

MS 3 Sport 996 GT3 Cup Kit

Quick Start Manual

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1 Before you begin

1.1 Software Installation

In addition to the Quick Start guide, the USB Drive included with your ECU includes the software needed to interface with the ECU as well as data analysis software and important reference documents. The following are included:

- Modas Sport with MS 3 Sport GT3 Cup workbase – Calibration interface software
- MSA Box II Driver
- WinDarab V7 Free – Data analysis software. If you plan on keeping an existing WinDarab V6 installation, create a separate install for WinDarab V7 Free. WinDarab upgrade options can be provided by authorized Bosch Motorsport dealers.
- WinDCP – Compact Flash card configuration software for use with GT3 Cup C 5 Datalogger
- Function Description – MS 3 Sport ECU software manual
- Bosch Motorsport Catalog

Run the installation executable file to install all programs on your laptop. Software updates for all tools are available on the Bosch Motorsport website.

1.2 Hardware Checklist

- MS 3 Sport GT3 Cup ECU
- MSA Box II Calibration Interface
- Laptop
- Installation USB Drive

1.3 Hardware Installation

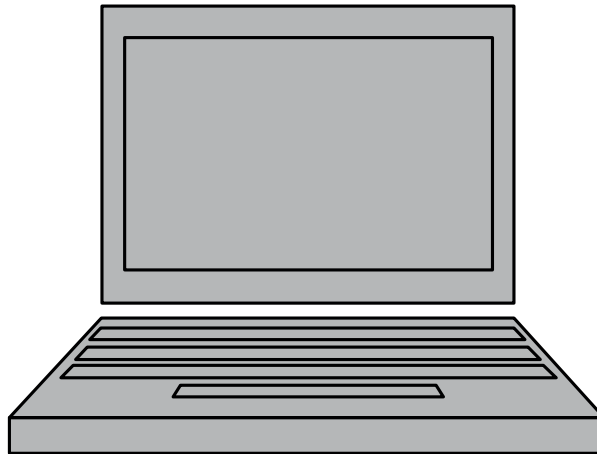
The MS 3.1 GT3 Cup ECU can be removed and directly replaced with the MS 3 Sport GT3 Cup ECU. Take care when removing and reattaching the plastic ECU header connectors.

2 Tools: Modas Sport

2.1 Modas Sport Calibration Tool Installation and Use

The ModasSport operation and calibration software allows users to access the control variables and engine maps on Bosch Motorsport control units and then make changes to them. It can also record measurements.

To work with ModasSport, you need a computer, preferably a laptop so you can be more flexible.



The computer must have a USB port to connect the MSA Box. The MSA Box is the communication link between the computer and the diagnosis connector plug in the vehicle's wiring harness, in most cases located on the passenger side B-pillar.

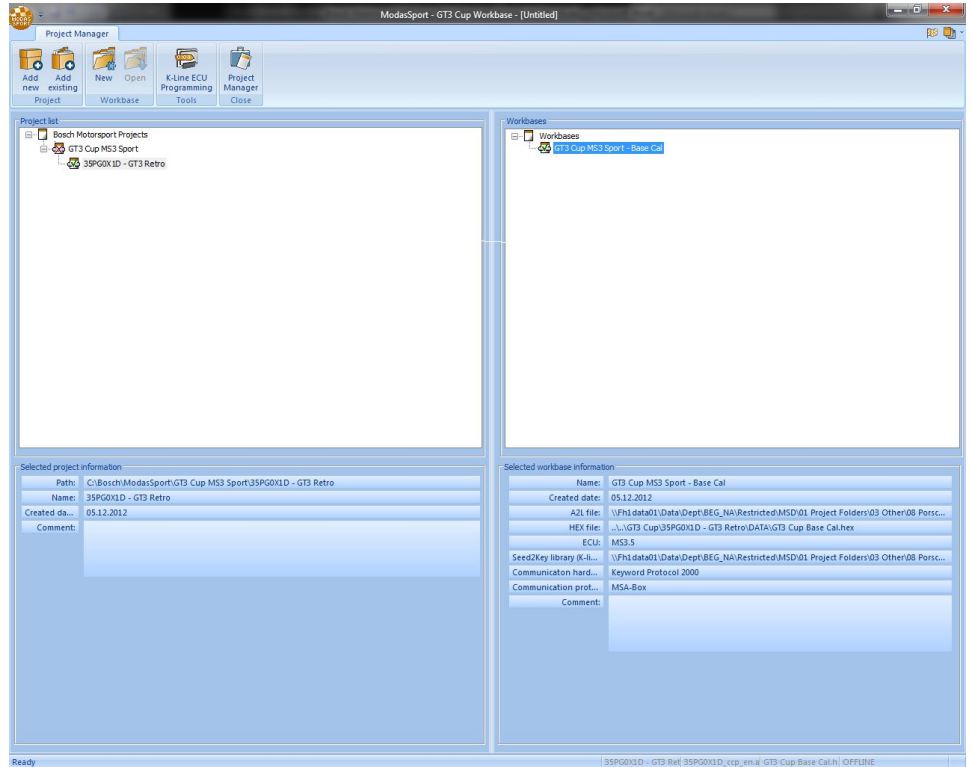


Before using the MSA Box, your computer must have the MSA Box driver installed.

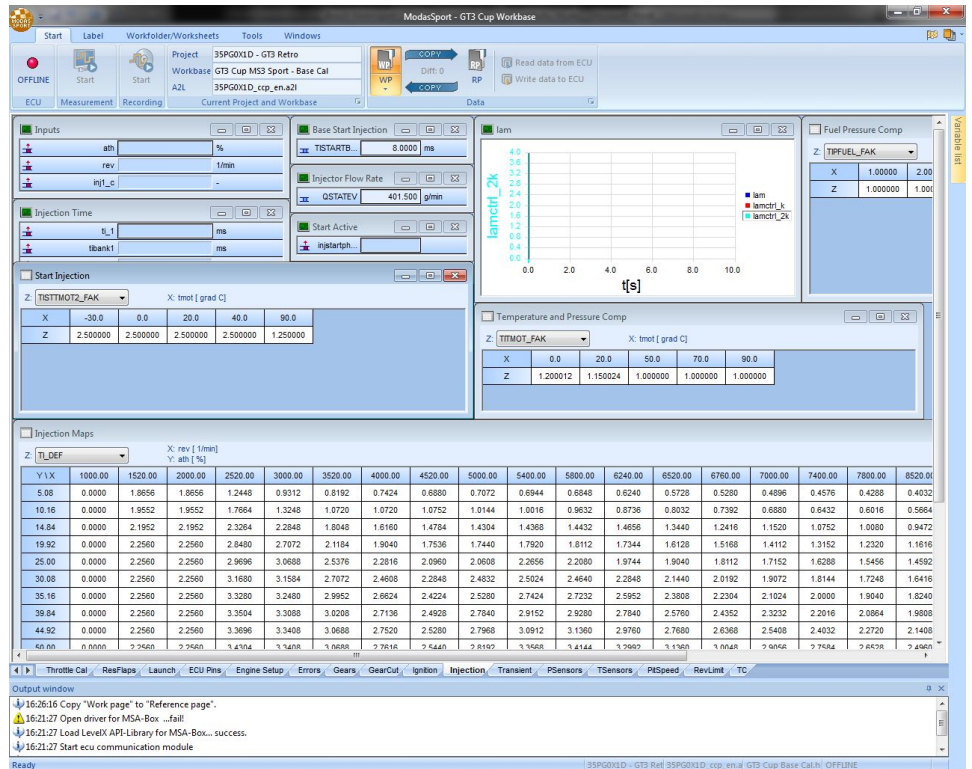
2.2 Loading the workbase

After running the installation routine, open Modas Sport.

Select the starter project file (.mxprj extension). Once loaded, double-click on the newly created project:

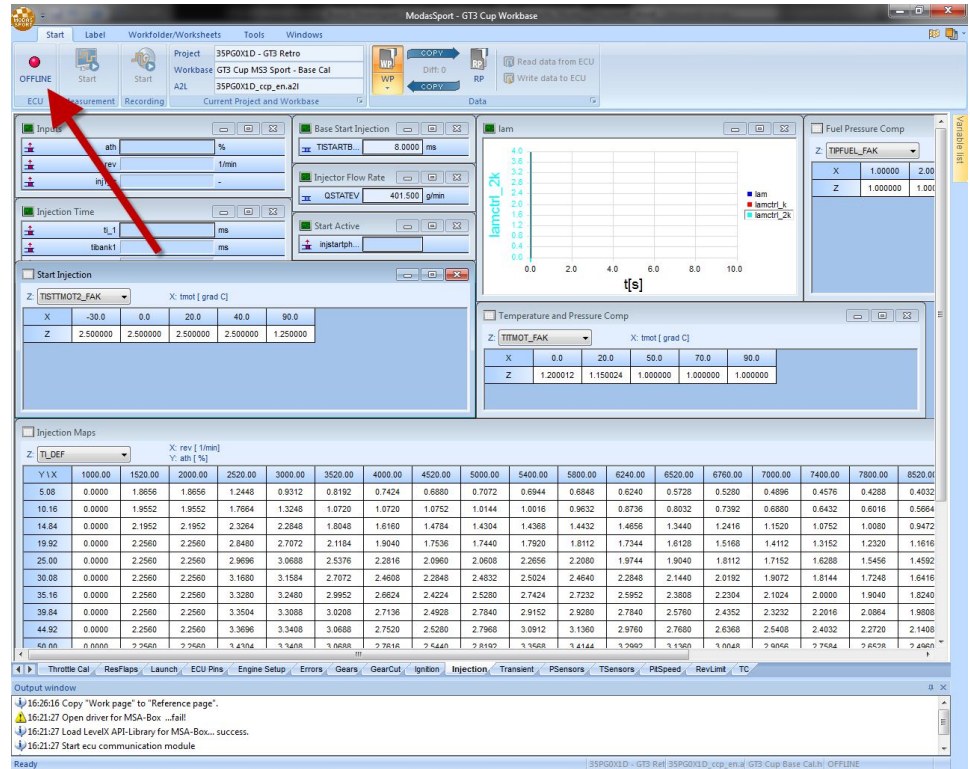


You will notice that many windows pop up and display calibration values from the ECU:

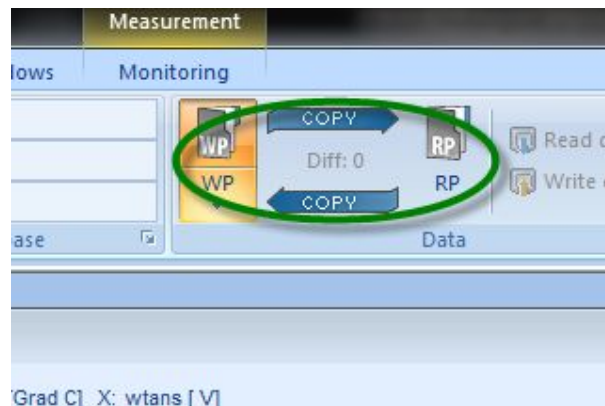


2.3 Connecting to the ECU

When opened, ModasSport switches to measuring and calibration mode for the new workbase. The ECU status light is green if connection to the control unit has been established. If it does not, please ensure that the MSA Box is plugged into the vehicle and laptop and verify that no MSA Box errors are present. The ECU status light is red if connection to the control unit has failed or if the ECU does not have the power switched on. Any errors will be displayed in the Output Window as shown in the bottom left corner of the screenshot below.



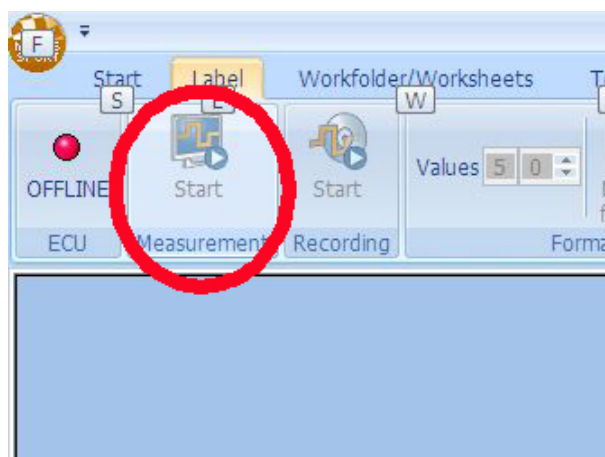
If you are working from a new ECU and the workbase supplied by Bosch, the ECU should not be different from the calibration on the laptop. This will result in no differences being reported in the 'Diff.' tab.



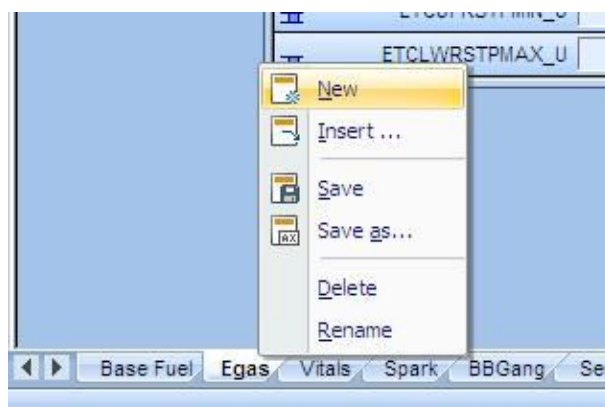
When the connection light and both WP and RP are illuminated green and 0 differences are shown, everything between the laptop and the ECU has synced correctly.

2.4 Measurements

After a connection has been established, you can start and stop online measurements of ECU variables by clicking "Measurement". If the computer is connected to the control unit, the oscilloscope and measurement window display the current values. Click "Record" to create measurement files that you can then open and analyze with WinDarab or WinDarab-Free (download on the bosch-motorsport website). The measurement file stores all the values shown in the worksheet.



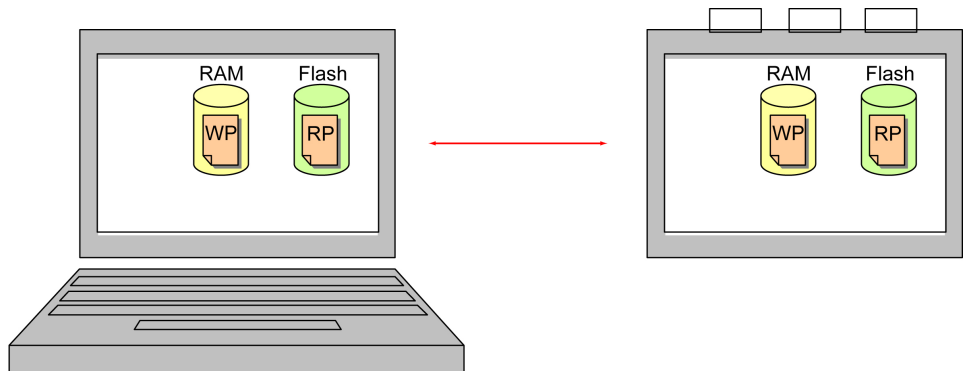
If too many variables are on the same measurement page, the measured data may be slow to refresh. To prevent this from happening and to provide more space for measurable variables, additional sheets can be created by right clicking the lower menu bar and selection "New". A new sheet will be inserted at the end of the row.



2.5 Calibration Changes with Working Page (WP) and Reference Page (RP)

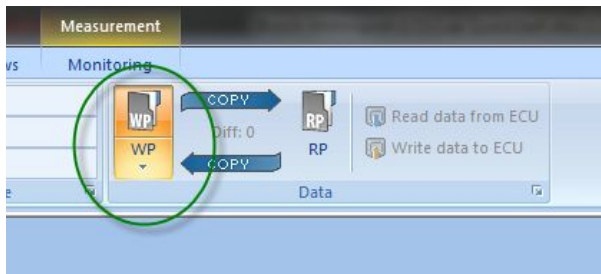
Modas Sport has two data memories: a temporary RAM memory, to which the user can write directly, and a non-temporary, indirectly programmable Flash memory. Each data memory contains one dataset: the RAM dataset is called "Work page WP"; the Flash memory dataset is called "Reference page RP".

Changes to the Calibration can only be made in the Working Page (WP). When these changes are to be saved permanently, the user copies the work page to the reference page. The ECU will complete a power cycle and the data will be saved to the reference page.



Making changes to the calibration requires the following steps:

1. Select WP to change parameters

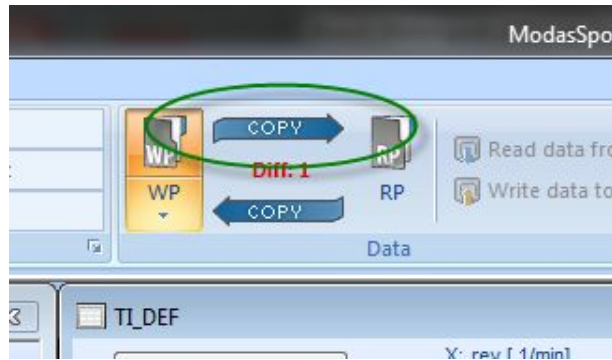


2. Change parameters by selecting the calibratable parameter, typing the desired value, and hitting 'Enter'. Note the changed values with arrows indicating the direction of the change in comparison to the reference page.

This screenshot shows the 'ModasSport - GT3 Cup Workbase' interface. The 'WP' icon is selected, and the 'Diff: 1' indicator is shown. Below the interface is a table titled 'Differences shown between WP/RP' for the parameter 'TI_DEF'. The table shows values for 'X: rev [1/min]' and 'Y: ath [%]' across various RPM points. A red arrow points to the value '4.2016' in the table, which is circled in green. Another red arrow points to the value '4.8000' in the table, which is also circled in green.

Y \ X	600.00	1520.00	2000.00	2520.00	3000.00
0.00	2.6976	2.6976	2.3008	2.4000	2.4000
5.08	▲ 4.2016	2.6048	2.7040	2.7040	2.7040
9.77	▼ 4.8000	3.2000	2.8032	2.8032	2.2912
14.84	6.4064	4.2496	3.1008	3.1008	2.7872
19.92	5.2448	4.7488	3.9968	3.9968	3.7984
25.00	5.9968	5.9968	4.9952	4.9952	4.9952
30.08	5.9968	5.9968	6.1952	6.1952	6.4992
34.77	5.9968	5.9968	5.9968	5.9968	6.3008

3. If you would like to keep the changes, copy WP to RP. See the screenshot below.



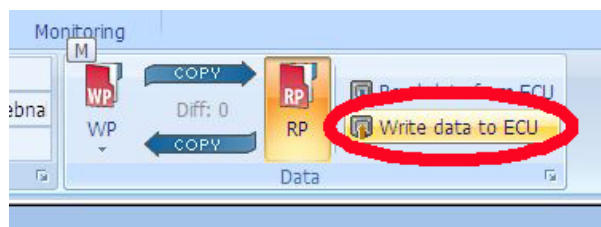
If you do not want to revert to the dataset before the changes were made, simply copy in the other direction.

2.6 Reading Data Sets from ECU and Writing Data Sets to ECU

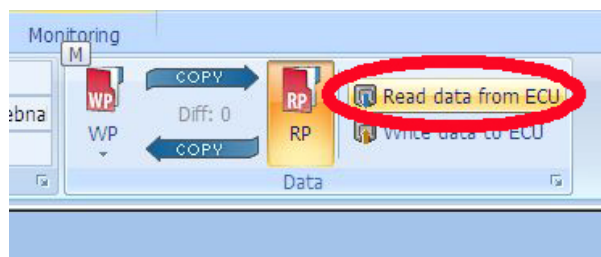
You will notice that when you plug into the ECU and establish a connection, the WP and RP will either be colored Green or Red.

- If the WP/RP are GREEN, it means that the ECU and laptop have the same data sets and it's OK to start working on them
- If the WP/RP are RED, it means that the data sets are different between ECU and laptop and one of the following steps must be taken

You now have the choice of working with the computer dataset or the control unit dataset. If you have amended data on the computer, you will want to continue working on this updated dataset. In this case, you can upload this updated dataset to the control unit by clicking "Write data to ECU". See the screenshot below:



If the data on the ECU is the desired data set, you can read out the control unit dataset and edit it on the computer. To do this, click "Read data from ECU". See the screenshot below:

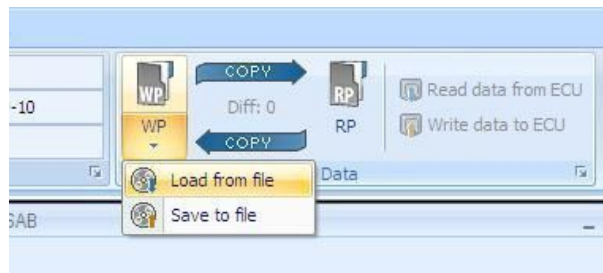


Notice

If the data on the ECU and laptop are unknown, save the data set on the laptop first before reading data from the ECU. After data is loaded from the ECU to the laptop, save the data from the WP to a new file.

Compare datasets from the computer and from the control unit every time the connection between the two is made. If they differ, decide which dataset you want to continue working on.

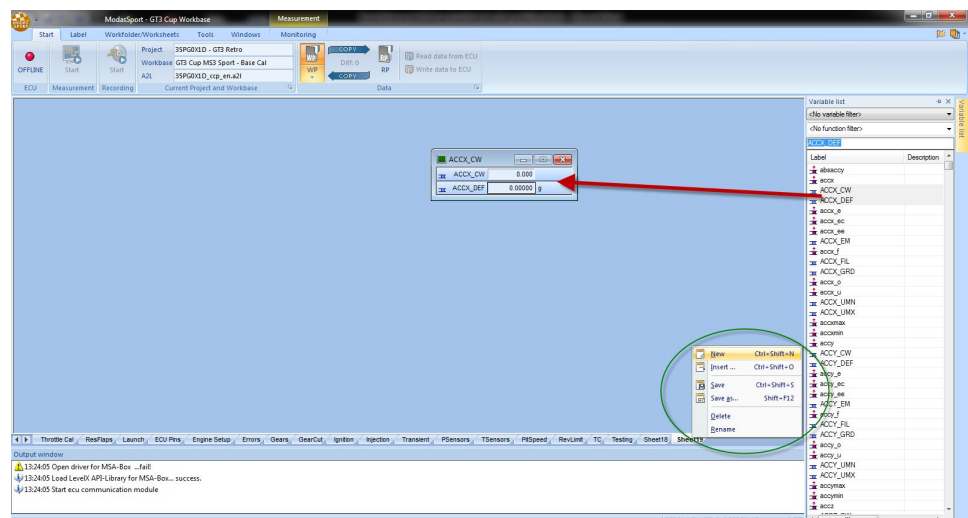
Should you want to save your parameter changes as a new hex file or load a previously saved revision, click on the arrow under the "Working Page WP" tab. A menu will appear, as shown in the screenshot below. Enter the desired file name and click 'OK'.



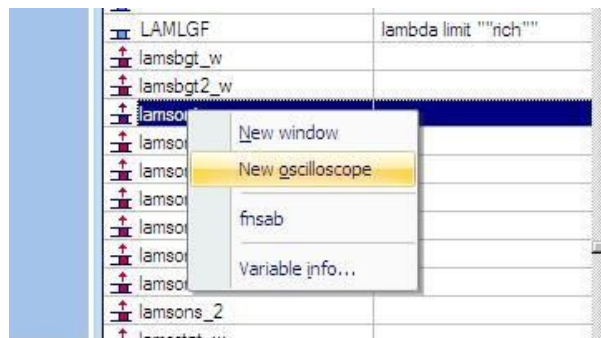
2.7 Editing the work base

A basic work base is provided with the MS3 Sport kit, however, the user can customize the work base if desired.

New worksheets can be created by right clicking on the bar at the bottom of the screen and selecting 'New'. This will create a totally blank screen on which variable viewing windows and oscilloscopes can be placed. Variables can be dragged from the Variable List directly into the work page. These values will be displayed numerically by default.



Variables can also be viewed using the oscilloscope function. To view variables in this window, simply right click on the desired variable and select "New oscilloscope" as shown below.



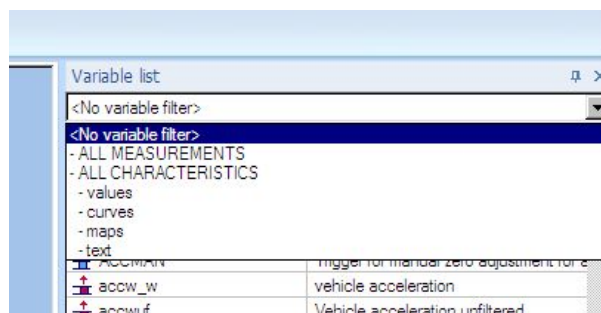
Right clicking on the variable names in the window and choosing the “settings” option will bring up the window where scaling and color can be adjusted.

After entering your data offline on the computer and online on the control unit, you can start fine-tuning (applying) with the engine running. You can change your calibration values on the work page WP. Press the F2 key to show/hide the list of variables.

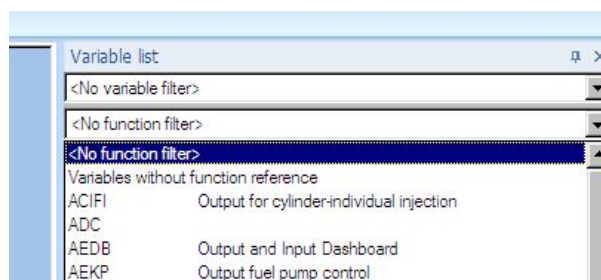
You can filter the lists by measurement (- ALL MEASUREMENTS) and tuning values (- ALL CHARACTERISTICS).

You can filter the tuning values again, by:

- * Single values (- values)
- * Curves (- curves)
- * Engine maps (- maps)
- * Text fields (- text)



You can also filter by function, as shown below.



The functions in the function filter go by the same names and categories as described in the functional framework. When you filter by function, the screen shows only those measurements and calibration values that are required in or influence the function.

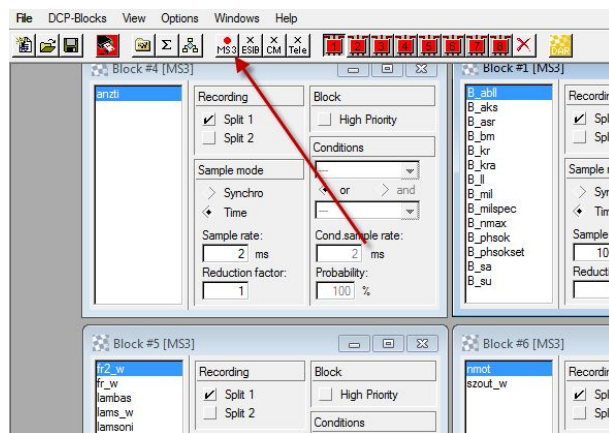
You can also obtain information on the variables by right-clicking the variables in the label list. In the measurement window, calibration values on the work page are shown in white (only these are editable) and measurements are shown in grey. This allows you to differentiate between the two.

3 Tools: WinDCP and WinDarab

3.1 Data Logging

The MS3 Sport supports the same Bosch Cardmemory protocol as the MS3.1, permitting the use of the C5 Data Logger that the Porsche GT3 Cup was originally equipped with. However, some changes are needed in WinDCP to configure the memory cards. To set up WinDCP to log data to the C5, the following steps need to be taken:

- Place the MS3 Sport a2l file in the same location as your other a2l files
- Load this a2l file into WinDCP by clicking the MS3 button and finding the new a2l file:



- You can then create a new DCP configuration and flash the configuration to data cards using the same method as used with the MS3.1
- WinDarab Free can be downloaded from the website to analyse the C5 data output.

4 Calibration

4.1 Starting the Calibration Process

The Bosch Motorsport MS3 Sport for GT3 Cup cars does come with a base calibration flashed to the ECU but it is critically important to perform the following process before the car encounters track use.

- Set the throttle using the 'Set Throttle' Macro in ModasSport. The lower stop value should be written with the throttle plate completely closed (ie back off the idle screw until throttle is shut)
- Verify all sensor values and enter in correct sensor calibration curves, offsets, slopes, etc for your particular sensors. The kit includes base values for common sensors but by no means does this encompass all variants. It is your responsibility to ensure that sensor values read correctly.
- Enter in the correct ECU pinning as determined by the variant matrix in the section below.
- Verify correct trigger wheel offset and timing output by putting a timing light on cylinder #1. The advance value on the timing light should exactly equal the ign_1 value. If not, adjust IGN_OFFS to obtain identical timing between ign_1 and timing light.
- When changing the injection, ignition, and lambda setpoint values, keep in mind that the maps correspond to the map switch with the DEF maps corresponding to mappos 2.

4.2 Variant Coding

The Porsche GT3 Cup came in many different ECU pinout variations. The MS3 Sport ECU is designed to compensate for these pinout changes without requiring modifications to the engine or chassis harness.

For the sake of simplicity, each of the 996 GT3 Cup versions is considered a variant:

Variant 1: Formerly MS3.1 SW Versions 310P301P-R -> SW_VAR_CW = 1

Variant 2: Formerly MS3.1 SW Versions 310P302B-E-> SW_VAR_CW = 2

Variant 3: Formerly MS3.1 SW Versions 310P302F-K -> SW_VAR_CW = 3

To set the pinout of the ECU, simply change the variable SW_VAR_CW to correspond with the correct car variant and ECU pin location.

SW_VAR_CW	0	1	2	3
Acc X	custom	-	-	M08
Acc Y	custom	-	-	M56
Clutch Pressure	custom	-	-	-
Crank Pressure	custom	-	-	-
EGT1	custom	F05	F05	F08
EGT2	custom	F40	F40	F05
Exhaust Flap	custom	-	-	-
Fuel Temp	custom	F21	F21	-
Gear Cut	custom	F08	F08	F40
Gearbox temp	custom	-	-	F21
Intake Flap 2	custom	-	-	-
Laptrigger	custom	F60	F60	F60
Map Sw. Input 2	custom	F41	F41	F41
Oil Temp	custom	M08	M08	F22
TC Sw.	custom	-	-	F38
Water Pressure	custom	M41	M41	-

Fig 1. – ECU functions and pins as a function of car variant number SW_VAR_CW

For cars that are a hybrid using components from different generations of GT3 Cup cars, a different table exists. In order to use this table to select the ECU pin for each of the name functions, the parameter SW_VAR_CW must be set to 0 before the following codeword can be used.

If the pinout of the chassis and engine harnesses is unknown, simply monitor the channel signal values and change the PIN_XXXX_CW value for each of the functions until a reasonable value appears.

Custom Pins	0	1	2
PIN_ACCX_CW	-	M08	-
PIN_ACCY_CW	-	M56	-
PIN_PCLUTCH_CW	-	F05	F21
PIN_PCRANK_CW	-	F08	-
PIN_TEX1_CW	-	F05	F08
PIN_TEX2_CW	-	F05	F40
PIN_EXFLAP_CW	-	M04	-
PIN_TFUEL_CW	-	F21	M08
PIN_GEARCUT_CW	-	F08	F40
PIN_TGEAR_CW	-	F21	F38
PIN_RESFLAP2_CW	-	F34	-
PIN_LAP_CW	-	F26	F60
PIN_MAPSW2_CW	-	F27	F41
PIN_TOIL_CW	-	F22	M08
PIN_TCSW_CW	-	F38	-

Fig 2. – Custom pin codewords

Example: 2005 GT3 Cup car (Variant 3) with a chassis harness from a 2002 GT3 Cup (Variant 1):

SW_VAR_CW	0	1	2	3
Acc X	custom	-	-	M08
Acc Y	custom	-	-	M56
Clutch Pressure	custom	-	-	-
Crank Pressure	custom	-	-	-
EGT1	custom	F05	F05	F08
EGT2	custom	F40	F40	F05
Exhaust Flap	custom	-	-	-
Fuel Temp	custom	F21	F21	-
Gear Cut	custom	F08	F08	F40
Gearbox temp	custom	-	-	F21
Intake Flap 2	custom	-	-	-
Laptrigger	custom	F60	F60	F60
Map Sw. Input 2	custom	F41	F41	F41
Oil Temp	custom	M08	M08	F22
TC Sw.	custom	-	-	F38

Custom Pins	0	1	2
PIN_ACCX_CW	-	M08	-
PIN_ACCY_CW	-	M56	-
PIN_PCLUTCH_CW	-	F05	F21
PIN_PCRANK_CW	-	F08	-
PIN_TEX1_CW	-	F05	F08
PIN_TEX2_CW	-	F05	F40
PIN_EXFLAP_CW	-	M04	-
PIN_TFUEL_CW	-	F21	M08
PIN_GEARCUT_CW	-	F08	F40
PIN_TGEAR_CW	-	F21	F38
PIN_RESFLAP2_CW	-	F34	-
PIN_LAP_CW	-	F26	F60
PIN_MAPSW2_CW	-	F27	F41
PIN_TOIL_CW	-	F22	M08

Note: The Oil Temp input does not have a destination pin in this particular application.

4.3 The Function Description - Your Calibration Reference

Provided on your installation USB drive is a PDF document that details the inner workings of the software. This document is intended to be your reference for questions beyond the scope of the Quick Start guide. Please reference this extremely valuable resource for any questions you have during the calibration process.

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