

Project Documentation | Getting Started User Guide for Automotive and Industrial Radar Sensors

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2 Reference Documents

No.	Document	SVN-ID	Notes
[1]	UMRR_Automotive_Type_132_Data_Sheet.pdf		
[2]	UMRR_Automotive_Type_153_Data_Sheet.pdf		
[3]	Datasheet_DR3.pdf		
[4]	Detailed_Feature_List_DR3.pdf		
[5]	CustomerInterface		

Table 1: Reference documents

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3 Getting Started

3.1 Hardware Setup

3.1.1 UMRR-11 T132



(1)

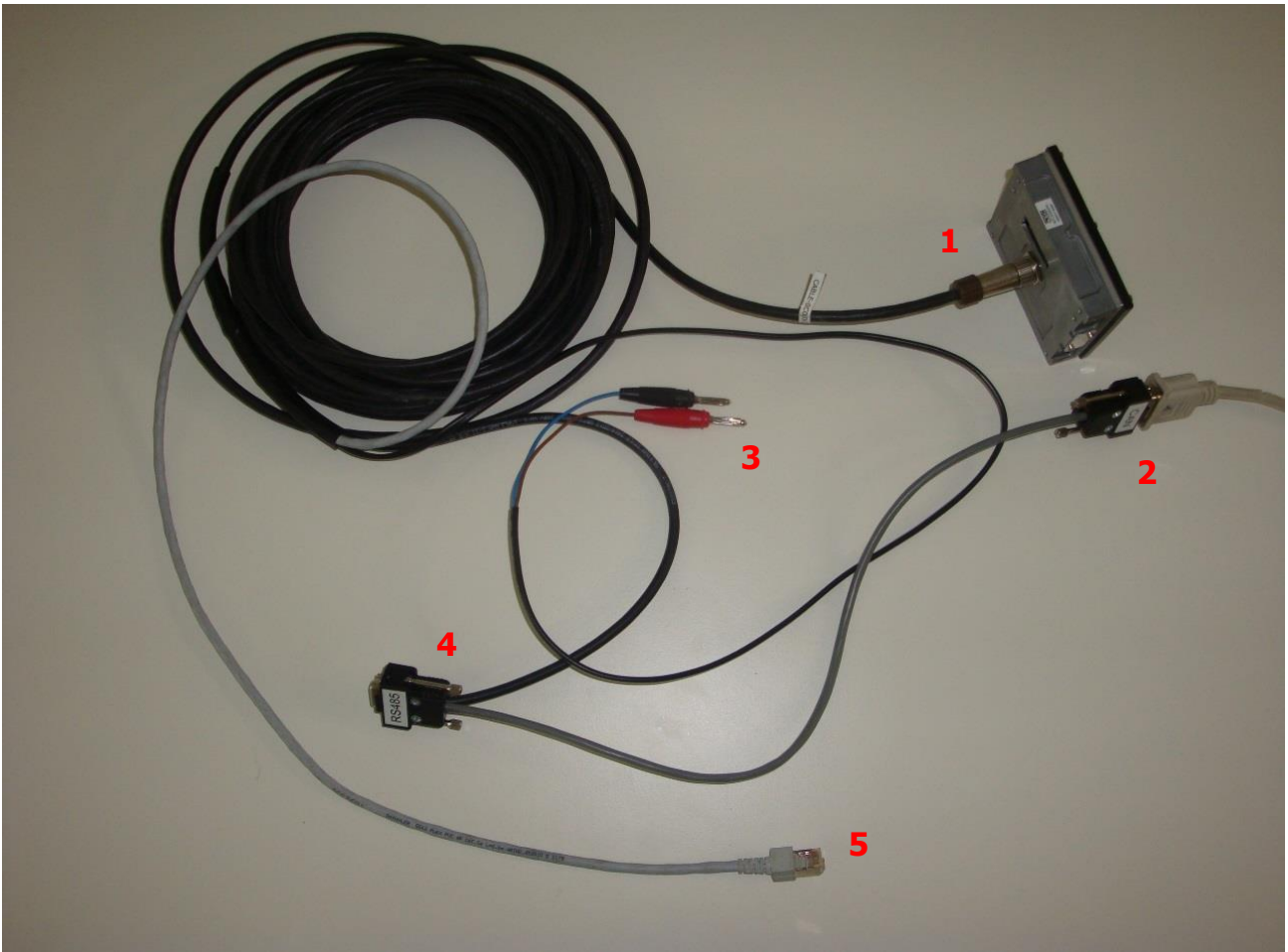


(2)

Picture 1: UMRR-11 Type 132 sensor front (1) and rear (2) view

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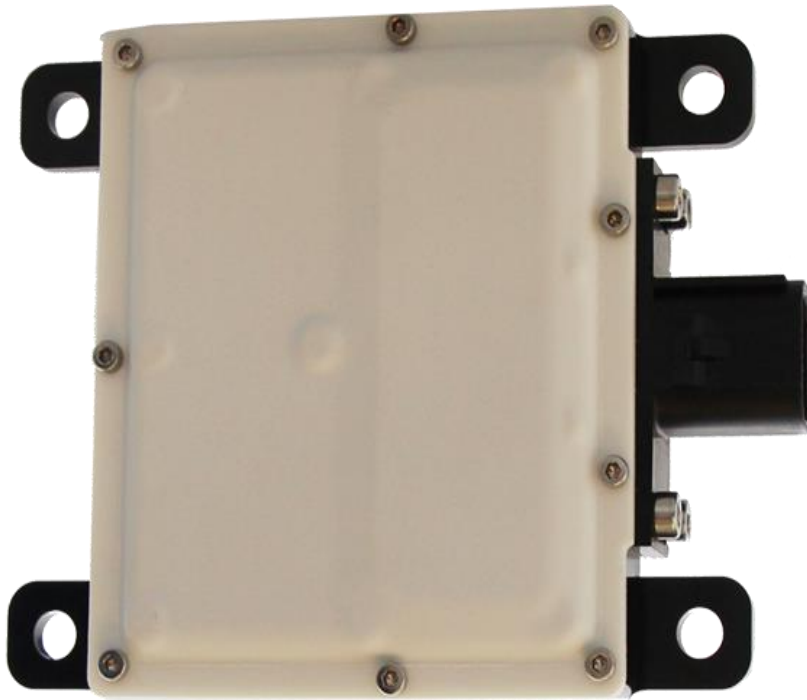
Picture 2: Overview of the UMRR-11 Type 132 connection setup with its compatible cable CABLE-0C0200

- The sensor must be connected to a bayonet connector to the cable (1) (Picture 2)
- The connection to the CAN interface is established by the DSUB9-connector labeled as "CAN" (2).
- The banana plugs (3) are used to supply power to the sensor. (Red - Supply voltage, Black - Electrical ground (GND)). The recommended supply voltage is noted within the datasheet [\[1\]](#).
- The "RS485" connector (4) is currently not supported for the automotive applications.
- Finally, the RJ45 connector (5) can be used to stream out intermediate data from the signal processing chain through Ethernet, which will not be covered in this document.

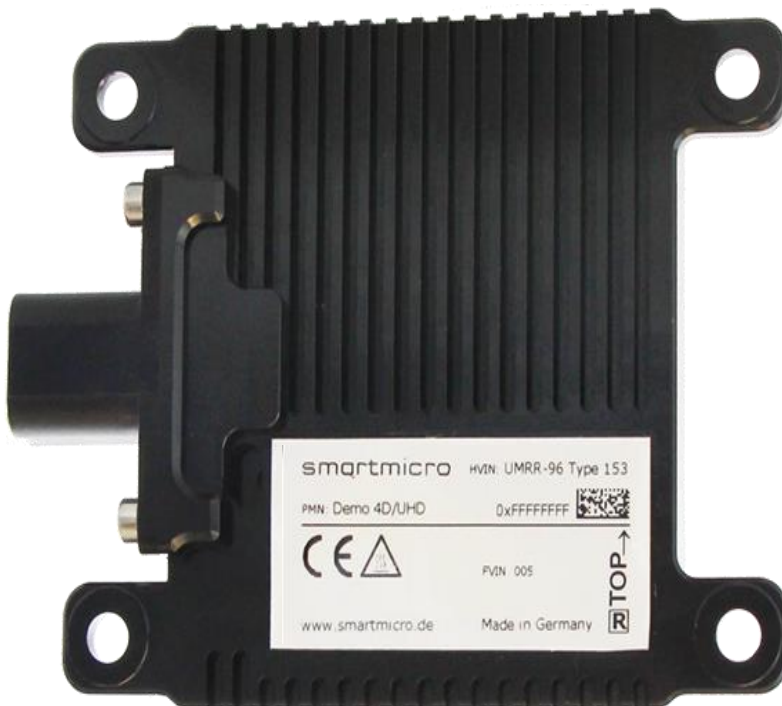
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3.1.2 UMRR-96 T153



(1)

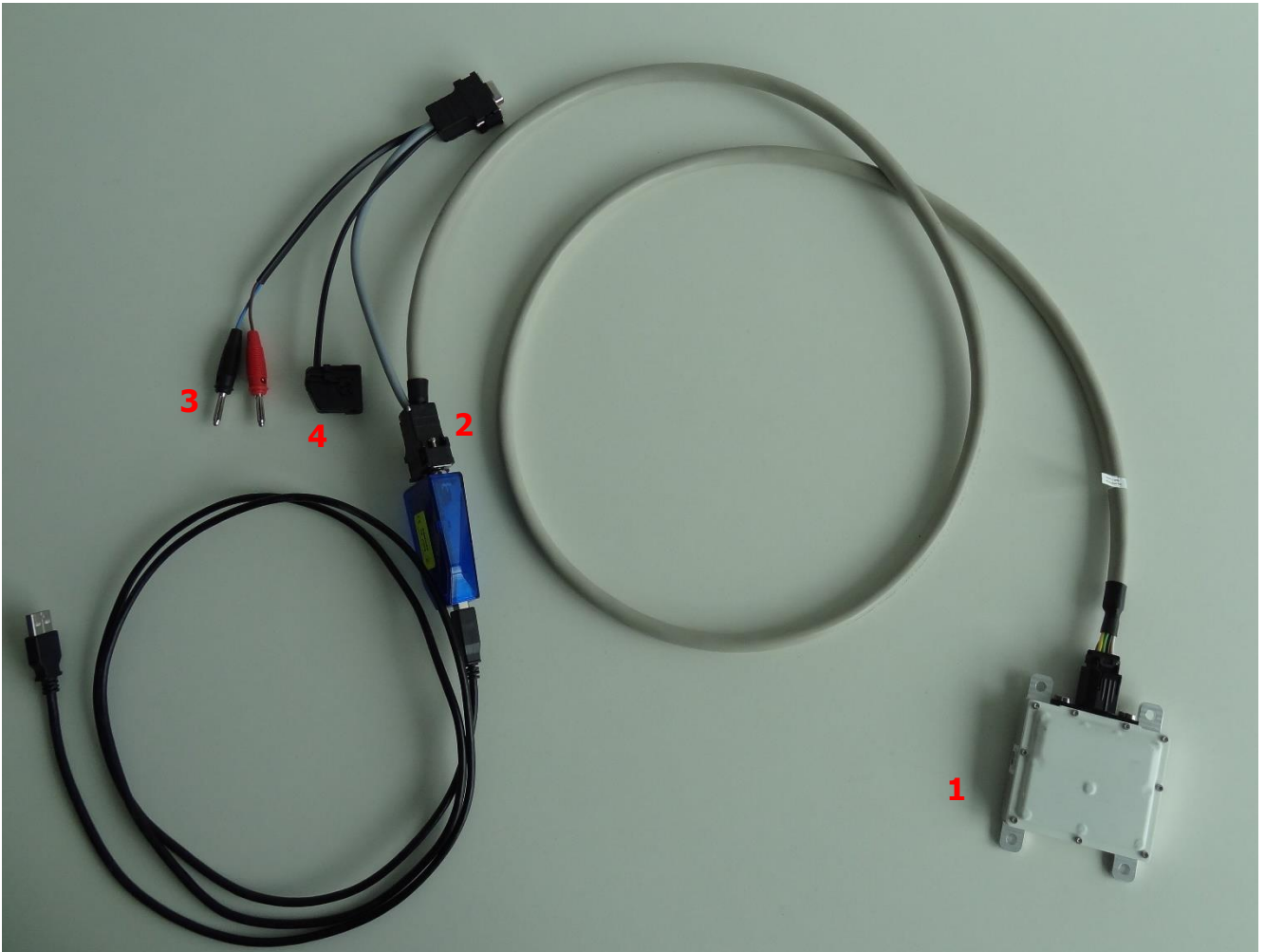


(2)

Picture 3: UMRR-96 Type 153 sensor front (1) and rear (2) view

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Picture 4: Overview of the UMRR-96 Type 153 connection setup with its compatible cable CABLE-FF0025

- The sensor must be connected to the cable (1) (Picture 4)
- The connection to the CAN interface is established by the DSUB9-connector labeled as "CAN" (2). The pinning is shown in the datasheet [\[2\]](#).
- The banana plugs (3) are used to supply power to the sensor. (Red - Supply voltage, Black - Electrical ground (GND)). The recommended supply voltage is noted within the datasheet [\[2\]](#).
- The second CAN connection (4) and the automotive Ethernet connector are currently unused.

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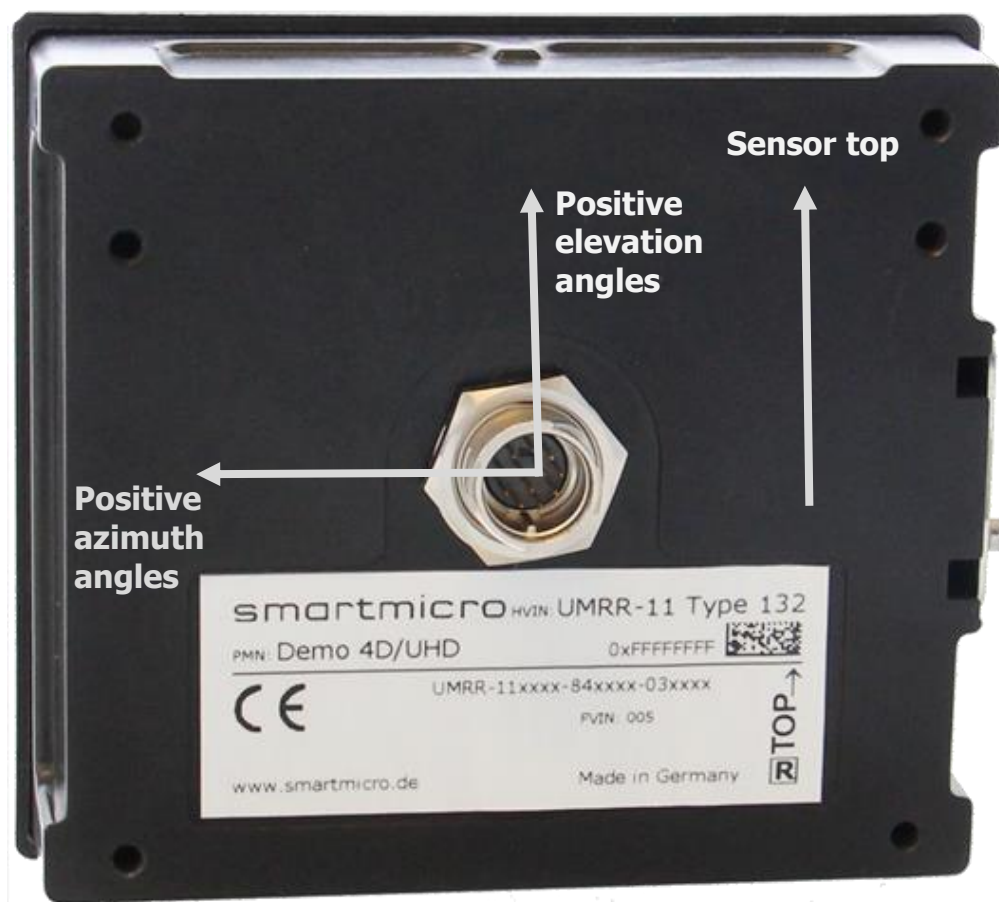
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3.2 Installation

Typically, the radar sensors should be installed at the same height level as the targets to be detected. Please make sure that the radar beam covers the zone of interest as much as possible by adjusting the azimuth and elevation angle. For installations in a car, a mounting height between 50cm and 80cm over the ground with an elevation angle of 0 degree is recommended.

3.2.1 UMRR-11 T132

The connector of the UMRR-11 is placed on the rear side of the sensor above the label. The origin of the coordinate system is in the middle of the sensor (zero axis). The azimuth angle refers to the horizontal axis, whereas the elevation angle refers to the vertical axis (as indicated in the Picture 5). All the values are provided relatively in regard with the mounting position.



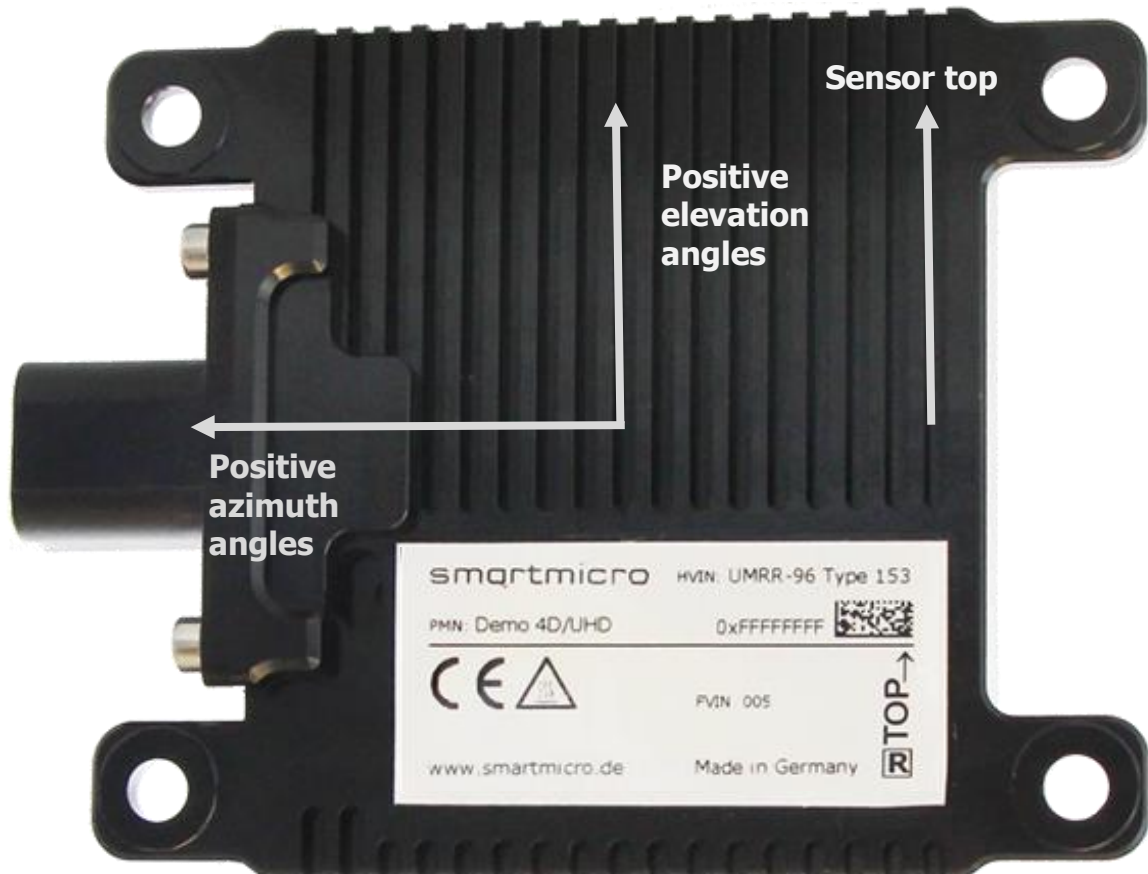
Picture 5: UMRR-11 T132 Coordinate system (view from the rear side in the positive x-axis direction)

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3.2.2 UMRR-96 T153

The UMRR-96 is placed in such a way that you're facing it from the rear side and its connector is pointing to your left (as shown in the Picture 6). The origin of the coordinate system is in the middle of the sensor (zero axis). The azimuth angle refers to the horizontal axis, whereas the elevation angle refers to the vertical axis as indicated in the Picture 6. All the values are provided relatively in regard with the mounting position.



Picture 6: UMRR-96 T153 Coordinate system (view from the rear side in the positive x-axis direction)

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3.3 DriveRecorder3 Software

DriveRecorder3 (DR3) is a smartmicro tool for visualization, recording, replaying and exporting the CAN or Ethernet data. This software can be downloaded on smartmicro's [homepage](#). To use DR3, an access code is required. At the start of DR3 after it's installation, a request code will be generated. Please send this request code to:

software-registration@smartmicro.de

After the registration you can use DR3 as a full version. In DR3 software, a help menu is available (Press F1). The software supports multiple CAN interfaces and compatible hardware can be found in [\[3\]](#).

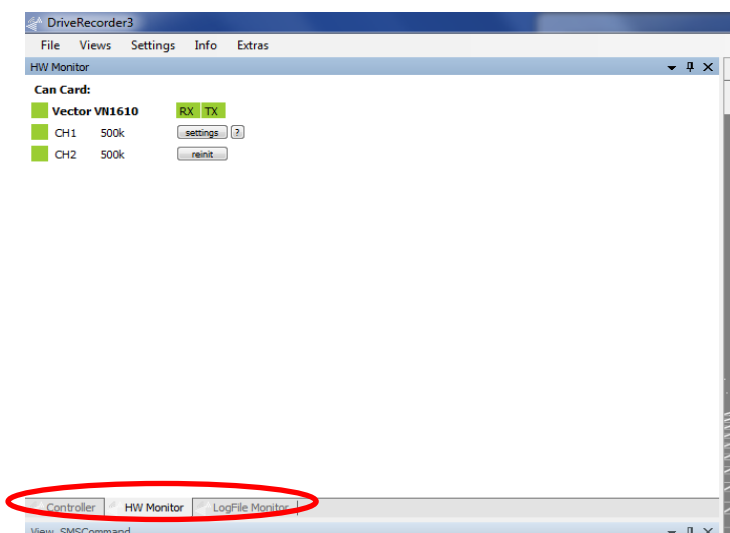
The DR3 allows you to record any CAN data on the connected channels and can interpret the CAN packages directly. It also allows you to export the target data to a CSV-file for later analysis. Further information can be found in [\[3,4\]](#)

3.3.1 CAN hardware controller and monitor

Once everything is connected and the sensor is powered, the targets should appear in both TargetDraws as well as in the sensor TargetList window. If not, then the below items should be checked.

1. First, check the "HW Monitor" (Picture 7): The connection must be indicated in green. If this is not the case, a click on the "reinit" will search again for CAN hardware (this could be the case when the hardware is connected after starting DR3)

This dialogue can be found in the top left sub window; furthermore you need to select the appropriate tab (as indicated in the Picture 7)

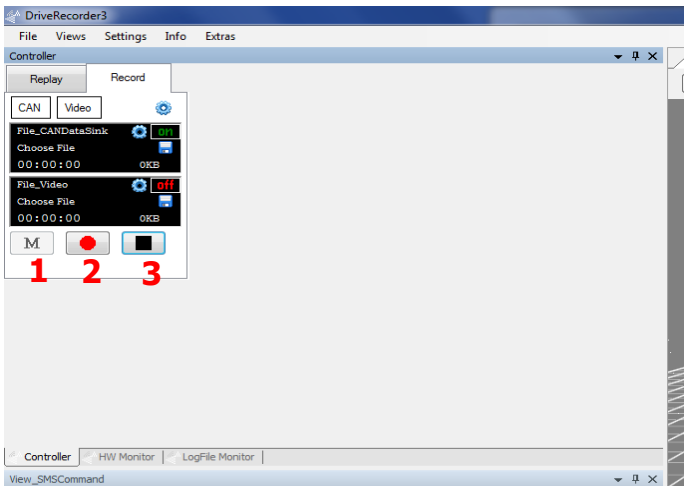


Picture 7: Hardware Monitor

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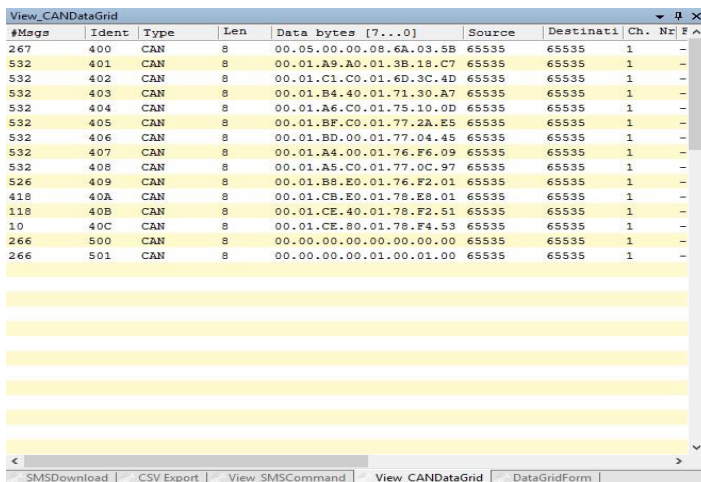
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2. Second, check if the "Controller" is monitoring (Picture 8): For this "Record" tab and the "M" button (1) must be activated (which will be indicated in grey) and this in turn will activate "Start Recording" (2) and "Stop Recording/Monitoring" (3) elements (as shown in the Picture 8)



Picture 8: Controller with active monitoring

The CAN raw data (not interpreted) is displayed on the CANDataGrid (Picture 9). In this window, the messages are sorted either by identifier (Identifier mode: Here each message with the same identifier overwrites the old message) or time (Buffer mode).



#Msgs	Ident	Type	Len	Data bytes [7...0]	Source	Destinati	Ch.	Nr	F
267	400	CAN	8	00.05.00.00.08.6A.03.5B	65535	65535	1	-	-
532	401	CAN	8	00.01.A9.A0.01.3B.18.C7	65535	65535	1	-	-
532	402	CAN	8	00.01.C1.C0.01.6D.3C.4D	65535	65535	1	-	-
532	403	CAN	8	00.01.B4.40.01.71.30.A7	65535	65535	1	-	-
532	404	CAN	8	00.01.A6.CO.01.75.10.0D	65535	65535	1	-	-
532	405	CAN	8	00.01.BF.CO.01.77.2A.E5	65535	65535	1	-	-
532	406	CAN	8	00.01.BD.00.01.77.04.45	65535	65535	1	-	-
532	407	CAN	8	00.01.A4.00.01.76.F6.09	65535	65535	1	-	-
532	408	CAN	8	00.01.A5.CO.01.77.0C.97	65535	65535	1	-	-
526	409	CAN	8	00.01.B8.E0.01.76.F2.01	65535	65535	1	-	-
418	40A	CAN	8	00.01.CB.E0.01.78.E8.01	65535	65535	1	-	-
118	40B	CAN	8	00.01.CE.40.01.78.F2.51	65535	65535	1	-	-
10	40C	CAN	8	00.01.CE.80.01.78.F4.53	65535	65535	1	-	-
266	500	CAN	8	00.00.00.00.00.00.00.00	65535	65535	1	-	-
266	501	CAN	8	00.00.00.00.01.00.01.00	65535	65535	1	-	-

Picture 9: CAN raw data on CANDataGrid

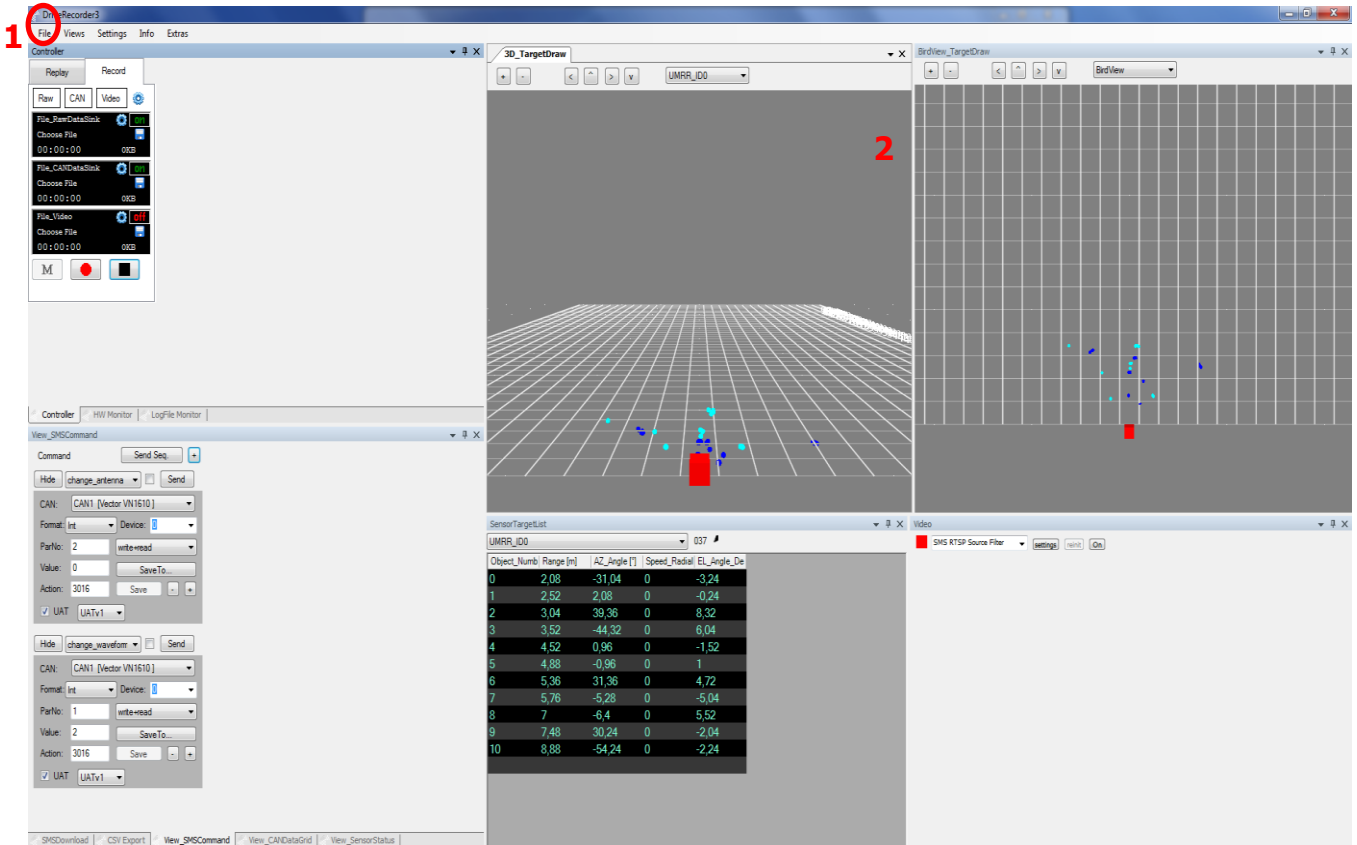
3.3.2 Desktop files

The behavior of the DR3 is mainly controlled by so called "desktops", which store the configuration within a *.dsk file. There are three DR3 desktops delivered within the installation of the software, one for UMRR-96 Type 153 and two for the UMRR-11 Type 132.

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To load the appropriate desktop, open the "File" menu (as shown in the Picture 10 - (1)) and click on the entry "Load Desktop". This opens a dialogue pointing to the installation directory of DR3, where the individual desktop files are stored. To use UMRR-96 Type 153, the desktop "std_desktop_T153.dsk" should be used. To use UMRR-11 Type 132 in long range mode, the desktop "std_desktop_T132_ACC.dsk", and for the medium/short range mode "std_desktop_T132_AEB.dsk" should be used.



Picture 10: Main window of DR3, UMRR-96 Type 153 desktop

3.3.3 Desktop configuration

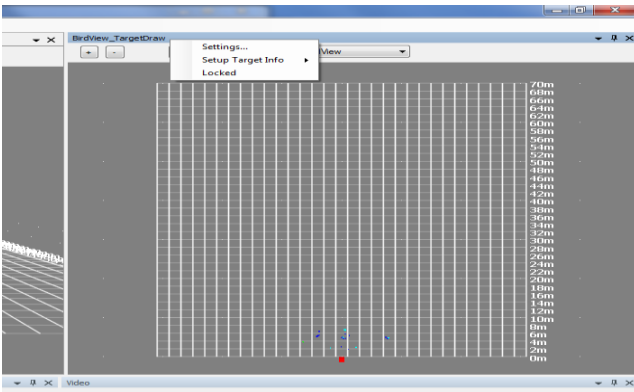
The DR3 is configurable to a higher extent, therefore only a minor subset of the configuration will be presented in this document.

The most important settings for visualizing the raw targets transmitted via CAN are in the two TargetDraw sub windows (as shown in the Picture 10 - (2)) in the top right of the main window. All in all, both views are configured with the same settings, just the perspectives are different. However, one difference is the option of the speed vectors in the bird view perspective. This means that each raw target will be plotted with a vector pointing towards (or away from) the sensor depending upon the direction of movement of the target, and the length of the vector being scaled to the radial speed value.

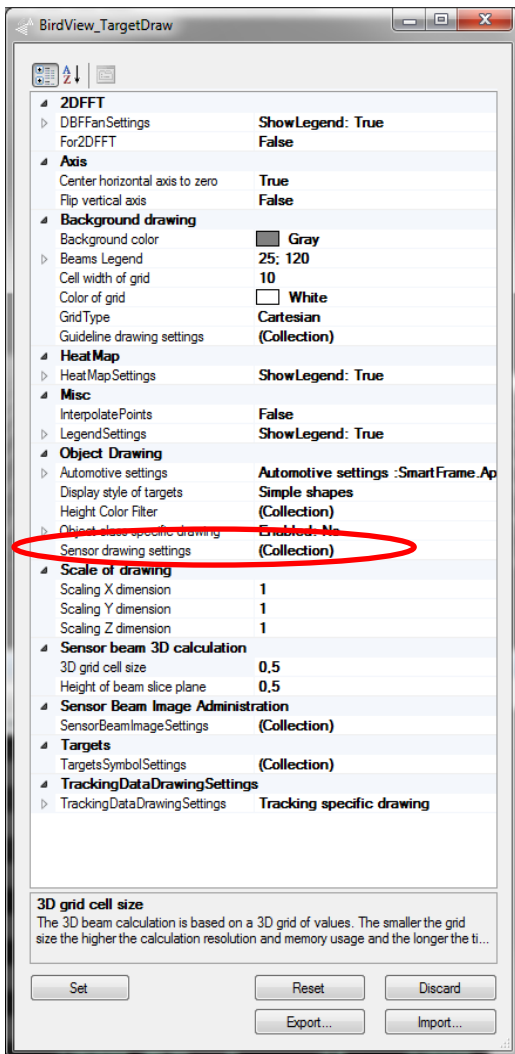
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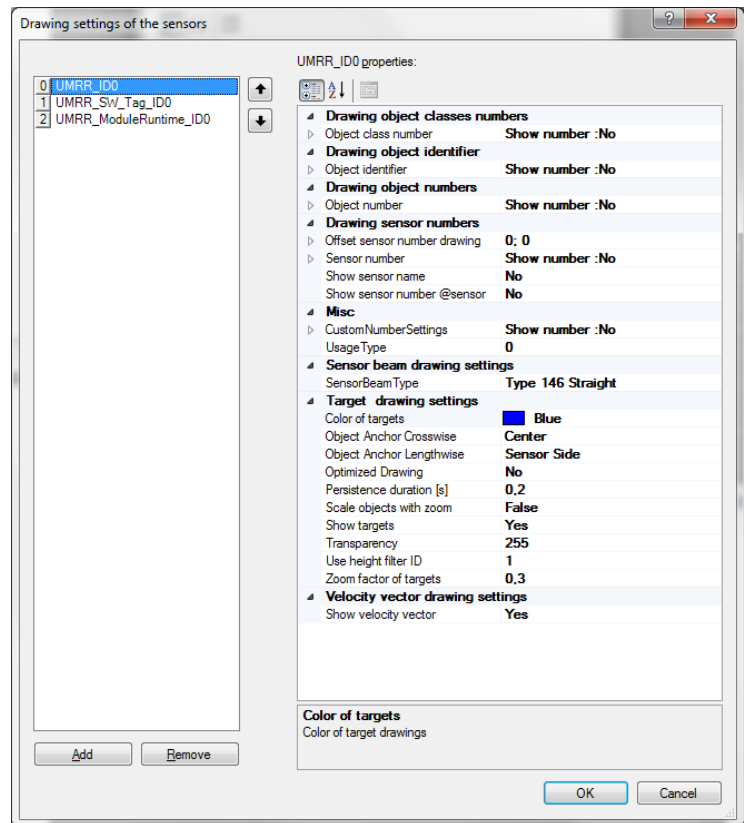
To (de)activate this option, the settings dialogue of the TargetDraw must be opened by right clicking on the title bar of the sub window and selecting the "Settings" entry (Picture 11)



Picture 11: Opening the TargetDraw Settings



Picture 12: TargetDraw Settings



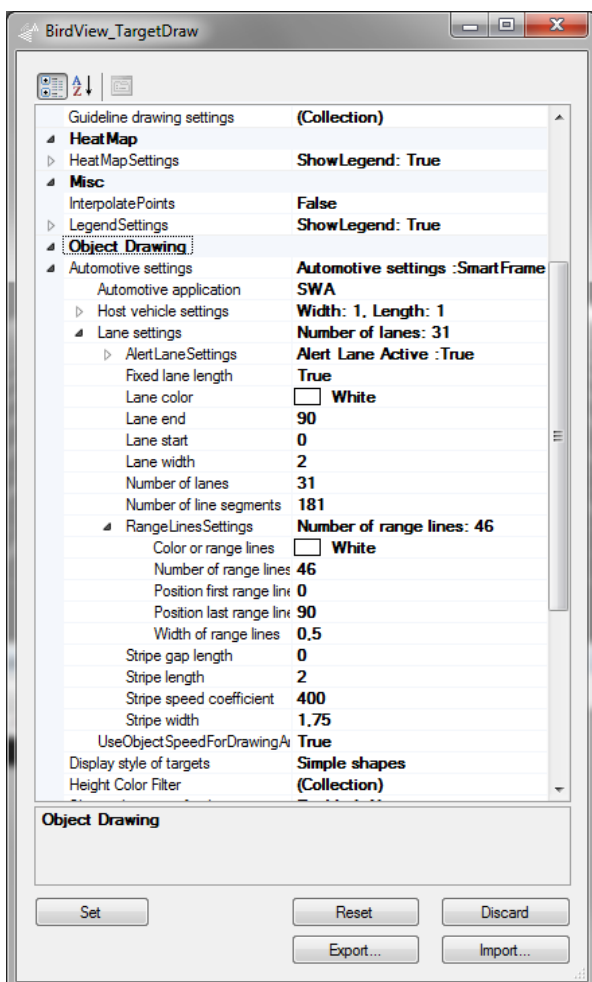
Picture 13: Sensor Drawing Settings

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Afterwards select the field "Sensor drawing settings" (Picture 12 - (1)) which in turn make a button appear beside "Collection", upon then clicking that button will opens a dialogue (as shown in the Picture 13). At the bottom of the dialogue, there exist an option to turn the velocity vector on/off.

Another noticeable option within the TargetDraw is the configuration of the reference lanes. For general purpose, the desktops are preconfigured to have grid-like references to easily estimate the target position. Depending upon the application, we can select the suitable settings. For example, the broader lanes are for the street reference or finer/sparser range lines so that it will not clutter the visualization. This can be achieved by expanding the "Automotive settings" and then "Lane settings" (as shown in the Picture 14). There we can configure the number of lanes, their width and reference range lines. Additionally, the settings can be imported and exported using the buttons at the bottom of the dialogue, and henceforth saving different settings for different applications or scenarios is possible. This applies for every configuration dialogue within DR3.



Picture 14: Automotive settings

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