

# CPCI-CAN/400-4

## 4x CAN: Layer 2, CANopen or ARINC 825 optional IRIG-B

- 4 high performance CAN interfaces according to ISO 11898-2
- CAN-Layer 2, CANopen or ARINC 825 protocol available
- CAN controlled by esd Advanced CAN Core (esdACC) in FPGA
- All I/O signals via 25-pin DSUB connector in the front panel.

- CompactPCI board in 3U format
- PCI bus according to PCI Local Bus Specification 2.2
- Common API approved at various operating systems

- Error simulation support
- Advanced CAN diagnostic
- IRIG-B input (option)

### CPCI CAN Interface

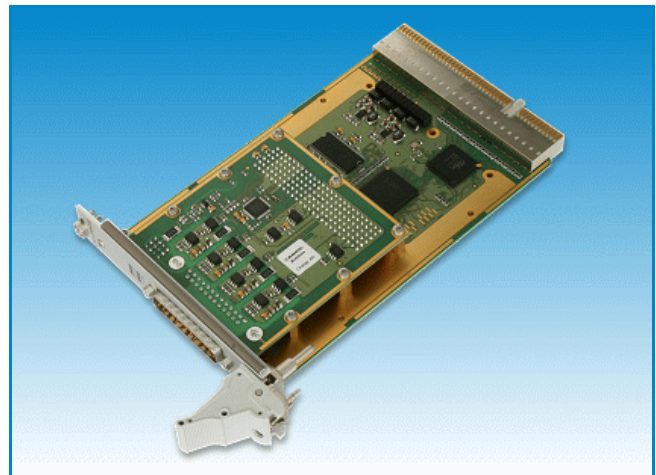
The CPCI-CAN/400-4 is a CompactPCI board in 3U format, that features four electrically isolated CAN High-Speed interfaces according to ISO 11898-2. CAN is driven by the esd Advanced CAN Core (esdACC) CAN controller implemented in the Xilinx Spartan 3e FPGA. The CPCI-CAN/400-4 provides high resolution hardware timestamps.

### IRIG-B

The CPCI-CAN/400-4 IRIG-B features an IRIG-B interface that offers inputs for analog or RS-422 IRIG-B coded signals. Both are electrically isolated. IRIG-B evaluation is controlled by an additional microcontroller. IRIG-B is used directly for CAN timestamping.

### Software Support<sup>1</sup>

CAN layer 2 (CAN-API) software drivers are available for Windows, Linux, VxWorks, QNX and RTX supporting up to 24 CAN nets. The

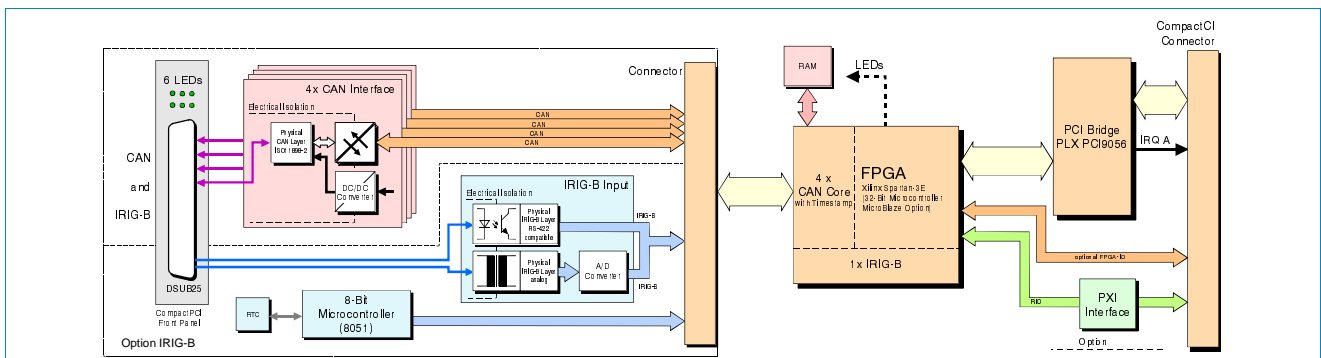


CANopen software package and the ARINC 825 as another higher layer protocol are available for Windows, Linux, VxWorks, QNX and RTX. Drivers for other operating systems are available on request.

### Options

The CPCI-CAN/400-4 optionally features a PXI interface:

The signals TRG 0-7, CLK 10 and STAR are controlled via the FPGA. The signals LBL/LBR1-12 are looped through. An optional 32-bit MicroBlaze  $\mu$ C is available in the FPGA. Please, contact our sales team (sales@esd.eu) for further information.



### Technical Specifications:

CompactPCI Interface and Microprocessor:	
Interface	PCI bus according to PCI Local Bus Specification 2.2, 32 bit 33/66 MHz, 3.3 V (5 V tolerant), PCI bus master capability
Memory	BlockRAM: 72 KB, DRAM: 64 MB
<b>CAN:</b>	
Interface	4x CAN high-speed interface acc. to ISO 11898-2, differential, electrically isolated, bit rate up to 1 Mbit/s
CAN controller	According to ISO 11898-1 (CAN 2.0 A/B)
<b>General:</b>	
Ambient temp.	0 °C ... +50 °C
Rel. humidity	Max. 90 %, non-condensing
Connectors	P1, P2, DSUB25 (male)
Power supply	5 V, 3.3 V
LEDs	CAN status, 1x module status

Order information:		
<b>Hardware</b>		<b>Order No.</b>
CPCI-CAN/400-4 IRIG-B	4x CAN, IRIG-B	C.2034.01
CPCI-CAN/400-4	4x CAN	C.2034.04
<b>Software Support</b>		
CAN layer 2 object licences including CD-ROM <sup>1</sup> :		
CAN-DRV-LCD Windows/Linux		C.1101.02
CAN-DRV-LCD QNX		C.1101.32
CAN-DRV-LCD VxWorks		C.1101.55
CAN-DRV-LCD RTX		C.1101.35
CANopen object licences including CD-ROM <sup>1</sup> :		
CANopen-LCD Windows/Linux		C.1101.06
CANopen-LCD QNX		C.1101.17
CANopen-LCD VxWorks		C.1101.18
CANopen-LCD RTX		C.1101.16
ARINC 825 object licences including CD-ROM <sup>1</sup> :		
ARINC825-LCD Windows / Linux		C.1140.06
ARINC825-LCD QNX		C.1140.17
ARINC825-LCD VxWorks		C.1140.18
ARINC825-LCD RTX		C.1140.16

<sup>1</sup> For detailed information about the driver availability for your operating system please contact our sales team.

# CPCI-CAN/400-4

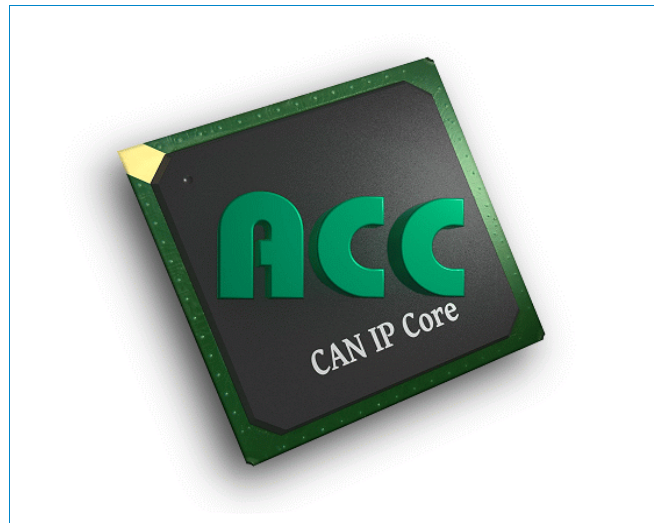
## Driven by esdACC (Advanced CAN Core)

### Basic Product Features:

- CAN ISO 11898-1 protocol compatibility
- 11-bit and 29-bit CAN IDs
- Bit rates from 10kbit/s up to 1 Mbit/s supported
- Receive buffer (64 CAN messages)
- Complete access to CAN error counters
- Programmable error warning limit
- Error code capture register
- Error interrupt for each CAN bus error
- Arbitration lost interrupt with detailed bit position
- Single-shot transmission (no re-transmission)
- Listen only mode (no acknowledge, no active error flags)
- Automatic bit rate detection (software supported bit rate detection)
- Acceptance filter (4-byte code, 4-byte mask)
- Self reception mode (reception of 'own' messages)

### Superior esdACC Features:

- Operating system independently programmable via esd's NTCAN-API
- 32-bit register interface optimized for CAN needs
  - Easy to program
  - Transmission and reception of CAN frames with a minimum of register accesses
- RX and TX timestamping (64-bit wide, bit accurate, resolution may vary with input clock, in any case  $\leq 62.5$  ns, usually 20.833 ns)
  - On hardware with IRIG-B interfaces IRIG-B time is used for timestamping
- TX FIFO (8 CAN frames deep)
  - Providing the means to generate 100% busload even with non-realtime operating systems
  - Providing the means for real back-to-back transmission
- Frame accurate abortion of transmissions with minimum delay
  - e.g. for driver timeouts
  - ISO11898-1 conform
  - Aborted frames in FIFO won't be blocked by low priority TX
- Hardware timer to provide accurate software timeouts beyond operating system accuracy
- Bus mastering in RX direction takes the load off host CPU (needs bus master capable local bus to host interface)
- Optional integration with 32-Bit microcontroller to further relieve host CPU
- Optional different sources for timestamps (e.g. IRIG-B)
- Using FPGA technology provides the option to tailor any feature to any customer's needs, including optional integration with customer's FPGA content
- CAN error injection units
  - Simulating a wide range of error situations on CAN bus, e.g.:
    - ID pollution (100% bus load on certain CAN ID/priority)
    - Defective sensor (Destroying all CAN messages of a given CAN ID)
  - Different trigger modes
    - Bit pattern match
    - Time triggered
    - Immediate regarding CAN arbitration
    - External
  - 'Cross CAN bus triggering' (event on one CAN bus triggers event on another bus)



### Driver Availability:

Windows, Linux, QNX<sup>1</sup>, VxWorks<sup>1</sup>, RTX<sup>1</sup>

<sup>1</sup> For detailed information about the driver availability of your special operating system please contact our sales team.

### Available higher level protocols:

CANopen, ARINC825, J1939

For further information on the esdACC IP Core please contact our sales team.