

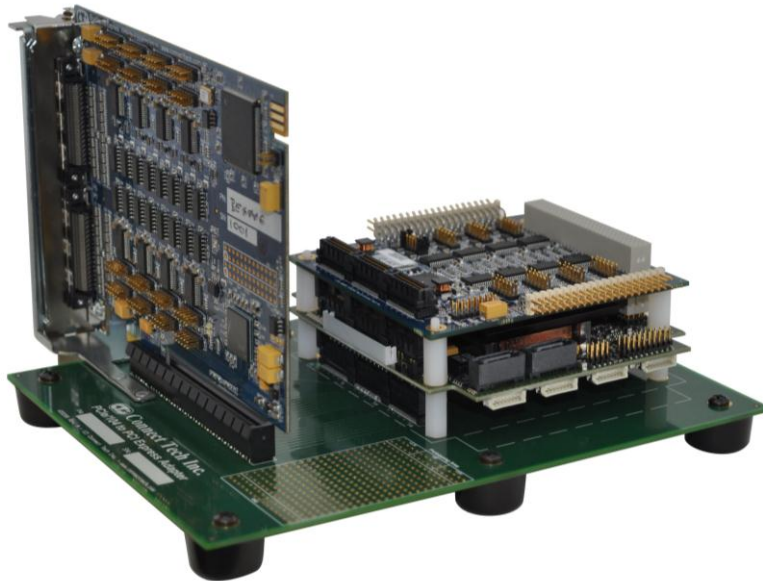


**Connect Tech Inc.**  
*Industrial Strength Communications*

# **USER MANUAL**

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## **PCIe/104 (PCI/104-Express) to PCI Express Adapter *Bottom Stacking Model***



**CTIM-00056 (0.00) - November 24, 2011**

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## Revision History

<b>Revision 0.00</b>	Original Document
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## Introduction

Connect Tech's PCI/104-Express to PCI Express Adapter enables users to install any x1, x4, x8 or x16 lane PCI Express card in a PCI/104-Express stack.

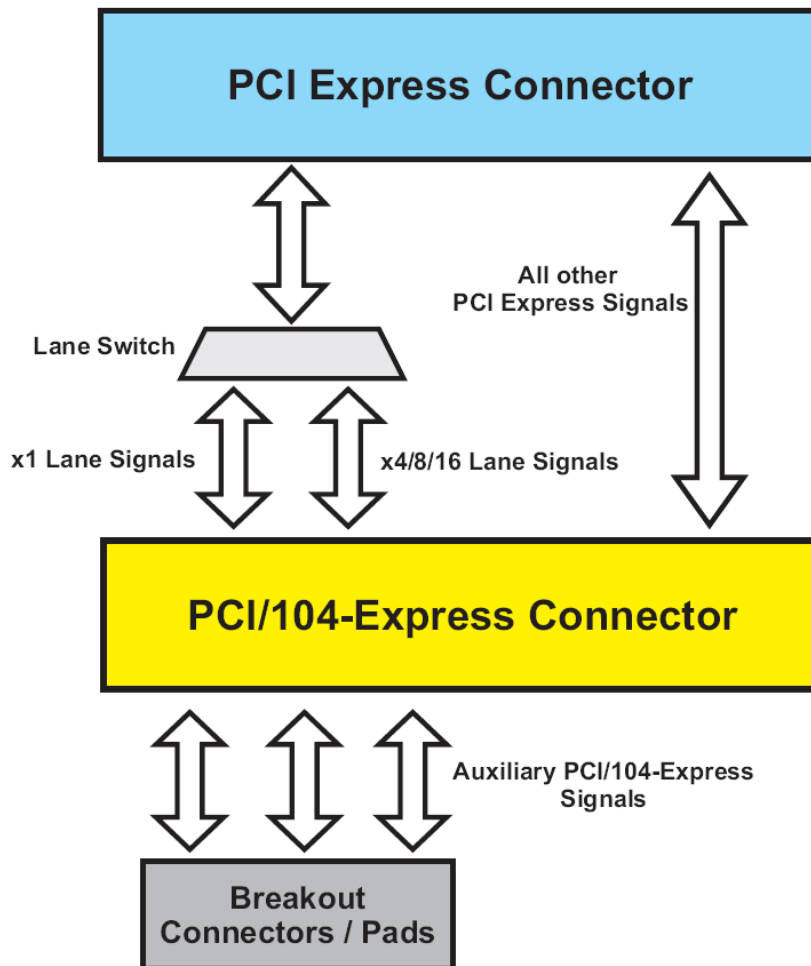
This convenient adapter board enables the testing, development and deployment for standard PCI Express cards into embedded the PCI/104-Express environment.

## Features

- PCI/Express x1, x4, x8, x16 Lane Card Compatible
- PCI/104-Express & PCIe/104 Compatible
- SBC Bottom Stacking Compatible

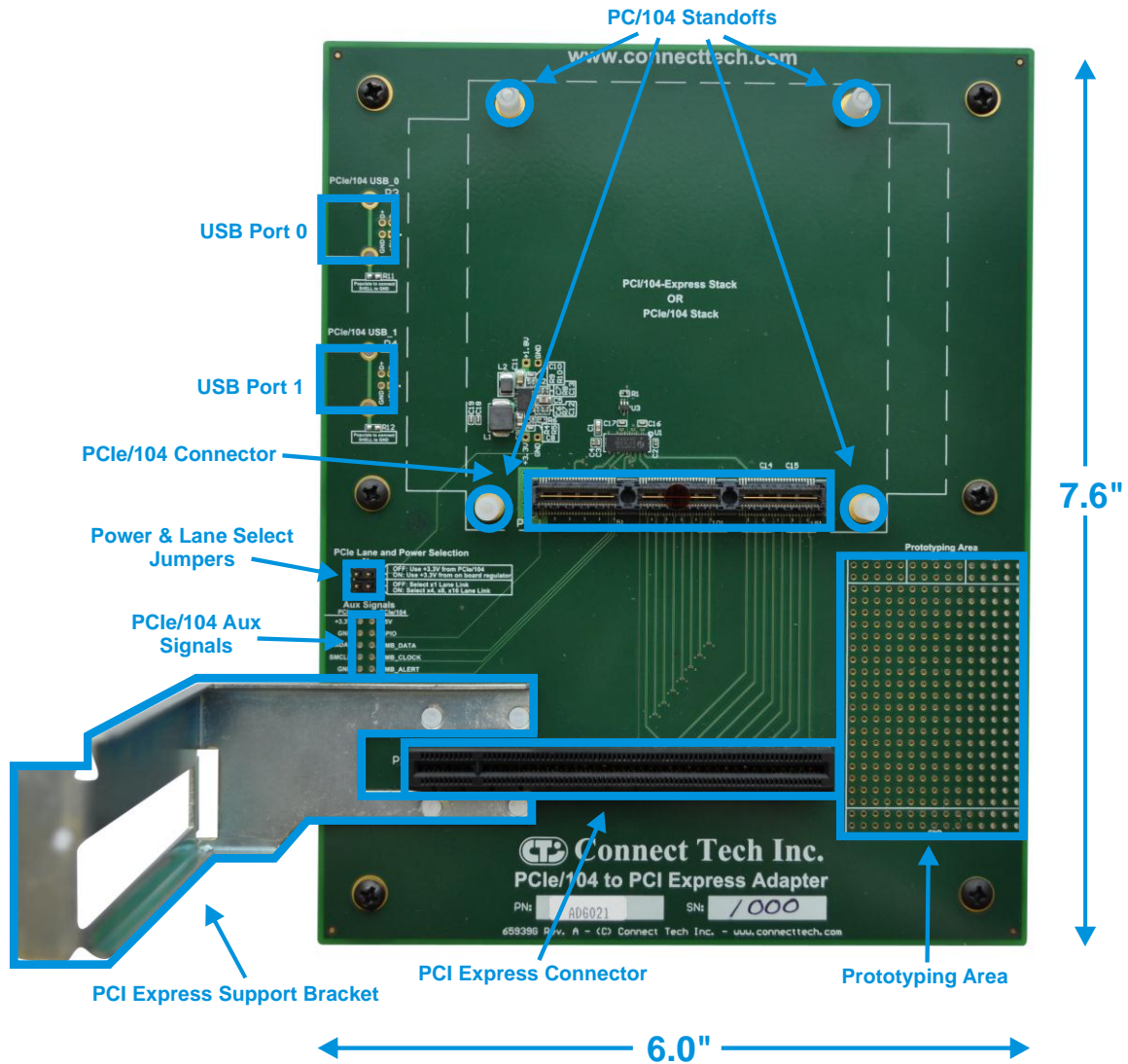
## 1. Block Diagram

Below is a high level view of the PCI/104-Express to PCI Express Adapter. Aside from the x1 and x16 lane switch the rest of the PCI express signals are direct connections to those of the PCI/104-Express signals. See [Table 1](#) in this manual for a full listing of pinouts and interconnections.



## 2. Detailed Hardware Description

An ADG021 is depicted below with all of the user accessible locations defined. Further detailed descriptions of these locations will be defined below.



### PCIe Lane and Power Selection Jumper

**Position A:** Should only be installed when you SBC power supply does not supply +3.3V to the PCI/104-Express bus.

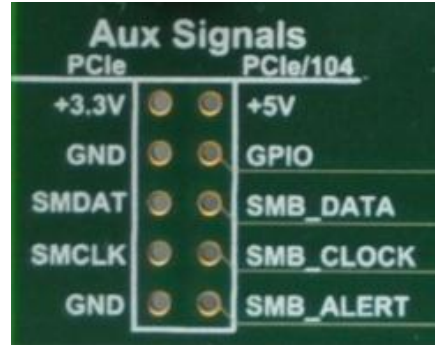
**Position B:** In some cases PCI/104-Express SBC require the PEG\_ENA signal to be enabled to use the x16 lane bus, if your SBC requires this please install this jumper.



## Auxiliary Signals Jumper Block

**Position A:** Should only be installed when your SBC power supply does not supply +3.3V to the PCI/104-Express bus.

**Position B:** In some cases PCI/104-Express SBC require the PEG\_ENA signal to be enabled to use the x16 lane bus, if your SBC requires this please install this jumper.



## USB Port Connector Pads

USB Type “B” connectors can be optionally installed by the user. These ports will directly interface with the USB\_0 and USB\_1 on the PCI/104-Express bus. There is also an option to connect the shell of the USB connector to the PCB ground.

Compatible USB connectors:

Manufacturer	Part Number
Tyco	292304-X
Tyco	1734176-X
Samtec	USB-B-S-X-X-TH-X-XX
FCI	61729-XXXXBLF
Contact <a href="mailto:support@connecttech.com">support@connecttech.com</a> for others.	



## 3. Hardware Installation

### PC104 Stand-Offs

When installing your PCI/104-Express SBC system onto ADG021, four proper stack height (0.6”) PC/104 standoffs must be used. **If standoffs are not used, there is a high likelihood that the PCI/104-Express connector will be damaged.** 4 x PC/104 standoffs, 4 x PC/104 nuts and 4 x PC/104 screws are provided to complete your PCI/104-Express SBC installation to the ADG021.

### Support Bracket Installation

The ADG021 product ships with a *Standard Height PCI Express Custom Support Bracket* that can be optionally installed to provide greater stability to the PCI Express add-on card installed into your PCI/104-Express stack.

Installation steps:

1. Insert bracket into alignment holes (see photo above for bracket location on PCB)
2. Install and tighten each of the 4 supplied nuts.

### 3. Pinouts and Signal Interconnect

Below is a listing of all signal interconnect between the PCI Express connector and the PCI/104-Express connector. Power, ground and presence detection signals have been removed from this list.

PCI Express Connector Pinout			PCI/104-Express Connector Pinout	
Connector Side	Pin No.	Pin Name	Pin No.	Pin Name
Side A	5	SMCLK		no connection
Side A	6	SMDAT		no connection
Side A	9	JTAG1		no connection
Side A	11	WAKE#	53	Reserved / WAKE#
Side A	12	RSVD		no connection
Side A	14	PETp0	12 OR 58	PEx1_OTp OR PEx16_OT(0)p
Side A	15	PETn0	14 OR 60	PEx1_OTn OR PEx16_OT(0)n
Side A	19	PETp1	64	PEx16_OT(1)p
Side A	20	PETn1	65	PEx16_OT(1)n
Side A	23	PETp2	70	PEx16_OT(2)p
Side A	24	PETn2	72	PEx16_OT(2)n
Side A	27	PETp3	76	PEx16_OT(3)p
Side A	28	PETn3	78	PEx16_OT(3)n
Side A	30	RSVD		no connection
Side A	33	PETp4	82	PEx16_OT(4)p
Side A	34	PETn4	84	PEx16_OT(4)n
Side A	37	PETp5	88	PEx16_OT(5)p
Side A	38	PETn5	90	PEx16_OT(5)n
Side A	41	PETp6	94	PEx16_OT(6)p
Side A	42	PETn6	96	PEx16_OT(6)n
Side A	45	PETp7	100	PEx16_OT(7)p
Side A	46	PETn7	102	PEx16_OT(7)n
Side A	50	PETp8	57	PEx16_OT(8)p
Side A	51	PETn8	59	PEx16_OT(8)n
Side A	54	PETp9	63	PEx16_OT(9)p
Side A	55	PETn9	65	PEx16_OT(9)n
Side A	58	PETp10	69	PEx16_OT(10)p
Side A	59	PETn10	71	PEx16_OT(10)n
Side A	62	PETp11	75	PEx16_OT(11)p
Side A	63	PETn11	77	PEx16_OT(11)n
Side A	66	PETp12	81	PEx16_OT(12)p
Side A	67	PETn12	83	PEx16_OT(12)n
Side A	70	PETp13	87	PEx16_OT(13)p
Side A	71	PETn13	89	PEx16_OT(13)n
Side A	74	PETp14	93	PEx16_OT(14)p
Side A	75	PETn14	95	PEx16_OT(14)n
Side A	78	PETp15	99	PEx16_OT(15)p
Side A	79	PETn15	101	PEx16_OT(15)n
Side A	82	RSVD		no connection

Side B	5	JTAG2	no connection	
Side B	6	JTAG3	no connection	
Side B	7	JTAG4	no connection	
Side B	8	JTAG5	no connection	
Side B	11	PERST#	2	PE_RST#
Side B	13	REFCLK+	36 OR 48	PEx1_0Clkp OR PEx16_x8_x4_Clkp
Side B	14	REFCLK-	38 OR 50	PEx1_0Clkn OR PEx16_x8_x4_Clkn
Side B	16	PERp0	24 OR 110	PEx1_ORp OR PEx16_OR(0)p
Side B	17	PERn0	26 OR 112	PEx1_ORn OR PEx16_OR(0)n
Side B	19	RSVD	no connection	
Side B	21	PERp1	116	PEx16_OR(1)p
Side B	22	PERn1	118	PEx16_OR(1)n
Side B	25	PERp2	122	PEx16_OR(2)p
Side B	26	PERn2	124	PEx16_OR(2)n
Side B	29	PERp3	128	PEx16_OR(3)p
Side B	30	PERn3	130	PEx16_OR(3)n
Side B	32	RSVD	no connection	
Side B	33	RSVD	no connection	
Side B	35	PERp4	134	PEx16_OR(4)p
Side B	36	PERn4	136	PEx16_OR(4)n
Side B	39	PERp5	140	PEx16_OR(5)p
Side B	40	PERn5	142	PEx16_OR(5)n
Side B	43	PERp6	146	PEx16_OR(6)p
Side B	44	PERn6	148	PEx16_OR(6)n
Side B	47	PERp7	152	PEx16_OR(7)p
Side B	48	PERn7	154	PEx16_OR(7)n
Side B	50	RSVD	no connection	
Side B	52	PERp8	109	PEx16_OR(8)p
Side B	53	PERn8	111	PEx16_OR(8)n
Side B	56	PERp9	115	PEx16_OR(9)p
Side B	57	PERn9	117	PEx16_OR(9)n
Side B	60	PERp10	121	PEx16_OR(10)p
Side B	61	PERn10	123	PEx16_OR(10)n
Side B	64	PERp11	127	PEx16_OR(11)p
Side B	65	PERn11	129	PEx16_OR(11)n
Side B	68	PERp12	133	PEx16_OR(12)p
Side B	69	PERn12	135	PEx16_OR(12)n
Side B	72	PERp13	139	PEx16_OR(13)p
Side B	73	PERn13	141	PEx16_OR(13)n
Side B	76	PERp14	145	PEx16_OR(14)p
Side B	77	PERn14	147	PEx16_OR(14)n
Side B	80	PERp15	151	PEx16_OR(15)p
Side B	81	PERn15	153	PEx16_OR(15)n

**Table 1 – PCI/104-Express to PCI/Express Pinout**

All Pin Names have been referenced from the official specifications provided by [PCI-SIG](#) and the [PC/104 Consortium](#).



## 4. PCI/104-Express SBC Compatibility

Connect Tech's PCI/104-Express to PCI Express Adapters board's enables users to install any x1, x4, x8 or x16 lane PCI Express card in a PCIe/104 or PCI/104-Express stack. However certain CPU boards only populate the PCI-104/Express connector on the bottom side or on the top side of the board, allowing for a stack DOWN ONLY configuration, or a stack UP ONLY configuration. In these cases you must use the correct stacking Connect Tech adapter. Below is a compatibility list of all the known PCIe/104 or PCI-104/Express CPU boards that are on the market at the time this document was created.

To view the most recent list, please refer to our online Knowledge Database Document which can be found here: <http://www.connecttech.com/KnowledgeDatabase/kdb316.htm>

### List of Compatible CPU Boards with the ADG021

**AAEON Technology**  
PFM-945C

**Advanced Digital Logic**  
ADLGS45PC

**Digital-Logic / Kontron**  
MSM200XP  
MSM945P  
MSMG45P

**E.E.P.D.**  
PROFIVE M2

**Embedded Logic**  
PB-GS45e

**LiPPERT Embedded Computers**  
Cool XpressRunner-GS45

**RTD Embedded Technologies**  
CMA22MVD  
CMA22MCS

**Terratel**  
TTCM-01

### List of Incompatible CPU Boards with the ADG021

**AAEON Technology**  
EPIC-9457

**Digital-Logic / Kontron**  
MSM200XU

Please see Connect Tech's [ADG017 \(Top Stacking\) Adapters](#) for these products.

## 5. Power Notes

Some PCI/104-Express SBC systems will not come with +3.3V power over the PCI/104-Express connector. If this is the case, enable jumper block J1 Position A\*\* (See errata) to enable the on board regulator to generate +3.3V (which is limited to 1.5A) for your PCI Express card. If the SBC you are using does provide +3.3V power, do not enable this jumper.

### PCI/104-Express Power Specifications

Voltage	Minimum Voltage (V)	Maximum Voltage (V)	Number of Pins	Current per Pin (A)	Total Current (A)	Total Power (W)
+3.3V	3.0	3.6	2	1.8	3.6	11.9
+5V	4.75	5.25	2 planes	8.4	16.8	84.0
+12V	11.40	12.60	1 plane	8.4	8.4	100.8
+5V_SB	4.75	5.25	2	1.8	3.6	18.0
GND	n/a	n/a	46	1.8	82.8	n/a

Please refer to your PCI/104-Express SBC manual for actual ratings used.

## 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 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.

## 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 online Support Center is available 24 hours a day, seven days a week on our website at: [www.connecttech.com/sub/support/support.asp](http://www.connecttech.com/sub/support/support.asp). Please go to the [Download Zone](#) or the [Knowledge Database](#) for product manuals, installation guides, device driver software and technical tips. Submit your questions to our technical support engineers at [support@connecttech.com](mailto:support@connecttech.com). Our technical support is always free.

## Contact Information

### 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: 800-426-8979 (North America only) | Tel: 519-836-1291 | Fax: 519-836-4878 (online 24 hours)

### Email/Internet

You may contact us through the Internet. Our email and URL addresses are:

[sales@connecttech.com](mailto:sales@connecttech.com) | [support@connecttech.com](mailto:support@connecttech.com) | [www.connecttech.com](http://www.connecttech.com)

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