Digiteq Automotive

CANSim Studio

Manual 1.01

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Changes

Version	Date	Description of Change	Changed by	Approved by
1.00	12. 10. 2021	First version	Tomáš Penk	
1.01	8. 6. 2023	Add information about SW versions 1.1.2, 1.2.0 and 1.2.1.	Tomáš Penk	

Application Version History

Table 1: Versions of CANSim Studio Application

1.0.0	10. 9. 2021	First release candidate.
1.1.1	23. 9. 2021	Correct user simulation upload; second release candidate.
1.1.2	11. 2. 2022	Correct device licence upload.
1.2.0	31. 3. 2023	Correct saving CANSim Studio project file. Fix confused description of min/max and down/up values. **Add nonzero cycle time check and CAN FD settings.**
1.2.1	8. 6. 2023	Fix database and node selection.

About CANSim Studio Manual

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We are grateful for references to mistakes or for suggestions for improvements to be able to offer you even more efficient products in future.

General Requirements

The CANSim Studio application is a Windows application which purpose is to enhance CANSim4 device functionality.

It requires Windows 8 or later. Unfortunately, it is not available on Linux systems.

CANSim4 device (further as CANSim) should be connected to the PC via mini-USB and **switched to Mode 5** before the connection (the only exception is firmware update for which Mode F is required).

Application Overview

CANSim Studio is a multipurpose support tool for CANSim. It has three main fields of functionality – managing user defined simulations, automatic firmware update and setting of some device features (time and date, VIN, licences).
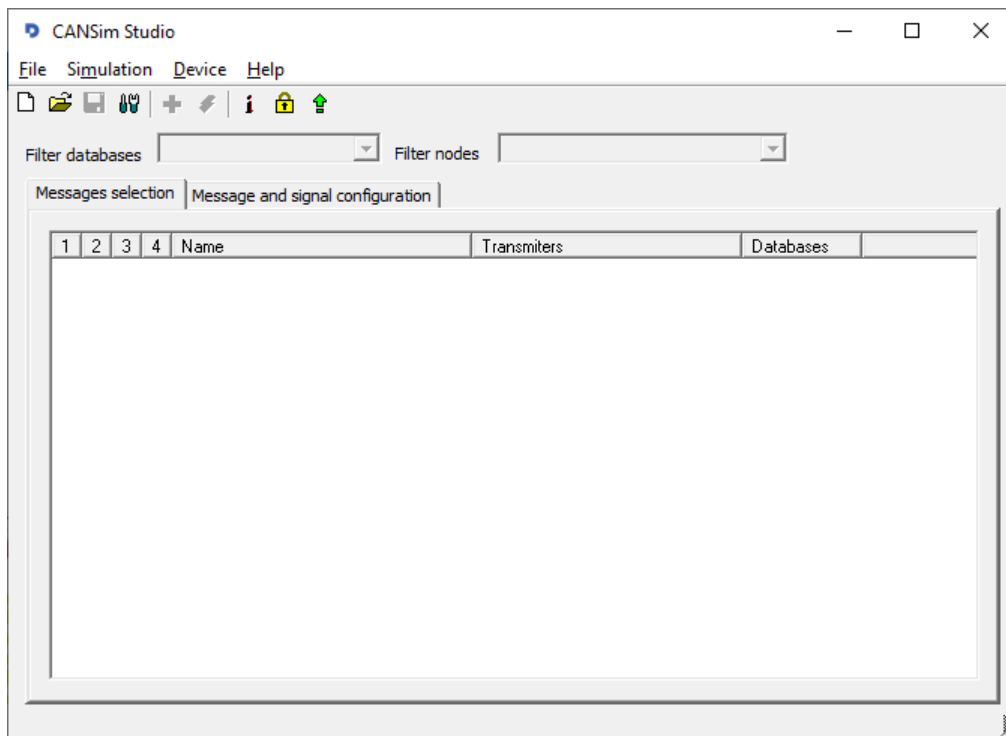
Figure 1: CANSim Studio main window

Simulation menu

In the simulation menu it is possible to add or remove database files (.dbc format). When the simulation configuration is complete, there are functions for uploading it to the CANSim or deleting it.

Device menu

In the device menu CANSim administration can be done. The following actions are available:

› **Device info**   Information about your CANSim device will be printed. These include:
  › Product code – This is the code of the product (firmware) that is currently flashed.
  › HW Version – Version of the CANSim hardware (might be 2.0 or 5.0).
  › FW Version – Version of the CANSim firmware.
  › Serial number – CANSim serial number.
› **Licence manager**   It allows licence handling (see below).
› **Firmware update**   CANSim Studio automatically downloads the latest version of the firmware available for the currently used product from our site.

› **Set device time and date** CANSim Studio allows you to change time and date stored in the device RTC.

› **Set VIN**   It is possible to change VIN transmitted in the CAN messages (see CANSim4 User Manual, chapter 8 – Message List) – independently for MQB, MQB37W and MEB regimes.

CANSim Studio Project

Basic project handling

First, a new project should be created. Use *File / New project* for this purpose. Then, you can save it via *File / Save project*. When you want to open an existing CANSim project, use *File / Open project*. To close the project use *File / Close project*.

Note: CANSim project are saved to files with .csp extension.

When your project is open, you can see its name in the main window title. A star before the name means that there are unsaved changes. In this case, the application will ask you when you try to create a new project, open another project, close the project or exit the whole application.

Database manipulation

When you have your CANSim project, you need to add a database files. From the added databases you can then select the messages that will be transmitted by your CANSim device. A database file should be in Vector Informatik format, i.e. a file with *.dbc* extension.

When you want to add new database, use *Simulation / Import dbc file*. When you want to remove some old database, select it from the *Simulation / Remove dbc file* menu.

Note: It is not possible to add a database with a name that has any of the already added databases. So if you want to replace some database with a newer version (update), you have to remove the old one first and then add the new one. Unfortunately, the selected messages will be deleted with all their signal values you have possibly set or changed.

Message selection

Once your CANSim Studio project is open, there are two tabs – *Messages selection* and *Message and signal configuration*. In the first tab you can select which message should be transmitted on which CAN bus. Note that CAN 1 and CAN 2 are not FD compatible, so you cannot select them for CAN FD messages.

Two filters can be used. One is based on the database name. When you select one database, the other filter become accessible. You can choose a node from the selected database. In the table you can then see all messages that the selected node sends.

When you click on the column heading the table will be sorted alphabetically according to the column. Another click reverts the order.

There is also a context menu available in the table. All messages can be assigned to or removed from some CAN or completely unselected.

In our example (Figure 2) we added four .dbc files, then we selected MQB2020_KCAN database, sorted the table according to the message name and finally check ACC_20 for CAN 2, AGA_01 for CAN 1 and Airbag_04 for CAN 1 and CAN 4.

Note: CAN FD is set to speed 500 / 2000 kBaud, sample point to 80 % for arbitration phase, 70 % for data phase and prescaler to 2 for both phases. These parameters cannot be changed!

Signal values

In the second tab you can set some parameters to the messages and signals. In Figure 3 we have chosen AGA_01 message. For signal "AGA_Charisma_FahrPr" we can now select a value from the listed ones. The names are parsed from the database file.

You can fill either raw signal value (it means the hexadecimal representation) or choose the textual representation of it from the drop-down list. In the latter case keep in mind that only values listed in the database file have their textual representation.

When you want to change the signal value during simulation dynamically, you can change *Modification type* to "Dynamic". Then you can select the control element and assign values to it (see Figure 4 where we choose "Switch 2" as the control element and assign the appropriate values).

Possible control elements and their meaning are:

› **No control** – no control element assigned
› **Potentiometer 1** to **Potentiometer 6** – the value is counted uniformly from the potentiometer position; you can fill in minimum and maximum
› **Voltage 1** – voltage at the main CANON 15 connector
› **Voltage 2** – voltage at the external power supply connector
› **Digital input 1, Digital input 2** – logical value of the digital input in the main CANON 25 connector; you can fill in a value for logical zero and logical one
› **Switch 1** to **Switch 4** – position of the corresponding switch; you can fill in a value for every position
› **Random 1** to **Random 4** – a (pseudo)random value generated at runtime; you can fill in minimum and maximum
› **DIP switch 1** to **DIP switch 12** – position of the corresponding DIP switch; you can fill in a value for both positions
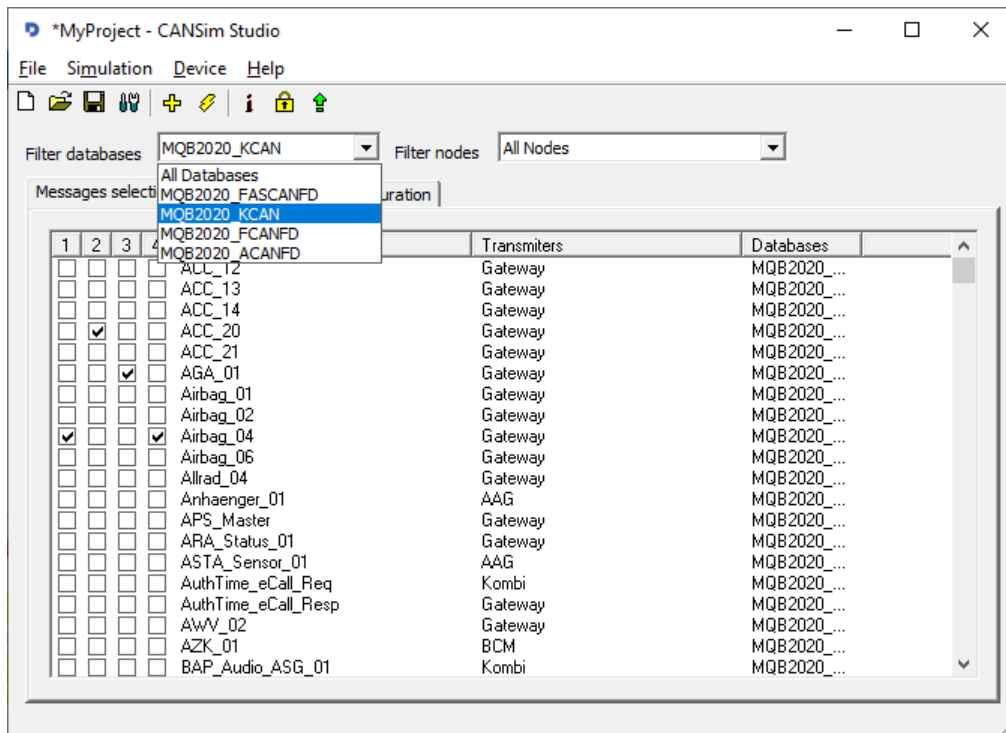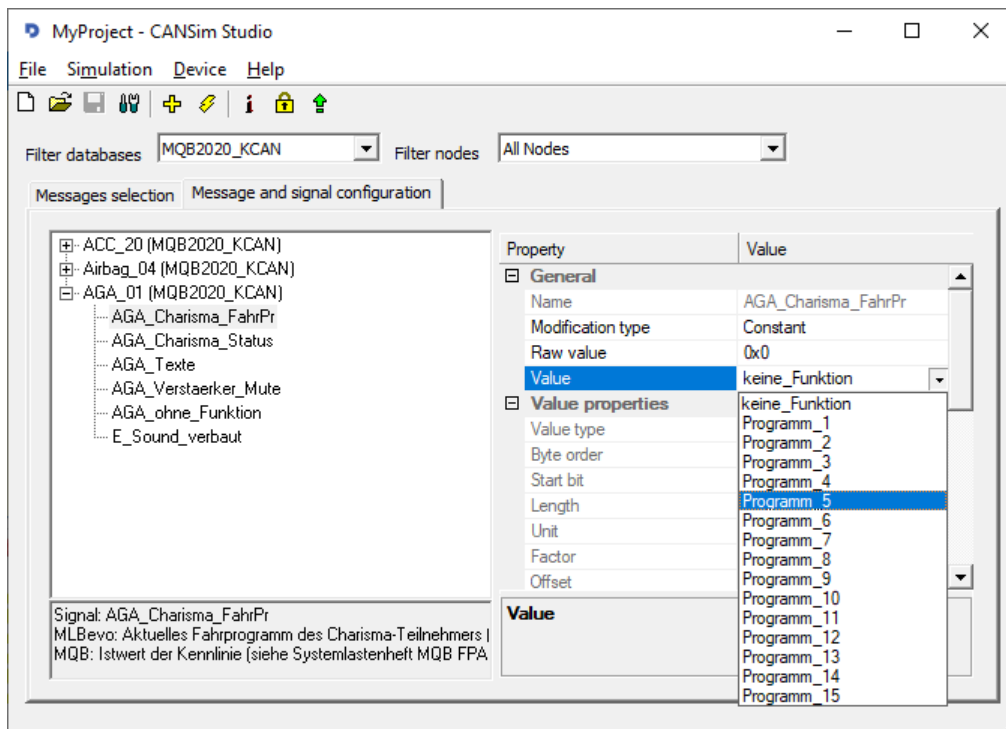
Figure 2: Messages selection window

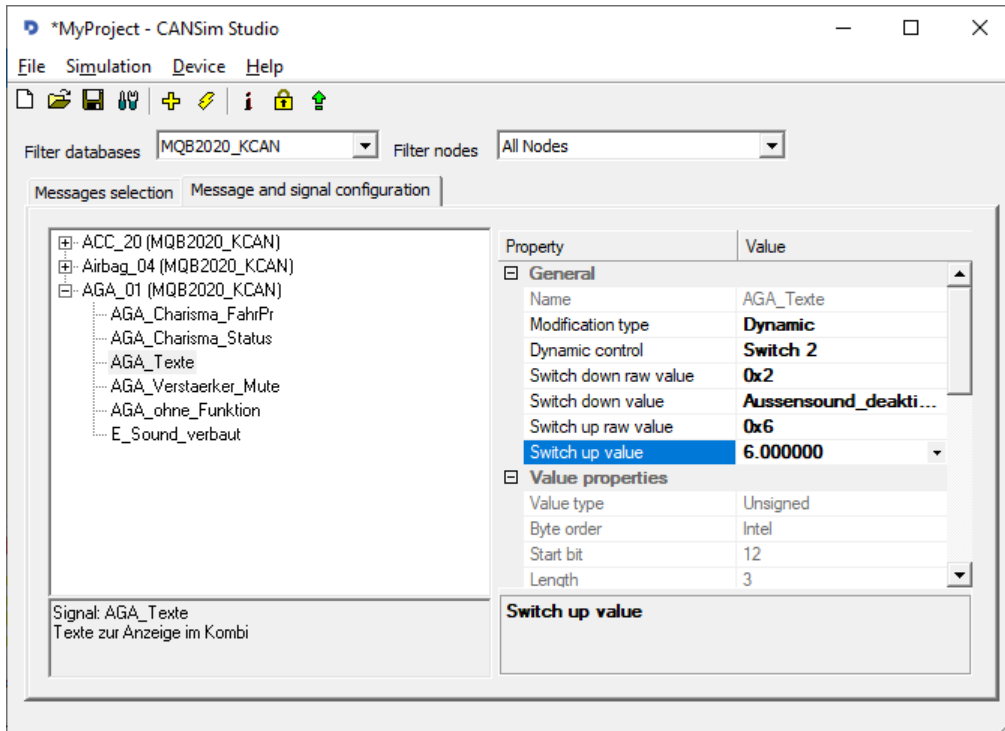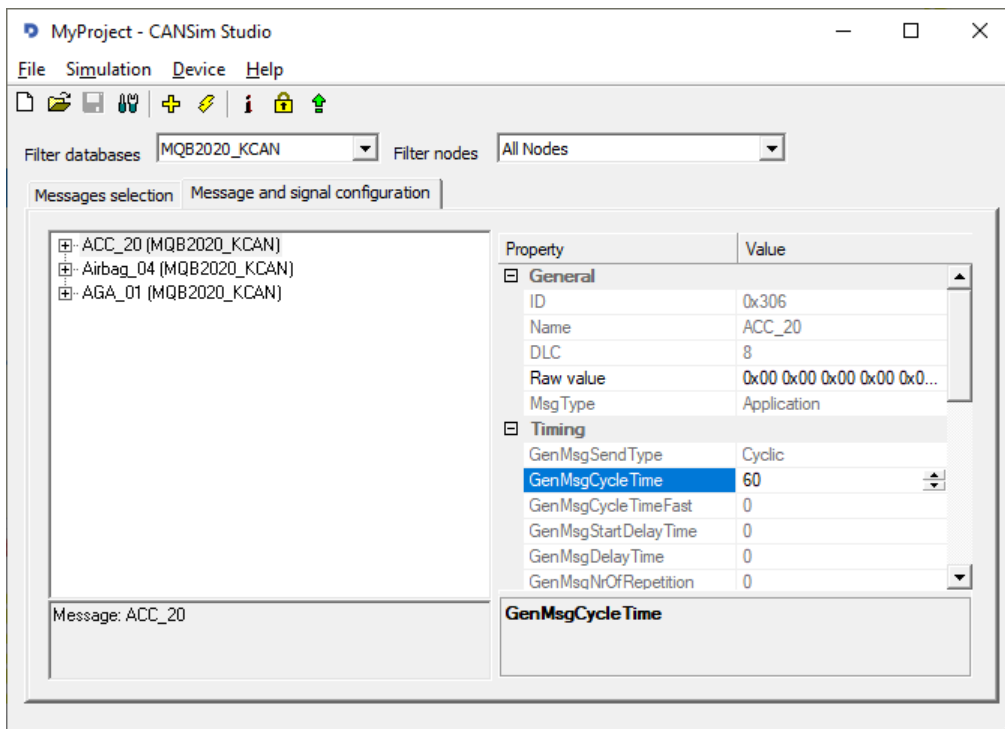Figure 3: Message and signal configuration window

Figure 4: Message and signal configuration window – dynamic control

One important warning

Please be sure that no message in your configuration has its *cycle time* (Figure 5: Message and signal configuration window – message cycle timeFigure 5) set to zero! Otherwise, your simulation will not run in CANSim.

Figure 5: Message and signal configuration window – message cycle time

Simulation upload

Once you have everything configured, you need to upload the simulation into your CANSim. It should be connected to PC via USB as described in [CANSim4 User Manual, chapter 7.1](#).

Before you connect CANSim to your PC be sure that it is switched to Mode 5. Then use *Simulation* / *Simulation upload* menu to upload your simulation to the device. The simulation upload erases the old simulation first. After the upload process finishes your simulation runs in your CANSim.

If you just need to erase some old simulation in your CANSim use *Simulation* / *Simulation erase* menu.

Device Management

Firmware update

CANSim Studio allows you to automatically update firmware in your CANSim. For this functionality your **CANSim must be switched to Mode F** before connecting it to the PC!

Note: Your PC should be connected to the Internet when using this functionality.

Choose *Device* / *Firmware update*. CANSim Studio check the product site for finding the latest firmware release. When newer version than the currently flashed is found, it will offer you firmware update. When you agree, CANSim Studio automatically downloads the latest release and flashes it to the connected CANSim. **Please do not disconnect the device from the PC nor switch off the PC during the flashing procedure!**

Licence management

The following features of CANSim are subject to a special licence:

› **CANSim API**

› **User defined simulations**

› **BAP functionality**

If you are interested in some of them, do contact us at bussiness.products@digiteqautomotive.com.

To handle available as same as currently stored licences go to *Device* / *Licence manager*. CANSim Studio tries to download licence file from our product site and communicates with CANSim connected to PC. If both actions succeed a dialogue with available (upper list) and currently stored (lower list) licences is shown (Figure 6).

Note: This functionality requires that your PC is connected to the Internet and CANSim swithed to Mode 5.

When you want to upgrade the licence, just click on *Store licence to the device* button (marked with a downarrow icon). CANSim Studio stores the available licence to the connected CANSim. If it succeeds the lower list is rewritten with the content of the upper list. You can then close the dialogue.

Note: Do not disconnect CANSim from the PC when "Licence manager" dialogue is open!

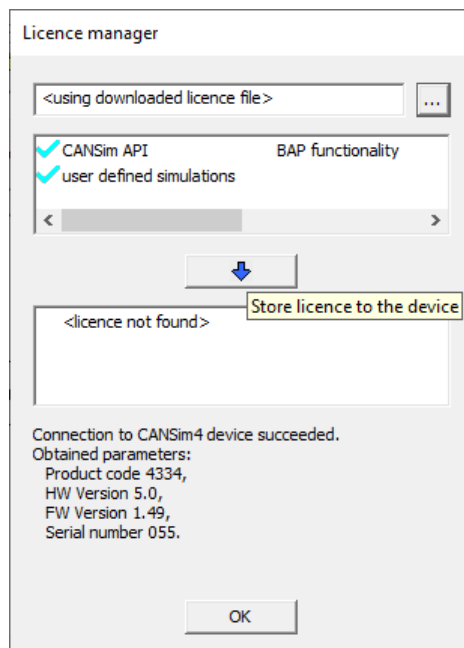A little bit detailed description of the above mentioned features follows.

Figure 6: Licence manager dialogue

CANSim API

CANSim API is our own developed through you can dynamically control your CANSim. It should be connected to the PC via USB and switched to Mode 5.

We provide a Windows library (.h, .lib and .dll). It has a C language interface. You can download it from our product site cansim.digiteqautomotive.com. Then you can write your own programme that takes advantages of the provided library.

User defined simulations

In order to run your own simulations in CANSim you need a licence for it. If you are interested in it, please do not hesitate us at the mentioned e-mail address. We just need to know the serial number of CANSim devices for which you want this licence.

BAP functionality

There is a special firmware that is able to simulate BAP functionality. Cf. CANSim4 User Manual, chapter 6.7 for more information or contact us.

Date & time setting

It is possible to change CANSim date or time stored in its RTC. To do this, use *Device / Set device date & time*. The dialogue as in Figure 7 (if CANSim is connected and switched to Mode 5) appears.

In the dialogue you can read currently stored data (*Get device time*), save the adjusted data (*Set device time*) or directly save date and time that your PC has (*Set local time*).
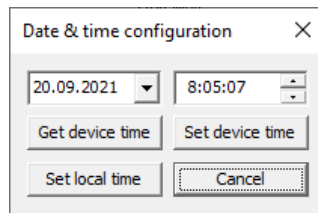
Figure 7: Date & time configuration dialogue

VIN setting

It is possible to change the content of VIN messages that CANSim sends (cf. CANSim4 User Manual, chapter 8). To do this, use *Device / Set VIN*, The dialogue as in Figure 8 (if CANSim is connected and switched to Mode 5) appears.

In the dialogue you can read, change and store VIN independently for the three car platforms: MQB, MQB37W, MEB. The *Default* checkbox means whether the default VIN is used.

You can type in up to 17 characters. When your VIN is shorter, spaces will be appended at the end to the full VIN length (17 characters).
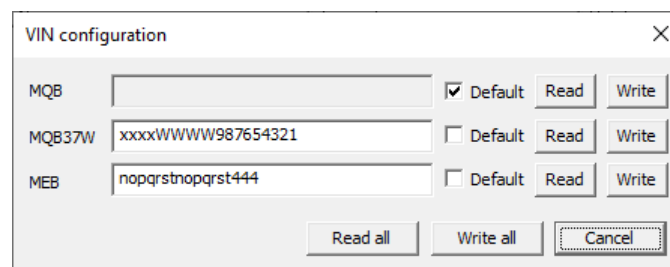

Figure 8: VIN configuration dialogue

CANSim Studio Settings

CANSim Studio has some setting that you usually do not need to change. To show "Settings" dialogue, use *File / Settings* (Figure 9). There are three things you can change there.
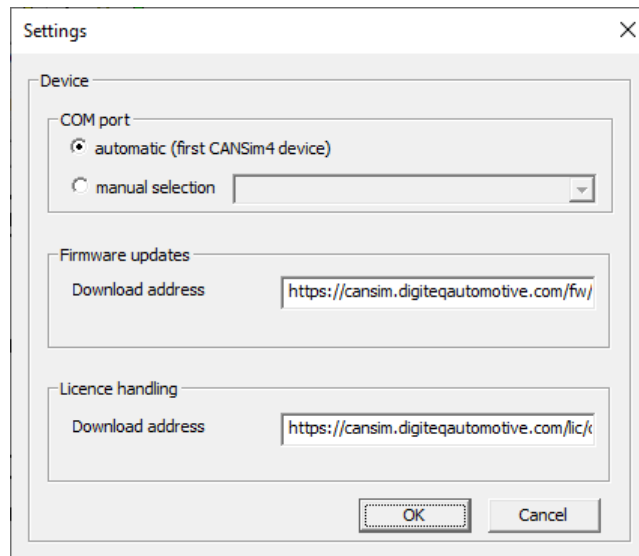

Figure 9: Settings dialogue

COM port

This setting allows you to control to which CANSim the application tries to connect. You can choose either "automatic" or "manual selection". The former choice means that CANSim Studio searches for the first value (COM0, COM1, …, COM255) of COM port to which a device with name "CANSim4" is connected. In the latter choice you can explicitly specify to which device CANSim Studio should connect.

Firmware update

This setting determines the Internet address on which list of firmware releases is placed. The default value is: https://cansim.digiteqautomotive.com/fw/updates.xml.

Licence handling

This setting determines the Internet address on which current licence file is placed. The default value is: https://cansim.digiteqautomotive.com/lic/cansim4.lic.