



## AiM Infotech

### Marelli SRA SRAE SRT small version ECU

Release 1.01

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ECU

# 1

## Supported models

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This tutorial explains how to connect Marelli ECUs to AiM devices. Supported models are:

- SRA small version
- SRAE small version
- SRT small version

These ECU feature 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.

# 2

## Hardware check

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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).

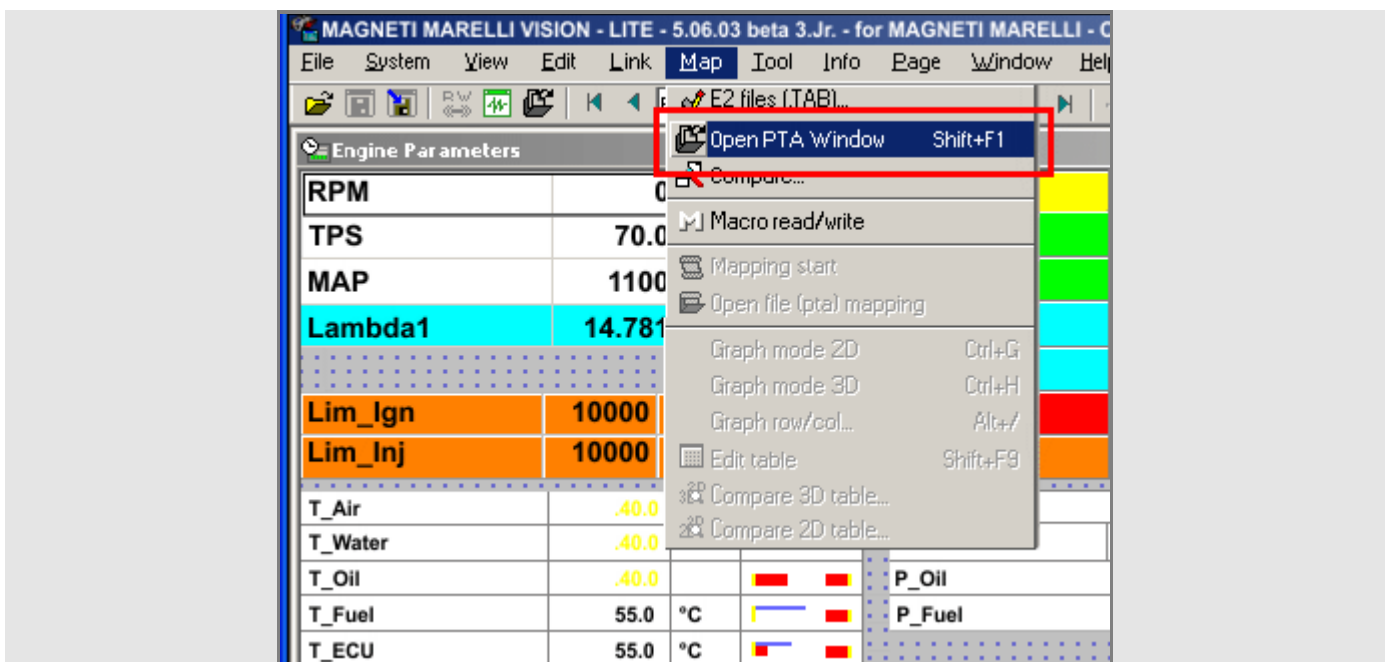
- if the reading shows 120 Ohm, there is one termination resistor on the ECU side, no additional operations are required: connect AiM device to the vehicle CAN bus;
- if the reading shows 50-60 Ohm, there are two termination resistors: either AiM device termination resistor located on the wiring or one 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.

### 3

## 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.



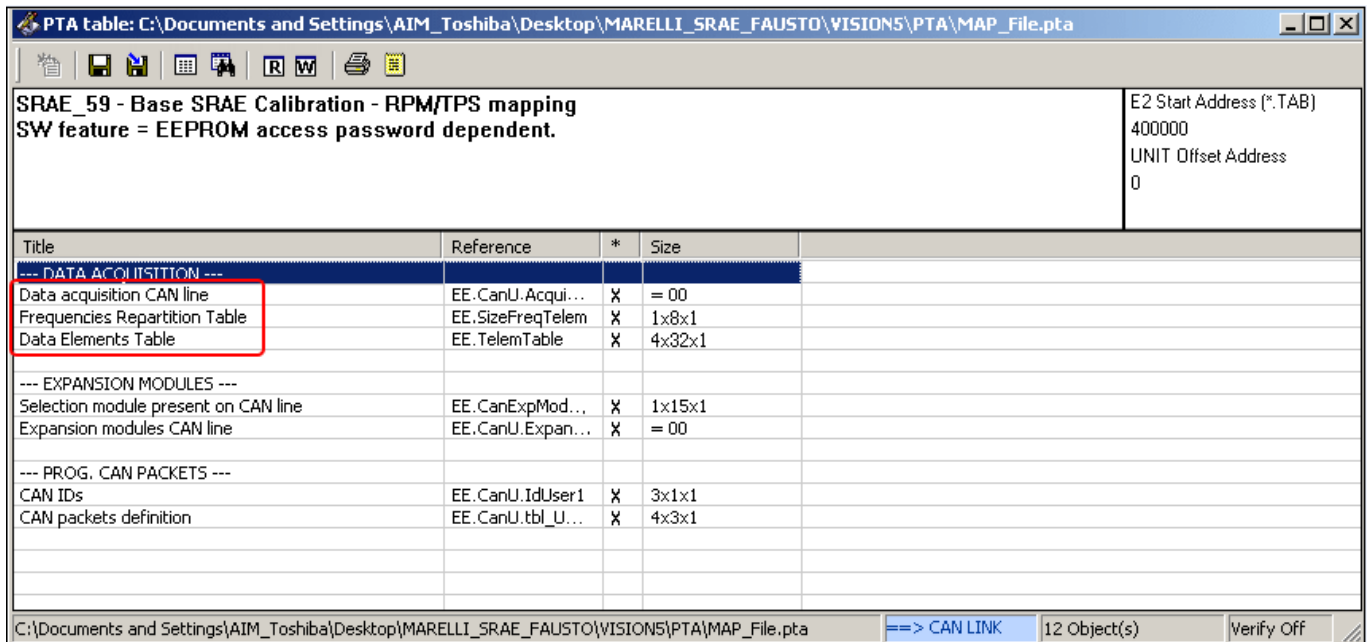
Browse the PC to find the MAP file. Normally it appears in the PTA files browser. If not browse the PC. Once the file selected, "PTA Table" opens. Then:

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

The screenshot shows the 'PTA table' application window. The title bar indicates the file path: C:\Documents and Settings\AIM\_Toshiba\Desktop\MARELLI\_SRAE\_FAUSTO\VISION5\PTA\MAP\_File.pta. The main window displays 'SRAE\_59 - Base SRAE Calibration - RPM/TPS mapping' with a note: 'SW feature = EEPROM access password dependent.' On the right, there are fields for 'E2 Start Address (\*.TAB)' (400000) and 'UNIT Offset Address' (0). A search dialog box titled 'Trova' is open, with 'CAN LINK' entered in the search field. The main table lists various engine parameters and their addresses. The '17 COMMUNICATIONS' section is expanded, and 'CAN LINK' is highlighted with a blue selection bar. Red circles with numbers 1, 2, and 3 are overlaid on the image to indicate the steps: 1 points to the search icon, 2 points to the search input field, and 3 points to the highlighted 'CAN LINK' row.

Title	Address
12 - ENGINE CONFIGURATION	[39]
13 - ENGINE CONFIGURATION	[39]
14 - SYSTEM CONFIGURATION	[39]
15 - INPUTS LINEARIZATION	[88]
16 - INPUTS FILTER/DIAG/BKP	[0]
==> ENGINE RPM	[13]
==> POSITION: THROTTLE	[12]
==> POSITION: THROTTLE PEDAL	[11]
==> POSITION: GEAR BARREL	[16]
==> PRESSURE: BAROMETRIC	[16]
==> PRESSURE: FUEL	[12]
==> 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]
17 COMMUNICATIONS	[0]
==> CAN LINK	[13]
==> DASHBOARD	[17]
==> VISION	[1]

The window below appears.

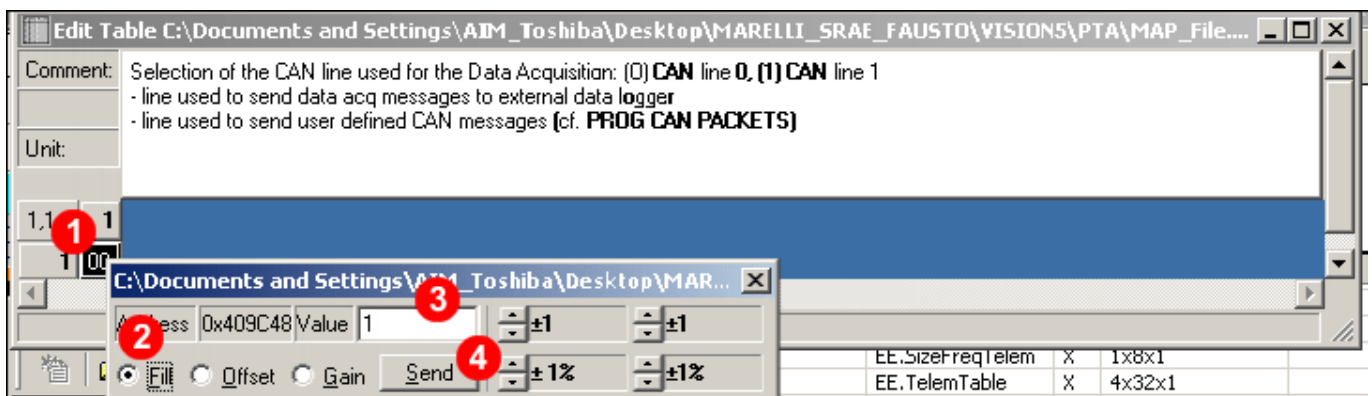


To correctly set "DATA ACQUISITION" it is necessary to set the tables highlighted above:

- 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)



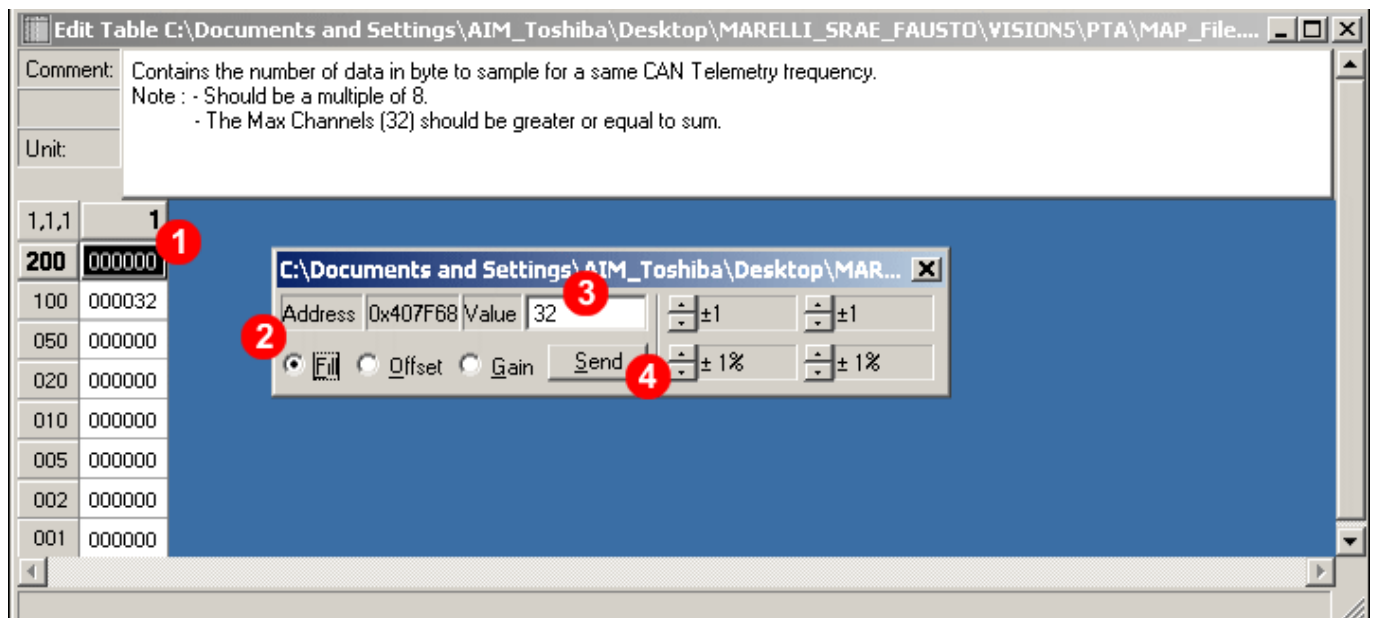
The software comes back to "PTA table".

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 screenshot shows a software window titled "Edit Table C:\Documents and Settings\AIM\_Toshiba\Desktop\MARELLI\_SRAE\_FAUSTO\VISION5\PTA\MAP\_File...". The window contains a table with the following data:

1,1,1	1
200	000000
100	000032
050	000000
020	000000
010	000000
005	000000
002	000000
001	000000

A context menu is open over the '200' field, showing the following options:

- Address: 0x407F68
- Value: 32
- Buttons:  Fill,  Offset,  Gain
- Send button
- Percentage controls: ±1, ±1, ±1%

Red circles with numbers 1 through 4 indicate the steps: 1 (right-click on the field), 2 (select 'Fill'), 3 (enter '32' in the value field), and 4 (click 'Send').

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

Comment: CAN telemetry element : Address, Type, Gain, Offset.  
 TYPE : Describe source data type and destination type.  
 TYPE: Byte=0x01,Word=0x02,D'Word=04,Float3=0x0E -> SByte,S'Word,SD'Word = 0x8X.  
 Unit: TYPE: LSB -> source , 3 bytes MSB destination. EXAMPLE: Pdl value : Conversion Float -> sword : TYPE =0x0000820E

1,1,1	1	2	3	4
1	00000064	00000002	3F800000	00000000
2	00000000	00000001	3F800000	00000000
3	00000065	00000082	3F800000	00000000
4	00000000	00000001	3F800000	00000000
5	00000077	00000082	3F800000	00000000
6	00000000	00000001	3F800000	00000000
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	0000006C	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

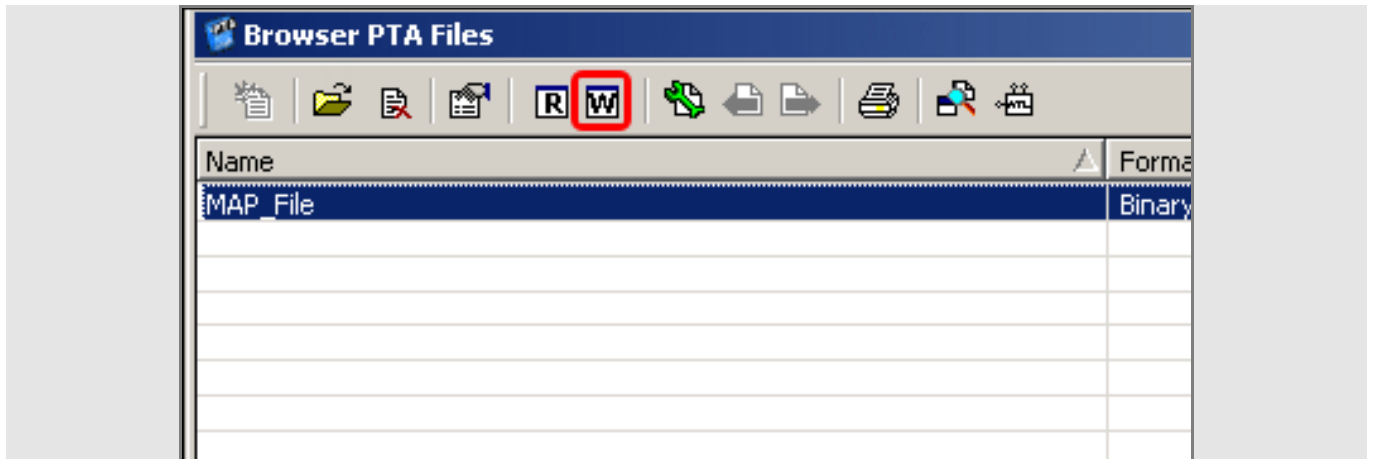
//RPM [1PRM/bit]

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.







## 3.1

### 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	TYPE	GAIN	OFFSET	DESCRIPTION
1	64	00210270	00000002	3F800000	00000000	RPM
2		00000000	00000001	3F800000	00000000	
3	65	00210080	00000082	3F800000	00000000	TPS1
4		00000000	00000001	3F800000	00000000	
5	77	0021008C	00000082	3F800000	00000000	PDL1
6		00000000	00000001	3F800000	00000000	
7	E6	00210E04	00000002	3F800000	00000000	Car speed
8		00000000	00000001	3F800000	00000000	
9	6B	002100A0	00000082	3F800000	00000000	Water temp
10		00000000	00000001	3F800000	00000000	
11	6E	002100A8	00000082	3F800000	00000000	Oil temp
12		00000000	00000001	3F800000	00000000	
13	6C	002100A4	00000082	3F800000	00000000	Air temp
14		00000000	00000001	3F800000	00000000	
15	6D	002100A6	00000082	3F800000	00000000	Fuel temp
16		00000000	00000001	3F800000	00000000	
17	67	00210084	00000082	3F800000	00000000	MAP1
18		00000000	00000001	3F800000	00000000	
9	6A	0021008A	00000082	3F800000	00000000	Oil press.
20		00000000	00000001	3F800000	00000000	
21	68	00210086	00000082	3F800000	00000000	Baro press.
22		00000000	00000081	3F800000	00000000	Fuel press.
23	69	00210088	00000082	3F800000	00000000	



24		00000000	00000001	3F800000	00000000	Fuel level
25	F0	00210692	00000082	3F800000	00000000	
26		00000000	00000001	3F800000	00000000	Lambda AFR
27	D8	002100BC	00000002	3F800000	00000000	
28		00000000	00000001	3F800000	00000000	Advance
29	E9	00210392	00000082	3F800000	00000000	
30		00000000	00000001	3F800000	00000000	Gear (Numeric)
31	Unknown	0021012B	00000001	3F800000	00000000	
32		00000000	00000001	3F800000	00000000	

## 3.2

### Data Elements table for Marelli SRA ECU

NUMBER	INDEX	ADDRESS	TYPE	GAIN	OFFSET	DESCRIPTION
1		00208270	00000002	3F800000	00000000	RPM
2		00000000	00000001	3F800000	00000000	
3		00208080	00000082	3F800000	00000000	TPS1
4		00000000	00000001	3F800000	00000000	
5		0020808C	00000082	3F800000	00000000	PDL1
6		00000000	00000001	3F800000	00000000	
7		00208E04	00000002	3F800000	00000000	Car speed
8		00000000	00000001	3F800000	00000000	
9		002080A0	00000082	3F800000	00000000	Water temp
10		00000000	00000001	3F800000	00000000	
11		002080A8	00000082	3F800000	00000000	Oil temp
12		00000000	00000001	3F800000	00000000	
13		002080A4	00000082	3F800000	00000000	Air temp
14		00000000	00000001	3F800000	00000000	
15		002080A6	00000082	3F800000	00000000	Fuel temp
16		00000000	00000001	3F800000	00000000	



17		00208084	00000082	3F800000	00000000	MAP1
18		00000000	00000001	3F800000	00000000	
19		0020808A	00000082	3F800000	00000000	Oil press.
20		00000000	00000001	3F800000	00000000	
21		00208086	00000082	3F800000	00000000	Baro press.
22		00000000	00000081	3F800000	00000000	Fuel press.
23		00208088	00000082	3F800000	00000000	
24		00000000	00000001	3F800000	00000000	Fuel level
25		00200FDC	00000082	3F800000	00000000	
26		00000000	00000001	3F800000	00000000	Lambda AFR
27		002080BC	00000002	3F800000	00000000	
28		00000000	00000001	3F800000	00000000	Advance
29		00208392	00000082	3F800000	00000000	
30		00000000	00000001	3F800000	00000000	
31		00000000	00000001	3F800000	00000000	
32		00000000	00000001	3F800000	00000000	

### 3.3 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)

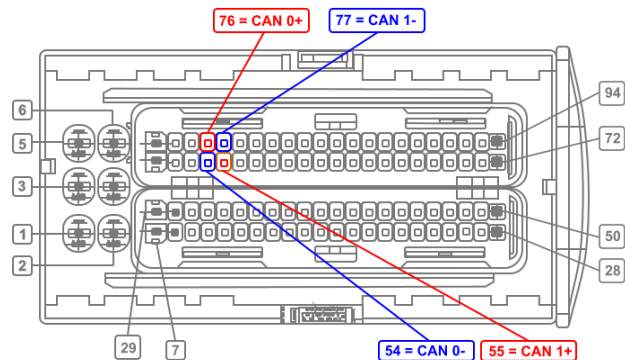
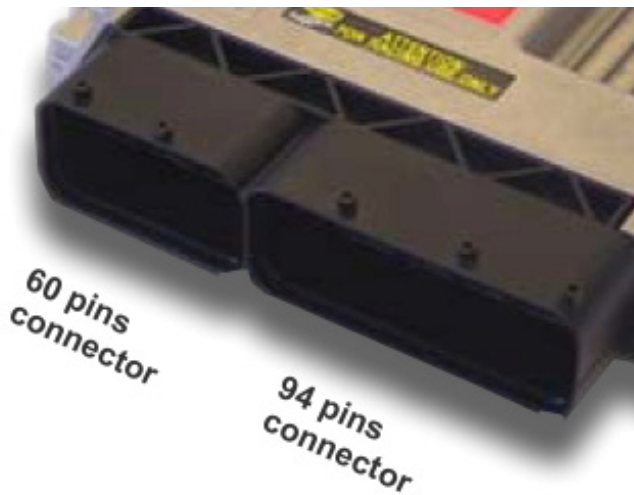
Channel	Address (or index) SRAE/SRT	Address SRA	Description
TPS2	00210082 (index 66)	00208082	Alternative to TPS1
Throttle	002100AA (index 79)	002100AA	Alternative to TPS1
PDL2	0021008E (index 78)	0020808E	Alternative to PDL1
MAP2	00210098 (index A0)	Unknown	Alternative to MAP1
LAMBDA2	002100CA (index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

# 4 Wiring connection

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

## 4.1 Wiring 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.

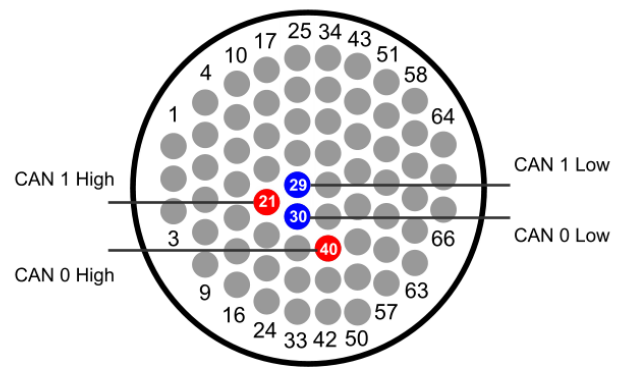


Connector pin	Pin function	AiM cable
76	CAN 0 High	CAN +
54	CAN 0 Low	CAN-
55	CAN 1 High	CAN+
77	CAN 1 Low	CAN-

## 4.2

# Wiring 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.



Connector pin	Pin function	AiM cable
40	CAN 0 High	CAN+
30	CAN 0 Low	CAN-
21	CAN 1 High	CAN+
29	CAN 1 Low	CAN-

## 5

# AiM device configuration

Before connecting the ECU to AiM device set this up using AiM Race Studio software. The parameters to select in the device configuration are:

- ECU manufacturer "MARELLI"
- ECU Model "SRA\_SRAE\_SRT\_Small"

## 6

# Available channels

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

<b>ID</b>	<b>CHANNEL NAME</b>	<b>FUNCTION</b>
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