ECU Bridge

User Manual

Racing Data Power

Introduction

ECU Bridge belongs to the last generation of **AIM** loggers for car/bike installations.

There are two available versions of **ECU Bridge**:

- **K line/CAN** version – with **OBDII connector** – for an easy and quick Plug&Play connection to the vehicle OBDII plug (suggested for stock ECUs).
- **RS232/CAN** version – with **free cables** – for a straight ECU connection through the serial/CAN communication protocol (suggested for both stock and after market ECUs). Supported ECUs database is constantly updated. Refer to www.aim-sportline.com "Download Area/ECU connections" for further information.

ECU Bridge samples but does not record data out coming from the vehicle ECU; it can show them if connected to an high technology **AIM** display like **MyChron3 Dash**, **TGDash** and **Formula Steering Wheel** or to **SmartyCam**, the AIM on board camera the only one with data overlay.

ECU Bridge manages 3 different communication protocols:

- K Line;
- CAN Line;
- Serial RS232 line.

Technical Characteristics:

- ECU interface;
- CAN protocol for external expansion modules;
- USB port for programming
- 8/18 V external power.

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Chapter 1 – ECU Bridge: kit, expansions and part numbers

Different **ECU Bridge** can be connected to AIM displays as well as to **SmartyCam**.

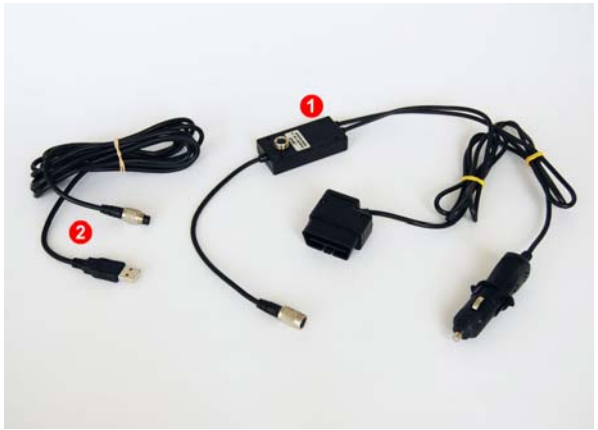
1.1 – Kit and part numbers

Here follow images and details of **ECU Bridge** available kits.

ECU Bridge CAN/RS232 kit: **ECU Bridge** with free cables, allows ECU straight connection. The kit includes:

- **ECU Bridge** RS232/CAN (1);
- USB cable for programming (2);

CAN/RS232 ECU Bridge kit part number is: **X90BGGPI2RMA**.



ECU Bridge CAN/Kline kit : **ECU Bridge** with OBDII connector, allows to remote the connection on the vehicle OBDII plug. The kit includes:

- CAN/K line **ECU Bridge** (1);
- USB cable for programming (2);

CAN/K Line ECU Bridge kit part number is: **X90BGCK12MA**

1.2 – ECU Bridge available expansions and related part numbers

ECU Bridge sampled – not recorded – data can be visualised through AIM displays or through **SmartyCam**, the only on board camera with data overlay.

To see data sampled and recorded by **SmartyCam** an AIM **Data Hub** is needed to connect the three devices (ECU Bridge, SmartyCam and an AIM display).

ECU Bridge expansions part number are:

- **2 ways Data Hub** with 40 cm cable: **X08HUB010**;
- **4 ways Data Hub** with 150 cm cable: **X08HUB150**;
- **MyChron3 Dash**: **X30VDAM01**;
- **TGDash**: **X45VDAM01**;
- **Formula Steering Wheel**: **X07VOLFORM**.

Chapter 2 – Installation, power and connections

To install **ECU Bridge**, its expansions, loggers and display choose a place where the devices are not in contact with heat electromagnetic interference sources like spark plug or coil.

2.1 – How to power ECU Bridge

ECU Bridge needs a not stabilized 8-18 VDC power sources.

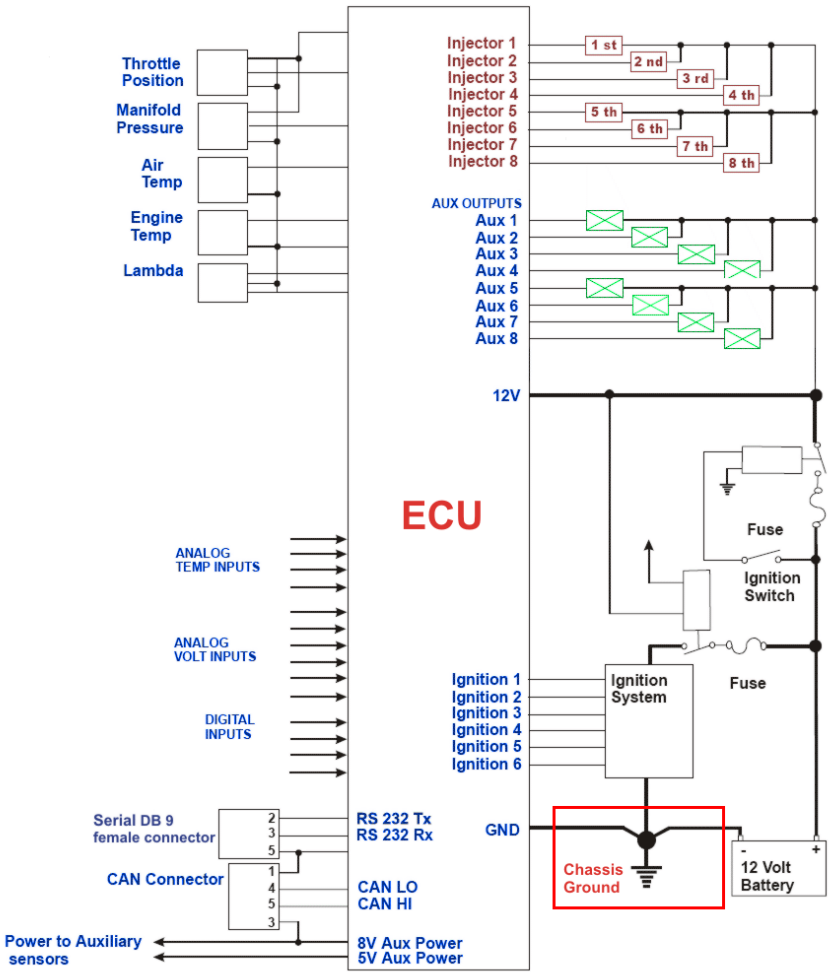
It is suggested to power **ECU Bridge** through the vehicle master switch to save the vehicle battery charge.

Use an external power source to power **ECU Bridge CAN/RS232** and connect **ECU Bridge** free cable directly to it.

Use the vehicle lighter plug to power **ECU bridge CAN/K Line**: insert the Bridge lighter plug in the vehicle one.

2.1.1 – Cable labelled GND

To correctly power ECU Bridge and for the signal to be stable it is recommended to connect cable labelled GND coming out from **ECU Bridge** powering harness to thevehicle chassis ground, as highlighted here below.



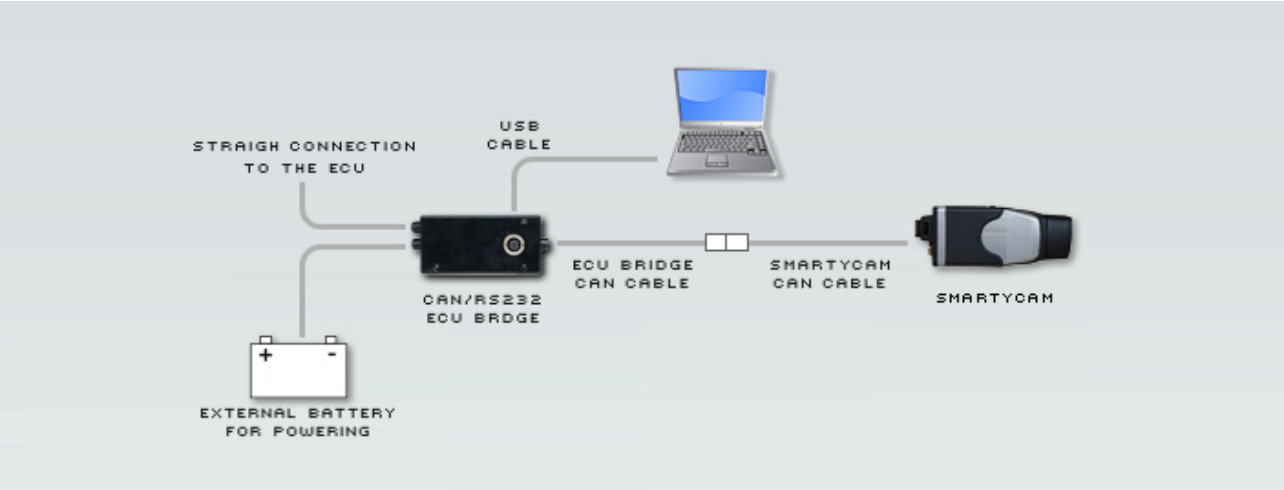
2.2 – How to connect ECU Bridge.

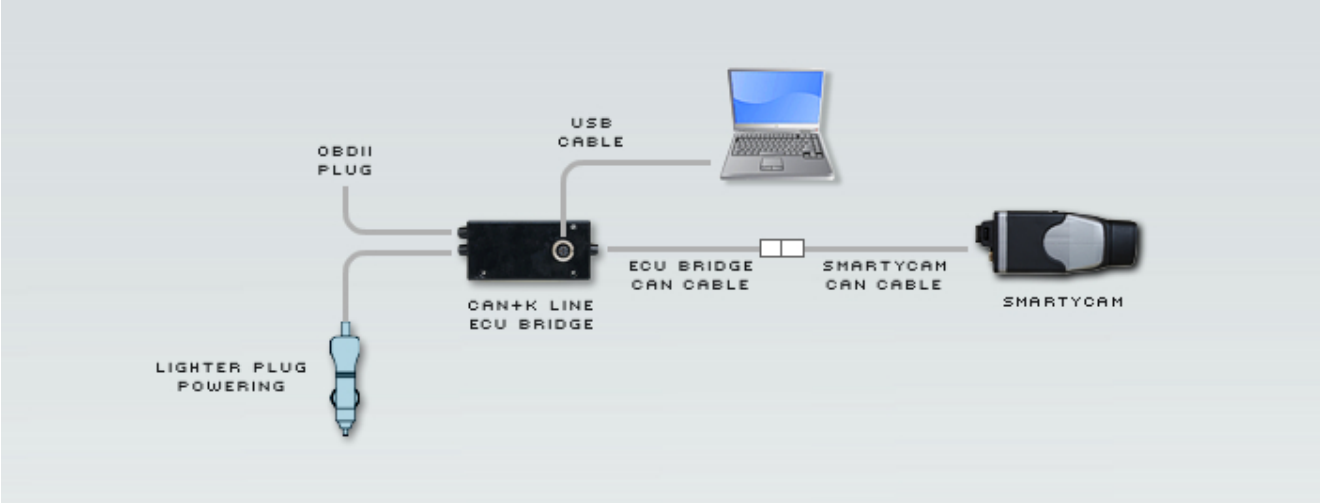
ECU Bridge is to be connected to the different AIM devices but it also needs ECU connection through CAN/RS232 or the K line.

2.2.1 – Connection with AIM devices and with the PC

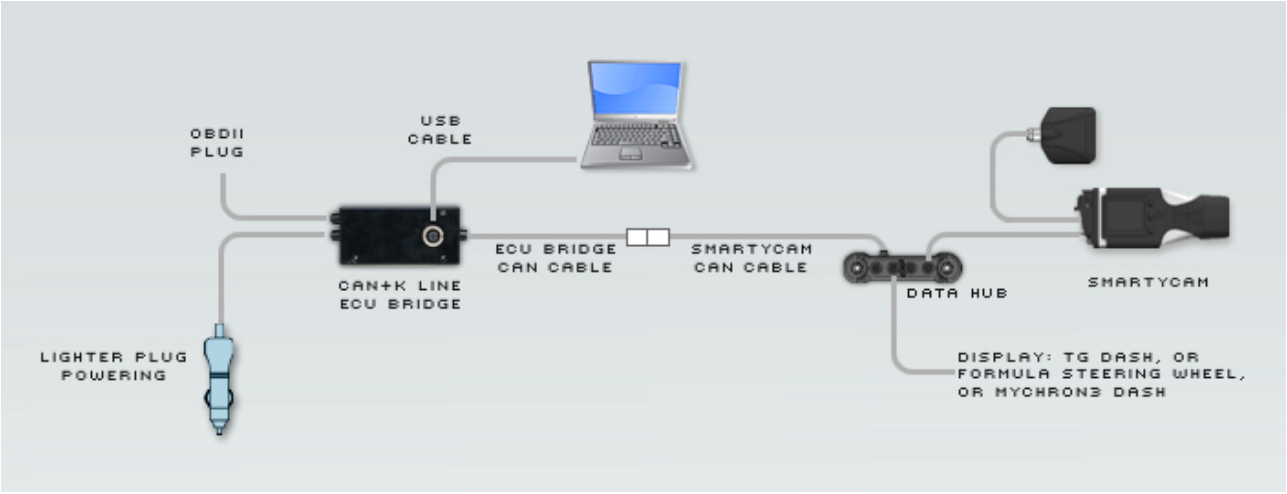
Images here below show how to connect **ECU Bridges** to **SmartyCam** and to the PC.

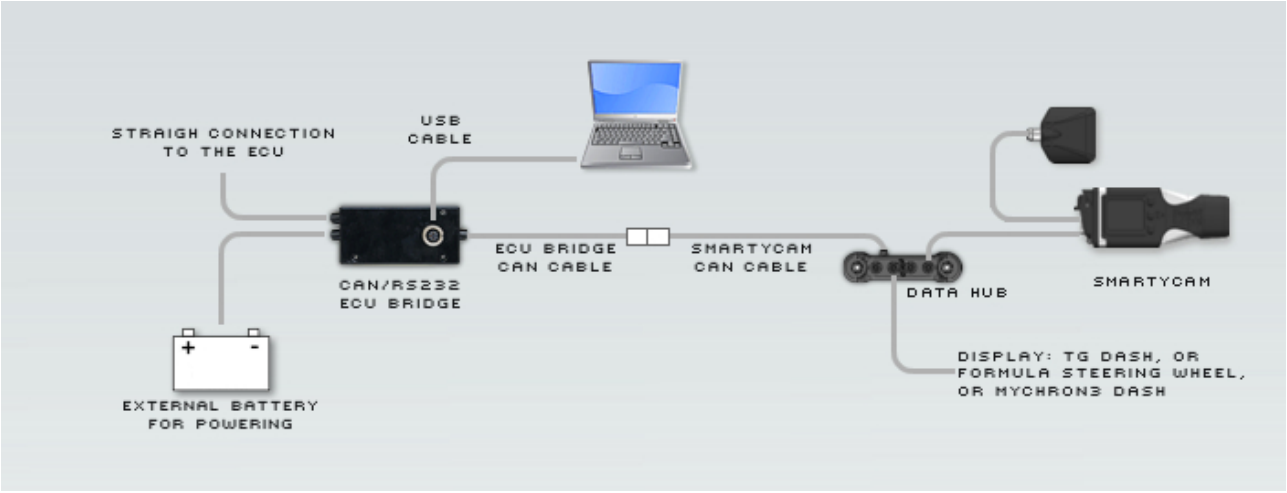
Warning: connect ECU Bridge to SmartyCam and to the display OFF.


STRAIGH CONNECTION
TO THE ECU
USB
CABLE
CAN/RS232
ECU BRDGE
ECU BRIDGE
CAN CABLE
SMARTYCAM
CAN CABLE
SMARTYCAM
+
-
EXTERNAL BATTERY
FOR POWERING


OBDII
PLUG
USB
CABLE
CAN+K LINE
ECU BRIDGE
ECU BRIDGE
CAN CABLE
SMARTYCAM
CAN CABLE
SMARTYCAM
LIGHTER PLUG
POWERING

In case a display is wished a un 4 ways **Data Hub** is needed, as shown here below.

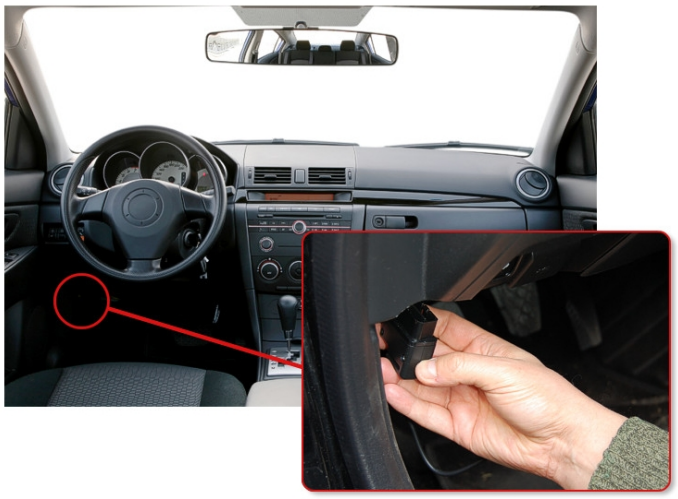




2.2.2 – Connection of CAN/K Line ECU Bridge to the OBDII plug

With CAN/K Line **ECU Bridge** it is possible to receive data out coming from the ECU using the vehicle CAN or K line. It is just sufficient to plug **ECU Bridge** OBDII connector in the vehicle diagnostic (OBDII) plug and power **ECU Bridge** using the vehicle lighter plug. Powering the vehicle on, **SmartyCam** and **ECU Bridge** will automatically power on.

Images here below show the place where OBDII plus is generally placed on the vehicles (top image), a OBDII plug (bottom left) and an example of connection.



It is possible that all parameters managed by the ECU are sent on the OBDII plug. Refer to paragraph 3.1 for further information concerning the channels that can be shown on **SmartyCam** videos.

2.2.3 – Connection of RS232/CAN ECU Bridge to the ECU

With **RS232/CAN ECU Bridge** it is possible to sample data out coming from the vehicle ECU or OBDII plug. To know if the vehicle ECU is supported by **ECU Bridge** and to know how to connect the vehicle directly to the vehicle OBDII plug refer to the document downloadable from AIM corporate website "Download area", "ECU connections".

Always refer to the ECU user manual for any information concerning pins and cable connections.

For straight connection of RS232/CAN **ECU Bridge** to the ECU, connect the free cables to the ECU pins.

Usin the **CAN** bus connect:

- **ECU Bridge** white cable labelled CAN+ to the pin corresponding to ECU CAN+.
- **ECU Bridge** blue cable labelled CAN– to the pin corresponding to ECU CAN–.

Using **RS232** line connect:

- **ECU Bridge** white cable labelled RS232RX to pin RS232TX of the ECU.
- **ECU Bridge** blue cable labelled RS232TX to pin RS232RX of the ECU.

Refer to the documentation downloadable from AIM corporate website, "Download area", "ECU Connections" for further information concerning the connection of ECU Bridge to the ECU.

Chapter 3 – Driver, configuration, sampled data visualisation, engaged gear computation and maintenance

Once **ECU Bridge** installation and connection is over it is necessary to configure it using **Race Studio Configuration** software freely downloadable from www.aim-sportline.com, "Download area /Software".

Once software and driver installed connect **ECU Bridge** to the PC using the USB cable included in the kit. Plug the cable three pins connector in **ECU Bridge** USB connector shown below, run the software and follow the procedure here explained.

Press "AIM system manager">>"SMC bridge">>"New" and fill in "New configuration" panel;

- "**Data Logger type**": is already set on ECU Bridge;
- "**ECU Manufacturer**": select the correct vehicle or OBD_II
- "**ECU Model**" select ECU model or OBDII protocol;
- select the desired measure units and press "OK".

The system comes back to "System Manager" window: press "**SmartyCam Functions setting**" button top right in the window and select the channels to show.

3.1 – Visualising data sampled by ECU Bridge on SmartyCam video

To view data sampled by **ECU Bridge** on **SmartyCam** videos it is necessary to set them in the bridge configuration. Pressing "**SmartyCam functions setting**", "**Set functions to Channels**" window shows up. It associates each function to the corresponding ECU channels. Available channels changes according to the connection used and to the communication protocol the vehicle can manage. Here below are listed the functions managed and the related channels. Each channel is indicated with 1 or more acronyms.

FUNCTIONs	Acronyms	NOTES
RPM	RPM	Configured by default
Reference speed	Speed	Average speed computed through the 4 wheel speeds
	WH_SPD_FL	Front left wheel speed
	WH_SPD_FR	Front right wheel speed
	WH_SPD_RL	Rear left wheel speed
	WH_SPD_RR	Rear right wheel speed
	Vel. GPS	GPS speed
Gears	GEAR	If missing refer to paragraph 3.2
Water temperature	ECT o ENGINET	Both acronyms are used
Oil temperature	OIL_TEMP	Other acronyms are also possible
Oil pressure	OIL_PR_....	Other acronyms are also possible
Brake pressure	BRAKE_PRESS	Other acronyms are also possible
Throttle opening	TPS	Throttle opening
	PPS	Acceleration pedal position
Brake position	BRAKE_SW	Other acronyms are also possible
Steering wheel position	Steer_angle	Other acronyms are also possible

Once the channels set transmit the configuration to the logger. In case the information concerning the engaged gear is not supplied by the ECU it is possible to compute it as explained in the following paragraph.

For any further information concerning ECU Bridge refer to **Race Studio Configuration** user manual – **ECU Bridge** chapter.

Please note: it is suggested to periodically check on www.aim-sportline.com, "Download/software area" if new releases of Race Studio 2 software and/or ECU Bridge firmware have been released.

3.2 – Gear computation procedure

If the vehicle ECU does not provide the information concerning the engaged gear follow this procedure to compute it. For the procedure to be successful carefully follow these instructions.

The procedure is to be set via software and starts automatically at ECU Bridge first start up: this is why software configuration is to be made before vehicle power on. Gear calibration is to be correctly performed once.Afterwards it is no more necessary.

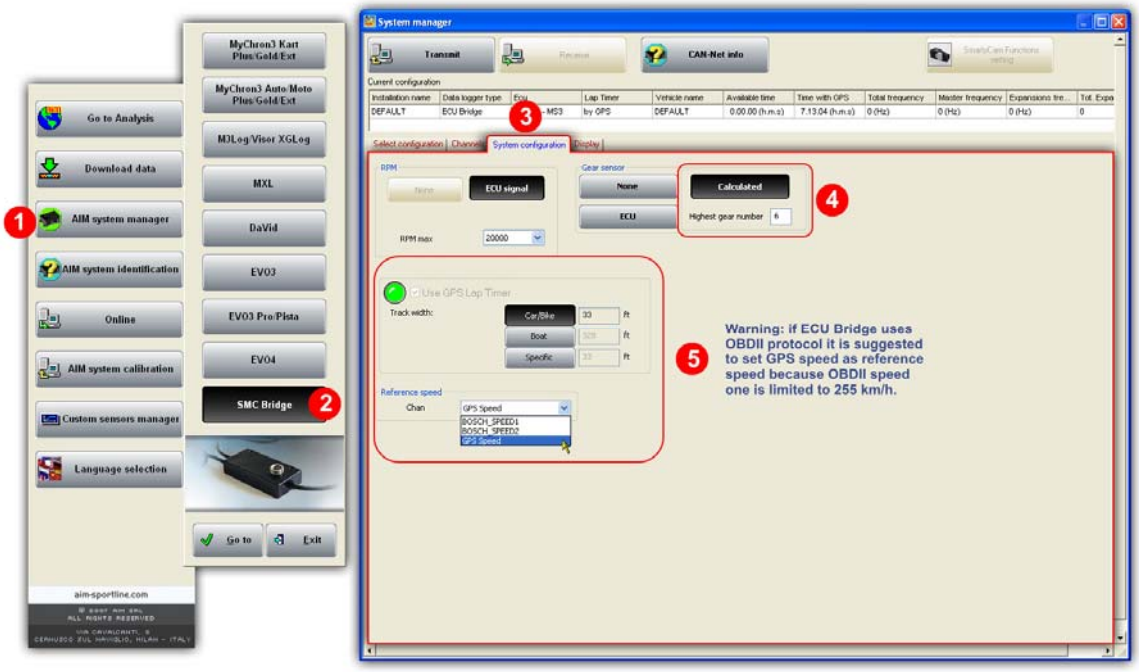
3.2.1 – Preliminary Information

Gear channel calibration is made through **rpm** and **speed** channels. These channels are to be both correctly working and configured. In case of protocols with more speed channels configured the system will use the reference speed. AIM suggests to use as reference speed the one of a driving wheel. The computation works also in case of a non driving wheel or a GPS speed but in this case more attention is required to the wheels that should not slip or block during the learning lap.

3.2.2 – Activating the procedure

Gear computation is to be set via software with **Race Studio 2**. With reference to the image here below:

- run software;
- press "**AIM system manager**" on the left vertical keyboard (**1**);
- select **SMC Bridge** (**2**);
- create a new configuration or select an existing one;
- activate "**System Configuration**" (**3**) layer;
- enable **Calculated gear** function and fill in the number of available gears on the vehicle (**4**);
- set the reference speed: select GPS speed in case OBDII protocol is being used, as highlighted in the note (**5**).



Once the configuration transmitted to **ECU Bridge** the system is ready for the learning lap that samples speed and RPM signals needed to perform the gear computation.

3.2.3 – Learning lap

During the **learning lap** follow carefully these instructions:

- start driving ensuring that the street is clear;
- engage all gears in sequence;
- keep each gear engaged for at least 5/6 seconds;
- drive in a "smooth" way avoiding sudden accelerations, slips or wheel blocks in braking; RPM should increase gradually;
- engage all gears and switch of the vehicle or **ECU Bridge** once the last gear reached; if this is not possible shift the gears each 5/6 seconds engaging the clutch for the minimum time.

Warning: absolutely avoid "revs" while the vehicle is moving and do not drive with the clutch pedal pressed. If required by the vehicle press the accelerator before switching off the engine but only with the vehicle is completely stopped.

3.2.4 – Erasing gear calibration

To clear gear calibration use **Race Studio 2** software. The procedure is the same performed to set calculated gears but in spite of "Calculated" highlighted by "4" in the previous image, set "**None**" and transmit the configuration to **ECU Bridge**.

To re-compute the engaged gear select again **Calculated** option and transmit the configuration: **ECU Bridge** is again ready for a new calibration.

3.3 – Configuring the displays

To see data sampled by **ECU Bridge** it is possible to connect it to an **AIM** display. Available displays are **MyChron3 Dash**, **Formula Steering wheel** and **TG Dash**. Information shown on the different display pages are set through **Race Studio 2**.

Refer to Race Studio Configuration user manual to know how to configure ECU Bridge and/or the displays and to the display user manual for further information concerning their working mode.

3.4 – Maintenance

The only recommended maintenance for **ECU Bridge** is a periodical software/firmware update. Updates are downloadable from www.smartycam.com or www.aim-sportline.com Download area firmware/software.

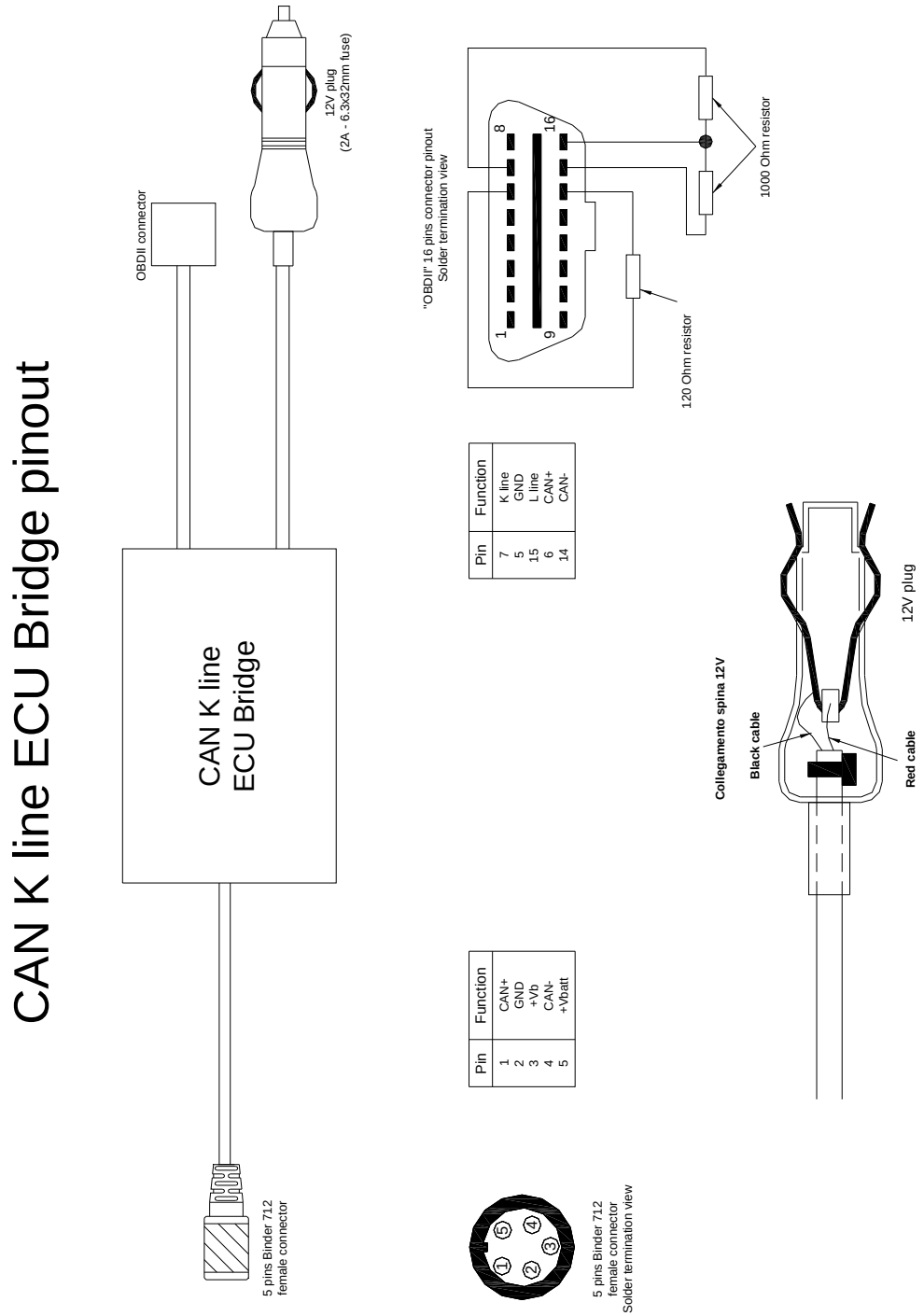
To update firmware/software:

- connect **ECU Bridge**, **SmartyCam** and its external GPS;
- enter www.smartycam.com;
- click "Firmware" or "Software" in Home Page;
- check if any update has been released;
- download and run them double clicking on;
- follow the instruction that appears on the PC monitor.

Appendix – Technical drawings

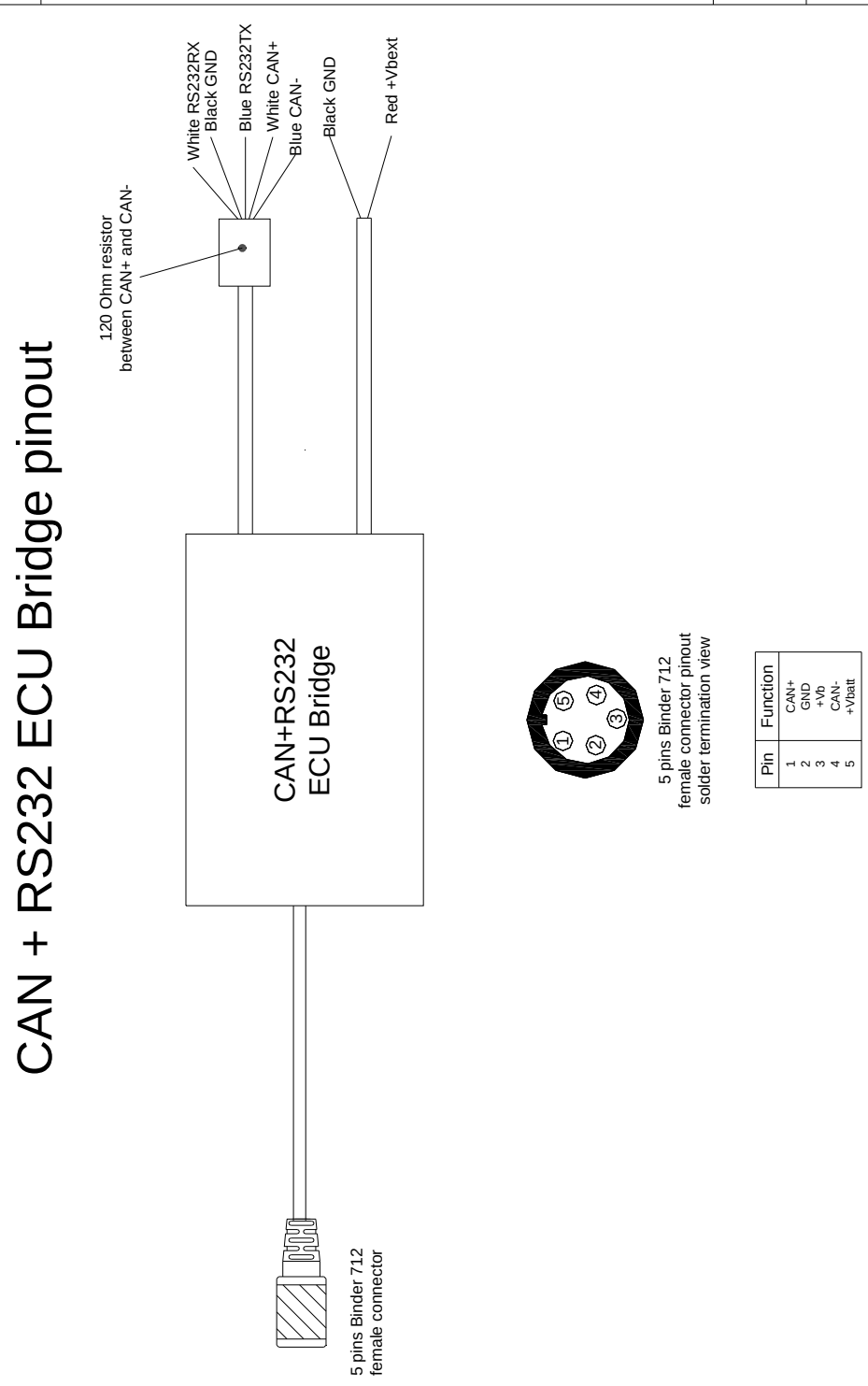
N.rev. / Rev. N.	Descrizione / Description	Data / date	Firma / Sign	Contr. da / Ckd. by

CAN K line ECU Bridge pinout



Rif. / Ref.	Q.tà / Q.ty	Materiale / Material		N. articolo / Item N.	
Progettato da / Designed by	Contr. da / Ckd. by	Approvato da / Approved by	Nome file / File name	Data / Date	Scala / Scale
Racing Data Power		Titolo / Title: Pinout ECU Bridge CAN e Linea K			
		N. disegno / Drawing N.		Rev. / Rev.	Foglio / Sheet: 1 of 1

N.rev. / Rev. N.	Descrizione / Description	Data / date	Firma / Sign	Contr. da / Ckd. by



Rif. / Ref.	Q.tà / Q.ty	Materiale / Material		N. articolo / Item N.	
Progettato da / Designed by	Contr. da / Ckd. by	Approvato da / Approved by	Nome file / File name	Data / Date	Scala / Scale
Racing Data Power		Titolo / Title: Pinout ECU Bridge - CAN+RS232			
		N. disegno / Drawing N.		Rev. / Rev.	Foglio / Sheet: 1 of 1