AiM Infotech

# Marelli SRA SRAE SRT small version ECU

Release 1.00







This tutorial explains how to connect Marelli SRA, SRAE and SRT small version ECUs to AiM devices. This ECU features 16 available channels (32 elements) only, while the full version features 38 available channels (64 elements). For further information see software setup chapter here following.

#### 1 Hardware check

All AiM devices are provided with a 120 Ohm CAN termination resistor. Before connecting Marelli CAN bus to any of them check that two only termination resistors are working on the CAN bus once the network is completed.

With a multimeter check the resistance between CAN High (positive probe) and CAN low (ground probe).

- if the reading shows 120 Ohm, there is one termination resistor on the ECU side, no additional operations are required: connect AiM device to the vehicle CAN bus;
- if the reading shows 50-60 Ohm, there are two termination resistors: either AiM device termination resistor located on the wiring or one of the resistors located on the vehicle CAN bus are to be removed;
- if the reading shows a very high resistance (nearly infinite), no termination resistor is present: add a resistor on the ECU CAN bus and leave the one included in AiM device.



## 2 Software Setup

Marelli SRA-SRAE-SRT small version ECU needs to be set up via Marelli "Vision" software. Run it and follow this path.

• "MAP" -> "Open PTA Window" as shown below.





Browse the PC to find the MAP file. Normally it appears in the PTA files browser. If not browse the PC. Once the file selected, "PTA Table" opens. Then:

- click on "Find" icon (1)
- fill in the panel that appears with "CAN LINK" (2)
- click on "CAN LINK" (3)

| FTA table: C:\Documents and Settings\AIM_To  | shiba\Desktop\MARELLI_SRAE_   | FAUSTO\VISION5\PTA\MAP_File.pta |  |
|--|-------------------------------|---------------------------------|--|
| 12   |                               |                                 |  |
| SRAE_59 - Base SRAE Calibration - RPM/TF<br>SW feature = EEPROM access password de | PS mapping<br>ependent.       |                                 | E2 Start Address (*.TAB)<br>400000<br>UNIT Offset Address<br>0 |
| Title Trova  | ? × e                         |                                 |  |
| 12 - ENG<br>13 - ENG Trova: CAN LINK 2   | Trova succ <u>e</u> ssivo     |                                 |  |
| 14 - SYS   | Annulla                       |                                 |  |
| ==> INF  | þ                             |                                 |  |
| ==> OL  Maiuscole/minuscole  | 1]                            |                                 |  |
| ==> CC   | þ]                            |                                 |  |
| ==> ENGINE CONFIGORMITON   | [55]                          |                                 |  |
|  | [col]                         |                                 |  |
| 15 - INPUTS LINEARIZATION  | [88]                          |                                 |  |
|  | [0]                           |                                 |  |
|  | [U]                           |                                 |  |
|  | [13]                          |                                 |  |
|  | [12]                          |                                 |  |
|  | [16]                          |                                 |  |
|  | [16]                          |                                 |  |
|  | [10]                          |                                 |  |
| ==> PRESSURE: MANIFOLD   | [23]                          |                                 |  |
| ==> PRESSURE: OIL  | [12]                          |                                 |  |
| ==> TEMPERATURE: AIR   | [7]                           |                                 |  |
| ==> TEMPERATURE: FUEL  | [8]                           |                                 |  |
| ==> TEMPERATURE: OIL   | [9]                           |                                 |  |
| ==> TEMPERATURE: WATER   | [8]                           |                                 |  |
| ==> THERMOCOUPLES  | [7]                           |                                 |  |
| ==> ROTARY SWITCHES  | [13]                          |                                 |  |
| ==> BATTERY VOLTAGE  | [6]                           |                                 |  |
|  | [0]                           |                                 |  |
|  | [13]                          |                                 |  |
|  | [17]                          |                                 |  |
| ==> VISION   | [17]                          |                                 |  |
|  | L*J                           |                                 |  |
| C:\Documents and Settings\AIM_Toshiba\Desktop\MARELL                               | I SRAE FAUSTO/VISIONS/PTA/MAP | File.pta 66 Obje                | ect(s) Verify Off  |



#### The window below appears.

| 🖑 PTA table: C:\Documents   | 🖑 PTA table: C:\Documents and Settings\AIM_Toshiba\Desktop\MARELLI_SRAE_FAUSTO\VISION5\PTA\MAP_File.pta 📃 🗵 🗶 |                  |   |        |  |  |   |   |  |
|---|---|------------------|---|--------|--|--|---|---|--|
| 猶   🖬 🔛   🎟 🖏   | R M   🖨 🔳   |                  |   |        |  |  |   |   |  |
| SRAE_59 - Base SRAE Calibration - RPM/TPS mapping<br>SW feature = EEPROM access password dependent.                             |   |                  |   |        |  |  | E2 Start Address (*.TAB<br>400000<br>UNIT Offset Address<br>0 | ) |  |
| Title   |   | Reference        | * | Size   |  |  |   |   |  |
| DATA ACOUISITION  |   |                  | [ |        |  |  |   |   |  |
| Data acquisition CAN line   |   | EE-CanU-Acqui    | X | = 00   |  |  |   |   |  |
| Frequencies Repartition Table   |   | EE.SizeFreqTelem | X | 1×8×1  |  |  |   |   |  |
| Data Elements Table   |   | EE.TelemTable    | X | 4x32x1 |  |  |   |   |  |
|   | •   |                  |   |        |  |  |   |   |  |
| EXPANSION MODULES   |   |                  |   |        |  |  |   |   |  |
| Selection module present on CAI   | N line  | EE.CanExpMod,    | X | 1×15×1 |  |  |   |   |  |
| Expansion modules CAN line  |   | EE.CanU.Expan    | X | = 00   |  |  |   |   |  |
|   |   |                  |   |        |  |  |   |   |  |
| PROG. CAN PACKETS   |   |                  |   |        |  |  |   |   |  |
| CAN IDs   |   | EE.CanU.IdUser1  | X | 3×1×1  |  |  |   |   |  |
| CAN packets definition  |   | EE.CanU.tbl_U    | X | 4x3x1  |  |  |   |   |  |
|   |   |                  |   |        |  |  |   |   |  |
|   |   |                  |   |        |  |  |   |   |  |
|   |   |                  |   |        |  |  |   |   |  |
| :\Documents and Settings\AIM_Toshiba\Desktop\MARELLI_SRAE_FAUSTO\VISION5\PTA\MAP_File.pta ==> CAN LINK  12 Object(s) Verify Off |   |                  |   |        |  |  |   |   |  |

To correctly set "DATA ACQUISITION" it is necessary to set the tables highlighted above:

- Data acquisition CAN line
- Frequencies Repartition Table
- Data Elements Table.

To set "Data acquisition CAN line" table click on it and the table – shown below – appears.

- right click on the black box (1) and the related panel appears
- select fill (2) and fill in the digit corresponding to the CAN line to be used (0=CAN0; 1=CAN1); in the example below CAN1 has been selected (3)
- click "Send" (4)

| 🏢 Edit Ta | ble C:\Document <i>s</i> and Settings\AIM_Toshiba\Desktop\MARE   | ELLI_SRAE_FAUSTO\VISION5\PTA\MAP_File 💶 🗙          | ĺ |  |  |  |
|-----------|--|--|---|--|--|--|
| Comment:  | ent: Selection of the CAN line used for the Data Acquisition: (0) <b>CAN</b> line <b>0, (1) CAN</b> line 1 - line used to send data acq messages to external data logger - line used to send user defined CAN messages (cf. <b>PROG CAN PACKETS)</b> |  |   |  |  |  |
| Unit:     |  |  |   |  |  |  |
| 1,101     |  | _  |   |  |  |  |
|           | C:\Documents and Settings\231_Toshiba\Desktop\MAR 🔀  |  |   |  |  |  |
| 1 1 1 1   | ⊙ <u>Fill</u> ○ <u>O</u> ffset ○ <u>G</u> ain <u>S</u> end <b>4 ÷</b> ±1% <b>÷</b> ±1%   | EE.SizeFreqTelem X 1x8x1<br>EE.TelemTable X 4x32x1 |   |  |  |  |





The software comes back to "PTA table".

Click on "Frequencies Repartition Table" and the table – shown below – appears:

- all fields currently set to "100" must be set to "32"
- the remaining fields must be set to "0".

To set a field:

- right click on the field to modify (1) and the related panel appears
- select fill (2) and fill in 32 (3)
- click "Send" (4)





#### The software comes back to "PTA table". Click on "Data Elements Table" and the table – shown below – appears.

| Ed 🗱  | it Table C:\ | Document     | s and Setti    | ngs\AIM_1     | 「oshiba\Desktop\MARELLI_SRAE_FAUSTO\VISION5\PTA\MAP_File               |
|-------|--------------|--------------|----------------|---------------|--|
| Comm  | ent: CAN te  | lemetry elem | ent : Addres:  | s, Type, Gair | n, Offset.   |
|       | TYPE:        | Byte=0x01,V  | Vord=0x02,D    | Word=04,Flo   | aduori gipe.<br>pat3=0x0E -> SByte,SWord,SDWord = 0x8X.                |
| Unit  | TYPE:        | LSB -> sourc | ce , 3 bytes N | 1SB destinat  | ion. EXAMPLE: Pdl value : Conversion Float -> sword : TYPE =0x0000820E |
|       | 0            | 2            |                | - 4           |  |
| 1,1,1 |              | 2 0000002    | 3<br>25000000  | 4             |  |
|       | 00000064     | 00000002     | 25000000       | 00000000      |  |
| 2     | 00000000     | 00000001     | 25000000       | 00000000      |  |
|       | 00000000     | 00000002     | 3E800000       | 00000000      |  |
| 5     | 000000077    | 00000082     | 3E800000       | 00000000      |  |
| 6     |              | 00000001     | 3E800000       |               |  |
| 7     | 000000E6     | 00000002     | 3F800000       | 00000000      |  |
| 8     | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 9     | 0000006B     | 00000082     | 3F800000       | 00000000      |  |
| 10    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 11    | 0000006E     | 00000082     | 3F800000       | 00000000      |  |
| 12    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 13    | 00000060     | 00000082     | 3F800000       | 00000000      |  |
| 14    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 15    | 0000006D     | 00000082     | 3F800000       | 00000000      |  |
| 16    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 17    | 00000067     | 00000082     | 3F800000       | 00000000      |  |
| 18    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 19    | 0000006A     | 00000082     | 3F800000       | 00000000      |  |
| 20    | 00000000     | 00000001     | 3F800000       | 00000000      |  |
| 21    | 00000068     | 00000082     | 3F800000       | 00000000      |  |
| 22    | 00000000     | 00000081     | 3F800000       | 00000000      |  |
| 23    | 00000069     | 00000082     | 3F800000       | 00000000      |  |
|       | Frontally 3  |              |                |               |  |
| MKPM. | [IPRM/DIC]   |              |                |               |  |

As shown here above each record is made up of four fields:

- address (1)
- type (**2**)
- gain (**3**)
- offset (4)

Fill the table above with the digits you find in the tables that follow according to the ECU you are setting (paragraph 2.1 and 2.2). You can set the fields as explained before.





Once all channels set, click "W" icon – highlighted below – to transmit the configuration to the ECU.

| Name     |  |  | A Fo |
|----------|--|--|------|
| MAP File |  |  | Bin  |
|          |  |  |      |
|          |  |  |      |
|          |  |  |      |
|          |  |  |      |
|          |  |  |      |
|          |  |  |      |
|          |  |  |      |



## 2.1 Data Elements table for Marelli SRAE, Marelli SRT ECU

**Please note**: the table here following shows an additional column labelled "INDEX", which has the same function as the column "address" and you can choose which one to be used.

| NUMBER | INDEX | ADDRESS  | ТҮРЕ    | GAIN     | OFFSET   | DESCRIPTION |
|--------|-------|----------|---------|----------|----------|-------------|
| 1      | 64    | 00210270 | 0000002 | 3F800000 | 00000000 | RPM         |
| 2      |       | 00000000 | 0000001 | 3F800000 | 00000000 |             |
| 3      | 65    | 00210080 | 0000082 | 3F800000 | 00000000 | TPS1        |
| 4      |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 5      | 77    | 0021008C | 0000082 | 3F800000 | 0000000  | PDL1        |
| 6      |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 7      | E6    | 00210E04 | 0000002 | 3F800000 | 0000000  | Car speed   |
| 8      |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 9      | 6B    | 002100A0 | 0000082 | 3F800000 | 00000000 | Water temp  |
| 10     |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 11     | 6E    | 002100A8 | 0000082 | 3F800000 | 0000000  | Oil temp    |
| 12     |       | 00000000 | 0000001 | 3F800000 | 00000000 |             |
| 13     | 6C    | 002100A4 | 0000082 | 3F800000 | 00000000 | Air temp    |
| 14     |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 15     | 6D    | 002100A6 | 0000082 | 3F800000 | 00000000 | Fuel temp   |
| 16     |       | 00000000 | 0000001 | 3F800000 | 00000000 |             |
| 17     | 67    | 00210084 | 0000082 | 3F800000 | 0000000  | MAP1        |
| 18     |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 9      | 6A    | 0021008A | 0000082 | 3F800000 | 00000000 | Oil press.  |
| 20     |       | 0000000  | 0000001 | 3F800000 | 0000000  |             |
| 21     | 68    | 00210086 | 0000082 | 3F800000 | 0000000  | Baro press. |
| 22     |       | 0000000  | 0000081 | 3F800000 | 0000000  | Fuel press. |
| 23     | 69    | 00210088 | 0000082 | 3F800000 | 00000000 |             |



| 24 |         | 0000000  | 0000001  | 3F800000 | 00000000 | Fuel level     |
|----|---------|----------|----------|----------|----------|----------------|
| 25 | FO      | 00210692 | 0000082  | 3F800000 | 00000000 |                |
| 26 |         | 00000000 | 00000001 | 3F800000 | 00000000 | Lambda AFR     |
| 27 | D8      | 002100BC | 0000002  | 3F800000 | 00000000 |                |
| 28 |         | 00000000 | 0000001  | 3F800000 | 00000000 | Advance        |
| 29 | E9      | 00210392 | 0000082  | 3F800000 | 00000000 |                |
| 30 |         | 00000000 | 0000001  | 3F800000 | 00000000 | Gear (Numeric) |
| 31 | Unknown | 0021012B | 0000001  | 3F800000 | 00000000 |                |
| 32 |         | 00000000 | 00000001 | 3F800000 | 00000000 |                |

# 2.2 Data Elements table for Marelli SRA ECU

| NUMBER | INDEX | ADDRESS  | ТҮРЕ     | GAIN     | OFFSET   | DESCRIPTION |
|--------|-------|----------|----------|----------|----------|-------------|
| 1      |       | 00208270 | 0000002  | 3F800000 | 00000000 | RPM         |
| 2      |       | 00000000 | 0000001  | 3F800000 | 00000000 |             |
| 3      |       | 00208080 | 0000082  | 3F800000 | 0000000  | TPS1        |
| 4      |       | 0000000  | 0000001  | 3F800000 | 0000000  |             |
| 5      |       | 0020808C | 0000082  | 3F800000 | 0000000  | PDL1        |
| 6      |       | 00000000 | 0000001  | 3F800000 | 00000000 |             |
| 7      |       | 00208E04 | 0000002  | 3F800000 | 0000000  | Car speed   |
| 8      |       | 0000000  | 0000001  | 3F800000 | 0000000  |             |
| 9      |       | 002080A0 | 0000082  | 3F800000 | 0000000  | Water temp  |
| 10     |       | 00000000 | 0000001  | 3F800000 | 00000000 |             |
| 11     |       | 002080A8 | 0000082  | 3F800000 | 00000000 | Oil temp    |
| 12     |       | 00000000 | 0000001  | 3F800000 | 00000000 |             |
| 13     |       | 002080A4 | 0000082  | 3F800000 | 00000000 | Air temp    |
| 14     |       | 00000000 | 0000001  | 3F800000 | 00000000 |             |
| 15     |       | 002080A6 | 0000082  | 3F800000 | 0000000  | Fuel temp   |
| 16     |       | 00000000 | 00000001 | 3F800000 | 00000000 |             |



| 17 | 00208084 | 0000082  | 3F800000 | 00000000 | MAP1        |
|----|----------|----------|----------|----------|-------------|
| 18 | 0000000  | 0000001  | 3F800000 | 00000000 |             |
| 19 | 0020808A | 0000082  | 3F800000 | 00000000 | Oil press.  |
| 20 | 0000000  | 0000001  | 3F800000 | 00000000 |             |
| 21 | 00208086 | 0000082  | 3F800000 | 00000000 | Baro press. |
| 22 | 0000000  | 0000081  | 3F800000 | 00000000 | Fuel press. |
| 23 | 00208088 | 0000082  | 3F800000 | 00000000 |             |
| 24 | 0000000  | 0000001  | 3F800000 | 00000000 | Fuel level  |
| 25 | 00200FDC | 0000082  | 3F800000 | 00000000 |             |
| 26 | 0000000  | 0000001  | 3F800000 | 00000000 | Lambda AFR  |
| 27 | 002080BC | 0000002  | 3F800000 | 00000000 |             |
| 28 | 0000000  | 0000001  | 3F800000 | 00000000 | Advance     |
| 29 | 00208392 | 0000082  | 3F800000 | 00000000 |             |
| 30 | 0000000  | 0000001  | 3F800000 | 00000000 |             |
| 31 | 0000000  | 00000001 | 3F800000 | 00000000 |             |
| 32 | 0000000  | 0000001  | 3F800000 | 0000000  |             |

# 2.3 Available alternative channels setting

TPS, Pedal (PDL), MAP and Lambda channels can also be set as TPS2 or Throttle, MAP2, Pedal 2 (PDL2), MAP2 and Lambda 2 using these Addresses (or Index too for SRAE/SRT)

| Channel  | Address (or index) SRAE/SRT | Address SRA | Description            |
|----------|-----------------------------|-------------|------------------------|
| TPS2     | 00210082 (index 66)         | 00208082    | Alternative to TPS1    |
| Throttle | 002100AA (index 79)         | 002100AA    | Alternative to TPS1    |
| PDL2     | 0021008E (index 78)         | 0020808E    | Alternative to PDL1    |
| MAP2     | 00210098 (index A0)         | Unknown     | Alternative to MAP1    |
| LAMBDA2  | 002100CA (index 87)         | Unknown     | Alternative to LAMBDA1 |

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# 3 CAN connection

Marelli SRA, SRAE and SRT ECU feature a data transmission bus based on CAN.

# 3.1 CAN connection of Marelli SRA and SRAE

Marelli SRA and SRAE ECUs have two front connectors: a 60 pins connector on the left and a 94 pins connector on the right. The CAN bus is on the 94 connector. Here below you see the connectors on the left and the 94 pins connector pinout on the right. Below is connection table.



| Connector pin | Pin function | AiM cal |
|---------------|--------------|---------|
| 76            | CAN 0 High   | CAN +   |
| 54            | CAN 0 Low    | CAN-    |
| 55            | CAN 1 High   | CAN+    |
| 77            | CAN 1 Low    | CAN-    |
|               |              |         |

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# 3.2 CAN Connection of Marelli SRT

Marelli SRT ECU has two 66 pins Deutsch connectors on the front: AS218-35PA on the left and AS218-35PN on the right. The CAN bus is on AS218-35PA. Here below you see the connectors on the left and AS218-35PN pinout on the right. Below is connection table.



## 4 AiM device configuration

Before connecting AiM device to the ECU, set it up as follows:

Run Race Studio 2 software and select:

- Device Configuration -> Select the device you are using;
- select the configuration or press "New" to create a new one;
- select ECU manufacturer "MARELLI" and ECU Model "SRA\_SRAE\_SRT\_Small"
- transmit the configuration to the device pressing "Transmit".



### 5 Available channels

Channels received by AiM devices connected to Marelli "SRA\_SRAE\_SRT\_Small" protocol are:

| ID     | CHANNEL NAME | FUNCTION                   |
|--------|--------------|----------------------------|
| ECU_1  | MAR_RPM      | RPM                        |
| ECU_2  | MAR_TPS      | Throttle position sensor   |
| ECU_3  | MAR_PDL      | Pedal position             |
| ECU_4  | MAR_SPEED    | Speed                      |
| ECU_5  | MAR_WATER_T  | Engine coolant temperature |
| ECU_6  | MAR_OIL_T    | Oil temperature            |
| ECU_7  | MAR_AIR_T    | Intake air temperature     |
| ECU_8  | MAR_FUEL_T   | Fuel temperature           |
| ECU_9  | MAR_MAP      | Manifold air pressure      |
| ECU_10 | MAR_OIL_P    | Oil pressure               |
| ECU_11 | MAR_ATM_P    | Atmospheric pressure       |
| ECU_12 | MAR_FUEL_P   | Fuel pressure              |
| ECU_13 | MAR_FUEL_LEV | Fuel level                 |
| ECU_14 | MAR_LAMBDA   | Lambda value               |
| ECU_15 | MAR_ADV      | Spark advance              |
| ECU_16 | MAR_GEAR     | Engaged gear               |