FMB641 CAN adapters

FMB641 supports CAN adapters over RS232 connection. **CAN adapter support is added from 02.02.11.Rev.00 firmware**
Easy steps to install and configure following CAN adapters on FMB641 device:

- LV-CAN200
- ALL-CAN300
- ECAN02

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Contents

Installing CAN adapter with FMB641 device

Installing LV-CAN200 / ALL-CAN300

You can watch LV-CAN200 / ALL-CAN300 installation video in our YouTube channel **here** or follow connection instructions below.

Tools needed for installation

- LV-CAN200 or ALL-CAN300
- Connection scheme (Please contact Teltonika Sales Representative and provide information about **vehicle manufacturer**, **model** and **year**.
- FMB641 device

- Pliers
- Quick splice connectors (If vehicle CAN bus wires are very thin CAN adapter wires should be connected directly)
- Plastic pry tool
- Zip ties

Installation steps

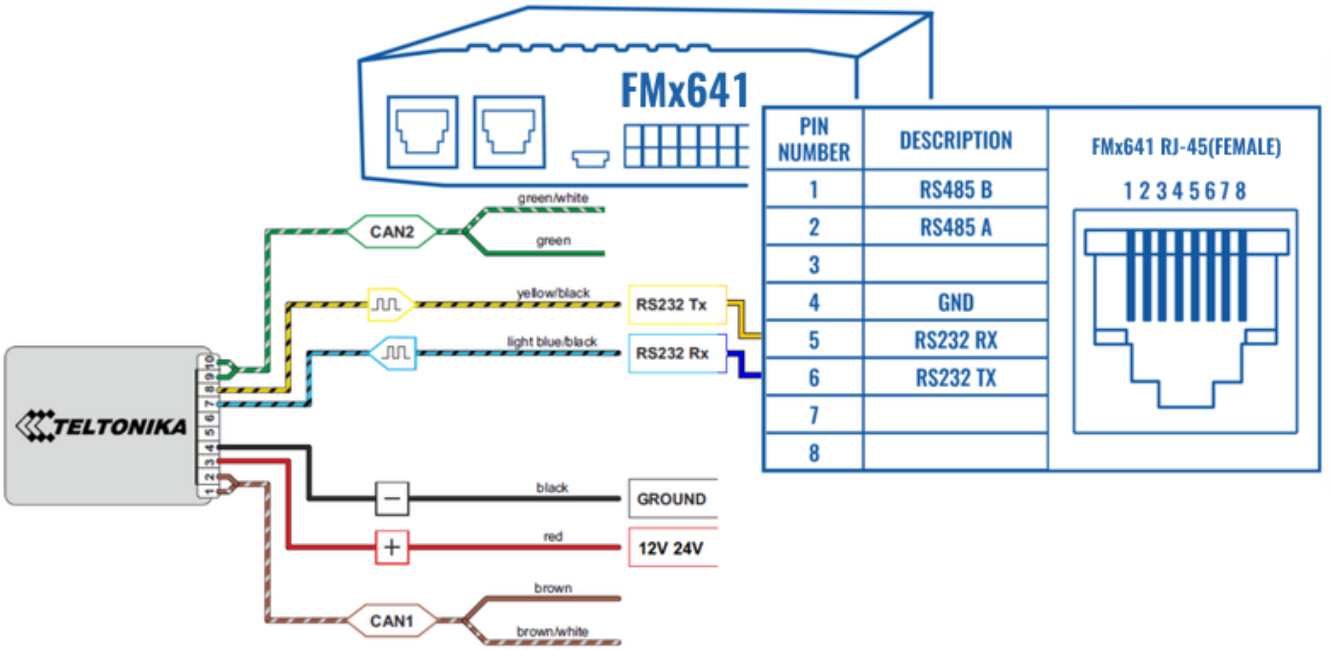
1. Be ready with a vehicle **connection scheme** that you have received from a Teltonika Sales Representative.
2. **Check the scheme** for the current vehicle connection. Look for connectors matching **PINs numbers** and colors (maybe different) according to the connection scheme.
3. Connect CAN adapter with FMB641:
    1. Connect CAN adapter's RS232 to RJ45 of FMB641.
4. Connect CAN adapter **CAN wires (CAN L, CAN H)** as specified in connection scheme.

Do not swap CAN L and CAN H lines.
Not all CAN adapter wires may be used in the vehicle.

5. Connect CAN adapter **positive** and **ground** wires to the vehicle power supply lines or near FMB641 power wires.

Do not swap power supply lines.
Make sure that voltage does not exceed 30V.

6. Switch vehicle **ignition to ACC** position. CAN adapter **LED diode** on the back should start **blinking**.
7. Configure CAN adapter to read CAN bus data or control vehicle by setting its **program number** - CAN Adapter configuration



LV-CAN200 connection example. This is not a connection diagram for your vehicle. Every vehicle has a specific scheme.

Installing LV-CAN200 / ALL-CAN300 + ECAN02

Tools needed for installation

- LV-CAN200 / ALL-CAN300
- Connection scheme (Please contact Teltonika Sales Representative and provide information about **vehicle manufacturer**, **model** and **year**.
- ECAN02 (Used for contactless connection. If **two CAN lines** need to be connected, **ECAN02** must be used.)
- FMB641 device
- Pliers
- Quick splice connectors (If vehicle CAN bus wires are very thin CAN adapter wires should be connected directly)
- Plastic pry tool
- Zip ties

Installation steps

1. Follow the same **1, 2, 3** installation steps as with LV-CAN200 installation.
2. Connect the appropriate CAN bus pair of wires between the CAN adapter and ECAN02:

    If **CAN1 line** need to be connected as specified in the connection scheme:

    1. Connect CAN adapter **CAN1 L** to **CAN L** of ECAN02.
    2. Connect CAN adapter **CAN1 H** to **CAN H** of ECAN02.

    If **CAN2 line** need to be connected as specified in the connection scheme:

    1. Connect CAN adapter **CAN2 L** to **CAN L** of ECAN02.
    2. Connect CAN adapter **CAN2 H** to **CAN H** of ECAN02.

Do not swap CAN L and CAN H lines.
Not all CAN adapter wires may be used in the vehicle.

3. Fasten ECAN02 **on vehicle CAN bus wires** according to the connection scheme. **Make sure CAN H and CAN L of vehicle corresponds to CAN H, CAN L markings on ECAN02** PCB.

4. Connect CAN adapter **positive** and **ground** wires to the vehicle power supply lines or near FMB641 power wires.

Do not swap power supply lines.
Make sure that voltage does not exceed 30V.

5. Configure CAN adapter to read CAN bus data by setting its **program number** - CAN Adapter configuration

CAN Adapter Configuration

CAN Adapter program number selection

CAN Adapter must be set to the program number which depends on the vehicle model. **Needed program number is always written on CAN Adapter mounting scheme.** In order to be able to enter the program number in the adapter **Software date of the CAN adapter must be newer than the connection scheme date**. CAN adapter Software date can be checked:

- Via Teltonika Configurator→Status→CAN Adapter
- Via SMS command - lvcangetinfo

The number of digits required to enter the correct Program No. may vary depending on the Software and manufacture date of your CAN Adapter:

- LV-CAN200 adapter changes
- ALL-CAN300 adapter changes

Entering via SMS command

Required conditions:

- CAN adapter properly connected to FMB641 device

CAN adapter program number can be set remotely, using an SMS command. Send following **SMS command** to FMB641 device:

- If you have set SMS login and password: `login pass lvcansetprog X`

- If SMS login and password are not set leave two spaces before the command:
  `lvcansetprog X`

Command example: `lvcansetprog 11434`
SMS response: `LVCAN ProgNum: 11434`

If during SMS command FMB641 was in the following Sleep mode:

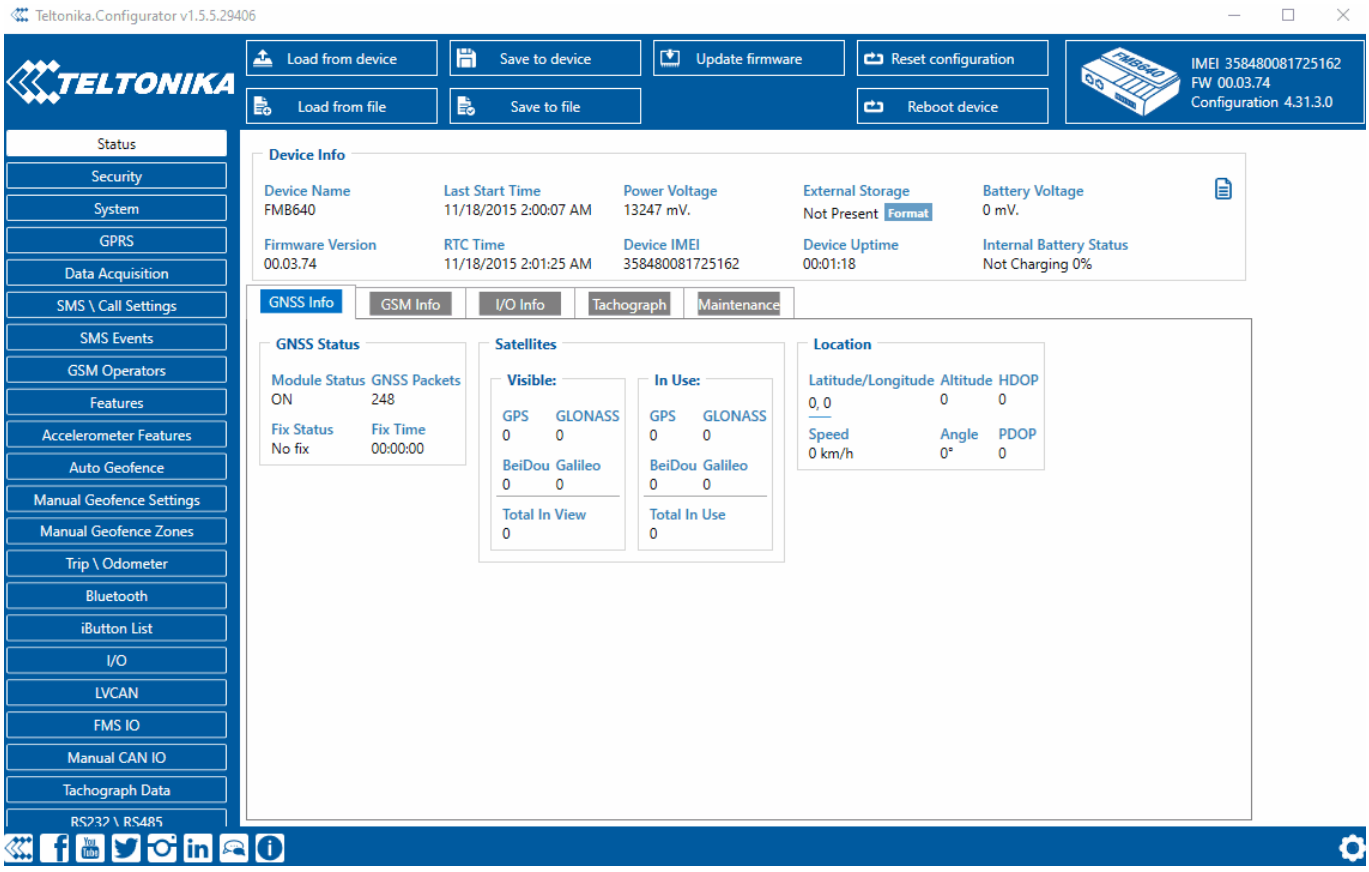
- GPS Sleep - Program No. will be set immediately.
- Deep Sleep - Program No. will be set after the device wakes up.
- Online Deep Sleep - Program No. will be set immediately.

Entering via Teltonika Configurator

Required conditions:

- CAN adapter properly connected to FMB641 device

CAN adapter program number can be set via **Teltonika Configurator → LVCAN → Program Number**. When the program number is entered press **Save to device** button that saves the entered program number into FMB641.



Entering manually

Required conditions:

- CAN adapter properly connected to FMB641 device
- Vehicle ignition must be ON

Depending on the used CAN Adapter, the length of the setup sequence will vary.

Steps to set program number:

LV-CAN200 back

For ALL-CAN300 LV-CAN200 3 digit	For ALL-CAN300 LV-CAN200 4 digit	For ALL-CAN300 LV-CAN200 5 digit	1. Hold SWITCH down until LED stars blink.
			2. Release the SWITCH.
			3. Then the LED starts blinking and counting the first digit of the program number (one blink means digit 1, two blinks mean digit 2, etc). To stop the counter, push SWITCH.
			4. Release the SWITCH, then the LED starts blinking and counting the second digit of the program number. To stop the counter, push SWITCH.
			5. Release the SWITCH, then the LED starts blinking and counting the third digit on the program number. To stop the counter, push SWITCH.
			6. Release the SWITCH, then the LED starts blinking and counting the fourth digit on the program number. To stop the counter, push SWITCH.
			7. Release the SWITCH, then the LED starts blinking and counting the fifth digit on the program number. To stop the counter, push SWITCH.
All Devices			8. Release SWITCH, if programming is successful LED will blink 10 times.

Send data with 0 if the ignition is off

Depending on CAN Adapter I/O parameters and ignition status, FMB641 can send locked (last known) CAN Adapter I/O and active (real-time) parameter values or reset values to 0. When the ignition is off, CAN Adapter I/O parameters values sent to the server are:

CAN Adapter I/O element	Status
Vehicle Speed	reset
Accelerator pedal position	reset
Total fuel used	lock

Fuel level (liters)	lock
Engine RPM	reset
Total mileage	lock
Fuel level (%)	lock
Program number	lock
Module ID	lock
Engine Work Time	lock
Engine Work Time (counted)	lock
Total Mileage (counted)	lock
Fuel Consumed (counted)	lock
Fuel Rate	reset
Program number	lock
AdBlue Level (%)	lock
AdBlue Level (liters)	lock
Engine Load	reset
Engine Temperature	active
Axle 1 Load	lock
Axle 2 Load	lock
Axle 3 Load	lock
Axle 4 Load	lock
Axle 5 Load	lock
Control State Flags	active
Agricultural Machinery Flags	active
Harvesting Time	lock
Area of Harvest	reset
Mowing Efficiency	active
Grain Mown Volume	active
Grain Moisture	active
Harvesting Drum RPM	reset
Gap Under Harvesting Drum	active
Security State Flags	active
Tachograph Total Vehicle Distance	lock
Trip Distance	reset
Tachograph Vehicle Speed	reset
Tachograph Driver Card Presence	active

Driver1 States	active
Driver2 States	active
Driver1 Continuous Driving Time	active
Driver2 Continuous Driving Time	active
Driver1 Cumulative Break Time	active
Driver2 Cumulative Break Time	active
Driver1 Selected Activity Duration	active
Driver2 Selected Activity Duration	active
Driver1 Cumulative Driving Time	active
Driver2 Cumulative Driving Time	active

SMS Configuration

All CAN Adapter IO elements can be configured remotely via SMS commands.

SMS/GPRS Commands

CAN Adapters have several dedicated SMS/GPRS commands.
SMS command structure:

```
<SMS login><space><SMS password><space><command><space><value>
```

SMS command lvcangetinfo example:

- If you have set SMS login and password: `login pass lvcangetinfo`
- If SMS login and password are not set leave two spaces before the command: `lvcangetinfo`

GPRS commands require Codec 12 protocol.

For more SMS commands please see SMS/GPRS command list

COMMAND	DESCRIPTION	RESPONSE
lvcansetprog #	Set program number to CAN Adapter that is connected to FMB641. # - three digit number that identity vehicle.	Yes

lvcansimpletacho #	Add or remove simpletacho start byte. # - 0 or 1 (0 – don't add start byte, 1 – add start byte).	No
lvcangetprog	Get program number from CAN Adapter that is connected to FMB641.	Yes
lvcangetinfo	Get information about connected CAN Adapter	Yes
lvcanclear #	Clear Total Mileage (counted), Engine Work Time (counted), Fuel Consumed (counted) parameters values. # - parameter (0 – Engine work time (counted), 1 – Fuel Consumed (counted), 2 – Vehicle Mileage (counted)).	Yes

CAN Adapter State Flags

CAN Adapters receive data about the states of various systems within the vehicle, and send them as flags to FMB641. FMB641 device stores these flags in hexadecimal format, as one variable. **Note!** To retrieve all flags, Firmware version **03.00.16.Rev.01** for **FMx650 / FMx641** or newer must be used. Below are the table of flags that are kept by LV-CAN200, ALL-CAN300 and information how to retrieve them:

Security State Flags P4

Byte	Bit	Value bitmasks	LVCAN	ALLCAN
0	0	0x00 – CAN1 connected, currently no data is received 0x01 – CAN1 connected, currently data is received 0x02 – CAN1 not connected, needs connection 0x03 – CAN1 not connected does not need connection	□	□
0	2	0x00 – CAN2 connected, currently no data is received 0x01 – CAN2 connected, currently data is received 0x02 – CAN2 not connected, needs connection 0x03 – CAN2 not connected does not need connection	□	□
0	4	0x00 – CAN3 connected, currently no data is received 0x01 – CAN3 connected, currently data is received 0x02 – CAN3 not connected, needs connection 0x03 – CAN3 not connected does not need connection		
1	8	0x01 – ignition on	□	□
1	9	0x02 – key in ignition lock		□
1	10	0x04 – Webasto		□
1	11	0x08 – engine is working		□
1	12	0x10 – standalone engine		□
1	13	0x20 – ready to drive		□
1	14	0x40 – engine is working on CNG	□	□
1	15	0x80 – work mode (0 – private, 1 – company)		□
2	16	0x01 – operator is present		□
2	17	0x02 – interlock active		□
2	18	0x04 – handbrake is active		□
2	19	0x08 – footbrake is active		□
2	20	0x10 – clutch is pushed		□
2	21	0x20 – status of the hazard warning lights switch active		□

2	22	0x40 – front left door opened	□	□
2	23	0x80 – front right door opened	□	□
3	24	0x01 – rear left door opened	□	□
3	25	0x02 – rear right door opened	□	□
3	26	0x04 – trunk door opened	□	□
3	27	0x08 – engine cover opened	□	□
3	28	0x10 – charging wire is plugged		□
3	29	0x20 – battery charging on		□
3	30	0x40 – electric engine is working		□
3	31	0x80 – car is closed with factory remote control		□
4	32	0x01 – car is closed		□
4	33	0x02 – factory installed alarm is active		□
4	34	0x04 – emulated alarm is active		□
4	35	0x08 – signal of closing with factory remote control was sent		□
4	36	0x10 – signal of opening with factory remote control was sent		□
4	37	0x20 – rearm signal was sent		□
4	38	0x40 – trunk was opened with remote control		□
4	39	0x80 – CAN module is in SLEEP mode	□	□
5	40	0x01 – signal of closing with factory remote control was sent 3 times		□
5	41	0x02 – parking is active		□
5	42	0x04 – reverse is active		□
5	43	0x08 – neutral is active		□
5	44	0x10 – drive is active		□
5	45	0x20 – engine lock active		
5	46	0x40 – request to lock the engine (activation after attempt to restart the engine)		
5	47	0x80 – factory armed		
6	48	0x01 - roof opened	□	□