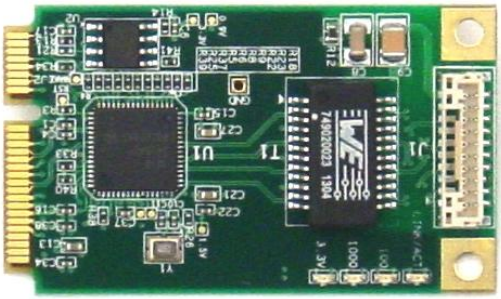
# DS-MPE-GE210

**PCIe MiniCard Gigabit Ethernet Module**

Rev A.00 July 2014



| Revision | Date | Comment |
|---|---|---|
| A.00 | 7/10/2014 | Initial release |
| | | |

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# 1. IMPORTANT SAFE HANDLING INFORMATION

## WARNING!

### ESD-Sensitive Electronic Equipment

Observe ESD-safe handling procedures when working with this product.

Always use this product in a properly grounded work area and wear appropriate ESD-preventive clothing and/or accessories.

Always store this product in ESD-protective packaging when not in use.

### *Safe Handling Precautions*

This board contains a high density connector with many connections to sensitive electronic components. This creates many opportunities for accidental damage during handling, installation and connection to other equipment. The list here describes common causes of failure found on boards returned to Diamond Systems for repair. This information is provided as a source of advice to help you prevent damaging your Diamond (or any vendor's) embedded computer boards.

**ESD damage** – This type of damage is usually almost impossible to detect, because there is no visual sign of failure or damage. The symptom is that the board eventually simply stops working, because some component becomes defective. Usually the failure can be identified and the chip can be replaced. To prevent ESD damage, always follow proper ESD-prevention practices when handling computer boards.

**Damage during handling or storage** – On some boards we have noticed physical damage from mishandling. A common observation is that a screwdriver slipped while installing the board, causing a gouge in the PCB surface and cutting signal traces or damaging components.

Another common observation is damaged board corners, indicating the board was dropped. This may or may not cause damage to the circuitry, depending on what is near the corner. Most of our boards are designed with at least 25 mils clearance between the board edge and any component pad, and ground / power planes are at least 20 mils from the edge to avoid possible shorting from this type of damage. However these design rules are not sufficient to prevent damage in all situations.

A third cause of failure is when a metal screwdriver tip slips, or a screw drops onto the board while it is powered on, causing a short between a power pin and a signal pin on a component. This can cause overvoltage / power supply problems described below. To avoid this type of failure, only perform assembly operations when the system is powered off.

Sometimes boards are stored in racks with slots that grip the edge of the board. This is a common practice for board manufacturers. However our boards are generally very dense, and if the board has components very close to the board edge, they can be damaged or even knocked off the board when the board tilts back in the rack. Diamond recommends that all our boards be stored only in individual ESD-safe packaging. If multiple boards are stored together, they should be contained in bins with dividers between boards. Do not pile boards on top of each other or cram too many boards into a small location. This can cause damage to connector pins or fragile components.

**Power supply wired backwards** – Our power supplies and boards are not designed to withstand a reverse power supply connection. This will destroy each IC that is connected to the power supply (i.e. almost all ICs). In this case the board will most likely will be unrepairable and must be replaced. A chip destroyed by reverse power or by excessive power will often have a visible hole on the top or show some deformation on the top surface due to vaporization inside the package. **Check twice before applying power!**

**Overvoltage on digital I/O line** – If a digital I/O signal is connected to a voltage above the maximum specified voltage, the digital circuitry can be damaged. On most of our boards the acceptable range of voltages connected to digital I/O signals is 0-5V, and they can withstand about 0.5V beyond that (-0.5 to 5.5V) before being damaged. However logic signals at 12V and even 24V are common, and if one of these is connected to a 5V logic chip, the chip will be damaged, and the damage could even extend past that chip to others in the circuit

# 2. INTRODUCTION

## 2.1 Description

The DS-MPE-GE210 provides a convenient, compact, cost-effective means to add an extra gigabit Ethernet port to your embedded system. The Intel 210IT Ethernet controller provides 10/100/1000Mbps operating speed with industrial temperature range capability. The module includes link and speed LEDs as well as latching connectors for enhanced ruggedness. Wake-on-LAN functionality is supported.

## 2.2 Features

- 1 Gigabit Ethernet port
- PCI Express-based Ethernet port
- Wake on LAN
- 4 status LEDs for link, activity, 100 speed and 1000 speed

## 2.3 Operating System Support

- Linux 2.6.16, 2.6.27, 2.6.31, and 2.6.32
- Windows 7, XP

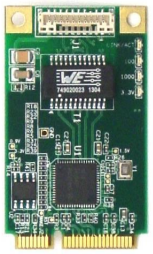
## 2.4 Mechanical, Electrical, Environmental

- PCIe MiniCard full size format
- Dimensions: 50.95mm x 30mm (2” x 1.18”)
- -40°C to +85°C ambient operating temperature
- Power input requirements: +3.3VDC +/- 5%
- PCIe x 1 Gen 1 host interface

# 3. PACKING LIST

The DS-MPE-GE210 product comes with the PCIe MiniCard hardware assembly, one gigabit Ethernet cable, and a hardware kit containing mounting screws.

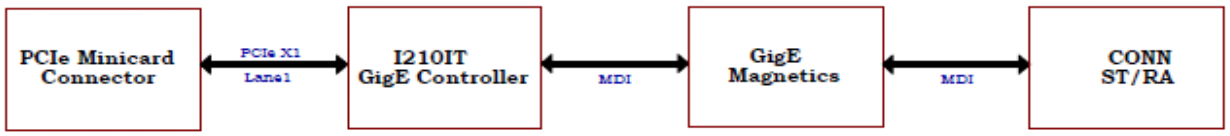
| Quantity | Part Number | Description |
|---|---|---|
| 1 | 91505xx | DS-MPE-GE210 hardware assembly |
| 1 | 6800501 | Hardware Kit with screws |
| 1 | 6980502 | Gigabit Ethernet cable |



# 4. FUNCTIONAL OVERVIEW

## 4.1 Functional Block Diagram

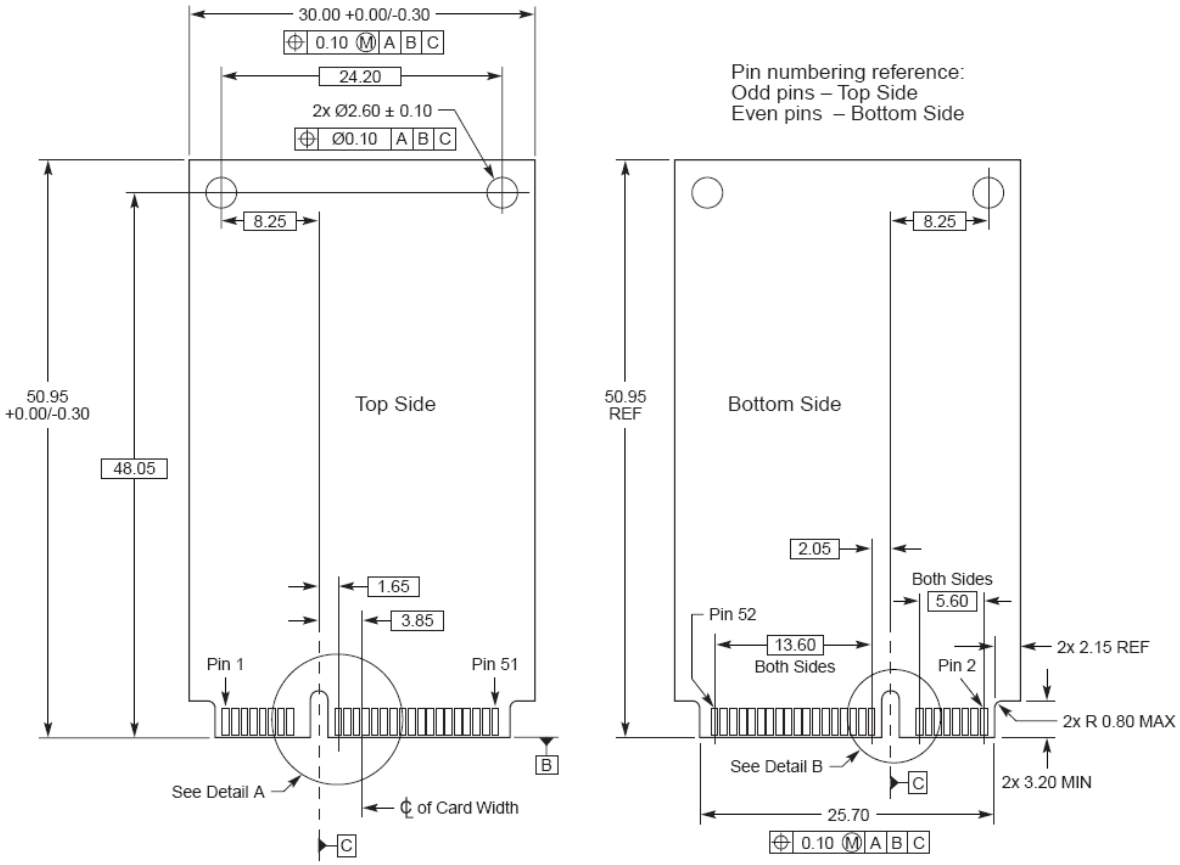
The DS-MPE-GE210 block diagram is shown below.




## 4.2 Mechanical Board Drawing

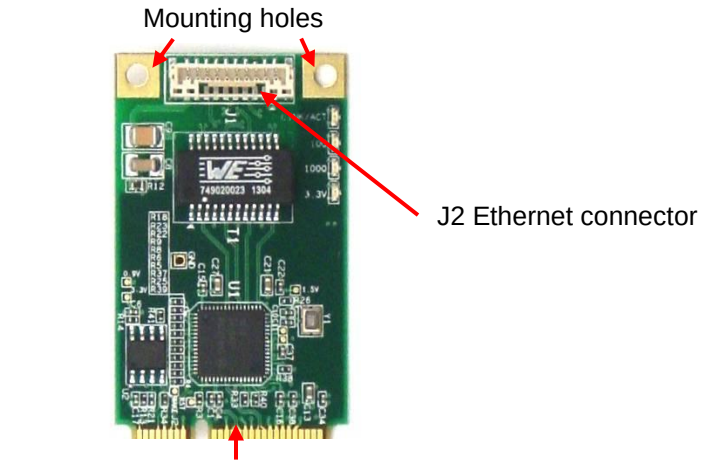
The DS-MPE-GE210 conforms to the PCIe MiniCard electromechanical specification revision 1.2, full size format. Overall dimensions are 50.95mm L x 30.00mm W.

The two mounting holes are isolated from the CPU ground and not connected to any ground lines.



# 5. INSTALLATION

The DS-MPE-GE210 plugs in to any socket meeting the PCIe MiniCard specifications. It has one connector for the Ethernet port and a pair of mounting holes. To install the DS-MPE-GE210, fully insert the board into a PCIe MiniCard connector and secure in place by inserting one screw from the hardware kit into each of the mounting holes, see the diagram below.



# 6. CONNECTOR PINOUT AND PIN DESCRIPTION

## 6.1 PCIe MiniCard Edge Connector (J1)

The DS-MPE-GE210 module is compatible with the standard Mini PCIe socket pinout as shown below.

| | | | |
|---|---|---|---|
| WAKE# | 1 | 2 | +3.3VAUX_3 |
| COEX1 | 3 | 4 | GND9 |
| COEX2 | 5 | 6 | +1.5V_1 |
| CLKREQ# | 7 | 8 | UIM_PWR |
| GND1 | 9 | 10 | UIM_DATA |
| REFCLK- | 11 | 12 | UIM_CLK |
| REFCLK+ | 13 | 14 | UIM_RESET |
| GND2 | 15 | 16 | UIM_VPP |
| | KEY | | |
| RSVD(UIM_C8) | 17 | 18 | GND10 |
| RSVD(UIM_C4) | 19 | 20 | W_DISABLE# |
| GND3 | 21 | 22 | PERST# |
| PERN0 | 23 | 24 | +3.3VAUX_4 |
| PERP0 | 25 | 26 | GND11 |
| GND4 | 27 | 28 | +1.5V_2 |
| GND5 | 29 | 30 | SMB_CLK |
| PETN0 | 31 | 32 | SMB_DATA |
| PETP0 | 33 | 34 | GND12 |
| GND6 | 35 | 36 | USB_D- |
| GND7 | 37 | 38 | USB_D+ |
| +3.3VAUX_1 | 39 | 40 | GND13 |
| +3.3VAUX_2 | 41 | 42 | LED_WWAN# |
| GND8 | 43 | 44 | LED_WLAN# |
| RSVD1 | 45 | 46 | LED_WPAN# |
| RSVD2 | 47 | 48 | +1.5V_3 |
| RSVD3 | 49 | 50 | GND14 |
| RSVD4 | 51 | 52 | +3.3VAUX_5 |

## 6.2 Ethernet Connector (J2)

The Gigabit Ethernet connector, J2, is a 10-pin miniature latching connector with the pinout below.

| | |
|---|---|
| 1 | DA+ |
| 2 | DA- |
| 3 | DB+ |
| 4 | DB- |
| 5 | DC+ |
| 6 | DC- |
| 7 | DD+ |
| 8 | DD- |
| 9 | NC |
| 10 | Ground |

**Connector Part Number / Description**

JST BM10B-GHS-TBT 8 pos, 1.25mm, vertical, latching, SMD

# 7. SPECIFICATIONS

| | |
|---|---|
| Number of ports | 1 10/100/1000Mbps Ethernet from Intel 210IT |
| Wake on LAN | Yes |
| Status LEDs | Link<br>Activity<br>100 speed<br>1000 speed |
| Input power | +3.3VDC +/-5% |
| Power consumption | 0.46W at 3.3V |
| Software drivers | Windows 7, XP<br>Linux 2.6.16, 2.6.27, 2.6.31, and 2.6.32 |
| Operating temperature | -40°C to +85°C |
| Operating humidity | 5% to 95% non-condensing |
| MTBF | tbd hours |
| Dimensions | 50.95mm x 30mm (2” x 1.18”) |
| Weight | 8.5g (0.3oz) |
| RoHS Compliant | Yes |