2D
2d-datarecording.com

- English -

SpecSheet

General Manual

1   Revision History

Revision	Description	Release Date	Author
0	Initial Release	2022-09-15	FS

2   Content

3   Notes and symbols used in this Manual

Further Information
In the paragraphs highlighted with this symbol, you will find tips and practical advice to work with the 2D-Software.

Documentation reference
Documentation reference to another manual or handout

Important information
It is very important to follow the instructions given

4 Introduction

Especially in motorsports, *SpecSheets* are used to store Meta-data containing various information about vehicle setup, weather, or drivers' parameters during a race weekend or testing.

For each measurement there is an individual SpecSheet, which makes it possible to, for example, document vehicle setup changes from measurement to measurement in the SpecSheets.

⇨ Chapter SpecView

Further Information
SpecSheets are always stored in respective measurement folder as .HED file.

Beside racing parameters, 2D also stores download information as well as other measurement related information inside SpecSheets.

⇨ Chapter Default 2D SpecSheet entries

SpecSheets are generated at every data download (=reading the data from the data logger or USB stick) in measurement folder and users can create predefined SpecSheets.

At download the software automatically checks if a predefined SpecSheet (also called permanent SpecSheet) is available. If so, all entries of the predefined SpecSheet are used for the creation of individual measurement related SpecSheet in measurement folder.

⇨ Chapter Permanent SpecSheet

Therefore, for multiple vehicles with different setup parameters, different predefined SpecSheets can be prepared.

Also, a User-interface can be shown at download that the user is forced to enter values, setup parameters or comments at every data download.

⇨ Chapter User Interface

The user of the software – the engineer, the data recording man, or the mechanic – is in charge of the maintenance and integrity of the data.

Mostly this *SpecSheet* is only used for documentation, but it can also be used in connection with the *CalcTool* because the *CalcTool* can read from information as constant from the *SpecSheet* and write information back into it.

E.g., the input values of a mass calculation of vehicle can be completely managed by SpecSheet entries.

⇨ Chapter CalcTool

Via SpecSheet is also possible to document for which distance several parts of a vehicle were used.

⇨ Chapter Mileage

Finally, SpecSheet entries can be used for exports

⇨ Chapter Export

5   SpecView

The SpecSheet of one or multiple measurements can be opened in SpecView by either clicking on SpecView toolbar icon   or using short-cut [Alt]+[i] in Analyzer or WinARace.

For every opened (Analyzer) or selected measurement (WinARace) the SpecSheet is opened in SpecView. Basically, a SpecSheet is a text-based HED-file, which can be also opened and edited by an Editor.

Clicking on a group, the submenu is opened where the different groups can be selected.

When loading SpecSheets from multiple measurements, the differences to SpecSheet in first column are highlighted in red:

By double-clicking in one field, also the entries can be changed. When one entry needs to be applied to each SpecSheet with holding key [Shift] + [tab] the selected entry is duplicated to the fields on the right.

6 General

6.1 Creating new groups

The values of the different entries can be edited via SpecView but when creating completely new entries or new groups, a SpecSheet must be opened in text editor.

6.2 Display all entries of a group

Sometimes in SpecView not all entries of a group are shown, it can be either scrolled down in group or [Shift]+[+] can be used to show more entries.

6.3 2D SpecSheet entries

6.3.1 Comment group

At SpecSheets also one group can be used to add comments to the respective measurement related SpecSheet which really helps later on to quickly distinguish different measurements.

Open comment window automatically at every download:

The 2D software can be set, that at every download of a measurement the comment window is opened automatically.
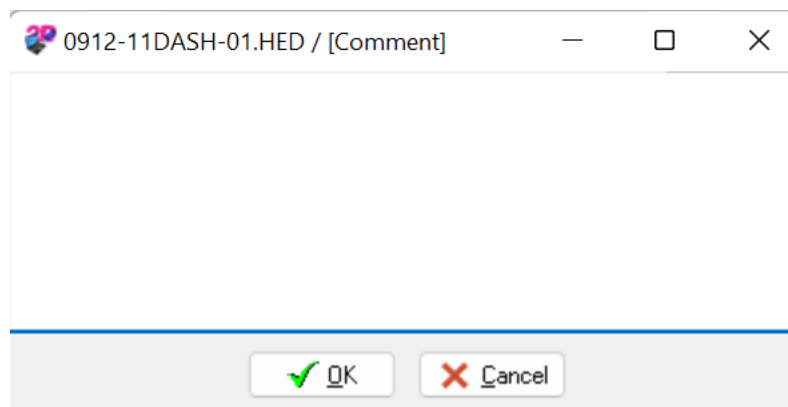
Further Information
Comment interface can be closed with OK without any entry.

Open comment window manually:

To open to comment window manually, the respective measurement has to be selected in WinARace and [ALT]+[Q] hast to be pressed.

6.3.2   2D Default entries

[DOWNLOAD]	
LapMeter [m]=4450	Lapmeter of this MES
Date=22.0907	Download-Date
Time=085509	Download-time
Run total [s]=0	Download information
Run recording [s]=0	
Start of download=07.09.2022 08:55:09	
End of download=07.09.2022 08:55:09	
Number of errors=0	
Time to decompress=0.0 sec	
Loggername=FS20	Logger name
Logger serial=2765125A	Serial number of logger
Mileage calculated=(44 km)	Calculated mileage value of this MES
MainSamplingRate=1000	Logger main sampling rate
DL folder=C:\TMP\OneFileRec0003.DL	Raw measurement data directory

[INFO_2D]	
Computer=FLORIAN-NOTEBOO	Computer used for data download
Computer user=fs	Computer user at download
Licence name=Flo	2D-Licencse name
Licence level=Team licence	Licences level
CRC=00AA36F9	

[Laptimes]	
Fastest lap=2:07.515	Fastest lap from all laptimes of this MES
0=2:52.329	Laptimes of this MES
1=2:08.719	
2=2:09.009	
3=2:08.041	
4=2:07.515	
5=2:08.585	
6=2:08.355	
7=2:12.685	
8=2:08.477	
9=2:54.885	

[CalcTool]	
Cal Files which were applied to measurement data	

6.3.3 Toolchain entries

6.3.3.1 *2D GPS Post-processing*

Documentation reference
For more information about *2D GPS Postprocessing* please see the respective manual at download area on 2D website:
http://2d-datarecording.com/downloads/manuals/

[GPS]	
Rate=10	Detected GPS/GNSS sampling rate in [Hz]
Version=21.0607	Version of GPS Postprocessing toolchain (7th June 2021)
MaxDropOutTime=30	GPS dropouts not longer then 30 seconds are interpolated
ChannelRate_Hi=100	High rate of GPS postprocessing toolchain
ChannelRate_Lo=10	Low rate of GPS postprocessing toolchain (= Rate)
ShiftTime=-0.21	Shift time GPS/GNSS channels were shifted by GPS post-processing toolchain
AverageMulti=4	Dynamical filtering value

[MES]	*Entries are required for GoPro AutoSync*
Date_Mes=22.0907	GPS/GNSS date of measurement (7th Sepemper 2022)
SOD_Mes_FV=23385.6	First UTC-Second of Day (SOD) value of measurement
SOD_Mes_LV=24627.6	Last UTC-Second of Day (SOD) value of measurement

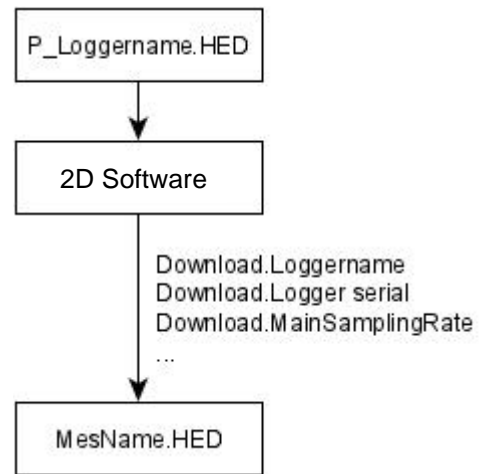| [Time]	*[MES] group values converted to HHMM values with CAL-files SOD_Reverse.CAL*
Date=22.0907	GPS/GNSS date of measurement (7th September 2022)
HHMM_FV=6.29	First UTC-HHMM value of measurement (6:29 am)
HHMM_LV=6.5	First UTC-HHMM value of measurement (6:50 am)

7   Permanent SpecSheet

Pre-Download

Predefined, so-called permanent SpecSheets, are stored in the data directory (RaceData / one directory <u>above</u> the event folders) and start with *P_*.

These permanent SpecSheets can be assigned to different loggers by naming them (P_Loggername) and store them in data directory.

When downloading measurement data, the software checks whether there is a SpecSheet matching the **logger name** in the data directory. If a predefined, permanent SpecSheet is found, it is copied, filled with 2D default information, renamed to establish the link to measurement and **stored in the respective measurement folder as measurement SpecSheet**.

```
┌──────────────────────┐
│  P_Loggername.HED    │
└──────────┬───────────┘
           │
           ▼
┌──────────────────────┐
│    2D Software        │
└──────────┬───────────┘
           │
   Download.Loggername
   Download.Logger serial
   Download.MainSamplingRate
   ...
           │
           ▼
┌──────────────────────┐
│    MesName.HED        │
└──────────────────────┘
```

Further Information

- Measurement related SpecSheets are generally called SpecSheet!

- If no matching permanent SpecSheet is found during download only a SpecSheet with 2D default information is created in measurement folder

When using more than one vehicle at a team it is very helpful to use permanent SpecSheets for documenting the individual vehicles parameters (suspension settings, engine settings, …).

Important information

If a suspension setting change (or any other parameter, which is documented via permanent SpecSheet) was made, the user of course must also adapt the changes in the respective permanent SpecSheets that the file is prepared for next data download.

For open all permanent SpecSheets from the currently used WinARace-installation the following toolbar button can be used:

Further Information

- The toolbar can also be modified to only open one respective permanent SpecSheet via a button.

Example:

A team has two riders (FS #20 & JR #91) with each one bike.
The loggers of the two measurement systems are called FS20 and JR91.
On the computer which is used for downloading, two permanent SpecSheets p_FS20.HED and p_JR91.HED are located.

P_FS20.HED	P_JR91.HED

Beside the different information from the RIDER group, also various other parameters, like SHOCK and FORK parameters, can be documented in the respective permanent SpecSheets.

Click here to open 2D example permanent SpecSheet for racing use

Further Information
- The permanent SpecSheets must always be stored inside the directory right before the .MES directories!

8   User Interaction

Pre-Download

This functionality can be used to open individually definable dialog at every download that the user is forced to enter values to a predefined set of SpecSheet groups from permanent SpecSheet.

▽ **Important information**
Groups to be accessed in User interface must be available in **permanent** SpecSheet!

SpecSheet information are always very helpful for documenting measurement related information (Comment or Vehicle).

SpecSheet information are not only used for documentation but also via *CalcTool* it is possible to access SpecSheet values for calculations (Rider.Mass, e.g., for summing vehicle mass + rider mass) or defining names of exports (ProBike_Street600_KA-DD-123.txt)

```
[Comment]
0=
1=
2=
3=

[Rider]
Name=FS
Mass=85
Age=26
Sex=m
Height=1.78

[VEHICLE]
Make=ProBike
Type=Street600
SN=007
Version=KA-DD-123
```
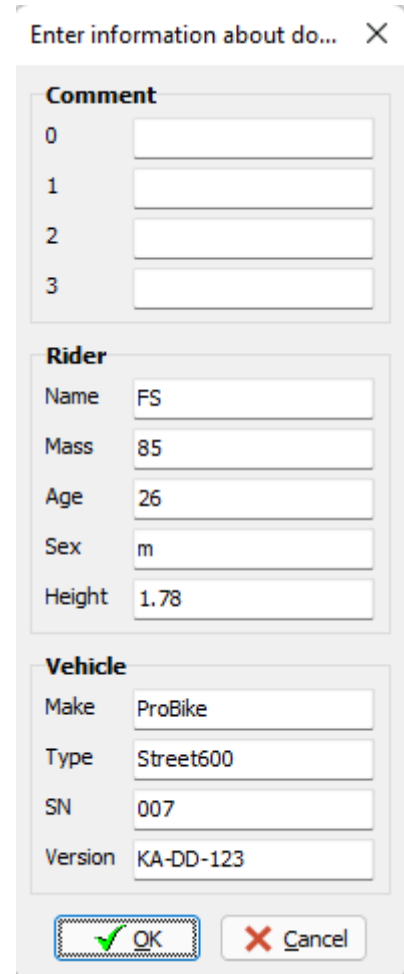
The default entries of this dialog can be predefined in permanent SpecSheets, so that when downloading data, always the logger name related permanent SpecSheet is taken.

The information with which logger the data is recorded is stored inside raw measurement data

When closing the dialog all entries are written to the measurement related SpecSheet!

Enter information about do...   ✕

Comment
0	
1	
2	
3	

Rider
Name	FS
Mass	85
Age	26
Sex	m
Height	1.78

Vehicle
Make	ProBike
Type	Street600
SN	007
Version	KA-DD-123

✓ OK   ✕ Cancel

(i) Further Information
- It is possible to display the user interface parameters either predefined or completely empty.
- The user interface can only be closed if a value has been entered in each entry shown.

8.1 Setup AutoFillSpecSheetAtDownload:

1. Open *WinARace* and open *Folders - Protocols* folder via WinARace-Tab *Settings* and open *Application data directory* by clicking on the button with respective path

Further Information
Instead of opening *Folders – Protocols* also shortcut [CTRL]+[ALT]+[D] can be used with *WinARace* opened!

2. It must be distinguished between downloading from internal logger memory and downloading data from USB Stick now:

Downloading data from internal logger memory: Open *WinIt.ini*
Downloading data from USB Stick: Open *Decompress.ini*

Further Information
.ini-files can be opened and edited with any text-editor!

3. Navigate to group [Special] and set entry *FillSpecGroupAtDownload* to 1 to activate AutoFillSpecSheetAtDownload.

[Special]
…
FillSpecGroupAtDownload = 1
…

4. Navigate to group [SpecGroupsToEnterAfterDL] and set which predefined SpecSheet groups should be opened automatically at downloading data:

[SpecGroupsToEnterAfterDL]
1=Comment
2=Rider
3=Vehicle
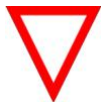
Further Information
Only the defined groups, which are existing in defined permanent SpecSheet, are shown after download in an stay-on-top dialog with all in permanent SpecSheet defined entries!

Important information
Every box of the dialog has to be contain a value!

5. Save ini-file

6. Execute a test download if user dialog is shown correctly

7. **After confirming the dialog with OK, all entered information are written in the measurement related SpecSheet!**

9   Mileage

Post-Download

The 2D software system provides a possibility to document via SpecSheet, for which distance several parts of a vehicle were used.

Documentation reference

For more information about *Mileage* please see the respective manual at download area on 2D website:
http://2d-datarecording.com/downloads/manuals/

10 CalcTool

Post-Download

Within *CalcTool* the channels recorded by a 2D data acquisition system can be further processed with the help of text-based calculation files to e.g., visualize data for development purposes in various plots provided by the 2D software or for further calculations.

Further processing includes among others:

- Mathematical calculations
- Trigonometrical calculations
- Filtering
- Bit manipulation operations
- Signal analysis (Min, Max, Average, …)

Documentation reference

For more information about *CalcTool* please see the respective manual at download area on 2D website:
http://2d-datarecording.com/downloads/manuals/

10.1 Read access

CalcTool is able to read values from SpecSheet entries as calculation variables (constant values) to use them for calculations.

Further Information

SpecSheet-read-values are then available as constant values in measurement.

This is very helpful for gear calculations (gearbox settings are done via (permanent) SpecSheet), mass calculations (adding vehicle mass, fuel mass, …) together for further calculations.

10.2 Write access

Calculational results can then also be written (new entries can be created or already existing entries can be overwritten) to measurement related SpecSheet (not to permanent SpecSheet), what is important when using the SpecSheet print and export functions.

Further Information

When writing values to SpecSheet only one value type of a channel (Last value, first value, minimal value, maximal value or average value) can be written!

11 Print

Post-Download

The report function provides an easy way to define and print SpecSheet groups as targeted report for specific users.

For example a race mechanic might be only interested in the groups he is working on (take the groups BIKE, FORKSET, SHOCKSET, ENGINE or SETTING)

12 Export

Post-Download

Naming exports:

SpecSheet entries can also be used for naming exported files of various 2D tools (MinMax-Export, XY-Plot-Export, …).

Filling defined excel sheet:

Also, the SpecSheet entries can be used as placeholders, that a customer can create a excel file where different values or gauges can be filled with.

2D uses this tool for internal analogue channel testing of loggers, where first the calculational results from CalcTool are written into SpecSheet and then the entries are used for creating an predefined Analog-Test-ExcelSheet as documentation about any tested logger.

These created ExcelSheets can also be printed automatically via 2D software.
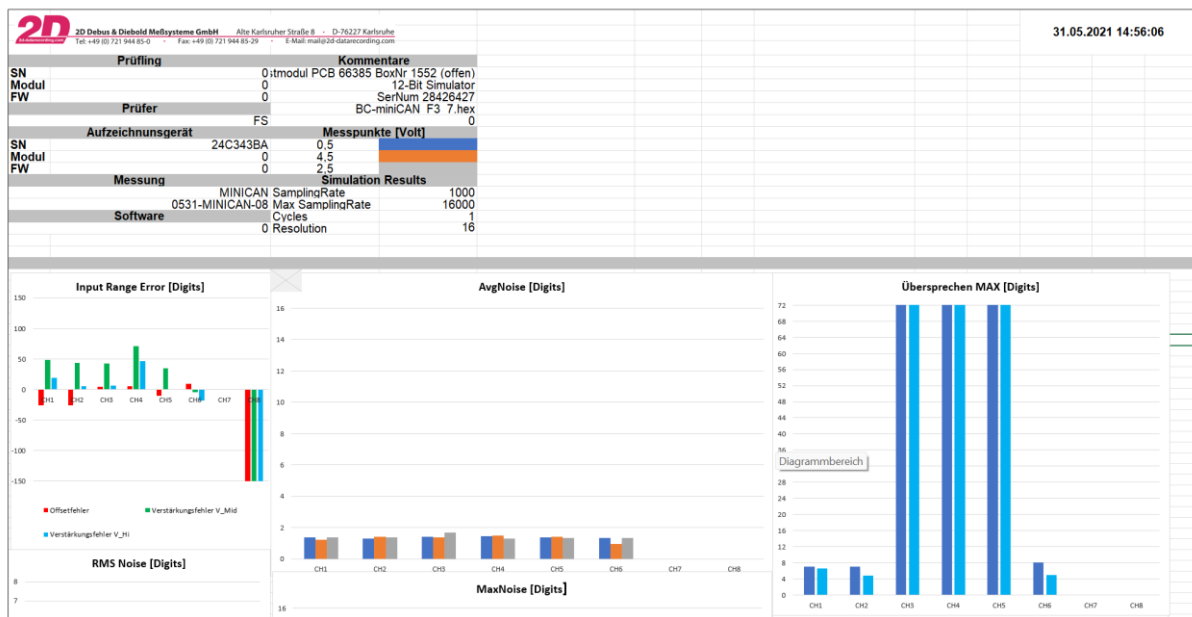
> ℹ️ **Further Information**
> For more information please contact 2D via contact form on website!

For racing this feature would be interesting to define a racing-based ExcelSheet where Laptimes, Sectimes, calculated values like information about throttle grip actuation, mappings used and further more can be displayed.
With 2D software automation, this defined ExcelSheet can be created and printed by the software automatically after data download.

13 Appendix

13.1 Permanent SpecSheet example

Click [here](#) to open 2D example permanent SpecSheet for racing use

2D_3ax_FilterAndRotate

Default entries for 2D_3ax_FilterAndRotate toolchain

https://2d-datarecording.com/Downloads/Manuals/AC-DOC_2D_FilterAndRotate.pdf

[Sensor_1]	[Sensor_GPS]	[Sensor_ROT]
Name=Debug	Name=GPS/GNSS2CAN	Name=Helmet
Rot_x=0	Rot_x=0	Rot_x=0
Rot_y=0	Rot_y=0	Rot_y=0
Rot_z=0	Rot_z=0	Rot_z=0
Cor_x=0	Cor_x=0	Cor_x=0
Cor_y=0	Cor_y=0	Cor_y=0
Cor_z=0	Cor_z=0	Cor_z=0