

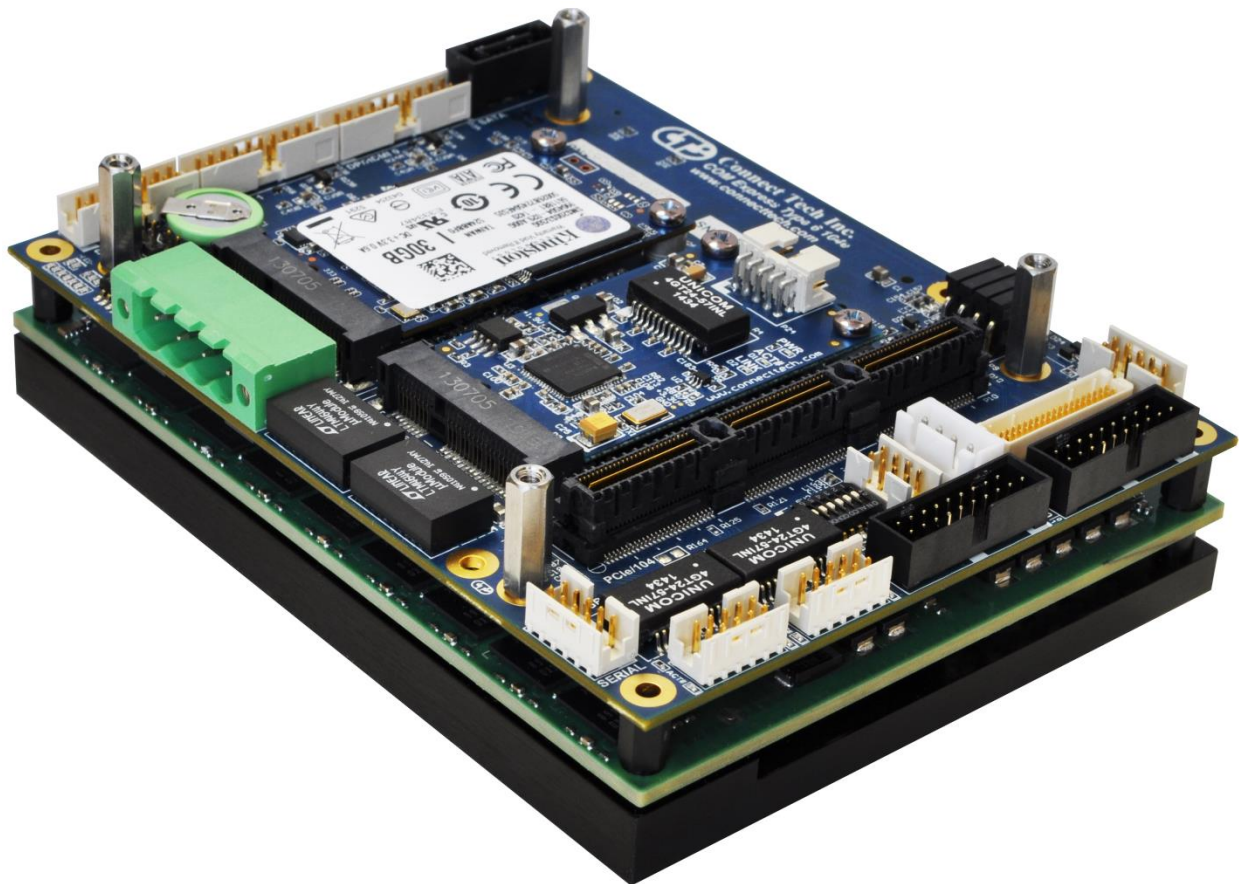


# Connect Tech Inc.

Embedded Computing Experts

[www.connecttech.com](http://www.connecttech.com)

## COM Express Type 6 104e Users Guide



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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](http://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](http://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 Product Warranty

Connect Tech Inc. provides a two year Warranty for the COM Express Type 6 104e Carrier. 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	2015/03/10	Initial Release

## Introduction

Connect Tech's COM Express Type 6 104e brings new functionality and expandability to COM Express. With a Basic COM Express Size (125mm x 95mm), the Type 6 104e is packed full of great features. With multiple video display options, including on-board DisplayPort/HDMI/DVI Switching, as well as four USB 3.0 Links and a PCIe/104 Type 2 Stack, there is little the Type 6 104e is unable to handle.

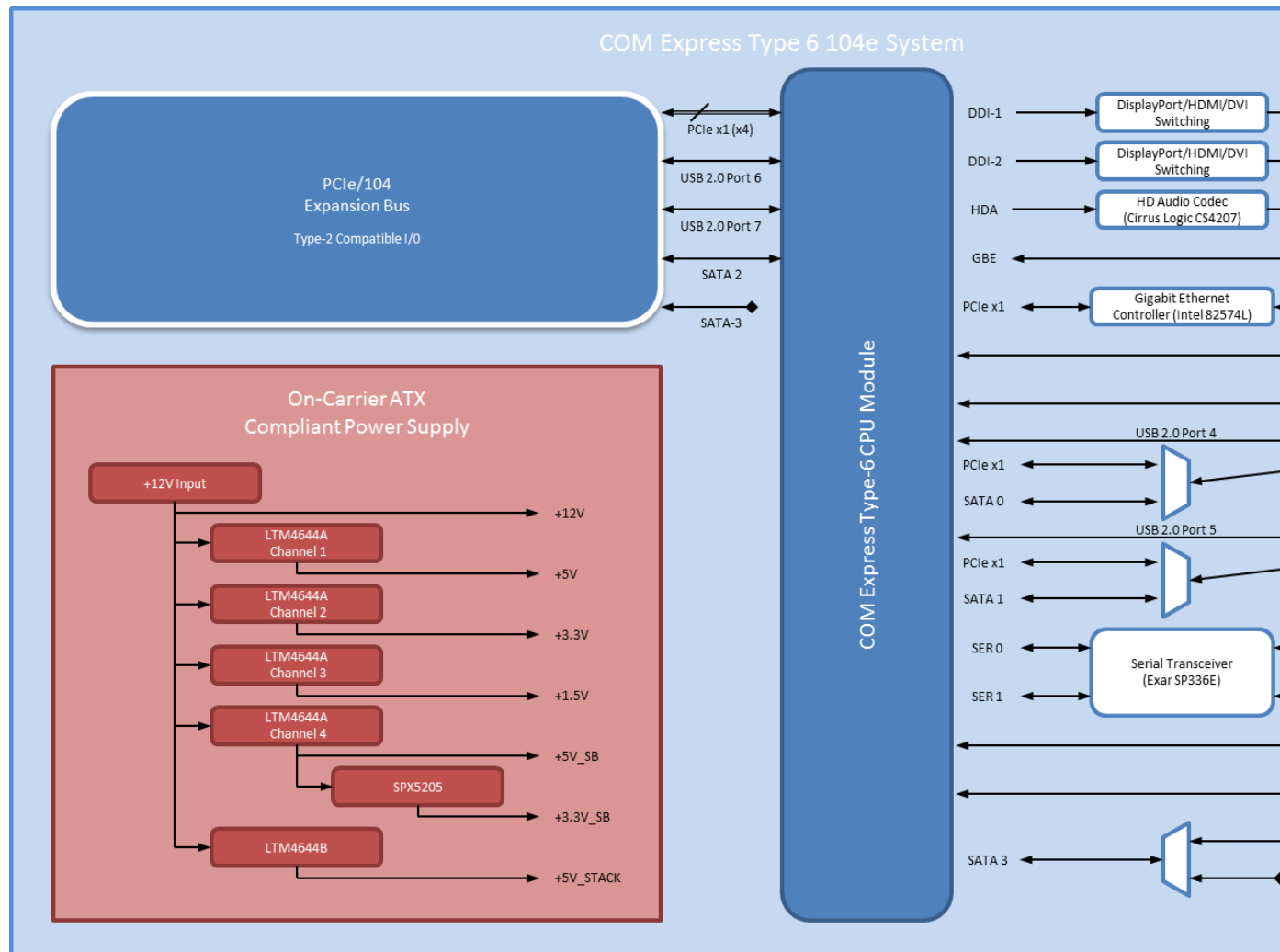
With the included PCIe/104 Type 2 Stack, customization with additional storage, additional devices over PCI Express, or just additional Power for other devices is possible.

## Product Features and Specifications

Feature	COM Express Type 6 104e
<b>COM Express Compatibility</b>	COM Express® Type 6 (PCIMG COM Express® COM.0 R2.1)
<b>PCB Size / Overall Size</b>	125mm x 95mm (4.921" x 3.740") 3D STEP Model: <a href="#">download here</a>
<b>Display</b>	2x DisplayPort/HDMI/DVI (On-Board Switching) 1x VGA 1x LVDS
<b>Ethernet</b>	2x Gigabit Ethernet (10/100/1000)
<b>USB</b>	4x USB 3.0
<b>SATA</b>	1x External SATA Link (Switchable with PCIe/104 Type 2 SATA Link 2)
<b>Audio</b>	HD Audio: 1x Input, 1x Output
<b>Serial</b>	2x RS-232/RS-485
<b>Mini-PCIe/mSATA</b>	2x Full Sized Mini-PCIe/mSATA
<b>PCIe/104 Type 2</b>	4x PCIe Gen 2.0 x1 Link 2x USB 2.0 Link 2x SATA Link (Link 2 Switchable with External SATA)
<b>PCIe/104 Power</b>	+12V @ Supplied Amperage +5V @ 16A +3.3V Not Supplied (Population Option) +5V_SB Not Supplied (Population Option)
<b>Power Operation</b>	ATX Compliant Operation SUS_S3# Controlled (Default Option) SUS_S5# Controlled (Population Option)
<b>Power Requirements</b>	+12V DC Input
<b>Operating Temperature</b>	-40°C to +85°C
<b>Accessories</b>	Cable Kit
<b>Warranty and Support</b>	2 Year Warranty and Free Support

## Product Overview

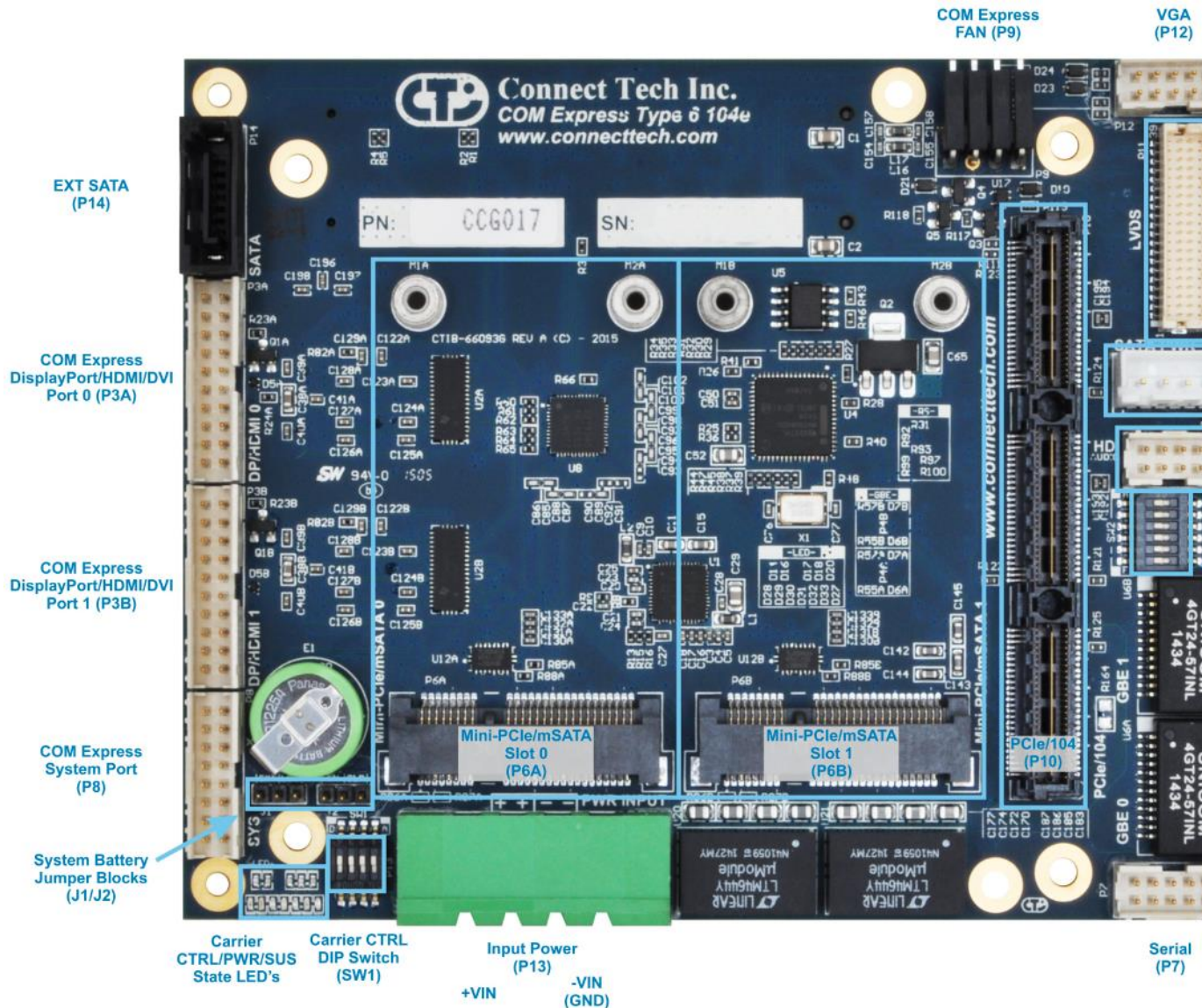
### Block Diagram







## Connector Locations



## Connector Summary

Designator	Connector	Description
P1	COM Express	COM Express Module Connector
P2	HD Audio	HD Audio: 1x Input, 1x Output FCI MiniTek Connector
P3A	DisplayPort/HDMI/DVI Port 0	DisplayPort/HDMI/DVI Selectable FCI MiniTek Connector
P3B	DisplayPort/HDMI/DVI Port 1	DisplayPort/HDMI/DVI Selectable FCI MiniTek Connector
P4A	Gigabit Ethernet Port 0	Gigabit Ethernet (10/100/1000) FCI MiniTek Connector
P4B	Gigabit Ethernet Port 1	Gigabit Ethernet (10/100/1000) FCI MiniTek Connector
P5A	USB 2.0/3.0 Ports 0-1	USB 2.0/3.0 Links 0 and 1 Intel Style Locking Connector
P5B	USB 2.0/3.0 Ports 2-3	USB 2.0/3.0 Links 0 and 1 Intel Style Locking Connector
P6A	Mini-PCIe/mSATA Slot 0	Mini-PCIe/mSATA Full Sized Card Slot
P6B	Mini-PCIe/mSATA Slot 1	Mini-PCIe/mSATA Full Sized Card Slot
P7	Serial	Serial: Dual RS-232/RS485 FCI MiniTek Connector
P8	COM Express System Port	COM Express System Port FCI MiniTek Connector
P9	COM Express FAN	COM Express FAN Molex Connector
P10	PCIe/104	PCIe/104 Type 2 Bus Connector
P11	LVDS Video	LVDS Video Hirose Connector
P12	VGA	VGA FCI MiniTek Connector
P13	Input Power	Input Power FCI Screw Terminal Connector
P14	External SATA	External SATA Molex Connector
P15	External SATA Power	External SATA Power Molex KK Connector

## Jumper Summary & Locations

Designator	Function	Description
J1	RTC External/Local	Jumper to Select Local or External RTC Battery
J2	RTC Enable/Clear	Jumper to Enable RTC Battery or Clear BIOS

## DIP Switch Summary & Locations

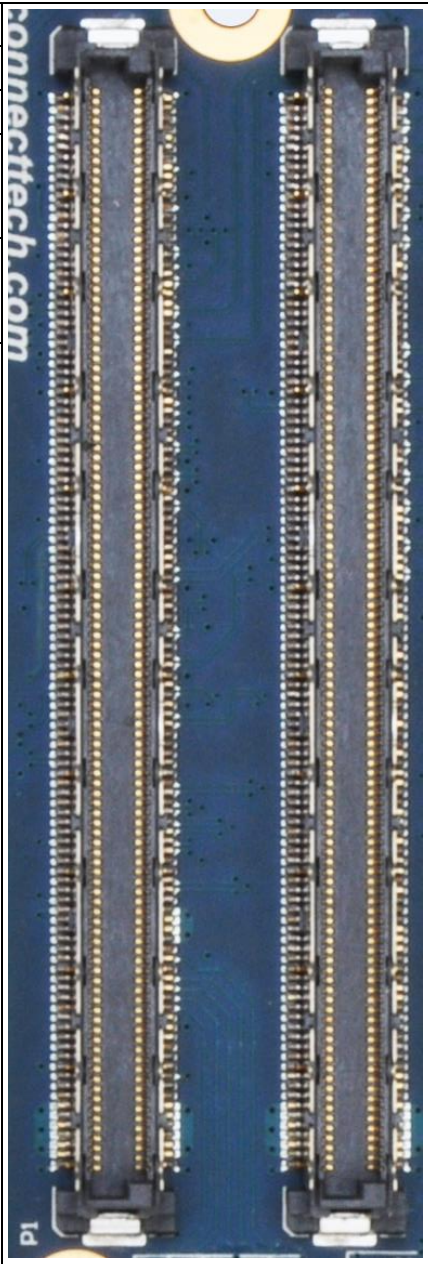
Designator	Function	Description
SW1	Carrier Control Switch	DIP Switches for Selecting Mini-PCIe Slot Operation, External or PCIe/104 SATA Links, and ATX Power Operation Override
SW2	Serial Selection	DIP Switches for Controlling Serial Format and Related Features

## Detailed Feature Description

In COM Express Systems, the processor and chipset are implemented on the COM Express Module. This connects to the COM Express Type 6 104e Carrier via a TE Board to Board Connector. There are various connector pin configurations, known as Types. Please ensure you are only connecting a Type 6 COM Express Module to the COM Express Type 6 104e Carrier.

### COM Express

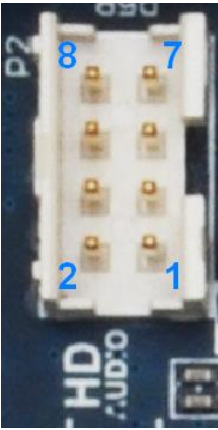
The processor and chipset are implemented on the COM Express Type-6 Module, which connects to the COM Express Type 6 104e Carrier Board via a Tyco fine pitch stacking connector.

<b>Function</b>	<b>COM Express Interface</b>	
<b>Location</b>	P1	
<b>Type</b>	TE Connectivity Board to Board Connector	
<b>Carrier Connector P/N</b>	3-6318491-6 Manufacturer: TE Connectivity	
<b>Mating Connector P/N</b>	3-1827231-6 Manufacturer: TE Connectivity	
<b>Pinout</b>	Refer to COM Express R2.0 specification, Type-6	

## HD AUDIO

The COM Express Type 6 104e Carrier features HD Audio capabilities with the assistance of the Cirrus Logic CS4207 Codec device. From the Codec, 1 Microphone Input and 1 Headphone Output are available.

<b>Function</b>	<b>HD Audio</b>			
<b>Location</b>	P2			
<b>Type</b>	FCI Minitek Double Row 4 x 2			
<b>P/N</b>	98414-G06-08LF			
<b>Mating</b>	10073599-008LF			
<b>Cable</b>	CBG118			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	-	2	-
	3	MIC IN R	4	MIC IN L
	5	GND	6	GND
	7	HP OUT R	8	HP OUT L



## Software Support for the CS4207

The audio codec used on the COM Express Type 6 104e Carrier is the CS4207 from Cirrus Logic.

Additional drivers will be needed to properly operate audio on the COM Express Type 6 104e 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](http://www.cirrus.com/en/pubs/software/CS4207_WinXP_1-0-0-38.zip)

**Windows 7/8 Driver:**

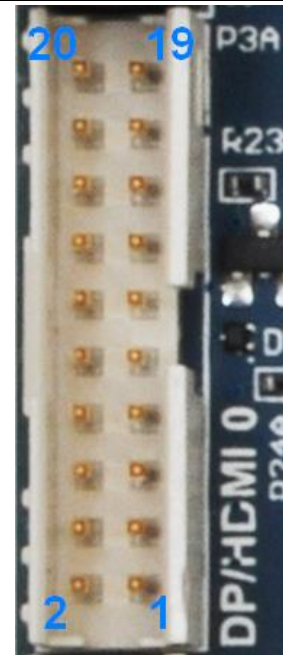
[http://www.cirrus.com/en/support/lic/lic3.html?uri=/en/pubs/software/CS4207\\_LogoedDriverPackage\\_6-6001-1-39.zip](http://www.cirrus.com/en/support/lic/lic3.html?uri=/en/pubs/software/CS4207_LogoedDriverPackage_6-6001-1-39.zip)

**Linux Driver:** Included in kernels 2.6.30 and up.



## DisplayPort/HDMI/DVI Connector

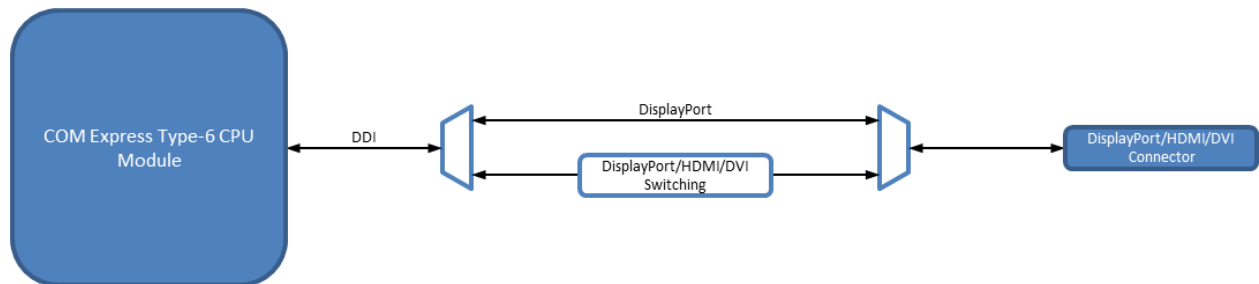
<b>Function</b>	DisplayPort/HDMI/DVI Connector (DisplayPort Output)			
<b>Location</b>	P3A, P3B			
<b>Type</b>	FCI Minitek Double Row 10 x 2			
<b>P/N</b>	98414-G06-20LF			
<b>Mating</b>	10073599-020LF			
<b>Cable</b>	CBG113			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	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	Hot Plug Detect
	15	DP2-	16	GND
	17	GND	18	GND
	19	+3.3V	20	DP/TMDS SEL <sup>[1]</sup>



Note [1]: Cable assembly must tie low (GND) for DisplayPort output

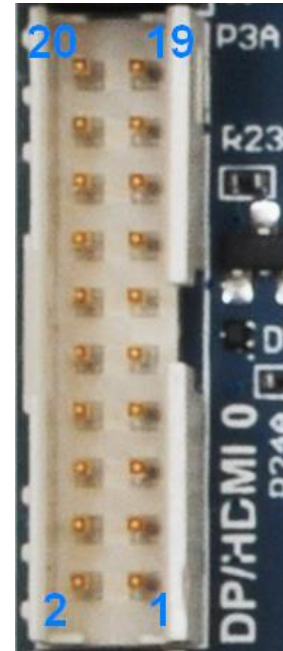
## COM Express Module DisplayPort/HDMI/DVI

The COM Express Specification has multiple display output formats, including DisplayPort, HDMI, and DVI as part of the Digital Display Interface (DDI). The 104e Carrier connectors can be used to display all of these formats. On-board switching circuitry to enable HDMI or DVI has been included. The COM Express DDI may require a change to the COM Express BIOS to swap output formats.



DisplayPort/HDMI/DVI

<b>Function</b>	<b>DisplayPort/HDMI/DVI Connector (HDMI/DVI Output)</b>			
<b>Location</b>	P3A, P3B			
<b>Type</b>	FCI Minitek Double Row 10 x 2			
<b>P/N</b>	98414-G06-20LF			
<b>Mating</b>	10073599-020LF			
<b>Cable</b>	CBG145			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	TMDS2+	2	TMDS CLK+
	3	TMDS2-	4	TMDS CLK-
	5	GND	6	GND
	7	TMDS1+	8	DDC DATA
	9	TMDS1-	10	DDC CLK
	11	GND	12	GND
	13	TMDS0+	14	Hot Plug Detect
	15	TMDS0-	16	GND
	17	GND	18	GND
	19	+3.3V	20	DP/TMDS SEL <sup>[2]</sup>



Note [2]: Cable assembly must tie high (+3.3V) HDMI/DVI output

## 10/100/1000 Ethernet (GBE)

<b>Function</b>	<b>Gigabit Ethernet Connector</b>			
<b>Location</b>	P4A, P4B			
<b>Type</b>	FCI Minitek Double Row 5 x 2			
<b>P/N</b>	98414-G06-10LF			
<b>Mating</b>	10073599-010LF			
<b>Cable</b>	CBG117			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	MX0-	2	MX0+
	3	MX1-	4	MX1+
	5	SHELL	6	SHELL
	7	MX2-	8	MX2+
	9	MX3-	10	MX3+



## Software Support for the Intel 82574

Additional drivers will be needed to properly operate the GBE Port 1 (P4B) on the 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>

## USB 2.0/3.0

The maximum configuration for a Type 6 COM Express Modules allows for four external USB 3.0 Ports with integrated USB 2.0 Ports. The USB 3.0 signals are sourced from the COM Express Module, and run through a Pericom Semiconductor PI3EQX7502AIZDE re-driver.

Over current protection, power supply filtering and ESD protection is provided.

<b>Function</b>	<b>USB 2.0/3.0</b>			
<b>Location</b>	P5A, P5B			
<b>Type</b>	Lotes Co. Ltd Double Row 10 x 2			
<b>P/N</b>	ABA-USB-152-K01			
<b>Cable</b>	CBG131			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	Port A - VBUS	20	-
	2	Port A - SSRX-	19	Port B - VBUS
	3	Port A - SSRX+	18	Port B - SSRX-
	4	GND	17	Port B - SSRX+
	5	Port A - SSTX-	16	GND
	6	Port A - SSTX+	15	Port B - SSTX-
	7	GND	14	Port B - SSTX+
	8	Port A - D-	13	GND
	9	Port A - D+	12	Port B - D-
	10	-	11	Port B - D+

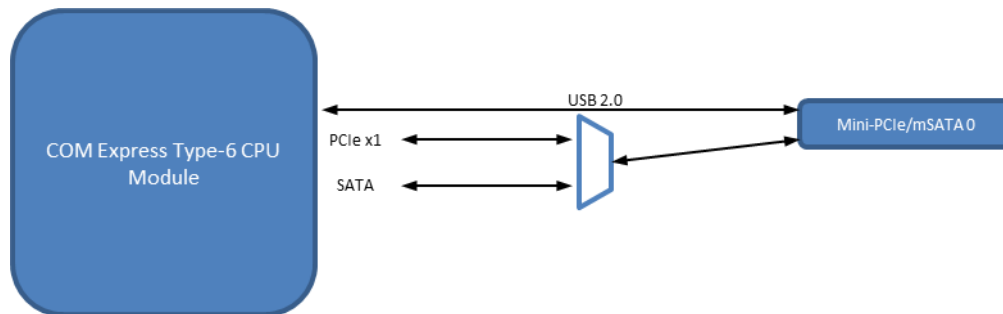


## Mini-PCIe/mSATA Slots

### Dual Function Mini-PCIe/mSATA Slots

The COM Express Type 6 104e Carrier has two special dual purpose functional Mini-PCIe/mSATA slots. Each of these slots can accept either a Mini-PCIe module or an mSATA SSD module. These slots have circuitry that allows for the selection between connecting PCIe lanes or SATA lanes to the Connector. Finally, each of these slots also contain a USB 2.0 link as per the Mini-PCIe specification.

See the block diagram for the Mini-PCIe/mSATA switching functionality.



**Mini-PCIe/mSATA Switching Functionality Diagram**

If a Mini-PCIe Card is placed into the Mini-PCIe/mSATA 0 slot, then the Carrier Control DIP Switch (SW1B) will select the SATA link routed to the Mini-PCIe/mSATA 0 slot to be disconnected.

If however an mSATA Card is placed into the Mini-PCIe/mSATA 0 slot, then the Carrier Control DIP Switch (SW1B) will select the PCIe link routed to the Mini-PCIe/mSATA 0 slot to be disconnected.

This allows for the following maximum configurations:

- A. 2x Mini-PCIe Cards, with 0x mSATA Cards
- B. 1x Mini-PCIe Cards, with 1x mSATA Cards
- C. 0x Mini-PCIe Cards, with 2x mSATA Cards

**Carrier Control DIP Switch Selection**

Switch Location	Switch ON	Switch OFF
SW1A	Slot 1 Mini-PCIe	Slot 1 mSATA
SW1B	Slot 0 Mini-PCIe	Slot 0 mSATA

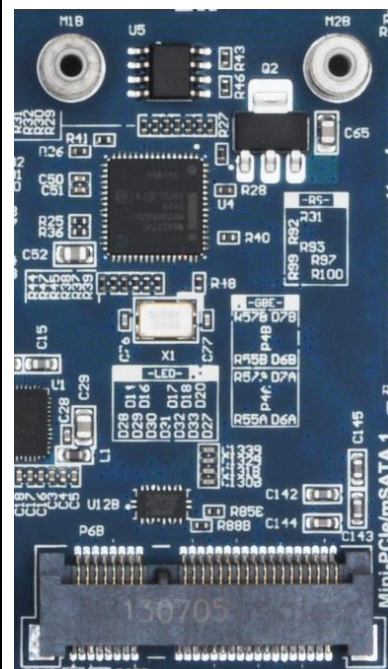
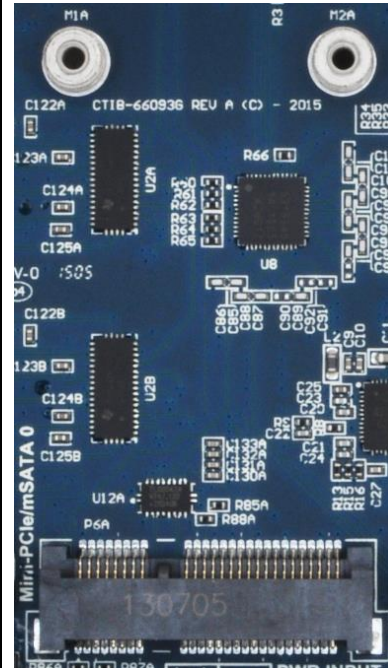
### Half and Full Length Mini-PCIe/mSATA Module Installation

The COM Express Type 6 104e Carrier is designed with mounting holes to allow for the population of a full length module. To install a half-length module you must use a Mini-PCIe Half to Full Size Extension Bracket.





Function	Mini-PCIe/mSATA Slots		
Location	P6A, P6B		
Type	Molex Card Edge Connector		
P/N	48338-0065		
Pinout	Pin	Mini-PCIe Description	mSATA Description
	1	-	-
	2	+3.3V	+3.3V
	3	-	-
	4	GND	GND
	5	-	-
	6	+1.5V	+1.5V
	7	CLKREQ#	-
	8	UIM_PWR	-
	9	GND	GND
	10	UIM_DATA	-
	11	PCIe CLK+	-
	12	UIM_CLK	-
	13	PCIe CLK-	-
	14	UIM_RESET	-
	15	GND	GND
	16	UIM_VPP	-
	17	-	-
	18	GND	GND
	19	-	-
	20	W_DISABLE#	-
	21	RESV	RESV
	22	-	-
	23	PCIe RX+	SATA TX+
	24	+3.3V	+3.3V
	25	PCIe RX-	SATA TX-
	26	GND	GND
	27	GND	GND
	28	+1.5V	+1.5V
	29	GND	GND
	30	SMB_CLK	-
	31	PCIe TX-	SATA RX-
	32	SMB_DATA	-
	33	PCIe TX+	SATA RX+
	34	GND	GND
	35	GND	GND
	36	USB D-	-
	37	GND	GND
	38	USB D+	-
	39	+3.3V	+3.3V
	40	GND	GND
	41	+3.3V	+3.3V
	42	-	-
	43	RESV	RESV
	44	-	-
	45	-	-
	46	-	-
	47	-	-
	48	+1.5V	+1.5V
	49	-	-
	50	GND	GND
	51	-	-
	52	+3.3V	+3.3V



## Serial

<b>Function</b>	<b>Dual Serial (RS-232/RS-485)</b>	
<b>Location</b>	P7	
<b>Type</b>	FCI Minitex Double Row 5 x 2	
<b>P/N</b>	98414-G06-10LF	
<b>Mating</b>	10073599-010LF	
<b>Cable</b>	CBG104	
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>
	1	Serial 0 - RS-232TX/RS-485TX+
	2	Serial 0 - RS-232RX/RS-485RX+
	3	Serial 0 - RS-485TX-
	4	Serial 0 - RS-485RX-
	5	GND
	6	GND
	7	Serial 1 - RS-232TX/RS-485TX+
	8	Serial 1 - RS-232RX/RS-485RX+
	9	Serial 1 - RS-485TX-
	10	Serial 1 - RS-485RX-



## Serial Configuration

All of the Serial UART Links from the COM Express Type 6 Module are routed into an Exar SP336E Transceiver. This enables the various selectable serial outputs (RS-232/RS-485). To configure the setting, the appropriate configuration of the Serial Selection DIP Switch is required. Please refer to the Exar SP336E datasheet for additional details.

### Dual RS-232

Switch	Position	Description
A	OFF	Mode 0 Selection - RS-232 Selection
B	OFF	Serial Link 0 - RX+ BIAS
C	OFF	Mode 1 Selection - RS-232 Selection
D	OFF	Serial Link 0 - RX- BIAS
E	OFF	Serial Link 1 - TX+ BIAS
F	OFF	Serial Link 1 – TX- BIAS

### Serial 0 RS-232/Serial 1 RS-485

Switch	Position	Description
A	OFF	Mode 0 Selection - RS-232 Selection
B	OFF	Serial Link 0 - RX+ BIAS
C	ON	Mode 1 Selection - RS-485 Selection
D	OFF	Serial Link 0 - RX- BIAS
E	USER	Serial Link 1 - TX+ BIAS
F	USER	Serial Link 1 – TX- BIAS

### Dual RS-485

Switch	Position	Description
A	ON	Mode 0 Selection - RS-232 Selection
B	USER	Serial Link 0 - RX+ BIAS
C	OFF	Mode 1 Selection - RS-485 Selection
D	USER	Serial Link 0 - RX- BIAS
E	USER	Serial Link 1 - TX+ BIAS
F	USER	Serial Link 1 – TX- BIAS

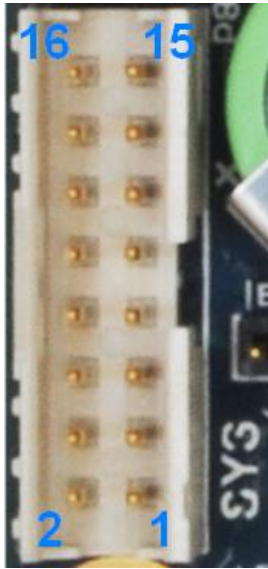
### Dual Disable

Switch	Position	Description
A	ON	Mode 0 Selection - Disable Selection
B	XX	Serial Link 0 - RX+ BIAS
C	ON	Mode 1 Selection - Disable Selection
D	XX	Serial Link 0 - RX- BIAS
E	XX	Serial Link 1 - TX+ BIAS
F	XX	Serial Link 1 – TX- BIAS

## System

The System header can be used to connect the power button, reset button, and LED's required to monitor the module performance or state. It also allows access to the COM Express Module via I2C and SMB.

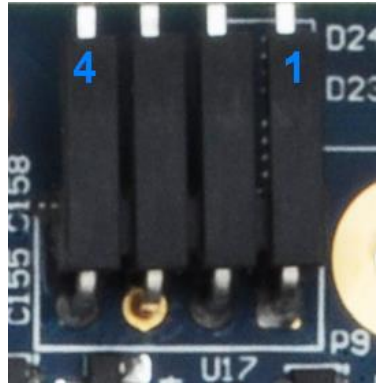
<b>Function</b>	<b>System Connector</b>			
<b>Location</b>	P8			
<b>Type</b>	FCI Minitek Double Row 8 x 2			
<b>P/N</b>	98414-G06-16LF			
<b>Mating</b>	10073599-016LF			
<b>Cable</b>	CBG186			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	SYS_RST#	2	+5V
	3	SYS_PWRBTN#	4	+5V
	5	SYS_BATLOW#	6	RTC BAT EXT
	7	SUS_S3#	8	I2C SCL
	9	SUS_S5#	10	I2C SDA
	11	SMB DATA	12	SPEAKER N
	13	SMB CLK	14	GND
	15	SMC ALERT#	16	GND



## COM Express Fan

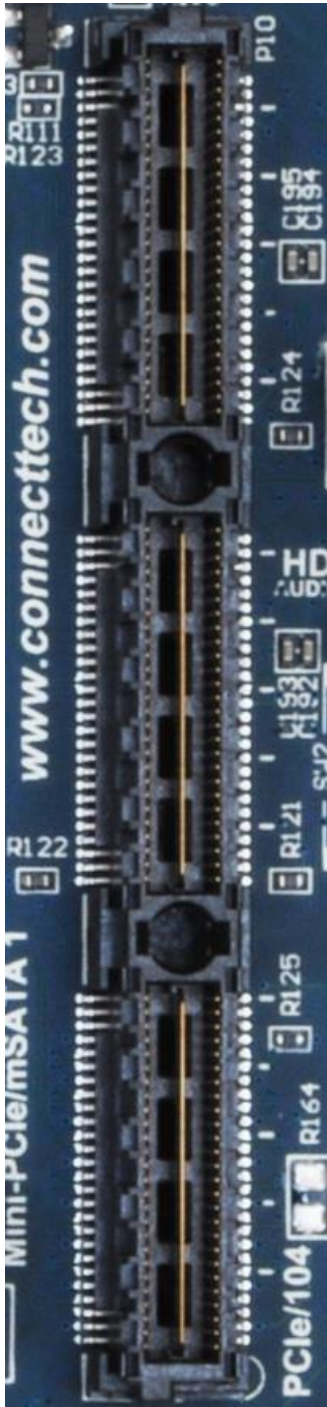
If provided, the COM Express CPU Fan can be powered from the Carrier.

<b>Function</b>	<b>COM Express Fan Control</b>			
<b>Location</b>	P9			
<b>Type</b>	Molex KK 100 Right Angle Header			
<b>P/N</b>	22-28-1040			
<b>Mating</b>	22-01-2041 (Or Equivalent)			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>		
	1	TACH		
	2	+12V		
	3	GND		
	4	PWM		



## PCIe/104 Type 2 Top Connector

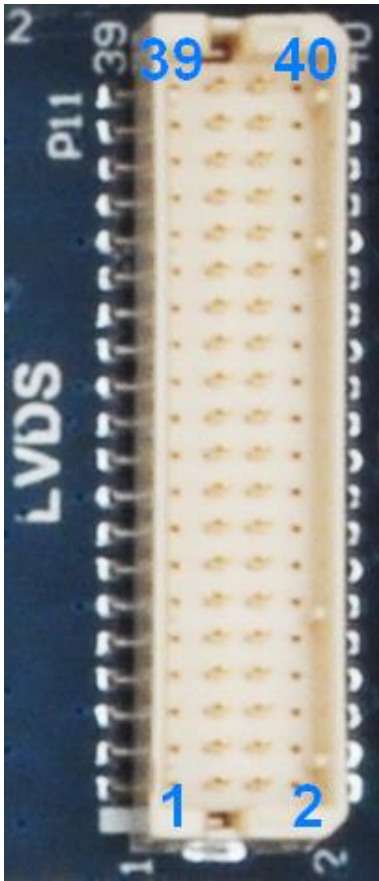
The COM Express Type 6 104e Carrier provides the addition of PCIe/104 Type 2 Stack ability. This enables up to 4 PCIe/104 cards to be added atop of the Carrier.

<b>Function</b>	<b>PCIe/104 Type 2 Stack Interface</b>	
<b>Location</b>	P10	
<b>Type</b>	Samtec Fine Pitch Stacking Connector 15mm Stack Height	
<b>Carrier Connector P/N</b>	ASP-129637-03	
<b>Mating Connector P/N</b>	ASP-129646-03	
<b>Pinout</b>	Refer to PCI/104-Express & PCIe/104 Specification, Rev 2.01  NOTE: PCIe/104 Type 2 (SATA in Banks 2/3, No PCIe x16 Link)	



## LVDS Connector

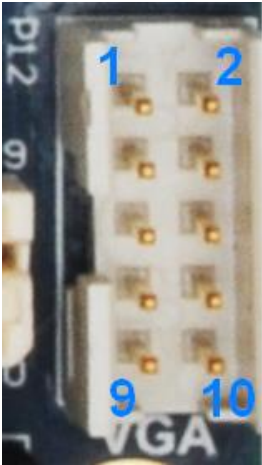
<b>Function</b>	<b>LVDS/Embedded DisplayPort Connector</b>			
<b>Location</b>	P11			
<b>Type</b>	Hirose Low Profile Board to Cable Connector			
<b>P/N</b>	DF20G-40DP-1V(56)			
<b>Mating</b>	DF20A-40DS			
<b>Cable</b>	CBG125			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	LVDS B0-	2	PANEL VCC <sup>[1]</sup>
	3	LVDS B0+	4	PANEL VCC <sup>[1]</sup>
	5	GND	6	GND
	7	LVDS B1-	8	GND
	9	LVDS B1+	10	LVDS A0-
	11	GND	12	LVDS A0+
	13	LVDS B2-	14	GND
	15	LVDS B+	16	LVDS A1-
	17	GND	18	LVDS A1+
	19	LVDS B CLK-	20	GND
	21	LVDS B CLK+	22	LVDS A2-
	23	GND	24	LVDS A+
	25	LVDS B3-	26	GND
	27	LVDS B3+	28	LVDS A CLK-
	29	GND	30	LVDS A CLK+
	31	GND	32	GND
	33	LVDS PPEN	34	LVDS A3-
	35	-	36	LVDS A3+
	37	LVDS BLT CTRL	38	LVDS BLC CLK
	39	LVDS BLEN	40	LVDS BLC DAT



## VGA Video Connector

To allow for greater flexibility, the COM Express Type 6 Carrier provides a VGA Video Output. Routed directly from the COM Express Type-6 Module, this provides additional video output formats for operation.

<b>Function</b>	<b>VGA Video</b>			
<b>Location</b>	P12			
<b>Type</b>	FCI Minitek Double Row 5 x 2			
<b>P/N</b>	98414-G06-10LF			
<b>Mating</b>	10073599-010LF			
<b>Cable</b>	CBG120			
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
	1	DAC RED	2	GND
	3	DAC GREEN	4	-
	5	DAC BLUE	6	SC DDC
	7	HSYNC	8	SD DDC
	9	VSNC	10	GND



## Power Input

The COM Express Type 6 104e Carrier accepts a single power input to power all on-board devices. A single +12V input is required for operation.

Function	Power	
Location	P13	
Type	FCI Pluggable Terminal Block	
P/N	20020111-G041A01LF	
Mating	20020003-G041B01LF (Or Equivalent)	
Pinout	Pin	Description
	1	+12V
	2	+12V
	3	GND
	4	GND

## ATX Power Functionality

The COM Express Type 6 104e Carrier has on-board ATX Power Supply Functionality. The default configuration is to have this controlled by Suspend State S3 (Standby/Sleep), however it is possible to have this changed to Suspend State S5 (Soft Off) at the time of order.

The COM Express Type 6 104e Carrier is shipped in an ATX Power Mode. There is an on-board ATX Override, which is controlled with the SW1D Switch. In Override Mode, the COM Express Module can still be placed into S3 or S5 State; however the rest of the Carrier will remain fully powered.

**Carrier ATX Power DIP Switch Selection**

Switch Location	Switch ON	Switch OFF
SW1D	ATX Override Mode	ATX Mode

## PCB Revision A

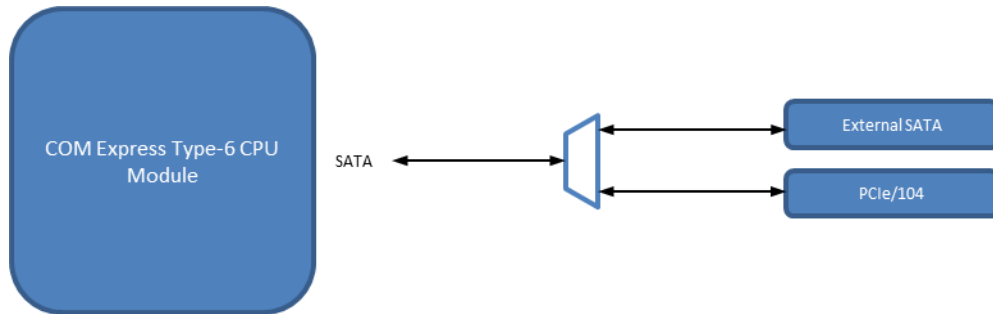
Please note that the ATX Power Functionality of the COM Express Type 6 104e Carrier has been removed. As such, the Carrier will always remain in ATX Override Mode, regardless of the SW1D Switch Position. The PCB Revision can be found just under the Part Number/Serial Number Silk on the Top Side of the PCB.



## SATA-PCIe/104 Switching

### SATA Switching

The COM Express Type 6 104e Carrier has SATA Link 3 sourced from the COM Express Module and connected both an External SATA Connector and the PCIe/104 via Switching Circuitry. This enables the use of either an external SATA HDD or SSD, or a connection via the PCIe/104 Stack. Which way the Link it routed is selected by the Carrier Control DIP Switch (SW1C)



**SATA-PCIe/104 Switching Diagram**


**Carrier SATA DIP Switch Selection**

Switch Location	Switch ON	Switch OFF
SW1C	External SATA	PCIe/104

### External SATA

The COM Express Type 6 104e Carrier provides an External SATA plug for SATA Link 3. Please note that this Link is Switchable with the PCIe/104 Bus.

<b>Function</b>	<b>External SATA</b>	
<b>Location</b>	P14	
<b>Type</b>	Molex Vertical Serial ATA Plug	
<b>P/N</b>	0471554001	
<b>Cable</b>	CBG079 or CBG090	
<b>Pinout</b>	<b>Pin</b>	<b>Description</b>
	1	GND
	2	TX+
	3	TX-
	4	GND
	5	RX-
	6	RX+
	7	GND




A photograph of a black Molex Vertical Serial ATA Plug. The plug is oriented vertically with the SATA connector facing upwards. The label 'SATA' is printed vertically on the right side, and 'P14' is printed at the top right corner.



## SATA Power Connector

The COM Express Type 6 104e Carrier also provides power for external SATA Hard Drives.


Function	SATA Power		
Location	P6B, P6B		
Type	XH Low Profile Crimp Connector		
P/N	B4B-XH-AM(LF)(SN)(P)		
Mating	XHP-4		
Cable	CBG090		
Pinout	Pin	Description	
	1	GND	
	2	+5V	
	3	GND	
	4	+12V	

A close-up photograph of a white SATA Power connector. The connector is oriented vertically, and its four pins are visible. The pins are labeled with blue numbers: '1' at the bottom, '2' above it, '3' above that, and '4' at the top. The connector is plugged into a dark blue or black PCB. To the left of the connector, the text 'SATA PWR' is printed vertically in white. To the right, 'P15' is printed vertically in white. The connector has a small notch on its right side.


## Jumper Description

The COM Express Type 6 104e Carrier has a couple jumper blocks for RTC Battery Control.

### J1 Jumper – RTC External/Local Control

Function	RTC External/Local Battery		
Location	J1		
Pinout	Position	Description	
	EXT	External RTC Battery	
	LOC	On-Board RTC Battery	

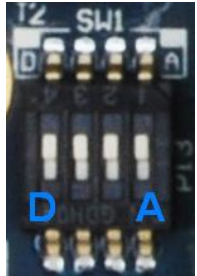
### J2 Jumper – RTC Enable/Clear Control

Function	RTC BIOS Enable/Clear		
Location	J2		
Pinout	Position	Description	
	EN	Enable RTC	
	CLR	Clear BIOS	

## Switch Description

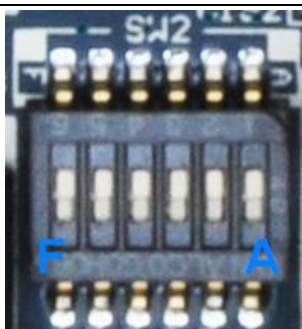
The COM Express Type 6 104e Carrier has a couple DIP Switch blocks for various on-board control.

### SW1 DIP Switch – Carrier Control

Function	Mini-PCIe/mSATA Selection, External SATA-PCIe/104 SATA Selection, ATX Power Override		
Location	SW1		
Pinout	Switch	Description	
	A	Mini-PCIe/mSATA Slot 0 Control	
	B	Mini-PCIe/mSATA Slot 1 Control	
	C	External SATA-PCIe/104 SATA Control	
	D	ATX Power Operation Override	

### SW2 DIP Switch – Serial Selection/Control

Function	Serial Selection and Control	
Location	SW2	
Pinout	Switch	Description
	A	Mode 0 Selection - RS-232/RS-485
	B	Serial Link 0 - RX+ BIAS
	C	Mode 1 Selection - RS-232/RS-485
	D	Serial Link 0 - RX- BIAS
	E	Serial Link 1 - TX+ BIAS
	F	Serial Link 1 – TX- BIAS



## Typical Installation

1. Ensure all external system power supplies are off.
2. Install the COM Express Module onto the TE Connector P1. Be sure to follow the manufacturer's directions for proper installation of mounting hardware, heatsink/heatspreader, and any other applicable requirements from the manufacturer.
3. Install the necessary cables for application. At a minimum these would include:
  - a) Power cable to the input power connector
  - b) Connect a video display cable
  - c) Keyboard and mouse via USB
  - d) SATA or mSATA hard drive

For additional information on the relevant cables, please see the Cables and Interconnects section of this manual.

4. Connect the Power Cable to the Power Supply
5. Switch ON the Power Supply. DO NOT power up your system by plugging in live power.
  - A. To Override the ATX Power Configuration, ensure that SW1D is in the ON position
  - B. For Normal ATX Operation, toggle SYS\_PWRBTN#

## On-Board Indicator LED's

The COM Express Type 6 104e Carrier has 16 on-board indicator LEDs.

LED	Description
D6A	GBE0 ACT#
D6B	GBE1 ACT#
D7A	GBE0 LINK#
D7B	GBE1 LINK#
D14	RST#
D16	SATA ACT#
D17	SYS_STAT#
D18	SUS_S3#
D20	SUS_S5#
D27	+1.5V
D28	+12V_SB
D29	+12V
D30	+5V (PCIe/104)
D31	+5V
D32	+5V_SB
D33	+3.3V

## Current Consumption Details

Below are the maximum ratings of the COM Express Type 6 104e Carrier.

Maximums	Amps	Watts
Theoretical absolute maximum total draw of all functionality on the board	48	500

Below are measurements taken with the COM Express Type 6 104e Carrier running in various configurations. Some values will change depending on what COM Express Module is installed. Please refer to the module manufacturer's 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	0.45	5.4
Module Installed <sup>[4]</sup> , single HDMI video output, USB keyboard, and system sitting in BIOS	1.4	17
Module Installed <sup>[4]</sup> , single HDMI video output, USB keyboard/mouse, 1x mSATA, and system sitting at Linux Desktop (GUI)	1.75	21
Module Installed <sup>[4]</sup> , dual HDMI video output, USB keyboard/mouse, 2 x Mini-PCIe installed, 1 x external SATA HDD installed, audio in/out running, 2 x GBE running, system in Windows 7 running 1080p Video Test	3.0	36

Note [4]: COM Express Type 6 Module with Intel<sup>®</sup> Core<sup>™</sup> i7-3517, 8GB DDR3

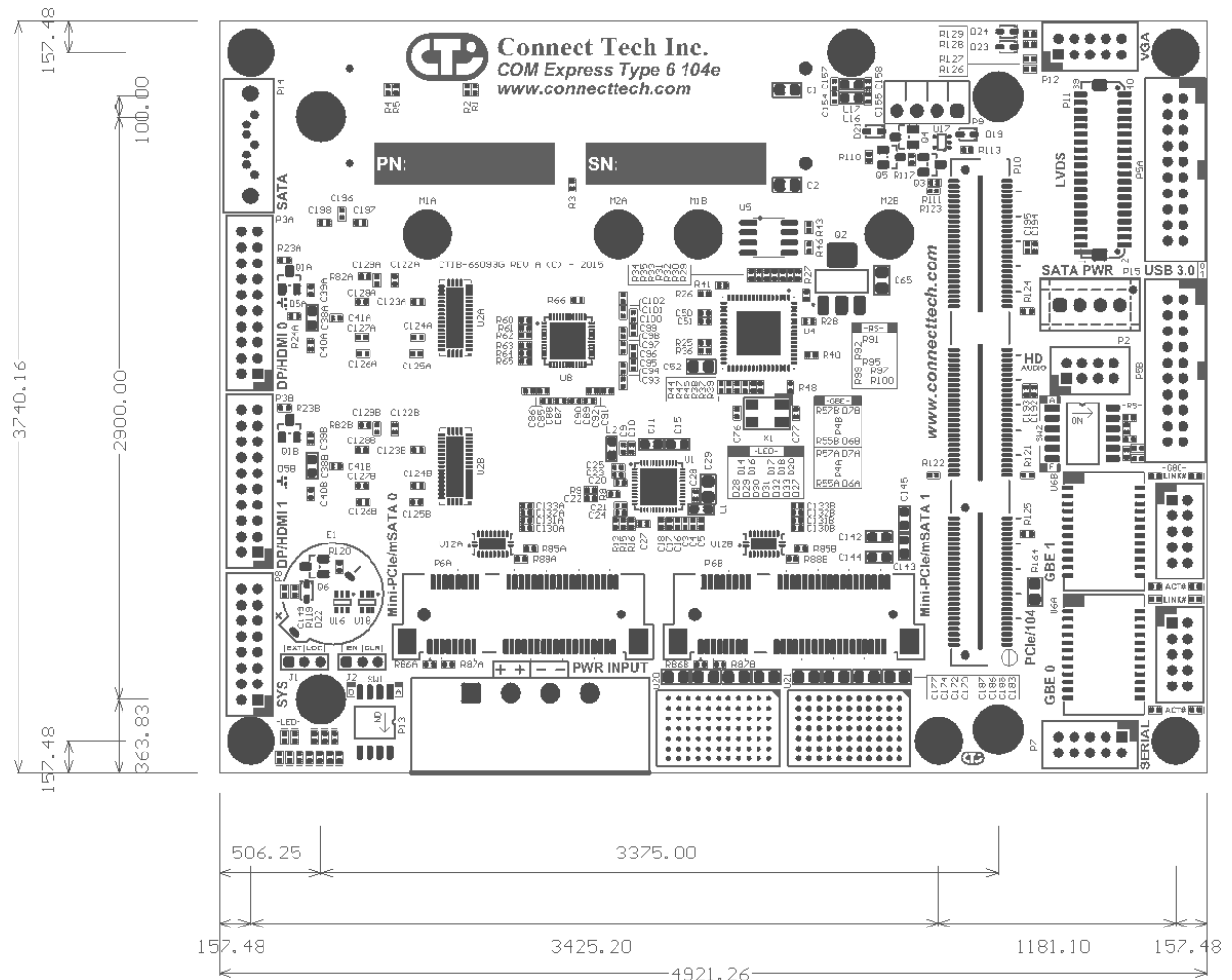
## Mechanical Details

A complete 3D STEP Model file of COM Express Type 6 104e Carrier can be downloaded here:

[http://www.connecttech.com/ftp/3d\\_models/CCG017\\_3D\\_MODEL.zip](http://www.connecttech.com/ftp/3d_models/CCG017_3D_MODEL.zip)

2D Mechanical Dimensioned Drawing (Top View) - PCB and Mounting Hole Dimension are in mil.

### Top View



## Cables

The following table summarizes the COM Express Type 6 104e Carrier cables available.

### Cable Kits

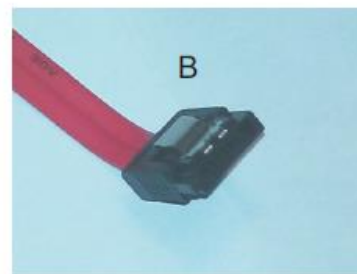
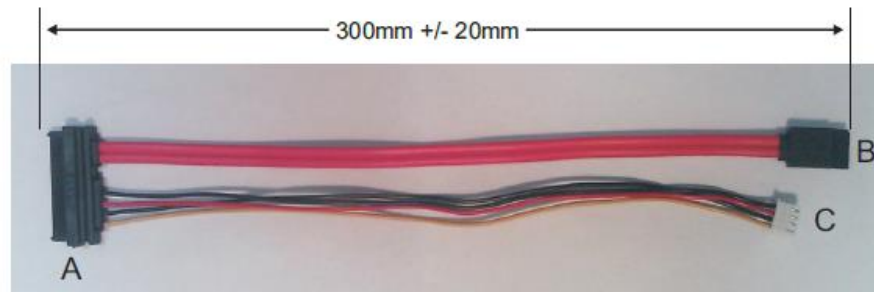
Drawing No.	Part No.	Description	CKG036 Starter Kit	CKG037 Full Kit
CTIC-00199	CBG090	SATA HDD Signal and Power Cable	1	1
CTIC-00430	CBG111	Dual DB-9 Panel Mount to 10-Pin Minitex Cable	0	1
CTIC-00432	CBG113	DisplayPort to 20-Pin Minitex Cable	1	2
CTIC-00433	CBG117	RJ-45 to 10-Pin Minitex Cable	1	2
CTIC-00434	CBG118	Dual Audio to 8-Pin Minitex Cable	1	1
CTIC-00379	CBG120	VGA to 10-Pin Minitex Cable	1	1
OEM	CBG131	Dual USB 3.0 to 20-Pin Cable	1	2
CTIC-00461	CBG145	HDMI Female to 20-Pin Minitex Cable	1	2
CTIC-00533	CBG186	COM Express 16-Pin Minitex System Cable	1	1

### Additional Available Cables

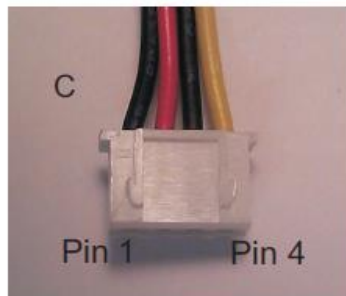
Drawing No.	Part No.	Description
OEM	CBG125	LVDS (DP20A-40DS) to Un-Terminated Wires

Cable drawings are available upon request. Send an email request to: [support@connecttech.com](mailto:support@connecttech.com)

## CBG090 - SATA HDD Signal and Power Cable



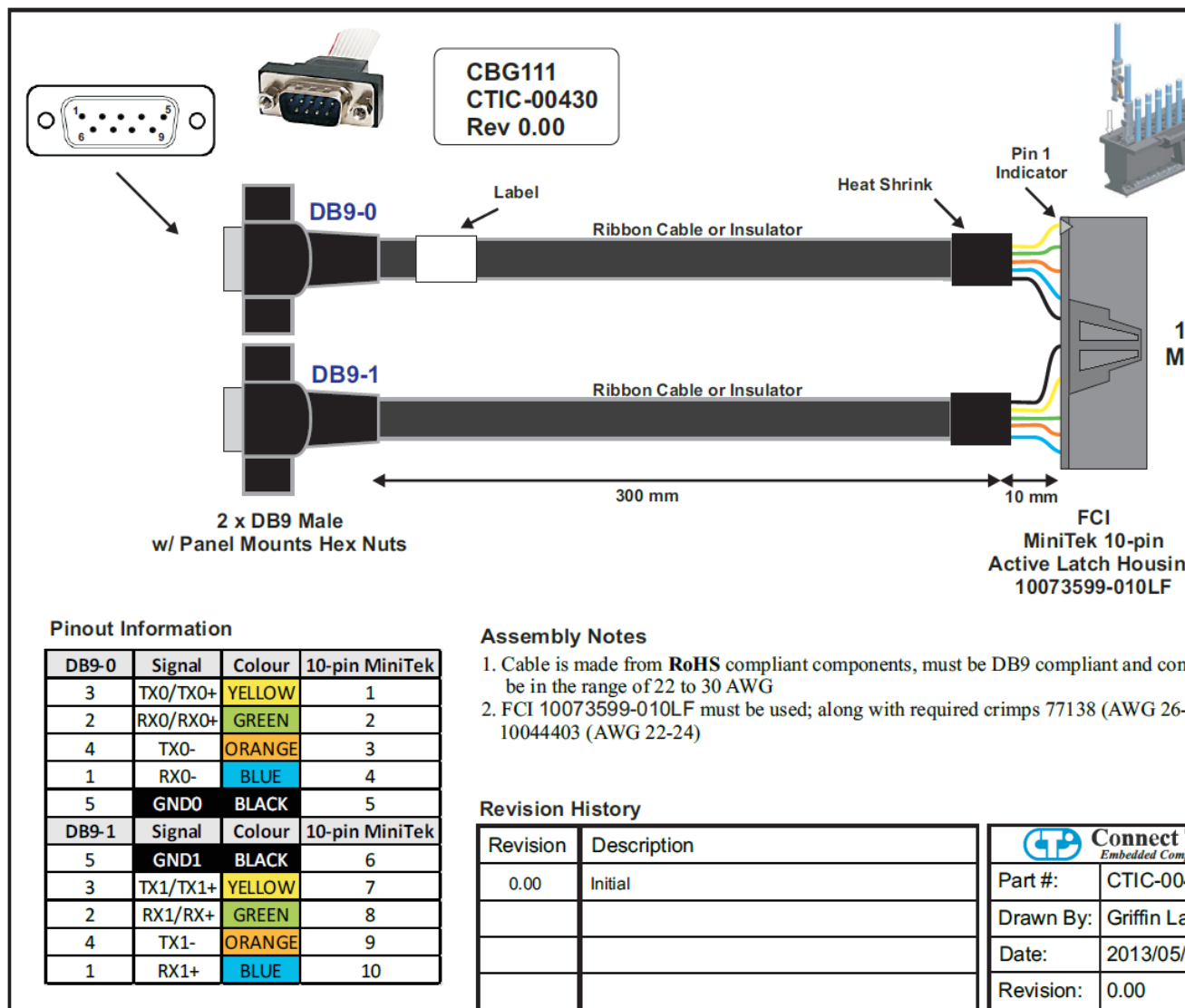
Vertical SATA connector with metal tab for locking connector.



JST PN: XHP-4, or Sin Sheng M241854

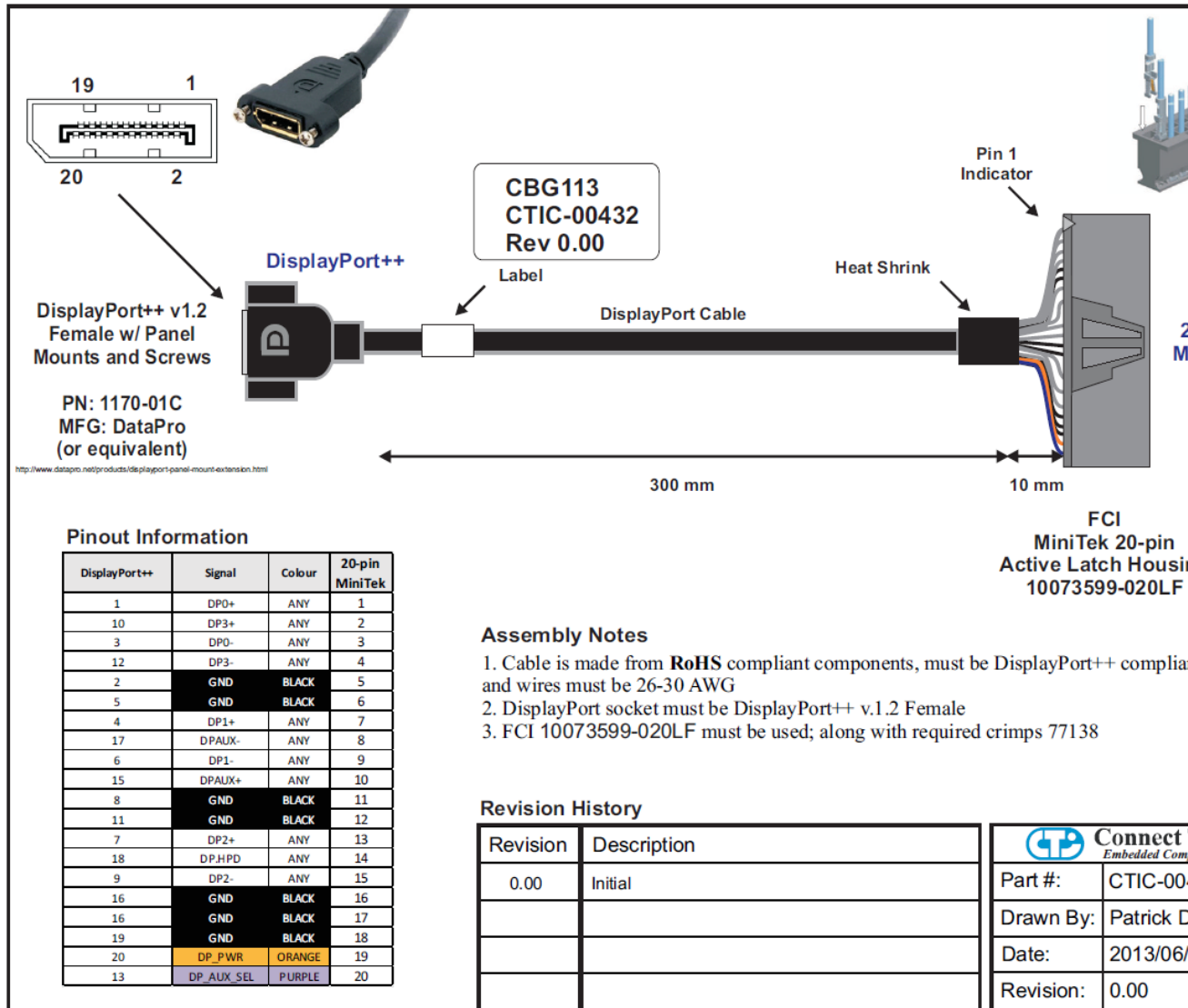
Connect Tech Inc  
Doc: CTIC-00347 PN: CBG090  
Title: SATA HDD Signal and Power Cable  
Rev: 0.00  
Date: December 6, 2011  
Page: 1

## CBG111 - Dual USB 2.0 panel mount to 8-pin MiniTek Cable

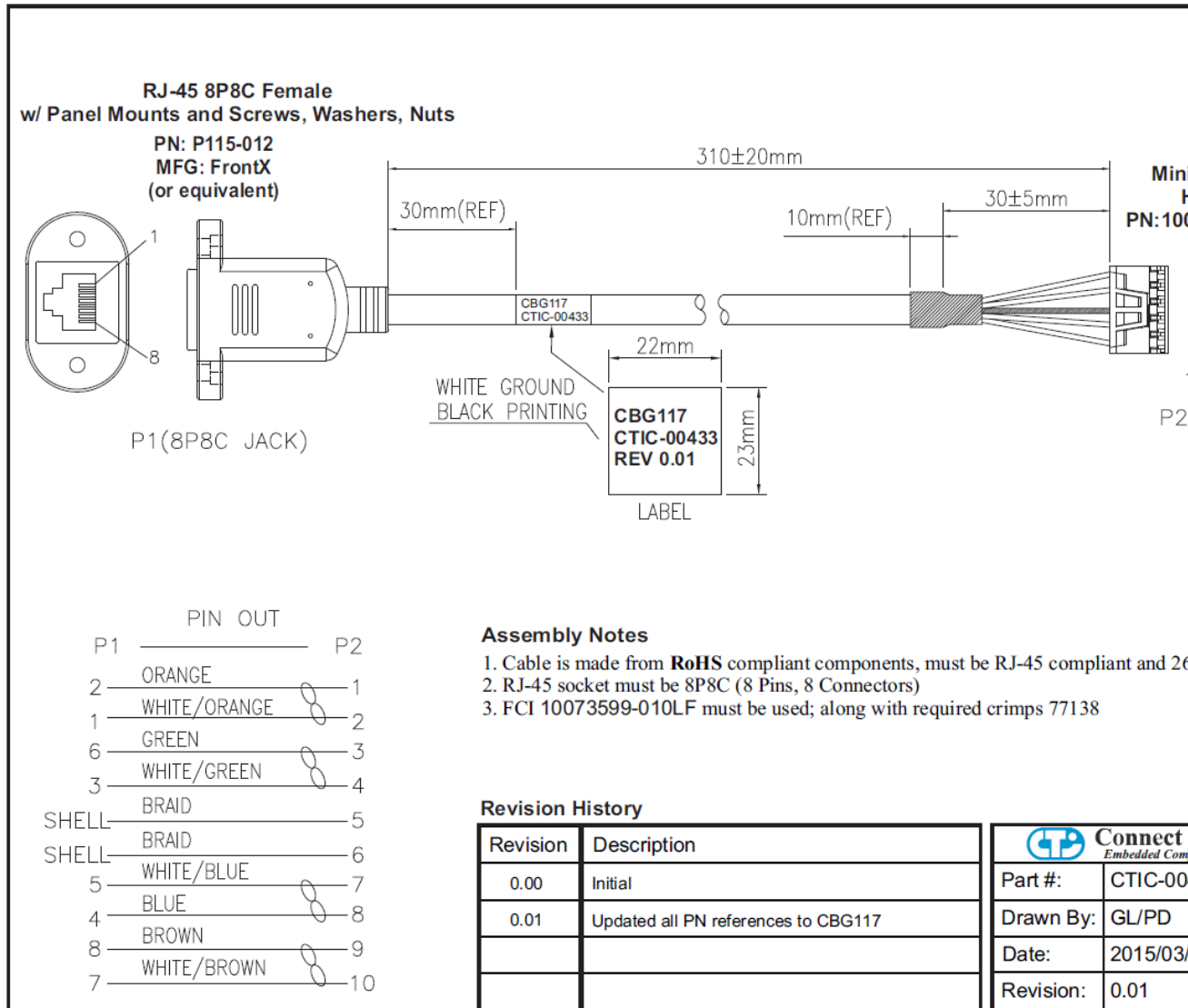




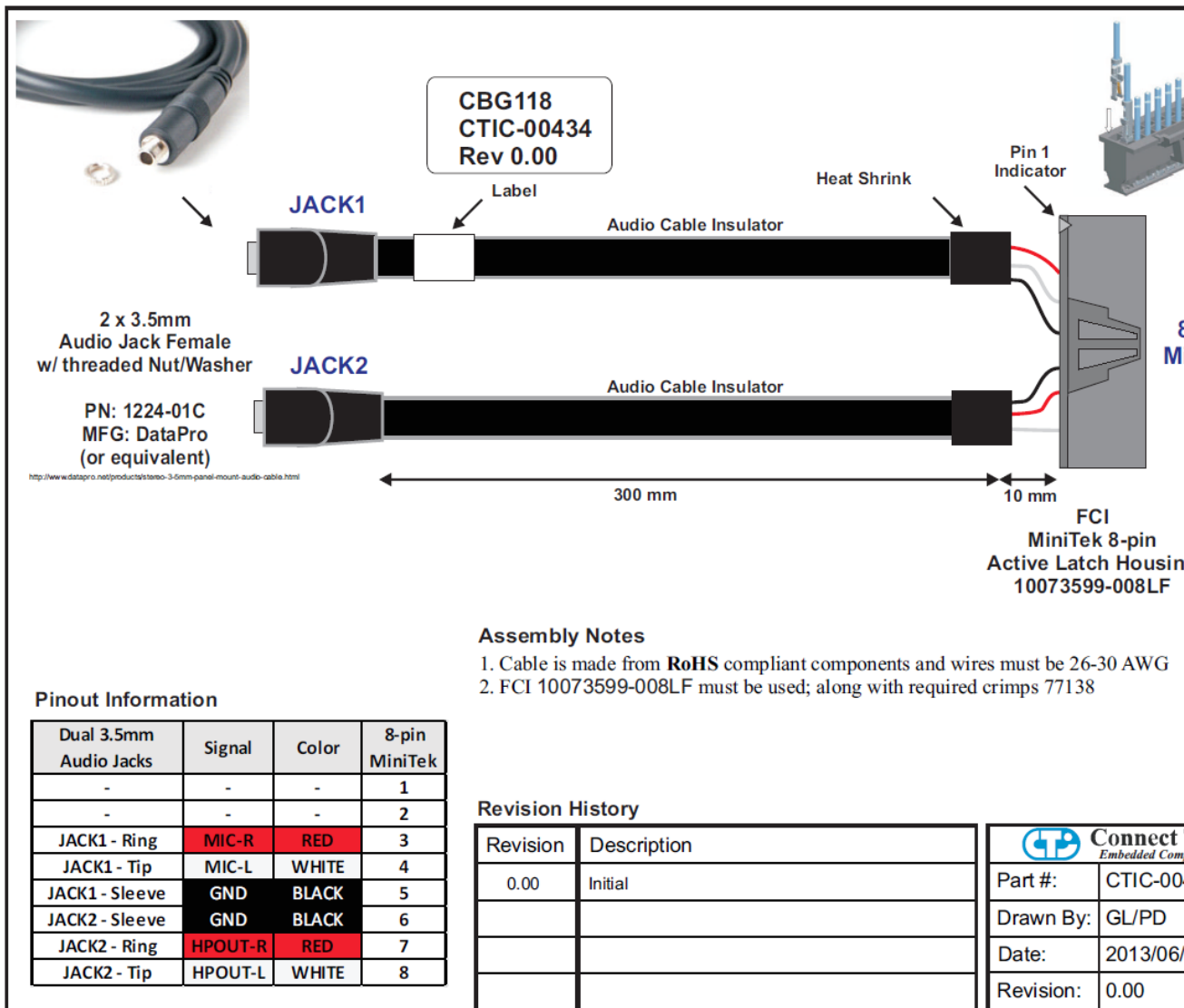
## CBG113 - DisplayPort to 20-Pin Minithek Cable



## CBG117 - RJ-45 to 10-Pin Minitex Cable



## CBG118 - Dual Audio to 8-Pin Minithek Cable



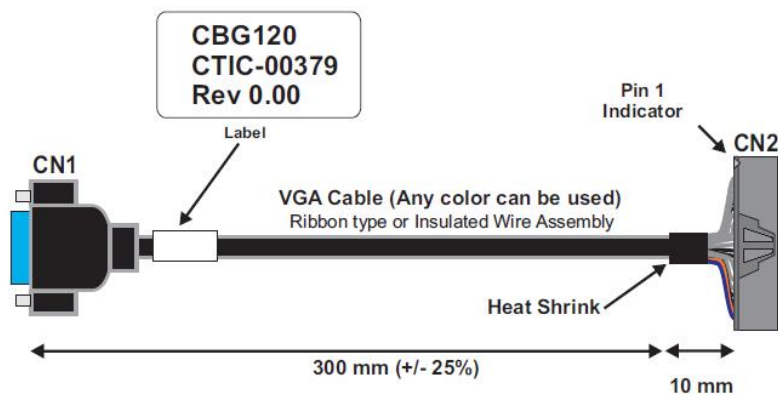
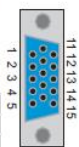
## CBG120 - VGA to 10-Pin Minitex Cable



**VGA - HD-15 Female Panel Mount Connector with moulding/cover and hex nut screws**

Any of the below or equivalents can be used

Manufacturer	Part Number
Assman	A-HDF15LL-TL-B-R
Sullins	SDS104-PRW2-F15-SN00-1
FCI	10090770-S154ALF
Norcomp	180-015-202L001



### Pinout Information

CN1 VGA (HD-15)	Signal	CN2 10 Pin Header
1	RED	1
2	GREEN	3
3	BLUE	5
4	NC	-
5	GND	10
6	GND	2
7	GND	2
8	GND	2
9	NC	-
10	GND	10
11	NC	-
12	DDC DATA	8
13	HSync	7
14	VSynC	9
15	DDC CLK	6

### Assembly Notes

- Cable must be made from **RoHS** compliant components
- Wires must be 26-30 AWG
- Hex nut screws on CN1 must be installed

### Revision History

Revision	Description
0.00	Initial

	Connect Tech Inc.
Part #:	CTIC-
Drawn By:	Patric
Date:	2013/
Revision:	0.00

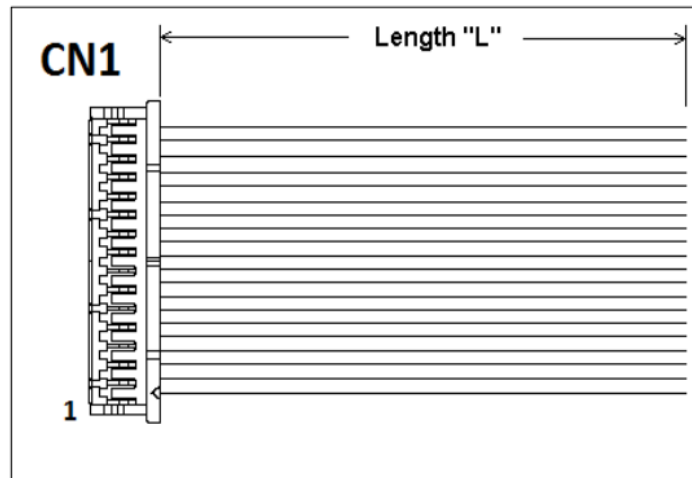
## CBG125 - LVDS (DP20A-40DS) to Un-Terminated Wires

<u>COLOR</u>	<u>CN1</u>	<u>CN2</u>
Black	1	Flying Lead
White	2	Flying Lead
White	3	Flying Lead
White	4	Flying Lead
White	5	Flying Lead
White	6	Flying Lead
White	7	Flying Lead
White	8	Flying Lead
White	9	Flying Lead
White	10	Flying Lead
White	11	Flying Lead
White	12	Flying Lead
White	13	Flying Lead
White	14	Flying Lead
White	15	Flying Lead
White	16	Flying Lead
White	17	Flying Lead
White	18	Flying Lead
White	19	Flying Lead
White	20	Flying Lead
White	21	Flying Lead
White	22	Flying Lead
White	23	Flying Lead
White	24	Flying Lead
White	25	Flying Lead
White	26	Flying Lead
White	27	Flying Lead
White	28	Flying Lead
White	29	Flying Lead
White	30	Flying Lead
White	31	Flying Lead
White	32	Flying Lead
White	33	Flying Lead
White	34	Flying Lead
White	35	Flying Lead
White	36	Flying Lead
White	37	Flying Lead
White	38	Flying Lead
White	39	Flying Lead
White	40	Flying Lead

CN1 = HIR DF20A-40DS-1C

WIRE = UL1571 AWG 28(7)

LENGTH = "L" = 18.00" +/- 0.25"



## CBG131 - Dual USB 3.0 to 20-Pin Cable

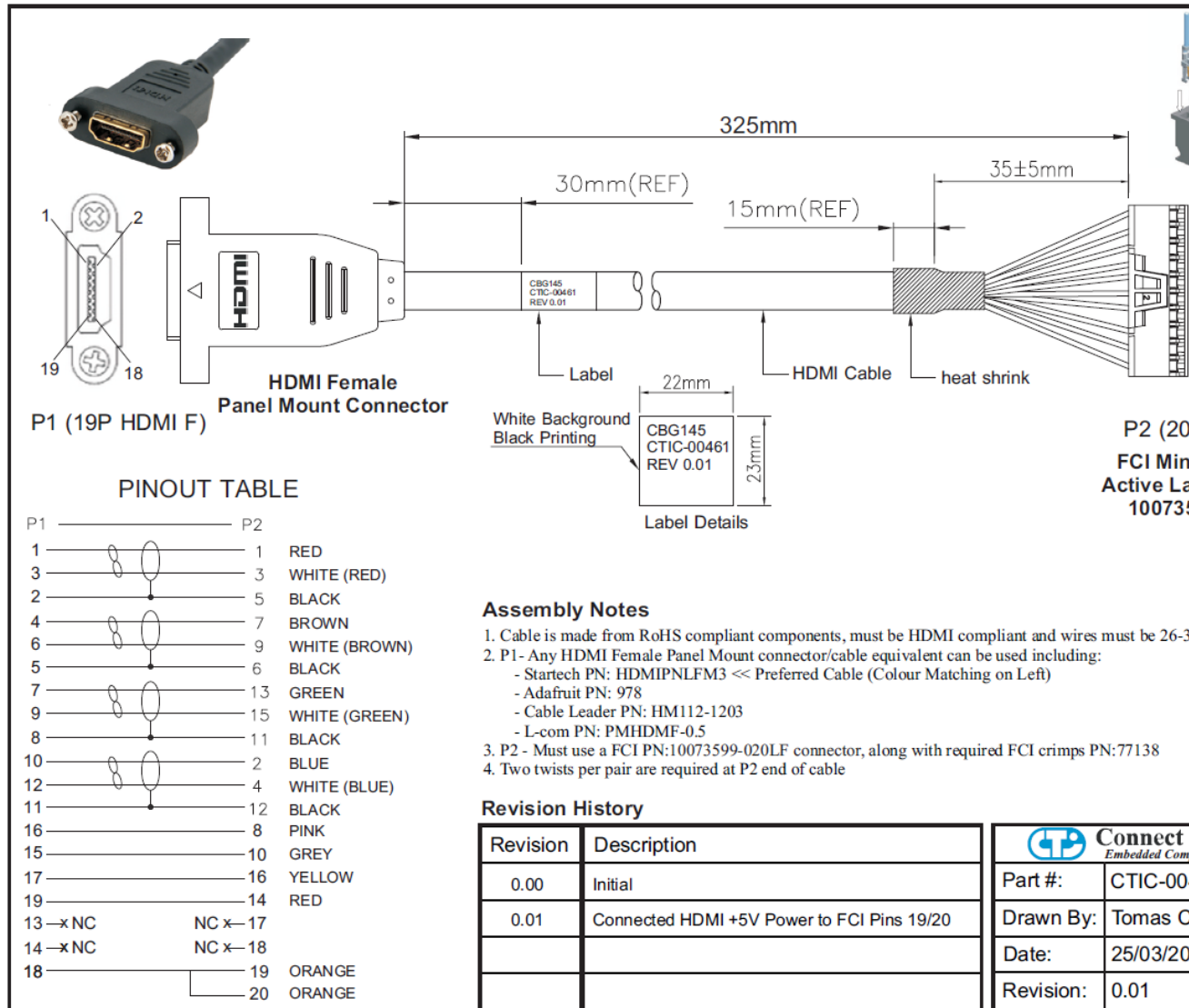
The CBG131 cable is an OEM 19-pin internal type cable, to panel mountable USB 3.0 Type-A Connector(s).

Hardware	
Cable Jacket Type	PVC - Polyvinyl Chloride
Cable Shield Type	Aluminum-Mylar Foil with Braid
Connector(s)	
Connector A	2 - USB 3.0 A (9 pin; SuperSpeed) Female
Connector B	1 - IDC (20 pin; USB 3.0; Motherboard Header) Female
Physical Characteristics	
Color	Blue
Wire Gauge	28 AWG
Cable Length	1.6 ft [0.5 m]
Product Length	19.7 in [500 mm]
Product Width	1.4 in [36.5 mm]
Product Height	0.5 in [12 mm]
Product Weight	2.5 oz [70 g]



*Note: Cable will not ship with b*

## CBG145 - HDMI Female to 20-Pin Minitex Cable



## CBG186 - COM Express 16-Pin Minittek System Cable

