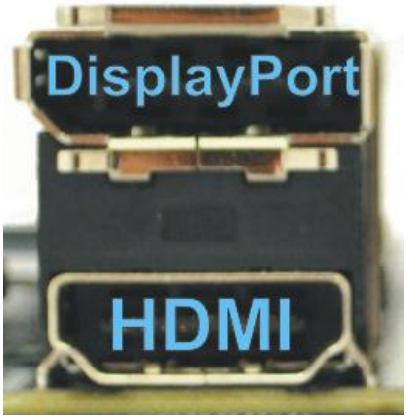


Video Outputs

The *COM Express Type-6 PMC/XMC Carrier* features up to 5 video outputs, VGA, HDMI, DisplayPort, DVI and LVDS. The availability of the graphics interfaces depends on your Type 6 COM Express module.

The configuration of either interface as the primary or secondary or tertiary display depends on the COM Express module's BIOS capabilities and settings. Refer to the COM Express module's documentation for more details.

HDMI and Display Port

Function	**HDMI and Display Port**	
Location	P3	
Type	**DisplayPort** Standard 4-lane connection **HDMI** Standard 3 pairs of TMDS Data, and 1 clock pair	

DVI

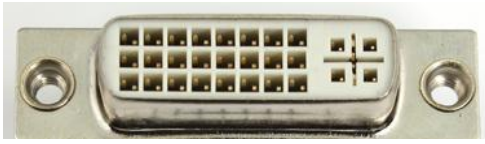
The DVI output on the carrier provides a Single-Link DVI connection. Where four pairs are connected back to the host COM Express module, Three of the pairs correspond to the RGB components of the video signal: red, green, blue (for a total of 24 bits per pixel.) The fourth link carries the pixel clock.

No dual-link signals are routed to this DVI Connector.
No analog signals are routed to this DVI Connector.

Function	**HDMI and Display Port**
Location	P3

Type

Pin	Signal
1	TMDS Data Channel 2-
2	TMDS Data Channel 2+
3	Shield for TMDS Data 2/4
4	NC
5	NC
6	DDC Clock
7	DDC Data
8	NC
9	TMDS Data Channel 1-
10	TMDS Data Channel 1+
11	Shield for TMDS Data 1/3
12	NC
13	NC
14	Power (+5V)
15	Ground
16	Hot Plug Detect
17	TMDS Data Channel 0-
18	TMDS Data Channel 0+
19	Shield for TMDS Data 0/5
20	NC
21	NC
22	TMDS Clock Shield
23	TMDS Clock+
24	TMDS Clock-
C1	NC
C2	NC
C3	NC
C4	NC



LVDS Video

Description

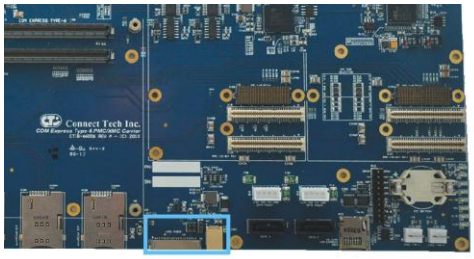
The COM Express carrier provides dual 18 or 24 bit LVDS display channels via P4, which are connected directly from the COM Express module. LVDS panel supply power is selected with jumper J1 and backlight power is selected with jumper J2. Both are current limited to 500 mA with Raychem resettable ploy fuses.

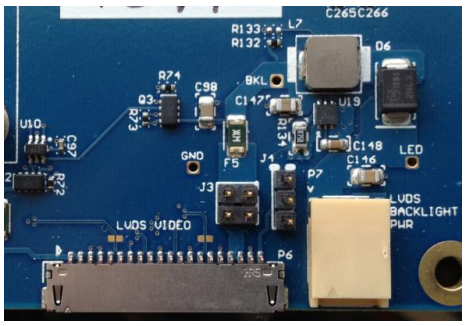
LVDS Video Header

Function	**LVDS Graphics**
Location	P13
Type	Hirose DF19G-20P-1H(54) connector

Pinout

Pin	Signal	Description
1	+3.3 VCC_PNL	Panel Power
2	+3.3 VCC_PNL	Panel Power
3	GND	Digital ground
4	GND	Digital ground
5	LVDS_A0_N	Channel A Data
6	LVDS_A0_P	Channel A Data
7	GND	Digital ground
8	LVDS_A1_N	Channel A Data
9	LVDS_A1_P	Channel A Data
10	GND	Digital ground
11	LVDS_A2_N	Channel A Data
12	LVDS_A2_P	Channel A Data
13	GND	Digital ground
14	LVDS_CLK_N	Channel A Data
15	LVDS_CLK_P	Channel A Data
16	GND	Digital ground
17	+5 VCC_PNL	Backlight Power
18	+5 VCC_PNL	Backlight Power
19	GND	Digital ground
20	BKLT Control / GND	LED ADJ

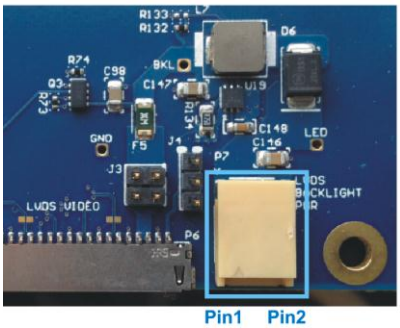




LVDS Backlight Power Connector

Function	**LVDS backlight Inverter power**
Location	P7
Type	JST SM02B-BHSS-1-TB(LF)(SN) connector
Pinout	

Pin	Signal
1	VA LED
2	VK LED

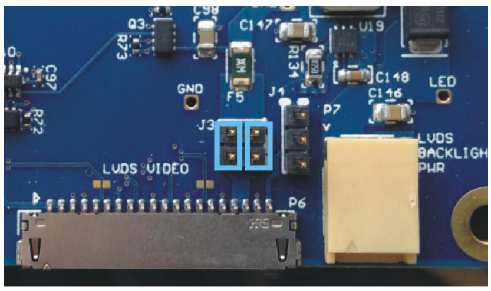


Designed to power HDA700LPT-GHL (or similar screen type) which has 13 parallel strings of 3 series white LEDS. Each white LED has a Vf of around 3.3V.

LVDS Backlight Power Jumper

Function	**LVDS backlight power select** You can optionally connect +5V to pins 17 & 18 of the LVDS Video connector. Some LVDS displays require this for backlight powering, others require external backlight power to be sourced from P7.
Location	J3
Type	2x2 2mm jumper block
Pinout	
Default	off

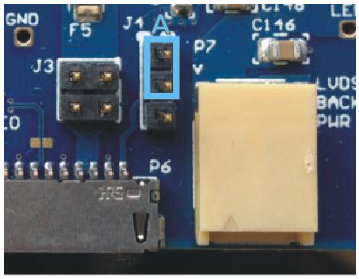
Position	Description
J3A / J3B	+5V BKL

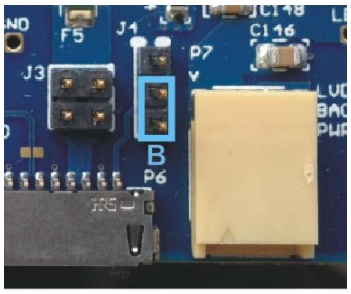


LVDS Panel LEDADJ Selection Jumper

Function	**LVDS panel power select**
Location	J4
Type	1x3 0.100” jumper block
Pinout	
Default	Off or position A

Position	Description
J4A	Disable / (or off)
J4B	Enable Control





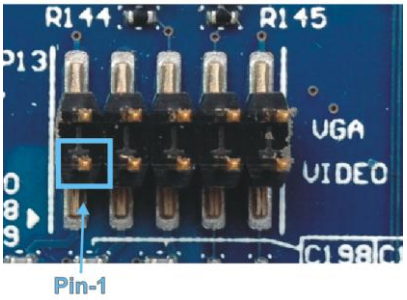
VGA

The carrier boards brings the VGA video output to a 2x5 2mm header. This header can be mated to Connect Tech’s CBG070 cable which then terminates to a standard DB-15 VGA connector which is panel mountable.

VGA Pinouts

Function	Standard VGA
Location	P11
Type	2x5 2mm pitch header
Pinout	
Optional Cable	CBG070

Pin	Description
1	Red
2	GND
3	Green
4	NC
5	Blue
6	SC DDC
7	HSYNC
8	SD DDC
9	VSYNC
10	GND



USB 3.0

The COM Express carrier implements four USB 3.0 connections via two 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.

Connector

Function	**USB 3.0**
Locations	P21A, P21B
Type	Standard Dual USB 3.0 jacks
Pinout	

Pin	Description
1	VBUS
2	D−
3	D+
4	GND
5	SSRX−
6	SSRX+
7	GND
8	SSTX−
9	SSTX+

10/100/1000 Ethernet

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 the COM Express module.

10/100/1000 Ethernet RJ Connector

Function	**LAN Connector**
Locations	**P21A, P21B**
Type	**Standard 8 position RJ connector**
Pinout	

Pin	Signal
1	MX1P
2	MX1N
3	MX2P
6	MX2N
4	MX3P
5	MX3N
7	MX4P
8	MX4N

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&ProductProduct=Intel%C2%AE+82574+Gigabit+Ethernet+Controller

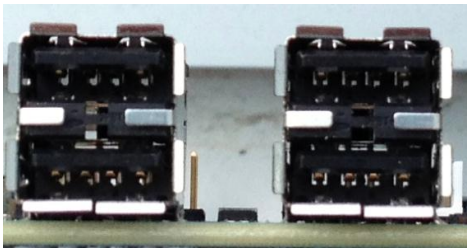
USB 2.0

The *COM Express Type-6 PMC/XMC Carrier* provides 4 x USB 2.0 external ports via standard PC type-A USB connectors. As well the carrier provides 2 x USB 2.0 "internal" connections via a standardized 2x5 0.1" pitch IDC header. This header can be mated to any standardized motherboard type dual USB to panel cabling. As well USB 2.0 connections are also routed to the miniPCIe slots.

USB 2.0 External Connectors

Function	**USB 2.0**
Locations	P23A, P23B
Type	Standard Dual USB 2.0 jacks
Pinout	

Pin	Description
1	+VBUS (+5V)
2	D-
3	D+
4	Ground



USB 2.0 Internal Connector

Function	**USB 2.0**
Locations	P2A, P2B
Type	Standard 10-pin ATX Style DIL Header
Pinout	

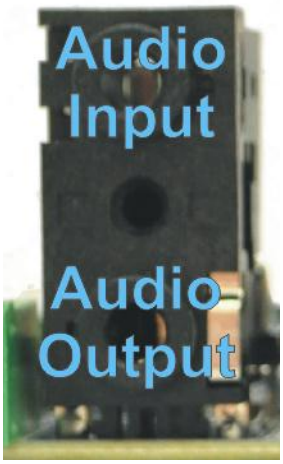
Pin	Description
1	VBUS Port 6
2	VBUS Port 7
3	Port-6 D-
4	Port-7 D-
5	Port-6 D+
6	Port-7 D+
7	GND
8	GND
9	NC
10	NC

Audio Interface

The COM Express Carrier features two 3.5mm stereo audio jacks, one input and one output. The audio codec used on the carrier board is the CS4207 from Cirrus Logic.

Audio Connectors

Function	**Audio Input**	**Audio Output**
Location	P5 (“Top”)	P5 (“Bottom”)
Details	Stereo Audio Input OS: “Microphone In”	Stereo Audio Output OS: “Headphone Out”
Type	3.5mm Stereo Jacks	



Notes:

1. The Microphone input is equipped with a Phantom Power circuit.
2. The Headphone output is amplified by the CS4207 Codec.

Some operating systems may not properly register the input sense detection from the CS4207 audio codec.

Software Support for the CS4207

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.

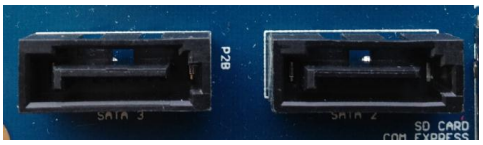
External SATA Ports

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

SATA HDD Connectors

Function	**SATA host**
Locations	P2A – SATA - 2 P2B – SATA - 3
Type	Industry standard vertical entry SATA host connector with locking.
Pinout	

Pin	Signal
1	GND
2	SATA_TX_P
3	SATA_TX_N
4	GND
5	SATA_RX_N
6	SATA_RX_P
7	GND

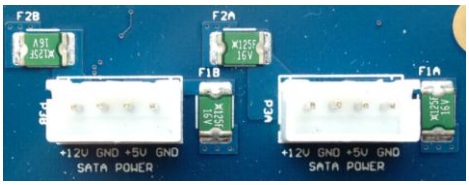


SATA HDD Power Connectors

Function	**SATA HDD Power**
Locations	**P6, P7**
Type	**4 Pos 0.100” connector** Can be mated to any 0.1” cable assembly, or Connect Tech’s CBG090 cable which ships in the CCG008 cable kit.
Pinout	

Pin	Signal
1	GND (Black)
2	+5V (Red)
3	GND (Black)
4	+12V (Yellow)

+12V and +5V are protected with 1200mA Raychem Poly fuses.



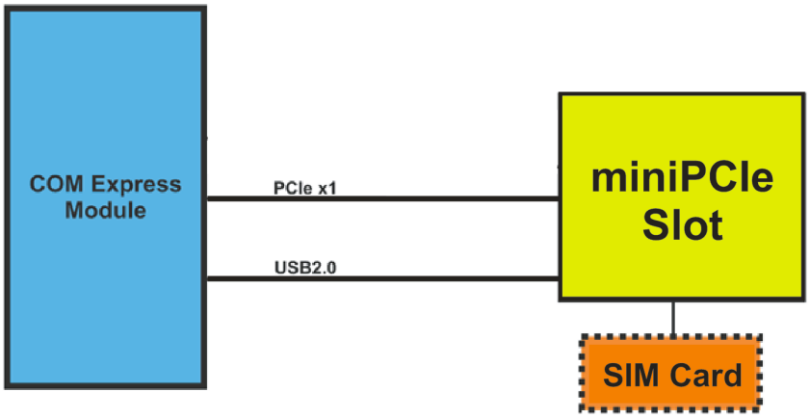
Note: The SATA power connectors are fused independently from the main +12V fuse that provides +12V power to the board, i.e. the SATA power connectors are not double fused.

miniPCIe & mSATA Slots

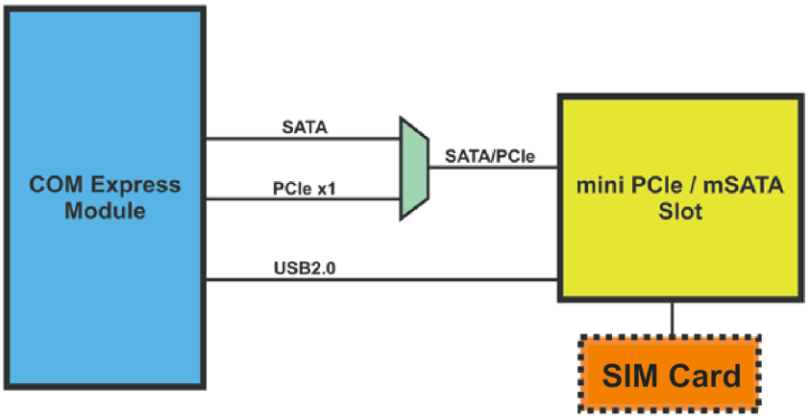
Dual Function miniPCIe mSATA Slots

The *COM Express Type-6 PMC/XMC Carrier* has two standard miniPCIe slots and two special dual purpose functionality mini PCIe / mSATA slots. Each of the special dual purpose 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 slot is 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.



Standard miniPCIe Slot Block Diagram (U11A, U11B)



PCIe / SATA Dual Functionality Diagram (U13A, U13B)

Selection between mSATA and miniPCIe is done on the jumper block (J6)

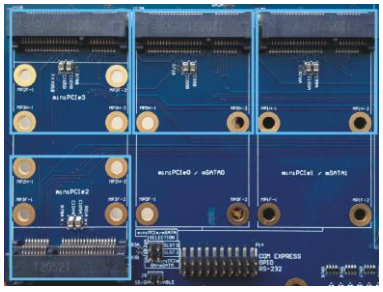
Position	Jumper ON	Jumper OFF
J6A	Slot-0 miniPCIe selected	Slot-0 mSATA selected
J6B	Slot-1 miniPCIe selected	Slot-1 mSATA selected

***** Note: This is opposite to the logic labeled on the PCB silk screen of REV A PCB's *****

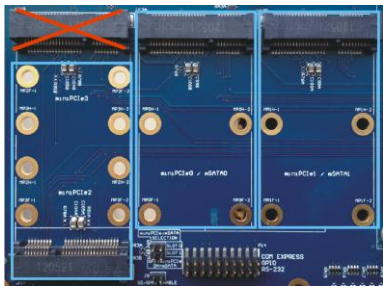
Half and Full Length mini PCIe / mSATA module Installation

The *COM Express Type-6 PMC/XMC Carrier*'s miniPCIe / mSATA slots are designed for easy ruggedized selection between full and half-length modules. This is done via the installation of M2.5 threaded standoffs. Standoffs and screws are provided with the shipping configuration of the carrier board. Below are some examples of how the various modules sizes can be installed.

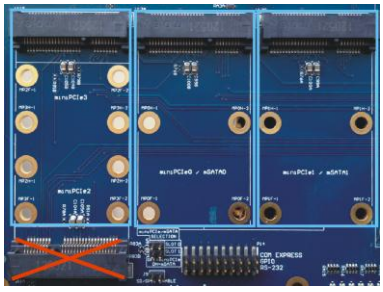
All Half Length Modules Installed



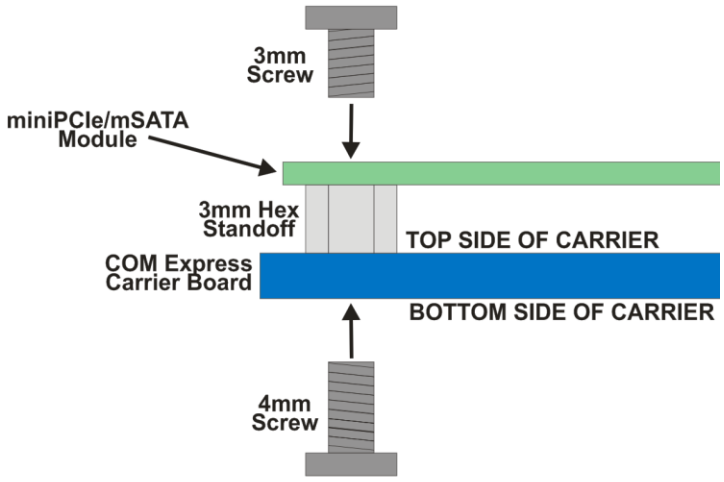
3 Full Length Modules Configuration "A"



3 Full Length Modules Configuration "B"

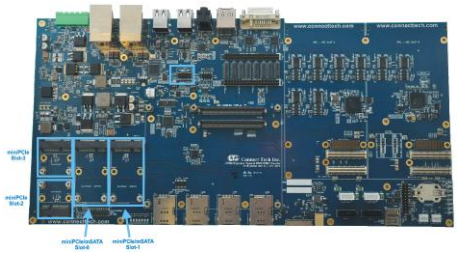


Standoff and Screw Assembly Diagram



miniPCIe / mSata Connector Pinout

Function	**mini PCIe / mSATA Slots**
Locations	**U11A, U11B, U13A, U13B**
Type	**Standard 52-pin 0.8mm pitch PCI Express mini Card connector.**



Pinout

mSATA Pinout

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

miniPCIe Pinout

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

8 x Asynchronous Serial Ports

The *COM Express Type-6 PMC/XMC Carrier* features 8 "external" serials ports. Each serial port's line interface can be configured to be a RS-232 or RS-422/485. These serial ports are generated from on-board PCIe 8-port UART the Exar 17V358 (Connect Tech's BlueStorm/Express Circuitry).

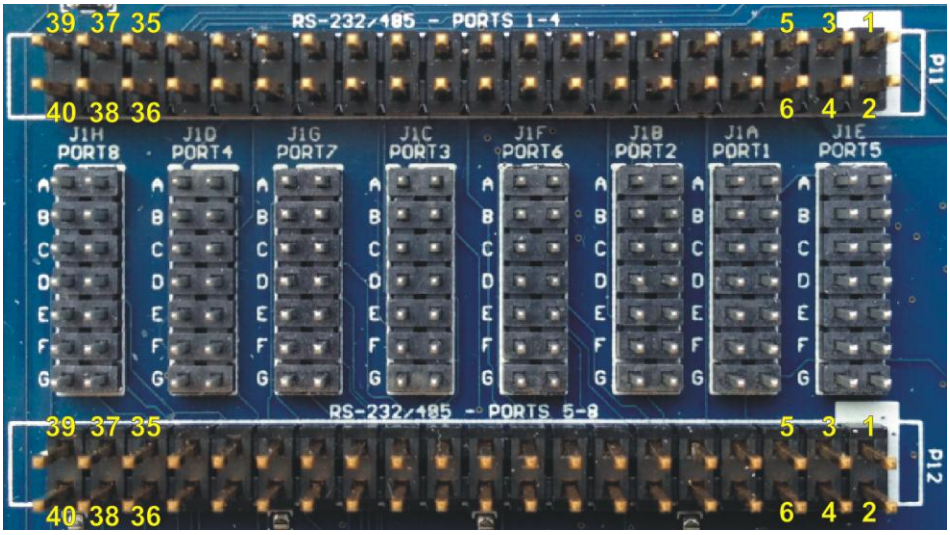
Software Support for the Exar 17V358

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 download zone here: http://www.connecttech.com/asp/Support/DownloadZone_results.asp?Product=3&OperatingSystem=IS+NOT+NULL&x=16&y=13

Serial Connectors RS-232/RS-485 Pinout

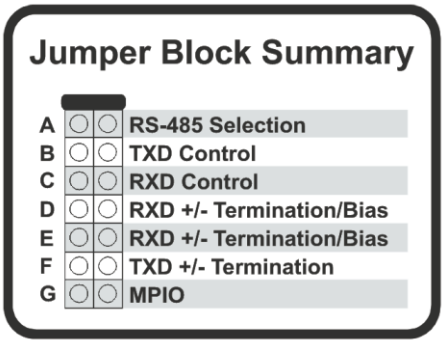
Port No.	Pin No.	RS-232	Direction	RS-422/485	Direction
1 or 5	1	DCD	Input	RxD+	Input
	2	DSR	Input	CTS-	Input
	3	RxD	Input	RxD-	Input
	4	RTS	Output	RTS+	Output
	5	TxD	Output	TxD+	Output
	6	CTS	Input	CTS+	Input
	7	DTR	Output	TxD-	Output
	8	RI	Input	RTS-	Output
	9	SG	Signal Ground	SR	Signal Reference
	10	N/C	No Connection	N/C	No Connection
2 or 6	11	DCD	Input	RxD+	Input
	12	DSR	Input	CTS-	Input
	13	RxD	Input	RxD-	Input
	14	RTS	Output	RTS+	Output
	15	TxD	Output	TxD+	Output
	16	CTS	Input	CTS+	Input
	17	DTR	Output	TxD-	Output
	18	RI	Input	RTS-	Output
	19	SG	Signal Ground	SR	Signal Reference
	20	N/C	No Connection	N/C	No Connection
3 or 7	21	DCD	Input	RxD+	Input
	22	DSR	Input	CTS-	Input
	23	RxD	Input	RxD-	Input
	24	RTS	Output	RTS+	Output
	25	TxD	Output	TxD+	Output
	26	CTS	Input	CTS+	Input
	27	DTR	Output	TxD-	Output
	28	RI	Input	RTS-	Output
	29	SG	Signal Ground	SR	Signal Reference
	30	N/C	No Connection	N/C	No Connection
4 or 8	31	DCD	Input	RxD+	Input
	32	DSR	Input	CTS-	Input
	33	RxD	Input	RxD-	Input
	34	RTS	Output	RTS+	Output
	35	TxD	Output	TxD+	Output
	36	CTS	Input	CTS+	Input
	37	DTR	Output	TxD-	Output
	38	RI	Input	RTS-	Output
	39	SG	Signal Ground	SR	Signal Reference
	40	N/C	No Connection	N/C	No Connection

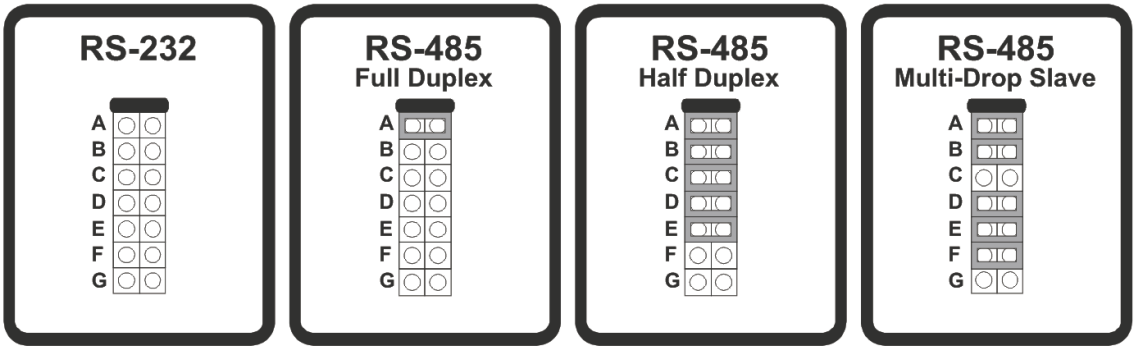
Pinout Mapping on PCB 0.1" Headers



8 x Serial Port Jumper Configuration

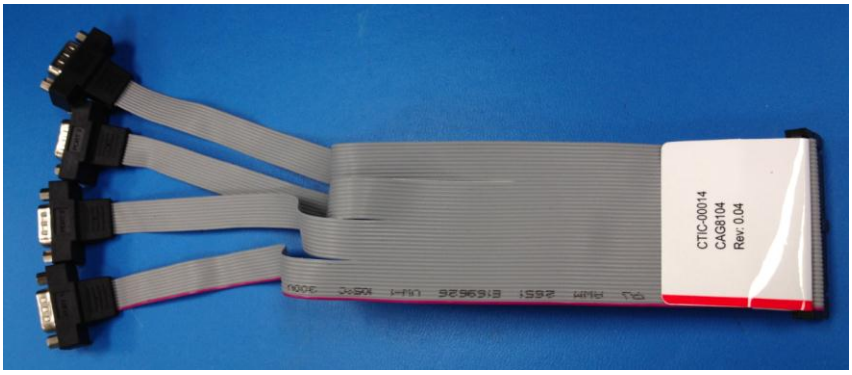
The *COM Express Type-6 PMC/XMC Carrier* allows for each of its 8 external serial ports interface to be hardware configurable. The four most desired modes are RS-232, RS-485 Full Duplex (4-wire), RS-485 Half-Duplex (2-wire) and RS-485 Multi-Drop Slave. Details on how to configure each of these modes can be found below.





8 x Serial Port Cabling Details

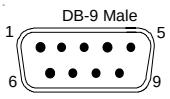
The *COM Express Type-6 PMC/XMC Carrier* cable kit (CKG011) provides two 40-pin to 8 x DB-9 ribbon cables (CAG8104) that are panel mountable. The cable is shown below as well as details on the pinouts of the DB-9 end connectors.



CAG8104 Cable

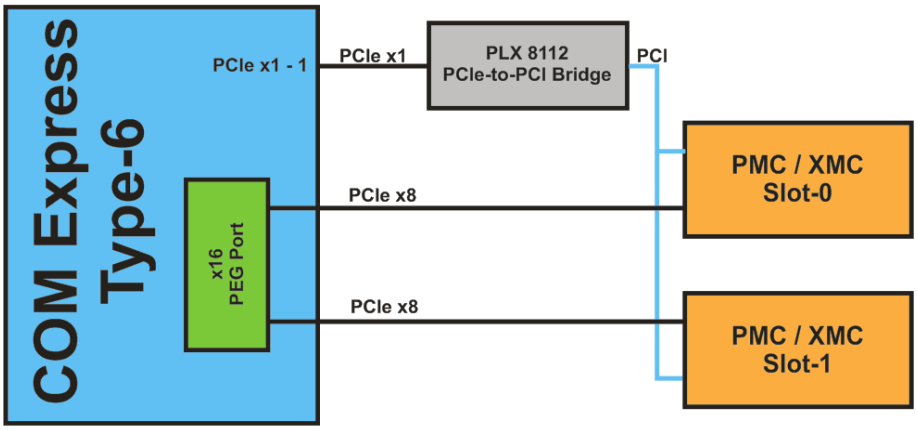
CAG8104 DB-9 Connector Pinout

Pin #	RS-232		RS-422/485	
DB-9	**Signal**	**Direction**	**Signal**	**Direction**
1	DCD	Input	RxD+	Input
2	RxD	Input	RxD-	Input
3	TxD	Output	TxD+	Output
4	DTR	Output	TxD-	Output
5	SG	Signal Ground	SR	Signal Reference
6	DSR	Input	CTS-	Input
7	RTS	Output	RTS+	Output
8	CTS	Input	CTS+	Input
9	RI	Input	RTS-	Output



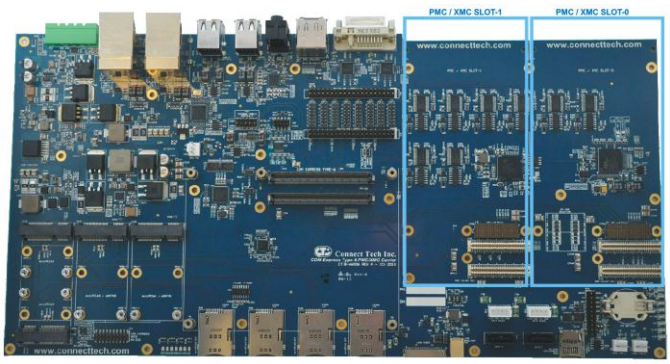
PMC / XMC Expansion Slots

The *COM Express Type-6 PMC/XMC Carrier* provides two VITA 42 PMC/XMC expansion slots. Each of these slots are provided with a 32-Bit PCI connection and a x8 PCI Express connection. The PMC (PCI) connection is sourced through a PCIe to PCI bridge through the PCIe x1 – 1 link on the COM Express module. The XMC (PCIe) connection is sourced through PEG connection on COM Express module. The 16 lanes of the PEG connection are split into two x8 PCIe lane connections (one x8 to each slot).

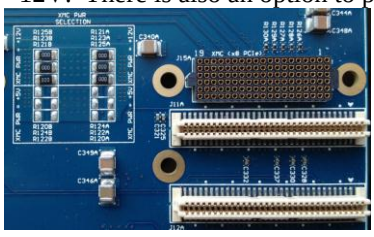


Module BIOS Configuration
In order to properly use both PMC / XMC expansion slots, your modules BIOS must configure its PEG link to be configured as 2 x8 PCIe links. Some modules allow this configuration to be done via the BIOS settings, other require a special utility to be run for configuration. Please consult with your COM Express modules Manual for full details on configuring the COM Express PEG as split x8 PCIe links.

Function	**PMC / XMC**
Location	J15A/B, J11A/B, J12A/B
Type	Part Number: ASP-103612-04, 71439-0164
Pinout	Standard PMC and XMC pinouts used. Refer to IEEE Std 1386.1-2001 for PMC. VITA 42.3 for XMC for complete pinouts.



XMC +VPWR Selection
By default *COM Express Type-6 PMC/XMC Carrier* is populated to set the XMC slot's +VPWR rail to +12V. There is also an option to populate this to +5V power if needed via 0ohm resistors.



GPIO and Console Serial Port

The *COM Express Type-6 PMC/XMC Carrier* provides additional functionality of COM Express Type-6 specification.

Connector

Function: **Console RS-232 / GPIO**

Locations: P9

Type: 2x10 2mm Header

Pinout

Header Pin	Signal	DB9 Pin
1	GPIO Input 0	1
2	GPIO Output 3	6
3	GPIO Input 1	2
4	GPIO Output 2	7
5	GPIO Input 2	3
6	GPIO Output 1	8
7	GPIO Input 3	4
8	GPIO Output 0	9
9	GND	5
10	-	
11	-	1
12	-	6
13	RS-232 TX	2
14	RS-232 RX	7
15	-	3
16	-	8
17	-	4
18	-	9
19	GND	5
20	-	

SD Card

The *COM Express Type-6 PMC/XMC 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.

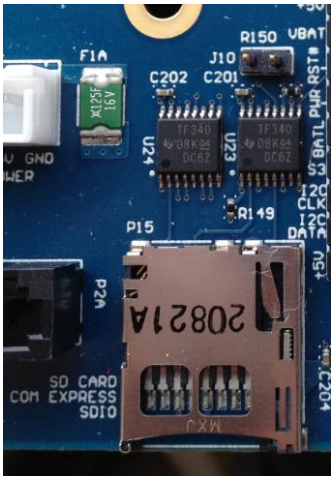
** Note this SD card slot will ONLY operate if the COM Express module provides the SDIO interface over the GPIO pins. See below for the SDIO / GPIO mapping **

SD Card Jumpers
J9 – Will enable/disable SDIO / GPIO Functionality.
(JUMPER ON= SD Enabled, JUMPER OFF = GPIO)
J10 – Will enable/disable Write Protect on the SD Card
(JUMPER ON= Write Protect Enabled, JUMPER OFF = Write Protect Disabled)

Micro SD Card Connector

Function	**Micro SD Card Slot**
Locations	P4 Part Number: 502570-0893
Type	Micro SD Card Socket
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



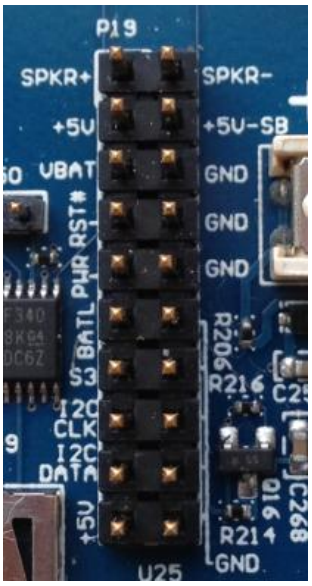
System Control Header

This system control header can be used to connect power button, reset button, PC speaker, I2C device and monitor other power rails.

Function	Miscellaneous Control Header
Location	P19
Type	2x10 0.1”

Pinout

Pin	Description	Pin	Description
1	Speaker+	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



Typical Hardware Installation Procedure

1. Ensure all external system power supplies are off.

2. Install the COM Express module. 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) Power cable to the input power connector.
   b) Connect a video display cable to one of the video channels.
   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. Ensure your power supply is in the range of +6V to +36V DC.

6. Switch on the power supply.

On-Board "ATX" Power Supply

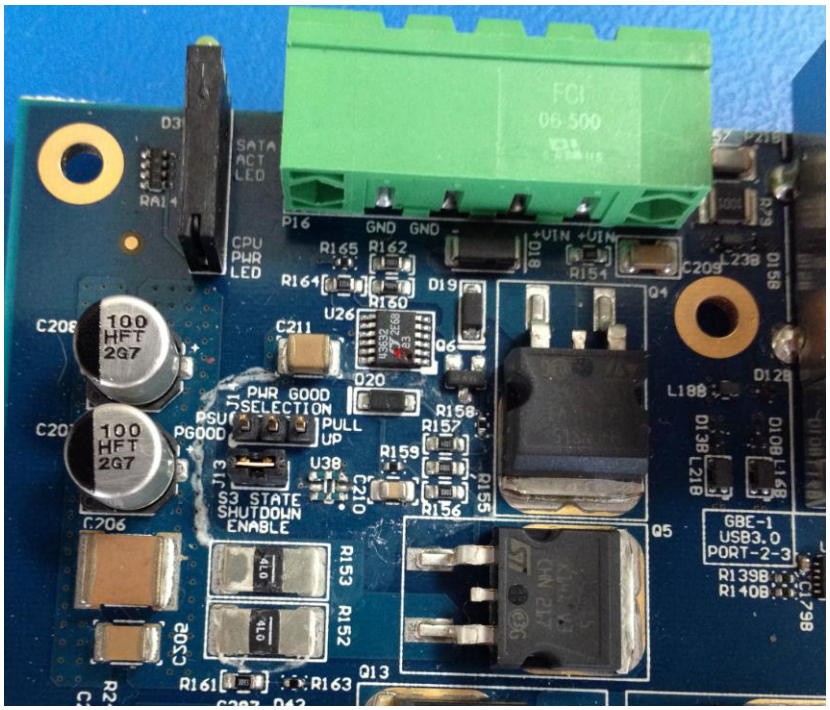
The *COM Express Type-6 PMC/XMC Carrier* provides takes the +6V to +36V input and generates all of the on-board voltages rails needed for the COM Express modules and peripherals. This on-board power supply is also has "ATX" functionality where it generates the PWR_OK signal to the COM Express module upon for start-up and uses the SUS_S3# signal for shutdown. The main power rails can be powered ON and OFF via the power button pins located on the system control header.

The voltages generated by the on-board supply are +12V, +5V, +3.3V, +1.8V, +1.5V, +5V-SB and +3.3V-SB. Below is a listing of the current sourcing capabilities of the on-board power supplies.

Power Rail	Maximum Current Sourcing Capability
+12V	10A
+5V	10A
+3.3V	10A
+1.8V	0.15A
+1.5V	5A
+5V-SB	1.2A
+3.3V-SB	0.15A

Startup and Shutdown Jumpering

Recommended default jumpering for properly powering ON and OFF the carrier should be as shown below. No jumpers should be installed on jumper block J14, and a single jumper should be installed at J13.



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)	TBD	TBD
Safety Protected Maximum Current Draw Rating for Module and Carrier (from in-line fuse)	TBD	TBD

Below are some examples of actual measurements taken with the *COM Express Type-6 PMC/XMC 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	TBD	TBD
Module Installed[1], single DDI video output, USB keyboard with system sitting in BIOS	TBD	TBD
Module Installed[1], single DDI video output, USB keyboard, booted Linux running CPU stress test	TBD	TBD
Module Installed[1], dual DDI video output, 4 x USB 3.0 devices installed, 2 x USB2.0 devices installed, mSATA installed, miniPCIe installed, audio in/out running, dual GBE running and CPU stress test	TBD	TBD

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 GBE Controller
PCIe x1 - 1	PCIe to PCI Bridge for PMC Slots
PCIe x1 - 2	PCIe UART for 8 x RS-232/RS-485
PCIe x1 - 3	miniPCIe / mSATA Slot 0
PCIe x1 - 4	miniPCIe / mSATA Slot 1
PCIe x1 - 5	miniPCIe Slot 2
PCIe x1 - 6	miniPCIe Slot 3
PCIe x1 - 7	No Connect
PEG (lanes 0-7) PCIe x8 - 0	PMC / XMC Slot 0
PEG (lanes 8-15) PCIe x8 - 1	PMC / XMC Slot 1

USB Allocation Details

Below is a listing of how the USB Ports are allocated on the carrier board. Please note that if you are intending to use the USB ports to their maximum bandwidth that you should be selecting ports that are directly connected to the COM Express USB ports and not through the USB hub controller. IE – For highest USB bandwidth select ports from the table below on the left.

COM Express USB Port	Peripheral Connection
Port 0 (USB 3.0)	USB Port 0 (External)
Port 1 (USB 3.0)	USB Port 1 (External)
Port 2 (USB 3.0)	USB Port 2 (External)
Port 3 (USB 3.0)	USB Port 3 (External)
Port 4 (USB 2.0)	**7-Port USB Hub**
Port 5 (USB 2.0)	USB Port 8 (External)
Port 6 (USB 2.0)	USB Port 9 (External)
Port 7 (USB 2.0)	USB Port 7 (Internal)

------>

USB Hub Port	Peripheral Connection
Port 0 (USB 2.0)	miniPCIe / mSATA Slot 0
Port 1 (USB 2.0)	miniPCIe / mSATA Slot 1
Port 2 (USB 2.0)	miniPCIe Slot 2
Port 3 (USB 2.0)	miniPCIe Slot 3
Port 4 (USB 2.0)	USB Port 6 (Internal)
Port 5 (USB 2.0)	USB Port 4 (External)
Port 6 (USB 2.0)	USB Port 5 (External)

Mechanical Details

A complete **3D STEP Model** file of carrier board can be downloaded here:
http://www.connecttech.com/ftp/3d_models/CCG007_3D_MODEL.zip

2D Mechanical Dimensioned Drawing - All dimensions are in (mm)

TBD

Mounting Holes Details - All dimensions are in (mm)

TBD

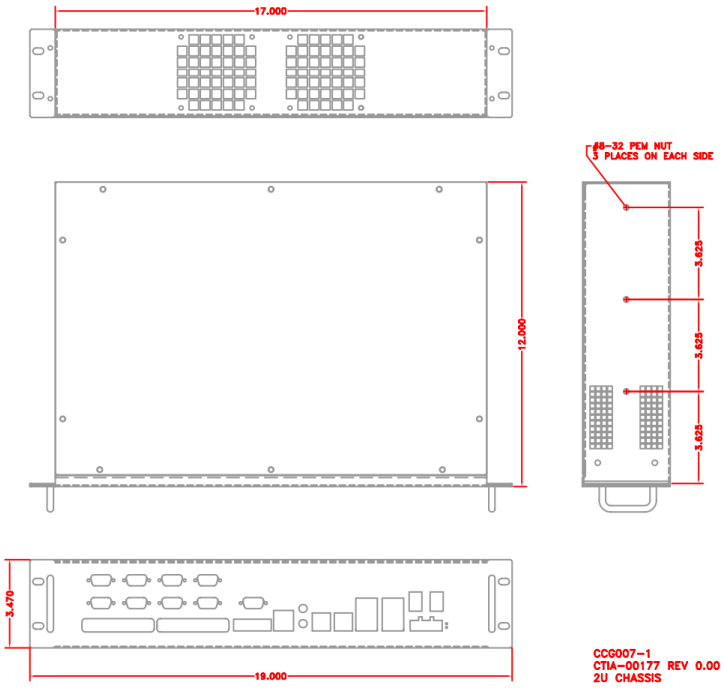
Enclosure Details

The *COM Express Type-6 PMC/XMC Carrier* has been specially design to fit into a 19" width rack mount enclosure. Connect Tech also offers a standardized 2U off-the-shelf enclosure that is specifically designed to fit the carrier board and all of its peripherals. Details on this can be found below. For ordering and pricing details on this enclosure please contact: sales@connecttech.com

Front Panel View

Isometric View

Mechanical Details



Cables & Interconnect

The following table summarizes the COM Express carrier's headers and lists the matching cables included with the optional cable kit CKG009.

PCB Connector	Cable Part Number	Description	PCB End	Interface End
40 Pin 0.1" Pitch Header at P11/P12	CAG8104	8 x Serial Cable	2x20 pin 0.1" header	8 x DB9 Male
2x10 2mm at P8, P9 and P10	CBG073	2 x Serial Cable (Also used for GPIO)	2x10 2mm header	2 x DB9 Male
SATA Power and Signal at P2A/B, P3A/B	CBG090	SATA Power and Signal	SATA Power and Signal	SATA Power and Signal
2x5 2mm at P26	CBG070	VGA Cable	2x5 2mm	HDB15 Female

Cable drawings are available upon request. Send an email request to: **support@connecttech.com**