# FMS OEM CHIP V6+
# CAR2BT
# CAR2COM
# CAR2USB

## Contents:

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## General description

FMS OEM CHIP V6 is preset microcontroller PIC 18F46K80 in 44-pin TQFP case designed for integration into the system for vehicles monitoring, systems for vehicles fleet administration or suchlike. The chip performs pre-processing of data from the vehicle CAN bus, digital tachograph and J1708/J1587 (VOLVO) bus and provides decoded data through RS232 interface.

Customers are provided with the particular chip designed for the integration into the customer's system. Alternatively, the chip including the electronics (a supportive bus circuit, a source, a box)is delivered to a customer either with the RS232 (CAR2COM) interface, also possible in TTL levels, or with integrated Bluetooth module (CAR2BT).

It is possible to order the following:

- The chip only  (the chip for integration)
- CAR2COM – output RS232
- CAR2COM TTL – output RS232 in TTL
- CAR2BT – Bluetooth
- CAR2USB – USB

CAR2BT variation is especially convenient for monitoring system based on mobile/tablet applications with GPS and/or GSM/GPRS integrated within. These systems, contrary to common systems, offer some means of interaction with the driver. They can contain a navigation system and etc.
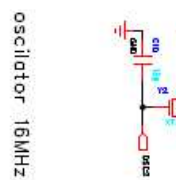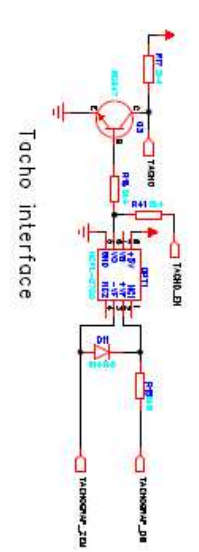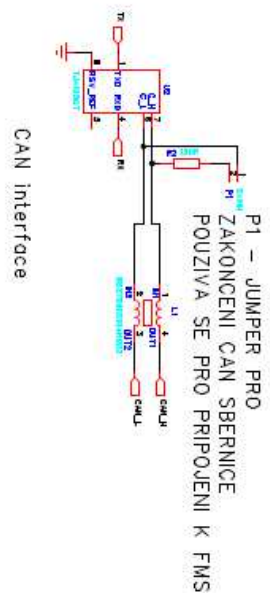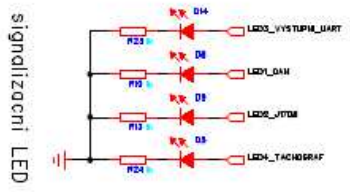
Our company also offers the demo application for Android 4.0. This can be used for of available data.

# Integration of FMS chip into the system

The sample schema will be sent upon the request.
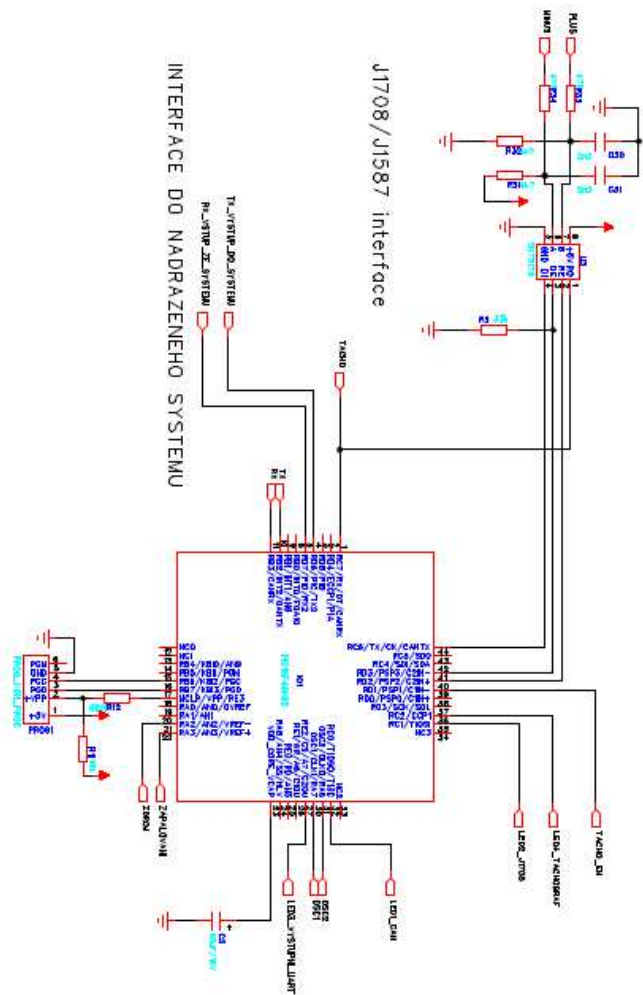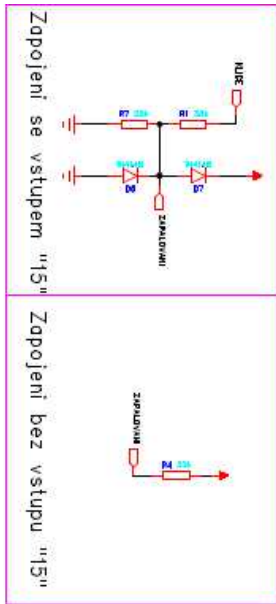
## RS232 Interface

The communication runs through text chains, the standard speed of interface is 57600 Bauds. The communication chain includes the check code. This code is xor signs which come after $ to *.

In order to compute the check code, the program "FMS OEM CHIP check sum coder" is available for download on our web pages.

The each chain starts with $PCAN, sequence. One of 3 possible symbols C,T,J comes after the comma. C symbol means that data are being read or being required from CAN bus. In order to preserve the backward compatibility with the previous versions of the chip, C symbol is used for general news, that are related not only to CAN bus but they refer to the chip generally. The reading of firmware version can serve as an example. J symbol indicates that the data are being read from J1708K1587. T symbol stands for tachograph then.

The current version of firmware executes the following data:

| Symbol | ASCII dec | ASCII hex | Interface Support | | | Description |
| --- | --- | --- | --- | --- | --- | --- |
| | | | C | J | T | |
| R | 82 | 52 | | | | Engine rpm |
| S | 83 | 53 | | | | Speed of vehicle |
| A | 65 | 41 | | | | Acceleration pedal position. |
| B | 66 | 42 | | | | Brake pedal position. |
| F | 70 | 46 | | | | Total fuel consumption |
| H | 72 | 48 | | | | Celkový počet motohodin. |
| L | 76 | 4C | | | | Fuel tank level. Trucks - %, VW-litres |
| C | 67 | 43 | | | | Average consumption. |
| W * | 87 | 57 | | | | Axle load. |
| T | 84 | 54 | | | | Total vehicle distance |
| D | 68 | 44 | | | | Kilometres done in oneday/kilometres done per drive. |
| V | 86 | 56 | | | | Distance (km) untill the next service control. |
| N | 78 | 4E | | | | Engine cooling temperature. |
| I | 73 | 49 | | | | Driver identification according to tachographcard |
| K | 75 | 4B | | | | Tachograph and driver status. |
| E | 69 | 45 | | | | Error codes |
| Z | 90 | 5A | | | | Tachograph speed |
| J | 74 | 4A | | | | Fuel rate |
| P | 80 | 50 | | | | Current consumption. |
| U* | 85 | 55 | | | | Pressure in tires |
| Q | 81 | 51 | | | | Door and car states. |
| Y | | | | | | Fuel consumption per a drive |
| G | | | | | | Current and recommended gear |
| M | | | | | | Engine load |
| O | | | | | | Ad blue |

*Command in answer transfers load (or tire pressure) on more axles. Before each axle load value, two signs are stated that specify the location of measured load. The first sing specifies the number of the axle, the second one the position of the

wheel. Axle indexes range is 0 to 15 and is entered using signs 0….F, which means in a hexadecimal way. The value F means that the position is unknown.

Theoretically, such news of axle load can contain up to 15 axles load with the sequence:W15:0-F-3245:1-F-2252:0-F-1763………..E-F-1223 The load on the first axle (front) is 3245 kg, the wheel location on which the load is measured is unknown (F), the load of the next axle is 2252 kg, and so on.

The device is able to produce preset data automatically with the adjustable period of execution 1-255 minutes.

The configuration is read from the internal EEPROM after the start. After each change of settings this change is saved in EEPROM .

## Ranges of individual quantities:

| Data | Počet číselných znaků | Váha 1 bitu |
|------|----------------------|-------------|
| Speed | 1..3 | km/h |
| Acc. pedal position | 1..3 | % |
| Brake pedal position | 1..3 | % |
| Total fuel used | 1..10 | L |
| Fuel level | 1..3 | % / L |
| RPM | 1..4 | rpm |
| Vehicle weight | 1..5 | kg |
| Total engine hours | 1..10 | hours |
| Total vehicle distance | 1..8 | Km |
| Service distance | 1..8 | Km |
| Engine temperature | 1..3 | °C |
| Average fuel consumption. | 1..5 | 0.1L100 km |
| Instantaneous fuel consumption | 1..5 | 0.1L/100 km |
| Fuel rate | 1..5 | 0.05L/hod |
| Wheel pressure | 1.4 | kPa |

## Examples of communication – General data and CAN bus
### Start
*$PCAN,C,VER,0.01,FMS_CHIP_V6,CANLABsro,SKODA YETI___,\*66<enter>*

Thedevice on RS232 sendsthestatedinformationonceafterthe start. The text 0.01 indicatesfirmware version, i.e. 2.0.01 and in each new version the value is changed. After the trademark of a producer CANLABsro, 12-numeral chain identifying  car follows. This chain can be configured by a user. As long as the identification is not configured, the configuration is replaced by the sequence of 12 signs "?" If the configured chain is shorter than 12 signs, the rest of signs is replaced by "_" sign. The couple of signs CR LF , 0X0D 0x0A (convention Win/DOS) is used for <enter> sign.

Configuration of the identification

*$PCAN,C,CID,SKODAYETI,\*42*
Identificationis set as follows: SKODAYETI___.

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# Reading the firmware version

*$PCAN,C,VER,\*32<enter>*

**Answer**
*$PCAN,C,VER,0.01,FMS_CHIP_V6,CANLABsro,????????????,\*6A enter>*

Request upon firmware version detection. The answer has the same format as Start packet.

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**Data request sent into CAN unit from super ordinate system**

*$PCAN,C,GET,#Q##,\*7B<enter>*

Data aboutdoor and coverstaterequested.

**Answer**

*$PCAN,C,GET,Q0000,\*58<enter>*

No doors or cover are open. 4 signs follow Q symbol and are hexadecimal.number s if individual bits represent door state.

Fortrucks: stateisindicated:
Q0000- alldoors areshut
Q0001- somedoors are open

For VWcars:
Q0000- alldoors areshut
Q0001- driver'sdoor open

Q0002- co-driver'sdoor open
Q0004-left reardoor open
Q0008- rightreardoor open
Q000F- all 4 doors are open
Q0010- enginebonnet open
Q0020- baggagecompartmentbonnet open

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**Data request sent to CAN unit from superordinate system – axle load**

*$PCAN,C,GET,#W##,\*7D<enter>*
Data ofaxleload arerequested – symbol W see. the tab.

**CAN unit answer**

*$PCAN,C,GET,W3:1-F-5384:2-F-0:0-F-5343,*19<enter>*
The unit signalizes that  load on 3 axles was measured. The returned data signalize axle location and the value of load. Axle nr. 1,2 and 0, the data of measured wheel arenot available (F) and value in kg. Sign ":" (colon) is used as separator of individual axles.

## Alternative answer from CAN unit
*$PCAN,C,GET,WX,*06<enter>*
The unit signalizes that requested data are not available (sign X comes after sign W Sign X indicates data that are not measured – they were not accepted from CAN bus).

## Data request sent to CAN unit from superordinate system

*$PCAN,C,GET,#L##,*66<enter>*
Requestforfuel tank level.

## Answer:
*$PCAN,C,GET,LX,*1D<enter>*
Fuel tank levelis not available.

## Alternativeanswer:
### Trucks:
*$PCAN,C,GET,L42:50,*7C<enter>*
Theinformation 42 per cent in primary tank, 50 per cent in secondary tank isreturnedinformation.

### Cars:
*$PCAN,C,GET,L42,*43*
42 litres in tank isreturnedinformation

## Alternativeanswer no. 2:
### Trucks:
*$PCAN,C,GET,L42:X,*21*
The information 42 per cent in primary tank is returned, the information concerning the secondary tank is unknown.

## Data request sent to CAN unit from superordinate system speed, rpm, total number of kilometres

*$PCAN,C,GET,#SRT##,*7F<enter>*

Speed information, rpm and totalnumberof km isrequested. (symbols S,R and T).

## Answerfrom CAN unit

*$PCAN,C,GET,S16R1313T398405.2,*44<enter>*

The unit returns data of speed (16km/h), rpm (1313 rpm/min) and kilometer reading (398405.2 km)

## Alternative answer from CAN unit
*$PCAN,C,GET,SXRXTX,\*04<enter>*

The unit returnsstatementthat data are not available. Probability of non-existence of these data islow, thereforesupposethat CAN line to the unit isinterrupted, defect/ incorrectly set CAN or car. Or the unit is active but the car engine is off (CAN of the car is off) - signal error 15.

Periodically proceeded data according to the preset mask have the same form as unit answer.

## Data request sent to CAN unit from superordinate system

*$PCAN,T,GET,#K##,\*76<enter>*

Requests the data of exceeded length of drive without a safety break if the information from digital tachograph is transferred to CAN bus.

*$PCAN,T,GET,K02-00-01,\*56<enter>*

After the sign, there are 2 hexadecimal codes, each shows the state for one of the tachograph cards. The data of exceeded length of drive follows after them. The meanings of the codes:

0 = reset                      0 = normal
1 = driver available           1 = 15 min bef. …
2 = work
3 = drive
6 = error


7 = not available

Driver 1: 0 – Rest, 00 – normal
Driver 2: 2 – Work, 00 – 15 min bef. 41/2 h

## Message with settings to CAN unit 1

*$PCAN,C,SET,C8,EXT,LISO,P10,T0,#SRTL##,\*15<enter>*
C8                CAN-speed setting (usually 8-trucks, 9-engine CAN at VW)

          Settings     CAN speed==tab==.

EXT/TWO    type of CAN-identifier, EXT indicates extended identifier,if EXT is not
            stated, standard identifier is set (extended identifier – trucks, not stated-
            standard in case of VW).
            If TWO is stated, both types of identifiers are accepted.

P10      - generate data automatically every 10 minutes, if P indentifier is not stated, data are not generated automatically

LISO      - if identifier is stated, the device works in mode that ensures that unit cannot influence the CAN bus function in the car.

T<n>      - type of car, used in cases when 2 same identificators of CAN messages carry various data at various cars.

| Code | Car type |
|------|----------|
| 0 | FMS, SAEJ1939 |
| 16 | VW |
| 1 | DAF – distance SA 0xEE |
| 2 | DAF – distance SA 0x00 |
| 3,4 | Mercedes BUS |
| 7 | Volvo 2013+ |
| 8 | Renault T |
| 9 | Mercedes 2015+ |
| 10 | SAEJ1939 trip fuel z fuel rate |
| 15 | Mercedes Truck |
| 48 | Mercedes Sprinter |
| 49 | Mercedes Vito |
| 64 | Nissan - Note, Micra |
| 65 | Nissan - Primastar, Kubistar |
| 66 | Nissan - Navara |
| 67 | Nissan |
| 80 | Opel Astra J |
| 96 | Toyota 1 |
| 97 | Toyota 2 (Auris) |
| 128 | Ford Mondeo |
| 129 | Ford Tranzit |
| 130 | Ford CMAX |
| 131 | Ford SMAX |
| 132 | Ford Fusion |
| 133 | Ford Turneo |
| 134 | Ford Tranzit 2015 |
| 135 | Ford Ranger |
| 136 | Ford Turneo Connect 2015 |
| 144 | Fiat |
| 145 | Fiat Ducato |
| 146 | Fiat Ducato, Citroen Jumper 29b ID |
| 147 | Citroen Jumper 50k, LS CAN |
| 148 | Citroen Jumper 50k, LS CAN |
| 149 | Doblo LS CAN, 50kb |
| 160 | Mazda |
| 176 | Suzuki SX4 |
| 192 | Audi A4, MQB platform |
| 193 | MQB platform CNG (Octavia 3 CNG) |
| 208 | Citroen Berlingo, |

| 224 | Peugeot 207 |
|---|---|
| 240 | Renault Master >2011 |
| 241 | Renault Master <2011 |
| 256 | Chrysler Voyager |
| 272 | Mercedes C180 |
| 288 | Renault Megane |
| 320 | Hyundai ix35 |
| 1024 | OBD 11 id (aktivní dotazy) |

It is not always possible to ensure the full functioning in the listed cars. The communication with cars and trucks is not standardized and can differ in year of production, engine type and equipment of the car. However, the chip is possible to function with the other cars besides the ones that are listed, because ECU are used the same. The example is VW Crafter that has the same ECU as Mercedes Sprinter.

**#SRTL##** between signs # and ## is the list of automatically generated data. In this case: S-speed, R –rpm, T – tachometer state, L – fuel tank level.

After receipt of the message the unit will proceed the data, save them (EEPROM), respond back having sent the identical message and restart. After the restart itcontinues according to the new setting.

*$PCAN,C,SET,C5,EXT,LISO,P0+10,T0,#SRABFHLCTDVNIWU##,*5A<enter>*
**The message is generated every 10 minutes.**

*$PCAN,C,GET,S45R1432A88B0F2428H341L56CXT33457DXVXN93IX,*7B <enter>*

**As axle load and tire pressure messages are requested, each message can carry up to 12 signs. These two messages are proceeded separately to simplify their parsing. Thus, 3 messages are generated:**

*$PCAN,C,GET,S45R1432A88B0F2428H341L56CXT33457DXVXN93IX,*7B <enter>*
*$PCAN,C,GET,W2:0-F-5792:1-F-2055,*66<enter>*
*$PCAN,C,GET,UX,*04<enter>*

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**Messagewithsettings to CAN unit 2**

*$PCAN,C,SET,C8,EXT,LISO,P1+40,T0,#SRTL##,*0A <enter>*
The message is the same as above mentioned. The only difference is the generating period set at 1 minute and 40 seconds, totally 100 seconds.

**Message with settings to CAN unit 3**

*$PCAN,C,SET,C8,EXT,LISO,P0,T0,*32<enter>*

This message is identical with the above mentioned with the regards to CAN setting.

However, periodical messages are not generated. The device provides data information upon the request.

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**Request upon unit settings**

*$PCAN,C,SET,\*31*

Answer has the same format as the setting command.

**User data sending to CAN**

This function is used minimally in common practice. It serves as a car diagnostics and user's requirements for data. Usage of the function requires larger knowledge of car CAN bus communication.

*PCAN,C,CAN,S,I123,S,L5,B0:11,B1:22,\*3E<enter>*

The message from the superordinate system into FMS CHIP. After receipt of this message CHIP sends message to CAN with the standard ID 123 with 5 data bytes. The values of data bytes will be 11,22,0,0,0.

**User data reading from CAN**

This function is use minimally in common practice. It is used when it is necessary to monitor also the data that are not proceeded by FMS OEM CHIP normally.

*$PCAN,C,CAN,T0,I123,S,B0:11,B1:22,\*5C<enter>*

The message from superordinate system sets user buffer 0 for reading CAN to receive the message with standard ID 123. Message must contain the same identifier aswell as value 11 in data byte 0 and value 22 in data byte 1. If the data byte is stated, filtration is made according to its value. Identifies must be always stated. Filtration can be done according to the identifier and optionally according to the first databytes. There are 8 user buffers T0…….T7 available for receipt.

*$PCAN,C,CAN,T1,I1234,E,\*7E<enter>*

The message sets user buffer 1 for CAN reading to extended identifier message receipt. Filtration receipt to buffer will be made only according to the identifier.

*$PCAN,C,CAN,R0,\*71<enter>*

Request from the superordinate system for the value of user buffer 0.

*$PCAN,C,CAN,R0,E,\*18<enter>*

Chip responds to the previous request for the value of user bufferthrough the value E-empty. Buffer responds to the message that either was not received or reading was already finished.  Every reading sets buffer to the state empty until the message is received from CAN again.

*$PCAN,C,CAN,R0,I123,S,L8,B0:11,B1:22,B2:3,B3:4,B4:5,B5:6,B6:7,B7:8,*08<enter>*

Chip responds to the previous request for the value of user buffer 0. Buffer contains the message with standard ID 123 which is 8 data bytes long with values 11, 22, 3,4,5,6,7,8.

*$PCAN,C,CAN,R1,*70*

Request from the superordinate system for the value of user buffer 0.

*$PCAN,C,CAN,R1,I1234,E,L8,B0:11,B1:22,B2:3,B3:4,B4:5,B5:6,B6:7,B7:8,*2B*

Chip responds to the previous request for the value of user buffer 1. Buffer contains the message with extended ID 123 with the length of 8 data bytes with values 11,22, 3,4,5,6,7,8.

**User buffer deletion**

*$PCAN,C,CAN,D,*57*

The message deletes all the user buffers.

# Examples of communication –tachograph

**Request for driver identification from the tachograph**

*$PCAN,T,GET,#I##,*74*

**Unit response to the driver identification request**

*$PCAN,T,GET,I@ @ @,*17*

Drivers identifications are not available.

**Unit response to identification request of driver 2**

*$PCAN,T,GET,I@0000000000465000@0000000000465700@,*10*

Identificationof driver 1 0000000000465000.
Identificationof driver 2 0000000000465700.

**Unit respond to the request for the identification of driver 3**

*$PCAN,T,GET,I@ @0000000000465700@,*17*

Identificationof driver 1 is not available.
Identificationof driver 2 0000000000465700.

**Requestforautomaticallygenerated data fromtachograph**

*$PCAN,T,SET,P0+3,#SRI##,*35*

Therequestfor speed, rpm and driver identification data read from tachographautomatically generated every 3 sec is set.

**Request for unit setting**

*$PCAN,T,SET,*26*

The response has the same format as the setting command.

# Examples of communication – J1708 (VOLVO)

## Request for automatically generated data from J1708

*$PCAN,J,SET,ENB,P0+1,#SRT##,*51*

The request for speed and rpm data read from J1708, automatically generated every 3 sec is set. If the command ENB is not stated J1708 is not allowed!

## Request for speed and rpm read from J1708

*$PCAN,J,GET,#SR##,*22*

**Answer**

*$PCAN,J,GET,S83R3694,*02*

Speed 83 km/h, 3694 rpm.
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## Request for unit settings

*$PCAN,J,SET,*38*

The response has thesameformat as thesettingcommand.

# Examples of communication – setting of series line

## UART Speed settings at 9600 Bauds

*$PCAN,C,COM,9600,\*11*

This speed (9600) cannot be used with the Bluetooth module variation.

## UART Speed settings at 57600 Bauds

*$PCAN,C,COM,57600,\*2A*

The standard speed (57600Bd)

# Command SETTINGS of the most frequently monitored cars

## Trucks – spinal CAN bus
- listen only
- expanded CAN ID
- speed 250k

$PCAN,C,SET,C8,EXT,LISO,P0+10,T0,#SRTL##,*0E<enter>

## Trucks – FMS gateway
- normal mode
- expanded CAN ID
- speed 250k

$PCAN,C,SET,C8,EXT,P0+10,T0,#SRTL##,*3B<enter>

## Skoda/VW, engine CAN bus
- listen only
- standard CAN ID
- speed 500k

$PCAN,C,SET,C9,LISO,P0+10,T16,#SRTL##,*5D<enter>
In case of VWcars FMS OEM CHIP isconnected to engine CAN. Thus, reading
DTC codesis not possible.

## Nissan, Renault, Dacia, variant 1 (Nissan Micra)
- listen only
- standard CAN ID
- speed 500k
- experimental support

$PCAN,C,SET,C9,LISO,P0+10,T64,#SRTL##,*58<enter>

## Nissan, variant 2
- listen only
- standard CAN ID
- speed 250k
- experimental support

$PCAN,C,SET,C8,LISO,P0+10,T65,#SRTL##,*58<enter>

**Ford Mondeo**
- listen only
- standard CAN ID
- speed 500k
- experimental support
$PCAN,C,SET,C9,LISO,P0+10,T128,#SRTL##,*61<enter>

**Ford Tranzit**
- listen only
  standard CAN ID
- speed 500k
- experimental support
$PCAN,C,SET,C9,LISO,P0+10,T129,#SRTL##,*60<enter>

The other cars that support CAN diagnostics can read some general data:
- engine temperature
- engine rpm
- car speed
- accelerating pedal
- fuel tank level

Function is in experimental stage.

**General OBD car, 11 bit ID, 250k**
$PCAN,C,SET,C8,P0+10,T1024,#SRTL,*69<enter>

**General OBD car, 11 bit ID, 500k**
$PCAN,C,SET,C9,P0+10,T1024,#SRTL##,*68<enter>

**General OBD car, 29 bit ID, 250k**
$PCAN,C,SET,C8,EXT,P0+10,T1025,#SRTL##,*0D<enter>

**General OBD car, 29 bit ID, 500k**
$PCAN,C,SET,C9, EXT,P0+10,T1025,#SRTL##,*2C<enter>

# Car error codes reading

OBD compatible cars allow reading of error codes (DTC). These codes describe errors in the car detected by control units. CAN must be connected to diagnostic connector and mode LISTEN ONLY must not be activated. If his mode is active, it is possible to deactivate it (preset settings with off listen only modem, then read car errors and activate it again). The car must support OBD diagnostics through CAN interface.

Whether OBD standardized form diagnostic functions depends on a car type. Nevertheless, sending the request to the car, which does not support this function, does not have any impact on the car.

After request for DTC errors 2 parameters follow:

s- standard CAN identifier
e- expanded CAN identifier

The type of identifier depends on type of the car; the easiest way is to  test the standard identifier first and if it does not work, then, try the less frequent one.

3 – diagnostics mode 3, saved error codes
7 – diagnostics mode 7, error codes in actual or previous drive

The function is in the experimental stage.

**Request 1**:
**$PCAN,C,GET,#E&lt;s3&gt;##,*2D&lt;enter&gt;**

**Answer:**
**$PCAN,C,GET,E:P0107P0113,*73&lt;enter&gt;**
2 errorcodes are returned: P0107 and P0113
Meaningofthecodescanbefoundhere: http://www.obd-codes.com/ .
P0107 - ManifoldAbsolutePressure/BarometricPressureCircuitLow Input
P0113 - Intake Air TemperatureCircuitHigh Input

**Request 2:**
**$PCAN,C,GET,#E&lt;s3&gt;##,*2D**

**Answer:**
**$PCAN,C,GET,E:U0073P0420,*71&lt;enter&gt;**
**$PCAN,C,GET,E:U0101U0155C0444,*30&lt;enter&gt;**
**$PCAN,C,GET,E:C0534C0446C2647C3700,*71&lt;enter&gt;**
**$PCAN,C,GET,E:P0011P0012,*75&lt;enter&gt;**

In this case, severalanswerswerereturned.
Thereasonisthatoneofthecontrolunitscontains many errorcodesoritanswers to severalcontrolunits..
Errorcodes: U0073 P0420 U0101 U0155 C0444 C0534 C0446 C2647 C3700 P0011 P0012

## DM1 error messages reading - cars with protocol J1939

In case of cars that use J1939 protocol, the chip saves error codes SM1 found on CAN interface. Error codes can be claimed through sending the request. The errors in the table are deleted after having been read and the table is filled again.

Request for error codes DM1:
**$PCAN,C,DM1,*4B**

If no error codes are found, the chip responses through the message:

**$PCAN,C,DM1,EMPTY,*32**

Orelse, the answer is made by message sequence. Only one message refers to one error code.

**$PCAN,C,DM1,E0,37,70,9,9,*11**
Decimal/Decadicaldata :
37 – ECU address
70 – SPN error
9 – FMI
9 – OC

**$PCAN,C,DM1,E1,47,62,9,1,*1C**

**$PCAN,C,DM1,E2,37,190,9,8,*2D**

## Statistics per drive reading

The chip saves the information about actual values to the statistic tabs every second.
Value range in the tab referring to the actual value is increased by 1.
The current statistics can be read anytime.

The tabs are divided into the value rangeaccording to the following tab:

| Speed (km/h) | Rpm | Acceleration pedal (%) | Engine load (%) |
|---|---|---|---|
| <1 | <1000 | 0 | 0 |
| 1   -< 40 | 1000 -< 1200 | >0 -< 10 | >0 -< 10 |
| 40 -< 60 | 1200 -< 1300 | 10 -< 20 | 10 -< 20 |
| 60 -< 70 | 1300 -< 1400 | 20 -< 30 | 20 -< 30 |
| 70 -< 80 | 1400 -< 1500 | 30 -< 40 | 30 -< 40 |
| 80 -< 85 | 1500 -< 1600 | 40 -< 50 | 40 -< 50 |
| 85 -< 90 | 1600 -< 1700 | 50 -< 60 | 50 -< 60 |
| 90 -< 110 | 1700 -< 1800 | 60 -< 70 | 60 -< 70 |
| 110-<130 | 1800 -< 2000 | 70 -< 80 | 70 -< 80 |
| >=130 | 2000 -< 2200 | 80 -< 90 | 80 -< 90 |
|  | 2200 -< 2500 | 90 -<= 100 | 90 -< 100 |
|  | 2500 -< 3000 |  | 100 -< 110 |
|  | 3000 -< 3500 |  | >=110 |
|  | 3500 -< 4000 |  |  |
|  | 4000 -< 4500 |  |  |

| | 4500 -< 5000 | | |
|---|---|---|---|
| | >=5000 | | |
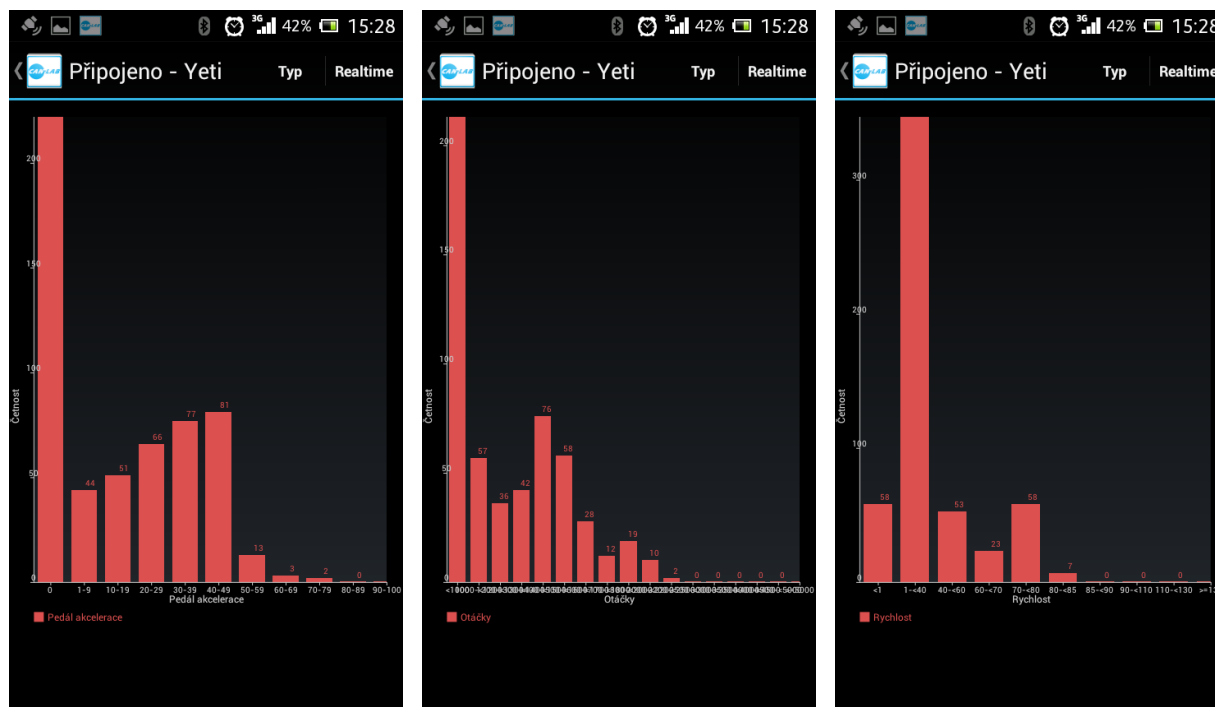


Request for rpm tab:

**$PCAN,C,STT,R,*5E**

Answer:

**$PCAN,C,STT,R,13,20,57,60,30,20,21,3,3,0,0,0,0,0,0,0,0,*74**

Rpm in the range of 0-1000: 13 sec
Rpm in the range of 1000-1200: 20 sec
Rpm in the range of 1200-1300: 57 sec
…etc.

Request for speed tab:

**$PCAN,C,STT,S,*5F**

Answer:

**$PCAN,C,STT,S,0,715,0,0,0,0,0,0,0,0,0,*5C**

Request for acceleration pedal tab:

**$PCAN,C,STT,A,*4D**

Answer:

**$PCAN,C,STT,A,45,6,5,9,22,27,15,10,3,0,0,*69**

Request for engine load tab:

**$PCAN,C,STT,M,*41**

Answer:

**$PCAN,C,STT,M,184,69,191,78,58,40,29,31,10,0,0,0,0,*68**

## Device connection process

The device is placed in TOPTEC 102 box produced by OKW comp. The device consists of 1 or 2 connectors. The first connector is MOLEX connector that is used for feeding and car interfaces connections.



When BT module is not used, however RS232 is connected the second connector is attached. Then 4-pin connector MOLEX is attached.
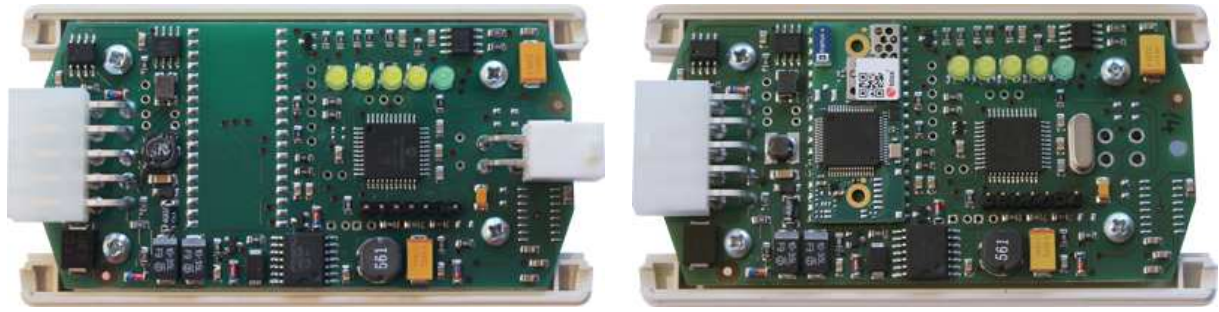
The device works with the feeding resistance range 8-36V. The consumption of the running device is 1.7W. In deactivated state the consumption almost equals 0after the signal 15 disconnection. Signal 15 is activated from approximately 1V level.

## 10-pin connector MOLEX.
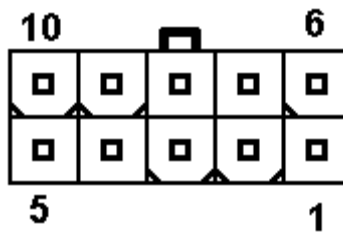


| Pin | Description |
|---|---|
| **1** | Power supply 8-36V |
| **2** | GND |
| **3** | CAN H |
| **4** | J1708 A |
| **5** | Tachograph A – signal |
| **6** | Signál 15 (startup-shutdown) |
| **7** | GND |
| **8** | CAN L |
| **9** | J1708 B |
| **10** | Tachograph B – GND |

## 4-pin connector MOLEX
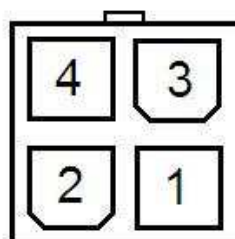


Pin     Description

| Pin | Description |
|---|---|

| 1 | TX output |
|---|-----------|
| 2 | RX input |
| 3 | 5V output |
| 4 | GND |

## Functions of indicating LED

| LED# | Barva | Popis |
|------|-------|-------|
| **1** | **GREEN** | Power |
| **2** | **YELLOW** | J1708 |
| **3** | **YELLOW** | CAN |
| **4** | **YELLOW** | TACHOGRAPH |
| **5** | **YELLOW** | RS232 |

# Power control

Customer can optionally order the chip with POWE CONTROL function. In this case, RE0 pin is designed for connection of the signal by ignition or another control signal. RE2 pin controls the supply. Respective supply and connection scheme is available upon request.

The function allows the source go off with some delay after signal 15 disconnection.

**$PCAN,C,PWR,10,*0B**
Command for settings of disconnection delay 10 sec.

**$PCAN,C,PWR,?,*35**
Request for current settings of disconnection delay.

**$PCAN,C,PWR,DWN,????????????,*7**
The message sent by chip just before the disconnection. In this case, chip ID is not set and is replaced by question marks.

**$PCAN,C,PWR,DWN,*57**
Command speeds up the chip switch off after signal 15 is disconnected.

   Superordinate system can also switch on FMS OEM CHIP through MCLR pin control.

## WARNING

Customer attaches the chip to the car at his own risk. Incorrect setting of the chip can cause incorrect function of the car control units. CANLAB s.r.o. is not liable for any damage to the car. We recommend the device CAN Sniffer data reader with non-electrically conductive connection with a car.

## Versions

6.0.10          supplemented support for tractors CASE and CLASS
6.0.20          supplemented support for DM1 and statistics