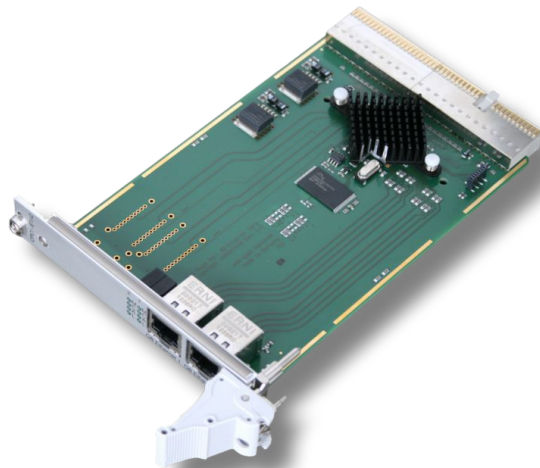




CPCI-ETH2

10/100/1000BASE-T Interface for CompactPCI®



Hardware Manual

to Product I.2321.02



NOTE

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Document History

The changes in the document listed below affect changes in the hardware as well as changes in the description of the facts, only.

Rev.	Chapter	Changes versus previous version	Date
1.0	-	First English version	2005-07-05
1.1	-	The CPCI-ETH2-FX and CPCI-ETH2-MX versions are deleted, manual restructured, Safety Instructions inserted	2015-09-28
	1.	Block circuit diagram new, "Front Panel View" with LEDs and Connectors"	
	2.	Chapter "Hardware Installation" revised	
	3.	Chapter "Technical Data", description of Fibre Optic Interface deleted	
	4.	Note inserted	
	5.	EU-Declaration of Conformity inserted	
	6.	Chapter "Order Information" moved and revised	

Technical details are subject to change without further notice.



Safety Instructions

- When working with the CPCI-ETH2 follow the instructions below and read the manual carefully to protect yourself from injury and the CPCI-ETH2 from damage.
- The device is a built-in component. It is essential to ensure that the device is mounted in a way that cannot lead to endangering or injury of persons or damage to objects.
- The device has to be securely installed in the control cabinet before commissioning.
- Protect the CPCI-ETH2 from dust, moisture and steam.
- Protect the CPCI-ETH2 from shocks and vibrations.
- The CPCI-ETH2 may become warm during normal use. Always allow adequate ventilation around the CPCI-ETH2 and use care when handling.
- Do not operate the CPCI-ETH2 adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature as specified in the technical data.
- Do not use damaged or defective cables to connect the CPCI-ETH2 and follow the CAN wiring hints in chapter: "Correctly Wiring Electrically Isolated CAN Networks".
- In case of damages to the device, which might affect safety, appropriate and immediate measures must be taken, that exclude an endangerment of persons and domestic animals and property.
- Current circuits which are connected to the device have to be sufficiently protected against hazardous voltage (SELV according to EN 60950-1).
- The CPCI-ETH2 may only be driven by power supply current circuits, that are contact protected.
A power supply, that provides a safety extra-low voltage (SELV or PELV) according to EN 60950-1, complies with this conditions.



DANGER

Hazardous Voltage - Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages inside of the system into which the CPCI-ETH2 is to be integrated.

- ▶ Disconnect all hazardous voltages (mains voltage) before opening the system.



NOTICE

Electrostatic discharges may cause damage to electronic components.

To avoid this, please perform the steps described on page 10 *before* you touch the CPCI-ETH2, in order to discharge the static electricity from your body.

Qualified Personal

This documentation is directed exclusively towards personal qualified in control and automation engineering.

The installation and commissioning of the product may only be carried out by qualified personal, which is authorized to put devices, systems and electric circuits into operation according to the applicable national standards of safety engineering.

Conformity

The CPCI-ETH2 is an industrial product and meets the demands of the EU regulations and EMC standards printed in the conformity declaration at the end of this manual.

Warning: In a residential, commercial or light industrial environment the CPCI-ETH2 may cause radio interferences in which case the user may be required to take adequate measures.

Data Safety

This device is equipped with an Ethernet or other interface which is suitable to establish a connection to data networks. Depending on the software used on the device, these interfaces may allow attackers to compromise normal function, get illegal access or cause damage.

esd does not take responsibility for any damage caused by the device if operated at any networks. It is the responsibility of the device's user to take care that necessary safety precautions for the device's network interface are in place.

Intended Use

The intended use of the CPCI-ETH2 is the operation as Ethernet interface in a CompactPCI system.

The guarantee given by esd does not cover damages which result from improper use, usage not in accordance with regulations or disregard of safety instructions and warnings.

- The CPCI-ETH2 is intended for installation in a CompactPCI system only.
- The operation of the CPCI-ETH2 in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the CPCI-ETH2 for medical purposes is prohibited.

Service Note

The CPCI-ETH2 does not contain any parts that require maintenance by the user. The CPCI-ETH2 does not require any manual configuration of the hardware.

Disposal

Devices which have become defective in the long run have to be disposed in an appropriate way or have to be returned to the manufacturer for proper disposal. Please, make a contribution to environmental protection.

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Typographical Conventions

Throughout this design specification the following typographical conventions are used to distinguish technical terms.

Convention	Example
File and path names	<code>/dev/null</code> Or <code><stdio.h></code>
Function names	<code><i>open()</i></code>
Programming constants	<code>NULL</code>
Programming data types	<code>uint32_t</code>
Variable names	<code><i>Count</i></code>

The following indicators are used to highlight noticeable descriptions.



Attention:

Warnings or cautions to tell you about operations which might have unwanted side effects.



Note:

Notes to point out something important or useful.

Number Representation

All numbers in this document are base 10 unless designated otherwise. Hexadecimal numbers have a prefix of 0x, and binary numbers have a prefix of 0b. For example, 42 is represented as 0x2A in hexadecimal and 0b101010 in binary.

Abbreviations

API	Application Programming Interface
CAN	Controller Area Network
CPU	Central Processing Unit
CiA	CAN in Automation
HW	Hardware
I/O	Input/Output
LSB	Least Significant Bit
MSB	Most Significant Bit
n.a.	not applicable
OS	Operating System
SDK	Software Development Kit

1. Overview

1.1 Description of the CPCI-ETH2

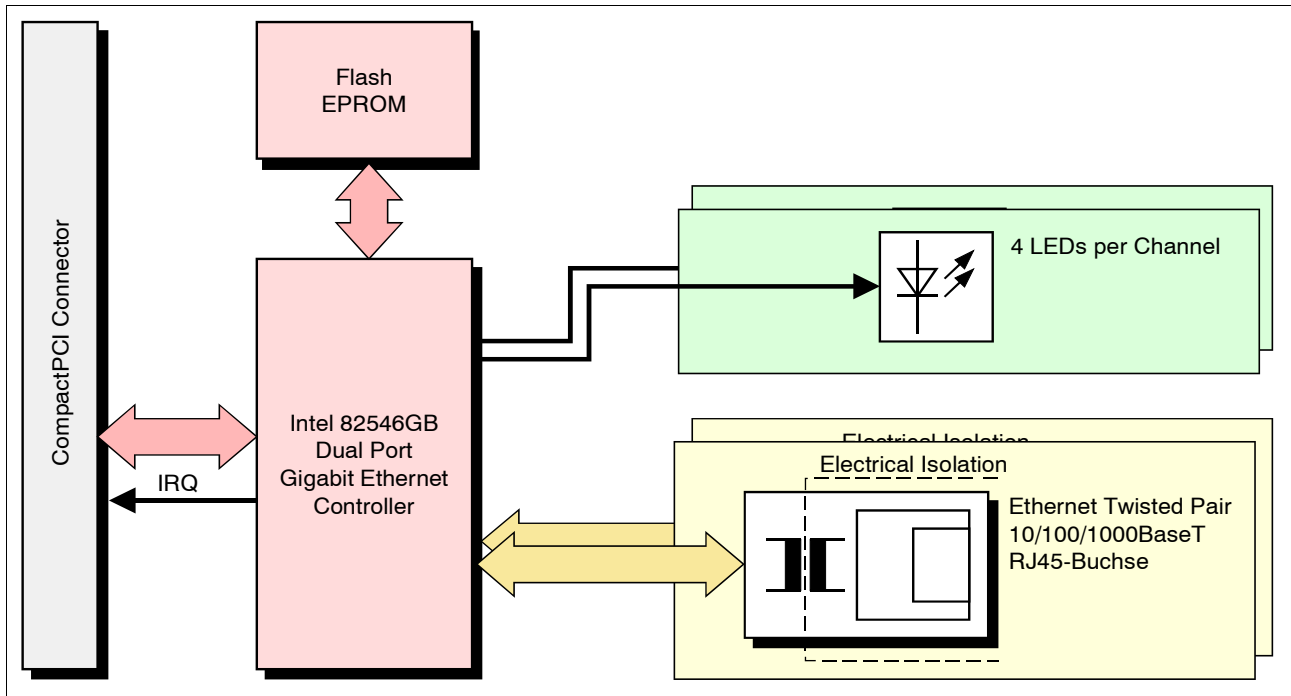


Figure 1: Block circuit diagram

The CPCI-ETH2 is a CompactPCI board in Euro format. The Intel 82546GB Gigabit controller provides two Gigabit ports on a single compact component. Both Gigabit Ethernet ports are equipped as two 10/100/1000BASE-T Ethernet interfaces.

The CPCI-ETH2-module operates with standard Ethernet drivers.

The Ethernet interfaces for 10/100/1000BASE-T-networks are easily accessible via RJ45-sockets in the front panel. The interfaces are electrically isolated from the Ethernet controller.

LEDs in the front panel indicate the status of the CPCI-ETH2.

1.2 Front Panel View with LEDs and Connectors

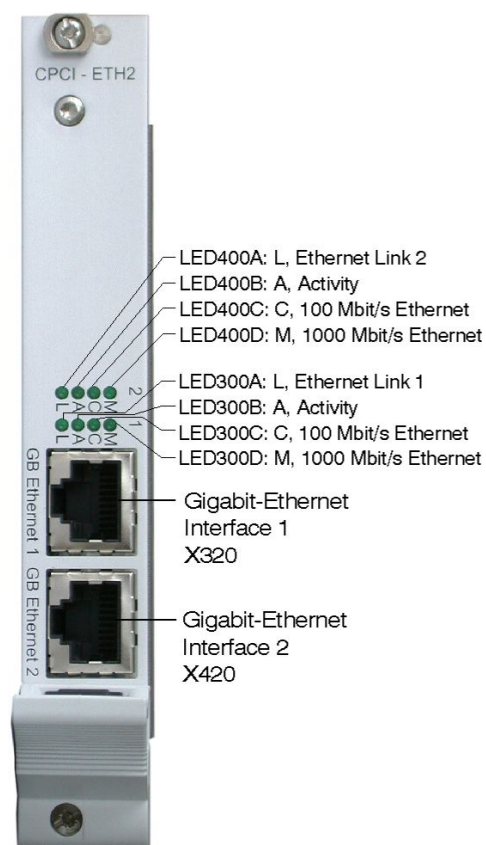


Figure 2: Connectors and LEDs

1.3 LED Indication

Interface	LED	Name	Colour	Indication of the LED (LED on)	LED name in schematic diagram
GB-Ethernet 2	L	Ethernet Link 2	green	Link Status-Ethernet 2 (10/100/1000BaseT) (Link to server or hub detected)	LED400A
	A	Activity	green	Activity, access of Ethernet 2 to the Dual Gigabit Ethernet controller 82546GB	LED400B
	C	100 Mbit/s Ethernet	green	Speed 100 (C) Status Ethernet 2, interface operates with a bit rate of 100 Mbit/s. (at 10/1000 Mbit/s LED off).	LED400C
	M	1000 Mbit/s Ethernet	green	Speed 1000 (M) Status Ethernet 2, interface operates with a bit rate of 1000 Mbit/s. (at 10/100 Mbit/s LED off).	LED400D
GB-Ethernet 1	L	Ethernet Link 1	green	Link Status-Ethernet 1 (10/100/1000BaseT) (Link to server or hub detected)	LED300A
	A	Activity	green	Activity, access of Ethernet 1 to the Dual Gigabit Ethernet controller 82546GB	LED300B
	C	100 Mbit/s Ethernet	green	Speed 100 (C) Status Ethernet 1, interface operates with a bit rate of 100 Mbit/s. (at 10/1000 Mbit/s LED off).	LED400C
	M	1000 Mbit/s Ethernet	green	Speed 1000 (M) Status Ethernet 1, interface operates with a bit rate of 1000 Mbit/s. (at 10/100 Mbit/s LED off).	LED300D

Table 1: Description of LEDs

2. Hardware Installation



Read the safety instructions at the beginning of this document carefully, before you start with the hardware installation!



DANGER

Hazardous Voltage - Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages inside of the system into which the CPCI-ETH2 is to be integrated.

► Disconnect all hazardous voltages (mains voltage) before opening the system.



NOTICE

Electrostatic discharges may cause damage to electronic components. To avoid this, please discharge the static electricity from your body by touching the metal case of the CompactPCI system *before* you touch the CPCI-ETH2.

Furthermore, you should prevent your clothes from touching the CPCI-ETH2, because your clothes might be electrostatically charged as well.

Procedure:

1. Switch off your CompactPCI system and all connected peripheral devices (monitor, printer, etc.).
2. Discharge your body as described above.
3. Disconnect the CompactPCI system from the mains.



DANGER

Hazardous Voltage - Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages inside of the system into which the CPCI-ETH2 is to be integrated.

► Disconnect all hazardous voltages (mains voltage) before opening the system.

If the system does not have a flexible mains cable, but is directly connected to mains, disconnect the power supply via the safety fuse and make sure that the fuse cannot switch on again unintentionally (e.g. with caution label).

4. Insert the CPCI-ETH2 board into a free CompactPCI slot. Carefully push the board until it snaps into place.
5. Fix the CPCI-ETH2 module with the mounting screws in the front panel.
7. Connect the Ethernet cables (10/100/1000BASE-T) to the RJ45-sockets in the front panel of the CPCI-ETH2.
8. Connect the CompactPCI system to mains again (mains connector or safety fuse).
9. Switch on the CompactPCI system and the peripheral devices.
10. End of hardware installation.
11. Now you can install the Gigabit Ethernet interface. Refer to the documentation of your operating system.

3. Technical Data

3.1 General Technical Data

Power supply voltage	via CompactPCI bus, nominal voltages: 5 V ± 5% and 3.3 V ± 5% current consumption: max. 0.75 A at 3.3V
Connectors	X100 (132-pin post connector) - CompactPCI-board connector P1 X101 (132-pin post connector) - CompactPCI-board connector P2 X320 (8-pin RJ45-socket) - Ethernet Twisted Pair, 10/100/100BASE-T X420 (8-pin RJ45-socket) - Ethernet Twisted Pair, 10/100/1000BASE-T
Temperature range	0...50 °C ambient temperature
Humidity	max. 90%, non-condensing
Dimensions	100 mm x 160 mm (without connectors)
Weight	165 g

Table 2: General data of the module

3.2 CompactPCI Bus

Host bus	PCI-Bus according to PCI Local Bus Specification 2.3
PCI-data/ address bus	64 Bit
Controller	Intel 82546GB
Interrupt	Interrupt signal A, B
Board dimensions	according to CompactPCI-Specification, Rev. 1.0
Connectors	
Connector coding	Universal-Board (3.3 V or 5 V signalling voltage) not keyed

Table 3: Data of the CompactPCI Bus

3.3 Ethernet Interface

Number of Ethernet interfaces	2
Bit rate	10Mbit/s, 100 Mbit/s, 1000 Mbit/s
Connection	Twisted Pair (compatible to IEEE 802.3), 10BASE-T, 100BASE-TX, 1000BASE-T
Electrical isolation	via transformer integrated in the connector
Connector	RJ-45-sockets in the front panel

Table 4: Data of the Ethernet interface

3.4 Software Support

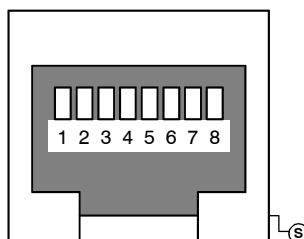
The CPCI-ETH2-module operates with standard system drivers of Windows NT/2000, Linux, VxWorks and QNX.

4. Connector Assignments

4.1 Ethernet

Device connector: RJ45 socket, 8-pin

Pin Position:



Pin Assignment:

Pin	Signal	Meaning
1	MDI0+ (TxD+)	Transmit Data +
2	MDI0- (TxD-)	Transmit Data -
3	MDI1+ (RxD+)	Receive Data +
4	MDI2+	-
5	MDI2-	-
6	MDI1- (RxD-)	Receive Data -
7	MDI3+	-
8	MDI3-	-
S	Shield	

Signal Description:

MDIx+/- ...	Ethernet data lines
- ...	reserved for future applications, do not connect!
Shield...	case shield, connected with the front panel of the CPCI-ETH2.



Note:

Cables of category CAT-5e SF/UTP or higher have to be used to grant the function in networks with 1000 Mbit/s.

esd grants the EC conformity of the product, if the wiring is carried out with shielded twisted pair cables.

5. EU Declaration of Conformity

EU-KONFORMITÄTSERKLÄRUNG EU DECLARATION OF CONFORMITY



Adresse **esd electronic system design gmbh**
Address **Vahrenwalder Str. 207**
30165 Hannover
Germany

esd erklärt, dass das Produkt
esd declares, that the product

CPCI-ETH2 Dual 10/100/1G BaseT Ethernet

Typ, Modell, Artikel-Nr.
Type, Model, Article No.

I.2321.02

die Anforderungen der Normen
fulfills the requirements of the standards

EN 61000-6-2:2005,
EN 61000-6-4:2007+A1:2011

gemäß folgendem Prüfbericht erfüllt.
according to test certificate.

H-K00-0359-09,
H-Z01-0359-13

Das Produkt entspricht damit der EU-Richtlinie „EMV“
Therefore the product conforms to the EU Directive 'EMC'

2014/30/EU

Das Produkt entspricht der EU-Richtlinie „RoHS“
The product conforms to the EU Directive 'RoHS'

2011/65/EU

Diese Erklärung verliert ihre Gültigkeit, wenn das Produkt nicht den Herstellerunterlagen entsprechend eingesetzt und betrieben wird, oder das Produkt abweichend modifiziert wird.
This declaration loses its validity if the product is not used or run according to the manufacturer's documentation or if non-compliant modifications are made.

Name / Name T. Ramm
Funktion / Title CE-Koordinator / CE Coordinator
Datum / Date Hannover, 2015-02-12

Rechtsgültige Unterschrift / authorized signature

6. Order Information

Type	Properties	Order No.
CPCI-ETH2	Dual 10/100/1000BASE-T Ethernet CompactPCI 3U/4HP card with 2 Ethernet interfaces	I.2321.02

For detailed information about the driver availability of your special operating system, please contact our sales team.

Table 5: Order information

PDF Manuals

Manuals are available in English, see table below.

Please download the manuals as PDF documents from our esd website www.esd.eu for free.

Manuals		Order No.
CPCI-ETH2-ME	Hardware manual in English	I.2321.21

Table 6: Available manuals

Printed Manuals

If you need a printout of the manual additionally, please contact our sales team: sales@esd.eu for a quotation. Printed manuals may be ordered for a fee.