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Connect Tech Inc.
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ComSync/PCI-104 Gen 3
Users Guide



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Preface

Customer Support Overview

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

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

Contact Information

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

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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.

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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	2014-08-28	Preliminary Release
0.01	2017-01-26	Minor formatting changes

Introduction

The ***ComSync/PCI-104 Gen 3*** is a 2-Port Synchronous and Asynchronous Serial board for PCI-104 computer systems. Although it includes Asynchronous capability, its main focus is for Synchronous communications protocols, like HDLC, MonoSync or BiSync.

The Serial controller device is an industry standard Zilog ESCC (8523L) which has been well known and supported, for quite a long time. The ESCC's main weak point is its small data FIFO's, which limits maximum data bit rates to 100 to 200 Kbps in most implementations.

This ***"Gen 3"*** board teams the ESCC with an FPGA which allows Serial Data to be transferred between the ESCC and the system memory very quickly, thus realizing bit rates up to 2.6 Mbps.

Product Features and Specifications

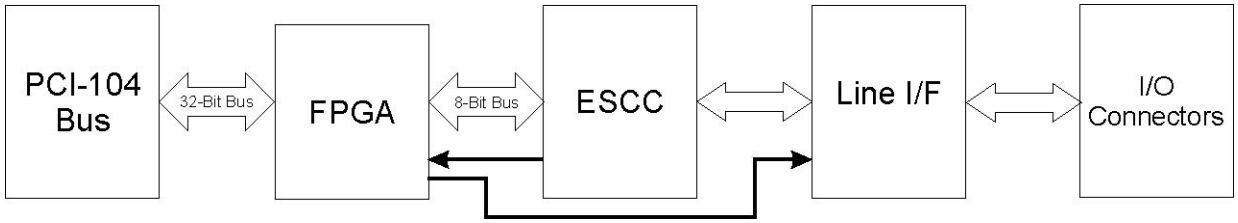
Specifications	
PCI-104 Board footprint	PCI-104 V1.1 and PC/104 V2.6 Compliant
Zilog ESCC (8523L)	Dual channel Synchronous Serial controller
FPGA	PCI-104 Bus interface with DMA support
Bit Rate	Up to 2.6 Mbps, depending on line interface, and serial mode settings
Data FIFO's	512 bytes per port / direction
Line Interfaces	RS232, RS422, RS485
Industrial Temp operation	-40C to +85C

Part Numbers / Ordering Information

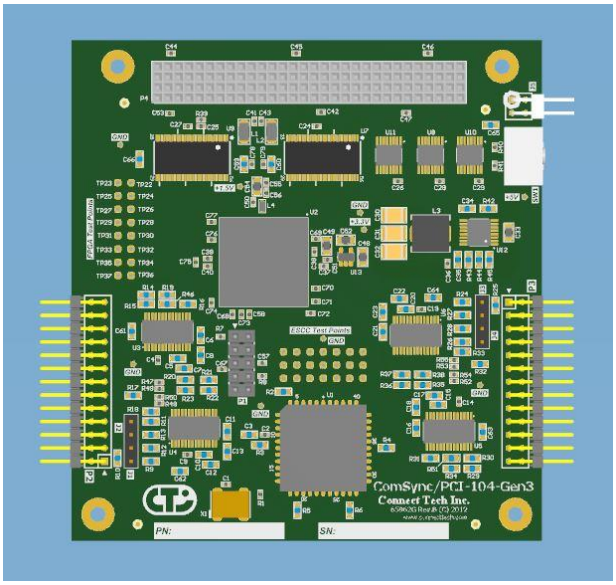
Part Number	
CPG004	Standard Product
CPG005	CPG004 with Conformal coating

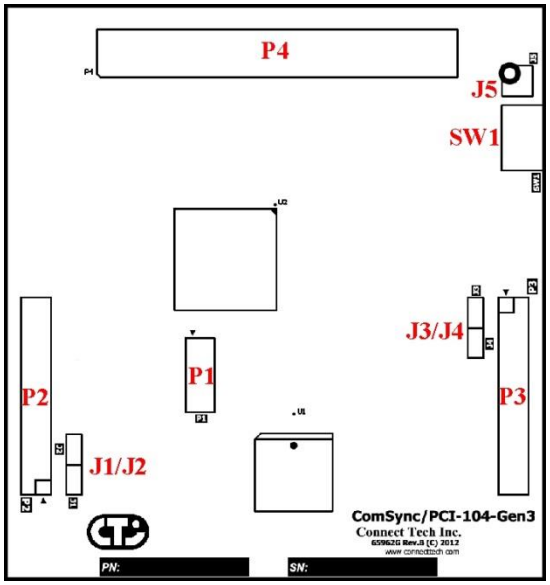
Product Overview

Block Diagram



Connector & Jumper Summary & Locations

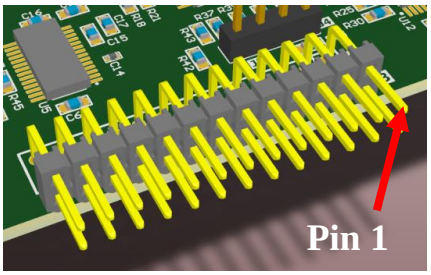


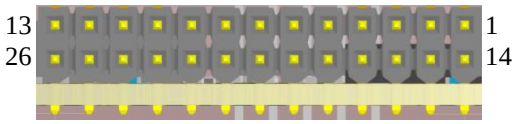


Designator	Description
P1	JTAG FPGA programming connector (not for user connection)
P2	Port-1 Serial Data and Clocking signals
P3	Port-2 Serial Data and Clocking signals
P4	PCI-104 Bus Stack connector
SW1	PCI-104 Bus “Slot” selector
J1/J2	Port-1 RS485 Bias/Termination
J3/J4	Port-2 RS485 Bias/Termination
J5	Alternate PCI-104 Bus “Slot” selector (not normally populated)

Serial Data & Clocking Connectors

Connectors P2 (for Port-1) and P3 (for Port-2) are used to connect between the ComSync/PCI-104 Gen 3 board and the peripheral device. The following drawings show the orientation and pin assignments for these connectors.





26 pin Header Pin#	RS422 (full duplex) Signal	RS485 (½ duplex) Signal	RS232 Signal	Direction	DB25 Connector Pin# [1]
1	GND	GND	GND	---	1
2	TX+	TXRX+	TXD	I/O [4]	2
3	RX+	--- [2]	RXD	Input	3
4	RTS+	--- [2]	RTS	Output	4
5	CTS+	--- [2]	CTS	Input	5
6	--- [2]	--- [2]	DSR	Input	6
7	GND	GND	GND	---	7
8	--- [2]	--- [2]	DCD	Input	8
9	RTxC+	RTxC+	--- [2]	Input	9
10	TRxC+	TRxC+	--- [2]	I/O [3]	10
11	--- [2]	--- [2]	TRxC	Input	11
12	N/C	N/C	N/C	---	12
13	N/C	N/C	N/C	---	13
14	N/C	N/C	N/C	---	14
15	TX-	TXRX-	--- [2]	I/O [4]	15
16	RX-	--- [2]	--- [2]	Input	16
17	RTS-	--- [2]	--- [2]	Output	17
18	CTS-	--- [2]	--- [2]	Input	18
19	N/C	N/C	N/C	---	19
20	--- [2]	--- [2]	DTR	Output	20
21	N/C	N/C	RTxC	Input	21
22	RTxC-	RTxC-	--- [2]	Input	22
23	TRxC-	TRxC-	--- [2]	I/O [3]	23
24	SYNC [5]	SYNC [5]	SYNC [5]	Input	24
25	N/C	N/C	N/C	---	25
26	N/C	N/C	N/C	---	---

Notes:
[1] A cable can be provided to adapt the 26 pin header to a 25 pin D connector.
[2] Do NOT connect (pin is carrying an image of another signal).
[3] Input or Output in RS422 or RS485 modes, output only in RS232 mode.
[4] Input or Output in RS485 mode, otherwise an Output.
[5] Always RS232 level signal in all modes.

Signal Description

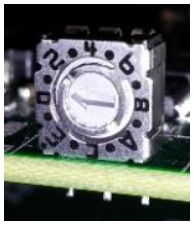
Signal Name	Signal Description	Mode Used
GND	Signal Ground	All
TXD	Transmit Data	RS232
TX+	Transmit Data (+)	RS422
TX-	Transmit Data (-)	RS422
TXRX+	Transmit / Receive Data (+)	RS485
TXRX-	Transmit / Receive Data (-)	RS485
TRxC	Transmitter Data Clock	RS232
TRxC+	Transmitter Data Clock (+)	RS422, 485
TRxC-	Transmitter Data Clock (-)	RS422, 485
RTxC	Receiver Data Clock	RS232
RTxC+	Receiver Data Clock (+)	RS422, 485
RTxC-	Receiver Data Clock (-)	RS422, 485
DTR	Data Terminal Ready	RS232
DSR	Data Set Ready	RS232, 485
RTS	Request To Send	RS232,
RTS+	Request To Send (+)	RS422
RTS-	Request To Send (-)	RS422
CTS	Clear To Send	RS232
CTS+	Clear To Send (+)	RS422
CTS-	Clear To Send (-)	RS422
SYNC	Receiver Sync	All
N/C	Pin Not Connected	---

Configuration Jumpers & Switches

PCI-104 Slot Selection

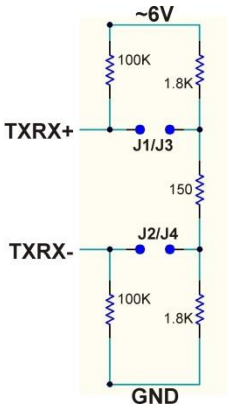
A rotary switch enables selection of the PCI-104 bus slot, as defined in the PCI-104 or PC/104-*Plus* Specifications. Positions 0 through 3 select the 4 possible slots. The other positions just mirror the first 4 selections.

Switch Position	Slot Number
0,4,8,C	#1
1,5,9,D	#2
2,6,A,E	#3
3,7,B,F	#4



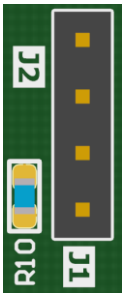
RS485, ½ Duplex Bias/Termination Selection

Each port, has a pair of jumpers which enable bias and termination resistors to be applied to the differential TX/RX± signal pair. J1/J2 for Port-1 and J3/J4 for Port-2. High resistance biasing is always applied when the jumpers are not installed. The circuit is implemented as follows. These jumpers should be **removed** for RS422 (full duplex) and RS232 modes of operation. The RX± and CTS± signals have the high resistance (100K) bias applied permanently.

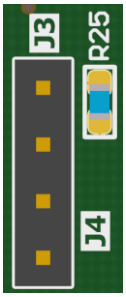


The jumpers are usually applied in pairs, but they can be used individually for special situations.

Port-1



Port-2



IO Cable

Cable assembly CBG001 (CTIC-00055) can be used with the ***ComSync PCI-104 Gen 3*** product. It provides a DB-25 style of connector. The pin assignments for this cable are shown in the table above.



ESCC DMA Data Transfers

The Zilog ESCC device has the ability to "signal" the need for data transfers to/from its internal data FIFO's, which operates independently from its interrupting mechanism. This ability has been exploited in this product with the inclusion of an FPGA. Internal to the FPGA is 2 independent DMA controllers, each with dual memory buffer access capability. Also with the FPGA is a total of 2048 bytes of FIFO (512 bytes per port / direction).

Once initialized by software, the data transfers between the computer memory and the ESCC are completely autonomous, with the DMA controllers generating interrupts when transfer buffers are completed, or errors occur.

Detailed Technical Manual

A companion detailed technical manual for this product is available upon execution of an Non-Disclosure Agreement (NDA). This manual contains technical details that software developers would need to incorporate this product in their system.

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