

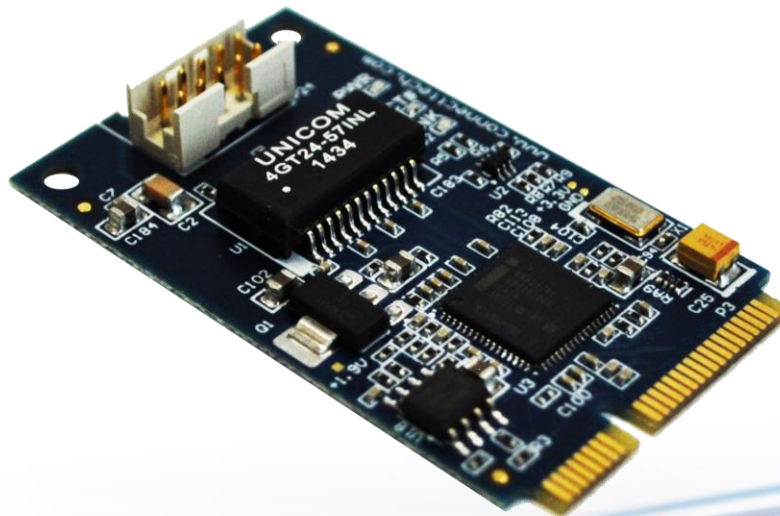


Connect Tech Inc.
Embedded Computing Experts

www.connecttech.com

USERS GUIDE

Mini PCIe GbE



Connect Tech Inc.

489 Clair Rd. W
Guelph, Ontario
N1L 0H7

www.connecttech.com

Tel: 519-836-1291

Toll: 800-426-8979 (North America only)

Fax: 519-836-4878

Email: sales@connecttech.com

support@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. 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

Mail/Courier

Connect Tech Inc.
Technical Support
489 Clair Rd. W.
Guelph, ON
N1H 0H7

Email/Internet

sales@connecttech.com
support@connecttech.com
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 Mini PCIe GbE Warranty

Connect Tech Inc. provides a 2-Year Warranty for the Mini PCIe GbE. 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. 2-Year 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 2-Year 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	2014-09-09	Preliminary Release
0.01	2014-09-23	Added images of Right Angle Mating Interference
0.02	2023-05-16	Added dual GbE Information (MPG104)
0.03	2015-04-14	Added caution note regarding MPG104 air-flow requirement
0.04	2017-08-08	Added cable drawing links, removed drawings from doc
0.05	2023-05-15	Added MPG111/MPG112 part numbers

Introduction

Connect Tech’s MPG1xx series boards are rugged, low cost Gigabit Ethernet Mini PCIe modules that are ideal for adding extra Ethernet capabilities to any system with minimal increase in overall system size and power consumption.

The modules utilize PCIe signaling which allows it to be used in any Mini PCIe socket that supports PCIe. The wide operating temperature, latching Ethernet connector and cabling solution allows these modules to be used in harsh environments.

Compatibility with a large variety of popular operating systems allows these boards to be easily integrated into a wide array of new and existing systems.

Product Features and Specifications

Specifications	
Dimensions	50.95 mm x 30 mm, Mini PCIe “Full” form factor
10/100/1000BASE-T Ports	MPG101: 1 port MPG102: 1 port MPG111: 1 port MPG112: 1 port MPG104: 2 ports
Connector	FCI MiniTek, 2mm, 2x5, Right Angle (MPG101/MPG111) FCI MiniTek, 2mm, 2x5, Vertical (MPG102/MPG112) 2x FCI MiniTek, 2mm, 2x5, Vertical (MPG104)
Cables	CBG117
Environmental *	MPG101/MPG102: -40°C to 85°C, Humidity: 5 to 95% non-condensing MPG111/MPG112: -40°C to 85°C, Humidity: 5 to 95% non-condensing MPG104: -40°C to 85°C, Humidity: 5 to 95% non-condensing
Status LEDs	LINK#, ACTIVITY#, POWER OK



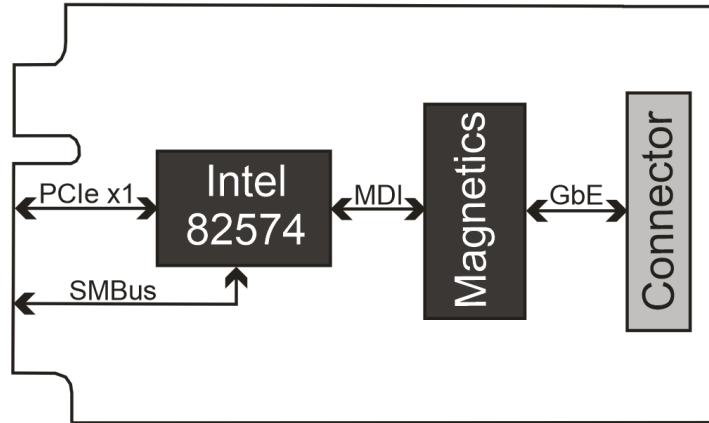
The MPG104 requires a minimum air-flow rate of 125CFM to operate reliably at an ambient of 85°C

Part Numbers / Ordering Information

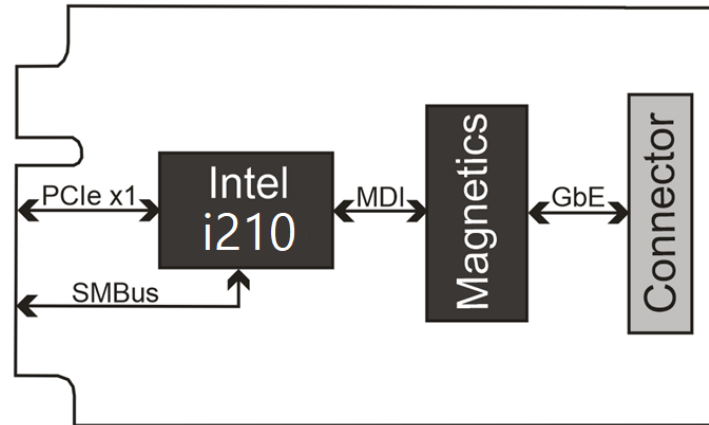
Part Number	
MPG101/MPG111	10/100/1000BASE-T, Right-Angle Network Connector, -40°C to 85°C, ROHS
MPG102/MPG112	10/100/1000BASE-T, Vertical Network Connector, -40°C to 85°C, ROHS
MPG104	2x 10/100/1000BASE-T, Vertical Network Connector, -40°C to 85°C, ROHS

Product Overview

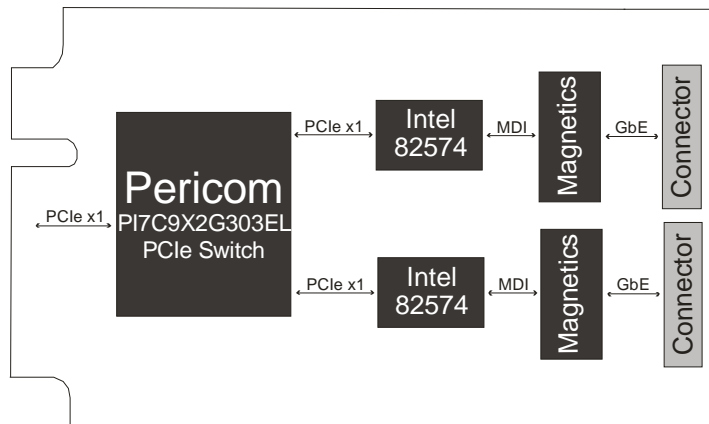
Block Diagrams



MPG101/MPG102

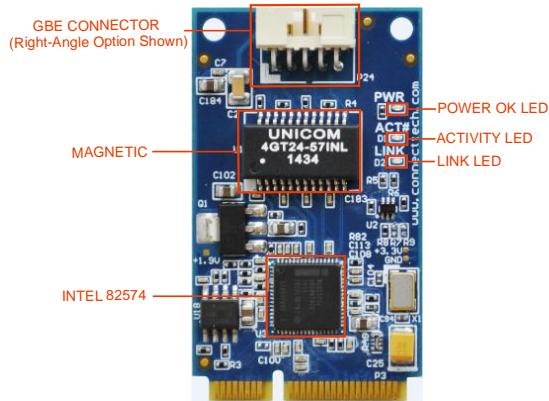


MPG111/MPG112

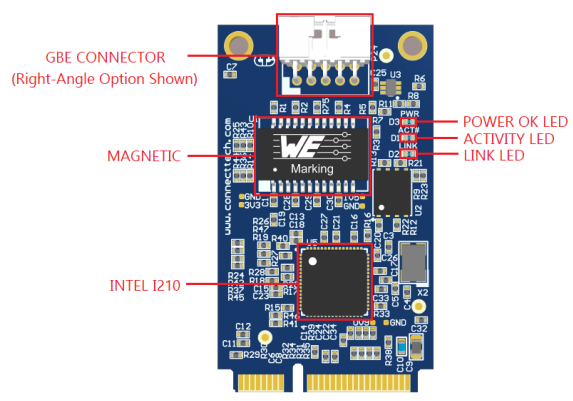


MPG104

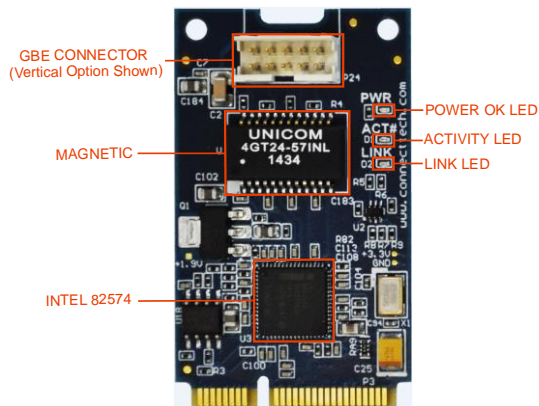
Connector Summary & Locations



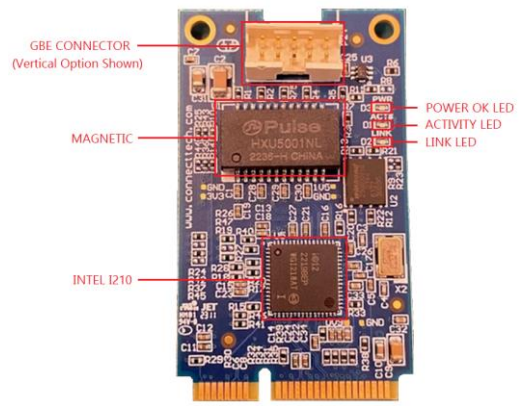
MPG101 (Right-Angle Connector)



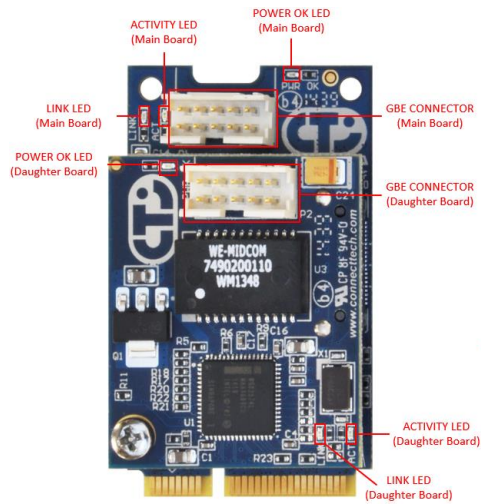
MPG111 (Right-Angle Connector)



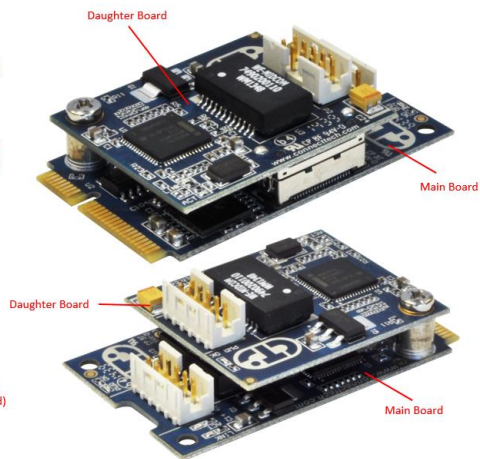
MPG102 (Vertical Connector)



MPG112 (Vertical Connector)



MPG104




Interface Pin-outs

Mini PCIe Edge Connector

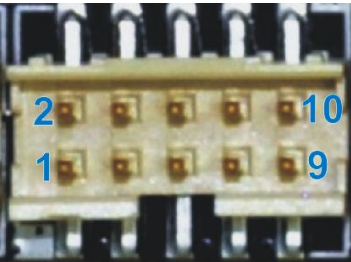
The Mini PCIe GbE pin-out is compliant to the PCI Express Mini Card Electromechanical Specification Rev. 2.0. Please note that this module does not require the +1.5V power provided to a standard Mini PCIe connector. This module uses only +3.3V for input power. This module does not connect the Display Port or USB pins on the Mini PCIe connector.

Function	Mini PCIe Card Edge Connector			
Location	P3			
Pinout	Signal	Pin	Pin	Signal
	WAKE#	1	2	
NC	3	4		GND
NC	5	6		NC
NC	7	8		NC
GND	9	10		NC
REFCLK-	11	12		NC
REFCLK+	13	14		NC
GND	15	16		NC
NC	17	18		GND
NC	19	20		NC
GND	21	22		PEREST#
PER- <small>(from this module to system)</small>	23	24		+3.3V
PER+ <small>(from this module to system)</small>	25	26		GND
GND	27	28		NC
GND	29	30		SMBus_CLK
PET- <small>(from system to this module)</small>	31	32		SMBus_DATA
PET+ <small>(from system to this module)</small>	33	34		GND
GND	35	36		NC
GND	37	38		NC
+3.3V	39	40		GND
+3.3V	41	42		NC
GND	43	44		NC
NC	45	46		NC
NC	47	48		NC
NC	49	50		GND
NC	51	52		+3.3V



10/100/1000 Ethernet (GbE) Connector

Function	LAN Connector																																			
Location	Various																																			
Connector PN	MPG101/MPG111: 98464-G61-10ULF - Manufacturer: FCI MPG102/MPG112: 98414-G06-10LF - Manufacturer: FCI MPG104: 98414-G06-10LF - Manufacturer: FCI																																			
Mating Connector PN	10073599-010LF - Manufacturer: FCI																																			
Pinout	<table border="1"> <thead> <tr> <th>Pin</th> <th>Signal</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>MX1-</td> <td>Ethernet Pair 1</td> </tr> <tr> <td>2</td> <td>MX1+</td> <td>Ethernet Pair 1</td> </tr> <tr> <td>3</td> <td>MX2-</td> <td>Ethernet Pair 2</td> </tr> <tr> <td>4</td> <td>MX2+</td> <td>Ethernet Pair 2</td> </tr> <tr> <td>5</td> <td>SHELL</td> <td>RJ Shell Connection</td> </tr> <tr> <td>6</td> <td>SHELL</td> <td>RJ Shell Connection</td> </tr> <tr> <td>7</td> <td>MX3-</td> <td>Ethernet Pair 3</td> </tr> <tr> <td>8</td> <td>MX3+</td> <td>Ethernet Pair 3</td> </tr> <tr> <td>9</td> <td>MX4-</td> <td>Ethernet Pair 4</td> </tr> <tr> <td>10</td> <td>MX4+</td> <td>Ethernet Pair 4</td> </tr> </tbody> </table>			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
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																																		



98414-G06-10LF shown

Detailed Feature Description

PCI Express Interface

The Mini PCIe Gbe supports one PCIe Rev. 1.1 lane connecting between the Mini PCIe edge fingers and the Intel 82574 or Intel i210 GbE controller. This interface has sufficient bandwidth to support 1000 Mb/s transfer rate and with 40 KB of on-board buffering, mitigates instantaneous receive bandwidth stresses and eliminates transmit delays by buffering the outgoing packet prior to transmission.

10/100/1000Base-T Port

The Mini PCIe GbE supports one Ethernet interface port supporting 1000BASE-T, 100BASE-TX, and 10BASE-T (IEEE 802.3, 802.3u, 802.3ab). This multi-speed port can operate in Half or Full duplex and includes flow control support compliant with IEEE 802.3X as well as VLAN support compliant with IEEE 802.3q. Note that half-duplex 1000 MB/s operation is not supported.

SMBus Management Port

The SMBus interface allows software-based network management by providing a mechanism by which network traffic can be routed to and from a Management Controller. The SMBus supports pass-through capabilities, with the following filtering options:

- RMCP/RMCP+ ports
- Flexible UDP/TCP port filters
- 128-byte flexible filters
- VLAN
- IPv4 address
- IPv6 address
- MAC address filters

Using the SMBus pass-through interface, a received packet can be discarded, sent to host memory, sent to an external management controller, or both host memory and external management controller. All manageability filters are controlled by the management controller, not the 82574/i210 drivers.

Software Support for the Intel 82574/i210

Additional drivers may be needed to properly operate the GBE Port.

These drivers can be downloaded directly from Intel website from the below link:

<https://downloadcenter.intel.com/SearchResult.aspx?lang=eng&ProductID=3023&ProdId=3023>

On-board Indicator LEDs

Each Mini PCIe GbE has three onboard LEDs that are clearly labeled on the PCB.

LED	Description
ACT	Activity Indicator; Illuminates when traffic is being transferred over the LAN port.
LINK	Link Indicator; When illuminated indicates 1000BASE-T channel bandwidth
PWR OK	Power OK Indicator; When illuminated indicates +3.3V to the Mini PCIe GbE module is within specification

Cables

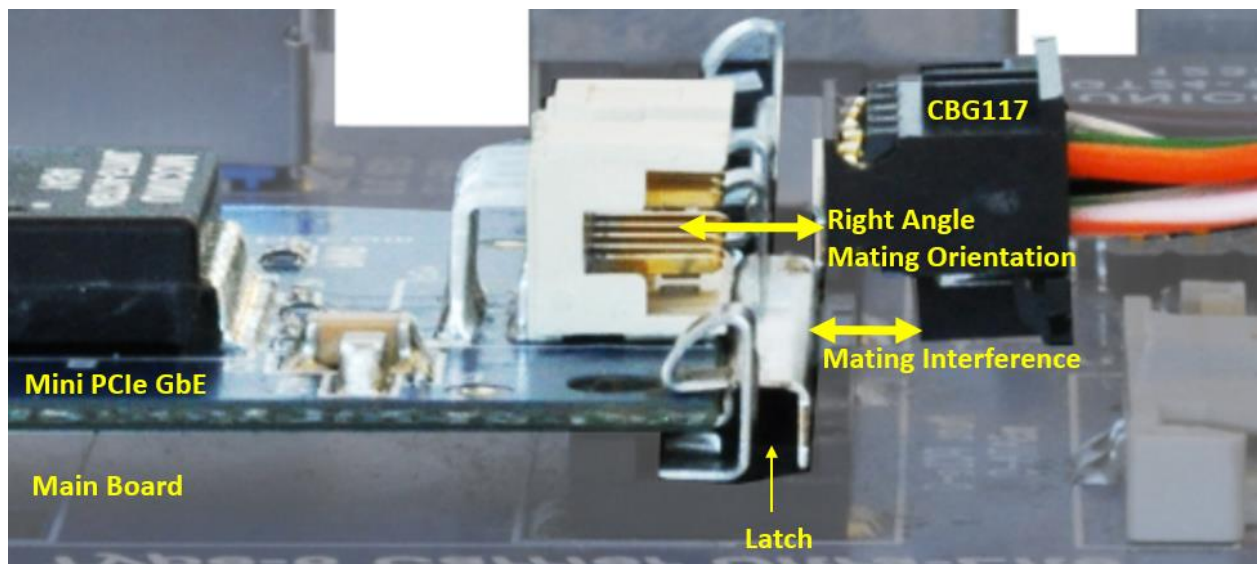
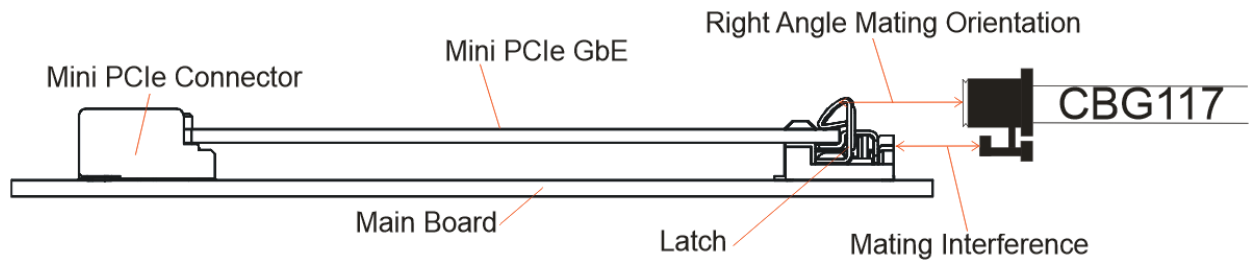
Available Cables

The following table shows the available cables for the Mini PCIe GbE. Click below to view the drawing.

Drawing No.	Part No.	Description
CTIC-00433	CBG117	RJ-45 to 10-pin Minitex Cable

Right Angle Connector Interference

When using the right angle Mini PCIe GbE (MPG101/MPG111), there is mating interference between the Mini PCIe latch and the latch on the network cable CBG117. This interference will not allow the cable to securely latch to the GbE connector. Please see images below.



Therefore, if your application requires the right angle connector option (MPG101/MPG111), CTI suggests using stand-offs and screws to secure the Mini PCIe module to the main board, not a latch as shown above.