CAN-USB/400 with IRIG-B Support
USB to Dual-Channel CAN CC/FD Module with I/Os and IRIG-B

Two High-Speed CAN CC or CAN FD Interfaces for USB
- CAN interfaces according to ISO 11898-2 with galvanic isolation
- Powered by ISO 16845:2004 certified esd Advanced CAN Controller (esdACC)
- Capable of 100 % CAN bus load

Robust and Easy to Handle
- Power supply by USB
- Aluminum case
- USB cable included
- DSUB15 connector for IRIG-B and IOs

Advanced Diagnostics and Timestamping
- Enhanced diagnostic features
- Error injection capabilities with external trigger
- High resolution hardware timestamping synchronized by IRIG-B
- Both CAN ports share common time base

IRIG-B and Additional Features
- Analog and digital IRIG-B inputs
- External trigger I/Os for Error Injection
- Miscellaneous I/Os for customized functionality

Optimized Architecture
The CAN-USB/400 was developed for CAN communication with minimum latency via USB. For this purpose, USB is connected internally via FIFOs and the data management is controlled by the esd Advanced CAN Controller (esdACC).

IRIG-B and Multiple I/Os
The analog and digital IRIG-B inputs provide synchronized timestamps, ideal for use with ARINC825.
External trigger I/Os enable extended error injection functions, and additional I/Os offer a wide range of possible applications.

CAN Interfaces
Two independent CAN ports in accordance with ISO 11898-1 offer extensive options for using the CAN bus. Each port has its own ISO 16845:2004 certified esdACC. Depending on the variant, the interface can send and receive ISO-compliant CAN FD and/or CAN 2.0 A/B messages.
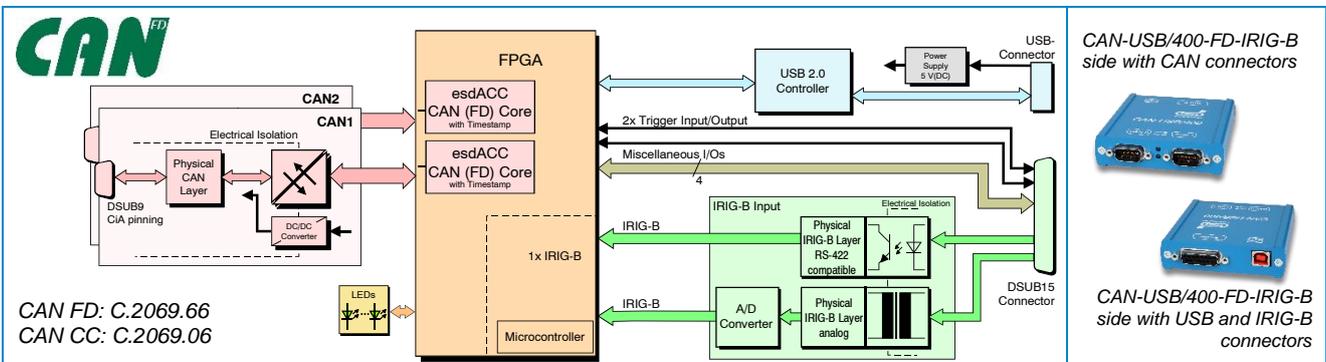
Error Injection Unit
esd has developed error injection technology to simplify the testing of fail-safety, diagnostics and optimization of CAN-based systems. This technology makes it possible to inject error situations into the CAN bus during active operation. Multiple trigger conditions and modes offer flexible and extensive options for sending almost any bit pattern to the CAN bus.

Software Support
esd offers the sophisticated NTCAN-API for accessing the CAN bus via the CAN-USB/400, which provides extensive functions for making the best possible use of the CAN bus. Device drivers and the NTCAN-API for Windows are included. Additional free esd CAN tools for Windows can be downloaded from our website. The tools enable efficient configuration and analysis of CAN applications and networks.

CAN-based Protocols
In addition, esd offers protocol stacks based on the NTCAN API for easy integration of e.g. CANopen, J1939 and ARINC825. For more information, please ask our sales team.

CAN FD: C.2069.66
CAN CC: C.2069.06

CAN-USB/400-FD-IRIG-B side with CAN connectors

CAN-USB/400-FD-IRIG-B side with USB and IRIG-B connectors

Technical Specifications:

USB Interface:	
USB	USB 2.0, high-speed 480 Mbit/s

CAN:	
Interface	2x CAN acc. to ISO11898-2, galvanically isolated, CAN CC bit rates from 10 kbit/s up to 1 Mbit/s CAN FD bit rates up to 8 Mbit/s
CAN controller	esdACC according to ISO 11898-1

IRIG- and IO:	
IRIG-B Input	1x analog and 1x digital RS-422 compatible
Trigger I/Os	2x trigger input/output, 3.3 V LVTLL (for Error Injection)
Misc. I/Os	4x digital input/output, 3.3 V LVTLL

General:	
Power supply	Via USB: 5 V
Ambient temp.	Standard range: 0 °C ... +55 °C
Rel. humidity	Max. 90 % (non-condensing)

General (Continued)	
Dimensions	Approximately 86 mm x 19 mm x 86 mm (excl. connector excess length)
Connectors	CAN: 2x DSUB9 (pin contacts) USB: USB2 standard socket type-B, IRIG-B, Sync, Trigger, Misc. I/O: DSUB15

Order Information:		
Hardware		Order No.
CAN-USB/400-IRIG-B	2x CAN CC, 1x IRIG-B, Trigger I/Os, Misc. I/Os	C.2069.06
CAN-USB/400-FD-IRIG-B	2x CAN FD, 1x IRIG-B, Trigger I/Os, Misc. I/Os	C.2069.66
Software Support		
CANopen Software Stack for Windows		C.1101.06
J1939 Stack for Windows		C.1130.10
ARINC825 Stack for Windows		C.1140.06

CAN-USB/400 with IRIG-B Support
Driven by esdACC (Advanced CAN Controller)

Advanced
CAN
Controller

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 FD: CAN flexible data rate, supports bit rates from 10 kbit/s up to 8 Mbit/s with bit rate switch as well as a payload of up to 64 bytes per frame. It is fully backward compatible with CAN CC
  - CAN CC: CAN classic also known as CAN 2.0A/B supports bit rates from 10 kbit/s to 1 Mbit/s with a payload of up to 8 bytes per frame.
- 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
- Disable Automatic Retransmission (DAR) (Single-shot transmission)
- 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-real-time 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 integration with 32-bit microcontroller to further relieve host CPU
- 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)
- 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 has been verified on Xilinx[TM] Spartan[TM] 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 esd Advanced CAN Controller please contact our sales team.