CAN-PCIeMini/402-2(-FD)

PCI Express® Mini Card with 2 CAN or 2 CAN FD Interfaces

Single Lane PCIe Mini Card with Altera® FPGA for 2x CAN or 2x CAN FD

- 2 CAN or optional 2 CAN FD interfaces according to ISO 11898-2
- Bus mastering and local data management by FPGA
- PCIe® Mini interface according to Mini Card Electromechanical Spec. R1.2
- Supports MSI (Message Signaled Interrupts)
- Full-Mini Card (Type F2) form factor
- Extended operating temperature range version available: -40°C … +85°C

Wide Range of OS Support and Advanced CAN Diagnostic

- Software drivers for Windows® and Linux® included free of charge
- Optional CAN layer 2 software drivers for real-time operating systems
- CANopen®, J1939 and ARINC 825 protocol libraries (Classical CAN mode only)
- ISO 16845:2004 certified esd Advanced CAN Core (esdACC) technology
- High resolution hardware timestamps

Flat Design of CAN Interface Adapter

- Adapter with DSUB9 connector and selectable CAN termination on board

CAN-PCIeMini/402-2
with 2x optional adapter
CAN-PCIeMini/402-DSUB9

Hardware Designs

The CAN-PCIeMini/402-2 is an add-in PCI Express Full-Mini Card, that features two electrically isolated CAN High-Speed interfaces. CAN-PCIeMini/402-2-FD comes with two CAN FD interfaces. The version CAN-PCIeMini/402-2-FD-T can be used for extended temperature range.
The optional adapter CAN-PCIeMini/402-DSUB comes with a DSUB9 connector, selectable on board CAN termination and an adapter cable.
All CAN FD versions are fully backwards compatible with CAN and can also be used in Classical CAN applications.

CAN Data Management

The independent CAN nets are driven by the ISO 16845:2004 certified esdACC (esd Advanced CAN Core) implemented in the Altera FPGA. The FPGA supports bus mastering (first-party DMA) to transfer data to the host memory.
This results in a reduction of overall latency on servicing I/O transactions in particular at higher data rates and a reduced host CPU load.
Due to the usage of MSI (Message Signaled Interrupts) the CAN-PCIeMini/402-2-FD can be operated for example in Hypervisor environments.
The CAN-PCIeMini/402-2-FD provides high resolution 64-bit hardware timestamps for CAN messages.

Software Support

Windows and Linux (NTCAN-API)
The CAN layer 2 drivers for Windows and Linux are included in the scope of delivery.

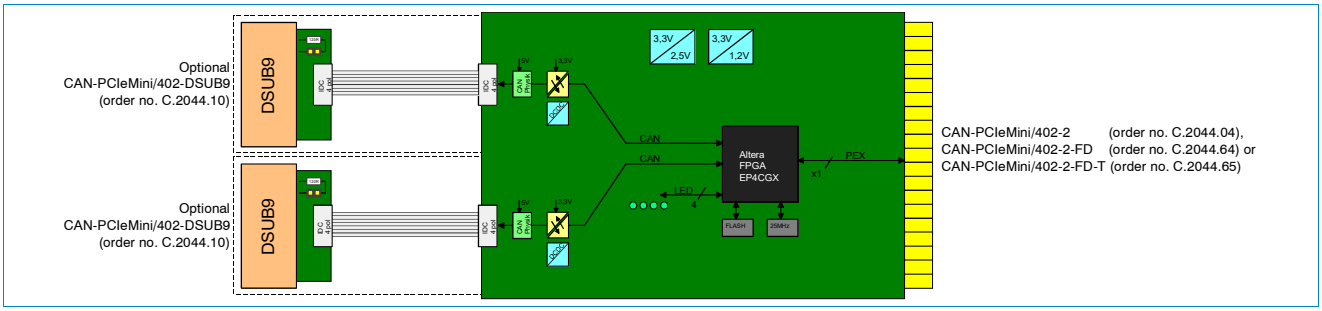
Realtime OS (NTCAN-API)
CAN layer 2 drivers for QNX, RTX(64), VxWorks® and On Time RTOS-32 can be ordered separately.

Higher Layer Protocols
(Classical CAN application only)
Higher Layer Protocols are available for many operating systems (see order info):

- CANopen Master- and Slave-Stack
- J1939
- ARINC825

Customization on Request

Customized options are available for customized series production in reasonable quantities. Please contact our sales team for etailed information.



Technical Specifications:

PCI Express Mini Interface:	
PCIe port	PCI Express Spec. R1.0a, Link width 1x
Form factor	PCI Express® Mini Card Electromechanical Specification, Revision 1.2
CAN:	
Interface	2 interfaces according to ISO 11898-2, electrical isolation, CAN-PCIeMini/402-2: Bit rates from 10 Kbit/s up to 1 Mbit/s, CAN-PCIeMini/402-2-FD: Bit rates from 10 Kbit/s up to 8 Mbit/s
CAN controller	esdACC in EP4CGX Altera FPGA, according to ISO 11898-1:2015
General:	
Ambient temp.	Standard range: 0 °C ... +75 °C (C.2044.04, C.2044.64) Extended range: -40 °C ... +85 °C (C.2044.65)
Rel. humidity	Max. 90 % (non-condensing)
Power supply	3.3 V: 2x CAN, I_{MAX} = 300 mA, I_{TYP} = 220 mA
Dimensions	30 mm x 51 mm
Weight	Board: approximately 15 g; Adapter: approximately 8 g
Connector	PCIe: Mini PCIe card edge connector CAN: 2x Wire-to-board IDC connector, 4 pole; via adapter to: 1x 9-pin DSUB per CAN channel,male

Order Information:

Hardware		Order No.
CAN-PCIeMini/402-2	Active CAN Interface Card for Mini PCI Express, 2x CAN, electrically isolated	C.2044.04
CAN-PCIeMini/402-2-FD	Active CAN Interface Card for Mini PCI Express, 2x CAN FD, electrically isolated	C.2044.64
CAN-PCIeMini/402-2-FD-T	As C.2044.64 but for extended temperature range: -40 °C ... +85 °C	C.2044.65
Accessories		
CAN-PCIeMini/402-DSUB9	Adapter to 1x DSUB9 connector, male, inclusive cable (C.2044.14)	C.2044.10
CAN-PCIeMini/402-Cable	Adapter cable, length: 150 mm	C.2044.14
Software Support[1]		
CAN layer 2 drivers for Windows/Linux are included in delivery free of charge.		
Additional CAN layer 2 object licences including CD-ROM:		
CAN-DRV-LCD QNX		C.1101.32
CAN-DRV-LCD RTX (incl. RTX64)		C.1101.35
CAN-DRV-LCD VxWorks (for Classical CAN operation)		C.1101.55
CAN-DRV-LCD On Time RTOS-32 (for Classical CAN operation)		C.1101.45
Higher CAN layer protocols including CD-ROM for Classical CAN :		
CANopen-LCD Windows/Linux, QNX, RTX or VxWorks		C.1101.xx
J1939 stack for Windows or Linux		C.1130.xx
ARINC 825-LCD for Windows/Linux, QNX, RTX or VxWorks		C.1140.xx

[1] For detailed information about driver availability for your operating system please contact our sales team.

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CAN-PCIeMini/402-2(-FD)

Driven by esdACC-FD (Advanced CAN Core)

Basic Product Features:

- CAN ISO 11898-1:2015 protocol compatibility
- Tested and certified acc. to ISO CAN Conformance Tests "ISO 16845:2004 Road vehicles - Controller area network (CAN) - Conformance test plan"
- 11-bit and 29-bit CAN IDs
- Supported bit rates:
  CAN-PCIeMini/402-2: from 10 kbit/s up to 1 Mbit/s
  CAN-PCIeMini/402-2-FD,
  CAN-PCIeMini/402-2-FD-T: from 10 kbit/s up to 8 Mbit/s
- 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
- Listen only mode (no acknowledge, no active error flags)
- Automatic bit rate detection (hardware supported bit rate detection)
- Self reception mode (reception of 'own' messages)
- Busload measurement

Superior esdACC Features [1]:

- 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 ≤ 62.5 ns, usually 12.5 ns)
  - Timestamping complies with the CiA 603 specification
  - On hardware with IRIG-B interfaces IRIG-B time is used for timestamping
- TX FIFO (16 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
- Timestamped Tx FIFO (16 CAN frames deep)
  - High priority
  - 64 bit timestamp
  - Bit time accuracy for CAN transmission
- Frame accurate abortion of transmissions with minimum delay
  - e.g. for driver timeouts
  - ISO11898-1:2015 conform
  - Aborted frames in FIFO won't be blocked by low priority TX

Superior esdACC Features (continued) [1]:

- 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 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
- The esdACC IP core has been verified on Xilinx® Spartan® and Altera® Cyclone® FPGAs.

[1] Availability of the Superior esdACC Features depends on the operating system. Please contact our sales team for further information.

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

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