



PMC-CAN/400-4

4x CAN with ARINC Protocol + IRIG-B



Hardware Manual

to Products C.2047.01, C.2047.03



NOTE

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This manual contains important information and instructions on safe and efficient handling of the PMC-CAN/400-4. Carefully read this manual before commencing any work and follow the instructions.

The manual is a product component, please retain it for future use.

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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.

Revision	Chapter	Changes versus previous version	Date
1.0	-	First English version	2011-01-12
1.1	-	Safety Instructions revised,	2014-06-25
	4.	Reference to Safety Instructions inserted	
	5.1	Absolute max. power specified, notes inserted	
	5.4	Notes inserted	
	5.5	Availability of the drivers updated	
	6.1	Notes about IRIG-B and cables inserted	
	6.2.3.1, 6.2.3.2	Description of IRIG-B signals supplemented	
	6.3	Chapter about cable changed, description of cable PMC-CAN/400-4-1C4 added, note to FE (functional earth) added	
	7.	Declaration of Conformity updated	
1.2	8.	Chapter 'Order Information' moved and updated	2014-10-01
	1.1, 1.2	Block circuit diagram corrected	
	7.	Declaration of Conformity updated	
1.3	-	Classification of Warning Messages and Safety Instructions inserted,	2016-04-19
	-	C.2047.02 and C.2047.04 on request only, described as customized products	
	1.2, 2.2, 6.2.3.2	Description of "Customized PMC-CAN/400-4 Version (Conduction Cooled)"	
	4.	Warning messages revised	
	5.1	Power supply voltage	
	7.	"Declaration of Conformity" new	
	8.	Order Information of C.2047.02 and C.2047.04 deleted	

Technical details are subject to change without further notice.

Classification of Warning Messages and Safety Instructions

This manual contains noticeable descriptions, warning messages and safety instructions, which you must follow to avoid personal injuries or death and property damage.



This is the safety alert symbol.

It is used to alert you to potential personal injury hazards. Obey all safety messages and instructions that follow this symbol to avoid possible injury or death.

DANGER, WARNING, CAUTION

Depending on the hazard level the signal words DANGER, WARNING or CAUTION are used to highlight safety instructions and warning messages. These messages may also include a warning relating to property damage.



DANGER

Danger statements indicate a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Warning statements indicate a hazardous situation that, if not avoided, could result in death or serious injury.



CAUTION

Caution statements indicate a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

Notice statements are used to notify people on hazards that could result in things other than personal injury, like property damage.



NOTICE

This NOTICE statement indicates that the device contains components sensitive to electrostatic discharge.



NOTICE

This NOTICE statement contains the general mandatory sign and gives information that must be heeded and complied with for a safe use.

INFORMATION



INFORMATION

Notes to point out something important or useful.



Safety Instructions

- When working with the PMC-CAN/400-4 follow the instructions below and read the manual carefully to protect yourself from injury and the PMC-CAN/400-4 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.
- Do not use damaged or defective cables to connect the PMC-CAN/400-4.
- 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 PMC-CAN/400-4 may only be driven by power supply current circuits, that are contact protected. A power supply, that provides a safety extra-low voltage (SELV) according to EN 60950-1, complies with this conditions.

- The device has to be securely installed in the control cabinet before commissioning.
- Protect the PMC-CAN/400-4 from dust, moisture and steam.
- Protect the PMC-CAN/400-4 from shocks and vibrations.
- The PMC-CAN/400-4 may become warm during normal use. Always allow adequate ventilation around the PMC-CAN/400-4 and use care when handling.
- Do not operate the PMC-CAN/400-4 adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature as specified in the technical data.



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 PMC-CAN/400-4 is to be integrated.

- Disconnect all hazardous voltages (mains voltage) before opening the system.
- Ensure the absence of voltage before starting any electrical work



NOTICE

Electrostatic discharges may cause damage to electronic components.

To avoid this, perform the steps described on page 12 *before* you touch the PMC-CAN/400-4, 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 PMC-CAN/400-4 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 PMC-CAN/400-4 may cause radio interferences in which case the user may be required to take adequate measures.

Intended Use

The intended use of the PMC-CAN/400-4 is the operation as PMC-CAN interface on a base board according to IEEE 1386.1-2001.

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 PMC-CAN/400-4 is intended for installation in PMC slots according to IEEE 1386.1-2001.
- The operation of the PMC-CAN/400-4 in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the PMC-CAN/400-4 for medical purposes is prohibited.

Service Note

The PMC-CAN/400-4 does not contain any parts that require maintenance by the user. The PMC-CAN/400-4 does not require any manual configuration of the hardware. Unauthorized intervention in the device voids warranty claims.

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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1. Overview

The PMC-CAN/400-4 is a PMC-CAN interface board with up to 4x CAN and optional ARINC protocol and IRIG-B.

1.1 PMC-CAN/400-4

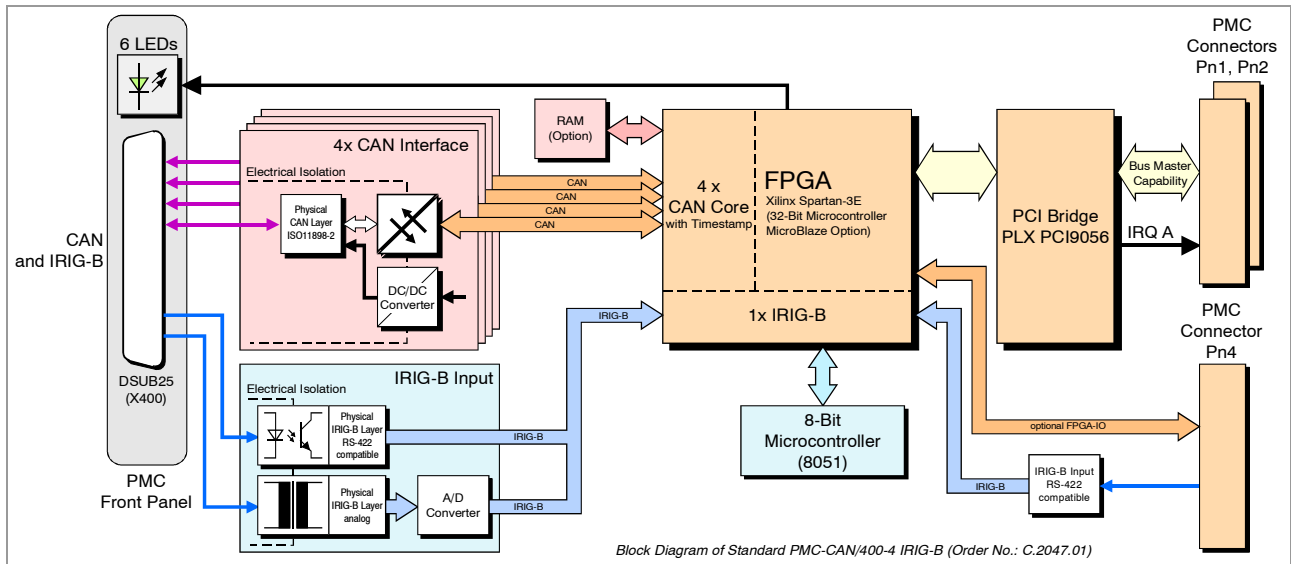


Fig. 1: Block circuit diagram PMC-CAN/400-4 4xCAN, IRIG-B

The PMC-CAN/400-4 features four electrically isolated high-speed CAN interfaces according to ISO 11898. Local data control and management is controlled by an FPGA. Optional the FPGA is available with integrated 32-bit soft microcontroller (MicroBlaze™).

The PMC-CAN/400-4 provides high resolution hardware timestamps.

The optional IRIG-B interface offers inputs for analog or RS-422 compatible IRIG-B coded signals at the front panel. Both are electrically isolated.

Additionally a digital input (RS-422 compatible) for IRIG-B is available at the PMC connector Pn4 (without electrical isolation).

IRIG-B evaluation is controlled by an additional microcontroller.

For the 25-pin DSUB connector in the front panel an adapter cable to 9-pin DSUB connectors for CAN and IRIG-B (analog and RS-422 compatible) is available.

1.2 Customized PMC-CAN/400-4 Version (Conduction Cooled)

i **INFORMATION**
 The customized PMC-CAN/400-4 version with conduction cooling is only available on request. For further information please contact our sales team (sales@esd.eu).

At the conduction cooled PMC-CAN/400-4 version the CAN interfaces are accessible with LVTTTL signal level (3.3 V, not 5 V tolerant) at the PMC connector Pn4 only. The physical layer of the IRIG-B input at Pn4 is RS-422 compatible.

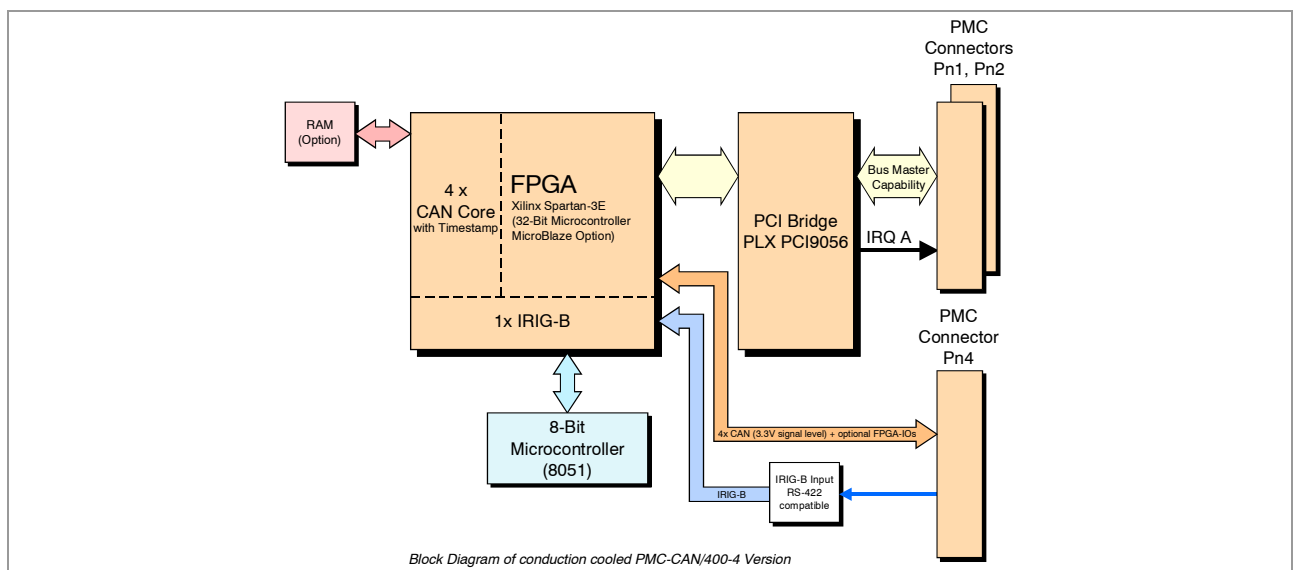


Fig. 2: Block circuit diagram of the conduction cooled PMC-CAN/400-4 version

i **INFORMATION**
 esd offers a VMEbus carrier board in conduction cooled design to carry up to two conduction cooled PMC-CAN/400-4 boards.

2. PCB-View with Connector Position

2.1 PMC-CAN/400-4

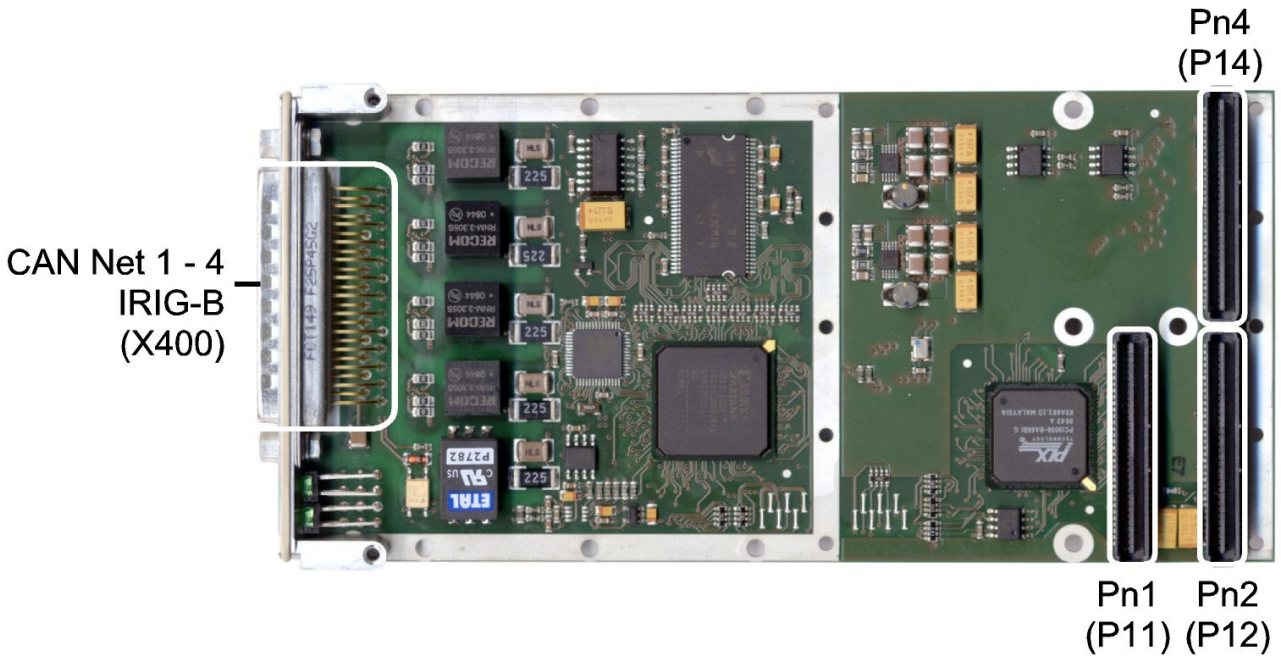


Fig. 3: Top view of PMC-CAN/400-4 facing the carrier board

See also page 17 for signal assignment of the connectors.

2.2 Customized PMC-CAN/400-4 Version (Conduction Cooled)

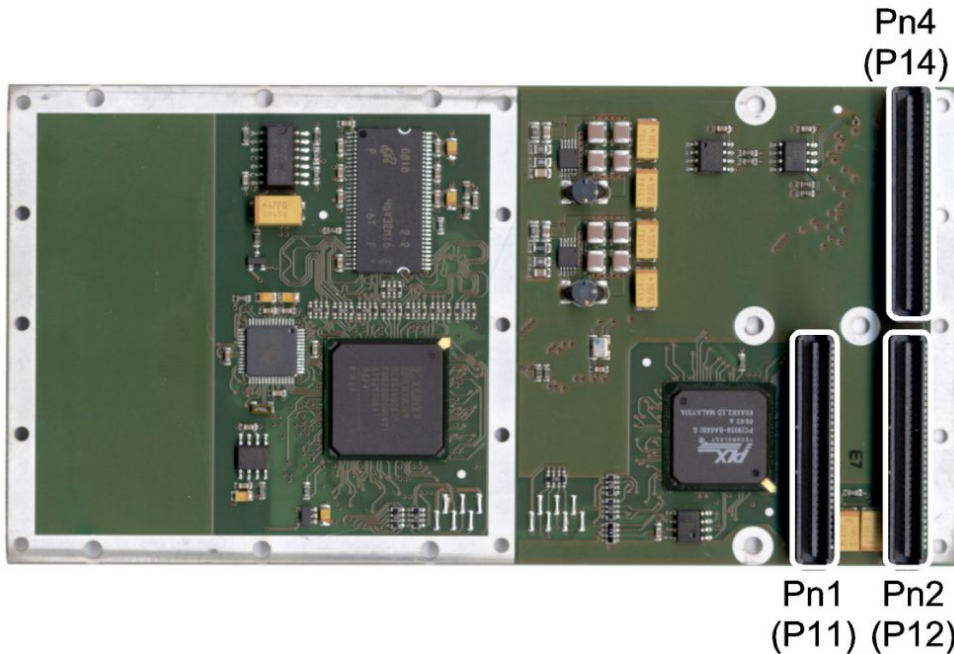


Fig. 4: Top view of the conduction cooled PMC-CAN/400-4 version facing the carrier board

See also page 17 for signal assignment of the connectors.

3. LEDs

The PMC-CAN/400-4 is equipped with 6 green LEDs in the front panel.

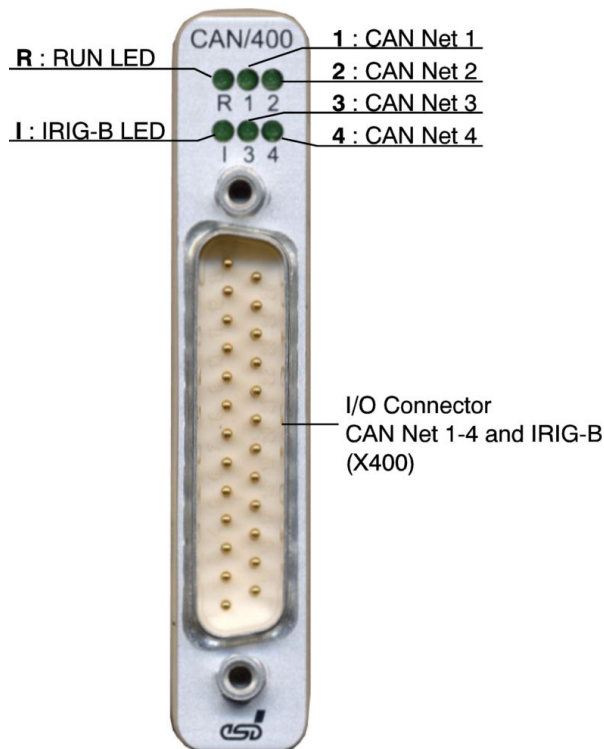


Fig. 5: Front panel view of PMC-CAN/400-4

LED	Function	Indication (LED on)
R	RUN	Board (FPGA) booted
I	IRIG-B	IRIG-B Link
1	CAN1	Traffic on CAN-Line 1
2	CAN2	Traffic on CAN-Line 2
3	CAN3	Traffic on CAN-Line 3
4	CAN4	Traffic on CAN-Line 4

The customized PMC-CAN/400-4 version with conduction cooling does not feature LEDs!

4. Hardware Installation



NOTICE

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 PMC-CAN/400-4 is to be integrated.

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

→ Ensure the absence of voltage before starting any electrical work



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 computer *before* you touch the PMC-CAN/400-4.

→ Furthermore, you should prevent your clothes from touching the PMC-CAN/400-4, because your clothes might be electrostatically charged as well.

Procedure:

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



DANGER

Hazardous Voltage

Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages.

→ 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 (i.e. with caution label).

4. Open the case.
5. A conductive O-ring is contained in the product package of the PMC-CAN/400-4 module (order No.:C.2047.01, .03). Mount the conductive O-ring on the front panel of the PMC-CAN/400-4 to obtain EMC shielding.
6. Remove the carrier board (if already installed) and plug the PMC-CAN/400-4 carefully on the carrier board. Pay attention that the PMC module is correctly installed on the carrier board. Fix the PMC-CAN/400-4 with the screws on the carrier board. Use the four M 2.5 x 6 mm screws which are contained in the product package of the module.
7. Install the carrier board in your system.
8. Close the computer case again.
9. Connect the CAN interfaces and if applicable the IRIG-B via the DSUB25 connector in the front panel of the PMC-CAN/400-4.
10. Connect the computer to mains again (mains connector or safety fuse).
11. Switch on the computer and the peripheral devices.

12. End of hardware installation.
13. Set the interface properties in your operating system. Refer to the documentation of the operating system.

5.2 PCI Bus

Host bus	PCI-Bus according to PCI Local Bus Specification 2.2
PMC specification	IEEE Standard 1386.1-2001
PCI bus master capability	yes
PCI-data bus	32 bit
PCI bus clock rate	33 MHz and 66 MHz
Signalling environment	Universal board, 3.3 V signal level and 5 V signal level
Microprocessor	optional: 32-bit microprocessor in FPGA
Memory	Block RAM: 72 KB optional DRAM: 64 MB
Interrupt	interrupt signal INT A
Connectors	P11 (Pn1), P12 (Pn2), P14 (Pn4) according to IEEE Standard P1386.1-2001

5.3 CAN Interfaces

Number	4x CAN High-Speed
CAN controller	CAN core integrated in FPGA, according to ISO11898-1 (CAN 2.0 A/B)

Module type	PMC-CAN/400-4 IrigB, PMC-CAN/400-4	customized PMC- CAN/400-4 version for extended temperature range	Customized PMC-CAN/400-4 version with conduction cooling
Order no.	C.2047.01, C.2047.03,	- (on request only)	- (on request only)
Physical interface	physical layer in accordance with ISO11898-2, bit rate up to 1 Mbit/s		LVTTL level (3.3V, NOT 5V-tolerant !), bit rate up to 1 Mbit/s
Electrical isolation	via dual digital isolators and DC/DC converters voltage over CAN isolation (CAN to slot bracket/EARTH; CAN to host/system ground; CAN to CAN): 500 V DC @ 1s (I < 1 mA)		none
Bus termination	has to be set externally		none
Connector	X400 (DSUB25 male)		Pn4 (PMC I/O)

5.4 IRIG-B Input

Input / decoder analog	<ul style="list-style-type: none"> - isolating transformer - 12 bit A/D converter - connector: X400 (DSUB25 male) 														
Input digital	<ul style="list-style-type: none"> - RS-422 compatible - connector: X400 (DSUB25 male), electrical isolation 														
	<ul style="list-style-type: none"> - RS-422 compatible - connector: Pn4 														
Coding	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Physical layer</th> <th>IRIG-Coding</th> <th></th> </tr> </thead> <tbody> <tr> <td>analog</td> <td>X400</td> <td>B12x (x = 0...7)</td> <td rowspan="2">+ selectable IEEE1344-1995 format</td> </tr> <tr> <td rowspan="2">digital</td> <td>X400</td> <td rowspan="2">B00x (x = 0...7)</td> </tr> <tr> <td>Pn4</td> </tr> </tbody> </table>			Physical layer		IRIG-Coding		analog	X400	B12x (x = 0...7)	+ selectable IEEE1344-1995 format	digital	X400	B00x (x = 0...7)	Pn4
	Physical layer		IRIG-Coding												
analog	X400	B12x (x = 0...7)	+ selectable IEEE1344-1995 format												
digital	X400	B00x (x = 0...7)													
	Pn4														
<p>For further information read the IRIG-B standard. The document can be downloaded from the IRIGB web site: http://www.irigb.com/.</p>															
Controller	8051														

i INFORMATION
 At the standard module types without conduction cooling the IRIG-B RS-422 compatible input is available at Pn4 as well. Please take attention that the interface is connected alternatively to connector X400 OR Pn4, not simultaneously!

i INFORMATION
 The IRIG-B option is not equipped on the PMC-CAN/400-4, order No.: C.2047.03.

5.5 Software

CAN layer 2 (CAN-API) software drivers are available for Windows®, Linux®, VxWorks®, QNX®, RTX*, RTX64* and OnTime-RTOS-32* supporting up to 24 CAN nets. Drivers for other operating systems are available on request.

The CANopen software package is available for Windows, Linux*, QNX*, RTX* and VxWorks* .

J1939 Stack is available as higher layer protocol for Windows, Linux and RTX.
 ARINC 825 as another higher layer protocol is available as an option.

* For a detailed information about the driver availability for your special operating system please contact our sales team.

6. Connector Assignment

6.1 I/O Connector X400 (DSUB25 male) Pin Assignment

X400			
Signal	Pin		Signal
CAN1_L	1	14	CAN1_H
CAN1_GND	2	15	-
-	3	16	CAN2_L
CAN2_H	4	17	CAN2_GND
-	5	18	-
CAN3_L	6	19	CAN3_H
CAN3_GND	7	20	-
-	8	21	CAN4_L
CAN4_H	9	22	CAN4_GND
-	10	23	-
-	11	24	IRIG-B_RX+
IRIG-B_RX-	12	25	IRIG-B_A+
IRIG-B_A-	13		

Description of Signals at X400

Name	Description
-	This pin is not connected at the module.
CANx_L, CANx_H, CANx_GND	CAN signals of CAN node x (x= 1, 2, 3, 4). Physical layer according to ISO11898-2.
IRIG-B_RX+, IRIG-B_RX-,	IRIG-B input. Physical layer RS-422 compatible.
IRIG-B_A+, IRIG-B_A-,	IRIG-B analog input.



INFORMATION

The IRIG-B option is not equipped on the PMC-CAN/400-4, order No.: C.2047.03. The IRIG-B signals do not apply for this version. The signal assignment of the CAN signals are kept as shown above.



NOTICE

To ensure the EC Conformity shielded cables have to be used. In the adapter cables FE (functional earth) shall be connected to the cable shield. It is recommended to use the cables PMC-CAN/400-4-1C5 or PMC-CAN/400-4-1C4, as described in chapter 'Adapter Cables DSUB25 to DSUB9', page 23.

6.2 PMC Connectors

The PMC-CAN/400-4 module uses the PMC connectors Pn1, Pn2 and Pn4. Pn1 and Pn2 provide the PCI interface and power supply connection. Pn4 has a complete module specific pin out.

6.2.1 PMC Connector Pn1 (P11)

Pn1			
Signal	Pin		Signal
TCK	1	2	-12V
GND	3	4	INTA#
n.c. (INTB#)	5	6	n.c. (INTC#)
GND (BMODE1#)	7	8	+5V
n.c. (INTD#)	9	10	n.c. (reserved)
GND	11	12	+3.3VAUX
PCI-CLK	13	14	GND
GND	15	16	GNT#
REQ#	17	18	+5V
VIO	19	20	AD[31]
AD[28]	21	22	AD[27]
AD[25]	23	24	GND
GND	25	26	C/BE3#
AD[22]	27	28	AD[21]
AD[19]	29	30	+5V
VIO	31	32	AD[17]
FRAME#	33	34	GND
GND	35	36	IRDY#
DEVSEL#	37	38	+5V
GND (XCAP)	39	40	LOCK#
n.c. (SDONE#)	41	42	n.c. (SBO)
PAR	43	44	GND
VIO	45	46	AD[15]
AD[12]	47	48	AD[11]
AD[09]	49	50	+5V
GND	51	52	C/BE0#
AD[06]	53	54	AD[05]
AD[04]	55	56	GND
VIO	57	58	AD[03]
AD[02]	59	60	AD[01]
AD[00]	61	62	+5V
GND	63	64	n.c. (REQ64#)

For signal description please refer to the PCI Local Bus Specification 2.2.

6.2.2 PMC Connector Pn2 (P12)

Pn2			
Signal	Pin		Signal
+12V	1	2	TRST#
TMS	3	4	TDO (bridged to TDI)
TDI (bridged to TDO)	5	6	GND
GND	7	8	n.c. (reserved)
n.c. (reserved)	9	10	n.c. (reserved)
n.c. (MODE2#)	11	12	+3.3V
PCI-RST#	13	14	n.c. (MODE3#)
+3.3V	15	16	n.c. (MODE4#)
n.c. (PME#)	17	18	GND
AD[30]	19	20	AD[29]
GND	21	22	AD[26]
AD[24]	23	24	+3.3V
IDSEL	25	26	AD[23]
+3.3V	27	28	AD[20]
AD[18]	29	30	GND
AD[16]	31	32	C/BE2#
GND	33	34	n.c. (IDSELB)
TRDY#	35	36	+3.3V
GND	37	38	STOP#
PERR#	39	40	GND
+3.3V	41	42	SERR#
C/BE1#	43	44	GND
AD[14]	45	46	AD[13]
M66EN	47	48	AD[10]
AD[08]	49	50	+3.3V
AD[07]	51	52	n.c. (REQB#)
+3.3V	53	54	n.c. (GNTB#)
n.c. (reserved)	55	56	GND
n.c. (reserved)	57	58	n.c. (EREADEY)
GND	59	60	RESETOUT#
n.c. (ACK64#)	61	62	+3.3V
GND	63	64	MONARCH#

For signal description please refer to the PCI Local Bus Specification 2.2.

6.2.3 PMC Connector Pn4 (P14) Pin Assignment

6.2.3.1 PMC-CAN/400-4

Pn4 (P14)

Direction	Signal	Pin		Signal	Direction
n.a.	-	1	2	-	n.a.
n.a.	-	3	4	-	n.a.
n.a.	-	5	6	-	n.a.
n.a.	-	7	8	-	n.a.
n.a.	-	9	10	-	n.a.
n.a.	-	11	12	-	n.a.
n.a.	-	13	14	-	n.a.
n.a.	-	15	16	-	n.a.
tbd.	(FPGA_IO)	17	18	-	n.a.
tbd.	(FPGA_IO)	19	20	-	n.a.
tbd.	(FPGA_IO)	21	22	-	n.a.
tbd.	(FPGA_IO)	23	24	-	n.a.
tbd.	(FPGA_IO)	25	26	-	n.a.
tbd.	(FPGA_IO)	27	28	-	n.a.
tbd.	(FPGA_IO)	29	30	-	n.a.
tbd.	(FPGA_IO)	31	32	-	n.a.
n.a.	-	33	34	(FPGA_IO)	tbd.
n.a.	-	35	36	(FPGA_IO)	tbd.
n.a.	-	37	38	(FPGA_IO)	tbd.
n.a.	-	39	40	(FPGA_IO)	tbd.
n.a.	-	41	42	-	n.a.
n.a.	-	43	44	-	n.a.
tbd.	(FPGA_IO)	45	46	-	n.a.
n.a.	-	47	48	-	n.a.
n.a.	-	49	50	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	51	52	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	53	54	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	55	56	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	57	58	(FPGA_IO)	tbd.
Input	IRIG-B.POS	59	60	(FPGA_IO)	tbd.
Input	IRIG-B.NEG	61	62	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	63	64	(FPGA_IO)	tbd.

Name	Description of Signals at PN4
-	This pin is not connected at the module.
n.a.	not applicable
tbd.	to be defined
(...)	Pins with signal names in brackets are reserved for future use. These signals are not supported at the moment.
IRIG-B.POS, IRIG-B.NEG	IRIG-B digital input. Physical layer RS-422 compatible. The IRIG-B signals are not available on the PMC-CAN/400-4 (order No.: C.2047.03).

6.2.3.2 Customized PMC-CAN/400-4 (Conduction Cooled)

Pn4 (P14)

Direction	Signal	Pin		Signal	Direction
Input	CAN1_RX	1	2	-	n.a.
Output	CAN1_TX	3	4	-	n.a.
Input	CAN2_RX	5	6	-	n.a.
Output	CAN2_TX	7	8	-	n.a.
Input	CAN3_RX	9	10	-	n.a.
Output	CAN3_TX	11	12	-	n.a.
Input	CAN4_RX	13	14	-	n.a.
Output	CAN4_TX	15	16	-	n.a.
tbd.	(FPGA_IO)	17	18	-	n.a.
tbd.	(FPGA_IO)	19	20	-	n.a.
tbd.	(FPGA_IO)	21	22	-	n.a.
tbd.	(FPGA_IO)	23	24	-	n.a.
tbd.	(FPGA_IO)	25	26	-	n.a.
tbd.	(FPGA_IO)	27	28	-	n.a.
tbd.	(FPGA_IO)	29	30	-	n.a.
tbd.	(FPGA_IO)	31	32	-	n.a.
n.a.	-	33	34	(FPGA_IO)	tbd.
n.a.	-	35	36	(FPGA_IO)	tbd.
n.a.	-	37	38	(FPGA_IO)	tbd.
n.a.	-	39	40	(FPGA_IO)	tbd.
n.a.	-	41	42	-	n.a.
n.a.	-	43	44	-	n.a.
tbd.	(FPGA_IO)	45	46	-	n.a.
n.a.	-	47	48	-	n.a.
n.a.	-	49	50	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	51	52	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	53	54	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	55	56	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	57	58	(FPGA_IO)	tbd.
Input	IRIG-B.POS	59	60	(FPGA_IO)	tbd.
Input	IRIG-B.NEG	61	62	(FPGA_IO)	tbd.
tbd.	(FPGA_IO)	63	64	(FPGA_IO)	tbd.

Name	Description of Signals at PN4
-	This pin is not connected at the module.
n.a.	not applicable
tbd.	to be defined
(...)	Pins with signal names in brackets are reserved for future use. These signals are not supported at the moment.
CANx_RX, CANx_TX	CAN signals of CAN node x (x= 1, 2, 3, 4). 3.3 V signal levels only (not 5 V tolerant!)
IRIG-B.POS, IRIG-B.NEG	IRIG-B digital input. Physical layer RS-422 compatible. The IRIG-B signals are not available on the PMC-CAN/400-4 (order No.: C.2047.03).

6.3 Adapter Cables DSUB25 to DSUB9

esd offers the following two adapter cables (see order information on page 28):

- **PMC-CAN/400-4-1C5 (order no. C.2047.18)**

- **PMC-CAN/400-4-1C4 (order no. C.2047.19)**

PMC-CAN/400-4-1C5 (order no. C.2047.18)

This adapter connects the four CAN interfaces and the IRIG-B input to the front panel connector X400. This cable offers one DSUB9 male connector for each CAN interface and one DSUB9 female connector for IRIG-B.

PMC-CAN/400-4-1C4 (order no. C.2047.19)

This adapter only connects the four CAN interfaces to the front panel connector X400. The cable comes with four DSUB9 male connectors for the CAN interfaces.



NOTICE

To ensure the EC Conformity shielded cables have to be used. In this adapter cables FE (functional earth) is connected to the cable shield.

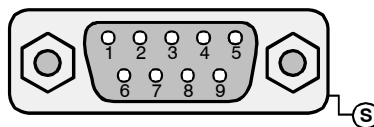
Connector Assignment

DSUB25 Connector		Cable		DSUB9 Connector		Signal Name	
Connector Type	Pin No.	Interface	Wire (internal)	Connector Type	Pin No.		
DSUB25 socket, female	1	CAN1	white	DSUB9 plug, male	2	CAN1_L	
	14		brown		7	CAN1_H	
	2		green		3	CAN1_GND	
	Housing		shield		Housing	FE	
	16	CAN2	white	DSUB9 plug, male	2	CAN2_L	
	4		brown		7	CAN2_H	
	17		green		3	CAN2_GND	
	Housing		shield		Housing	FE	
	6	CAN3	white	DSUB9 plug, male	2	CAN3_L	
	19		brown		7	CAN3_H	
	7		green		3	CAN3_GND	
	Housing		shield		Housing	FE	
	21	CAN4	white	DSUB9 plug, male	2	CAN4_L	
	9		brown		7	CAN4_H	
	22		green		3	CAN4_GND	
	Housing		shield		Housing	FE	
	PMC-CAN/400-4-1C5 (order no. C.2047.18) only:						
	24	IRIG-B	white	DSUB9 socket, female	9	IRIG-B_Rx+	
	12		brown		4	IRIG-B_Rx-	
	25		green		1	IRIG-B_A+	
13	yellow		8		IRIG-B_A-		
Housing	shield		Housing		FE		

CANx-GND are isolated from each other. They are not tied together by the adapter cable.

6.3.1 CAN Interfaces at DSUB9 Male (4x)

Pin Position:



Pin Assignment:

Signal	Pin		Signal
-	1	6	-
CANx_L	2	7	CANx_H
CANx_GND	3	8	-
-	4	9	-
-	5		

FE	S (Shield)
----	---------------

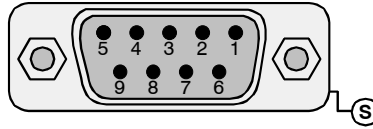
Signal Description:

Name	Description
-	This pin is not connected at the module.
CANx_L, CANx_H, CANx_GND	CAN signals of CAN node x (x= 1, 2, 3, 4). Physical layer according to ISO11898-2.
FE	Functional earth (FE) is connected to the housing of the DSUB9 connector and to the shield of the cable

6.3.2 IRIG-B Analog and RS-422 Compatible Input at DSUB9 Female

The DSUB9 female socket for the IRIG-B interface is only equipped on the cable PMC-CAN/400-4-1C5 (order no. C.2047.18).

Pin Position:



Pin Assignment:

Signal	Pin		Signal
IRIG-B_A+	1	6	-
-	2	7	-
-	3	8	IRIG-B_A-
IRIG-B_RX-	4	9	IRIG-B_RX+
-	5		

FE	S (Shield)
----	---------------

Signal Description:

Name	Description
-	This pin is not connected at the module.
IRIG-B_RX+, IRIG-B_RX-,	IRIG-B input. Physical layer RS-422 compatible.
IRIG-B_A+, IRIG-B_A-,	IRIG-B analog input.
FE	Functional earth (FE) is connected to the housing of the DSUB9 socket and the shield of the cable

7. 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

PMC-CAN/400-4 4xCAN, 1xIrigB
PMC-CAN/400-4 4xCAN

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

C.2047.01
C.2047.03

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-K00-0385-10

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, 2016-04-05

Rechtsgültige Unterschrift / authorized signature

8. Order Information

Type	Description	Order No.
PMC-CAN/400-4 4x CAN, 1xIrigB	Active PMC-CAN Interface Board for PMC up to 66 MHz, 3.3V (5V tolerant), - 4 CAN 2.0A/B interfaces via DSUB-25 connector on front panel, Physical Layer according to ISO 11898, electrically isolated - 1 IRIG-B interface (Input), Physical Layer: RS422 and analog - 6 x status LEDs for CAN, IRIG-B and board status - front panel and EMC shielding O-ring and fixing screws	C.2047.01
PMC-CAN/400-4 4x CAN	Active PMC-CAN interface board for PMC up to 66 MHz, 3.3V (5V tolerant) - 4 CAN 2.0A/B-interfaces via DSUB-25 connector on front panel, Physical Layer according ISO 11898, electrically isolated - 6 x status LEDs for CAN and board status - front panel and EMC shielding O-ring and fixing screws	C.2047.03
CAN layer 2 drivers for Windows and Linux are included in delivery.		
Accessories:		
PMC-CAN/400-4-1C5	Adapter cable DSUB25 female to 4x DSUB9 male (4x CAN)+ 1x DSUB9 female (IRIG-B), length: 0.5 m, to product: C.2047.01	C.2047.18
PMC-CAN/400-4-1C4	Adapter cable DSUB25 female to 4x DSUB9 male (4x CAN), length: 0.5 m, to product C.2047.03	C.2047.19
Software:		
CAN-DRV-LCD CDROM+Lizenz QNX		C.1101.32
CAN-DRV-LCD CDROM+Lizenz RTX		C.1101.35
CAN-DRV-LCD CDROM+Lizenz VxWorks		C.1101.55
CAN-DRV-LCD OnTime-RTOS-32		C.1101.45
CANopen-LCD CDROM+Lizenz Windows/Linux		C.1101.06
CANopen-LCD CDROM+Lizenz QNX		C.1101.17
CANopen-LCD CDROM+Lizenz RTX		C.1101.16
CANopen-LCD CDROM+Lizenz VxWorks		C.1101.18
J1939 Stack for Windows (Object)		C.1130.10
J1939 Stack for Linux (Object)		C.1130.11
J1939 Stack for RTX (Object)		C.1130.12
ARINC825-LCD Windows / Linux		C.1140.06
ARINC825-LCD CDROM+Lizenz QNX		C.1140.17
ARINC825-LCD CDROM+Lizenz RTX		C.1140.16
ARINC825-LCD CDROM+Lizenz VxWorks		C.1140.18
For detailed information about the driver availability for your special operating system, please contact our sales team.		

Table 1: Order information

PDF Manuals

Manuals are available in English and usually in German as well. For availability of English manuals see table below.

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

Manuals		Order No.
PMC-CAN/400-4-ME	PMC-CAN/400-4 Hardware manual in English	C.2047.21
CAN-API-ME	NTCAN-API: Application Developers Manual NTCAN-API: Driver Installation Guide	C.2001.21
CANopen-API-ME	CANopen Manager/Slave Manual	C.2002.21
J1939 Stack ME	J1939 Stack Software Manual	C.1130.21
ARINC825-API-ME	ARINC825-API Software Manual	C.1140.21

Table 2: 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.