Interface TCH2CAN

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General description

Device is designed as information generator from VDO SIEMENS, ACTIA, and STONERIDGE digital tachographs to CAN bus. The bus generates information about driver's ID, selected working activity and so on. Device can be used in several modes.

GATEWAY mode:

CAN IN interface accepts data from CAN bus; optionally, CAN device is in Listen only mode or normal operational mode. Listen only mode ensures separation of CAN bus of the car from CAN bus with added information from tachograph. All data from CAN IN bus are transmitted to CAN OUT interface and supplied with data from tachograph.

GENERATOR mode:

CAN IN interface is not included (lower price). At CAN OUT interface, data from tachograph are generated.

Technical information

- 2x CAN interface of type high, 250 kbit speed (different speed on demand)
- Without galvanic separation of CAN
- VDO SIEMENS, ACTIA a STONERIDGE digital tachographs connection with galvanic separation
- Allows to connect signal 15 (ignition) and automatic device switch-off
- Synchronous output switching with generating of each segment of tachograph message at CAN
- 5 x signal LED
- Consumption 30 mA at 12 V (0.36 W), approx. 20 mA at 24 V (0.48 W)
- Dimensions: 10 x 5 x 3 cm.

Generated messages structure

On CAN bus, the device generates information from tachograph at the moment of change of this information. Message with PGN FE6B is used for generating. Information is generated in sequence of several of these messages.

FE6B h							
65131							
Data Byte 1	**Data Byte 2**	**Data Byte 3**	**Data Byte 4**	**Data Byte 5**	**Data Byte 6**	**Data Byte 7**	**Data Byte 8**
Data Marker - data type - index	Data	Data	Data	Data	Data	Data	Data

Data marker:
It indicates type of data transferred, this type also defines its length (number of segments of CAN messages that have to be connected). It also indicates segment index.

Bit 7..5 data type
Bit 4 odd/even sequence, bit changes state in each sequence
Bit 3..0 segment index

Data type 0 – Driver ID

This data type is made of 7 segments

Data Byte 1	**Data Byte 2**	**Data Byte 3**	**Data Byte 4**	**Data Byte 5**	**Data Byte 6**	**Data Byte 7**	**Data Byte 8**
Data Marker - data type 0 - index 0	Work states	Driver 1 states	Driver 2 states	Tachograph status	Driver 1 ID length	Driver 1 ID length	Not used (255)
Data Marker - data type 0 - index 1	Driver 1 ID, character #1	Driver 1 ID, character #2	Driver 1 ID, character #3	Driver 1 ID, character #4	Driver 1 ID, character #5	Driver 1 ID, character #6	Driver 1 ID, character #7
Data Marker - data type 0 - index 2	Driver 1 ID, character #8	Driver 1 ID, character #9	Driver 1 ID, character #10	Driver 1 ID, character #11	Driver 1 ID, character #12	Driver 1 ID, character #13	Driver 1 ID, character #14
Data Marker - date type 0 - index 3	Driver 1 ID, character #15	Driver 1 ID, character #16	Driver 1 ID, character #17	Driver 1 ID, character #18	Driver 1 ID, character #19	Driver 1 ID, character #20	Not used (255)
Data Marker - data type 0 - index 4	Driver 2 ID, character #1	Driver 2 ID, character #2	Driver 2 ID, character #3	Driver 2 ID, character #4	Driver 2 ID, character #5	Driver 2 ID, character #6	Driver 2 ID, character #7
Data Marker - data type 0 - index 5	Driver 2 ID, character #8	Driver 2 ID, character #9	Driver 2 ID, character #10	Driver 2 ID, character #11	Driver 2 ID, character #12	Driver 2 ID, character #13	Driver 2 ID, character #14
Data Marker - data type 0 - index 6	Driver 2 ID, character #15	Driver 2 ID, character #16	Driver 2 ID, character #17	Driver 2 ID, character #18	Driver 2 ID, character #19	Driver 2 ID, character #20	Not used (255)

Tachograph information structure

Work states

Bit 2..0: Driver 1 working state
- 000 = Break/Rest
- 001 = Driver available
- 010 = Work
- 011 = Drive
- 110 = Error
- 111 = Not available

Bit 5..3: Driver 2 working state
- 000 = Rest
- 001 = Driver available
- 010 = Work
- 011 = Drive
- 110 = Error
- 111 = Not available

Bit 7..6: Drive recognize
- 00 = Vehicle motion not detected
- 01 = vehicle motion
- 10 = Error
- 11 = Not available

Driver 1 states

Bit 3..0: Driver 1 time rel states
- 0000 = normal
- 0001 = 15 min bef. 4 ½ h
- 0010 = 4 ½ h reached
- 0011 = 15 min before warning 1 (9h)
- 0100 = warning 1 reached
- 0101 = 15 min before warning 2 (16h)
- 0110 = warning 2 reached
- 1101 = Other
- 1110 = Error
- 1111 = Not available

Bit 5..4: Driver 1 card
- 00 = Card not present
- 01= Card present
- 10 = Error
- 11 = Not available

Bit 7..6: Overspeed
- 00 = No overspeed
- 01 = Overspeed
- 10 = Error
- 11 = Not available

Driver 2 states

Bit 3..0: Driver 1 time rel states
- 0000 = normal
- 0001 = 15 min bef. 4 ½ h
- 0010 = 4 ½ h reached
- 0011 = 15 min before warning 1 (9h)
- 0100 = warning 1 reached
- 0101 = 15 min before warning 2 (16h)
- 0110 = warning 2 reached
- 1101 = Other
- 1110 = Error
- 1111 = Not available

Bit 5..4: Driver 1 card
- 00 = Card not present
- 01= Card present
- 10 = Error
- 11 = Not available

Bit 7..6: Overspeed
- 00 = No overspeed
- 01 = Overspeed
- 10 = Error
- 11 = Not available

tachograph [3]

Bit 0..1: System event
- 00 = No tachograph event
- 01 = Tachograph event
- 10 = Error
- 11 = Not available

Bit 2..3: Handling information
- 00 = No handling information
- 01 = Handling information
- 10 = Error
- 11 = Not available

Bit 5..4: Tachograph performance
- 00 = Normal performance
- 01 = Performance
- 10 = Error
- 11 = Not available

Bit 7..6: Direction indicator
- 00 = Forward
- 01 = Reverse
- 10 = Error
- 11 = Not available

Data type 1 – Extinfo 1

Data are generated with 10 seconds period consisted of 3 segments.

Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8
Data Marker - data type 1 - index 0	Hours	Minutes	Seconds	Day	Month	Year	Not used (255)
Data Marker - data type 1 - index 1	RPM	RPM	Total vehicle distance	Total vehicle distance	Total vehicle distance	Total vehicle distance	Not used (255)
Data Marker - data type 2 - index 2	Tachograph vehicle speed	Tachograph vehicle speed	Trip vehicle distance	Trip vehicle distance	Trip vehicle distance	Trip vehicle distance	Not used (255)

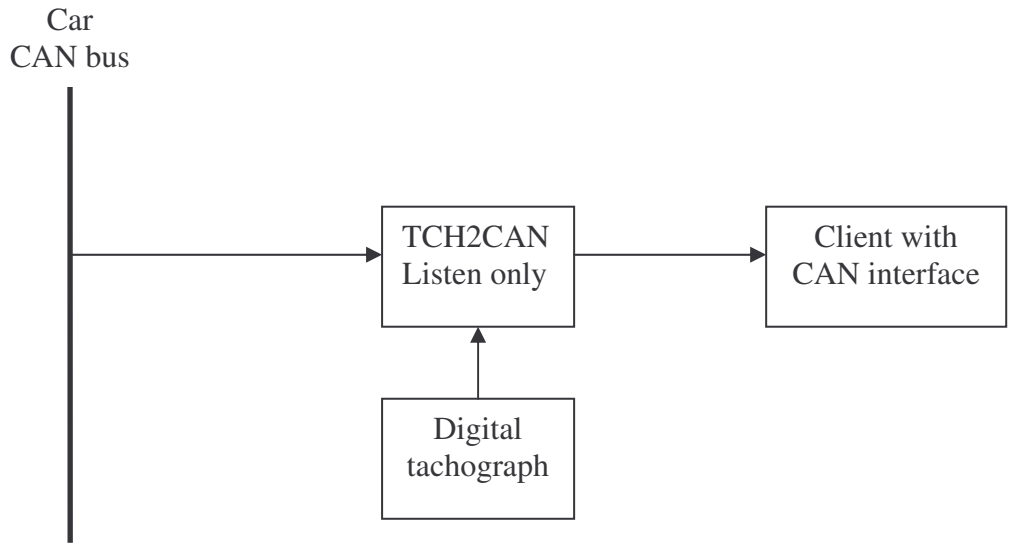
Data type 2 – Extinfo 2

Data are generated only after the start of device.

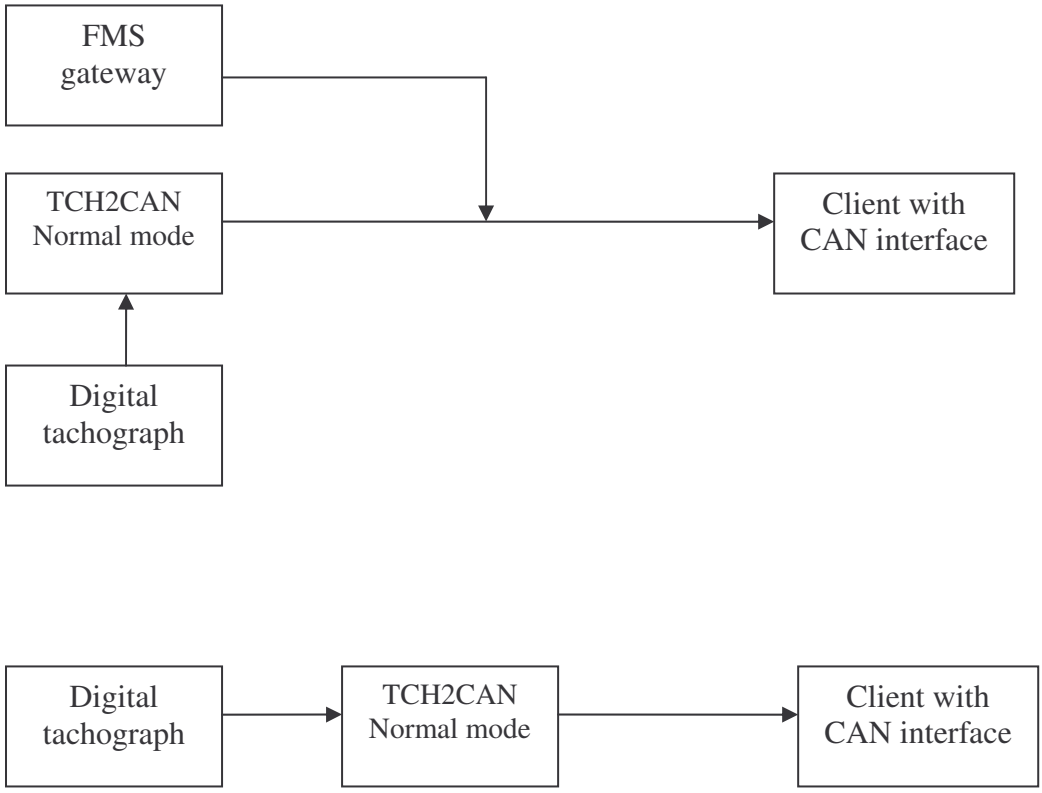
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8
Data Marker - data type 2 - index 0	Vehicle REG length	Vehicle REG, character #1	Vehicle REG, character #2	Vehicle REG, character #3	Vehicle REG, character #4	Vehicle REG, character #5	Vehicle REG, character #6
Data Marker - data type 2 - index 1	Vehicle REG, character #7	Vehicle REG, character #8	Vehicle REG, character #9	Vehicle REG, character #10	Vehicle REG, character #11	Vehicle REG, character #12	Vehicle REG, character #13
Data Marker - data type 2 - index 2	Vehicle REG, character #14	Vehicle REG, character #15	Vehicle REG, character #16	Vehicle REG, character #17	Vehicle REG, character #18	Vehicle REG, character #19	Vehicle REG, character #20
Data Marker - data type 2 - index 3	Vehicle ID length	Vehicle ID, character #1	Vehicle ID, character #2	Vehicle ID, character #3	Vehicle ID, character #4	Vehicle ID, character #5	Vehicle ID, character #6
Data Marker - data type 2 - index 4	Vehicle ID, character #7	Vehicle ID, character #8	Vehicle ID, character #9	Vehicle ID, character #10	Vehicle ID, character #11	Vehicle ID, character #12	Vehicle ID, character #13
Data Marker - data type 2 - index 5	Vehicle ID, character #14	Vehicle ID, character #15	Vehicle ID, character #16	Vehicle ID, character #17	Vehicle ID, character #18	Vehicle ID, character #19	Vehicle ID, character #20
Data Marker - data type 2 - index 6	TCH2CAN FW, character #2	TCH2CAN FW, character #3	TCH2CAN FW, character #4	TCH2CAN FW, character #5	TCH2CAN FW, character #6	TCH2CAN FW, character #7	TCH2CAN FW, character #8
Data Marker - data type 2 - index 7	Segments period low byte	Segments period high byte	Startup delay	Shutdown delay	Not used (255)	Not used (255)	Not used (255)

Connection variants

GATEWAY variant – car CAN bus



GENERATOR variant – FMS gateway



Digital tachograph connection

Device is connected to digital tachographs using D-connector, pin 8. Signal ground of tachograph is connected using A-connector, pin 6. Connector for tachograph connection is not provided with the delivery, however, it can be ordered.

Settings

Basic setting is made using DIP switch. Other optional parameters can be preset during production according to customer needs or using CAN bus.

DIP Setting

DIP	Description
1	Not used
2	Extended tachograph information is generated (Extinfo1 and Extinfo2).
3	Setting of output CAN into Listen only mode.
4	Fuel level data are eliminated from the output CAN data. Used when using external float with CAN interface.
5	Repeat 2 times the message in case of change of tachograph data.
6	Disable SJA1000. In case of variant without output CAN set on “ON”.
7	Setting of tachograph type. 00-VDO, 10-Stoneridge, 01-ACTIA (not tested), 11-
8	BOOT mode.

Settings through CAN bus

Other settings saved in EEPROM memory can be changed by sending data to output CAN.

Setting of time distance among tachograph information segments at CAN:

11bit (standard ID) 0x333, DLC=4, DB0=67 (0x43), DB1=76 (0x4C), DB2+3 = TIME. TIME is 16bit number in the range 40..2000. Resolution 5 ms. Value 40 corresponds to 200 ms interval, value 2,000 corresponds to 10,000 ms (10s). Value preset by manufacturer is 200, 1s.

Setting of lag after start.
This lag influences generating of the first tachograph information. Other information is generated only after the change of tachograph data.

11bit (standard ID) 0x334, DLC=3, DB0=67 (0x43), DB1=76 (0x4C), DB2 = TIME. TIME is 8bit number in the range 0..20. Resolution is 1s.

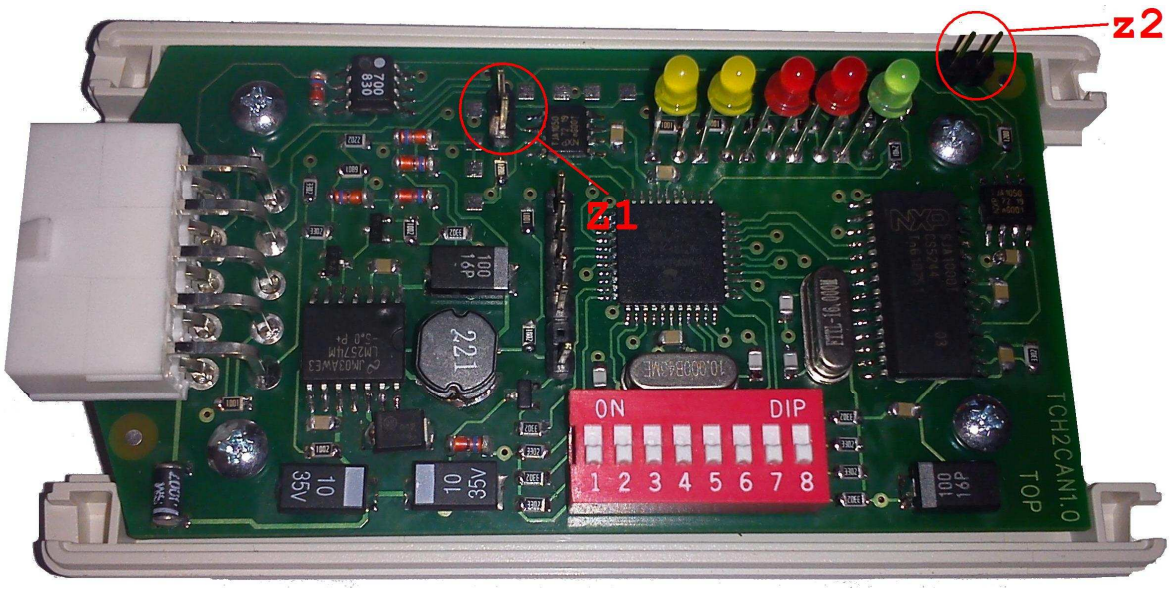
Setting of disconnection lag after ignition switch-off.
This lag influences delay of device switch-off after signal 15 disconnection (key).

11bit (standard ID) 0x335, DLC=3, DB0=67 (0x43), DB1=76 (0x4C), DB2 = TIME. TIME is 8bit number in the range 0..180. Resolution is 1s.

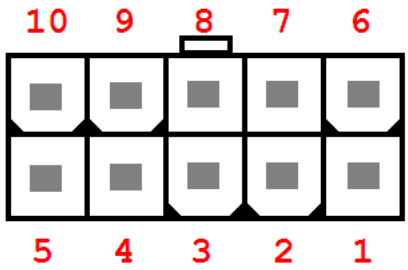
In case of high rate of errors of output CAN this interval can be automatically extended up to 3 minutes. During this time, the device tries to transfer tachograph data.

Terminal resistance setting

On the device, switching of terminate resistance of 120 ohm for both CANs can be done using short-circuit connectors. Z1 activates terminate resistance for output CAN. Z2 activates terminate resistance for input CAN.



Connector wiring



Pin	Description
1	Power 8..32 V
2	Output – signal switched on (5V) during tachograph information segment generating at CAN with lag of 70 ms, pulse duration 50 ms. Signal used for

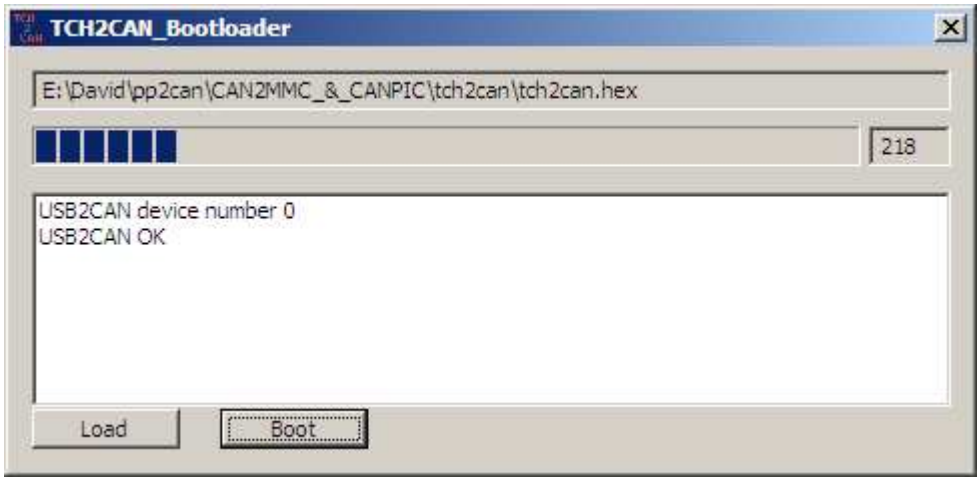
	example for preferred data sending from car unit to the server.
3	CAN OUT, high.
4	CAN IN, high.
5	Tachograph GND (pin 6 at tachograph A-connector).
6	Signal 15 (key, ignition). If continuous run required, connect with power.
7	GND
8	CAN OUT, low.
9	CAN IN, low.
10	Tachograph (pin 8, tachograph D-connector).

Signal LED

LED	Description
1	Power signalizing
2	Output CAN error signalizing
3	Input CAN error signalizing
4	Signalizing incoming data at input CAN
5	Signalizing incoming data at tachograph input.
2+3	Simultaneous flashing of both LED signalizes sending of tachograph information segment to CAN.

Firmware update

Firmware update is realized through CAN bus. Transducer USB2CAN with special application TCH2CAN_Bootloader.exe must be used.



Procedure:

1) On TCH2CAN switch DIP 7 and 8 to ON position.
2) Connect USB2CAN at output CAN and activate TCH2CAN_Bootloader.
3) Click Load to read firmware.

4) Click Boot to start the firmware recording process.
5) After the firmware has been loaded, disconnect the power from TCH2CAN.
6) At DIP 7 and 8, set respective tachograph.
7) When power connected, new firmware will be launched.

Warning

Customer attaches the chip to the car **at his own risk**. Incorrect setting of the chip can cause incorrect function of car control units. CANLAB s.r.o. **is not liable** for any damage of the car.