



MEGA

Application Tool

User Manual
Mega Application Tool MAT

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Prologue

The Mega Application Tool, also referred to as MAT, has been developed by *MEGA-Line RACING ELECTRONIC GmbH* and is used to apply, programme and manage datasettings for *MEGA-Line RACING ELECTRONIC GmbH*'s devices.

The tool has been developed for *Microsoft* Windows operating system and can communicate with the devices using various interfaces such as CAN and USB. Customer-specific applications for the individual application areas for single device types can be created using this tool.

The user manual provides a more detailed description for all functions which can be used in MAT and guides the user through installation and the device-specific application. Furthermore, the document also explains how to handle the tool's file system and how to carry out device software updates.

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In case of questions about this document, the use of MAT or handling of possible devices by *MEGA-Line RACING ELECTRONIC GmbH*, the user can contact the company's own support team using the following contact details:

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1. Document history

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2. Term definitions

The following terms occur in this manual frequently.

Definition	Description
CAN	<i>MEGA-Line</i> devices are connected to a PC using CAN bus (Controller Area Network). A further option is USB connection.
Datasetting	The entirety of all parameters with their values for a firmware. Datasettings define the setup of a device. Three levels of datasettings can be distinguished.
1) Datasetting Computer	This datasetting is loaded in MAT and represents the device datasetting from the RAM, the working page. This data remains available in MAT even after a connection loss until you close MAT or change the datasetting.
2) Datasetting Device (working page)	This datasetting is located in the RAM of the device. When switching the device on, the datasetting is copied from Flash into the RAM. Changes on the working page are lost, when the device is switched off.
3) Datasetting Device (reference page)	This datasetting is located in the non-volatile Flash of the device. The datasetting remains available even after switching the device off.
Desktop	The MEGA Application Tool Desktop is the environment for working with your device. It is provided in the form of a MAT project file (matproj).
Firmware	Device operating software. Each device class has its own firmware. This is provided as .mata2l file.
Device	Specifies the device you are using.
Device class	A device class refers to the product family to which the device belongs. On the hardware side, the product family includes the individual devices. On the software side, it includes the firmware versions and datasettings. Device classes are e.g. E-Shift (EGT), E-Clutch (ECO) or compressors.
MatA2l file	Firmware file for a <i>MEGA-Line</i> device.
Matproj file	This file includes the desktop of your device, the firmware and imported datasettings.
Matcex file	Exported file with a datasetting for a device class according to the firmware.
Measuring value	A measuring value issued by the device which can be displayed in MAT.



Parameter	A parameter which can be used to control the device's behaviour.
USB	Various <i>MEGA-Line</i> device classes are connected to a PC using USB bus (Universal Serial Bus). A further option is CAN connection.

3. Abbreviation directory

CAN Controller Area Network
MAT Mega Application Tool
USB..... Universal Serial Bus



4. System requirements

The following system requirements have to be fulfilled as a minimum.

- Operating system: *Microsoft Windows 7 64 bit or Microsoft Windows 10 64 bit, administrator rights for the start of the tool are required (depending on carrier partition)*
- Working memory: 4 GB RAM
- Screen size: 15.6 inches or larger.

5. Installation

The following chapter shows you the process to install the Mega Application Tool (short MAT) on your computer. If you did not receive any software with your device, then please contact the support team at *MEGA-Line RACING ELECTRONIC GmbH* by email to support@mega-line.de to obtain your software version.

5.1. Installation of PEAK driver

The driver to use the *PEAK* hardware is required to run MAT. For this purpose, *MEGA-Line RACING ELECTRONIC GmbH* supplies the OEM driver package which has to be installed (unless it is already present). For this, a version v4.1.4 or higher is required.

Please execute the supplied application (PeakOemDrv.exe) to install the driver and follow the notes in the installation application.

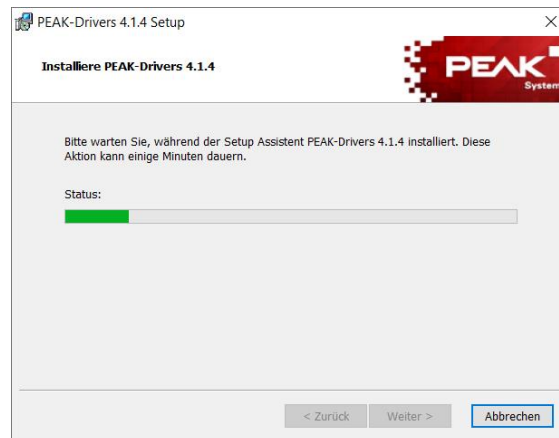


Figure 1 Installation of PEAK driver

5.2. Screen setting for perfect display

It is necessary to scale the screen to 100% to perfectly display MAT. Right-click on the screen and select "Display Settings" to adjust the scale of the screen. Go to "Scale and Arrange" item and adjust the size of the elements to 100%.

Scale and layout

Change the size of text, apps, and other items

[Custom scaling](#)

Figure 2 Set Windows display scale to 100%



5.3. Execute the Mega Application Tool

MAT does not require an independent installation. Copy MAT.exe and all associated files on your computer to the folder intended for this purpose. MAT itself is started via MAT.exe.

It is recommended to create a folder for the MEGA Application Tool directly in the C-partition on your hard drive. Including sub-folders for firmware, datasettings and display setups (the latter if necessary). If required, a desktop link to the exe-file can be created. The structure should look as follows:

<u>Folder structure</u>	<u>Folder contains</u>
C:	
└ Mega Application Tool	MAT.exe and associated files
└ Device 1 (e.g. E-Shift)	
└┬ Firmware v_.01	Device-specific project file (.matproj), firmware (.mata2l) and datasettings (.matcex).
└┬ Firmware v_.02	
└ Device 2 (e.g. E-Clutch)	
└┬ Firmware v_.01	
└┬ Firmware v_.02	
└ Device X	
└┬ Firmware v_.01	
└┬	
└ Display setup	Display setup files (.matdis) devices with display
└┬ Pages	Display wallpapers and alarm pictures, CAN-DBC files
└┬ CAN DBC	

Note:

We recommend to create backup copies of the original files in all cases and to store them on a separate medium.

Note:

If Pro or Prime licenses are used, then administrator rights are required to execute the MAT tool under the main partition (as specified here). If this is not possible, then another partition has to be used.

5.4. Restart of the Microsoft Windows PC System

After all steps of the installation has been done, a restart of the Microsoft Windows PC system is required before the MAT can be used correctly with all features.



6. Quickstart Guide

The following chapter provides an overview of the MEGA Application Tool. It describes the most important functions and how you can communicate with your device. For more detailed information, we refer to in the individual items to the relevant chapter in this manual.

6.1. MAT Projects and Data Type Overview

MAT projects (.matproj file)

MAT projects (.matproj file) include device-specific graphic user interfaces with which you can operate your device. This includes:

- The relevant firmware.
- All created or imported datasettings.
- A “Working Area”, which can be configured individually to display and change all device-specific parameters.

The MAT project file will be provided by *MEGA-Line RACING ELECTRONIC GmbH* and sent to you by email. For future applications, you can change and expand the graphic interface of the project file as you wish. It is recommended to do so with a copy of the original project file.

Device firmware (.mata2l file)

The firmware file .mata2l includes the source code which operates your device.

If you are connected to the device, then you can check your device’s firmware (device firmware) and the firmware loaded in MAT (selected firmware) in workbook explorer, in the active devices section. Selected firmware ID and device firmware ID have to match, otherwise you cannot go online with your device. In the example below, an EGT 1254 with the serial number #19001 has been selected. The devices, as well as the selected firmware, are v3.16. If MAT firmware and device firmware match, then MAT automatically connects to your device.

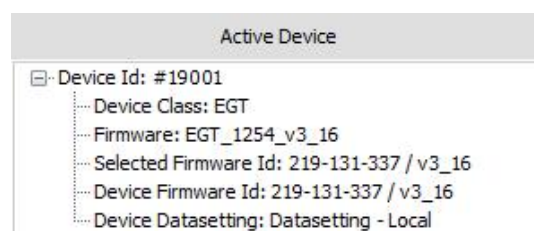


Figure 3 Active device window in MAT

Device datasetting (.matcex file)

Datasettings contain all parameters which are used in the firmware of the relevant device type. These can be edited and managed using MAT. A datasetting can be exported from MAT in the form of matcex files and saved as a backup on your computer or laptop. These backups include a list of all parameters and the associated parameter values at the time of the export.

6.2. User interface

The user interface is divided into the following areas. A more detailed description of all areas is provided in chapter 8.3.

- 1) Main menu: Includes the device detection button as well as the taskbar with the most important commands.
- 2) Workbook explorer: Shows the currently loaded firmware, datasetsettings and the used device.
- 3) Working area: Live display of your device's parameters. Here you can change and monitor all parameters. The area can be freely configured.
- 4) Properties/ ToolBox: Includes display elements for the working area and its settings.
- 5) Labels list: List with all signals and parameters for the relevant device.
- 6) Notifications: Shows notifications and warnings for your MAT project.

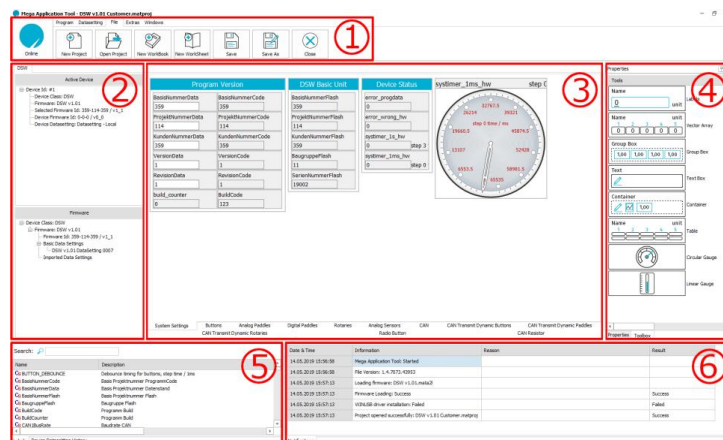


Figure 4 Graphical user interface in MAT

Note:

Right-click on an element in “Workbook Explorer” displays a drop-down menu, which includes all commands available for the selected element. This includes e.g. editing, importing and exporting of datasetsettings or activating a firmware. Right-click on the empty “Firmware” area opens the commands to import a firmware or a device class.

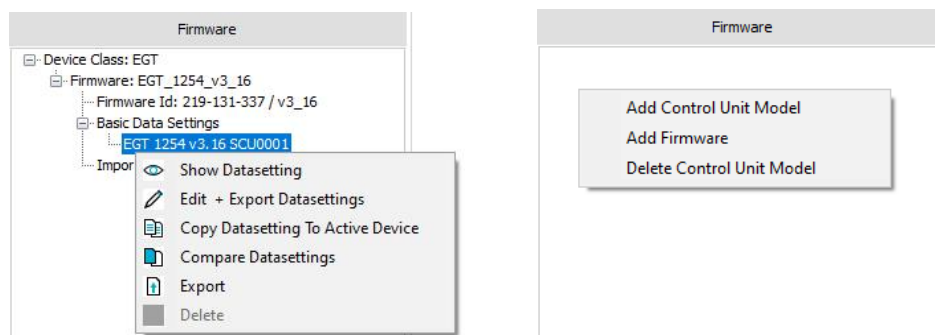


Figure 5 Right-click pop-up menus for operation commands

6.3. Device Detection Button (Online / Offline)

The device detection button in the “Main Menu” shows you the connection status to your device. The button shows both a successful connection as well as any error that occurred.

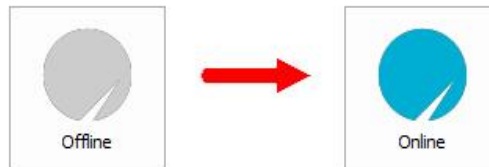


Figure 6 Colour change for device detection button when going online



Figure 7 Error state/ indicator for device communication

6.4. Quick Start Guide Establishing a Connection

Once you completed installation of MAT, you can connect the tool to your device and go online. A connection is only possible if the device firmware and the firmware loaded and active in MAT match. It is imperative to observe the notes in chapter 7.1 to safely connect your device.

Connect your *MEGA-Line* device to your PC/laptop and connect the device to the power supply. The connection can be established either via CAN bus or USB interface depending on the device class.

- 1) Start the MAT tool and load the MAT project file (.matproj) for the relevant device class. For this purpose, click on the “File” worksheet and then on “Open Project”.



Figure 8: Open project

- 2) The connected device is now displayed in the “Active Device” area. In this example, an E-Shift (EGT) with serial number #19001. The device firmware is displayed in the “Device Firmware ID” line.

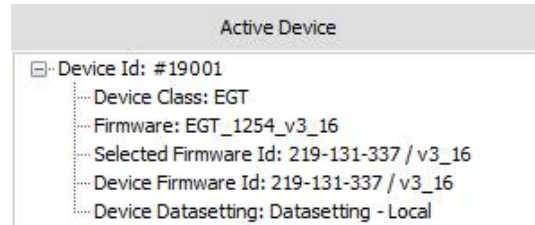


Figure 9 Active device window in MAT

- 3) Now ensure that the “Selected Firmware ID” matches that of the device in order to establish a connection to the device.
- 4) Once the firmware is imported and loaded, then this can be switched to active in workbook explorer. For this, “Right-click” in the “Firmware” area on the required firmware and select the “Set As Active Firmware” menu item.

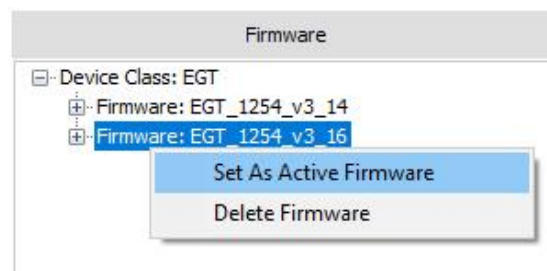


Figure 10 Set as active firmware

- 5) Establishing a connection to the device is now possible by clicking on the device detection button.

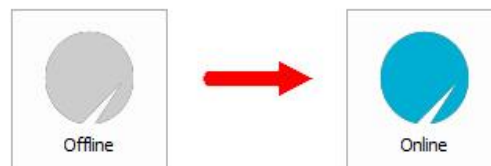


Figure 11 Colour change for device detection button when going online

6.5. Commands to manage data

The MEGA Application Tool is used as central management for your firmware and datasets. The following chapter shows the memory levels of the datasets as well as the commands to transfer data to the device and to load them from there into MAT. The figures below show the operating levels, memory levels of the device as well as the commands to transfer data.

Computer:

1) Datasets and firmware are managed centrally via the MEGA Application Tool. Once a connection has been established to the device, the data can be transferred to it or received by it.

Device:

The device itself is divided into three further levels.

2) Internal RAM (working page). RAM into which the device parameters are loaded from Flash during operation.

3) Internal Flash (reference page). The permanent memory of the device in which the dataset, which is to remain on the device (even after restart), is saved. If the dataset of the device is changed, then this occurs on the working page (2). Then the dataset has to be transferred to the Flash, with “RAM to Flash”.

4) In the device, the firmware is managed in its own memory segment.

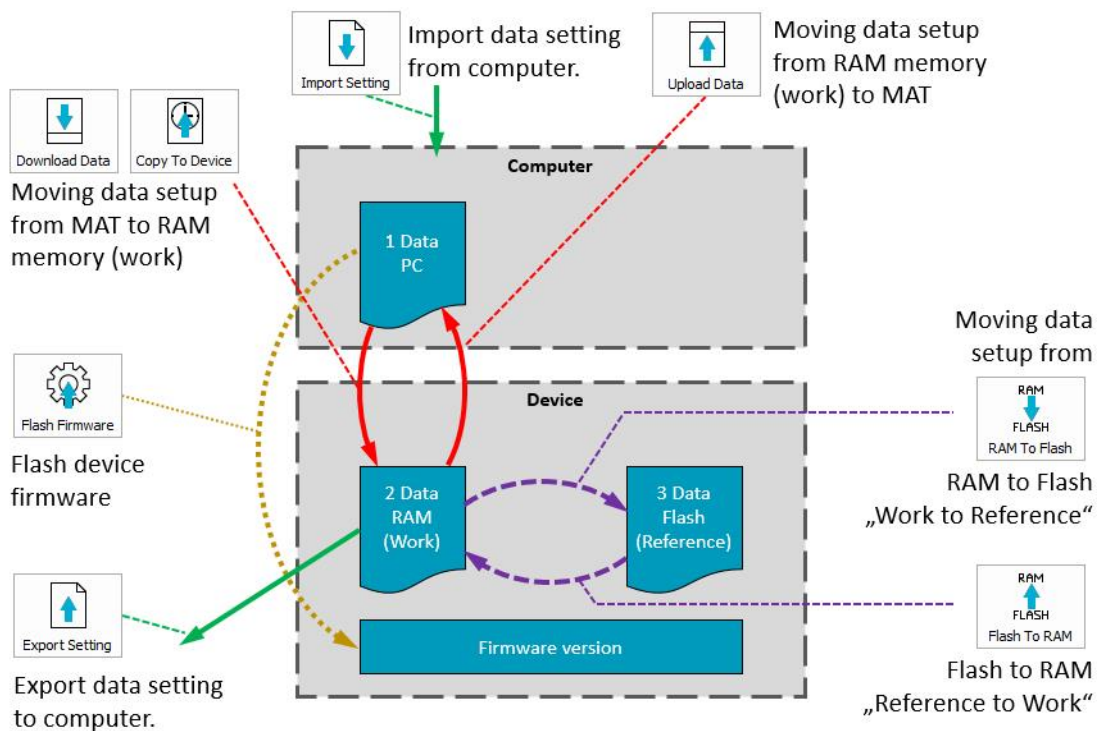
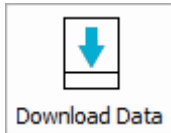


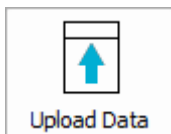
Figure 12 Data structure and commands for datasets



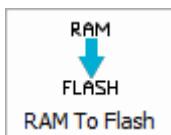
Updates the device with the firmware switched to active in MAT. Please ensure that the voltage supply is not interrupted during this process!



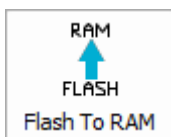
Transfers a datasetting to the device's RAM. The new datasetting remains permanently on the device only after overwriting in Flash. Whilst you are connected to the device, changes to the datasetting in the live display are transferred automatically to the device's RAM as soon as this has been confirmed with "Enter". Imported datasettings can also be transferred via drag and drop to the device.



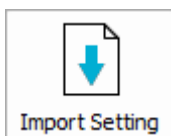
Transfers the datasetting of the device from RAM back to live display ("Working Area") of the MAT and thus to your PC/notebook. The datasetting can then be exported and saved.



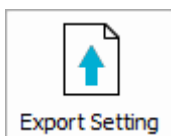
Writes a datasetting from the device's RAM into Flash. After a restart, the datasetting remains on the device.



Overwrites the RAM with the datasetting saved permanently on the device from Flash. This function can be used to reverse changes to the datasetting.



Imports a datasetting from your PC/notebook into MAT. The imported datasettings are automatically listed in the "Firmware" area and are not automatically transferred to the device during import. The command can also be activated with a "Right-click" on a datasetting in the "Firmware" area.



Exports the datasetting from MAT to your PC/notebook in order to save it as a backup. The command can also be activated with a "Right-click" on the "Device Datasetting: Datasetting Local" datasetting in the "Active Device" area.



6.6. Further MAT functions

All further MAT functions are described extensively in the following chapters.

- Connection and operation of your device in chapter 7.
- Managing of MAT projects, extensive description of graphic user interface and individual design of working area in chapter 8.
- Manage firmware in a MAT project in chapter 9.
- Carry out changes to setup (datasetting) of device in chapter 10.

7. MEGA-Line devices

The following chapters describe the general handling of your *MEGA-Line* device. Familiarise yourself with the device specifications before initial commissioning. Please observe in particular the correct voltage supply and loom configuration.

7.1. Connect device

Each device has a connection with which the voltage supply of the device can be established. Please observe the device-specific voltage supply before you try to commission a device. This and the pin layout of the loom are included in the datasheet and quick starter guide for the device. Ensure also correct polarity of the power connections.

If your device has a Status-LED, then this flashes as soon as the voltage supply has been established. The meaning of different LED status displays can also be found in the datasheet and the quick starter guide of the device.

7.2. Go online / offline with your device

Once the power supply has been established, you can go online with MAT. For this, first open the correct MAT project. The MAT project has to include the device class and firmware of the device with which you want to connect. Your device is recognised correctly by MAT if the serial number of the device is shown in the “Active Device” area under “Device ID: #”. The firmware is displayed under “Device Firmware ID:” which is currently installed on the device. It is important that “Selected Firmware ID” and “Device Firmware ID:” match in order to go online.

If a project is loaded with a different firmware but correct device class, then MAT will recognise your connected device and display the firmware version of the device. A connection to the device, however, is not possible. You can go online as soon as the matching firmware has been loaded.

If, on the other hand, you select a project with a different device class, which does not match the device class required by the relevant device, then the connected device is not recognised and also not displayed.

If your device is not recognised despite established power supply and matching MAT project, then check the correct installation of the interface driver and the functioning of the connection cable.



Figure 13 Active device

If the firmware of device and MAT project do not match, then load the correct firmware in MAT and set it active as described in chapter 9.4 and 9.5.

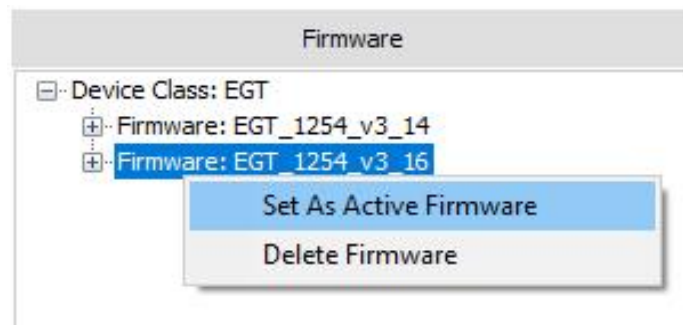


Figure 14 Set active firmware

The device detection button is located in the left area of the “Main menu”; this allows you to establish a connection to the device and to monitor the status of the connection. MAT connects automatically with your device as soon as it is recognised and the firmware matches. You can stop or retrieve the connection manually when you click on the device detection button. The colour change signals a successful connection or disconnection.

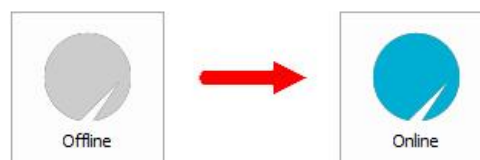


Figure 15 Status Offline (left) and Status Online (right)

If the MAT logo is displayed in red, then this indicates an error for the communication with the device.

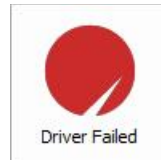


Figure 16 Status error - indicates a faulty communication with the device

7.3. Virtual Devices

You can open your MAT project and work with a virtual device even without a connected device. A virtual device is characterised by the fact that a device with the “Device ID: #1” and “Device Firmware ID: 0-0-0 / v0_0” is displayed as “Active Device”.

In this mode, you can edit and export datasetsettings as well as adapting your user interface. The advantage is that you can work location-independent without connection to a device. The process is recommended especially when creating new datasetsettings. Changed parameters are not transferred to any device. Wrong entries, thus, do not lead to abnormal behaviour of the device. Once a new datasetting has been created, then this can be compared with the previous one and possible errors can still be corrected. Then this datasetting is transferred to all devices.

The work process with virtual devices is identical to that of a device that has been connected for real. All work is carried out in the MAT project that you are working on.



Figure 17 Working with a virtual device

- 1) Start MAT and open the MAT project file of your device. A connection to the device is not necessary for this purpose.
- 2) If a device is already displayed in the “Active Device” area, then you can use this as a virtual device. For this purpose, check the “Selected Firmware Id:” for correctness. (Note: If you connected recently to your device, then it can be that the serial number of your device is still listed under “Device ID: #”. This has no impact on the virtual device).
- 3) If no device or no device with real serial number and selected firmware ID is activated in the “Active Device” area then a new virtual device has to be created. Highlight the correct firmware and right-click on it. Then select “Set As Active Firmware”.
- 4) The virtual device with ID #1 is now displayed under “Active Device”.
- 5) Apply the datasetting to the virtual device which you want to edit.

- 6) The virtual device is now ready. You can now work with it as if it was a real device. Export the changed datasettings so that these can be transferred to your devices later.

7.4. Remove Inactive Devices from Workbook

You can delete devices from your “Active Device” list by right-clicking on the device ID and selecting “Delete Device Instance”. This allows e.g. to remove virtual devices as soon as you want to connect to your device. Then, a new device instance has to be activated in order to connect to your devices.

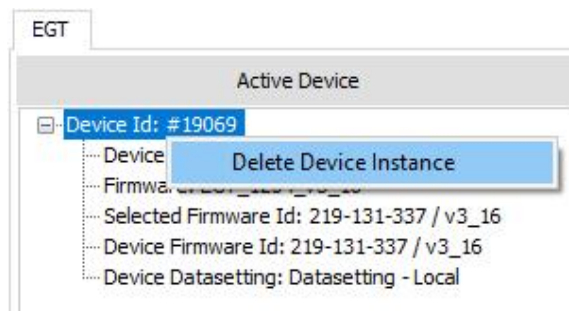


Figure 18 Remove active device instances from Workbook

8. Manage Desktop in MAT Projects

The desktop of the Mega Application Tool is used to display and edit the device parameters from the firmware. The desktop has been specifically developed by *MEGA-Line RACING ELECTRONIC GmbH* for the firmware of a device and works with this version. If the firmware is changed or if another device, which has a different firmware or device class, is connected, then the desktop for the relevant firmware has to be downloaded. For this reason, we recommend that you create a separate desktop file for each device or project. The desktop is provided to the customer by *MEGA-Line RACING ELECTRONIC GmbH* in the form of a separate file in the matproj format.

Note:

In all cases, make a backup copy of the original file.

8.1. Load MAT Project

Go to “File” worksheet in the taskbar and click on “Open Project” in order to open a project file. In the window that opens, you select the directory of your project file and select it. The desktop file loads and the firmware parameters are displayed.



Figure 19 Open a MAT-project by clicking the "Open Project" button

8.2. Save MAT Project

The structure of the application surface can be saved in a Mat project file (matproj). Save the user interface in the **current** project file by clicking on "Save" in the "File" worksheet.

Alternatively, you can also save the user interface in a **new** project file by clicking on "Save As".



Figure 20 Save the changes in the currently used project file

8.3. User Interface

The open MAT project consists essentially of the following areas.

- 1) Main menu: Includes the device detection button as well as the most important commands.
- 2) Workbook explorer: Shows the currently loaded firmware, datasettings and the used device.
- 3) Working area: Live display of your device's parameters. Here you can change and monitor all parameters. The area can be freely configured.
- 4) Properties/ ToolBox: Includes display elements for the working area and its settings.
- 5) Labels list: List with all signals and parameters for the relevant device.
- 6) Notifications: Shows notifications and warnings for your MAT project.

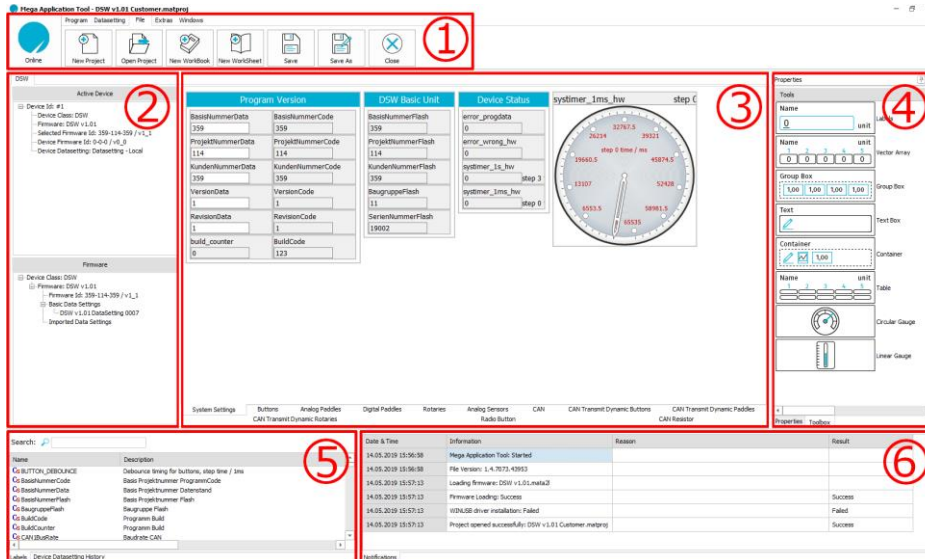


Figure 21 Explanation of all GUI main elements

8.3.1. Main Menu:

The main menu includes the general commands for MAT.

Online / Offline Button

The online / offline button is located in the left area; this allows you to establish a connection to the device and to monitor its status. You are online if the button is lit up in blue. If the button is grey, then you can try to establish an active connection to the device by clicking on the MAT logo. This assumes, that the device has a correct connection to the tool and uses the correct firmware for the communication. The MAT logo displayed in red indicates a communication error with the device.

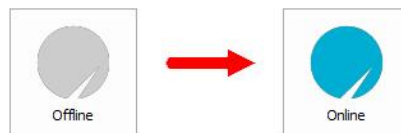


Figure 22 Status Offline (left) and Status Online (right)

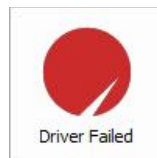


Figure 23 Status error - indicates a faulty communication with the device

Area: Application

The application area includes commands to work with the active firmware and datasetting management for the active device.

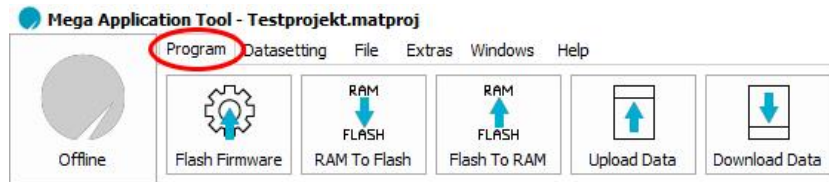


Figure 24 The application area from MAT

- Flash firmware: The active firmware is installed on the active device.
- RAM to flash: Loads the datasetting of the device from RAM (working page) into Flash (reference page).
- Flash to RAM: Loads the datasetting from Flash (reference page) into RAM (working page).
- Upload data: Loads the device datasetting from RAM to your PC
- Download data: Loads the displayed datasetting in MAT to the device's RAM

Datasetting area

This area helps you with the management of your datasettings. You can send datasettings to your device. Import or export datasettings from your PC and output datasettings as PDF.



Figure 25 Datasetting area of MAT

- Copy to device: Loads a datasetting to the device
- Import setting: Imports a datasetting from your PC into MAT tool.
- Export setting: Exports the datasetting from MAT tool to your PC
- Export as PDF: Output datasettings in table form in PDF format.

File area

In this area, you can find the main commands to manage MAT projects and their components. Create new projects or load those that are already available. Projects can be expanded with new workbooks and worksheets. The close command closes MAT.



Figure 26 The file area of MAT

- New project: Opens an empty surface to create a new MAT project.
- Open project: Opens already existing MAT projects.



- New workbook: With an additional workbook, you can operate several devices at the same time via a MAT project. The button adds a new workbook to your project.
- New worksheet: With a new worksheet, you also get an additional empty page in your working area. You can freely add display elements to your worksheets
- Save: Saves the current MAT project.
- Save as: Saves the current MAT project under a new name.
- Close: Closes the MEGA Application Tool

Extras area

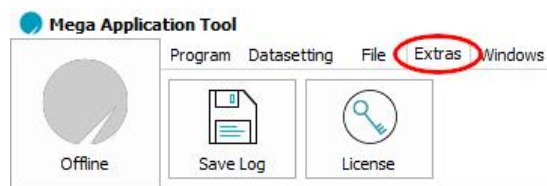


Figure 27 Extras area of MAT

- Save log: Saves a log file which includes information about the system status since opening MAT. In addition to notifications from the notification window, additional system information is also exported.
- License: Here you can manage licenses, which you procured for your MAT Tool.

Windows area

Adds the previous window to your user interface again.

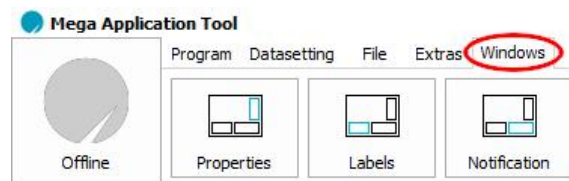


Figure 28 Windows area of MAT

- Properties: Adds the properties window to your MAT project.
- Labels: Adds the labels window to your MAT project.
- Notification: Adds the notification window to your MAT project.

8.3.2. Workbook explorer:

Workbook explorer is used to organise the firmware and datasettings of a device class. For this purpose, the area is divided into two parts. The “Active Device” area shows information for the connected device. The “Firmware” area lists all firmware and datasettings loaded in MAT. Only one device class can be managed per workbook.

If you have procured a license for the workbook feature, then you can manage several workbooks at once in a MAT project. A further workbook can be equipped with another device class and its firmware. The electrical circuit and clutch are managed at the same time via a MAT project in the figure below. You can switch between the individual workbooks using the worksheets above the “Active Device” area.

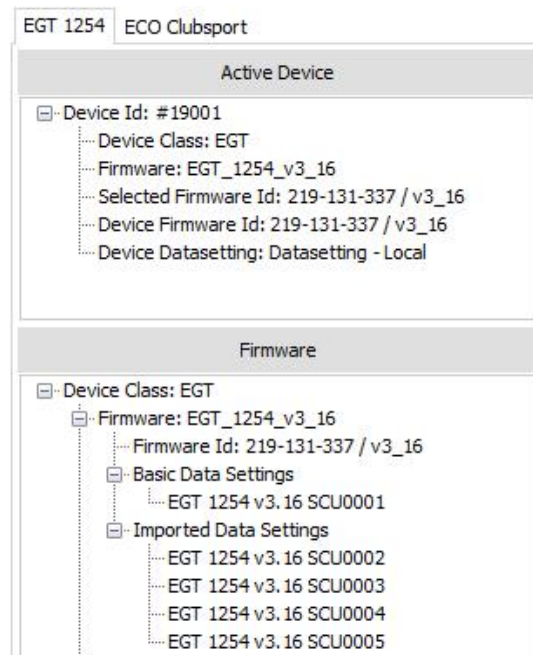


Figure 29 The workbook explorer with the sub-areas active device and firmware

Note:

Right-click on an element in “Workbook Explorer” displays a drop-down menu, which includes all commands available for the selected element. This includes e.g. editing, importing and exporting of datasettings or activating firmware. Right-click on the empty “Firmware” area opens the commands to import a firmware or a device class.

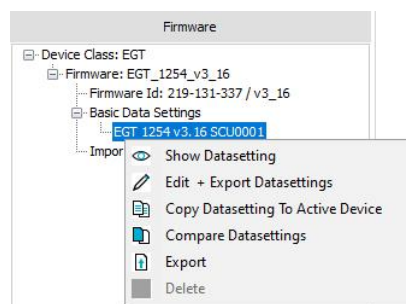


Figure 30 Drop-Down Menus for commands in Workbook Explorer

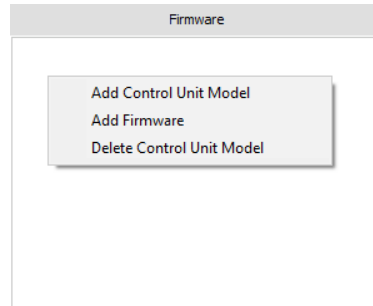


Figure 31 Drop-Down Menus for commands in Workbook Explorer

8.3.3. Working area

The working area is the user interface of your device. Here, you can control and set parameters for your device. You can freely design the working area to suit your requirements. New labels and additional worksheets can be inserted. The design is described in chapter 8.4.

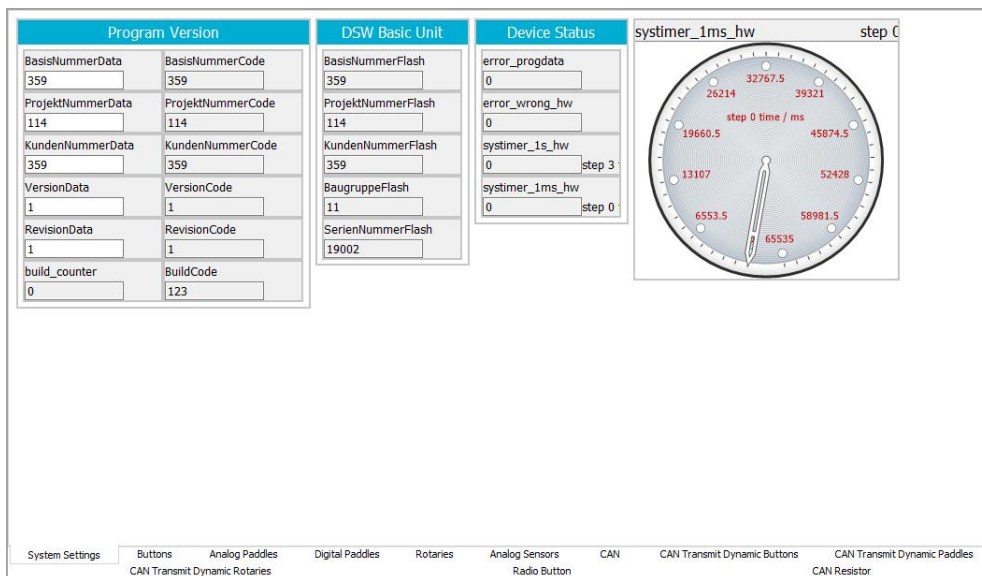


Figure 32 Working area of MAT with various labels and elements

8.3.4. Toolbox and Properties

The area on the right side of MAT is divided into two worksheets. The “Toolbox” includes a list with display elements which you can use in the working area to display the parameters. The “properties” worksheet includes all settings options, which are available to you in MAT.

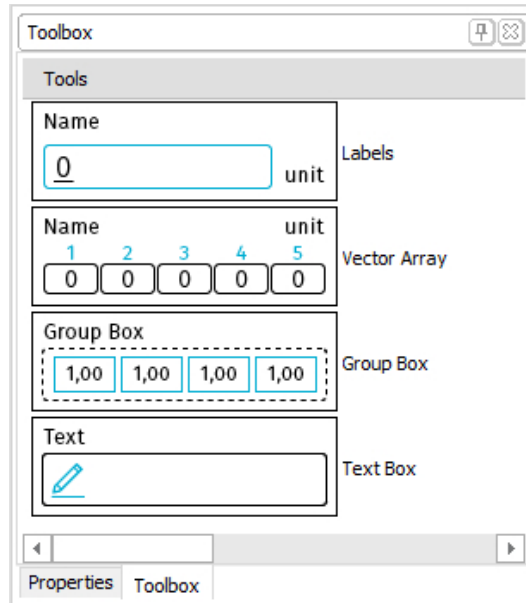


Figure 33 Toolbox area

8.3.5. Properties

The “properties” worksheet includes all settings options, which are available to you in MAT. For example, the font size and label background colour can be changed.

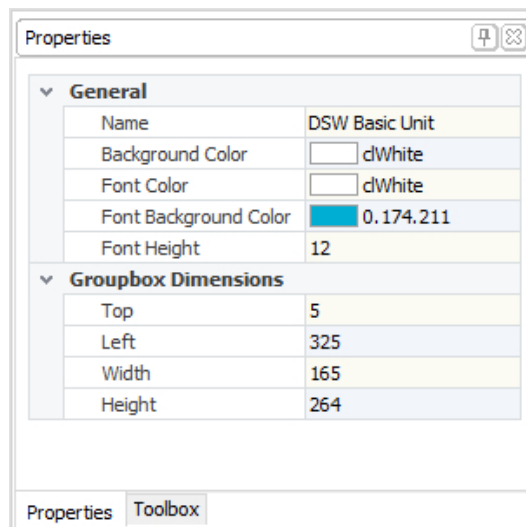





Figure 34 Properties Window

8.3.6. Labels List

All signals used by your device are listed in the label list. The signals are divided into two categories:

-  **Parameter** Control signals with which you can influence the behaviour of your device. Are only written in caps in the label list.
-  **Parameter-Array** A parameter symbol with a grey background indicates an array.
-  **Measuring values** Signals which can be used to display measuring values via your device. Are only written in lower case in the label list.

Signals from the labels list can be saved in the working area using drag and drop in order to have them displayed there graphically or to assign them to a display element.



Figure 35 Labels list

8.3.7. Notifications

The notifications area shows you information about the system state, loaded firmware, datasettings and usage notes since opening MAT. A detailed log file can be exported in the → safe log extras area. For this purpose, refer to chapter 8.3.1 Main Menu:.

Date & Time	Information	Reason	Result
16.05.2019 15:14:11	Failed to copy edited data	Firmware and hardware is different	Failed
16.05.2019 15:15:11	Saved to device history successfully: Data setting Race.mathis		Success
16.05.2019 15:15:58	Deleted device history datasetting successfully: Data setting Race.mathis		Success
16.05.2019 15:16:33	Saved to device history successfully: Data Setting SCU0012.mathis		Success
16.05.2019 15:17:18	Saved to device history successfully: Data Setting SCU0013.mathis		Success
16.05.2019 15:17:49	Saved to device history successfully: Data Setting SCU0014.mathis		Success
16.05.2019 15:18:09	Saved to device history successfully: Data Setting SCU0015.mathis		Success

Figure 36 Notification window

8.3.8. Device Datasetting History

The device datasetting history is a feature to manage datasettings across the lifetime of the devices. It establishes a database which allows you to manage, save and add information to datasettings.

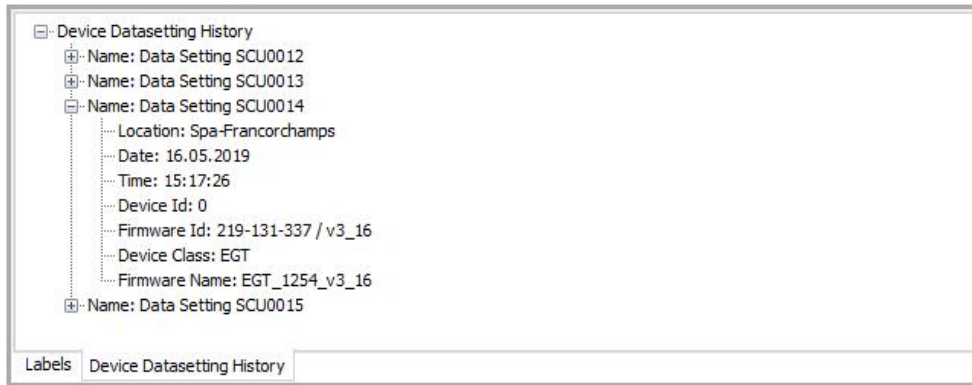


Figure 37 Device datasetting history

8.4. Individual Design of the User Interface

You can adjust the interface of the Mega Application Tool to suit your requirements. It is possible to position the individual areas of the interface such as the work folder explorer or document view. Furthermore, you can set the size and position of some parameter fields in the document window.

8.4.1. Adjust the Individual Windows

By double-clicking on a worksheet of a window, the individual sub-windows detach from their positions and become movable. The windows can then be positioned freely in the screen area or pinned in a new position. In the figure below, as an example, the label list has been moved to the right windows area.

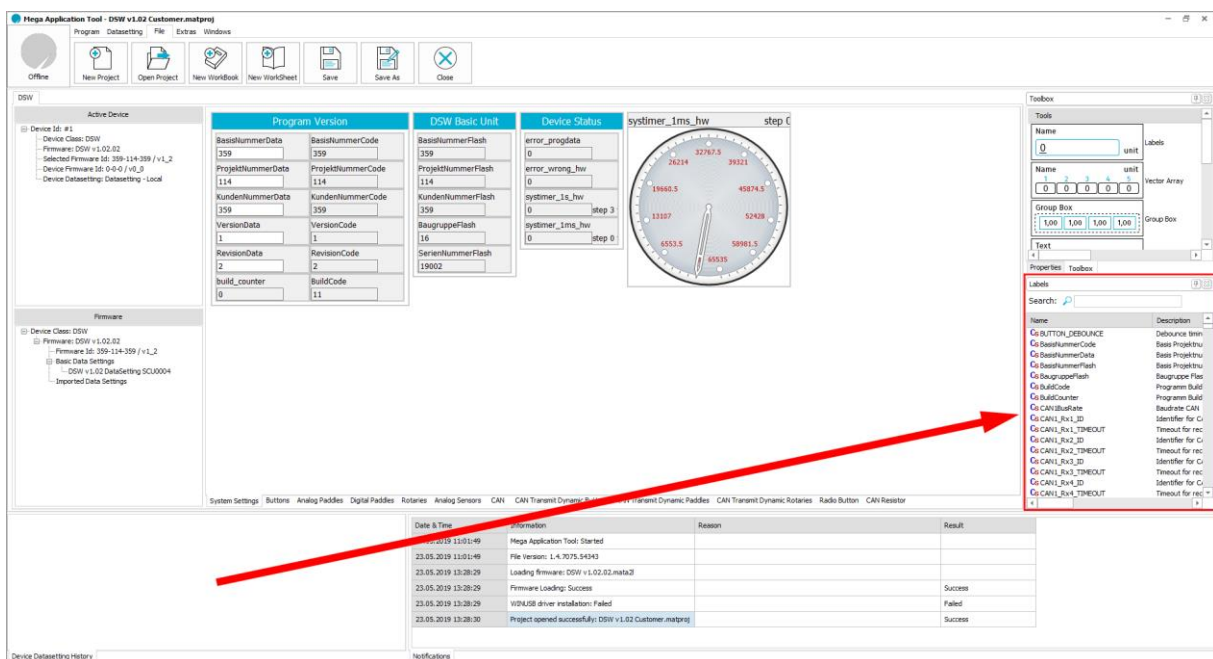


Figure 38 Moving and positioning of the label list window

8.4.2. Insert Worksheet

The worksheets are the working page for your device. Here, all device parameters are displayed or can be changed by you as soon as a connection to the device has been established. You can design this area freely to suit your requirements.

With a new worksheet, you also get an additional empty page in the working area. First click in the “Files” area in the “Main menu” and then on the “New Worksheet” item. In the lower area of the “Working area”, a new worksheet then appears with the “New Empty Sheet” title.

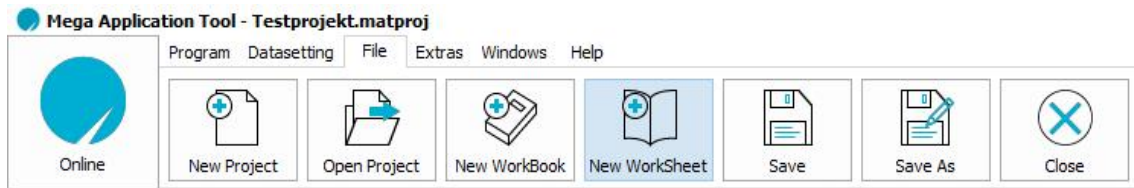


Figure 39 Insert a new worksheet

The title of the worksheet can be changed in the “Properties” window. It is also possible to set the background colour.

Note:

Changes in the “Properties” area have to be confirmed with enter.

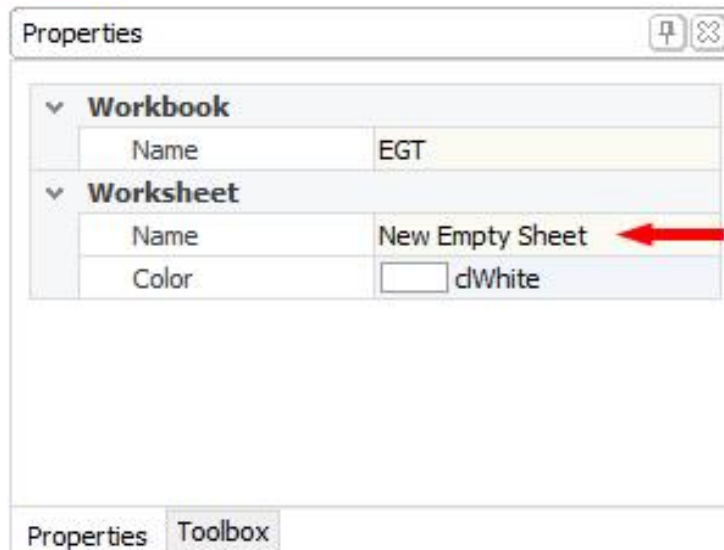


Figure 40 Change worksheet title and confirm with enter

8.4.3. Edit Worksheet - Individual Design of “Working Area”

To display individual parameters, you can drag them directly into the “Worksheet” from the labels list using drag and drop.

Display elements can be edited using the following shortcuts:

- Ctrl + C Copy the display element

- Ctrl + V: Insert the display element
- Ctrl + X: Cut the display element (can be inserted again using Ctrl + V)
- Ctrl + DEL: Deletes a display element

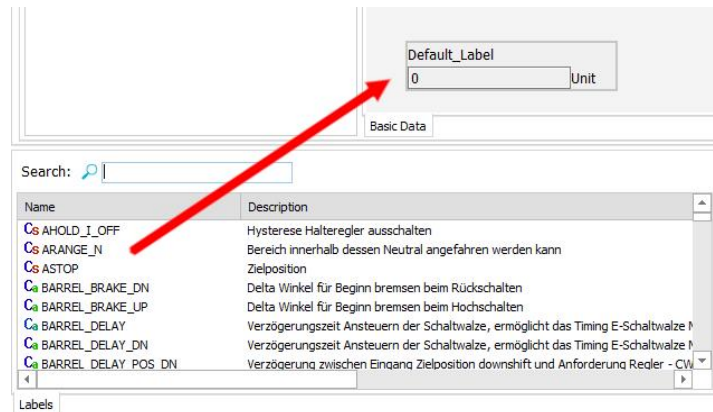


Figure 41 Integration of a parameter/signal into a label

If you want a different type of display, e.g. in the form of an analogue measuring display, then you have to drag it first into the worksheet from the toolbox and then add the parameter or signal from the label list. Display elements from the toolbox can be inserted into a worksheet using drag and drop.

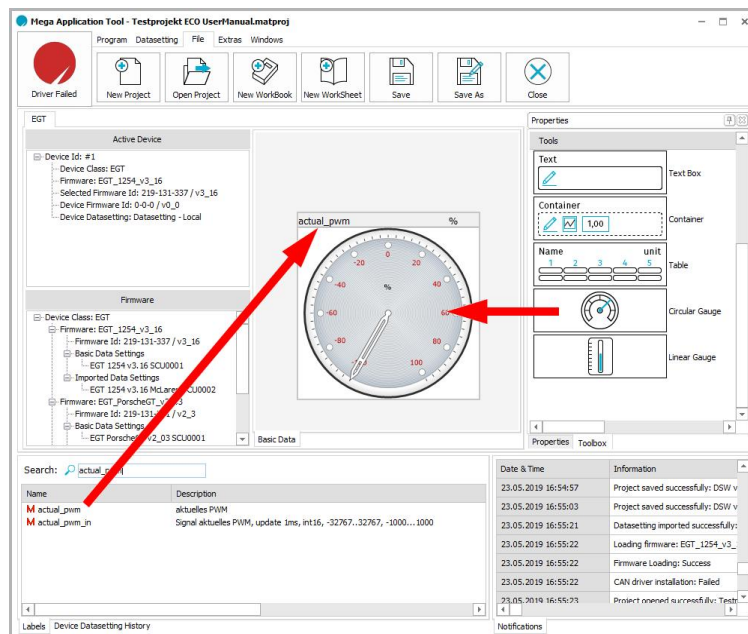


Figure 42 Using an analogue measuring display



Figure 43 Worksheet with different elements

8.4.4. Display Elements

The properties for all display elements introduced below can be set in the “Properties” window.

8.4.4.1. Display Element for Individual Values (labels)

Parameters and measuring values with only a single value can be displayed in your working area using the label display element. The signal is automatically displayed in this format if you drag a parameter or measuring value from the label list directly into the working area.



Figure 44 Display element for individual values (labels)

You can change the display of values, number of decimals, decimal or hex display by clicking on the display element and changing the value format option in the properties worksheet.

8.4.4.2. Display element for vectors (vector array)

Parameter and measuring value vectors can be displayed in your working area using the vector array display element. The signal is automatically displayed in this format if you drag a vector from the label list directly into your working area.

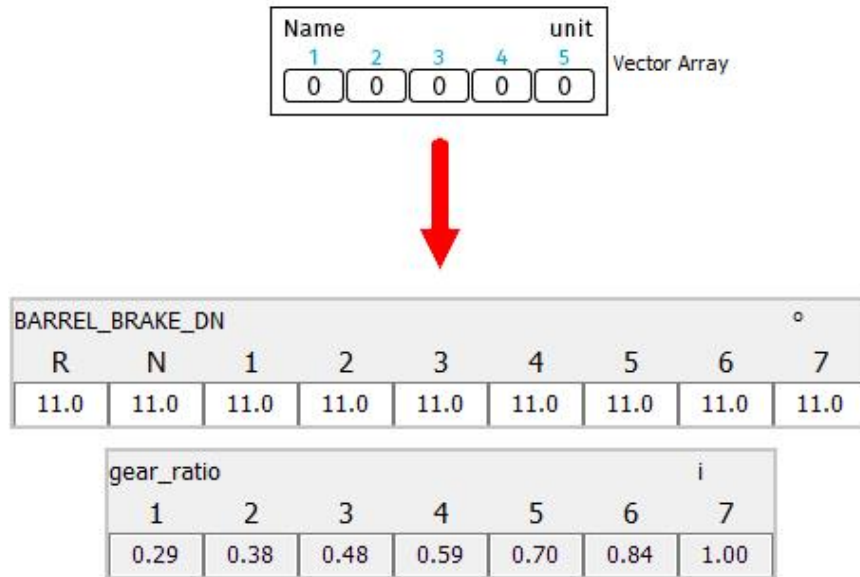


Figure 45 Display element for vectors (vector array)

You can change the display of values, number of decimals, decimal or hex display by clicking on the display element and changing the value format option in the properties worksheet.

8.4.4.3. Group Box

Several signals and display elements can be grouped using a group box. In this way, the signals can be moved as a group in the working area and distinguished in their colour from other groups by changing the background colour.

Initially insert a group box from your toolbox into the working area using drag and drop. Then, you can also drag display elements or signals into the group box using drag and drop and arrange them there.

If you want to remove a signal from the group box, then you can either completely delete the display element (Strg+Del) or cut it from the group box and then insert it back into the working area (Strg+X and Strg+V). In this way, you can also move display elements into a group box.

Note:

You get a better overview by colouring the background of the group box and thus separate it visually from other group boxes. For this purpose, click on a group box, go to properties worksheet, select the desired background colour and confirm with enter.

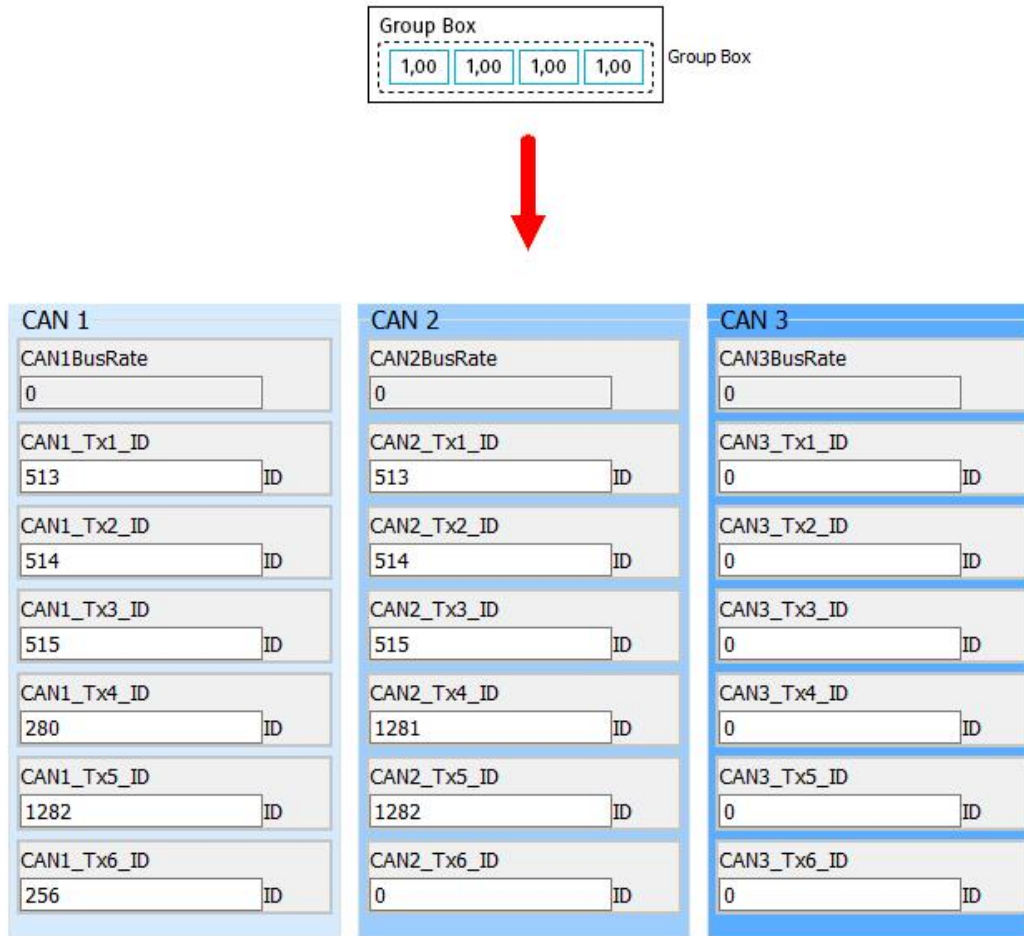


Figure 46 Grouping several display elements in group boxes

8.4.4.4. Text Box

The text box is a simple text field in which you can add comments or notes to the working area.

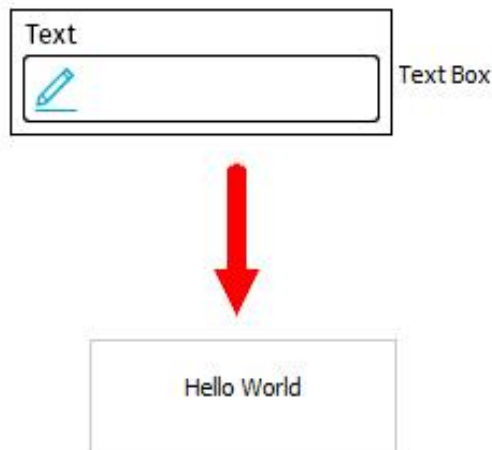


Figure 47 Inserting comments and notes

8.4.4.5. Container

Several signals and display elements can be grouped using a container. In this way, the signals can be moved as a group in the working area and distinguished in their colour from other groups by changing the background colour.

Initially insert a container from your toolbox into the working area using drag and drop. Then, you can also drag display elements or signals into the container using drag and drop and arrange them there.

If you want to remove a signal from the container, then you can either completely delete the display element (Strg+Del) or cut it from the container and then insert it back into the working area (Strg+X and Strg+V). In this way, you can also move display elements into a container.

Note:

You get a better overview by colouring the background of the container and thus separate it visually from other containers. For this purpose, click on a container, go to properties worksheet, select the desired background colour and confirm with enter.

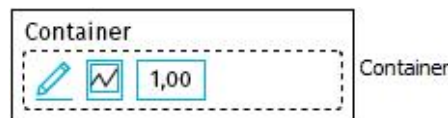


Figure 48 Container

8.4.4.6. Table

Vectors and their indexes can be displayed using the table display element.

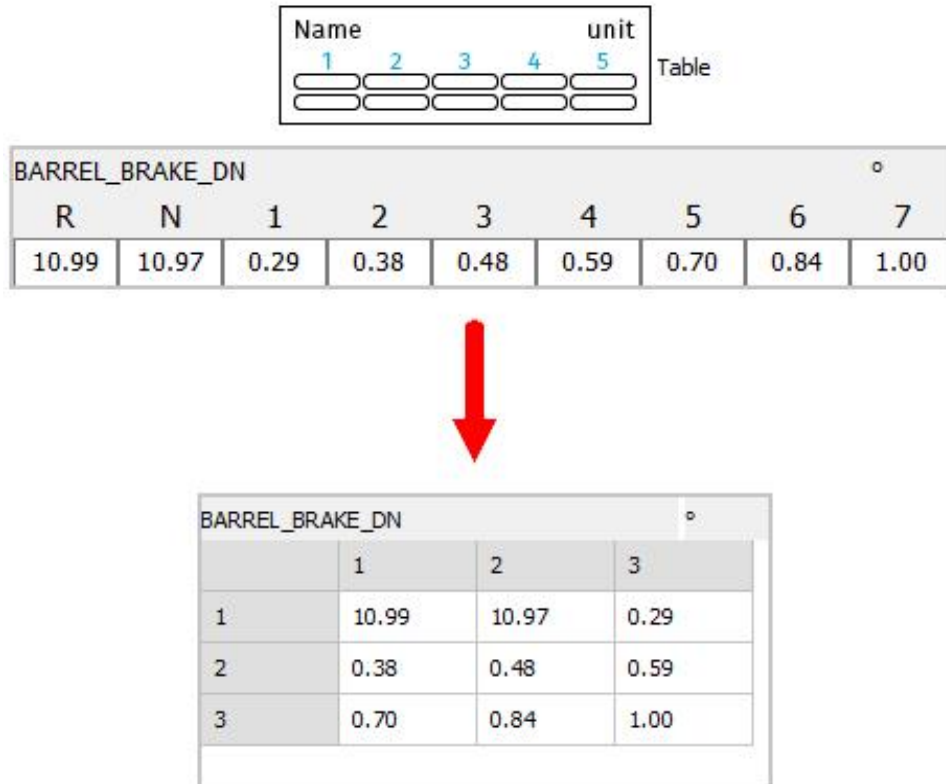


Figure 49 Table

8.4.4.7. Circular Gauge

Signals can be displayed as dials using the circular gauge.

Initially insert a circular gauge from your toolbox into the working area using drag and drop. Then signals can also be added and displayed on the circular gauge using drag and drop. In the properties worksheet, the display element and the minimum and maximum values can be changed.

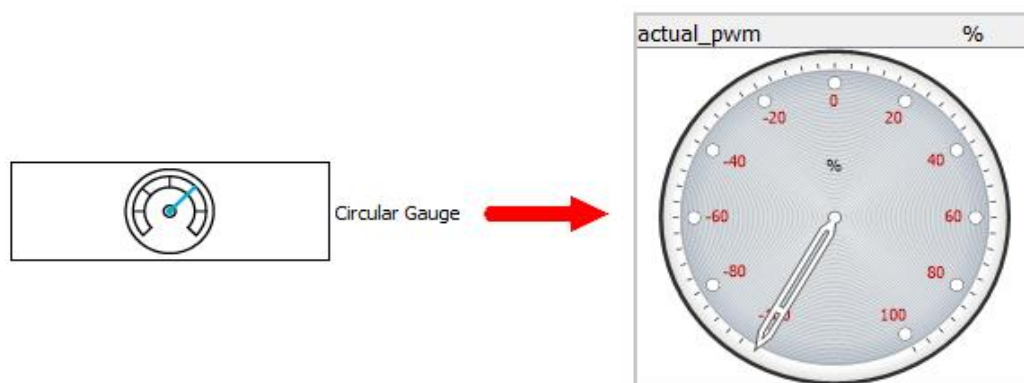


Figure 50 Display signals as dials using circular gauge

8.4.4.8. Linear Gauge

Signals can be displayed as a vertical graphical display using a linear gauge.

Initially insert a linear gauge from the toolbox into the working area using drag and drop. Then signals can also be added and displayed on the linear gauge using drag and drop. In the properties worksheet, the display element and the minimum and maximum values can be changed.

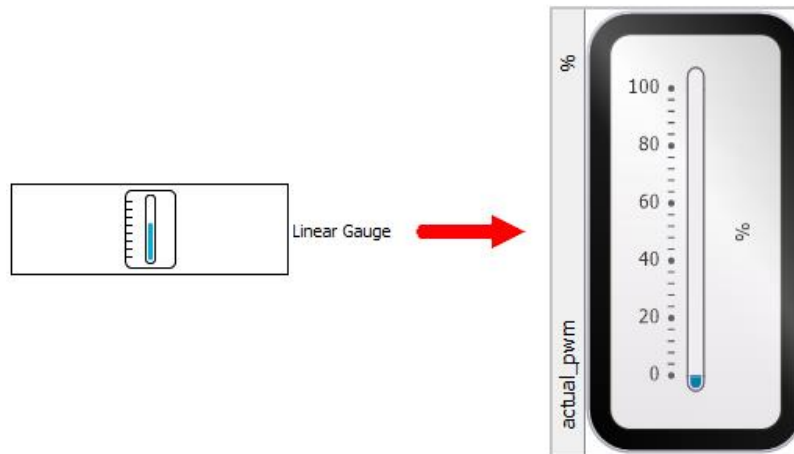


Figure 51 Display signals as bar graph display using linear gauge

9. Manage Firmware and Device Classes

The following chapter describes the handling of firmware which is required for your devices.

9.1. General Information about Firmware

The firmware includes the source code of your device and is provided as a mata2l file. Each firmware is clearly assigned to a device class. Therefore, the firmware is not interchangeable for different device classes.

A device class can have several firmware versions. For device delivery, *MEGA-Line RACING ELECTRONIC GmbH* will install the firmware specified for the device. A connection to the device is only possible if the device firmware and the active firmware in MAT match.

In general, it is possible to load more than one firmware for a device class in a workbook. For clarity, we recommend, however, to only load one firmware per device class in a workbook. This process has the advantage that the MAT gives you direct feedback if the connected device has a different firmware than the currently loaded firmware. This also prevents that a wrong firmware version is installed onto the device during a firmware update.

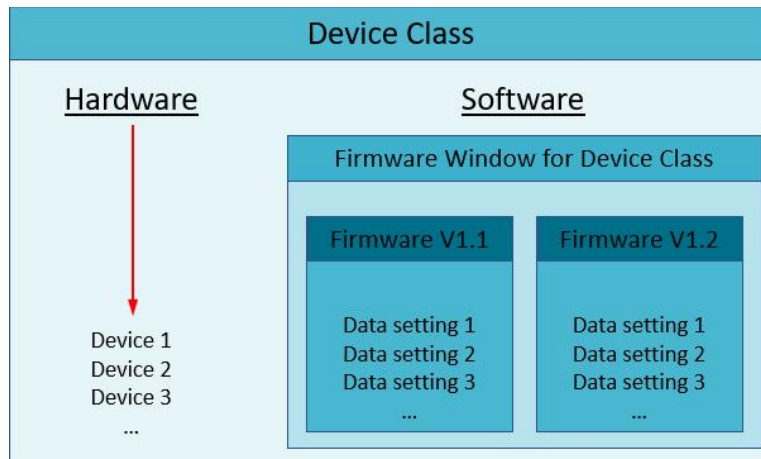


Figure 52 Device class with firmware

9.2. Working with Device Classes and Firmware

A connection to the device is only possible if the relevant device class with associated firmware is active in MAT. Furthermore, the firmware installed on the device has to match the firmware active on MAT. Per MAT project, only one device class can be loaded, however, it is possible to import several of these firmware versions.

Firmware window

In this area, the loaded device class and all firmware versions imported for it are displayed. For each firmware, the base datasetting and the imported datasettings are still displayed.

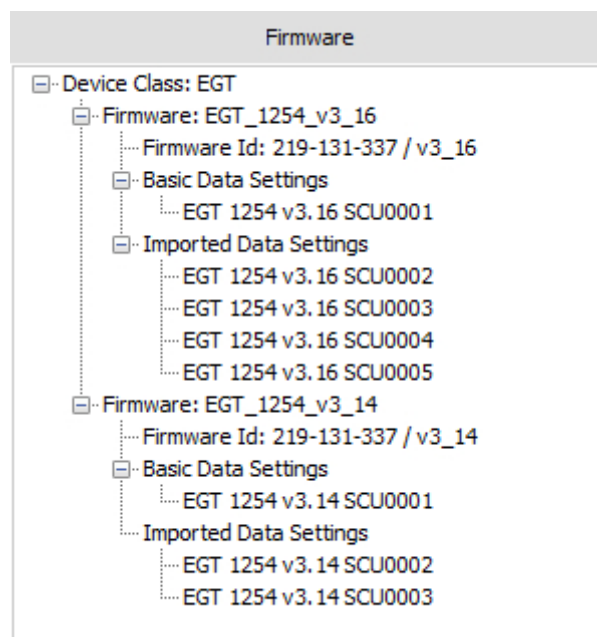


Figure 53 Firmware window with loaded device class and 2 firmware versions

Active device window

The “Active Device” area displays the active firmware and the device itself. The firmware displayed here is used for the connection to a device. This firmware is transferred to the device in case of a software update.

Device ID	If the correct device class is activated, then the serial number for the connected device is displayed here.
Device Class	States the device class to which you can connect.
Selected Firmware	Firmware active in MAT.
Device Firmware	Displays the firmware currently installed on the device.
Device Datasetting	Datasetting of the device.

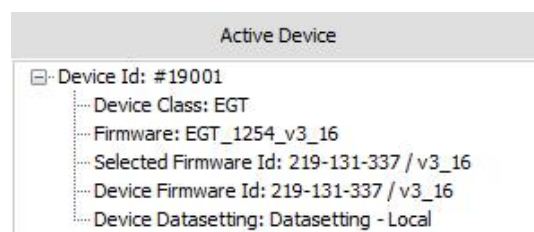


Figure 54 Active device window display from MAT

9.3. Add Device Class

If a new MAT project is created, then a device class and firmware has to be imported for it. No device class is loaded as long as nothing is displayed in the “Firmware” area. Please proceed as follows.

- 1) Right-click in the “Firmware” area into the empty area and select “Add Control Unit Model”.

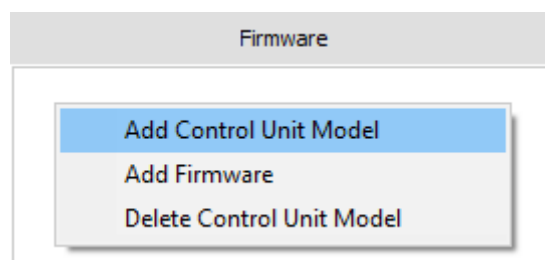


Figure 55 Selection area for the addition of a device class

- 2) The “Add Control Unit Model/Firmware” window opens.

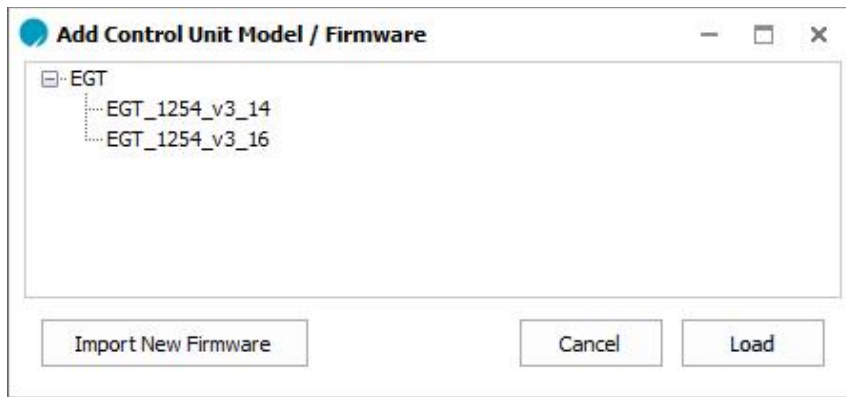


Figure 56 Select and import a new device class and/or firmware

- 3) From the list select the desired firmware (device class) which should be used for the MAT project, and confirm with “Load”.
- 4) If the desired firmware is not available, then it has to be imported first. For this, left-click on the “Import New Firmware” button. Navigate now to the desired firmware in the *Microsoft Windows* archive system and import it.
- 5) The device class is now displayed in the “firmware” area.
- 6) The loaded device class is automatically activated and displayed in the “Active Device” area.
- 7) If the firmware is not displayed automatically, then right-click on the just loaded firmware and select “Set As Active Firmware”.

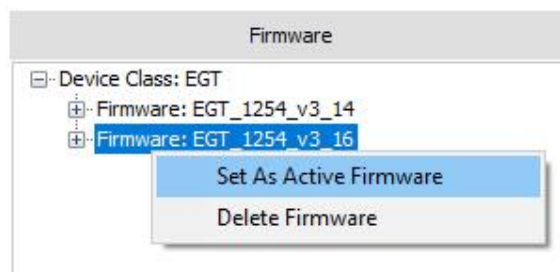


Figure 57 Activate firmware

9.4. Import Firmware

Additional firmware can be imported to your project, either if you receive new firmware for your device from *MEGA-Line RACING ELECTRONIC GmbH* or if the device firmware does not match the active project-firmware. In both scenarios, the process is identical.

- 1) Right-click with the mouse in the firmware area of the workbook explorer and select “Add Firmware”.

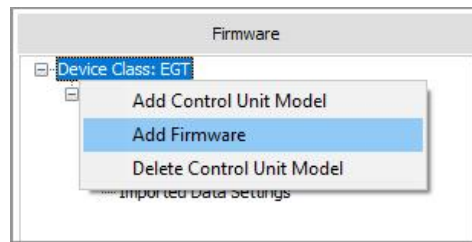


Figure 58 Pop-Up Add firmware

- 2) Then the “Add Control Unit Model/Firmware” window opens. Select the required firmware and click on the “Load” button in order to integrate it into the work folder.
- 3) If the required firmware is not available in the window, then you can import it with a click on the “Import New Firmware” button. For this purpose, a window is displayed with which you can navigate to the file path on your PC/notebook and select the required firmware.

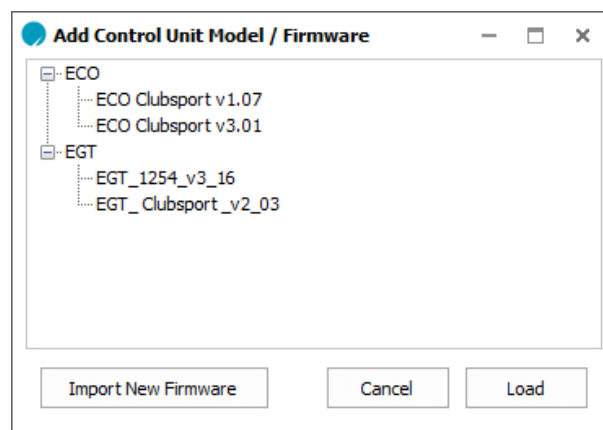


Figure 59 Window for firmware selection

- 4) The imported firmware is now displayed in the “firmware” area. This has to be activated before use. The process for this is described in chapter 9.5.

Note:

Transferring new firmware to your device is explained in chapter 9.8 „Update Firmware and Transfer to Device“.

Note:

It is recommended to delete firmware from your project once it is no longer in use. This prevents confusion and installing wrong firmware on the device. Chapter 9.7 „Delete Firmware from MAT Project“ explains how to delete firmware from your project.

9.5. Change Selected Firmware ID

There may be 2 reasons to make a change of firmware necessary. In both cases, the desired firmware has to be first set active.

- During a firmware update, the active firmware (selected) is always installed onto the device.
- The device firmware and the active firmware have to match in order to establish a connection to the device. “Selected Firmware Id” has to match the “Device Firmware ID”.

- 1) Import the desired firmware into MAT as described in chapter 9.4.
- 2) Right-click in the “firmware” area onto the desired firmware and select “Set As Active Firmware”.

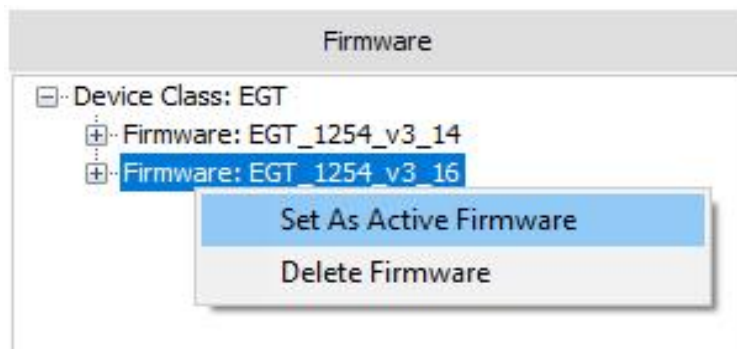


Figure 60 Set the desired firmware as active firmware

- 3) The firmware is now displayed in the “Active Device” area as “Selected Firmware ID”.

9.6. Delete Device Classes

With a right-click on the device class in the “Firmware” area and the “Delete Control Unit Model” command, it is possible to delete it from a MAT project.

Note:

All created but not exported datasettings from the project will be lost in this process. Export these to your hard drive, before deleting the device class. Datasettings in the datasetting device history manager are not affected by this.

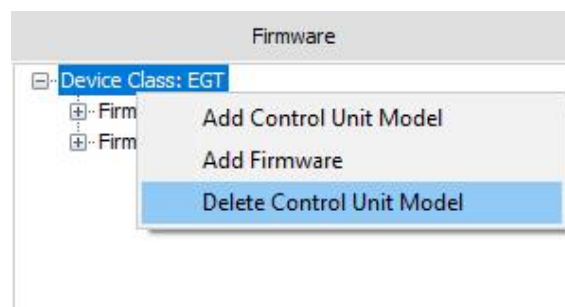


Figure 61 Delete device classes from MAT-project

9.7. Delete Firmware from MAT Project

You can delete an older, no longer required firmware from your MAT project. Click with the right mouse button on the relevant firmware and select “Delete Firmware”. The firmware is then deleted from your project.

Note:

All created but not exported datasets from the project will be lost in this process. Export these to your hard drive, before deleting the device class. Datasets in the datasetting device history manager are not affected by this.

Note:

For clarity, it is recommended to only ever integrate the current device firmware in your MAT project.

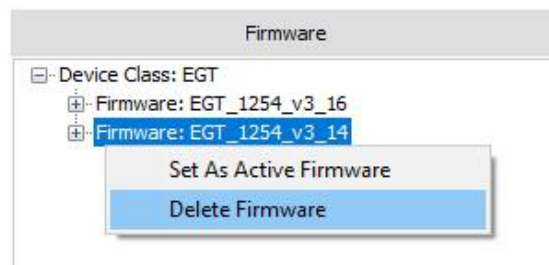


Figure 62 Delete firmware from MAT-project

9.8. Update Firmware and Transfer to Device

Firmware updates for a device can be made using the Mega Application Tool. If new firmware is available for your devices, then *MEGA-Line RACING ELECTRONIC GmbH* will send you a new MAT project file (.matproj).

For a firmware update, a connection to your device has to be established and the desired firmware has to be set active in MAT. Please proceed as follows.

Note:

During the transfer of a new firmware, the voltage supply of the device must not be interrupted!

- 1) Please ensure that the power supply to your device is not interrupted during the updating process. Loss of the device's function may be the result.
- 2) Start MAT and open the MAT project file with the new firmware or import the new firmware to an existing project. For this purpose, refer to chapter 9.4.
- 3) Switch the firmware active. It is now displayed in the “Active Device” window as “Selected Firmware ID”.
- 4) Connect your laptop to the interface of the vehicle or directly to the device which has to be programmed.
- 5) Switch on the device's voltage supply.
- 6) Going online will initially not be possible. The connection to your device exists and the update can be started, once the serial number and old device firmware is

displayed in the “Active Device” window behind “Device ID” and “Device Firmware ID”.

- 7) Click on the “Program” worksheet in the “Main Menu” and then on the “Flash Firmware” button. MAT now starts with the device update.

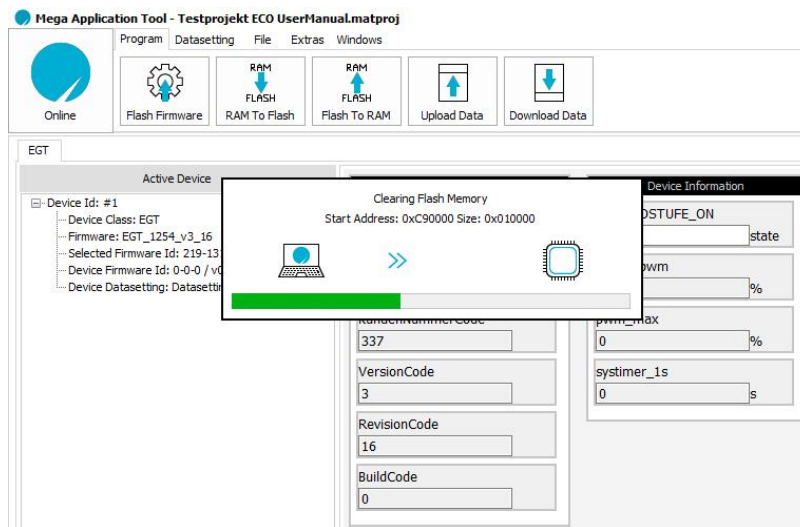


Figure 63 Firmware update / flash process of a device

- 8) If the update has been completed successfully, MAT expects that the user selects a datasetting which has to be installed onto the device.
- 9) If the desired datasetting has not yet been imported, then select initially the standard datasetting (“Basic Datasetting”) for the relevant firmware. The actual datasetting can then be installed directly after that.
- 10) Select the datasetting and confirm with OK.

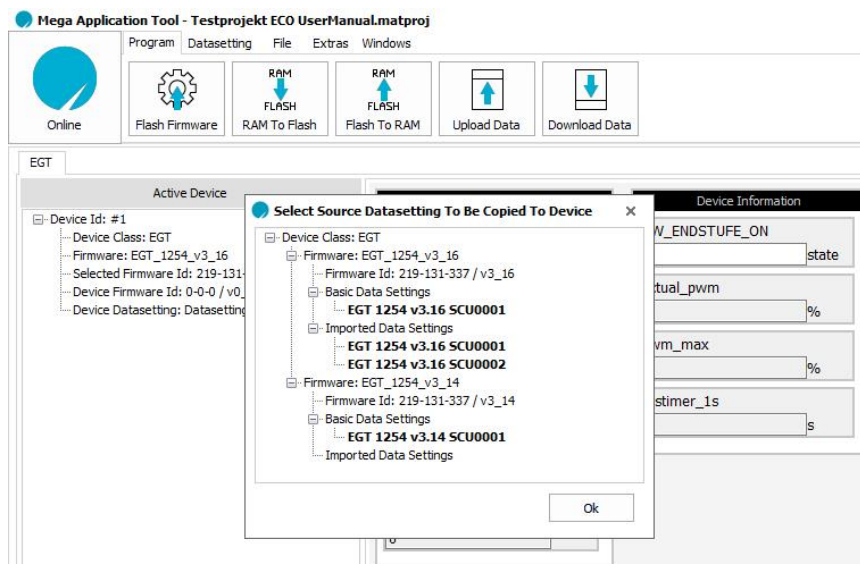


Figure 64 Select a datasetting for the standard application after flash process



- 11) Now MAT displays the “Copy/Edit Data Setting” window. Confirm this with OK, then the datasetting is transferred to the device.
- 12) Confirm datasetting by transferring it into the device’s Flash. For this purpose, click on the “Datasetting” worksheet in the “Main Menu” and then on the “RAM to Flash” button.
- 13) The firmware update has now been completed successfully.

10. Managing datasettings

Datasettings include the setup of your devices. Each datasetting is clearly assigned to a firmware. There can be several datasettings per firmware.

10.1. General information to datasettings

You can manage the datasetting of your device with the Mega Application Tool. The datasettings include a list of all parameters with associated values and thus the entire applied setup of your device. The information is saved in the form of a matcex file.

The datasetting applied on the device is represented in the “Active Device” area by “Device Datasetting: Datasetting Local“. Furthermore, further datasettings can be managed in the “Firmware” area. This area includes both a basic datasetting as well as datasettings created for the device.

When working with a device datasetting, a distinction between three operating levels has to be made. Your PC is the first level. The device itself has two levels. The RAM (working page) and the Flash (reference page).

As long as you have an active connection to the device, your PC (level 1) displays the RAM (level 2) of the device. Displayed parameters and measuring values are continuously updated. Changes to the datasetting on your PC are automatically transferred to the RAM as soon as these are confirmed with “Enter”. The device itself works with the datasetting from the RAM. Datasettings in the RAM will be lost when the device is switched off. If changed parameter values have to remain on the device, then they have to be transferred to the Flash of the device (level 3). These are transferred again to the RAM when the device is restarted.

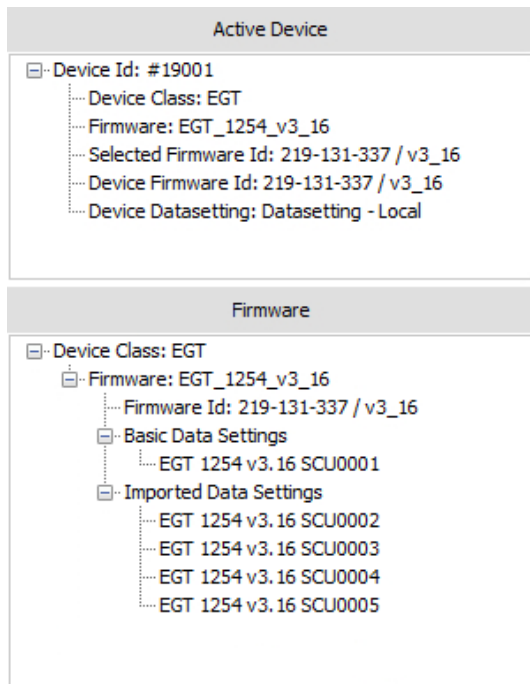


Figure 65 Datasettings in MAT

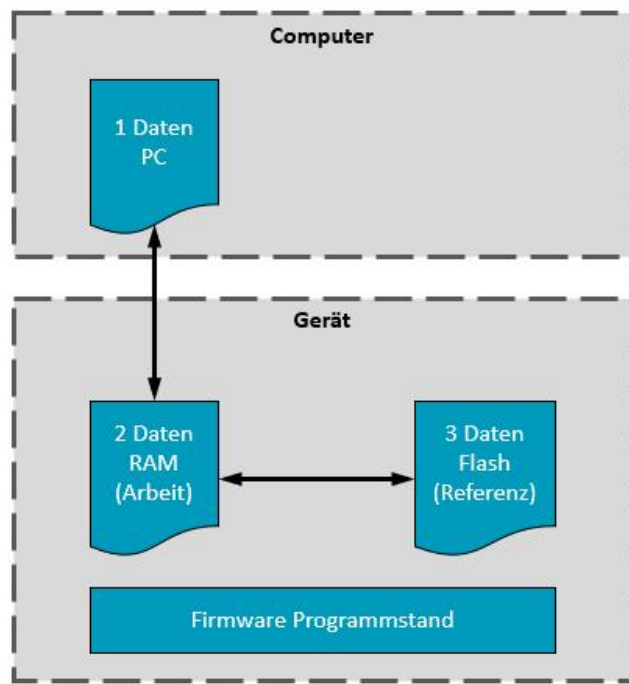


Figure 66 Comparison of datasettings

1) Datasetting PC

The datasetting on your computer is an image of the volatile datasetting (RAM) on the device (working page). As soon as you have an active connection to a device, then this is loaded from the device into the MAT display. You can now directly communicate with the working page (RAM) of your device and change parameters. If you want to transfer data permanently, then you have to transfer them from the RAM to the permanent Flash.

After severing the connection, the most recently loaded datasetting is still available and can be edited. However, there is no connection to your device and during the next connection to the device, this is replaced again by the working page of your device. If you have made changes without an active connection, then please export it before you connect again to the device.

2) Datasetting device in RAM (working page)

This datasetting is not located in the RAM of the device. If the device is switched on, then the data is loaded from the Flash on the reference page to the RAM of the working page. If the device is switched off or carries out a brownout reset, then the memory loses its data. If the device is "online", then changes to the parameters are first saved on the working page and are lost if you switch off the device without first backing up the data. Changes to the parameters on the working page of the device have no immediate effect on the parameters of the reference page. Any inputs can thus be reset by switching the device off and on.

3) Datasetting device in the Flash (reference page)

This datasetting is located in the non-volatile Flash of the device. This memory also maintains its data even if the device is switched off and disconnected from the power supply. If the device is switched on, then the data is copied from the Flash of the reference page to the RAM of the working page.

10.2. Determine Datasetting of the Device

The Mega Application Tool can show you the firmware of the device if you connect it to your PC/notebook and MAT is open. For this purpose, a MAT project has to be opened which has a firmware version of the device class. The “Selected Firmware ID” does not have to match that of the device exactly, however, it has to match the device class. As soon as the voltage supply is switched on, the device firmware is displayed as “Device Firmware ID”.

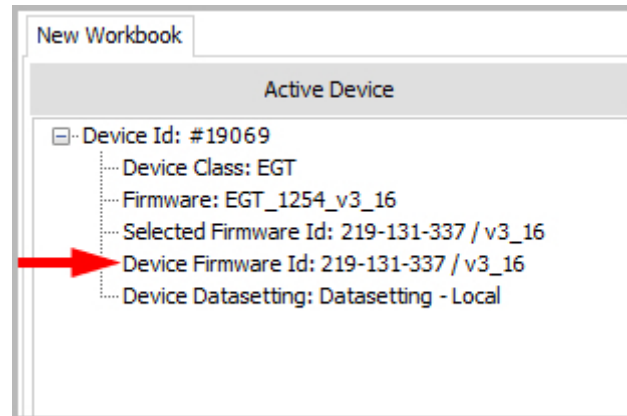


Figure 67 Device firmware

10.3. Display Datasettings

The current datasetting of the device and imported datasettings can be displayed in MAT. It can be displayed graphically in the workbook or in list form in its own window.

10.3.1. Display Datasettings in List Form

The datasetting of the connected device as well as the imported datasettings can be displayed in list form. The process for this is identical for the device datasettings and imported datasettings. The device datasetting will be displayed by the “Device Datasetting: Datasetting - Local” as long as you are online. Imported datasettings are displayed in the “Firmware” area under “Imported Datasettings”.

- 1) Highlight the desired datasetting and right-click on it.
- 2) Select the “Show Datasetting” command.
- 3) The window “View Datasetting” opens the datasetting in list form.

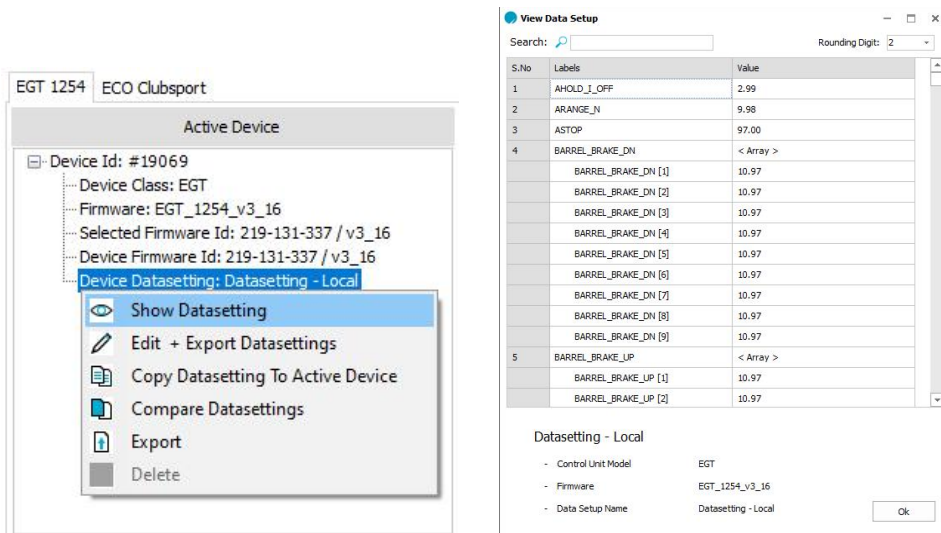


Figure 68 View datasetting in list form

10.3.2. Display Datasettings in Working Area

You can use the “Working area” to view the datasetting of the connected device. If a device is connected and online, then the current measuring values are also displayed here as live view.

Datasettings of connected device

The datasetting in the “working area” corresponds always to the RAM of your device. Measuring values are continuously updated and also displayed.

Display imported datasettings with virtual device

Imported datasettings can be displayed graphically with a virtual device in the “working area”. For this purpose, create a virtual device as described in chapter 7.3 and transfer the desired datasetting to it.



Figure 69 Real-time display of measuring values and parameters

10.4. Compare Datasets

Datasets can be compared to each other in MAT. As long as a device is connected, the imported datasets can also be compared with the device dataset which is loaded in MAT.

- 1) For this purpose, mark the desired dataset which you want to compare to another. Device dataset or imported dataset
- 2) Right-click on it and select "Compare datasets".
- 3) Select the dataset for comparison in the window that opens. All selectable datasets are highlighted.

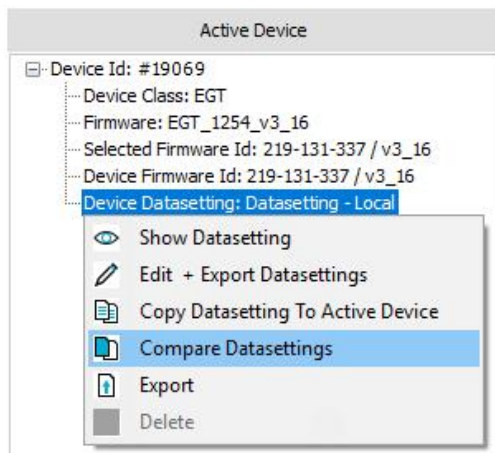


Figure 70 Compare Datasets

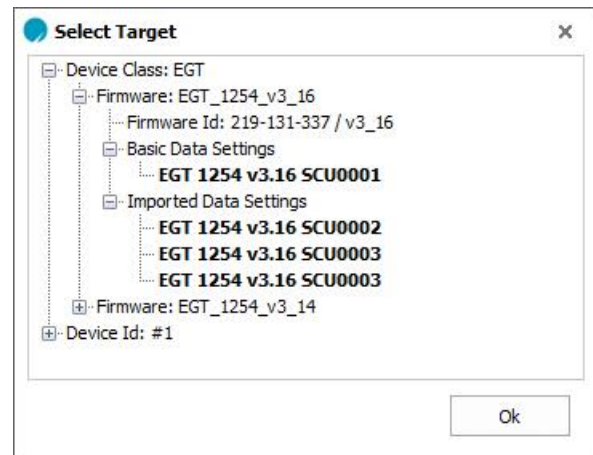


Figure 71 Select a dataset for comparison

"Compare Datasetting" window is essentially divided into two column areas. The left part shows the initially selected dataset, whilst the right part shows the one selected as the second one. Parameters which differ in their datasets are highlighted in the colour "purple".

Note:

The "View Options" allows you to sort the list for equal ("Equal Values") or different values ("Different Values").



S.No	Labels (EGT 1254 v3.16 SCU0002)	Value	Labels (EGT 1254 v3.16 SCU0004)	Value
1	AHOLD_I_OFF	3.0	AHOLD_I_OFF	3.0
2	ARANGE_N	10.0	ARANGE_N	10.0
3	ASTOP	97.0	ASTOP	97.0
4	BARREL_BRAKE_DN	< Array >	BARREL_BRAKE_DN	< Array >
	BARREL_BRAKE_DN [1]	11.0	BARREL_BRAKE_DN [1]	10.0
	BARREL_BRAKE_DN [2]	11.0	BARREL_BRAKE_DN [2]	10.0
	BARREL_BRAKE_DN [3]	11.0	BARREL_BRAKE_DN [3]	10.0
	BARREL_BRAKE_DN [4]	11.0	BARREL_BRAKE_DN [4]	10.0
	BARREL_BRAKE_DN [5]	11.0	BARREL_BRAKE_DN [5]	10.0
	BARREL_BRAKE_DN [6]	11.0	BARREL_BRAKE_DN [6]	10.0
	BARREL_BRAKE_DN [7]	11.0	BARREL_BRAKE_DN [7]	10.0
	BARREL_BRAKE_DN [8]	11.0	BARREL_BRAKE_DN [8]	10.0
	BARREL_BRAKE_DN [9]	11.0	BARREL_BRAKE_DN [9]	10.0
5	BARREL_BRAKE_UP	< Array >	BARREL_BRAKE_UP	< Array >
	BARREL_BRAKE_UP [1]	11.0	BARREL_BRAKE_UP [1]	11.0

Figure 72 Compare data setup window

10.5. Change Datasets

The MEGA Application Tool allows you to change the parameters and thus change the setup of your devices.

There are three options to process datasets:

- Datasets can be edited in list form using the “Edit + Export Datasets” command. In the dialogue window of the list form, you have the direct option to export the dataset.
- The “working area” allows you to change a dataset in the graphic user interface. Then export the changed dataset to your PC.
- If a device is connected, then its dataset can be edited in the “working area”. Changes are automatically transferred to the RAM of your device if this is confirmed with “Enter”.

Note:

It is recommended to always edit datasets offline without the device being connected! Edit and export the desired dataset and then transfer it to your devices. In this way, you have the option to examine the dataset for errors before it is transferred to the device and leads to abnormal behaviour. For this purpose, compare new and old dataset for any unwanted changes. This is also recommended when working with several devices since this will ensure that the identical dataset is installed on all devices.

Installing datasets on a device is explained in chapter 10.8.

Note:

Attention data loss!

Changes to the dataset of the connected device (online) are only transferred to the RAM. After a restart of the device, these will be lost. Thus overwrite the dataset in the Flash to save it permanently on your device. Furthermore, a backup copy should be exported.

Note:

Attention data loss when working offline in the “Working area”!

If you connect a new device or close MAT without saving, then the parameter values in the “Working area” will be overwritten. Therefore, export changed datasetsettings.

10.5.1. Change Datasetsettings with “Edit + Export Datasetsettings”

Offline, without connected device, you can edit your datasetsettings with the “Edit + Export Datasetsettings” option. The modifications are done here in their own window with a complete list of all parameters. The newly created datasetting can be exported directly via the editing window.

- 1) Highlight the datasetting which should be used as the basis for the new datasetting and open the pop-up menu with a right-click.
- 2) Select the “Edit + Export Datasetsettings” command.
- 3) You can now make your changes in the open window and export them as a new datasetting.
- 4) Changed parameters are highlighted in colour. This is explained in more detail on the following page.

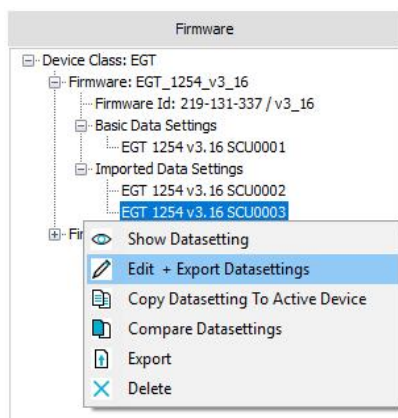


Figure 73 Edit + Export Datasetsettings

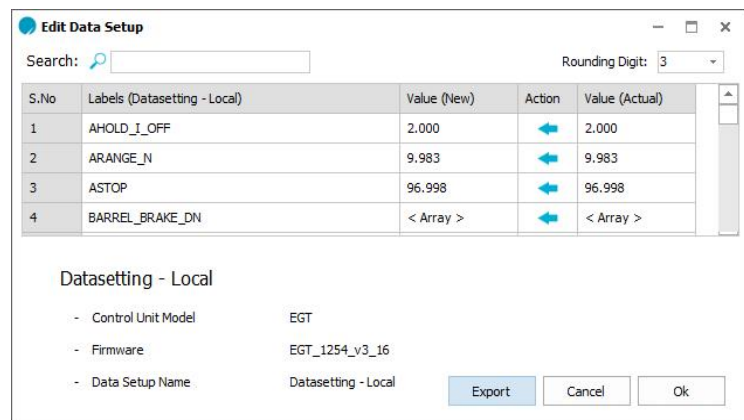


Figure 74 Edit Data Setup window

Note:

The original datasetting is not overwritten by the changes! If you close the “Edit Data Setting” window then all changes will be lost. Therefore, export the changed datasetting with the “Export” button under a new name.



Configuration and colour coding of the “Edit Data Setup” window

The window itself is divided into several columns. Column one and two numbers and names the individual parameters of the datasetting. In the third column “Value (New)”, you can enter the new parameter values. Changed values are highlighted in “orange”. Column 5 shows you the current, unchanged value of a parameter for comparison. If you want to undo an input and keep the current value, then you can reset this with the arrow in column 4. A changed but reset line is highlighted in “green”.

S.No	Labels (Datasetting - Local)	Value (New)	Action	Value (Actual)
1	AHOLD_I_OFF	2.988	↔	2.988
2	ARANGE_N	19.993	↔	19.993
3	ASTOP	96.998	↔	96.998
4	BARREL_BRAKE_DN	< Array >	↔	< Array >
	BARREL_BRAKE_DN [1]	11.8	↔	11.985
	BARREL_BRAKE_DN [2]	13.8	↔	13.998
	BARREL_BRAKE_DN [3]	14.8	↔	14.999
	BARREL_BRAKE_DN [4]	12.8	↔	13.002
	BARREL_BRAKE_DN [5]	12.8	↔	13.002
	BARREL_BRAKE_DN [6]	12.8	↔	13.002
	BARREL_BRAKE_DN [7]	12.8	↔	13.002
5	BARREL_BRAKE_UP	< Array >	↔	< Array >
	BARREL_BRAKE_UP [1]	10.967	↔	10.967
	BARREL_BRAKE_UP [2]	10.967	↔	10.967
	BARREL_BRAKE_UP [3]	12.799	↔	12.799
	BARREL_BRAKE_UP [4]	13.002	↔	13.002
	BARREL_BRAKE_UP [5]	9.983	↔	9.983
	BARREL_BRAKE_UP [6]	9.983	↔	9.983
	BARREL_BRAKE_UP [7]	9.983	↔	9.983
6	BARREL_BRAKE_UP	< Array >	↔	< Array >

Search: Rounding Digit: 3

Datasetting - Local

- Control Unit Model EGT
- Firmware EGT_1254_V3_16
- Data Setup Name Datasetting - Local

Export Cancel Ok

Figure 75 Edit Data setup with different selection colours

Values, which are highlighted in “orange” show changed values. Value (New) and (Actual) are different.

BARREL_BRAKE_DN [2]	13.888	↔	13.998
---------------------	--------	---	--------

Figure 76 Selection colour for changed parameters

Values, which are highlighted in “green” were reset. Value (New) and (Actual) are the same.

BARREL_BRAKE_UP [1]	10.967	↔	10.967
---------------------	--------	---	--------

Figure 77 Selection colour for reset parameters

10.5.2. Change Datasetsettings with a Virtual Device

If you carry out changes to datasetsettings using a virtual device, then you can have this displayed in the live display of the “working area”. For this purpose, please proceed as follows.

- 1) If necessary, disconnect the connected device and create a virtual device as described in chapter 7.3.
- 2) Apply the datasetting to be edited to the virtual device.
- 3) Now the individual parameters of your device can be changed via the MAT user interface.
- 4) Changes to a value have to always be confirmed with “Enter” and are included in the “Device Datasetting: Datasetting - Local” datasetting.
- 5) Once all changes have been made, the changed datasetting (“Device Datasetting: Datasetting – Local”) has to be exported.

ESW_GEAR_POS_TAB										°
R	N	1	2	3	4	5	6	7		
20.0	60.0	90.0	134.0	180.0	225.0	268.0	312.0	340.0		

Gear Status		Shift Request	
gear	actual_position_mod	esw_target_pos	
0 gear	0 °	0 °	
up_paddle	down_paddle		
0 Flag	0 Flag		

Motor Control		
IESW_START	IESW_DELTA	IESW_D2D_WAIT_UP
80 A	30 A	40 ms
IESW_MOVE	cw_power_on	IESW_D2D_WAIT_DN
80 A	0 flag	40 ms
IESW_D2D_ERAY	IESW_D2D_RED	ERAY_TIME_D2D_CUR
85 A	15 A	10 ms

Shift_System

Figure 78 Changing a datasetting in the working area

You can change parameters by clicking in the parameter’s text field and enter the desired values there. Parameters, which can be changed, are highlighted in white. Measuring values and signals, which cannot be changed, are, in contrast, highlighted in grey.

Changed, but not yet accepted parameter fields are highlighted in “green”. The new values are only accepted by confirming them with “Enter”. If you are connected to a device, then the parameter values are only transferred into the device’s RAM after confirming it with “Enter”.

CW_ENDSTUFFE_ON	1	state
actual_pwm	0	%

Figure 79 Changeable parameters (white) and non-changeable parameters (grey)

CAN1_Tx1_ID	512	ID
-------------	-----	----

Figure 80 Parameter change has not yet been accepted



10.5.3. Change Datasets Online Directly on the Device

The live display of the “working area” can be used in order to apply a connected device online. If a device is connected, then its parameter values are loaded directly in MAT. The datasetting can be changed as shown in the previous chapter 10.5.2. Changes are made for this in a RAM of the device and are reset if the device is restarted. If you are happy with the change, then you transfer the datasetting to the Flash of the device and export a backup copy.

Note:

Please note, that changed parameters are directly accepted into the RAM of your device and thus are immediately available for firmware. A faulty input of a parameter can thus lead to an undesired reaction of the device. This may lead to device damage. Be careful when changing parameters in online mode.

10.5.4. Naming of New Datasets

It is recommended to assign names as follows. The first part of the name provides information about device class and firmware version. This part should always stay the same in order to ensure easy allocation of the datasetting to a device class and firmware version. Each new datasetting should be highlighted with a sequential number, which comes after the SCU. The number should be continued with each new datasetting. A final comment is optional and can indicate special circumstances.

EGT 1254 v3.16 SCU0001 “Comment”.matcex

10.6. Export Datasets

Datasets can be exported from the MAT to your PC/notebook. The exported file is saved with a file ending .matcex. Please observe the recommended naming for exported datasets to ensure clean allocation of them. Exported datasets are used as backup files and can be imported again on other computers into MAT.

- 1) Highlight the datasetting to be exported. If you are connected with a device and are online, then the device datasetting can be exported if you select “Device Datasetting: Datasetting – Local”.
- 2) Open the pop-up menu with a right-click and then select the “Export” command.
- 3) A *Microsoft* Windows Explorer window opens in which you can navigate to the datasets folder.
- 4) Then you enter a file name and then click on “Save”.

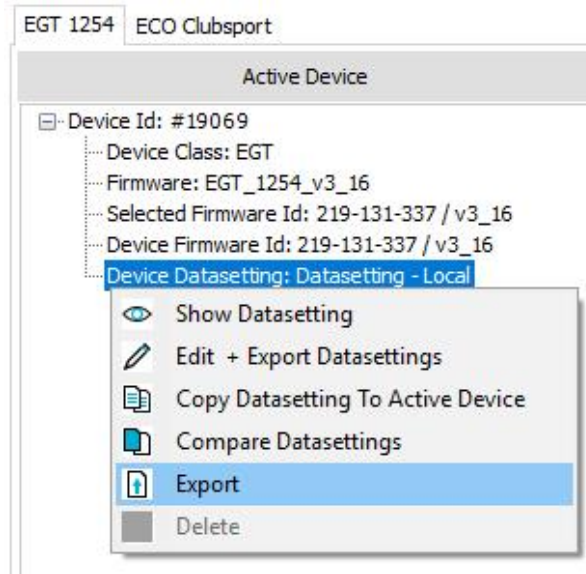


Figure 81 Function for export of a datasetting

10.7. Import Datasettings

A datasetting, which is available in the matcex-file format, can be imported into the tool. The datasetting can only be imported into the firmware area from which it was exported. Proceed as follows to import a datasetting.

- 1) Right-click in the "Firmware" area on the "Imported Data Settings" list entry and select in the pop-up menu the "Import DataSetting" item.
- 2) This opens the standard Windows directory and you can navigate to the datasetting and select it.

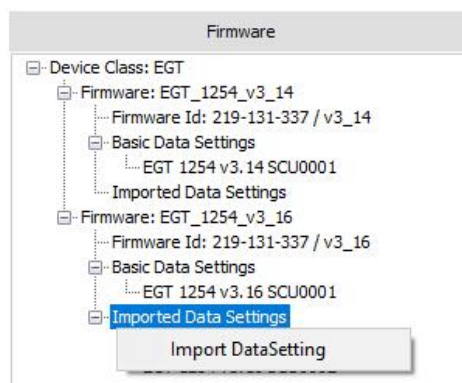


Figure 82 Selection menu to import a datasetting

- 3) Select the datasetting and import it.

4) The imported datasetting is listed in the “Imported Data Settings” area.

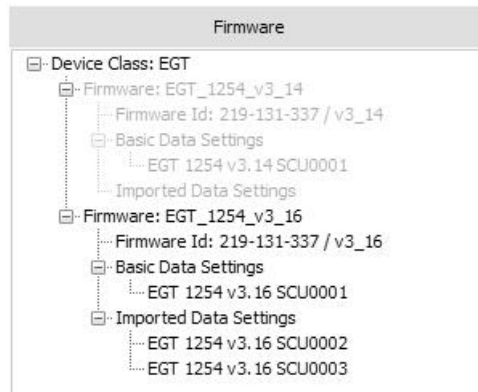


Figure 83 Imported datasettings visible in the firmware area

Note:

When saving the MAT project, all parameter values of the imported datasetting are transferred into the project file. The imported datasetting is thus independent of the file on your PC.

10.8. Apply Imported Datasettings to your Device

You can download the datasetting from your computer to a connected device. The datasetting is then valid on the device for as long as the device is switched on. If you want for the datasetting to be saved permanently on the device, then you have to also transfer it with the “RAM to Flash” button to the Flash.

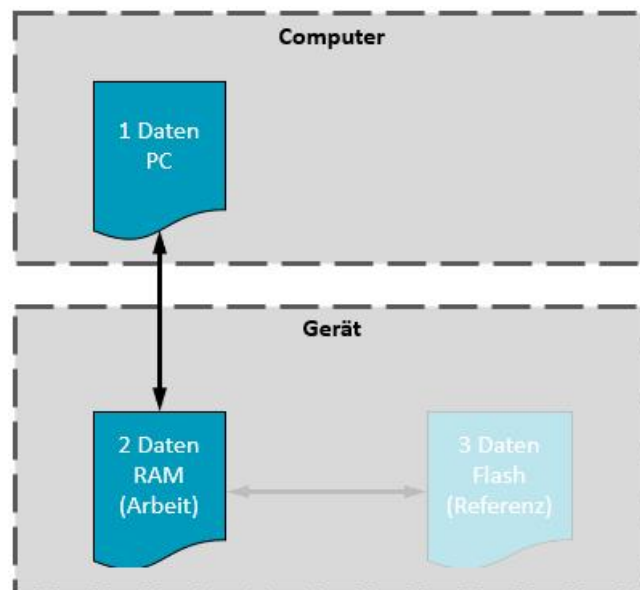


Figure 84 Different levels of datasetting hierarchy



You have to be connected to the device and be online in order to transfer a datasetting from your PC to the device. Refer to chapter 7 for the necessary steps. You can now either drag a datasetting from the firmware list to the local datasetting of the device using drag and drop or press the “Copy To Device” button in the “Datasetting” area and then select the desired datasetting in the window that opens. You can only transfer imported datasettings to a device. Furthermore, a datasetting can only be transferred to the associated firmware-version. Transferring datasettings to more recent or older versions is not possible.

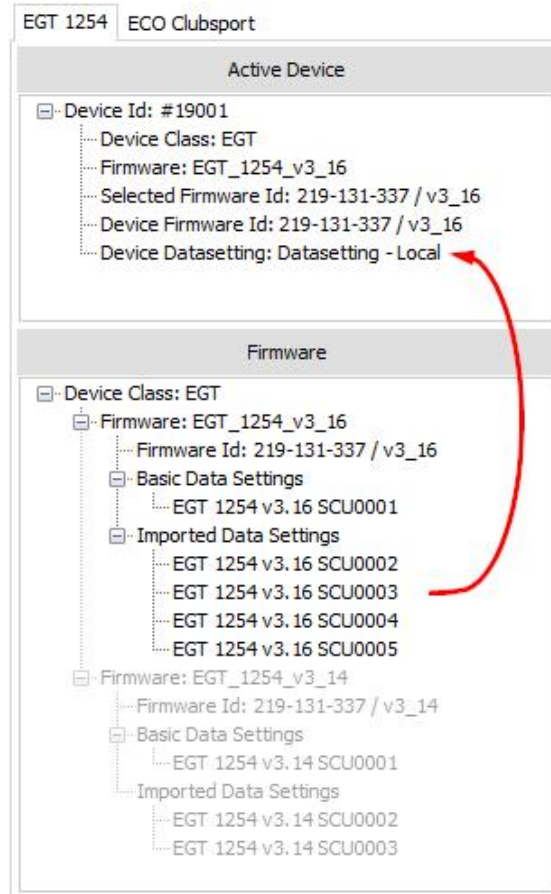
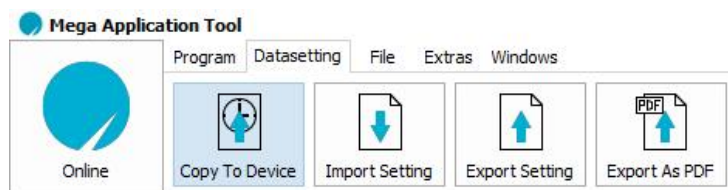


Figure 85 Transferring a datasetting to the device using drag and drop



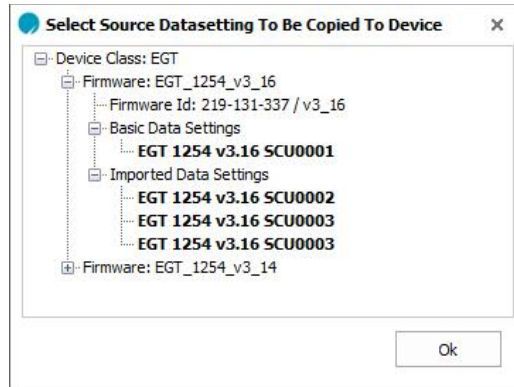


Figure 86 Transferring a datasetting to the device using "Copy to Device" menu button

For either path, the "Copy / Edit Data Setup"-window appears subsequently. Here, you can check which values will change due to the new datasetting.

The window is divided into three parts. On the left, parameter values are displayed which are transferred with the new datasettings to your device. The middle area is representative for the parameter values which are finally transferred to the device. And the right area shows the current parameter values of the device which are loaded in the RAM. Here, you have once again the option to check the parameter values which will be transferred to your device due to the new datasetting.

As an additional feature, you can once again actively intervene in the parameter transfer and change values.

Colour coding allows you to keep track of everything. Furthermore, display filters can be set in "View Options" in order to e.g. only show changed values.

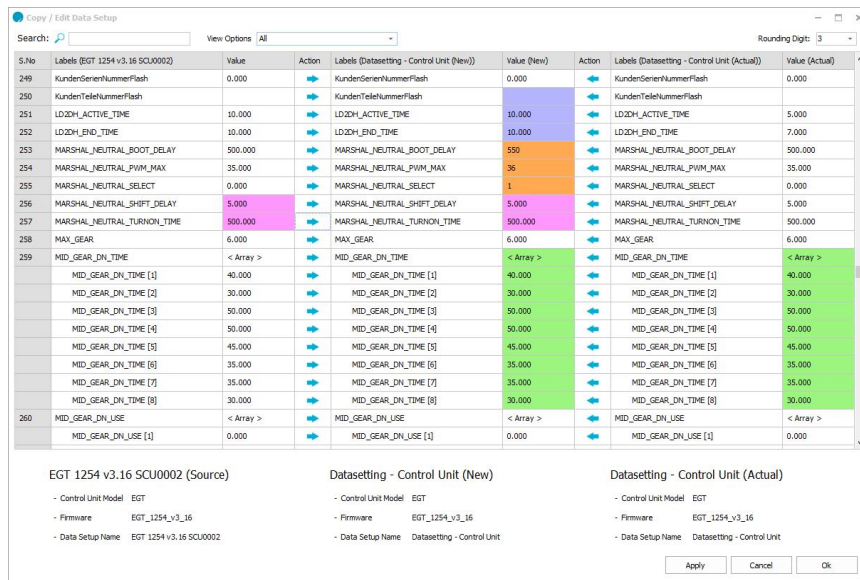


Figure 87 – Datasetting window

Parameter values, which are highlighted in "purple", are changed by the new datasetting. The values are not actively changed by the user.



251	LD2DH_ACTIVE_TIME	10.000	➔	LD2DH_ACTIVE_TIME	10.000	➔	LD2DH_ACTIVE_TIME	5.000
-----	-------------------	--------	---	-------------------	--------	---	-------------------	-------

Figure 88 Changed parameters

Not highlighted parameters indicate values which will not be changed by the new datasetting.

258	MAX_GEAR	6.000	➔	MAX_GEAR	6.000	➔	MAX_GEAR	6.000
-----	----------	-------	---	----------	-------	---	----------	-------

Figure 89 Unchanged parameters

Parameter values, which are highlighted in “Pink”, indicate such values for which the user has actively made the decision to use the parameter values from the new datasetting.

257	MARSHAL_NEUTRAL_TURNON_TIME	500.000	➔	MARSHAL_NEUTRAL_TURNON_TIME	500.000	➔	MARSHAL_NEUTRAL_TURNON_TIME	500.000
-----	-----------------------------	---------	---	-----------------------------	---------	---	-----------------------------	---------

Figure 90 Manual transfer of the parameter from the datasetting to be imported

Values, which are highlighted in “Green”, indicate such values for which the user has actively made the decision to keep the parameter values from the current device datasetting.

259	MID_GEAR_DN_TIME [1]	40.000	➔	MID_GEAR_DN_TIME [1]	40.000	➔	MID_GEAR_DN_TIME [1]	40.000
-----	----------------------	--------	---	----------------------	--------	---	----------------------	--------

Figure 91 Manual transfer of the parameter from the datasetting currently in use

Values, which are highlighted in “Orange”, were actively changed by the user. They do not correspond to either the new or the current datasetting.

253	MARSHAL_NEUTRAL_BOOT_DELAY	500.000	➔	MARSHAL_NEUTRAL_BOOT_DELAY	550	➔	MARSHAL_NEUTRAL_BOOT_DELAY	500.000
-----	----------------------------	---------	---	----------------------------	-----	---	----------------------------	---------

Figure 92 Manual change of a parameter

The following describes how a new datasetting can be installed.

- 1) Please ensure that the power supply to your device is not interrupted during the updating process.
- 2) Start the MAT tool, open the MAT project file of the device and import the new datasetting.
- 3) Connect your laptop to the device which has to be programmed.
- 4) Switch on the voltage supply of the device and go online.
- 5) There are two options to transfer the datasetting to the device.
- 6) Transfer the datasetting to your device using drag and drop.

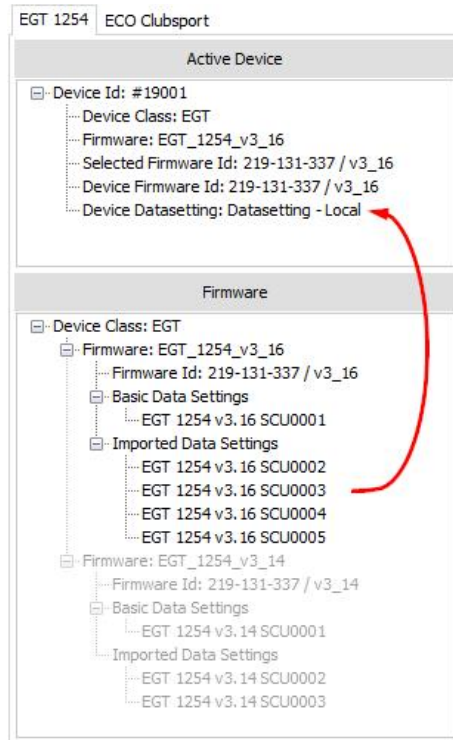


Figure 93 Transfer datasetting using drag and drop

- 7) Or click on the “Copy To Device” button and select the desired datasetting in the window that opens.

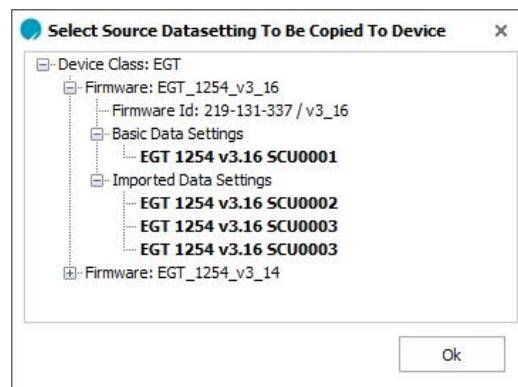
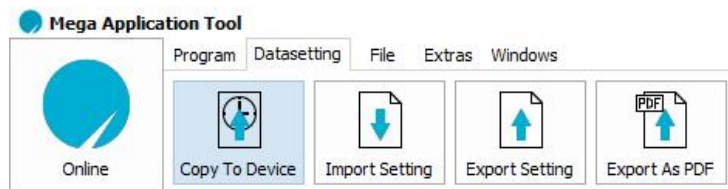


Figure 94 Transfer datasetting by using the menu button

- 8) For either path, the “Copy / Edit Data Setup” window appears subsequently. Here, you can check which values will change due to the new datasetting. Confirm this with OK, then the datasetting is transferred.



S.No	Labels (EGT 1254 v3.16 SCU0001)	Value	Action	Labels (Datasetting - Control Unit (New))	Value (New)	Action	Labels (Datasetting - Control Unit (Actual))	Value (Actual)
1	AHOLD_I_OFF	2.988	↔	AHOLD_I_OFF	2.988	↔	AHOLD_I_OFF	2.988
2	ARANGE_N	9.983	↔	ARANGE_N	9.983	↔	ARANGE_N	19.993
3	ASTOP	96.998	↔	ASTOP	96.998	↔	ASTOP	96.998
4	BARREL_BRAKE_DN	< Array >	↔	BARREL_BRAKE_DN	< Array >	↔	BARREL_BRAKE_DN	< Array >
	BARREL_BRAKE_DN [1]	10.967	↔	BARREL_BRAKE_DN [1]	10.967	↔	BARREL_BRAKE_DN [1]	11.985
	BARREL_BRAKE_DN [2]	10.967	↔	BARREL_BRAKE_DN [2]	10.967	↔	BARREL_BRAKE_DN [2]	13.998
	BARREL_BRAKE_DN [3]	10.967	↔	BARREL_BRAKE_DN [3]	10.967	↔	BARREL_BRAKE_DN [3]	14.999
	BARREL_BRAKE_DN [4]	10.967	↔	BARREL_BRAKE_DN [4]	10.967	↔	BARREL_BRAKE_DN [4]	13.002
	BARREL_BRAKE_DN [5]	10.967	↔	BARREL_BRAKE_DN [5]	10.967	↔	BARREL_BRAKE_DN [5]	13.002
	BARREL_BRAKE_DN [6]	10.967	↔	BARREL_BRAKE_DN [6]	10.967	↔	BARREL_BRAKE_DN [6]	13.002
	BARREL_BRAKE_DN [7]	10.967	↔	BARREL_BRAKE_DN [7]	10.967	↔	BARREL_BRAKE_DN [7]	13.002
	BARREL_BRAKE_DN [8]	10.967	↔	BARREL_BRAKE_DN [8]	10.967	↔	BARREL_BRAKE_DN [8]	13.002
	BARREL_BRAKE_DN [9]	10.967	↔	BARREL_BRAKE_DN [9]	10.967	↔	BARREL_BRAKE_DN [9]	13.002
5	BARREL_BRAKE_LP	< Array >	↔	BARREL_BRAKE_LP	< Array >	↔	BARREL_BRAKE_LP	< Array >
	BARREL_BRAKE_LP [1]	10.967	↔	BARREL_BRAKE_LP [1]	10.967	↔	BARREL_BRAKE_LP [1]	10.967
	BARREL_BRAKE_LP [2]	10.967	↔	BARREL_BRAKE_LP [2]	10.967	↔	BARREL_BRAKE_LP [2]	10.967
	BARREL_BRAKE_LP [3]	11.985	↔	BARREL_BRAKE_LP [3]	11.985	↔	BARREL_BRAKE_LP [3]	12.799
	BARREL_BRAKE_LP [4]	11.985	↔	BARREL_BRAKE_LP [4]	11.985	↔	BARREL_BRAKE_LP [4]	13.002

Figure 95 Compare the datasettings of the device

Note:

Here, you have once again the option to actively intervene into the datasetting. Please note, however, that changes only apply for the device datasetting! The selected datasetting in the items 6/7 is not changed in this process. Thus, the selected and actual device datasetting do not match. Be careful when changing parameters here!

11. License management

Tool features can be released by acquiring an expansion license for your MAT. The basic MAT version requires no extended license. However, it only provides the basic functions to work with your device.

MEGA-Line Racing sells two expansion licenses. A Pro and a Prime license. What functions are included in the relevant license can be found in the relevant MAT tool information material.

11.1. Use MAT with the Basic License

The basic license is already included when downloading the application tool and is free. When opening MAT, you receive a "License Check Failed" message in the notification window. This means that no expansion license is available and thus the basic version of MAT is used. Furthermore, the license menu shows that no license file has been found.

Date & Time	Information	Reason	Result
01.01.2020 01:37:22	Mega Application Tool: Started		
01.01.2020 01:37:22	File Version: 1.4.0000.00000		
01.01.2020 01:37:22	License Type : Basic Version	No extended license found	

Figure 96 Output if the standard license is used

Figure 97 Output of License Management System if standard license is used

11.2. Apply for a license

A license request file (.licreq) is necessary to create a license. This file can be created in MAT and has to be then sent to MEGA-Line Racing by email. MEGA-Line Racing then creates a license and returns it to you.

License request files can be sent to Support@mega-line.de.

Note:

MAT has to be started with a current internet connection in order to create license request file.

For this purpose, please proceed as follows.

- 1) Open MAT, navigate to the “Extras” worksheet and open the license menu by clicking on the “license” button.

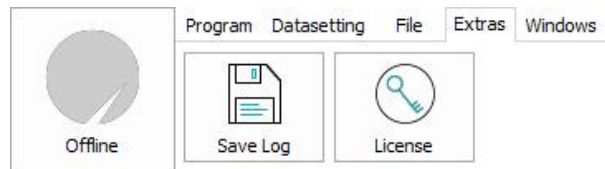


Figure 98 “Extras” tab with license menu button

- 2) Complete the license request file. The license request file is created by clicking on the “Create LRF” button and can be saved by you on your computer. Information about input is provided at the end of this sub-chapter.

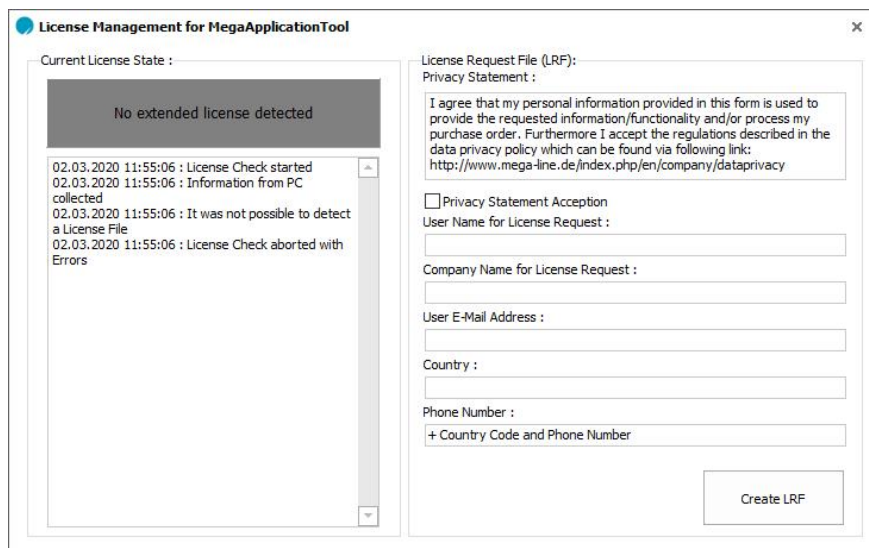


Figure 99: License menu

- 3) An additional menu informs about the data which is transferred alongside the license request file.

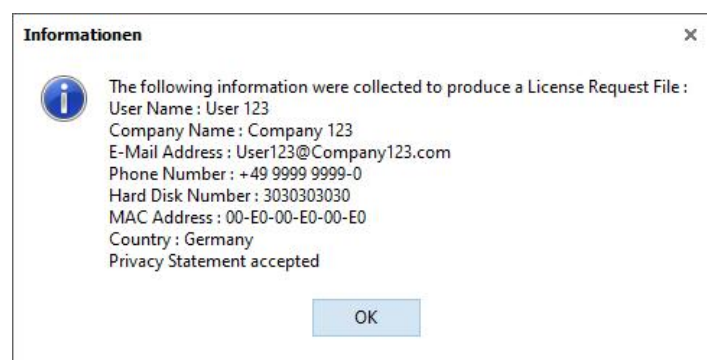


Figure 100 Output after applying for a license

- 4) Please send the completed license request file to support@mega-line.de.
- 5) After review of all specifications, the license (ending: .licfile) is created and returned to you by email. The license file always has the name “LicenseFile.licfile”.
- 6) Copy the license file to the folder which includes your MAT.exe.
- 7) When restarting the MAT tool, the license is now displayed and you can access the released features. Your license is now also displayed in the license menu.



Date & Time	Information	Reason	Result
01.01.2020 01:37:54	Mega Application Tool: Started		
01.01.2020 01:37:54	File Version: 1.4.0000.00000		
01.01.2020 01:37:54	License Type : Pro Version		Success

Figure 101: MAT Pro version license is used

Note:

If Pro or Prime licenses are used, then administrator rights are required to execute the MAT tool under the main partition (as specified in chapter 5.3). If this is not possible, then another partition has to be used.

Note:

Please observe the following when entering your information into the license request file:

- User name and company name must have at least 5 characters.
- Country at least 3 characters.
- Only ASCII characters allowed. No country-specific special symbols.
- A valid email address has to be provided.



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