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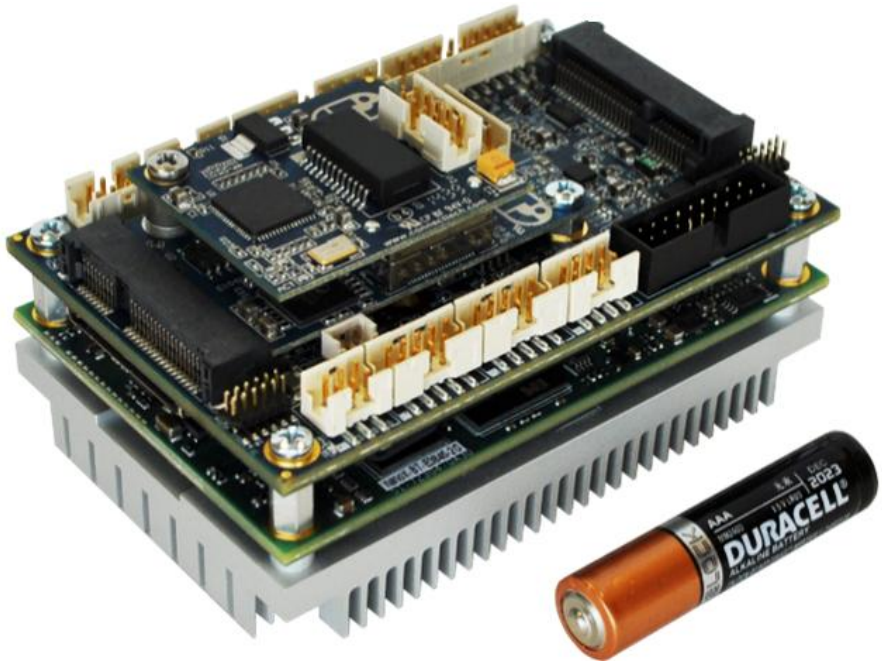
Embedded Computing Experts

USERS GUIDE



COM Express Type 10 Mini Carrier Manual

CTIM-00164 Revision 0.00 2026-04-13

CONNECT TECH

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sales@connecttech.com

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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. Support resources are available 24 hours a day, 7 days a week on our website at: https://connecttech.com/support/resource-center/. See the contact information section below for more information on how to contact us directly. Our technical support is always free.

Contact Information

Contact Information	
Mail/Courier	Connect Tech Inc. Technical Support 489 Clair Rd. W. Guelph, Ontario Canada N1L 0H7
Contact Information	sales@connecttech.com connecttech.com Toll Free: 800-426-8979 (North America only) Telephone: +1-519-836-1291 Facsimile: 519-836-4878 (on-line 24 hours)
Support	Please go to the Connect Tech Resource Center for product manuals, installation guides, device drivers, BSPs and technical tips. Submit your technical support questions to our support engineers. Technical Support representatives are available Monday through Friday, from 8:30 a.m. to 5:00 p.m. Eastern Standard Time.

Limited Product Warranty

Connect Tech Inc. provides a two-year Warranty for this product. 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 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	2026-04-13	Preliminary Release

INTRODUCTION

Connect Tech's COM Express® Type 10 Mini Carrier Board is an extremely small carrier board featuring rugged, locking connectors and offers the ultimate durability.

COM Express® Type 10 Mini 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

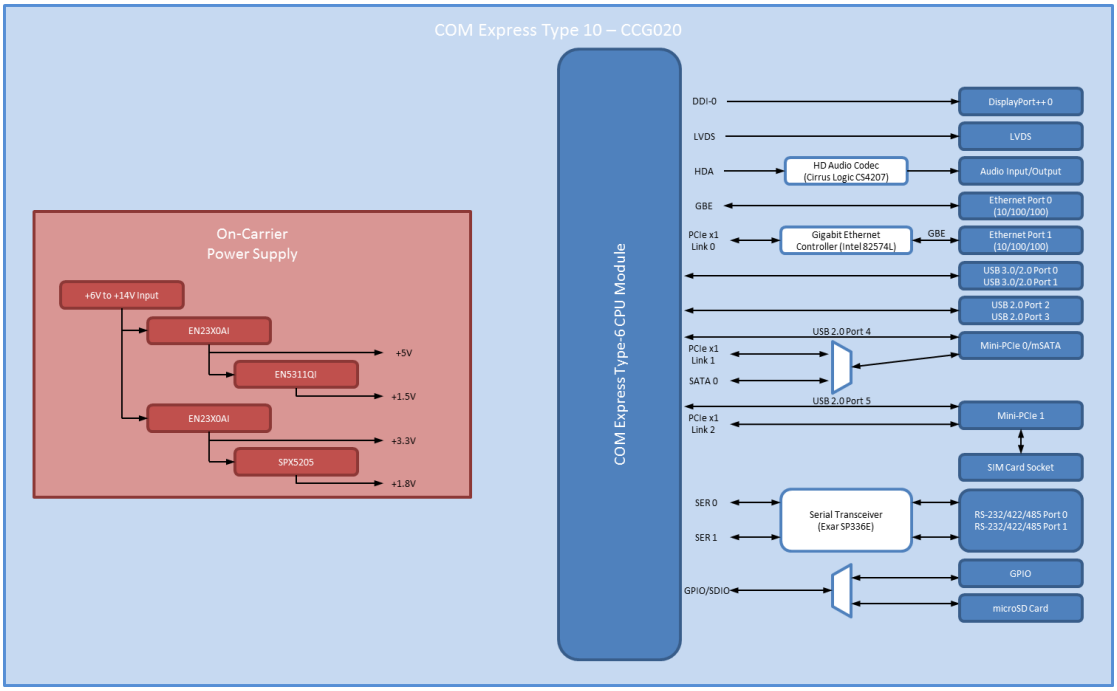
Specifications	
Compatibility	COM Express® Type 10 Mini Modules PICMG COM Express® COM.0 R2.1
Mini PCIe Expansion	2 x half size cards OR 1 x full length card Both sockets have PCIe and USB signaling, one socket also can be configured as mSATA.
Storage	1 x mSATA
USB	2 x USB 3.0 Ports (Only if supported by COM Express Module) 6 x USB 2.0 Ports (2 to USB 3.0 connector, 2 to USB 2.0 connector, 2 to miniPCIe)
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
Display	1 x DisplayPort++ (DDI) interface: Can be used for DisplayPort, HDMI, DVI or VGA 1 x LVDS interface (18-bit, 3 data pairs)
Audio	HD Audio (Cirrus Logic CS4207 codec) 1 x stereo input 1 x stereo output
Serial	2 x RS-232/422/485 hardware selectable ports
Misc External Interfaces	SMBus I2C Battery Low Indication System Status (S3 and Reset Outputs)
Power	Single wide input range +6V to +14V DC (may be module dependent)
RTC Battery	No on-board RTC battery Option to connect external RTC battery.
Connectors	All shrouded locking ruggedized 2mm pitch headers. Can be mated to CTI cable set which terminate to panel mountable PC type connectors. As well can mated to customer cables sets to terminate to any customer or MIL type connectors
Mechanical Information	84mm x 55mm (Same as Type 10 mini Form Factor) Download 3D model here
Weight	49g (carrier only, no module installed)
MTBF	1253592 hrs / 797.7073 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	
CCG020	COM Express® Type 10 Mini Carrier Board
CCG026	COM Express® Type 10 Mini Carrier Board (W/O HD Audio)

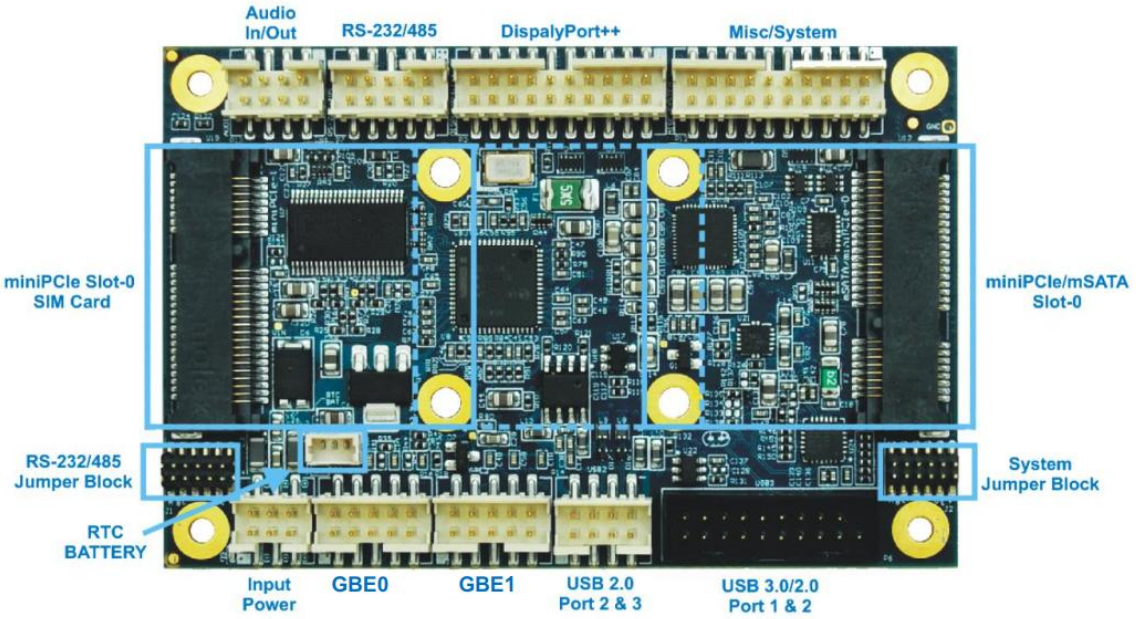
PRODUCT OVERVIEW

CCG020 Block Diagram

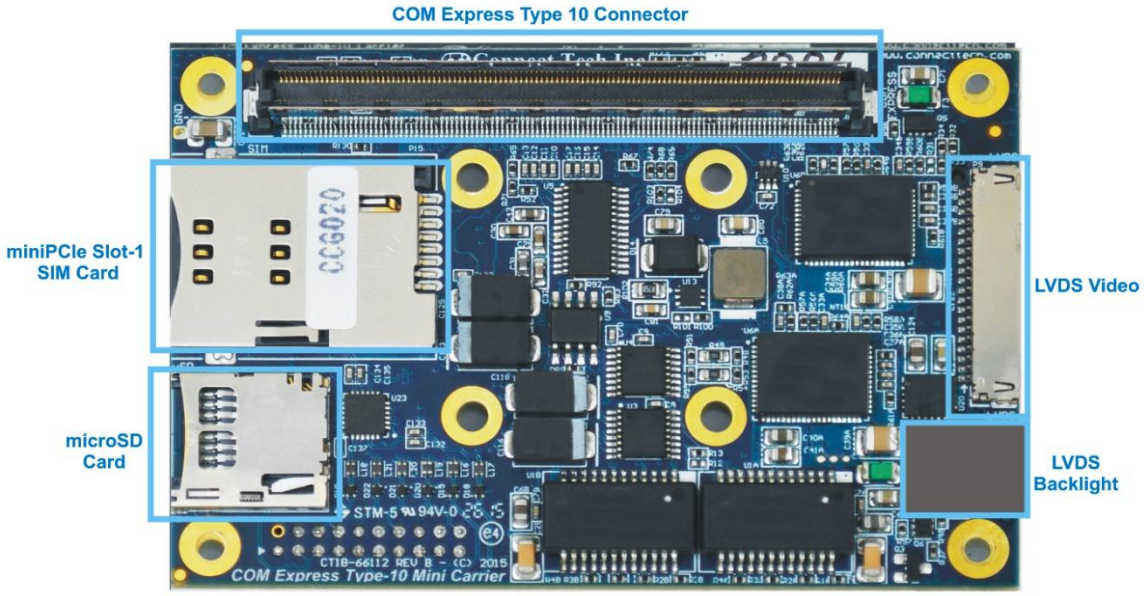


Connector Summary & Locations

CCG020 Top View



CCG020 Bottom View



Connector Summary

Designator	Description
P1A	GBE1 Connector
P1B	GBE0 Connector
P2	DisplayPort++ Connector
P3	microSD Card Connector
P4	Input Power Connector
P5	RTC Battery Connector
P6	USB 3.0 Connector (CCG020 only)
P7	RS-232/485 Connector
P8	COM Express Type 10 Connector
P9	LVDS Video Connector
P10	LVDS Backlight Power Connector
P11	SATA 0 Connector
P12	Misc/System Connector
P13	Audio Input/Output Connector
P14A	USB 2.0 Port 1 & 2 Connector
P14B	USB 2.0 Port 3 & 4 Connector
P14C	USB 2.0 Port 5 & 6 Connector

Jumper Summary & Locations

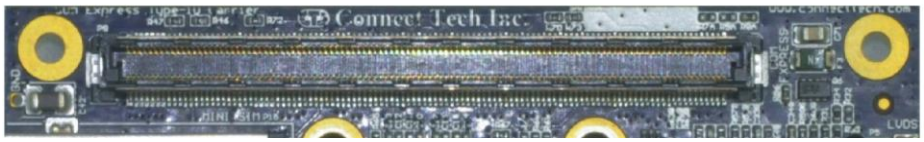
Designator	Description
J1	RS-232/RS-485 Jumper Block
J2	Misc/System Jumper Block

DETAILED FEATURE DESCRIPTION

COM Express Module

The processor and chipset are implemented on the COM Express Type 10 CPU module, which connects to the COM Express carrier via a Tyco fine pitch stacking connector.

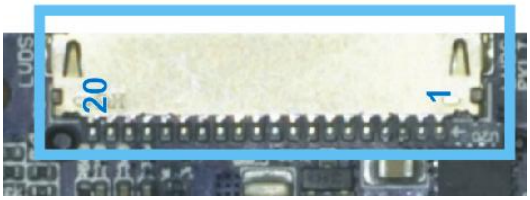
Function	COM Express interface
Location	P1
Type	3-6318491-6 Manufacturer: TE Connectivity
Pinout	See Appendix A



LVDS Video Connector

The COM Express carrier provides dual 18-bit LVDS display channels via P4, which are connected directly from the COM Express module.

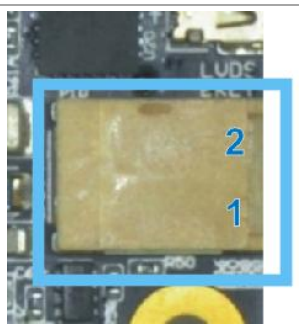
Function	LVDS Graphics		
Location	P9		
Type	DF19G-20P-1H(54) - Manufacturer: Hirose		
Pinout	Pin	Signal	Description
	1	+3.3 VCC_PNL	Panel Power
	2	+3.3 VCC_PNL	Panel Power
	3	GND	Digital ground
	4	GND	Digital ground
	5	LVDS_A0_N	Channel A Data
	6	LVDS_A0_P	Channel A Data
	7	GND	Digital ground
	8	LVDS_A1_N	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 [1]	Backlight Power
	18	+5 VCC_PNL [1]	Backlight Power
	19	GND	Digital ground
	20	BKLT Control [2]	LED ADJ
Notes	[1] – +5V_VCC_PNL – This voltage can be enabled or disabled to the display via Jumper J2 position C. [2] – BKLT Control – This signal can be connected to the COM Express backlight control pin or to GND via Jumper J2 position D and E.		



LVDS Backlight Power Connector

The *COM Express Type 10 Mini Carrier* carrier is equipped with a LVDS backlight inverter power supply connector. This power supply is 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.

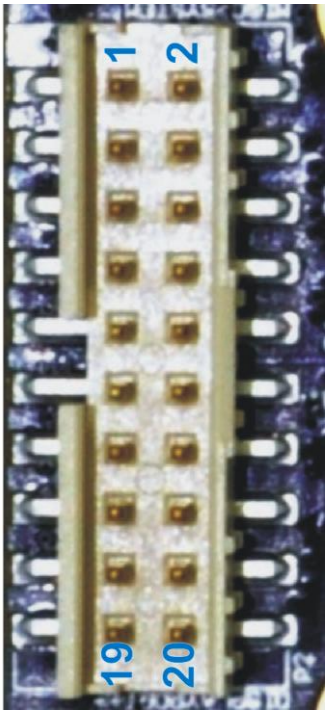
Function	LVDS backlight Inverter power	
Location	P10	
Type	SM02B-BHSS-1-TB - Manufacturer: JST	
Pinout	Pin	Signal
	1	VA LED
	2	VK LED



DisplayPort ++ (DDI) Video Connector

The *COM Express Type 10 Mini Carrier* features a DisplayPort++ connector. 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	Main Input Power		
Location	P4		
Type	98424-G52-20LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	DP0+	DisplayPort Pair 0
	2	DP3+	DisplayPort Pair 3
	3	DP0-	DisplayPort Pair 0
	4	DP3-	DisplayPort Pair 3
	5	GND	GND
	6	GND	GND
	7	DP1+	DisplayPort Pair 1
	8	DPAUX-	DisplayPort Auxiliary Pair
	9	DP1-	DisplayPort Pair 1
	10	DPAUX+	DisplayPort Auxiliary Pair
	11	GND	GND
	12	GND	GND
	13	DP2+	DisplayPort Pair 2
	14	DP.HPD	Hot Plug Detect
	15	DP2-	DisplayPort Pair 2
	16	GND	GND
	17	GND	GND
	18	GND	GND
	19	DP PWR	DisplayPort Power (+3.3V)
	20	DP AUX SEL [1]	Auxiliary Selection
Notes	[1] – For DP_AUX_SEL – Cable assembly must tie high (+3.3V) for HDMI/DVI output and low (GND) for DisplayPort output.		

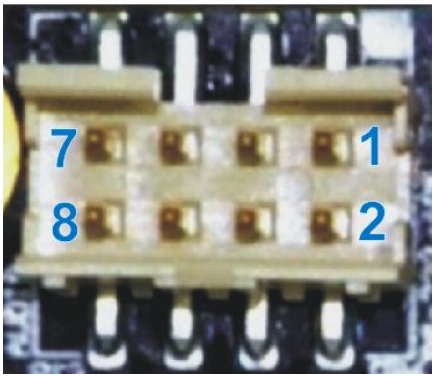


HDMI / DVI / VGA	The *COM Express Type 10 Mini Carrier*'s DisplayPort++ connector can be used for display outputs other than DisplayPort. The use of HDMI, DVI or VGA can be done through a simple dongle or cable assembly like the ones shown below. These can be purchased from any OEM vendor (such as www.startech.com) or directly through Connect Tech. **Note: Some newer processor series like the Intel Baytrail can actually output proper TMDS signaling, so no external dongles are needed in this case. TMDS actually comes out directly from the module and carrier.**   

Audio

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		
Location	P13		
Type	98424-G52-10LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	-	No Connect
	2	-	No Connect
	3	MIC-R	Mic Input – Right Channel
	4	MIC-L	Mic Input – Left Channel
	5	GND	Mic GND / Shield
	6	GND	Headphone GND / Shield
	7	HPOUT-R	Headphone Right Channel
	8	HPOUT-L	Headphone Left Channel

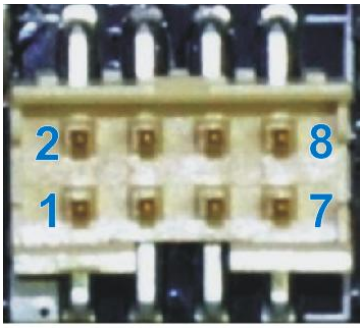


Notes	Software Support for the CS4207: The audio codec used on the carrier board is the CS4207 from Cirrus Logic. Additional drivers will be needed to properly operate audio on the COM Express carrier. Some downloadable links can be found below. **Windows XP Driver**: http://www.cirrus.com/en/pubs/software/CS4207_WinXP_1-0-0-38.zip **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 Port Connectors

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		
Location	P14 – A signals = Port2, B signals = Port3		
Type	98424-G52-08LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	A-VBUS	Port A Power (+5V)
	2	B-VBUS [1]	Port B Power (+5V)
	3	A-D-	Port A Data Pair
	4	B-D-	Port B Data Pair
	5	A-D+	Port A Data Pair
	6	B-D+	Port B Data Pair
	7	A-GND	Port A GND
	8	B-GND	Port B GND
Notes	[1] – B-VBUS – This voltage can be disable for USB Client mode on USB port 6, just installing jumper J2 position B.		



USB 3.0/2.0 Port Connectors

The maximum configuration for a Type 10 COM Express Modules allows for 2 USB 3.0 Ports with integrated USB 2.0 Ports. However most modules currently on the market only expose a single USB 3.0 Port. The USB 3.0 signals are sourced from the COM Express Module, and run through a Pericom Semiconductor PI3EQX7502AIZDE re-driver.

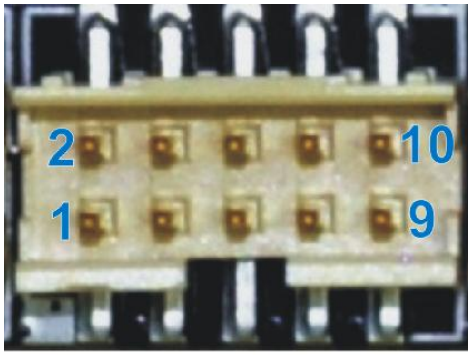
Over current protection, power supply filtering and ESD protection is also provided.

Function	USB 2.0/3.0			
Location	P6			
Type	Intel USB 3.0 Internal 19-pin Connector http://www.intel.com/content/www/us/en/io/universal-serial-bus/usb3-internal-connector-cable-specification.html			
Pinout	Pin	Description	Pin	Description
	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 - B+

10/100/1000 Ethernet (GBE) Connector

The COM Express carrier features dual 10/100/1000 Ethernet Ports.

Function	LAN Connector		
Location	P21A, P21B		
Type	98424-G52-10LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	MX1-	Ethernet Pair 1
	2	MX1+	Ethernet Pair 1
	3	MX2-	Ethernet Pair 2
	4	MX2+	Ethernet Pair 2
	5	SHELL	RJ Shell Connection
	6	SHELL	RJ Shell Connection
	7	MX3-	Ethernet Pair 3
	8	MX3+	Ethernet Pair 3
	9	MX4-	Ethernet Pair 4
	10	MX4+	Ethernet Pair 4

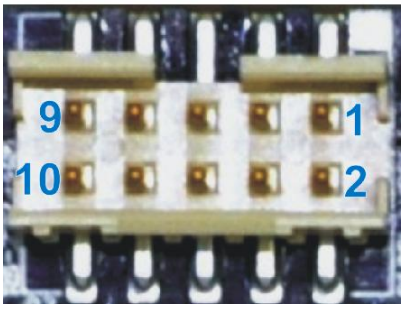


Notes	
	GBE Port 0 (P21B) is coming directly from the COM Express module. GBE Port 1 (P21A) is coming from an Intel 82574 PCIe PHY Controller located on the carrier.
	Software Support for the Intel 82574 Additional drivers will be needed to properly operate the GBE Port 1 on the COM Express carrier. 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

RS-232/485 Connector

The *COM Express Type 10 Mini Carrier* provides 2 asynchronous serial ports. Each of these ports are derived directly from the COM Express Type 10 SER1 and SER2 connections. These ports are hardware selectable through he means of jumpers to RS-232 or RS-422/485

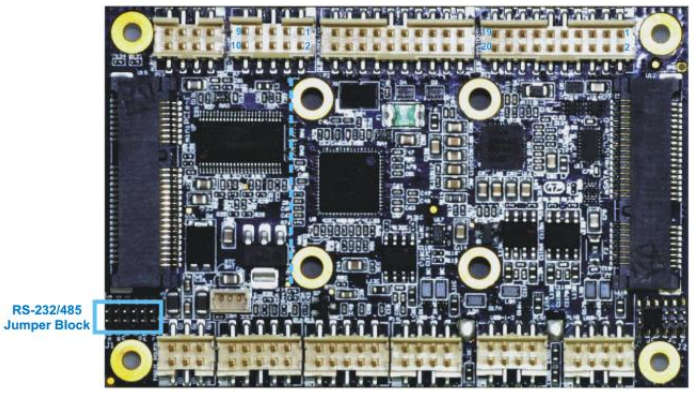
Function	RS-232 / RS-485		
Location	P7		
Type	98424-G52-10LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	232TX0/485TX0+	RS-232 0 Transmit / RS-485 0 Transmit +
	2	232RX0/485RX0+	RS-232 0 Receive / RS-485 0 Receive +
	3	485TX0-	RS-485 0 Transmit -
	4	485RX0-	RS-485 0 Receive -
	5	232/485-GND0	Port 0 Ground
	6	232/485-GND1	Port 1 Ground
	7	232TX1/485TX1+	RS-232 1 Transmit / RS-485 1 Transmit +
	8	232RX1/485RX+	RS-232 1 Receive / RS-485 1 Receive +
	9	485TX1-	RS-485 1 Transmit -
	10	485RX1	RS-485 1 Receive -



RS-232/485 Jumper

Below is a listing of the 3 main configurations of jumper settings for the serial ports on the carrier board. Positions A & B set the line mode, while positions C – F set BIAS termination for RS-485 signaling.

Function	RS-232/485 Jumper Block	
Location	J1	
Jumper settings	Position	Description
	A	Serial Mode Bit - M0
	B	Serial Mode Bit – M1
	C	Port 0 RS-485 BIAS+
	D	Port 0 RS-485 BIAS-
	E	Port 1 RS-485 BIAS+
	F	Port 1 RS-485 BIAS-



Serial Line Modes

Position A – M0	Position B – M1	Port 0 Selected Mode	Port 1 Selected Mode
OFF	OFF	RS-232	RS-232
OFF	ON	RS-232	RS-422/485
ON	OFF	RS-422/485	RS-422/485
ON	ON	Undefined	Undefined

Examples

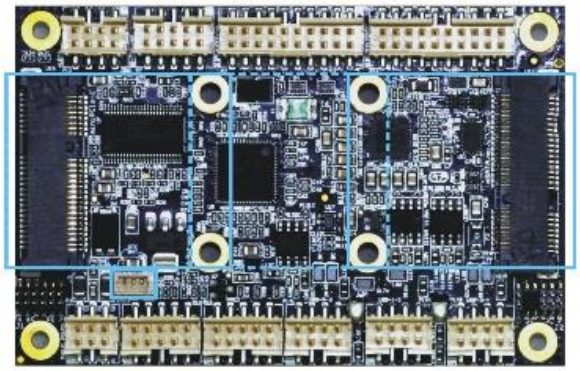
microSD Card Connector

The *COM Express Type 10 Mini 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.

Function	Micro SD Card Slot		
Location	P3		
Type	502570-0893 - Manufacturer: Molex		
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
Notes	**this SD card slot will ONLY operate if the COM Express module provides the SDIO interface over the GPIO pins. Some COM Express modules may have this as a BIOS setting, others will be strictly a hardware option. See below for the SDIO / GPIO mapping **		

Mini PCIe / mSATA Connector

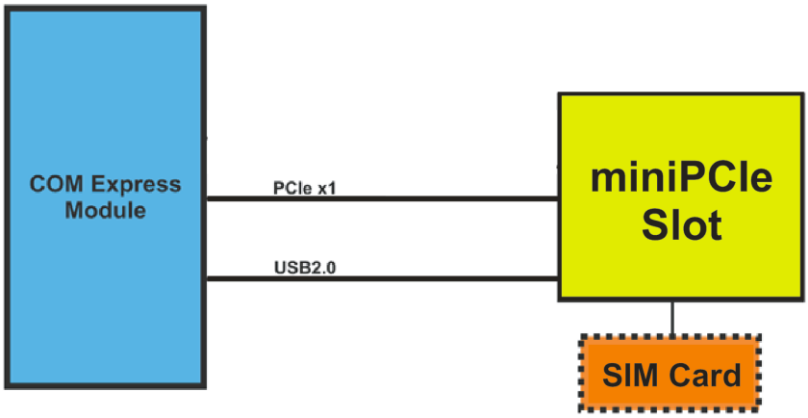
Function	mini PCIe / mSATA Slots
Location	U19 (“left slot” mini pcie) U12 (“right slot” mini pcie/mSATA)
Type	Standard 52-pin 0.8mm pitch PCI Express mini Card connector
Pinout	mSATA Pinout mini pcie Pinout



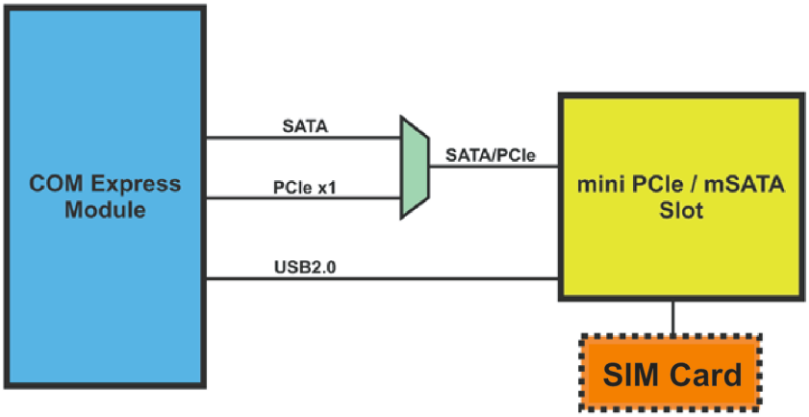
Dual Function mini PCIe mSATA Slots

The *COM Express Type 10 Mini Carrier* has a standard mini PCIe slot and a special dual purpose functionality mini PCIe / mSATA slots. The dual purpose slot 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 connection in addition to the PCIe as per the mini PCIe specification; see below for a block diagram of the slots functionality.



Standard mini PCIe Slot Block Diagram (U19)
Note: SIM card is only connected to the “left” mini pcie Slot 1



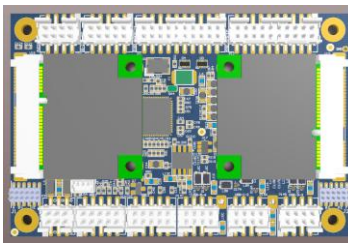
PCIe / SATA Dual Functionality Diagram (U12)

*** Selection between mSATA and mini pcie is done via Jumper J2 position F. (ON = mini pcie, OFF = mSATA)*

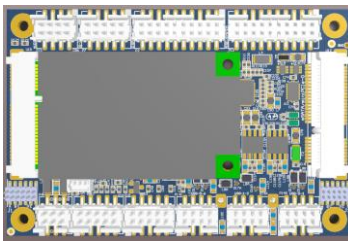
Half and Full Length mini PCIe / mSATA module Installation

The *COM Express Type 10 Mini Carrier's* mini pcie / 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.

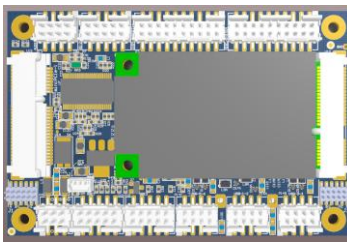
Two Half Length Modules Installed



One Full Length mini pcie Module Installed

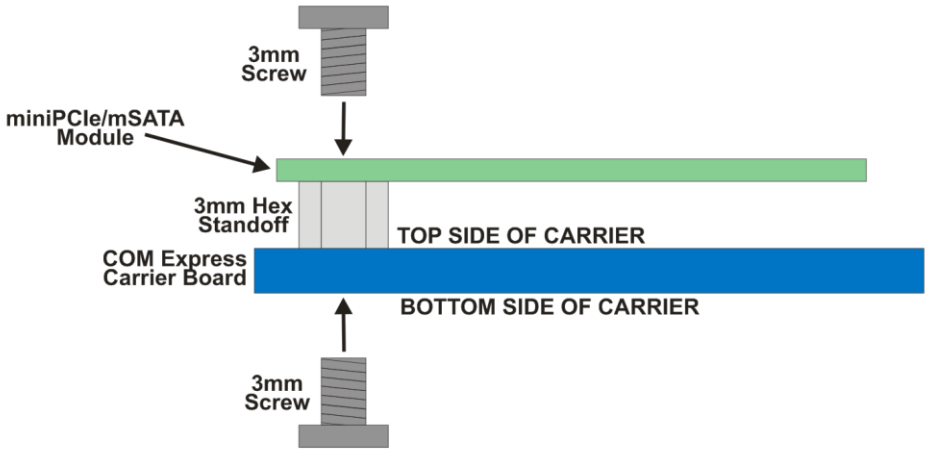


One Full Length mSATA Module Installed



Standoff and Screw Assembly Details

Below is a diagram of how the standoffs and mounting hardware should be installed. If the screw mount type standoffs is not preferred a solder-in standoff is also available.



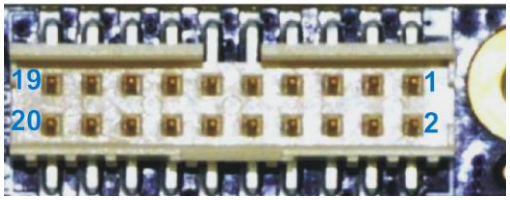
External Hard Drive Installation

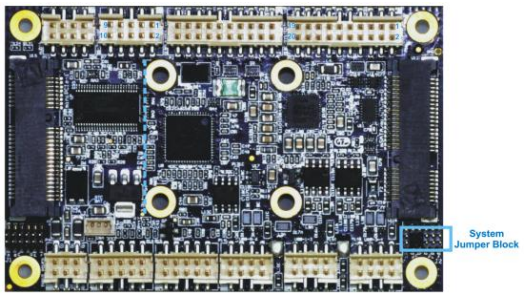
The CCG020 model only has a single mSATA link, so if an external 2.5” (or other) drive is needed, this can be facilitated by the use of an mSATA to SATA adapter. Contact sales@connecttech.com for more details on this configuration.

System Connector

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

Function	Misc/System Control Header		
Location	P19		
Type	98424-G52-20LF - Manufacturer: FCI		
Pinout	Pin	Signal	Description
	1	PWRM.PWRBTN#	Power Button
	2	GND	Ground
	3	PWRM.SYS RESET#	Reset Button
	4	GND	Ground
	5	PWRM.SUS_S3#	S3 Power Status Output
	6	SMB.ALERT#	SMB Alert Signal
	7	RESET-OUT	Carrier Board Reset Output
	8	SMB.DAT	SMB Data
	9	GPO0	GPIO Output Bit-0
	10	SMB.CK	SMB Clock
	11	GPO1	GPIO Output Bit-1
	12	PWRM.BATLOW#	Battery Low Indicator
	13	GPO2	GPIO Output Bit-2
	14	I2C.CK	I2C Clock
	15	GPO3	GPIO Output Bit-3
	16	I2C.DAT	I2C Data
	17	GPI0	GPIO Input Bit-0
	18	GPI2	GPIO Input Bit-2
	19	GPI1	GPIO Input Bit-1
	20	GPI3	GPIO Input Bit-3

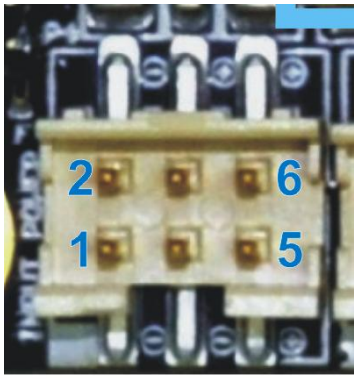


Function	System Jumper Block		
Location	J2		
Jumper settings	Position	Description	
	A	SD Card (ON) / GPIO (OFF) selection	
	B	USB Port 7 Client Enable	
	C	Enable +5V Backlight Supply to P9	
	D	Connect LVDS PWM Signal to GND	
	E	Connect LVDS PWM to COM Express	
	F	mini PCIe (ON) / mSATA (OFF) selection	

Input Power & Control

The COM Express Type 10 Mini Carrier accepts a single input to power all of the on board devices. All intermediate voltages are derived from this input. Most COM Express Type 10 module can accept a wide input voltage range, however the on-board power supplies on CTI's carrier can only accept up to a maximum of +14V.

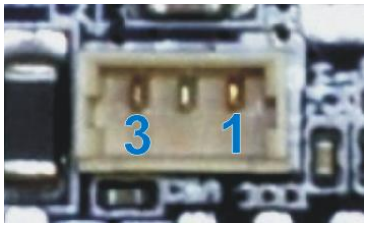
Function	Main Input Power		
Location	P4		
Type	98424-G52-06LF - Manufacturer: FCI		
Input Range	+5 VDC to +16 VDC		
Pinout	Pin	Signal	Description
	1	GND	Ground / Return
	2	GND	Ground / Return
	3	GND	Ground / Return
	4	+VIN	Power In
	5	+VIN	Power In
	6	+VIN	Power In



RTC Battery

The COM Express Type 10 Mini Carrier allows for an external RTC battery to be connected. This battery should be a 3V DC battery, and it will hold all BIOS settings including date and time. Some COM Express modules may have the RTC battery on the module so in this case this connector can be left disconnected.

Function	RTC Battery Connector		
Location	P5		
Type	53047-0310 - Manufacturer: Molex		
Pinout	Pin	Signal	Description
	1	+3V	RTC Battery Voltage Input
	2	NC	No Connect
	3	GND	Ground / Return
Notes	Connect Tech provides a Battery with cable assembly in any of the "Full" or "Starter" cable kits, please see the Cable Section of this manual for more details. If this battery is not sufficient for the application, a different battery cable can be designed. For further information about RTC battery selection and life time estimation, see Application Note 00009 CTIN-00009 http://connecttech.com/pdf/CTIN-00009.pdf		



TYPICAL INSTALLATION

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
   c) Keyboard and mouse via USB
   d) SATA Hard Drive
4. Connect the power cable to power supply
5. Ensure your power supply is in the range of +6V to +14V DC
6. Switch on the power supply

POWER CONSUMPTION & THERMALS

Current Consumption

Below are some examples of actual measurements taken with the *COM Express Type 10 Mini 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	0.14	1.68
Module Installed[1], single DDI video output, USB keyboard with system sitting in BIOS	0.72	8.64
Module Installed[1], single DDI video output, all peripherals connected, booted Linux running, CPU running stress test	1.03	12.36

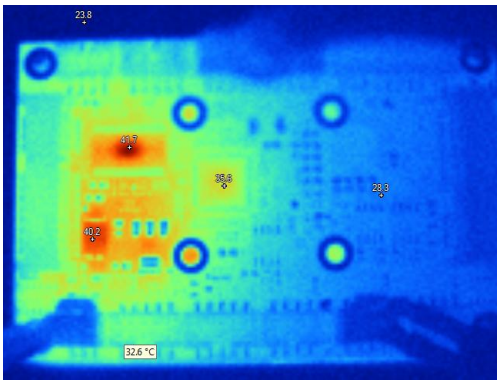
Note [1] : COM Express Type 10 Module used for measurements - Intel Core N2600 CPU

Thermal Properties

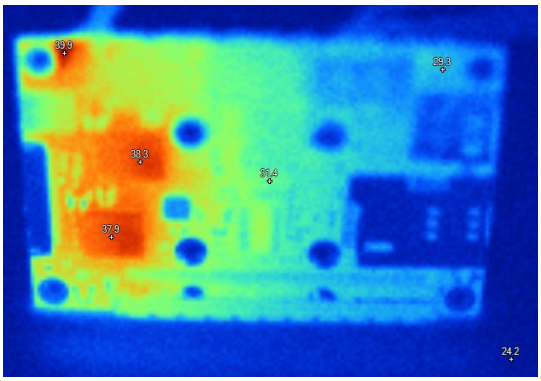
All components on the *COM Express Type 10 Mini Carrier* rare rated to a maximum operating temperature of -40°C to +85°C. The carrier has been fully tested to run in both extremes in an environmental test chamber with 125 CFM of airflow.

Below are some thermal images of the carrier running standalone at room temperature with and without a module installed.

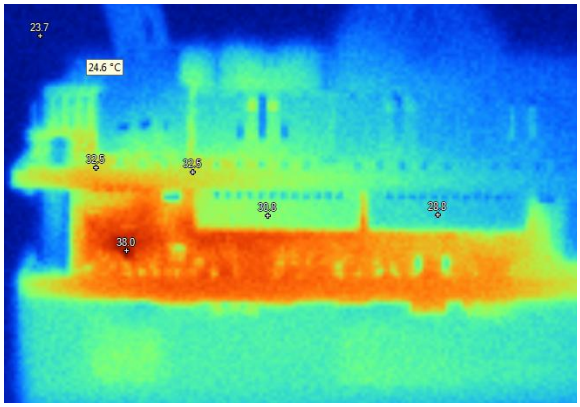
TOP VIEW



BOTTOM VIEW



SIDE VIEW

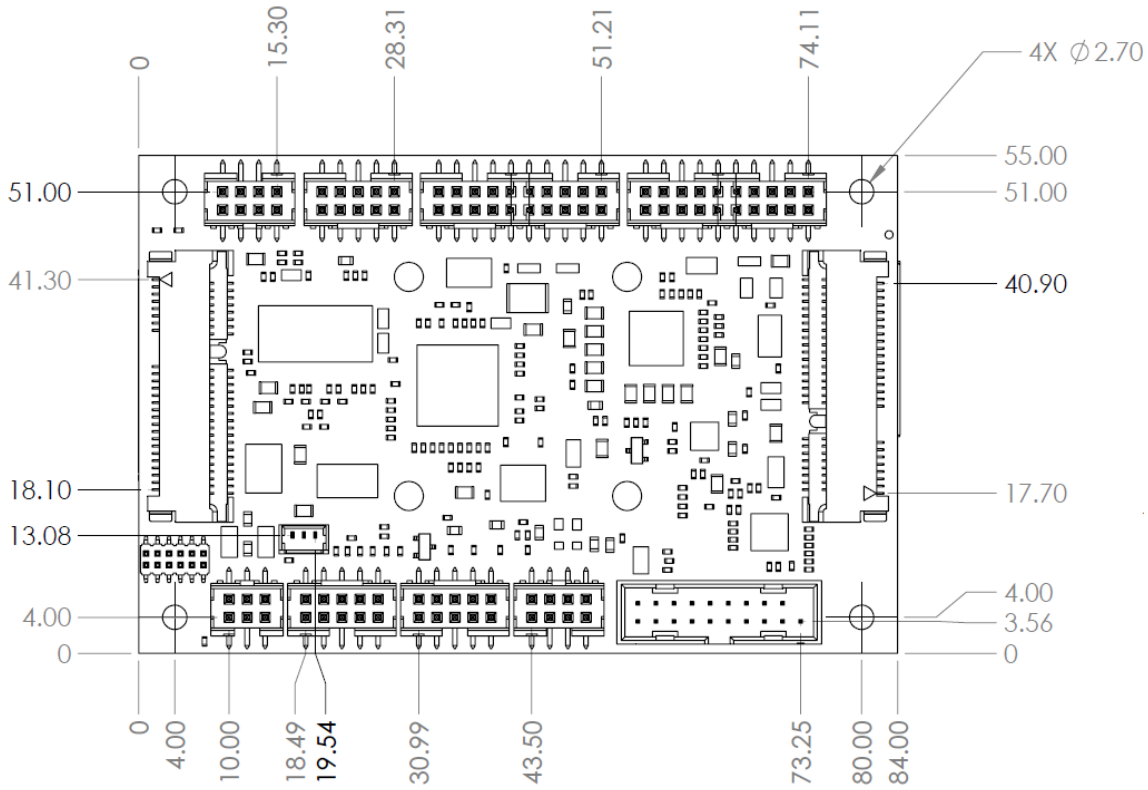


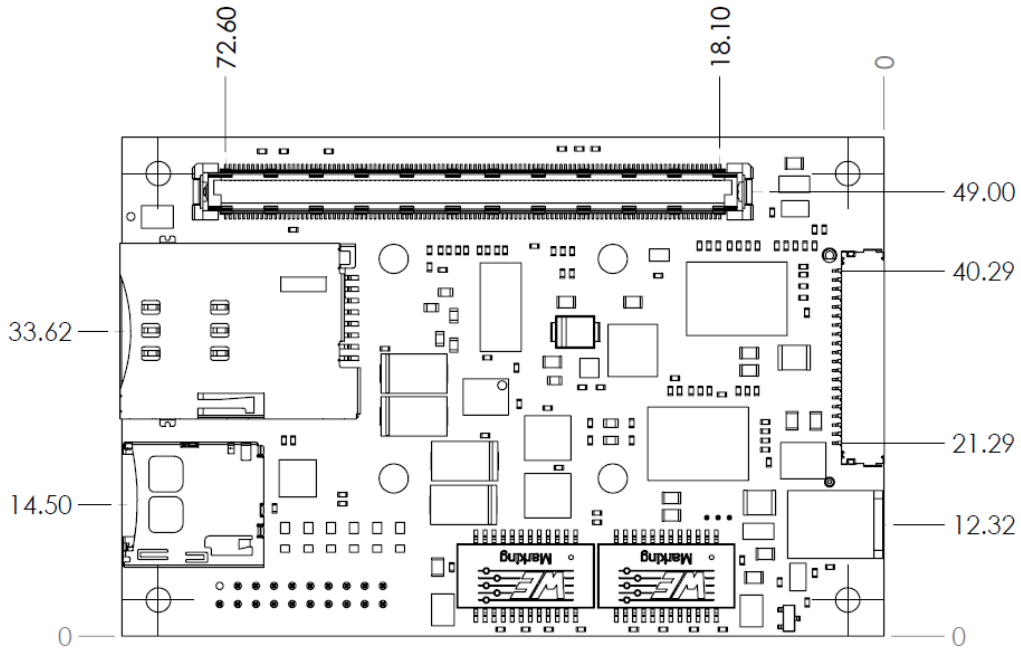
MECHANICAL DRAWINGS & MODELS

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

http://www.connecttech.com/ftp/3d_models/CCG020_3D_MODEL.zip

2D Mechanical Dimensioned Drawing (CCG020) – All dimensions are shown in (mm)





CABLES

The following tables summarize the COM Express carrier's available cable kits from Connect Tech. These cable kits all include 200mm length breakout cables to PC type panel mountable connectors. These cables can be used for production deployment or for lab bring-up and test purposes.

CCG020 Cable Kit - CKG035 – "Full" Cable Kit

Description	Part Number	Quantity
Dual USB 2.0 panel mount to 8-pin MiniTek w/Latch	CBG104	1
Dual DB-9 panel mount to 10-pin MiniTek w/Latch	CBG111	1
Power Cable - Unterminated wires to 6-pin MiniTek w/Latch	CBG112	1
DisplayPort++ panel mount to 20-pin MiniTek w/Latch	CBG113	1
RJ-45 panel mount to 10-pin MiniTek w/Latch	CBG117	2
Dual 3.5mm Stereo Audio panel mount to 8-pin MiniTek w/Latch	CBG118	1
System Cable - Unterminated wires to 20-pin MiniTek w/Latch	CBG116	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Inner Exit	CBG160	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Outer Exit	CBG287	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Vertical Exit	CBG288	1

CCG020 Cable Kit - CKG058 – “Starter” Cable Kit

Description	Part Number	Quantity
Dual USB 2.0 panel mount to 8-pin MiniTek w/Latch	CBG104	1
Power Cable - Unterminated wires to 6-pin MiniTek w/Latch	CBG112	1
DisplayPort++ panel mount to 20-pin MiniTek w/Latch	CBG113	1
RJ-45 panel mount to 10-pin MiniTek w/Latch	CBG117	1
System Cable - Unterminated wires to 20-pin MiniTek w/Latch	CBG116	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Inner Exit	CBG160	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Right Angle Outer Exit	CBG287	1
Dual USB 3.0 to 20-pin RA USB3.0 Cable Panel Mount: Vertical Exit	CBG288	1

APPENDIX A – COM EXPRESS SIGNAL/PINOUT CONNECTION DETAILS

The following table summarizes the COM Express Type-10 Mini Carrier'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. No Connection pins are noted as "NC", pull-ups as "PU", pull-downs as "PD" and pins exclusive to the CCG020 are appended with an asterisk.

COM Express Signal	COM Express Pin	CCG020 Connection	Direction
GND (FIXED)	A1	GND	Power
GBE0_MDI3-	A2	GBE Port 0 (P1B)	I/O
GBE0_MDI3+	A3	GBE Port 0 (P1B)	I/O
GBE0_LINK100#	A4	GBE Port 0 (P1B)	Output
GBE0_LINK1000#	A5	GBE Port 0 (P1B)	Output
GBE0_MDI2-	A6	GBE Port 0 (P1B)	I/O
GBE0_MDI2+	A7	GBE Port 0 (P1B)	I/O
GBE0_LINK#	A8	GBE Port 0 (P1B)	Output
GBE0_MDI1-	A9	GBE Port 0 (P1B)	I/O
GBE0_MDI1+	A10	GBE Port 0 (P1B)	I/O
GND (FIXED)	A11	GND	Power
GBE0_MDI0-	A12	GBE Port 0 (P1B)	I/O
GBE0_MDI0+	A13	GBE Port 0 (P1B)	I/O
GBE0_CTREF	A14	GBE Port 0 (P1B)	Output
SUS_S3#	A15	System Header (P12)	Output
SATA0_TX+	A16	External SATA (P11) / mSATA (U12)*	Output
SATA0_TX-	A17	External SATA (P11) / mSATA (U12)*	Output
SUS_S4#	A18	NC	Output
SATA0_RX+	A19	External SATA (P11) / mSATA (U12)*	Input
SATA0_RX-	A20	External SATA (P11) / mSATA (U12)*	Input
GND (FIXED)	A21	GND	Power
USB_SSRX0-	A22	USB 3.0 Port 0 (P6)*	Input
USB_SSRX0+	A23	USB 3.0 Port 0 (P6)*	Input
SUS_S5#	A24	NC	Output

USB_SSRX1-	A25	USB 3.0 Port 1 (P6)*	Input
USB_SSRX1+	A26	USB 3.0 Port 1 (P6)*	Input
BATLOW#	A27	System Header (P12)	Input
SATA_ACT#	A28	HDD Activity (D13) / NC*	Output
HDA_SYNC	A29	HD Audio (P13)	Output
HDA_RST#	A30	HD Audio (P13)	Output
GND (FIXED)	A31	GND	Power
HDA_BITCLK	A32	HD Audio (P13)	Output
HDA_SDOUT	A33	HD Audio (P13)	Output
BIOS_DISABLE#	A34	PU	Input
THRMTRIP#	A35	NC	Output
USB6-	A36	USB 2.0 Port 6 (P14C) / NC*	I/O
USB6+	A37	USB 2.0 Port 6 (P14C) / NC*	I/O
USB_6_7_OC#	A38	USB 2.0 Port 6/7 Overcurrent	Input
USB4-	A39	miniPCIe Slot 0 (U12)	I/O
USB4+	A40	miniPCIe Slot 0 (U12)	I/O
GND (FIXED)	A41	GND	Power
USB2-	A42	USB 2.0 Port 2 (P14B) / (P14)*	I/O
USB2+	A43	USB 2.0 Port 2 (P14B) / (P14)*	I/O
USB_2_3_OC#	A44	USB 2.0 Port 2/3 Overcurrent	Input
USB0-	A45	USB 2.0 Port 0 (P14A) / (P6)*	I/O
USB0+	A46	USB 2.0 Port 0 (P14A) / (P6)*	I/O
VCC_RTC	A47	RTC Battery (P5)	Power
EXCD0_PERST#	A48	NC	Output
EXCD0_CPPE#	A49	NC	Input
LPC_SERIRQ	A50	NC	I/O
GND (FIXED)	A51	GND	Power
RSVD	A52	NC	Passive
RSVD	A53	NC	Passive
GPI0	A54	GPIO (P19) OR SD Card (P3)	I/O
RSVD	A55	NC	Passive
RSVD	A56	NC	Passive
GND	A57	GND	Power
PCIE_TX3+	A58	NC	Output
PCIE_TX3-	A59	NC	Output

GND (FIXED)	A60	GND	Power
PCIE_TX2+	A61	miniPCIe Slot 1 (U19)	Output
PCIE_TX2-	A62	miniPCIe Slot 1 (U19)	Output
GPI1	A63	GPIO (P19) OR SD Card (P3)	I/O
PCIE_TX1+	A64	miniPCIe Slot 0 (U12)	Output
PCIE_TX1-	A65	miniPCIe Slot 0 (U12)	Output
GND	A66	GND	Power
GPI2	A67	GPIO (P19) OR SD Card (P3)	I/O
PCIE_TX0+	A68	GBE PHY Controller	Output
PCIE_TX0-	A69	GBE PHY Controller	Output
GND (FIXED)	A70	GND	Power
LVDS_A0+	A71	LVDS Video (P9)	Output
LVDS_A0-	A72	LVDS Video (P9)	Output
LVDS_A1+	A73	LVDS Video (P9)	Output
LVDS_A1-	A74	LVDS Video (P9)	Output
LVDS_A2+	A75	LVDS Video (P9)	Output
LVDS_A2-	A76	LVDS Video (P9)	Output
LVDS_VDD_EN	A77	LVDS Video (P9)	Output
LVDS_A3+	A78	LVDS Video (P9)	Power
LVDS_A3-	A79	LVDS Video (P9)	Power
GND (FIXED)	A80	GND	Power
LVDS_A_CK+	A81	LVDS Video (P9)	Output
LVDS_A_CK-	A82	LVDS Video (P9)	Output
LVDS_I2C_CK	A83	LVDS Video (P9)	Output
LVDS_I2C_DAT	A84	LVDS Video (P9)	I/O
GPI3	A85	GPIO (P19) OR SD Card (P3)	I/O
RSVD	A86	NC	Passive
EDP_HPD	A87	NC	Passive
PCIE_CLK_REF+	A88	Main Carrier PCIe Clock	Output
PCIE_CLK_REF-	A89	Main Carrier PCIe Clock	Output
GND (FIXED)	A90	GND	Power
SPI_PWR	A91	NC	Power
SPI_MISO	A92	NC	Power
GPO0	A93	GPIO (P19) OR SD Card (P3)	I/O
SPI_CLK	A94	NC	Power

SPI_MOSI	A95	NC	Power
TPM_PP	A96	NC	Input
TYPE10#	A97	NC	Power
SER0_TX	A98	Serial Port 0 (P7)	Output
SER0_RX	A99	Serial Port 0 (P7)	Input
GND (FIXED)	A100	GND	Power
SER1_TX/CAN_TX	A101	Serial Port 1 (P7)	Output
SER1_RX/CAN_RX	A102	Serial Port 1 (P7)	Input
LID#	A103	NC	Input
VCC_12V	A104	Input Power +VIN (P4)	Power
VCC_12V	A105	Input Power +VIN (P4)	Power
VCC_12V	A106	Input Power +VIN (P4)	Power
VCC_12V	A107	Input Power +VIN (P4)	Power
VCC_12V	A108	Input Power +VIN (P4)	Power
VCC_12V	A109	Input Power +VIN (P4)	Power
GND (FIXED)	A110	GND	Power
GND (FIXED)	B1	GND	Power
GBE0_ACT#	B2	GBE Port 0 (P1B)	Output
LPC_FRAME#	B3	NC	Output
LPC_AD0	B4	NC	I/O
LPC_AD1	B5	NC	I/O
LPC_AD2	B6	NC	I/O
LPC_AD3	B7	NC	I/O
LPC_DRQ0#	B8	NC	Input
LPC_DRQ1#	B9	NC	Input
LPC_CLK	B10	NC	Output
GND (FIXED)	B11	GND	Power
PWRBTN#	B12	System Header (P12)	Input
SMB_CK	B13	System Header (P12)	I/O
SMB_DAT	B14	System Header (P12)	I/O
SMB_ALERT#	B15	System Header (P12)	Input
SATA1_TX+	B16	mSATA (U12) / NC*	Output
SATA1_TX-	B17	mSATA (U12) / NC*	Output
SUS_STAT#	B18	NC	Output
SATA1_RX+	B19	mSATA (U12) / NC*	Input

SATA1_RX-	B20	mSATA (U12) / NC*	Input
GND (FIXED)	B21	GND	Power
USB_SSTX0-	B22	USB 3.0 Port 0 (P6)*	Output
USB_SSTX0+	B23	USB 3.0 Port 0 (P6)*	Output
PWR_OK	B24	System Header (P12)	Input
USB_SSTX1-	B25	USB 3.0 Port 1 (P6)*	Output
USB_SSTX1+	B26	USB 3.0 Port 1 (P6)*	Output
WDT	B27	NC	Output
HDA_SDIN2	B28	PD	Input
HDA_SDIN1	B29	PD	Input
HDA_SDIN0	B30	HD Audio (P13)	Input
GND (FIXED)	B31	GND	Power
SPKR	B32	NC	Output
I2C_CK	B33	System Header (P12)	Output
I2C_DAT	B34	System Header (P12)	I/O
THRM#	B35	PU	Input
USB7-	B36	USB 2.0 Port 7 (P14C) / NC*	I/O
USB7+	B37	USB 2.0 Port 7 (P14C) / NC*	I/O
USB_4_5_OC#	B38	USB 2.0 Port 4/5 Overcurrent	Input
USB5-	B39	miniPCIe Slot 1 (U19)	I/O
USB5+	B40	miniPCIe Slot 1 (U19)	I/O
GND (FIXED)	B41	GND	Power
USB3-	B42	USB 2.0 Port 3 (P14B) / (P14)*	I/O
USB3+	B43	USB 2.0 Port 3 (P14B) / (P14)*	I/O
USB_0_1_OC#	B44	USB 2.0 Port 0/1 Overcurrent	Input
USB1-	B45	USB 2.0 Port 1 (P14B) / (P6)*	I/O
USB1+	B46	USB 2.0 Port 1 (P14B) / (P6)*	I/O
EXCD1_PERST#	B47	NC	Output
EXCD1_CPPE#	B48	NC	Input
SYS_RESET#	B49	System Header (P12)	Input
CB_RESET#	B50	Carrier Board Internal Circuitry	Output
GND (FIXED)	B51	GND	Power
RSVD	B52	NC	Passive
RSVD	B53	NC	Passive
GPO1	B54	GPIO (P19) OR SD Card (P3)	I/O

RSVD	B55	NC	Passive
RSVD	B56	NC	Passive
GPO2	B57	GPIO (P19) OR SD Card (P3)	I/O
PCIE_RX3+	B58	NC	Input
PCIE_RX3-	B59	NC	Input
GND (FIXED)	B60	GND	Power
PCIE_RX2+	B61	miniPCIe Slot 1 (U19)	Input
PCIE_RX2-	B62	miniPCIe Slot 1 (U19)	Input
GPO3	B63	GPIO (P19) OR SD Card (P3)	I/O
PCIE_RX1+	B64	miniPCIe Slot 0 (U12)	Input
PCIE_RX1-	B65	miniPCIe Slot 0 (U12)	Input
WAKE0#	B66	PU	Input
WAKE1#	B67	PU	Input
PCIE_RX0+	B68	GBE Port 1 (P1B)	Input
PCIE_RX0-	B69	GBE Port 1 (P1B)	Input
GND (FIXED)	B70	GND	Power
DDI0_PAIR0+	B71	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR0-	B72	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR1+	B73	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR1-	B74	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR2+	B75	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR2-	B76	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR4+	B77	NC	Output
DDI0_PAIR4-	B78	NC	Output
LVDS_BKLT_EN	B79	LVDS Backlight Power (P10)	Output
GND (FIXED)	B80	GND	Power
DDI0_PAIR3+	B81	DisplayPort++ Channel 0 (P2)	Output
DDI0_PAIR3-	B82	DisplayPort++ Channel 0 (P2)	Output
LVDS_BKLT_CTRL	B83	LVDS Video (P9)	Output
VCC_5V_SBY	B84	Carrier Board Internal Circuitry	Power
VCC_5V_SBY	B85	Carrier Board Internal Circuitry	Power
VCC_5V_SBY	B86	Carrier Board Internal Circuitry	Power
VCC_5V_SBY	B87	Carrier Board Internal Circuitry	Power
BIOS_DIS1#	B88	PU	Input
DD0_HPD	B89	DisplayPort++ Channel 0 (P2)	Output

GND (FIXED)	B90	GND	Power
DDI0_PAIR5+	B91	NC	Output
DDI0_PAIR5-	B92	NC	Output
DDI0_PAIR6+	B93	NC	Output
DDI0_PAIR6-	B94	NC	Output
DDI0_DDC_AUX_SEL	B95	DisplayPort++ Channel 0 (P2)	Input
USB_HOST_PRSNT	B96	NC	Input
SPI_CS#	B97	NC	Passive
DDI0_CTRLCLK_AUX+	B98	DisplayPort++ Channel 0 (P2)	I/O
DDI0_CTRLCLK_AUX-	B99	DisplayPort++ Channel 0 (P2)	I/O
GND (FIXED)	B100	GND	Power
FAN_PWMOUT	B101	NC	Output
FAN_TACHIN	B102	NC	Input
SLEEP#	B103	NC	Input
VCC_12V	B104	Input Power +VIN (P4)	Power
VCC_12V	B105	Input Power +VIN (P4)	Power
VCC_12V	B106	Input Power +VIN (P4)	Power
VCC_12V	B107	Input Power +VIN (P4)	Power
VCC_12V	B108	Input Power +VIN (P4)	Power
VCC_12V	B109	Input Power +VIN (P4)	Power
GND (FIXED)	B110	GND	Power