



UniCAN 2 Professional

- ▶ Stand-alone data logger with optimized data acquisition
- ▶ 4 CAN bus interfaces, electrical isolation optional
- ▶ Digital I/O
- ▶ Integrated GPS receiver and UMTS/GPRS modem (optional)
- ▶ Exchangeable CF card with storage capacity up to 128 GB
- ▶ Recording of signals and messages in groups, with unique trigger conditions
- ▶ User-definable pre-trigger buffers; size is only limited by CF card capacity
- ▶ Support of CAN protocols (optional) CCP, J1939, XCP, OBD-2
- ▶ Software extensions (optional) CANsend, CAN Stimulation, Seed & Key
- ▶ Operating temperature range: -40 °C to +85 °C
- ▶ Quick start after "Power On"
- ▶ Very low stand-by power consumption

UniCAN 2 Professional is a μ -Controller-based stand-alone data logger. It has unique features and capabilities which otherwise can only be found in high end devices. This is possible because

- ▷ essential functional features are optimized by direct implementation in hardware (FPGA),
- ▷ the data file system REC09, which has been designed for UniCAN 2 Professional, specifically supports the characteristics of ATA flash cards with regard to fast data storage and the best possible protection from data loss.

Fields of application

Acquisition of measurement data and ECU information in road test, endurance test, driver dynamics, benchmarks, etc. in the field of:

- ▷ Passenger cars, trucks, busses, off-road vehicles, recreational vehicles
- ▷ Agricultural, construction and special purpose vehicles
- ▷ Aircraft, trains and military vehicles



In particular, also suitable for test and validation of new technologies such as:

- ▷ Electro-, hybrid- and fuel cell drives

Configuration

UniCAN 2 Professional currently offers two different methods for a fast, safe and convenient configuration:

- ▷ CompactFlash cards up to 128 GB
- ▷ GPRS, EDGE, UMTS/3G and CDMA

CSM sells CF cards meeting the environmental specifications of UniCAN 2 (temperature range -40 °C to +85 °C, robust design).

The configuration is accomplished by using the UniCAN 2 ConfigTool which has been especially designed for this task. During development, great emphasis was placed on simple and efficient operation. This tool combines the following functionalities:

- ▷ Generation / administration of the logger configuration
- ▷ Formatting, reading, writing of CF cards
- ▷ Configuration of device modem operation and remote data exchange (SIM cards, FTP server, ...)
- ▷ Fleet management
- ▷ Data flow control for data post processing with standard software
- ▷ Firmware upgrade (via CF card or remote data exchange)

Data sources and outputs

UniCAN 2 Professional is able to record data from different data sources:

- ▷ **CAN, free running** (“listen only” possible)
- ▷ CAN with **CCP protocol**
- ▷ **CCP BlockRead** (complete memory blocks of a CCP control unit can be logged)
- ▷ CAN with OBD-2 protocol (recording of current Service 1 and 9 data as channels)
- ▷ CAN with **XCP protocol** (using static and dynamic DAQ lists)
- ▷ Secure ECU communication **Seed & Key** (customer-specific realization)
- ▷ Recording of **J1939** parameter groups (passive), triggering on diagnostic messages (DM1)
- ▷ **GPS location data and other internal system signals**
- ▷ **Digital inputs**

Data output:

- ▷ **Digital outputs**
- ▷ Forwarding of channels **from several different data sources**
- ▷ **Definition of individually triggered message transmission groups** for stimulation of sensors, ECUs, etc.

Data acquisition and recording

UniCAN 2 Professional enables **simultaneously** time-based recording of **signals** in up to **8** separate **channel groups** and the event-driven recording of **CAN messages** (Trace) in up to **8** separate **message groups**.

The **signal definition** is taken from **DBC** or **A2L** description files and from the enclosed **signal database** (incl. GPS, system signals).

Inside a channel group a unique sampling rate for each channel is available. The signal can be used in different channel groups, and can be recorded with independent sampling rates. Each channel group has its own unique trigger conditions and can be managed as linear or ring memory. The following are the possible sampling rate ranges:

- ▶ CAN signals
100 µs, 200 µs, 500 µs, 1 ms, 2 ms, 5 ms, 10 ms, ... , 10 s, 30 s, 60 s, ... , 60 min
- ▶ GPS location data
250 ms, 500 ms, 1 s, 2 s, ... , 60 min

The **definition of CAN messages** for each message group is handled via a **message filter**. Each message group can have its own individual trigger conditions and can be managed either as linear or ring memory.

The unique **CSM REC09 data file system** provides a consistent data storage condition on the CF card and the highest possible data storage rate.

An interruption of the power supply or even removing the CF card from the card slot during recording will be detected by the firmware. Once the supply voltage is back on again or a CF card is re-inserted, the recording process will be automatically resumed.

The data blocs recorded are arranged in chronological order when analyzing and transferring data. As a rule, a maximum of 5 seconds of the data to be recorded will be lost.

Measurement data are compressed during recording. Furthermore REC09 data file system avoids fragmentation of the data written to the CF card. This minimizes the dramatically increasing overhead time of data storage of modern large capacity memory cards, associated with increasing fragmentation of memory with small data packets.

Start-up performance: UniCAN 2 Professional is **immediately ready to measure**. Depending on the complexity of the configuration and the capacity of the used CF card, data recording starts from about 600 ms after power on.

The internal timing cycle of the UniCAN 2 Professional is 1 µs, making the resolution of time stamps of incoming CAN messages to 1 µs.

Trigger conditions

Extensive **trigger conditions** can be defined per individual **channel/message group** using the UniCAN 2 ConfigTool. Alternatively or even additionally, simply all incoming CAN messages can be recorded.

For the trigger modes **Edge, Gate** and **Flip-Flop**, the following conditions are amongst others available:

- ▷ Up to 32 event / channel conditions can be defined using various logic functions in combination
- ▷ Range conditions with defined lead-time
- ▷ Absence of signals and / or messages (cycle monitoring)
- ▷ Error frames

Pre-Trigger / Post-Trigger

For each channel and message group, individual pre- and post-trigger memory storage areas can be defined. These are directly saved on the CF card, so that the only limitation of the size of the storage areas is the capacity of the CF card.

As a result, when a trigger condition is met **the pre-events history data storage can be virtually unlimited!**

❑ Start delay

Users can activate a delay parameter (100 ms to 60 s), during which time signals are ignored, thus allowing irregular bus activity at start-up to settle.

Storage formats

Per channel and message group the memory area on the CF card can be defined as:

- ▷ **Ring memory:** If the memory capacity is reached, the oldest available data on the card will be overwritten with new data, or
- ▷ **Linear memory:** If the memory capacity is reached, the measurement stops. Measurement data will never be overwritten.
- ▷ The maximum summary of the individual memory areas may not exceed approx. 128 GB.
- ▷ CF cards valid for industrial temperature ranges are available in sizes of up to 64 GB.

Data flow control

Measurement data is transmitted in two different ways with the UniCAN 2 ConfigTool:

- ▷ **Read data directly from CF card**
- ▷ **Remote data transmission via modem / FTP server**

Acquired measurement data can be filtered and converted into **different data formats** (e.g. MDF, ASCII, ...) for further analyses with standard software.

The output files can be supplemented with additional information, which are for example required for further processing in databases. In addition, this information can be used for documentation, traceability, etc. of the measurement setup.

The CF card can be inserted in and removed from the UniCAN 2 Professional. This functionality offers an appropriate way to exchange huge amounts of data simply by changing the memory card.

Using the **remote transmission**, the user must configure the mode for "data transmission from logger to FTP server" and the conditions to convert the transferred data into files, using the UniCAN 2 ConfigTool.

Available data transfer modes are:

- ▷ **After ignition has been switched off**
- ▷ **At predefined time intervals, e.g. every hour simultaneous to data acquisition and storage**

If the modem connection has been interrupted, the data transmission will be resumed immediately, once the connection is available again.

In order to guarantee highest data security and integrity, CSM employs a unique binary data transmission procedure. This procedure also minimizes the need for redundant data retransmissions due to interrupted modem connections. It has proven itself over the long term with major fleet OEMs in Europe, USA and Asia.

The incoming data on the FTP server is tapped automatically by the especially developed **CSM data post-processing** software. The measurement data is analyzed, assembled into the desired file format (e.g. MDF) and saved into the specified directories for further processing.

Data integrity and data security

While transmitting data over the internet UniCAN 2 Professional provides topmost data integrity and data security by:

- ▷ Ensure data integrity with the FTP server's **"XCRC"** command.
- ▷ Protect data against theft and being tampered with by usage of **SSH2** protocol.

The following test and encryption procedures are in use:

- ▷ CRC-32, MD5, SHA1 (integrity check)
- ▷ AES-256, 3DES (encryption)
- ▷ RSA, Diffie-Hellman (key exchange)

Specifications UniCAN 2 Professional

Technical Data	UniCAN 2 pro
CAN interface	up to 4 x CAN 2.0B High-Speed CAN (ISO11898-2), max. 1 Mbit/s, low-speed CAN (ISO11898-3) electrical isolation (optional)
GPRS/EDGE and UMTS/3G	internal GPRS/EDGE/UMTS modem with external antenna (optional)
GPS	internal GPS module with external passive or active antenna (optional)
USB 2.0	1 x USB type B (connection with a PC) 1 x USB type A (for WLAN or memory stick) ¹⁾
RS232	1 x external (up to 115.2 kBaud)
Digital I/O	4 digital I/Os available up to 4 x digital IN (TTL threshold) / up to 2 x digital OUT ²⁾
Slot CF card	1 slot (type I) for CF card at the front-side
Power supply	
Minimum	6.5 V DC (-10 %)
Maximum	50 V DC (+10 %)
Power consumption	stand-by current (PowerControl OFF) < 500 µA at 12 V approx. 3 W (in operation, without options)
LED indicators	2 multi-color LEDs on the rear side for status and network indication 2 multi-color LEDs on the front side for status and card access
Housing	aluminium, black coated
Weight	approx. 500 g
Dimensions (w x h x d)	approx. 109 x 35 x 150 mm
Connectors	
CAN	SUB-D15 HD
Voltage	LEMO 0B 5-pole
RS232/digital I/O	LEMO 0B 7-pole
Mobile communication	FME connector
GPS	SMA connector
Operating and storage conditions	
Operating conditions	-40 °C to +85 °C
Relative humidity	max. 95 % (non-condensing)
Storage temperature	-40 °C to +85 °C
Conformity	

1) In preparation.

2) A total of 4 digital I/Os is available. Standard: 3 digital inputs and 1 digital output. Other combinations are possible.

Shipping content

UniCAN 2 Professional in metal case with Installation Guide, **CD** containing **UniCAN 2 Professional Tools** (incl. software for configuration and data post-processing) for Windows 7, 8, 8.1 and 10, detailed documentation

Accessories

CAN Splitter cable to connect up to 4 CAN bus, **power cable** (open end), serial and I/O cable, different types of antennas, UniCAN CF DataCard with storage capacities up to 64 GB

Available hardware extensions (optional)

Internal GPS-Module **50 channel positioning engine, 4 Hz position update rate**
Internal GPRS/EDGE/UMTS Modem, also admitted for the U.S. market according to FCC and PTCRB for "used in vehicle environments"

Electrically isolated CAN busses

Available software extensions (optional)

CCP
CCP BlockRead
OBD-2
XCP on CAN
J1939
CANsend
CAN sensor stimulation
Seed & Key (customer-specific adaptation)

CSM GmbH

Computer-Systeme-Messtechnik

Raiffeisenstr. 36 • 70794 Filderstadt • Germany
Phone: +49 711 77964-20 • Fax: +49 711 77964-40
info@csm.de • www.csm-products.com

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