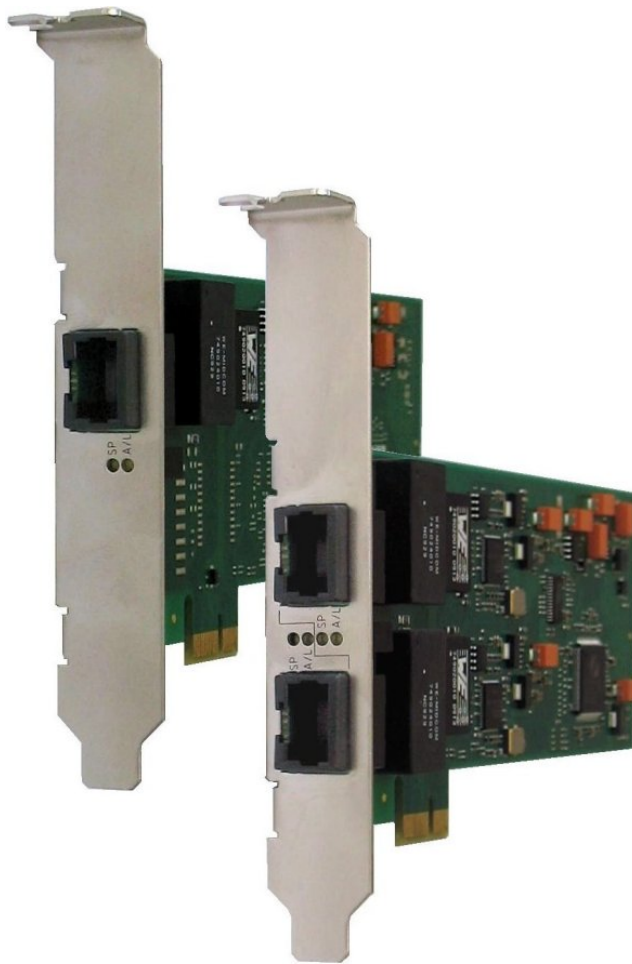


» Kontron User's Guide «



PCIe Medical LAN Card

User's Guide (Version 1.00)

0-0096-4514

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2. Introduction

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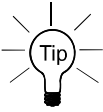
Kontron Embedded Computers GmbH

Oskar-von-Miller-Str. 1

85386 Eching near Munich

Germany

2.1. Symbols used in this Manual

Symbol	Meaning
	This symbol indicates the danger of injury to the user or the risk of damage to the product if the corresponding warning notices are not observed.
	This symbol indicates that the product or parts thereof may be damaged if the corresponding warning notices are not observed.
	This symbol indicates general information about the product and the user manual.
	This symbol precedes helpful hints and tips for daily use.

- ® Microsoft, MS-DOS, Windows and Windows NT are registered trademarks of the Microsoft Corporation.
- ® IBM, PC-AT, OS/2 and PS/2 are registered trademarks of the International Business Machines Corporation.
- ® Intel and Pentium are registered trademarks of Intel Corporation.
- ® AMI is a registered trademark of American Megatrends, Inc.

Other product names cited in this manual may also be trademarks and are used here solely for identification purposes.

3. Important Instructions

This chapter contains safety instructions which must be observed when using the PCIe Medical LAN Card.

The manufacturer's instructions provide useful information on your PCIe Medical LAN Card.

3.1. Note on the Warranty

Due to their limited service life, parts which by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the batteries, for example.

3.2. Exclusion of Accident Liability Obligation

Kontron Embedded Computers shall be exempted from the statutory accident liability obligation if the user fails to observe the safety instructions.

3.3. Liability Limitation / Exemption from the Warranty Obligation

In the event of damage to the device caused by failure to observe the hints in this manual and eventually on the device (especially the safety instructions), Kontron Embedded Computers shall not be required to honor the warranty even during the warranty period and shall be exempted from the statutory accident liability obligation.



4. Safety Instructions

Please read this section carefully and observe the instructions for your own safety and correct use of the board. Observe the warnings and instructions on the board and in the manual.

The PCIe Medical LAN Card has been built and tested by Kontron Embedded Computers in accordance with IEC / EN / UL 60950-1 with medical separation/isolation requirements acc. IEC 60601 and was delivered in perfect condition.

In order to maintain this condition and ensure safe operation, the user must observe the instructions and warnings acc. IEC 60601 contained in this manual.

Kontron Embedded Computers can only guarantee the safety, reliability and performance of the board if all of the following safety instructions are observed.

- The PCIe Medical LAN Card must be used in accordance with the instructions for use.
- The PCIe Medical LAN Card is designed to be built-in to a system. The integration into the system has to be done such that the system complies with the IEC / EN 60950-1 safety rules.
- When installing the board into a system, ensure that the system is switched off and the systems power cord is disconnected from the mains power. Disconnect all cable connections of peripheral devices from the system.
- Ensure that the DC operating voltages adheres to the specification given in the "Power Requirements".
- Repairs may only be carried out by Kontron Embedded Computers.
- It must be assumed that safe operation is no longer possible,
 - if the device has visible damage or
 - if the device no longer functions.In these cases the device must be shut down and secured against unintended operation.



4.1. Electrostatic Discharge (ESD)

The components on the board are sensitive to static electricity. Care must therefore be exercised at all times during handling and inspection of the PCIe Medical LAN Card, in order to ensure the product integrity.

- Do not handle this product while it is outside its protective enclosure, while it is not used for operational purposes, unless it is otherwise anti-static protected.
- Unpack or install this product only at EOS/ESD safe work stations. When safe work station are not guaranteed, it is important for the user to be electrically discharged before touching the PCIe Medical LAN Card with his/her hands or tools. This is most easily done by touching a metal part of your system housing.
- Only hold the assemblies at the edge.
- Do not touch any connection pins or conductors on the assembly.

4.2. FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(English): This Class A digital apparatus complies with the Canadian ICES-003.

(French): Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

4.3. Electromagnetic Compatibility

This product has been designed for industrial, commercial and office use, including small business use. The most recent version of the EMC guidelines (EMC Directive 2004/108/EC) apply. If the user modifies and/or adds to the equipment (e.g. installation of add-on cards) the prerequisites for the CE conformity declaration may no longer apply.

5. Scope of Delivery

Please check that your package is complete, and contains the items below (according to the ordered unit configuration). If you discover damaged or missing items, please contact your dealer.

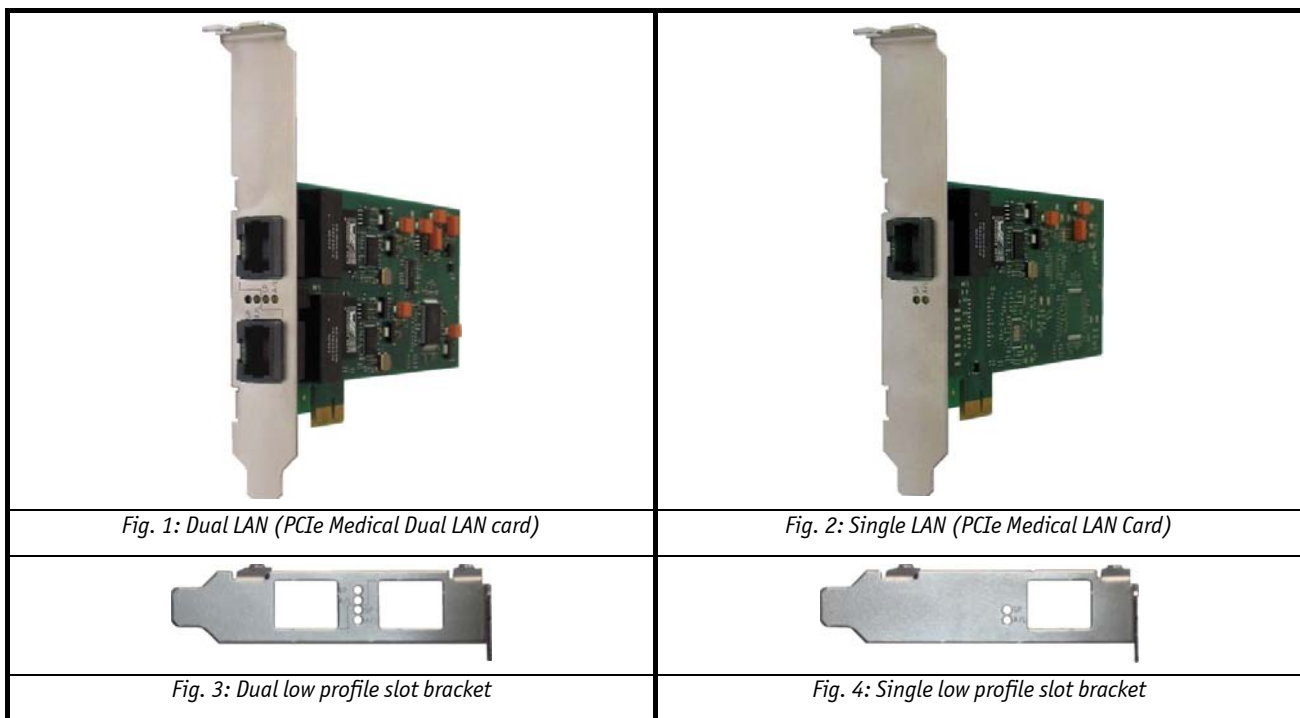
- PCIe Medical LAN Card (delivered as ordered: single or dual)
- 1x CD-ROM with the required drivers



Support for driver installation:

E-mail: support@kontron.com

Delivering versions of the PCIe Medical LAN Card with the corresponding low profile slot bracket (included):



5.1. Type Label and Product Identification

Card Type	Product Designation	Product Identification
PCIe Network Card	PCIe Med Dual LAN Card	PCIe Medical Dual LAN Card
	PCIe Med LAN Card	PCIe Medical Single LAN Card

Two types of printed labels on the PCIe Medical LAN Card (Single or Dual LAN) have to show the following information:

1. Board Identification Label that has implemented: Board Designation/Serial Number/Part Number/Product Revision/QM-Field/Bar Code/Datamatrix Code
2. 2x MAC Address Label for the PCIe Medical Dual LAN Card
1x MAC Address Label for the PCIe Medical Single LAN Card

6. Product Description

The PCIe Medical LAN Card is designed as a PCIe card (PCIe x1) for installation into a standard PC as well as into a system suitable for applications that require the reinforced insulation (demanded for international safety certification).

This card will function correctly in an extended PCIe slots (e.g. x1, x4, x8, x16) if available.

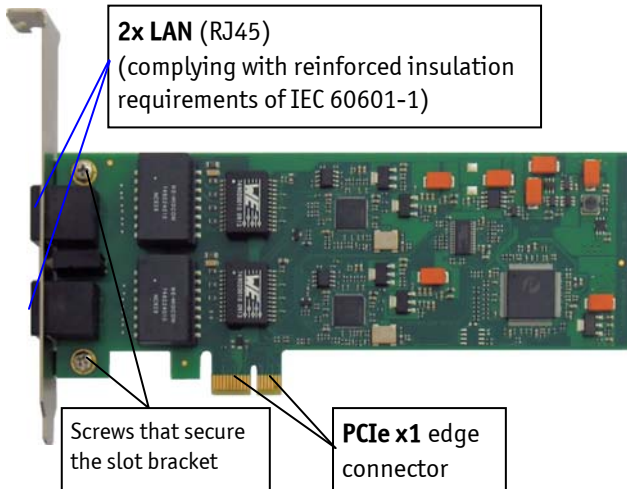


Fig. 5: PCIe Medical Dual LAN Card (top side)

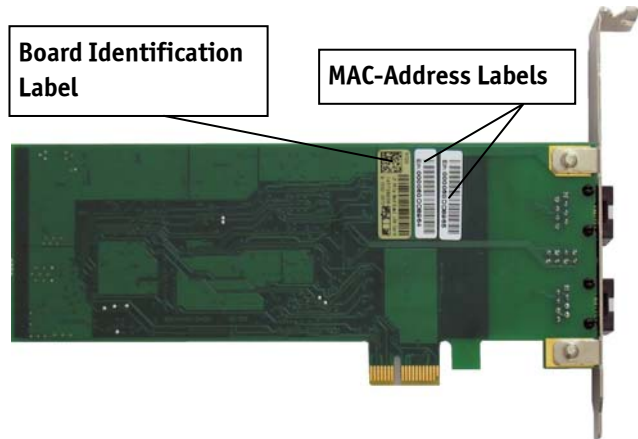


Fig. 6: PCIe Medical Dual LAN Card (bottom side)

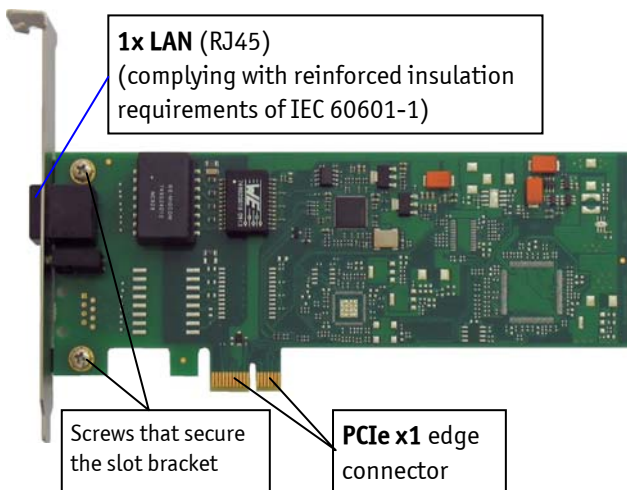


Fig. 7: PCIe Medical Single LAN Card Dual (top side)

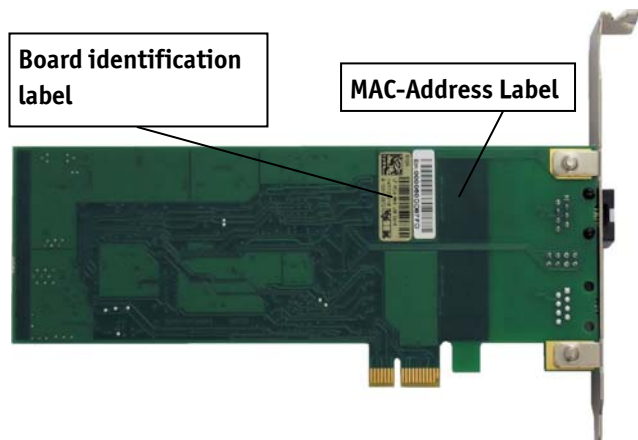


Fig. 8: PCIe Medical Single LAN Card (bottom side)



The shield of the ethernet cable is isolated to ground /earth at the LAN interface from PCIe Medical LAN Card (Single or Dual).

Therefore the shield of the ethernet cable shall be connected to ground or earth on the peripheral side (f.e. LAN- hub or ethernet-switch).

EMC disturbances as high frequent transients (Burst) have an influence of the LAN transmission performance, because connected peripherals may be sensitive to such EMC signals. These influences should be considered in the risk analysis from the medical device according ISO 14971 if connected.

6.1. Features

The PCIe Medical LAN Card is available with Dual LAN or Single LAN ports. Both versions of the PCIe Medical LAN Card (Single or Dual) come with a standard height bracket attached to it. The corresponding low profile bracket for single or dual version is included as accessory in the shipment (refer to the chapter 7.1.1 "Adapt the PCIe Medical LAN Card (Dual/Single) to a Low Profile Card).

The insulation of the LAN ports comply the requirements for reinforced insulation of IEC60601-1 2nd edition.

Data Transfer Rate: 10Mb/s Ethernet, 100Mb/s Fast Ethernet, and 1000Mb/s Gigabit Ethernet.

It is based upon the high performance of Intel® 82574L LAN controller

6.1.1. Network Features

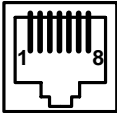
- Compliant with the 1 Gb/s Ethernet 802.3 802.3u 802.3ab specifications
- Multi-speed operation: 10/100/1000 Mb/s
- Full-duplex operation at 10/100/1000 Mb/s
- Half-duplex operation at 10/100 Mb/s
- Flow control support compliant with the 802.3X specification
- MAC address filters: perfect match unicast filters; multicast hash filtering, broadcast filter and promiscuous mode
- Statistics for management and RMON
- MAC loopback
- Two yellow status LEDs available for each LAN port (link/activity and speed)

6.1.2. Performance Features Supported by Intel® 82574L LAN Controller

- Configurable receive and transmit data FIFO; programmable in 1 KB increments
- TCP segmentation capability compatible with NT 5.x TCP Segmentation Offload (TSO) features
- Supports up to 256 KB TSO (TSO v2)
- Fragmented UDP checksum offload for packet reassembly
- IPv4 and IPv6 checksum offload support (receive, transmit, and TSO)
- Split header support
- Receive Side Scaling (RSS) with two hardware receive queues
- Supports 9018-byte jumbo packets
- Packet buffer size of 40 KB
- TimeSync offload compliant with 802.1as specification

6.2. LAN Port/s

These connectors provide two isolated Ethernet 1000Base-T ports, which are connected to on-board LAN controller by galvanic isolated transformers. Creepage distance and clearances comply with the standard IEC60601-1 2nd edition. The RJ45 connectors are unshielded.

Pin#	Signal Name	LAN 1, LAN2: unshielded [RJ45 (female)]
1	D1+	
2	D1-	
3	D2+	
4	D3+	
5	D3-	
6	D2-	
7	D4+	
8	D4-	



The shield of the ethernet cable is isolated to ground /earth at the LAN interface from PCIe Medical LAN Card (Single or Dual).

Therefore the shield of the ethernet cable shall be connected to ground or earth on the peripheral side (f.e. LAN- hub or ethernet-switch).

EMC disturbances as high frequent transients (Burst) have an influence of the LAN transmission performance, because connected peripherals may be sensitive to such EMC signals. These influences should be considered in the risk analysis from the medical device according ISO 14971 if connected.

6.3. Status LEDs

The LED block contains:

- ❑ four LEDs (yellow) on the PCIe Med Dual LAN Card (LED: A, B, C, D)
- ❑ two LEDs (yellow) on the PCIe Med LAN Card (Single) (LED: A, B)

LED#	Color	Function	Off	On	Blinking
LED A	yellow	LAN 1 status	no Link	Link no Activity	Link and Activity
LED B	yellow	LAN 1 Speed	10Mb/s	100Mb/s	1Gb/s
LED C	yellow	LAN 2 status	no Link	Link, no Activity	Link and Activity
LED D	yellow	LAN 2 Speed	10Mb/s	100Mb/s	1Gb/s

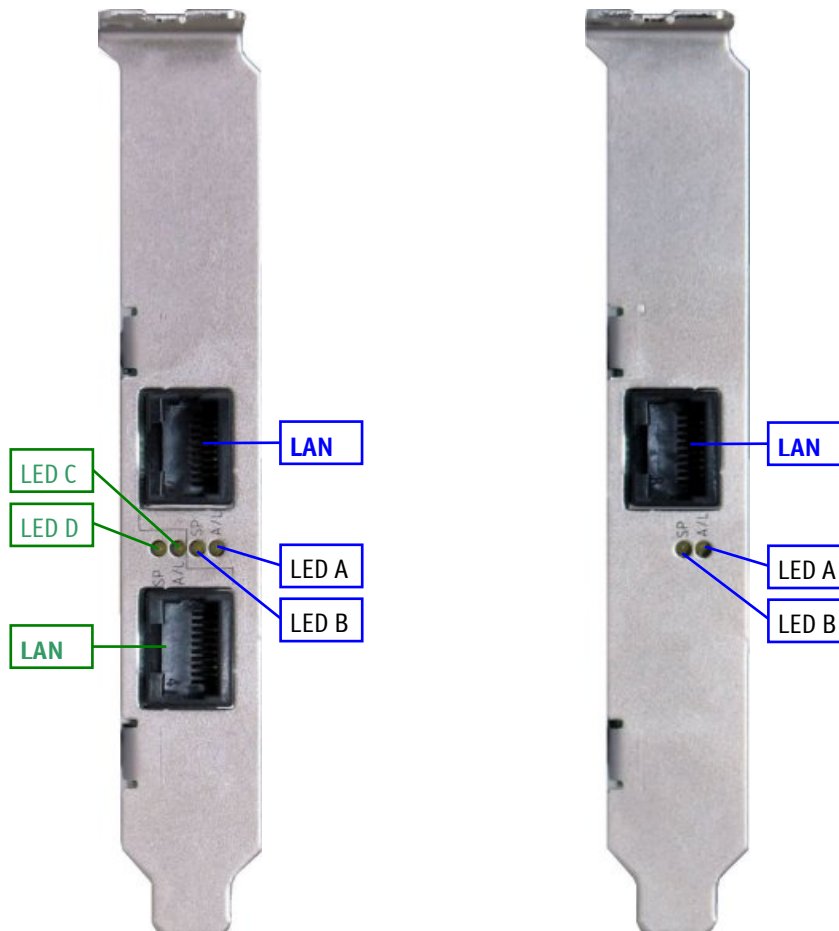


Fig. 9: LEDs of the PCIe Medical (dual / single) LAN Card

6.3.1. Labeling of the Single/Dual Slot Brackets (also for Low Profile Slot Bracket)

SP: Speed

A/L: Activity/Link

6.4. PCIe-Bus Edge Card Connector

The PCIe-Bus connector is a PCIe-Bus x1 card edge connector. It provides the following signals:

This connector has 36-pole, edge-board contacts.

Pin #	Side B (Bottom)			Side A (Top)		
	Name	Direction	Description	Name	Direction	Description
1	+12V	power	12V power	PRSNT1#	0 (connected to PRSNT2#)	Hot-Plug presence detect
2	+12V	power	12V power	+12V	power	12V power
3	+12V	Power (NC)	12V power	+12V	power	12V power
4	GND	power	Ground	GND	power	Ground
5	SMCLK	(NC)	SMBus Clock	JTAG2	(I) (NC)	TCK, clock input for JTAG interface
6	SMDAT	(NC)	SMBus Data	JTAG3	(I) (NC)	TDI
7	GND	power	Ground	JTAG4	(O) (NC)	TDO
8	+3.3V	power	3.3V power	JTAG5	(I) (NC)	TMS
9	JTAG1	(NC)	TRST#, resets the JTAG interface	+3.3V	power	3.3V power
10	3.3Vaux	(NC)	3.3V auxiliary power	+3.3V	power	3.3V power
11	WAKE#	Output	Signal for Link reactivation	PRST#	I	Fundamental reset
Mechanical Key						
12	RSVD	(NC)	reserved	GND	power	Ground
13	GND	power	Ground	REFCLK+	I	
14		I	Transmitter differential pair, Lane0	REFCLK-	I	
15		I		GND	Power	Ground
16	GND	power	Ground	PERp0	0	
17		I	Hot-plug presence detect	PERn0	0	
18			Ground	GND	power	Ground

I: (connected to PRSNT1#)

O: (connected to PRSNT2#)

NC: not connected

6.5. Mechanical Design

The PCIe Medical (Dual/Single) LAN Card is a low profile (half length and half height) card with standard or low profile (included) brackets, which offers flexibility in the configuration and expansion of a computer (desktop PC or server).

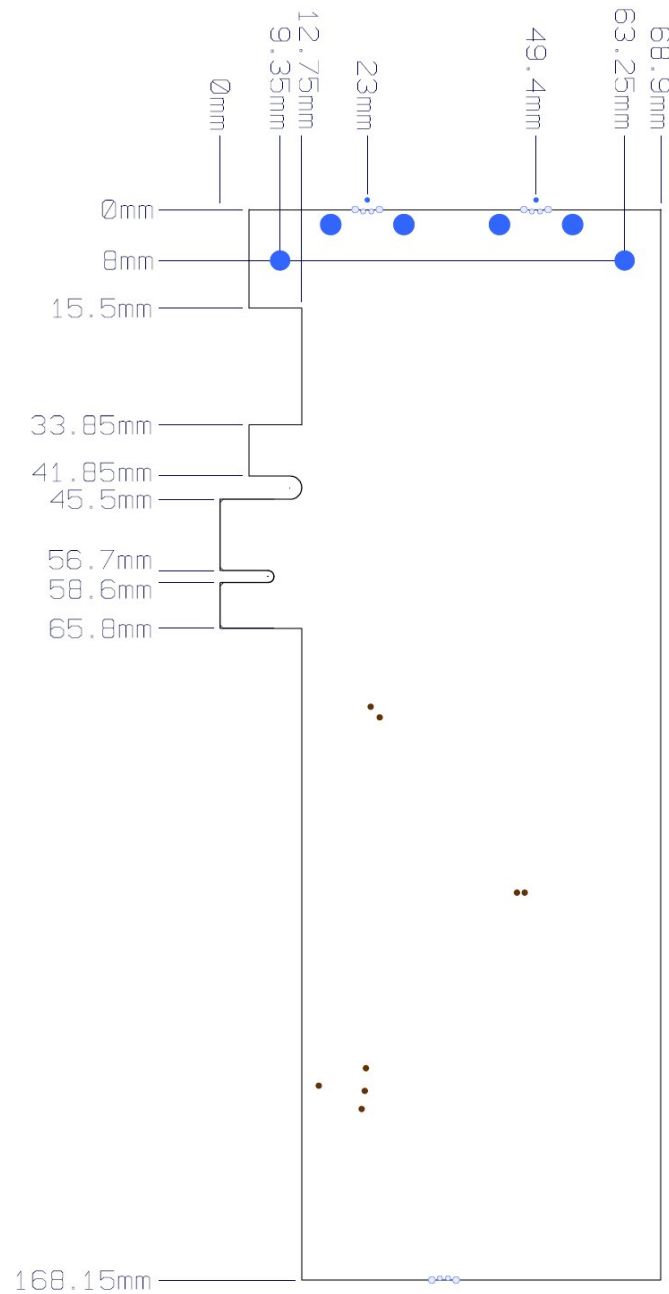


Fig. 10: PCIe Medical LAN Card -PCB - mechanical dimensions

6.6. System Requirements

- Minimum CPU clock recommended: 1GHz (with Intel® Pentium® III comparable)
- an available PCIe slot (e.g. x1, x4, x8 and x16) compliant with PCIe bus specification 2.0, which allows the system expansion
- a CD-ROM drive
- corresponding cables
- Operating systems supported: refer to the download center for LAN controller Intel® 82574L on the web side:
www.intel.com

7. Installation



Please observe the safety instruction for handling assemblies with static sensitive device [refer to the chapter 4.1 "Electrostatic Discharge (ESD)"].

Failure to take heed of this warning instruction can result in damage to the device.

7.1.1. Adapt the PCIe Medical LAN Card (Dual/Single) to a Low Profile Card

If the PCIe Medical LAN Card (Dual/Single) is needed as a low profile card, you can replace the standard height bracket attached, with the corresponding low profile slot bracket (included).

In order to adapt the PCIe Medical LAN Card (Dual/Single) to a low profile card follow these steps:

1. Loosen and remove the screws that secure the slot bracket (refer to Fig. 5 and Fig. 7). Retain the screws for later use.
2. Remove the bracket (standard height). Retain it for later use.
3. Mount the low profile slot bracket (included) to the card and secure it with the retained screws.

7.1.2. Installation of the PCIe Medical LAN Card (Dual/Single)

The PCIe Medical LAN Card (Dual/Single) can be installed only in computers with available PCIe slots (e.g. x1, x4, x8 or x16) for system extension.

In order to install the PCIe Medical LAN Card (Dual/Single) follow these steps:

1. Shut down your application.
2. Turn off the computer and the peripherally devices (printers, monitors, scanner etc.) connected to the computer. Disconnect them from the mains power.
3. To gain access to the free PCIe x1 slot (component of the installed, motherboard, SBC, backplane, riser card), remove the cover of the computer (refer to the user's guide of your computer).
4. Locate the unused PCIe expansion slot.
5. Remove the metal slot bracket covering the free chassis card slot.
6. Align the PCIe x1 connector with the PCIe slot of the base board. Carefully insert the card and press until all the edge connectors are firmly seated inside the slot.



Do not act with force when inserting the card. If this seems to be necessary, the card is not inserted properly into the slot. Remove the card from the slot and re-insert it with care.

7. Position the card into the corresponding socket that was covered by metal bracket previously.
8. Secure the card slot bracket to the chassis using a screw with proper size.
9. Replace the cover and secure it to the chassis (refer to the user's guide of your computer).
10. Connect the Ethernet cable (not included) to the RJ45 connector of the PCIe Medical LAN Card.



The shield of the ethernet cable is isolated to ground /earth at the LAN interface from PCIe Medical LAN Card (Single or Dual).

Therefore the shield of the ethernet cable shall be connected to ground or earth on the peripheral side (f.e. LAN- hub or ethernet-switch).

EMC disturbances as high frequent transients (Burst) have an influence of the LAN transmission performance, because connected peripherals may be sensitive to such EMC signals. These influences should be considered in the risk analysis from the medical device according ISO 14971 if connected.

8. Main Specifications

PCIe Medical LAN Card	PCIe Medical LAN Card (Single)	PCIe Medical Dual LAN Card
Chipset	1x Intel® 82574L Ethernet Controller	2x Intel® 82574L Ethernet Controller
LAN Interfaces	<ul style="list-style-type: none"> • one isolated Ethernet 1000Base-T port as RJ45 female, complying with the standard IEC60601-1, 2nd edition, • unshielded connector; 	<ul style="list-style-type: none"> • two isolated Ethernet 1000Base-T ports as RJ45 female, complying with the standard IEC60601-1, 2nd edition • unshielded connectors;
LED Indicators	1x LAN status LED 1x LAN speed LED	2x LAN status LED 2x LAN speed LED
BusType	PCIe x1 (PCIe Spezification Version 2.0); One Lane; Data Rate: 250 MByte/s per direction	
Data Transfer Rate	10/100/1000 Mb/s	
Mechanical Dimension (PCB)	Delivered with standard slot bracket attached: 168.15mm (half length) x 68.9mm (half height); [6.62" (half length) x 2.713" (half height)]	
Weight	Max. 74 g (0.163 lbs)	
Connectivity Media	UTP CAT5, CAT6, CAT7 (This cable must be connected to Ground or Earth on the other end (refer to chapter 6.2 "LAN Port/s")	

8.1. Environmental Specifications

Operating temperature / relative humidity	with minimum 1m/s forced air flow: 0°C ... +60 °C / 15-90 % / non condensing; (32 ... 140 °F / 15-90 % / non condensing) with passive cooling (assembled in vertical position) 0°C ... +45°C / 15-90 % / non condensing; (32 ... 113 °F / 15-90 % / non condensing;
Storage / transit temp. / relative humidity	-20 ... +70 °C / 15-95 % non condensing (-4 ... 158 °F / 15-95 %) not condensing
Operating and Storage / Transit altitude	-500 ... 3000 m (1640.5 ... 9843 ft)
Air Pressure	1100 hPa ... 700 hPa

8.2. CE Directives and Standards

CE Directives	
Electrical Safety	General Product Safety Directive (GPSD) 2001/95/EC Low Voltage Directive (LVD) 2006/95/EC
ElectroMagnetic Compatibility (EMC)	EMC Directive 2004/108/EC

Electrical Safety	Harmonized Standards
EUROPE	Information technology equipment - Safety - Part 1: General requirements EN 60950-1: 2006
U.S.A. / CANADA	UL 60950-1:2006 cULus recognized

EMC	Harmonized Standards
EU	Generic emission standard for industrial environments (Emission): EN EN 55022 and EN 55011 class B Generic standards - Immunity for industrial environments (Immunity): EN 61000-6-2:2005; EN 60601-1-2 (EMC of medical devices)
U.S.A.	FCC 47 CFR Part 15, Class A
CANADA	ICES-003, Class A

9. Technical Support

For technical support, please contact our Technical Support department.

German headquarter Hotline:

TEL: (+49) 8165-77 112

FAX: (+49) 8165-77 110

E-mail: support@kontron.com

Make sure you have the following on hand when you call:

- the unit part id number (P/No #),
- and the serial number (S/No #) of the unit (provide the serial number found on the label, placed on the rear side of the board).

Be ready to explain the nature of your problem to the service technician.

If you have any questions about Kontron Embedded Computers or our products and services, you may reach us at the aforementioned numbers, or at: www.kontron.com or by writing to:

Kontron Embedded Computers GmbH

Oskar-von-Miller-Str. 1

85386 Eching

Germany

9.1. Returning Defective Merchandise

Before returning any merchandise please:

1. Contact our Service and request an RMA number (Return Material Authorization) by:
Fax: (+49) 8165-77 412
E-mail: service@kontron.com
2. Make sure to receive an RMA number from Kontron Embedded Computers-Service before returning any merchandise. Clearly write or mark this number on the outside of the package you are returning.
3. Describe the device failure behavior as precisely as possible.
4. When returning goods, include the name and telephone number of a person whom we can contact for further explanations if necessary. Where applicable, always include all duty papers and invoice(s) associated with the item(s) in question.
5. When returning a unit:
 - Ensure that the unit is properly packed in the original box,
 - include a copy of the RMA form.

Corporate Offices

Europe, Middle East & Africa	North America	Asia Pacific
Oskar-von-Miller-Str. 1 85386 Eching/Munich Germany Tel.: +49 (0)8165/ 77 777 Fax: +49 (0)8165/ 77 219 info@kontron.com	14118 Stowe Drive Poway, CA 92064-7147 USA Tel.: +1 888 294 4558 Fax: +1 858 677 0898 info@us.kontron.com	17 Building,Block #1,ABP. 188 Southern West 4th Ring Beijing 100070, P.R.China Tel.: + 86 10 63751188 Fax: + 86 10 83682438 info@kontron.cn

