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# ***ADR4 Real Time Display Manual***

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1.0	Creation	I. Gamboa	13/01/2022	
1.1	Updated test generation procedure	I. Gamboa	13/01/2022	
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## 1 Introduction

The EM Motorsport Real Time Display Software, aimed for the new ADR4, is a dedicated software tool that allows the user to configure and read different parameters via serial link.

The EM Motorsport Real Time Display Software can be split in 4 different modes:

1. Track Mode: Allows easy and fast management of track fields, such as Driver, Circuit or Local Time.
2. Expert Mode: This window allows the user to modify sensible parameters related to the internal accelerometers and accident thresholds. These parameters can only be changed with a dedicated password.
3. Unit Mode: This mode shows the user the current values of acceleration and power for unit debugging.
4. EPA Mode: This mode only works when an Ear-Piece Accelerometer is connected directly to the ADR.



Figure 1 – ADR 4

## 2 List of Materials

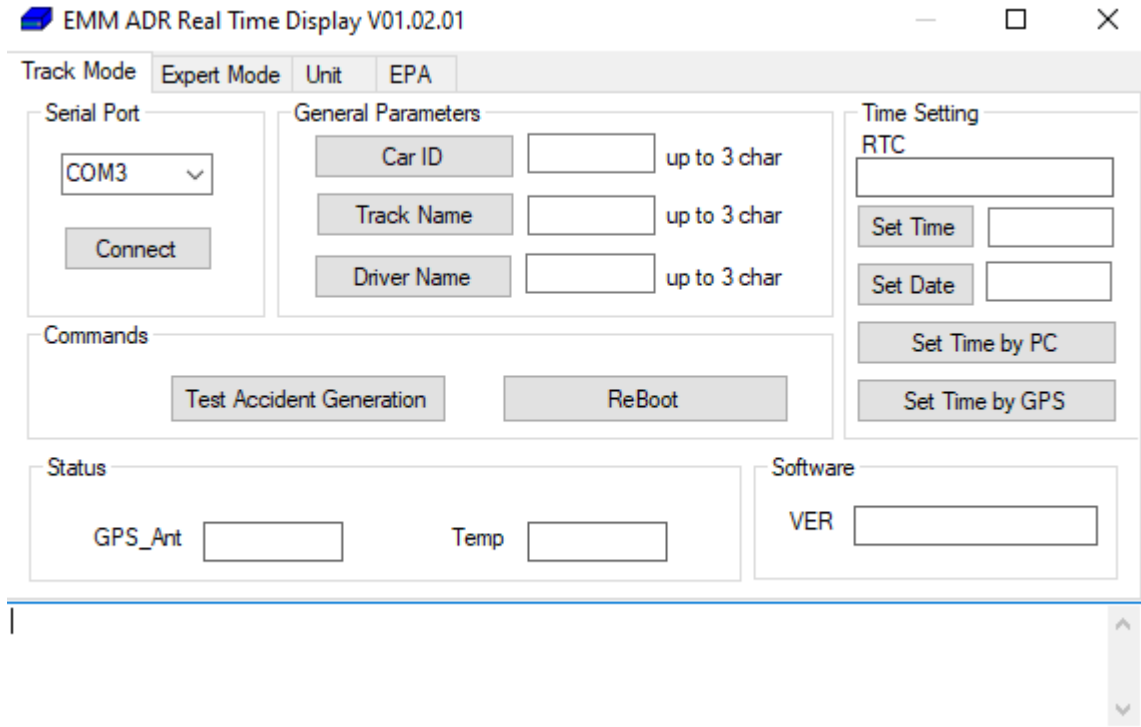
The following materials are needed to use the ADR4 Real Time Display:

- Bench loom with USB lead, Serial lead, 12V input and Deutsche connector.
- ADR4 Real Time Display Software.

### 3 EMM ADR4 Real Time Display

#### 1. Track Mode

This is the default mode of the EMM Real Time Display Software. The default window is shown below:

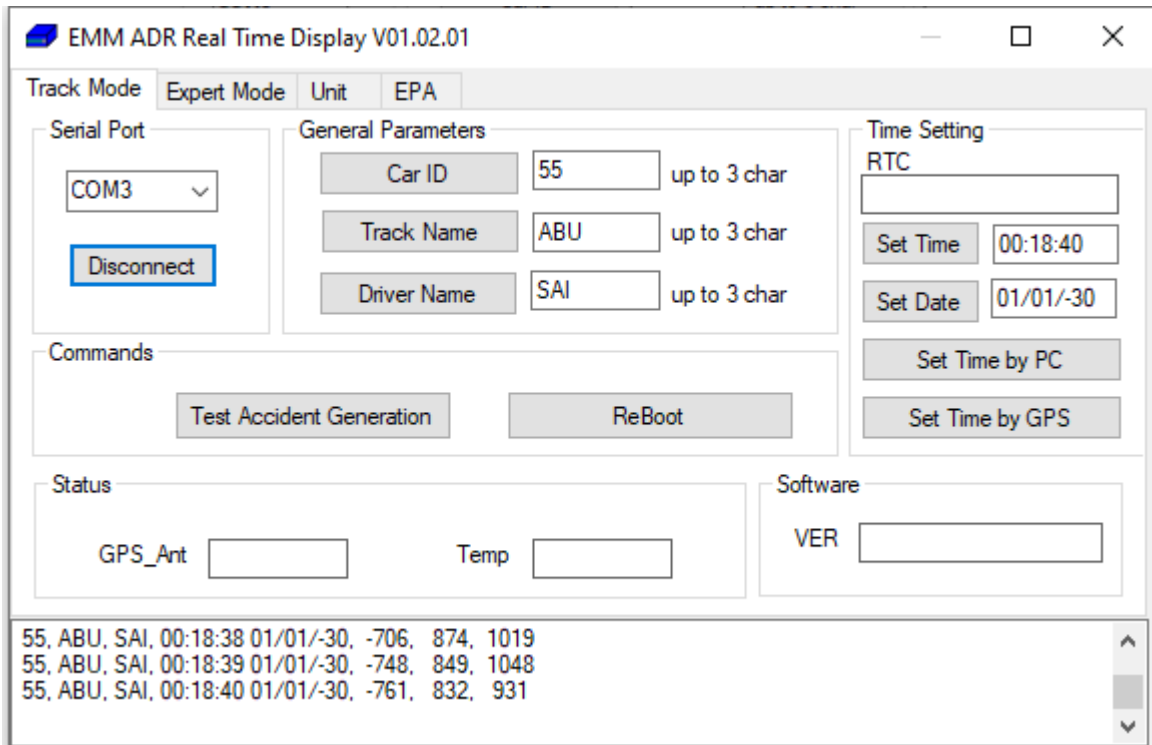


**Figure 2 - ADR Real Time Display: Default Window**

The following steps describe how to connect to the ADR4 via the ADR Real Time Display:

1. Connect the ADR4 to the laptop via USB.
2. Connect the serial lead to the laptop.
3. Select the correct serial port under the “Serial Port” section.
4. Click “Connect”.

If the unit is properly connected, serial messages will start to appear in the bottom console, as can be seen in the image below:



**Figure 3 - ADR Real Time Display: Unit connected**

It is possible to configure the following parameters:

- a) General Parameters: Allows configuration of typical track-related parameters:
  - Car ID: 3-digit Car Identifier. Type your defined Car ID, and then click “Car ID” button.
  - Track Name: TLA Track Identifier. Type your defined Track Name, and then click “Track Name” button.
  - Driver Name: TLA Driver Identifier. Type your defined Driver Name, and then click “Driver Name” button.
- b) Time Settings: Allows configuration of time and date of the unit:
  - Set Time: Allows manual configuration of the unit’s time.
  - Set Date: Allows manual configuration of the unit’s date.
  - Set Time by PC: Allows automatic configuration of the unit’s time based on the local PC time.
  - Set Time by GPS: Allows automatic configuration of the unit’s time based on the GPS time (if GPS connected).

c) Commands: Allows 2 different test commands:

- Test Accident Generation: In order to process this command, the unit must be **powered via 12V instead of USB**. When this command is sent, the self-test algorithm of the accelerometers is called, which will cause a pulse of 18g for around 10ms. An .emd accident file will be created, and data can be opened using eTS. An example is shown below:



- Reboot: This command reboots the unit.

## 2. Expert Mode

The expert mode allows the user to change advanced parameters of the internal ADR accelerometers. Typical values are shown in the figure below:

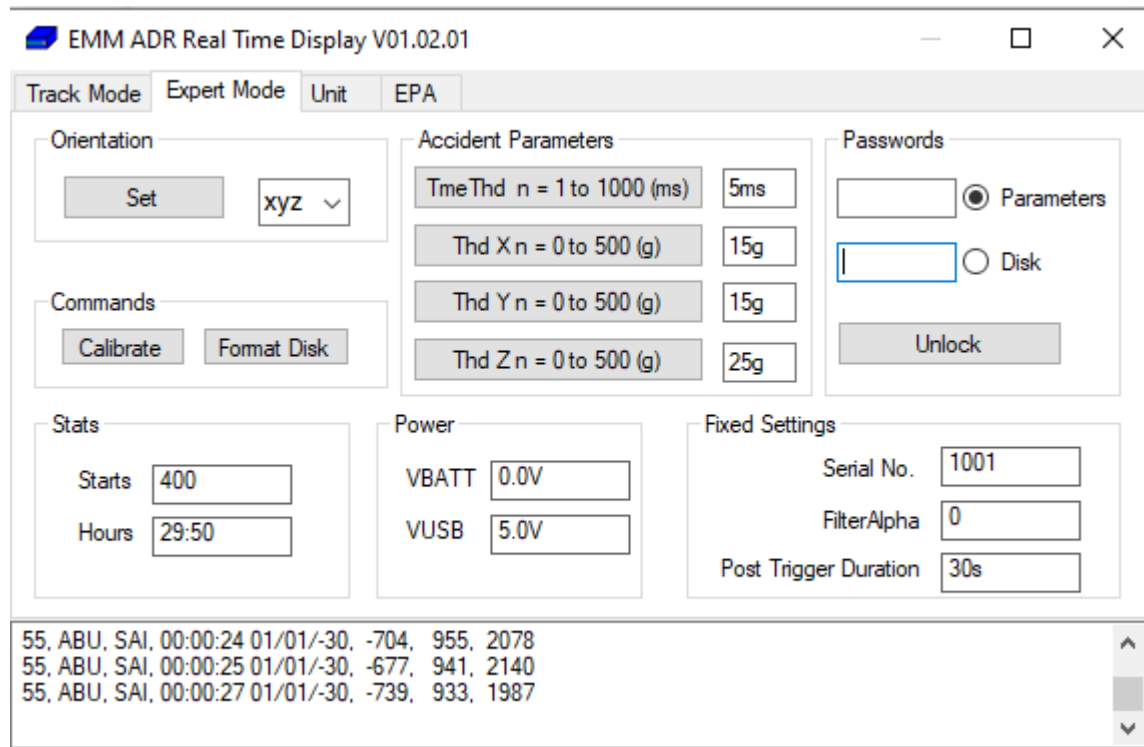


Figure 4 - ADR Real Time Display: Expert Mode

In order to modify these advanced parameters, the user must unlock first the unit by using a dedicated password provided by EMM personnel. When the unit is unlocked, the following commands can be processed by the ADR:

- Orientation: Allows the user to change the orientation of the X,Y, and Z axis.
- Accident Parameters: Allows the user to modify accident generation parameters, such as:
  - Time Threshold: Span of time used by the accident algorithm.
  - Threshold X: Threshold (in g) for the X axis to declare an accident.
  - Threshold Y: Threshold (in g) for the Y axis to declare an accident.
  - Threshold Z: Threshold (in g) for the Z axis to declare an accident.
- Commands: Allows the user to calibrate or format the disk.

At the bottom, different parameters are read from the ADR and shown to the user:

- Stats: Shows number of start cycles and hours logged in the unit.
- Power: Shows current power values.
- Fixed Settings: Shows current fixed settings, such as Serial Number and Post Trigger duration.



### 3. Unit Mode

This window shows the user the current power and accelerometer values read in real time from the ADR.

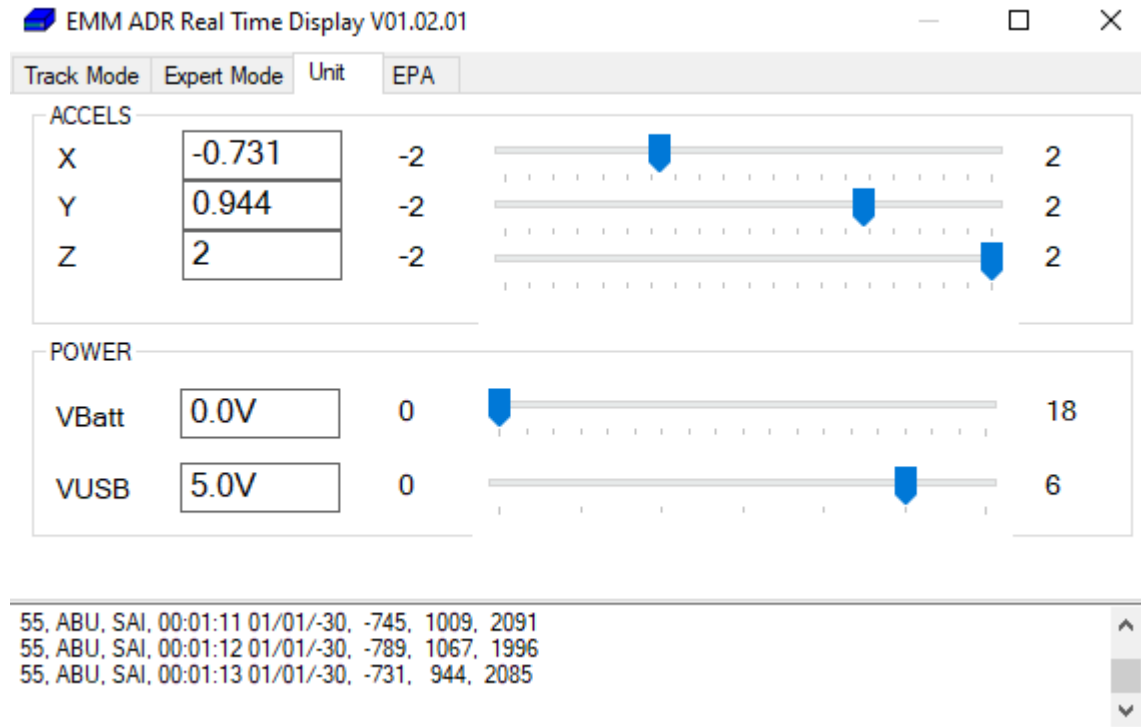


Figure 5 - ADR Real Time Display: Unit Mode

## 4 Technical Description

### 4.1 ADR4 Technical Information

#### Power Supply

- Voltage.....+8 - +19 V
- Nominal Current @13v.....150 mA
- Peak Current @13v.....500 mA (during charging phase)

#### Environmental

- Operating Temperature Ranges
  - Internal.....-10 - +60°C
  - Guaranteed ADR functionalities (GPS off).....-15 - +85°C
- Protection Class .....IP66
- Max impact survival .....>1000G

#### Mechanical

- Height (max incl. connector).....28 mm
- Width (max).....72mm
- Length (max).....85mm
- Weight.....<175g
- Main Connector.....Deutsch (AS2-10-35 PN)
- GPS Antenna Connector.....SMA Female

## 4.2 ADR4 System Loom Technical Data

ADR4 Connector AS 2 10-35 PN  
 Harness connector AS 6 10-35 SN

Pin	Function	Note.
1	RS232-RX Serial	
2	Digital Input 2	
3	CAN-P	
4	CAN-N	
5	Output 100mA LS	
6	GND, USB_VBUS-N	Download*
7	USB_VBUS-P	Download
8	USB_D-P	Download
9	USB_D-N	Download
10	RS232-TX Serial	
11	Digital Input 1	
12	VBATT +	
13	GND, USB_VBUS-N	Download*

Table 1 – ADR 4 Pin out



Master keyway

Figure 6 – Master keyway orientation

## 5 Download Link

The EMM Real Time Display application can be downloaded from the following link:

<https://www.emmotorsport.com/solutions/adr#downloads>

- User: ADR4
- Password: ADR4