CAN. User Manual for work with CAN scanner

User Manual

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Necessary tools, devices, materials

To use CAN scanner, it is necessary to have:

1. Electrical tools.
2. Set of connecting wires, USB-cable, cable for diagnostic connector OBD-II connection.
3. A computer running Windows with the installed service software for configuration of Galileosky tracking devices - "Configurator". We recommend you to install the latest version of the service software from our site https://galileosky.com/podderzhka/programmyi.html
4. Galileosky tracking device version 7.0 or Base Block with firmware version 20.0 (hereinafter - the tracking device).
General Information

A new solution of Galileosky company allows you to read messages in CAN-bus in original form and look through their changes in real time mode.

Using this functionality, you can quickly find such parameters as engine speed, pedal position, door position, etc. in the CAN-bus of the vehicle.

CAN scanner is primarily designed for technical specialists, who install tracking devices and carry CAN parsing out. CAN scanner usage significantly reduces the time for searching and parsing CAN messages.

This manual describes the interface and the procedure of work with CAN scanner. Unfortunately, the text version of the manual does not provide a sufficient level of clarity. To make it easier to understand how to work with CAN scanner, we recommend you to watch the video of CAN scanner usage. The video is available for viewing at the link “Do you still think reading data from CAN bus is difficult?”. 
Connecting CAN-bus

To use CAN scanner functionality, first of all it is necessary to connect the tracking device to the CAN-bus of the vehicle.

The Ways of connecting the CAN-bus of the vehicle are given in the User Manual “CAN-bus. Connection to the CAN-bus” on our web-site https://galileosky.com/podderzhka/dokumentacziya.html

Notice, that there are particular features of connecting CAN-bus for each vehicle, it is necessary to examine them before starting work.
Tracking device settings for work with the CAN-bus

After connecting tracking device to the CAN of the vehicle, before using the CAN scanner, it is necessary to determine the CAN-bus baud rate. The baud rate is determined according to the car technical documentation or empirically by sorting out the preset baud rate parameters.

Start the Configurator, connect the tracking device to the computer using USB cable, and as soon as the data of tracking device is uploaded go to “Settings” sector of the Configurator → “CAN scanner”.

Specify the baud rate of the CAN-bus, select the filter type “J1939 custom filter, 11bit ids” and click “Start receiving” (Pic. 1).

If the baud rate is chosen correctly and CAN connecting is done in a proper way then you can see a list of all CAN-messages. Otherwise, it is necessary to check if the CAN connection and bus baud rate are correct. Then go to the CAN scanner.
Work with CAN scanner

After successful CAN-messages reading the number of read messages will be displayed in the CAN scanner tab (Pic. 2).

Let's examine the functions that can be used as a part of the CAN scanner.

"Online calculator"

At the upper right of the window there are three lines that allow to convert numbers into different number systems (Pic. 3)

As soon as you enter the data you are able to see them in three popular number systems.

Messages follow

The CAN-bus message line begins with the tick box “Follow”. If you clear the tick box, then the message will not be followed and will not be displayed as active message in the CAN scanner window. (Pic. 4)
Minimal period to highlight

By default, the minimal time for the changing data when it is highlighted in red is 3 seconds.

To search the data that can be shown at any time, the necessary time may be chosen by the slider. During the chosen time some actions should be made and the data that shows, for example, opened/closed door will be highlighted in red, at the same time other data will stay grey.

The minimal period to highlight should be chosen for each vehicle individually by experiment. It should also be taken into account that all the data that are shown in “Data” field during the chosen time should stay grey in order not to focus attention away from the search.

Work with “Mask”

When you click on mask icon (it appears when the mouse is pointed to the data line) the scanner turns to the edit mode (Pic. 5).

In this window you can tick the bits, which are necessary to follow the specific part of CAN bus message. After the bits are ticked a double message line appears in the CAN messages list. In this line the data will be updated only in case of matching with mentioned in mask bits, for example:

- ticked bit does not match - lower line updates, upper line does not update (Pic. 6a)
- ticked bit matches - upper line updates simultaneously with the lower line (Pic. 6b)
Representing data in CAN message

The data received from CAN-bus are displayed in the line in bin and hex formats, in upper and lower lines respectively (Pic. 7).

Please notice that the faster the value in particular bit changes, the brighter it is highlighted in red. After the change the bit turns red and starts tarnishing. If the data has not been changing for 5 seconds the bit turns grey and keeps this colour till next change.

Searching for particular data in a CAN message

If you guess in which bytes and bits there is necessary information, click them with the mouse left button to choose the bits for displaying (Pic. 8). You can choose one bit or several in a single byte, or a byte as a whole. The maximum number of bytes to choose is 4.

After the necessary information is chosen the data will be displayed in decimal in the right part of the message

You can also choose the representing format from the list

- unsigned, little endian
- signed, little endian
- unsigned, big endian
- signed, big endian

New filter adding

It is not acceptable to choose several bits from different bytes in the same line while searching for particular data in the message.

If it is necessary to analyse different bytes or bits from the same line, it is better to add a double line by clicking “Add filter” in lower part of CAN scanner.
After that specify ID which will be mentioned in the data representing window (Pic. 10).

In the double line you can also choose necessary bits and bytes as well as in the original line.

## Data recording to the protocol tag

As soon as the data were decoded, they can be recorded to the protocol tag. At the moment it is possible to transfer up to 4 bytes in one message.

To do that it is necessary to choose the data, then the Configurator will automatically identify possible tags for recording, according to the size of chosen date.

After all the data and protocol tags are chosen, click the “Apply” button at the bottom of the Configurator tab.
Sending messages to the CAN-bus

When it is necessary to get data on a special request you may need to send a message to CAN bus.

To send messages to the CAN bus, you must agree to the proposed conditions by ticking the corresponding box (Pic. 12).

After the function activation click  to specify the ID of sending message. Then the new line appears which you need to fill in with necessary data (Pic. 13).

Let's analyse all fields

- 29 bit. 29-bit message must be sent;
- Size in bytes. You need to specify the number of bytes in a message;
- Data. Values to be sent to the CAN-bus;
- Send once after clicking a single message is sent the CAN-bus;
- Periodic send. Here you should specify the frequency of message sending in milliseconds. If you want to send a message constantly, you need to tick “every”;
- Delete message (sending) – when you click the button, the corresponding message is deleted from the sending section

If it is necessary you can click “Add message” several times.

In addition, in order to add a message to be sent to the CAN-bus, click the “Copy” button (appears after pointing the mouse to the required data line) next to the necessary message in the data field. After that, a message with the same ID and the same data will appear in the sending messages to the CAN-bus section.
Read data processing

After all information in CAN-bus was found and decoded, there are several ways to process the received data:

- Data processing with Easy Logic
- Received data conversion with the help of filters
- Data transmission to the server in original form

To learn more about Easy Logic technology and to complete a training course follow the link Easy Logic Technology.

You can learn more about the way of work and setting of filters at the link Service. Using filters for Converting data.

To send the received data to the server in original form it is necessary to do the following:

- Choose necessary data in the CAN scanner tab, specify the tags where the data should be recorded, click “Apply” button (Pic. 14)

Then go to the “Protocol” tab of the Configurator and find in the main packet the tag which was chosen earlier in CAN tab (CAN16BITR0 as in our example). The tag should be ticked to be sent to the monitoring server as a part of the main packet (Pic. 15).
RSA “Galileosky”, LLC produces satellite monitoring equipment for GPS and GLONASS real time vehicles monitoring. The tracking devices determine the mobile object location recording the time and route as points with geographical coordinates and send the data to the server to be further processed and sent to the traffic controller panel.

In addition, a number of other vehicle parameters are recorded: the state of analog and discrete inputs of the tracking device and the state of digital interfaces.

The tracking devices can be used in any vehicle.