FM1100 with Light Vehicles Can adapter LV-CAN100

Manual

V1.4

TABLE OF CONTENTS

1 Legal Notice

Other products and company names mentioned here may be trademarks or trade names of their respective owners.

The manufacturer reserves the right to make changes and/or improvements at any time in design, functionality, parameters and electrical characteristics without any prior notice and without incurring obligations.

2 Safety Introductions

This chapter contains information on how to operate device safely. By following these requirements and recommendations, you will avoid dangerous situations. You must read these instructions carefully and follow them strictly before operating the device!

The device uses a 10 V...30 V DC power supply. The nominal voltage is 12 V DC. The allowed range of voltage is 10 V...30 V DC.

To avoid mechanical damage, it is advised to transport the device in an impact-proof package. Before usage, the device should be placed in position where all its LED indicators would be visible. LED indicators shows status of operation the device is in.

When connecting the connection cables to the vehicle, the appropriate jumpers of the vehicle power supply should be disconnected.

Before dismounting the device from the vehicle, the plug must be disconnected.

The device is designed to be mounted in a zone of limited access, which is inaccessible for the operator. All related devices must meet the requirements of standard EN 60950-1.

Teltonika is not responsible for vehicle damage caused by installation of adapter.

3 Purpose of Light Vehicles Can Adapter LV-CAN100

LV-CAN100 is used to listening data from light vehicles. With this adapter FM1100 device is able to collect and send vehicle data.

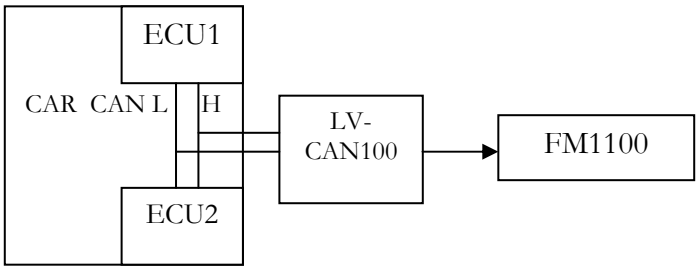


Figure 1 Connection block diagram

FM1100 shares the same USB port for connecting adapter and configuring device with PC.

LV-CAN100 Technical characteristics:

PARAMETER	VALUE
Supply voltage	10 to 30V
Power supply current	10mA
Working temperature	-40..85 ºC
Max working humidity	60 % (non condensate)

3.1 LV-CANBOOT10 bootloader driver installation

Drivers for the LV-CAN100 adapter can be downloaded from:

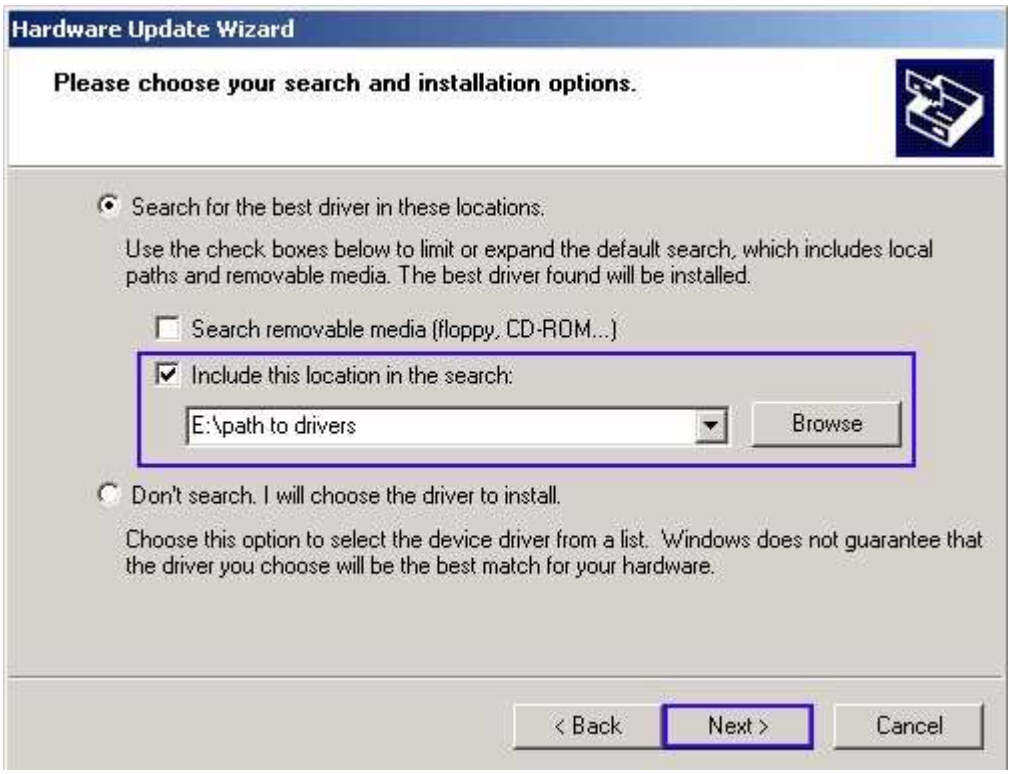
http://www.ftdichip.com/Drivers/VCP.htm

Please note that drivers are different for 32 bit and 64 bit Windows operating systems.

Please note that steps below are described for Windows XP operating system, for newer operating systems, such as Windows Vista or 7, steps are similiar.

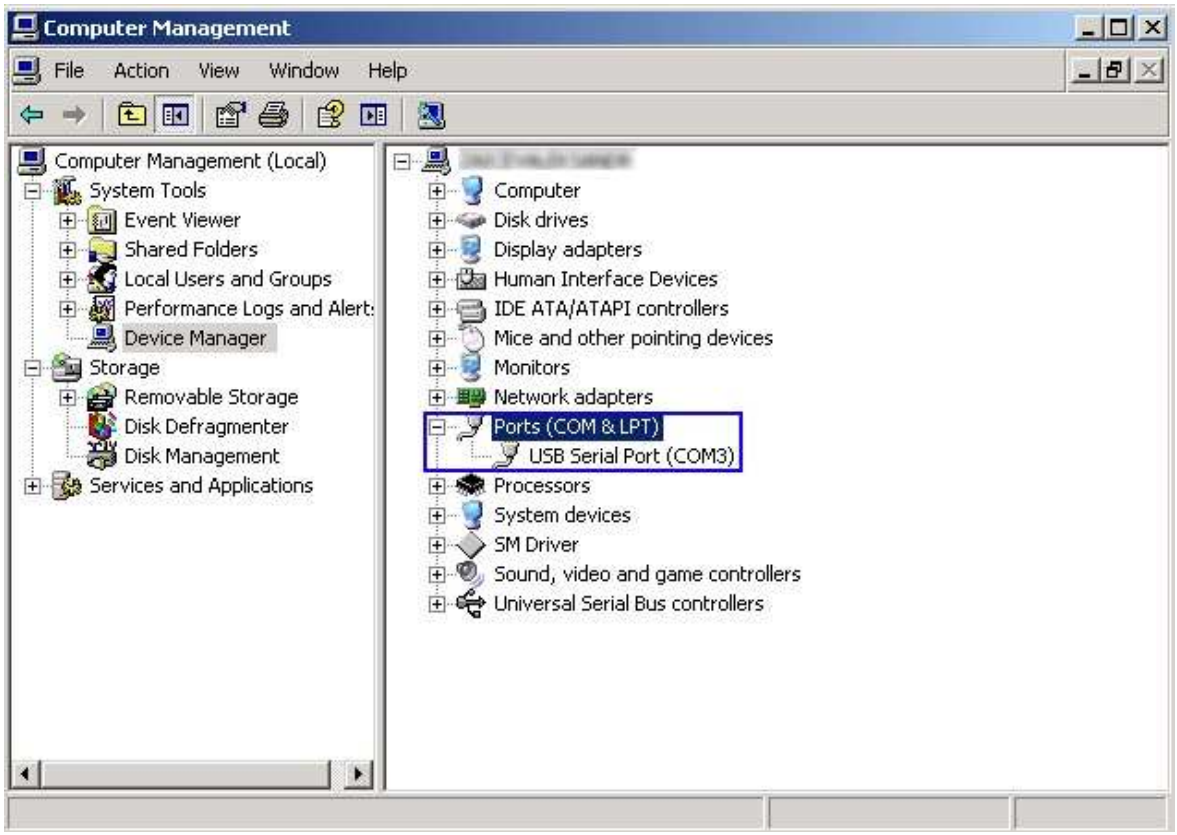
1. Connect LV-CANBOOT10 bootloader adapter to the PC using supplied USB cable.
2. Windows “Hardware update wizard” or similar dialog box should appear. In this window select „Install from a list or specific location (Advanced)” tab and press next.

3. In next window you must enter path to drivers or browse to the folder which contains drivers and click next.



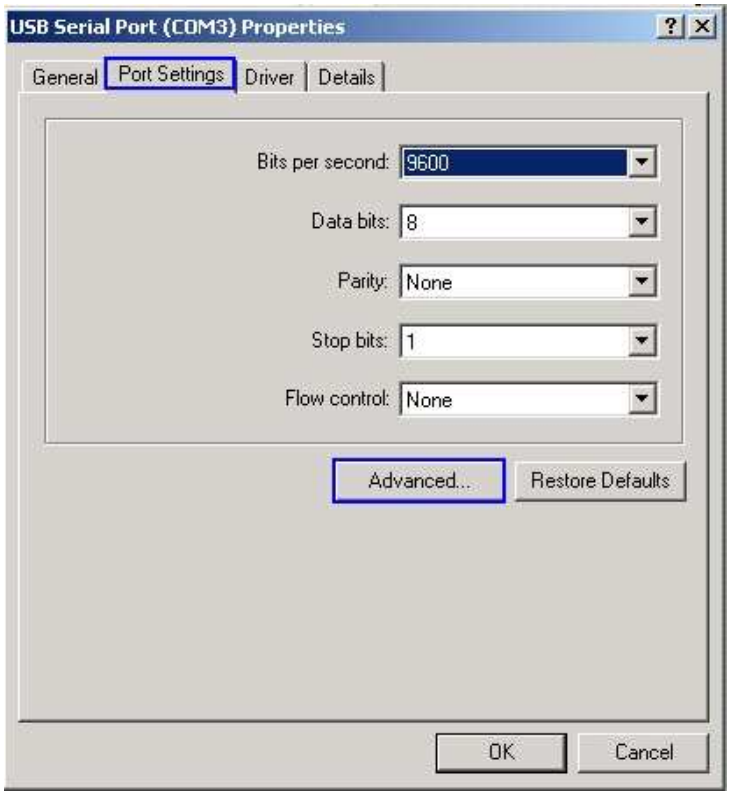
4. In last window press „Finish“ button.

To check on which COM port USB serial adapter is assigned open „Device manager“ program. In Ports (COM & LPT) tab find USB Serial Port line. In this example USB Serial Port is COM3.

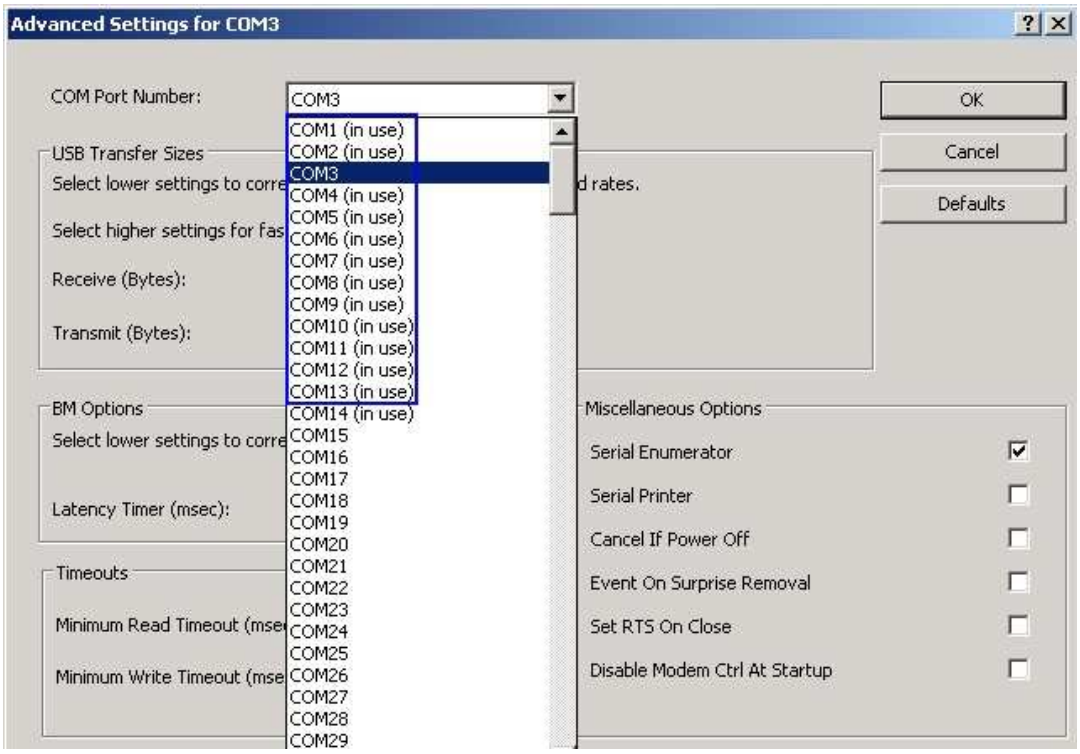


Please note that “Teltonika LV-CAN100 Bootloader” application supports COM ports numbers not higher than 12. If USB Serial Port is assigned to COM port 13 or higher please follow these steps:

1. In “Device manager” right click on USB Serial Port and select “Properties” tab.



2. Then select “Port Settings” tab and press “Advanced...” button.



3. In opened tab select COM port number not higher than 12 and press OK.

3.2 LV-CAN100 configuration

Connect bootloader USB adapter to computer and LV-CAN100 device.

Figure 2 LV-CANBOOT10 bootloader adapter

Start “Teltonika LV-CAN100 Bootloader” application. If you did not receive this application please contact Teltonika sales manager.

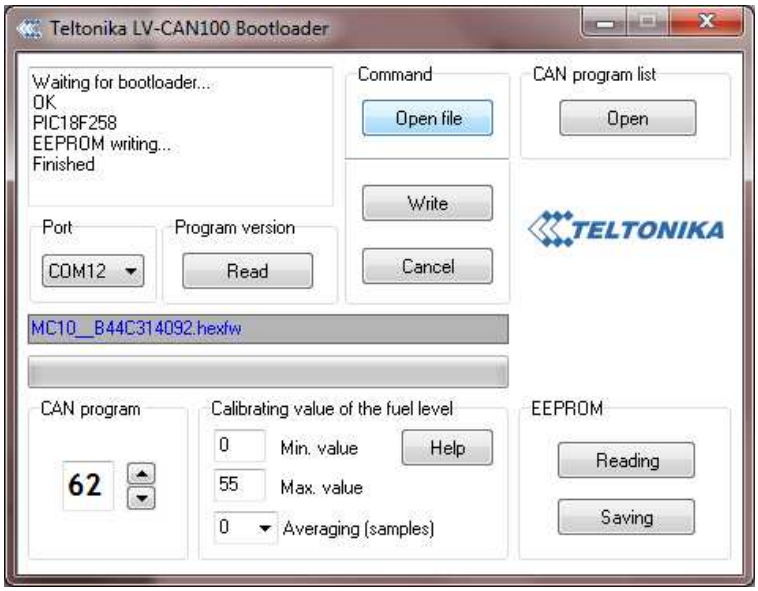


Figure 3 Teltonika LV-CAN100 Bootloader software

1. In “Teltonika LV-CAN100 Bootloader” application select port that was assigned to USB Serial Port.
2. Click „Open“ file button in „Command“ section and select firmware file for LV-CAN100. Which firmware you must to use for your car is described in “Light Vehicles Can adapter supported cars” document, column Software Group.
3. Click „Write“ button below and wait until massage “Finished” will be displayed.
4. In “Light Vehicles Can adapter LV-CAN100 Supported cars” document find CAN program number and min/max fuel level values for your selected light vehicle
5. Press “Reading” button in EEPROM section.
6. In “CAN program” section enter CAN program number from STEP 4.
7. In “Calibration value of the fuel level” section fill:
    a. Min. value – value from STEP 4
    b. Max. value – value from STEP 4
    c. For fuel averaging we suggest to use value 10
8. Click Saving button in EEPROM section and wait until “Finished” message will be displayed.

3.3 LV-CAN100 Signaling Led Description

LED name	Description
PROG-LED	1. When CAN program number is set, the LED indicates program number actual digit value. 2. When the module is working, the LED flashing indicates the correct validation of received data. *Behavior:* *Validation is correct:* Prog red LED is on, blinks; *Validation is bad:* Prog red LED is off.
CAN-Bus - Rx	The LED flashing indicates reception of CAN data. *Behavior:* *Reception is good:* CAN bus RX green is on; *Reception is not available:* CAN bus RX green is off;
CAN-Bus Active	The LED indicates correct connection of module CAN-bus wires to car CAN-bus wires. *Behavior:* *If good connection:* CAN bus active green LED is on; *If bad connection:* CAN bus active green LED is off.
IGN Status	The LED indicates that the ignition is turned on
RS-232: Green-TX	The LED indicates that the module is in car CAN-bus communication mode *Behavior:* *Module on:* RS232 green LED is on; *Module off:* RS232 green LED is off.
RS/UART-TX	The LED flashing indicates sending CAN data *Behavior:* *Sending is executed:* UART green LED is on, blinks; *Sending is not available:* UART green LED is off.

Figure 4 Adapter signaling led

4 Connecting FM1100 with Light Vehicles Can adapter

Connect USB Plug to FM1100 device, connect Light Vehicles Can adapter to other end of the cable.

Connect Light Vehicles Can adapter Pin 1 and Pin 2 to cars CAN bus. CAN interface location of the supported light vehicles are described in “Connection of LV-CAN100” manual.

Connect car power supply lines to Pin 16 positive, Pin 8 Negative.

For exact pinout see sticker on Light Vehicles Can adapter.

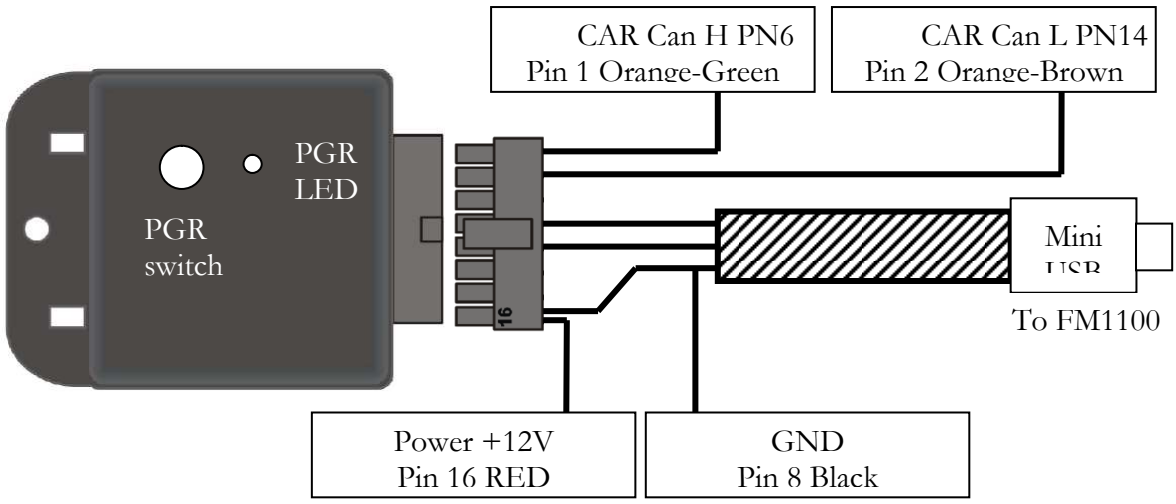
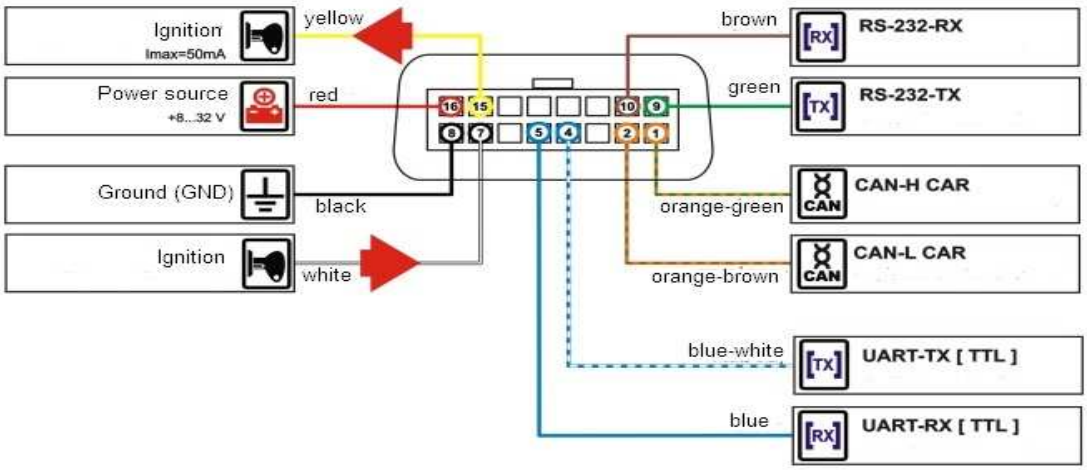


Figure 5 LV-CAN100 Adapter connection cable pinout



Attention! For detailed connection diagram of adapter to light vehicle please contact Teltonika, LTD sales representative and provide CAR manufacturer, model and year information.

Attention! Do not swap CAN L and CAN H lines.
Do not swap power supply lines. Make sure that voltage do not exceeds 30V.
Power supply lines should be connected at the end of installation work.

5 FM11 Configuration

To use LV-CAN100 adapter with FM1100 device you need to have:

a. FM11 firmware number 94.XX.XX
b. FM11 configurator version 1.94.XX.XX

For firmware and configurator please contact Teltonika sales manager.

FM1100 shares the same USB port for connecting LV-CAN100 adapter and configuring device with PC.

FM1100 can be configured using “SCAN” function or “Offline Configuration” (Figure 8)

SCAN function – is in use when FM1100 is connected to CAN adapter (Figure 6), then wait 10s (Note, that car engine must be started), disconnect adapter from FM1100, and connect PC USB cable to FM1100 Device (Figure 3). It is very important not to disconnect FM1100 from power source during this operation, because if FM1100 is reconnected all received CAN bus data will be lost. FM1100 remembers received data from LV-CAN100 and at the end of the procedure when “SCAN” button is pressed, user will see all CAN data which is sent by adapter. Enable CAN data which needs send to server and save configuration pressing “Save” button.

To configure CAN data:

1. In car, connect LV-CAN100 to CAN bus and to the FM1100 device (Figure 6), wait 10 seconds. Note, that car engine must be started.
2. Disconnect LV-CAN100 from FM1100, and connect PC USB cable to FM1100 Device (Figure 7). It is very important not to disconnect FM1100 from power source, because then all CAN data will be lost.

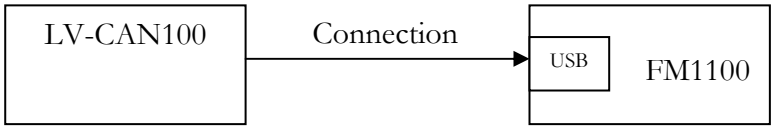


Figure 6 Connect adapter LV-CAN100 to FM1100

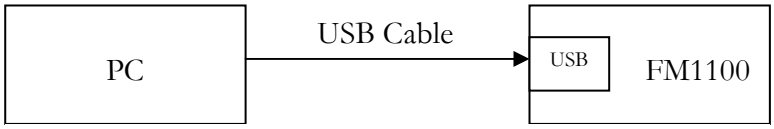


Figure 7 Connect FM1100 to PC and configure

CAN bus data which can be read from your car is shown in “Light Vehicles Can adapter supported cars” document.

Offline configuration – user can select which CAN data can be read from LV-CAN100 need to be sent to server without connection to adapter. Please note that parameters depend on vehicle manufacturer and vehicle model. Please for further information check “Light Vehicles Can adapter supported cars” document.

There are two types of operations with CAN data elements:

- Monitoring of CAN bus data
- CAN bus data event capturing

Monitoring method is used when user wants to receive CAN data on regular basis, for example every 20 seconds.

Event functionality is used to store additional AVL packet when state of CAN element is changing. For example Speed changes, low fuel level, engine temperate, etc.

Send data to server field - allows enabling CAN element so it is added to the AVL data packet and sent to the server. By default, all CAN elements are disabled and FM1100 records only GPS data.

It is possible to set CAN message priority: On Low Priority, On High Priority, and On Panic. Regular packets are sent as Low priority records. When low priority event is triggered, FM1100 makes additional record with indication what was the reason for that was CAN element change. When High priority is selected, module makes additional record with high priority flag and sends event packet immediately to the server by GPRS. Panic priority triggers same actions as high priority, but if GPRS fails, it sends AVL packet to server using SMS mode if SMS is enabled in SMS settings.

Data Acquisition Type - defines when to generate event – when value enters defined range, exits it or both, also is possible to select event which you want to generate then you change values, like crossing both values in high and low levels (Hysteresis).

High and Low levels – defines CAN value range. If CAN value enter or exits this range, FM1100 generates event by “Data Acquisition Type” settings. Figure 6 show example of FM1100 CAN configuration.

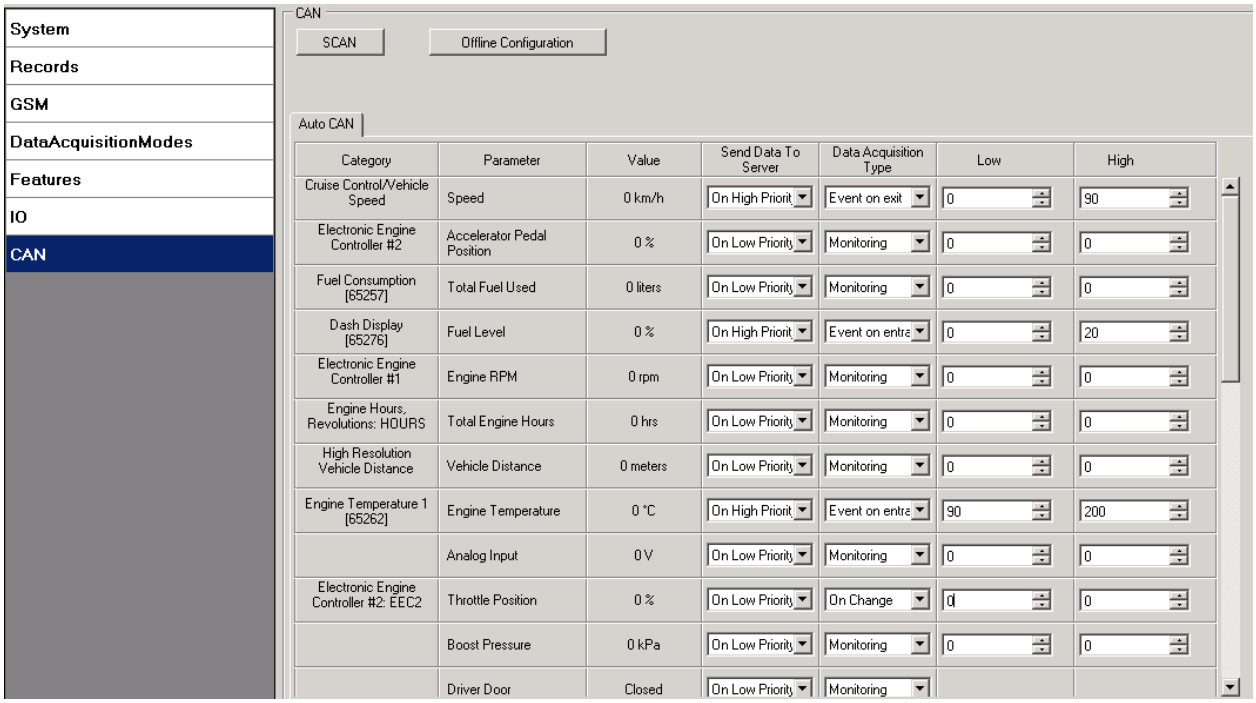


Figure 8 Configurator example

Available CAN Bus IO parameters and configuration can be found in Configurators CAN tab (Figure 8) and in next chapter “Parameters ID”.

6 Parameters ID

When no I/O element is enabled, AVL packet comes with GPS information only. After enabling I/O element(s) AVL packet along with GPS information contains current value(s) of enabled I/O element. AVL packet decoding is described in "FMXXXX Protocols" document. List of available CAN bus data, parameter size, ID and value range you can find in table 1.

Table 1 ACQUIRED PARAMETRS IO ID

Signal name	Size (Bytes)	Parameters IO ID	Value range
Speed	1	81	0-250 km/h*
Accelerator Pedal Position	4	82	0-100 %*
Total Fuel Used	4	83	0-2147483647 liters*
Fuel Level	4	84	0-100 %*
Engine RPM	4	85	0-8200 rpm*
Total Engine Hours	4	86	0 – 214748364 hrs*
Vehicle Distance	4	87	21474836475 meters*
Engine temperature	1	88	-40...+215 ºC*
Analog Input	4	91	[0 – 5]V*
Throttle Position	4	92	[0 – 100] %*
Boost Pressure	1	93	[0 – 500] kPa*
Driver Door	1	94	0 – Closed 1 – Open
Other Doors	1	95	0 – Closed 1 – Open
Trunk Door	1	96	0 – Closed 1 – Open
Ignition	1	97	0 – Off 1 – On
Cenrtal Door Lock Status	1	98	0 – Open 1 – Close
RPM Status	1	99	0 – RPM < 500 1 – RPM > 500
Work Status	1	100	0 – Not Working; Speed < 5 km/h 1 – Working; Speed > 5 km/h
Air Conditioning Status	1	101	0 – Off 1 – On
Program Number	1	102	[0 – 255]*
Fuel rate	4	106	[0 – 3212,75] litres/h*
Brake status	1	107	0 – Off 1 – On
Parking Brake	1	108	0 – Off 1 – On
Clutch Status	1	109	0 – Off 1 – On
Parking Headlights	1	110	0 – Off 1 – On
Low Headlights	1	111	0 – Off 1 – On
High Headlights	1	112	0 – Off

7 References

1. Light Vehicles Can adapter LV-CAN100 Supported cars
2. Connection of LV-CAN100
3. FM1100 User Manual

8 Changelog

Version	Date	Changes
1.0	2012 October 26	Initial release
1.1	2012 November 15	Added: SELECTING PROGRAM NUMBER AND FIRMWARE GROUP BY BOOTLOADER
1.2	2012 November 20	Minor changes
1.3	2012 November 27	Major changes
1.4	2013 January 11	Minor changes