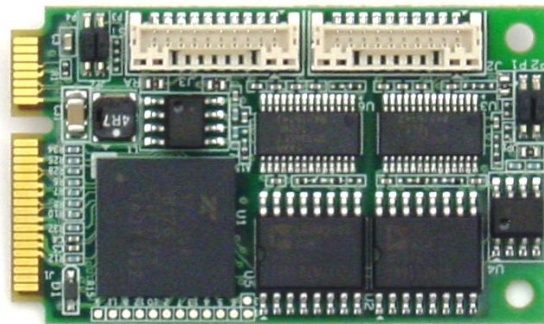




DS-MPE-SER4OPT

PCIe MiniCard 4 Port Opto-isolated Serial Module

Rev A.01 September 2013



Revision	Date	Comment
A.00	8/16/2013	Initial release
A.01	9/24/2013	Minor updates

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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

DS-MPE-SER4OPT offers 4 RS-232/485 opto-isolated serial ports in a PCIe MiniCard form factor with extended -40°C to +85°C temperature operation. Data rates on every port are up to 1Mbps in RS-232 mode and 10Mbps in RS-485 mode. The board's protocols are set in pairs at the factory based on the model ordered. I/O signals are provided on two miniature connectors with 2 ports per connector.

2.2 Features

- ◆ XR17V354 PCIe interface quad UART with 256-byte FIFOs
- ◆ SP336 multi-mode transceivers support RS-232 and RS-485
- ◆ 4 RS-232/485 opto-isolated serial ports with protocol set in pairs
- ◆ RS-485 termination jumper selectable
- ◆ +/-500V input/output isolation

2.3 Operating System Support

- ◆ Linux 2.6.16, 2.6.27, 2.6.31, and 2.6.32
- ◆ Windows 7, XP, Vista, and 2000

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%

3. MODELS

The DS-MPE-SER4OPT product is available in three different models with a different mix of RS-232 and RS-485 ports. The table below lists these models.

Model Number	Description	Port Assignment
DS-MPE-OPT4232	4-port RS-232 PCIe MiniCard Opto-Isolated Serial Module	Ports 1 – 4: RS-232
DS-MPE-OPT4485	4-port RS-485 PCIe MiniCard Opto-Isolated Serial Module	Ports 1-4: RS-485
DS-MPE-OPT4M22	2-port RS-232, 2-port RS-485 PCIe MiniCard Opto-Isolated Serial Module	Ports 1 & 3: RS-232 Ports 2 & 4: RS-485

4. PACKING LIST

The DS-MPE-SER4OPT product comes with the PCIe MiniCard hardware assembly, a cable kit with two dual serial cables, and a hardware kit containing jumpers and mounting screws.

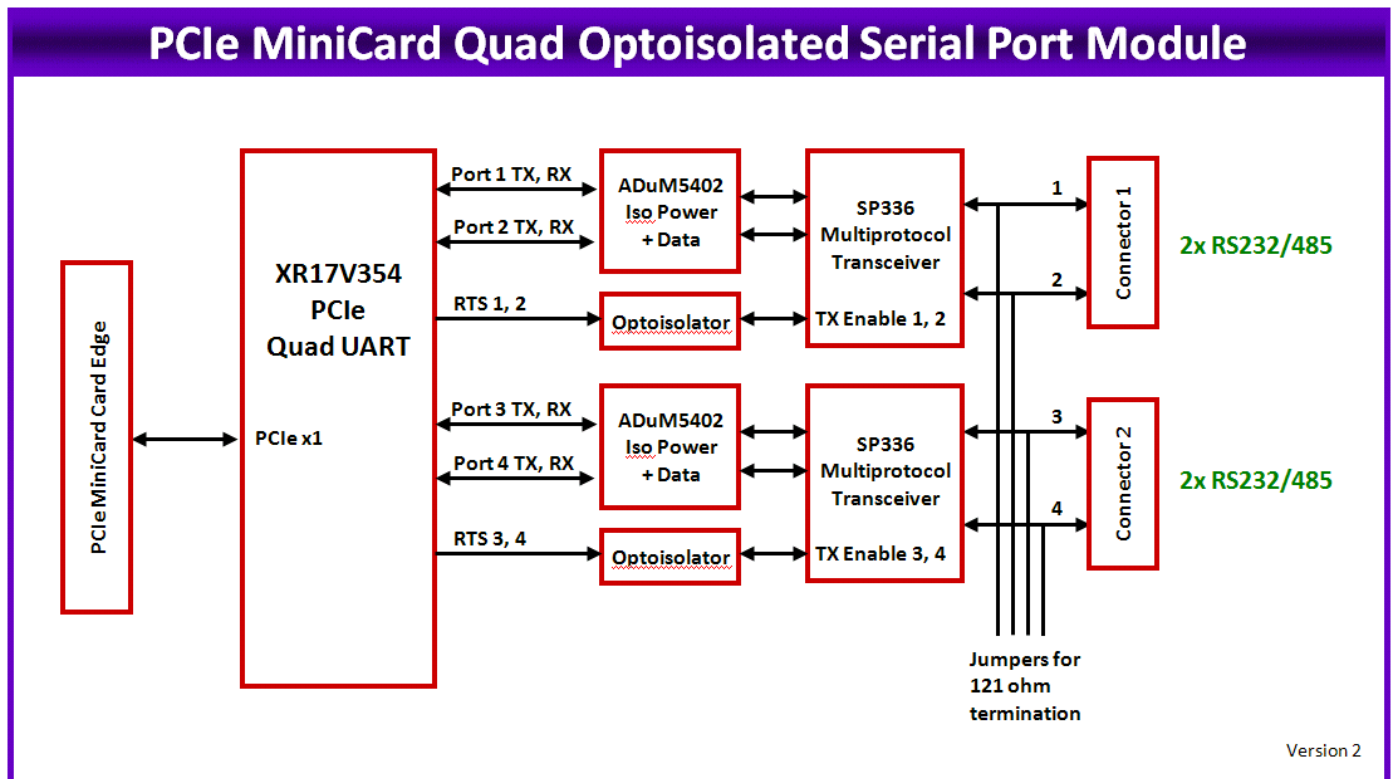
Quantity	Part Number	Description
1	915049x	DS-MPE-SER4OPT hardware assembly for the appropriate model ordered
1	6800500	Hardware Kit with jumpers and screws
1	CK-SER4M	Cable Kit with two dual serial cables



5. FUNCTIONAL OVERVIEW

5.1 Functional Block Diagram

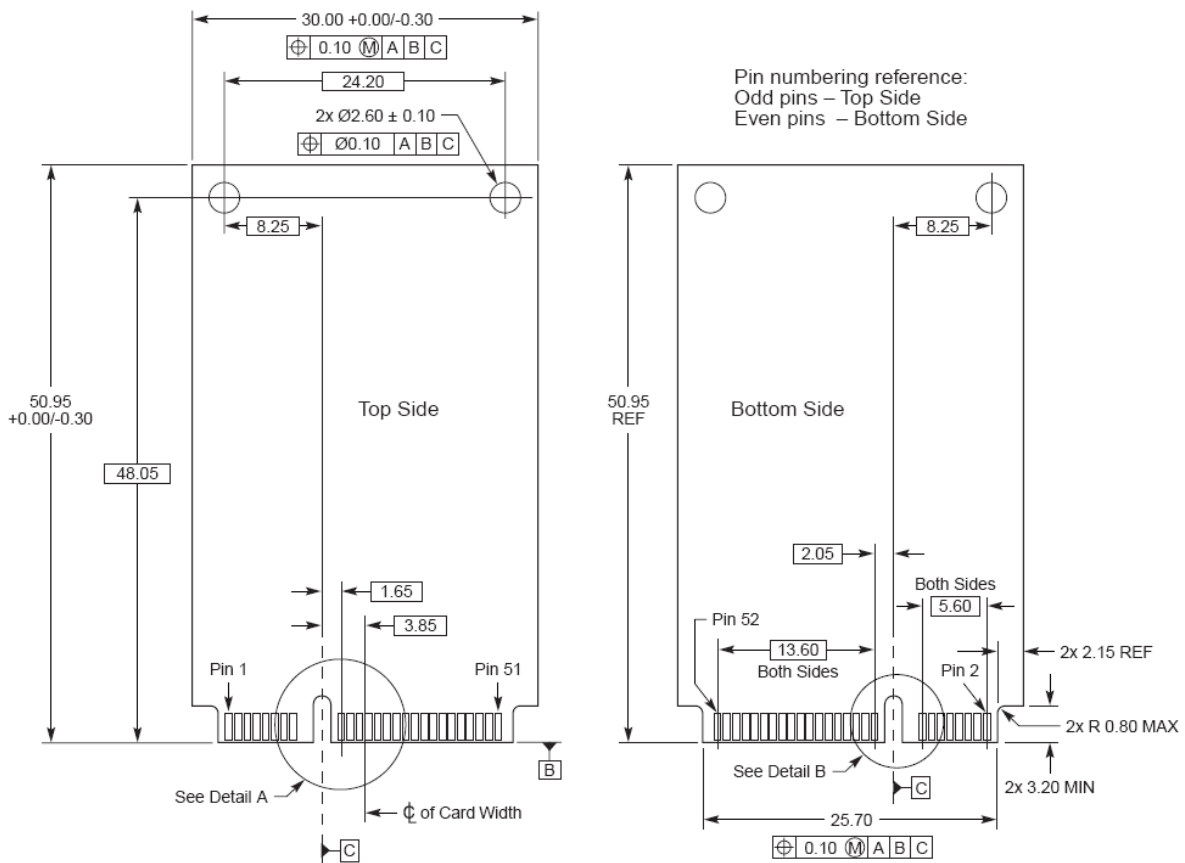
The DS-MPE-SER4OPT block diagram is shown below.



5.2 Mechanical Board Drawing

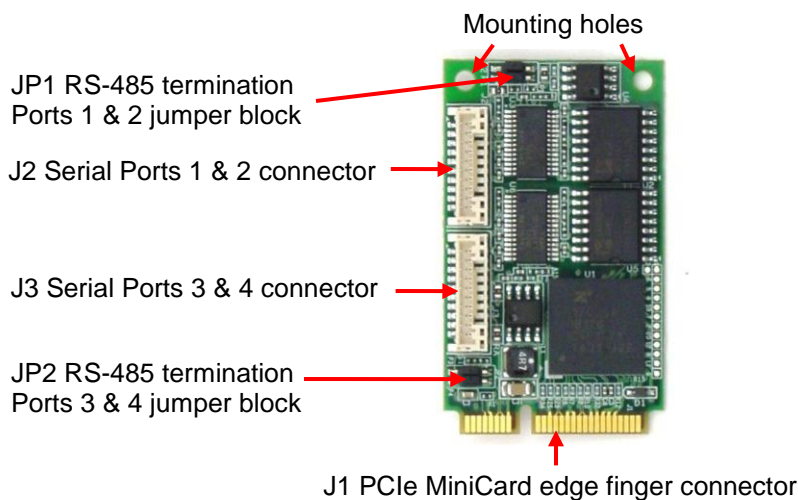
The DS-MPE-SER4OPT conforms to the PCIe MiniCard electromechanical specification revision 1.2, full size format. Overall dimensions are 50.95mm L x 30.00mm W.

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



6. INSTALLATION

The DS-MPE-SER4OPT plugs in to any socket meeting the PCIe MiniCard specifications. It has two connectors, one for each pair of serial ports, two RS-485 termination jumper blocks, and a pair of mounting holes. To install the DS-MPE-SER4OPT, 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.



7. CONNECTOR PINOUT AND PIN DESCRIPTION

7.1 PCIe MiniCard Edge Connector (J1)

The DS-MPE-SER4OPT 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

7.2 Serial Ports (J2, J3)

The four serial ports are provided on two miniature 10-pin headers with 2 ports per header. The pin definition depends on the serial protocol selected. The pinouts below describe each protocol for the first connector (J2) with ports 1 and 2. The second connector (J3) offers the identical pinout for ports 3 and 4.

Pin	RS-232	RS-485
1	TX1	TX/RX 1+
2	RX1	NC
3	RTS1	TX/RX 1-
4	CTS1	NC
5	Ground	Ground
6	TX2	TX/RX 2+
7	RX2	NC
8	RTS2	TX/RX 2-
9	CTS2	NC
10	Ground	Ground

Connector Part Number / Description

BM10B-GHS-TBT Conn, HDR, 10pos, 2mm, Straight, SMD

8. JUMPER CONFIGURATION

The DS-MPE-SER4OPT board has two jumper blocks, JP1 and JP2, for providing 121 ohm RS-485 RX/TX termination. These jumpers are set at the factory based on the model ordered as shown in the table below.

<i>Jumper Block</i>	<i>Description</i>
JP1	Ports 1 & 2 RS-485 RX/TX termination
JP2	Ports 3 & 4 RS-485 RX/TX termination

Model Number	JP1 Jumpers	JP2 Jumpers
DS-MPE-OPT4232	No jumpers	No jumpers
DS-MPE-OPT4485	Port 1: Jumper Pin 1 & 2 Port 2: Jumper Pin 3 & 4	Port 3: Jumper Pin 1 & 2 Port 4: Jumper Pin 3 & 4
DS-MPE-OPT4M22	Port 1: no jumper Port 2: Jumper Pin 3 & 4	Port 3: no jumper Port 4: Jumper Pin 3 & 4

9. SPECIFICATIONS

Number of serial ports	4
Protocols	RS-232/485 on each port jumper configured
Maximum baud rate	RS-232: 1Mbps RS-485: 10Mbps
Termination	RS-485 jumper selectable
Isolation	ADM5402 power and signal
UARTs	Quad XR17V354 with PCIe interface
FIFO	256-byte TX/RX
LEDs	LED 1: Power to Exar UART chip LED 2: +3.3V power
Isolation	+/-500V input/output
Input power	+3.3VDC +/-5%
Power consumption	0.462W @ 3.3V
Software drivers	Windows 7, XP, Vista, 2000 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	xxx hours
Form factor	PCIe MiniCard full size
Dimensions	50.95mm x 30mm (2" x 1.18")
Weight	8.5g (0.3oz)
RoHS	Compliant