



Vehicle Installation Notes

Document Number		DVIN0005	
Title		M800OEM - WRX7	
Approved By			
Revision	Date	Prepared By	Change History
1	02/05/2002	RB	Changed RA auto spray bar switch to DIG2
2	08/01/2003	RB	Notes to clarify link description
3	12/08/2004	RB	Added ICAT connection information
4	16/12/2004	DS	Re-formatted - Doc Ref: VIAU0005 WRX7 Adaptor
5	15/08/2006	RB	New Format
6	18/12/2006	RB	Additional information for spray bar set up
7	3/12/2007	RB	Correction to 0V/5V/8V link setup

Subaru WRX7

This Document refers to MoTeC M800 OEM installations to Subaru WRX and Sti Versions 7 and 8 using the WRX7 adaptor (**MoTeC Part No. 13006A**). For all other applications please refer to the correct installation notes.

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Introduction

The MoTeC M800 OEM is a MoTeC M800 ECU with an adaptor board that allows it to plug directly into the cars original wiring. ECU functionality is the same as the MoTeC M800 with the exception of peak and hold injector drive function which is not possible on the M800 OEM. Only high impedance injectors can be used with the M800 OEM.

The WRX7 M800 Adaptor is an interface that allows an M800 OEM to be mounted in the factory ECU case for a Subaru WRX or Sti version 7. With some additional link wires his adaptor will also suit WRX and Sti version 8 models and 2006 model cars fitted with the 2.0 litre engine (Spec C and JDM models). This document describes the details of the WRX7 adaptor and the configuration options that are available.

The Motec M800 OEM is supplied as an assembly which consists of the M800 OEM ECU and the adaptor board. The adaptor board is vehicle specific and there are links on the adaptor board to allow for variations in different models and functional requirements of the user. A start file is

installed which should be sufficient to start the engine prior to tuning. To ensure that the correct adaptor board, link setup and start file is provided full details of the vehicle must be quoted when ordering. Details should include the factory ECU part number, year, model and version.

Important Note!

The M800 OEM has been made to the highest standards and will provide reliable performance but should not be dismantled in any way due to the risk of damage. If the Link setup needs to be changed this should only be done by an authorised MoTeC dealer or someone with suitable equipment and soldering experience.

Parts Required

MoTeC Part No.	Description	Notes
13006A	ECU M800 OEM WRX7	MoTeC M800 OEM and WRX78 Adaptor board assembly Note: Now superseded by 13008A WRX78 (Refer to installation document DVIN006)
28116	Cam Control upgrade	Required for Sti versions only.
61046	OEM-CAN Loom	For PC connection to the ECU. Connects to the Communications connector on the OEM adaptor board to provide an external CAN communications connection.

Optional

MoTeC Part No.	Description	Notes
61044	OEM to lambda loom	For lambda sensor connection to the Lambda 2 connector on the OEM adaptor board. One end has a connector which connects to the Lambda 2 connection on the OEM Board, the other end is terminated with a 6 pin female DTM connector. Length is 30 cm.
61051	Lambda extension loom	A 2.5 meter extension to connect between the OEM-Lambda loom and a Bosch LSU wideband lambda sensor. One end has a 6 pin male DTM connector to mate to 61044; the other end has a connector for a Bosch LSU wideband lambda sensor. (MoTeC Europe part no.61050 3.0 metre).
28102	M800 Wideband Lambda	ECU upgrade required to control a wideband lambda sensor (free for the first 8 hours of engine running time).
28101	Logging 1 Mb	ECU data logging (free for the first 8 hours of engine running time).
26105	Advanced functions	ECU upgrade to enable the following functions: Over-run boost (ORB), Launch Control, Traction Control, Gear Change Ignition Cut.
28117	Over-run boost	ECU upgrade to enable Over-run boost (ORB) only without other advanced functions.

Model Specific Information

Engine Immobiliser.

The adaptor has been setup for vehicles with an engine immobiliser. **If the vehicle has no immobiliser fitted the links must be changed, otherwise some of the ECU input/output channel assignments will be in-correct.** The links must be changed from "Factory immobiliser" to "No engine immobiliser". This changes the adaptor to account for the differences in wiring between vehicle models.

TGV Control – not STi

Some vehicle models are fitted with "TGV" valves. This device is a second butterfly in each intake runner between the plenum chamber and the cylinder heads. The TGV valves consist of a DC motor to open and close each pair of butterflies, and a potentiometer to measure the butterfly position.

Factory Operation

The factory ECU uses the TGV valves only during starting. The butterflies are closed during cranking and open as soon as the engine has started. These valves are used to reduce hydrocarbon emissions during starting to help meet more stringent emission laws.

M800 Default operation

By default the TGV valves are not controlled by the M800. The OEM adaptor is wired to simply hold the valves open at all times so that the AUX1 and AUX2 outputs can be used for some other purpose. The AV8 input is wired to both TGV valve pots so that the TGV position can be monitored if required.

M800 TGV Control

The M800 can control the TGV valves if required. The setup described below allows the butterflies to be either fully opened or fully closed under ECU control.

AUX 1: AUX table, X-axis RPM, Y-axis TP, Switched output, Output mode: both, polarity high when active

AUX 2: AUX table, X-axis RPM, Y-axis TP, Switched output, Output mode: both, polarity low when active

TGV open: 100% in table

TGV closed: 0% in table

Note:

1. Both AUX1 and AUX2 tables must be identical
2. The servo and drive by wire enables are **NOT** required

Wide band Lambda

An NTK or Bosch LSU wide band sensor may be connected to the ECU in two different ways:

1. The adaptor PCB has a lambda connector. This connector allows an external loom to be used to connect a lambda sensor directly to the Lambda 2 pins on the M800. Note that Lambda 2 can be used with a single Lambda enable, as long as Lambda 1 is set to OFF or narrowband. This option is selected by default
2. Modify the factory wiring. The Lambda 1 pins are connected to the front lambda sensor wiring.

Spray bar control – STi RA

Certain vehicles have the ability for the ECU to perform automatic control of the water spray. This feature has been found primarily on “RA” models. This feature is present if there is an auto spray bar switch in the cabin and there are wires in ECU pins B12 and E11. The following changes need to be made to allow the adaptor to control the spray bars:

1. Cut Link9 (This must be done even if not using the auto spray bars)
2. Solder a wire from Pin C3 to D11
3. Setup INJ5 as spray bars.
4. Setup INJ5 parameters.

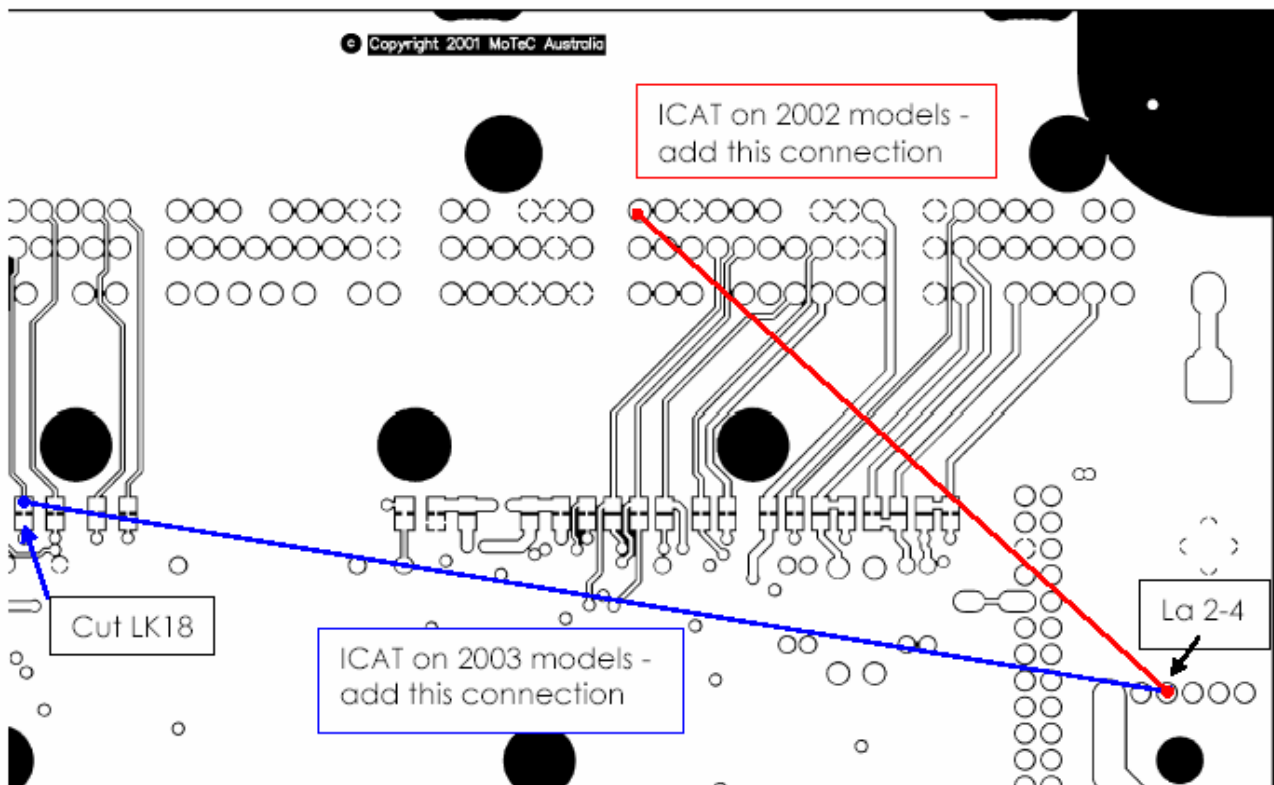
To use the auto switch as Overrun boost and spray bar enable do the following:

1. Solder a wire from A20 to B12
2. Setup Digital Input 2 as “Overrun boost Select”.
3. Set parameters “logic polarity” to “0” and “Spray Bars” to “1”.

Intercooler Air Temperature Sensor – STi RA

The WRX7 OEM needs a simple modification to connect AT6 to the intercooler air temp (ICAT) sensor. The steps are:

1. Cut LK18 (this disconnects 8V Aux from Pin D14)
2. For 2003 (Applies modes: GDBC4EH) Solder a wire from La2-4 to the pad of LK18 closest to the main connector – see figure below. (Pin D14)
3. For 2002 RA Type C - Solder a wire from La2-4 to B28 – see figure below



Note: If both wires are added the OEM will work with both 2002 and 2003 models

Refer to the M800 Pinout for setup and calibration details.

Input / Output Test

It is important to carry out an output test and check that all sensors are working prior to starting the engine. If outputs are not functioning or sensors are not reading correctly refer to the setup information in the Pinout Diagram.

Idle Control

If the idle valve is not driven (0% duty cycle) it lets through a default amount of air. It is therefore important that the min duty parameter is set to around 5% to avoid unusual idle control behaviour.

Mass Air Flow

The MAF sensor on the WRX / Sti version 7 and 8 has a non-linear output. A special sensor calibration must be used, otherwise the main fuel table will have an unusual shape and it will be difficult to get fuelling correct across the whole map. Refer to the MAF sensor calibration table. In most installations the MAP sensor will be used for Load and Efficiency calculation in preference to the MAF sensor.

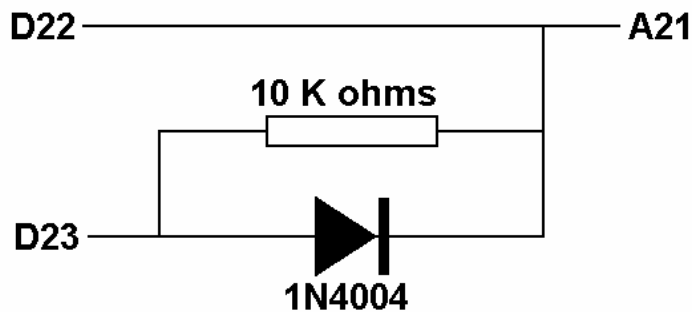
Additional Sensors

It is possible to use un-assigned pins for additional sensors. The availability of spare inputs will vary depending on the model of car; refer to the table below and the M800 Pinout for details. There are spare 5v 8v 0v pins which are connected by joining links (refer to M800 Pinout section for details)

Spare input	Notes
AV5	Pin B16 - No TCK - Join Link 28
AV6	Pin B4 - No TCK – Join Link26 Cut Link27
DIG2	Pin A20

Subaru Diff Controller (SDC2)

WRX7 OEM Adaptor link for SDC2 comms



To enable SDC2 communications to a WRX7 adaptor the adaptor needs to be modified because the necessary circuitry is not on the adaptor. This should only be done by an authorised MoTeC dealer or someone with suitable equipment and soldering experience.

1. Cut Link7.
2. Solder a link between pins D22, D23 and A21 with a diode and resistor as shown in the diagram.
3. Configure the ECU for SDC comms (version 3 only).

The M800 OEM can communicate with the MoTeC SDC2 via half duplex RS232. Refer to the SDC2 Manual for further information and configuration details. This function is not possible with the earlier version of SDC (with single connector plug). The SDC2 Manual is installed onto your computer with the SDC2 software and can be found in the folder C:\motec\SDC-v11.

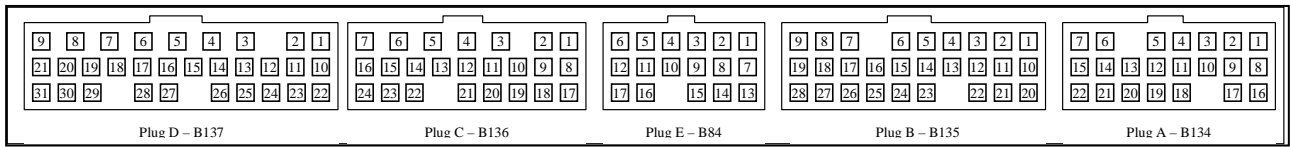
Using the Pinout Diagram

There are 2 Pinout sections in this document.

The M800 Pinout describes the function of each M800 pin with a reference to the OEM pin number it is connected to. There is a description of its function and optional function where applicable as well as notes on functional setup or calibration as necessary. Where there is one or more options for the pin the option is marked with a # or ##. The corresponding OEM Pin, function and setup notes refer to the parameters in M800 ECU Manager and are all marked with # or ## with any changes in link setup or vehicle modifications detailed.

The OEM ECU Pinout lists pins in order of the factory connector with corresponding MoTeC M800 pin and functional description.

M800 Pinout



NOTE: The connector numbering scheme was changed by Subaru around 2003. The numbering is different in Manuals for later models (2003 - 2006 is E, D, C, B, A). Also note that Japanese manuals use an alternate pin numbering scheme. Alternative pin numbers are shown in brackets.

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Power				
12V	E6 (71) E17 (83) D2 (8) D3 (7)	12v Switched (ECU Relay) E6. 12V to RH cam solenoid E17. 12V to LH cam solenoid		
GND	A7 (121) A15 (128) A22 (136) B10 (109) B11 (108) B21 (117) B22 (116) B26 (113) E1 (76) E3 (74) E8 (81) C8 (56) C17 (64) C18 (63) D8 (2) D9 (1) D18 (13)	ECU Earth B10. Sync sensor - B11. Ref Sensor - B21. Ref shield B22. Knock shield B26. Rear lambda shield E3. RH Cam sensor - E8. AFM shield D18. Front lambda shield		
8V ENG	B3 (97) INT	#B3. Spare 8V sensor supply 8V to TCK Module		
5V ENG	B9 (91)	5V sensor supply		
0V ENG	B19 (100) E7 (82)	0V sensor supply		
8V AUX	B3 (97)	8V to internal comms connector		
5V AUX	B6 (94) INT	B6. Spare 5V sensor supply 5 V to internal barometer		
0V AUX	B20(118) D21 (10) INT	B20. Spare sensor 0V C21. 0V sensor supply 0V to internal Comms Connector and Internal barometer		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Outputs				
INJ1	D1 (9)	Injector Cylinder 1		
INJ2	C5 (43)	Injector Cylinder 3		
INJ3	C6 (42)	Injector Cylinder 2		
INJ4	C4 (44)	Injector Cylinder 4		
INJ5	C3 (45)		#Spraybar output (User Option) See section on Spray Bar Control.	#Function: 114 Spraybars Parameters: (may vary depending on requirements) Mode: 1 On Value 90 Off Value 80 On Time 1.0 Off Time 3.0 Source 1 Logic Polarity 0
INJ6	#C13 (51) ##D4 (6) ##D5 (5) ###D6(4) ###D7(3)	Lambda Heater using Lambda 2 connector on adaptor board.	#C13. Rear Lambda heater ##D4 & D5. Front Lambda heater. ### D6 & D7. Lambda heater (User Option)	Function: 9 Lambda Sensor Heater Parameters: Lambda Sensor 2 #Optional Pin Assignment #Join Link 26 for rear lambda heater. ##Join Link 28 for front lambda heater. ###Join Link 16 for lambda heater on D6 & D7
INJ7	C9 (55)	Tacho output		Function: 4 Tacho Signal Parameters: Calibration 2
INJ8	D27 (26)	D27. A/C Clutch		Function: 104 Air Conditioner Clutch Parameters can be set to switch compressor off at high speed.
IGN1	C24 (57)	Ignition Cylinder 1		
IGN2	C22 (59)	Ignition Cylinder 3		
IGN3	C23 (58)	Ignition Cylinder 2		
IGN4	C21 (60)	Ignition Cylinder 4		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
IGN5	D15 (16)	Driver Warning Light (uses engine check light)	#Shift light	<p>Function: 108 Driver Warning Alarm</p> <p>Parameters: Hold Time 2 Logic Polarity 0 Output Mode 0 Power Hold 1 (minimum)</p> <p>#Optional Function: 107 Gear change light Set Parameters as required.</p>
IGN6	D16 (15) #D12 (19)	D16 Canister Purge	#D12 Alternator Control Sti	<p>Function:</p>
AUX1	E16 (84) #E4 (73) #E10 (79)	E16. LH Cam control solenoid – Sti only	#E4, E10. TGV (Not Sti)	<p>Function: 117 Cam control 1</p> <p>Parameters: Source Channel 3 Proportional Gain 2.00 Integral Gain 0.5 Derivative Gain 0.02 Dead Band 0.2 Y Axis 1 Frequency 300 Polarity 0 Lo Limit 35.0 Hi Limit 45.0 Table: Set as required.</p> <p>#Optional function: 3 Aux Table Load/RPM aux table #Cut Link11 and Link13, Join Link12 and 14</p>

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX2	E12 (77) #E5 (72) #E11 (78)	E12. RH Cam control solenoid – Sti only	#E5, E11. TGV (Not Sti)	<p>Function: 117 Cam control 1</p> <p>Parameters:</p> <p>Source Channel 5 Proportional Gain 2.00 Integral Gain 0.5 Derivative Gain 0.02 Dead Band 0.2 Y Axis 1 Frequency 300 Polarity 0 Lo Limit 35.0 Hi Limit 45.0</p> <p>Table: Set as required.</p> <p>#Optional function: 3 Aux Table Load/RPM aux table #Cut Link</p>
AUX3	D24 (29)	Boost control valve		<p>Function: 1 Boost control.</p> <p>Parameters:</p> <p>Frequency 15 Hz</p>
AUX4	C10 (54)	Idle control valve		<p>Function: 2 Idle Speed Control</p> <p>Parameters</p> <p>Idle Speed 840 Proportional Gain 10 Integral Gain 10 Derivative Gain 30 Anti Stall Gain 5 Air Con Duty Inc 5 Integration Limit 42 Frequency 250 Min Duty Cycle 22 Max Duty Cycle 90</p> <p>Note: PID parameters are a suggested starting point only and are based on M800 V2.3. V3.3 values will differ</p> <p>Active low duty cycle idle control.</p>

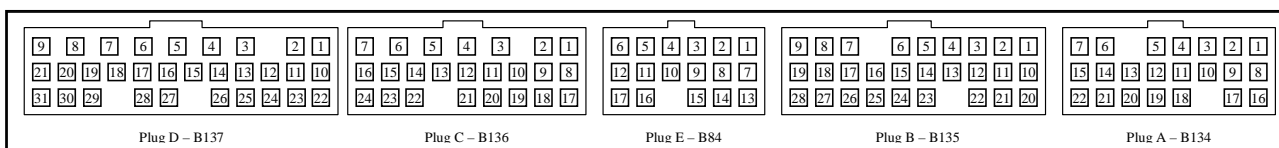
M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX5	D17 (14)	A/C Fan		Function: 103 A/C Fan Parameters: On Temp 94 Off Temp 90 On Speed 0 Off Speed 0 Speed Channel 0 Time Out 0
AUX6	D28 (25)	Thematic fan		Function: 102 Thematic Fan Parameters: On Temp 96 Off Temp 92 Time Out 2 Frequency 0 Polarity 0 Output Mode 0 Min Duty 0
AUX7	A2 (126) #A6 (122)	A2. Power Hold (no immobiliser) #A6. Power Hold (with immobiliser)		Function: 118 Power Hold Parameters: On Time 10 Polarity 1 Output Mode 1 Note: The Power hold will continue while communications are active
AUX8	C15 (49) C16 (48)	C15. Fuel Pump (no Immobiliser) C16. Fuel Pump (With immobiliser)		Function: 101 Fuel Pump Parameters: Delay 5 Polarity 1 Output Mode 2

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Inputs				
REF	B2 (98)			Falling edge magnetic signal
SYNC	B1 (99)			Falling edge magnetic signal
AT1	B27 (111)	Air Temperature Sensor		Calibration: #2
AT2	B18 (101)	Engine Temp Sensor		Calibration: Select -1 refer to Engine temperature Sensor calibration table.
AT3	A14 (129) # A5 (123)	A14. Ignition Switch (with immobiliser) #A5. Ignition Switch (no immobiliser)		Function: 8 Ignition Switch Parameters: Logic Polarity 1 Delay 0 Latch 0 Set AT Levels: AT3 Lo Level 5.5 AT3 Hi Level 6.0 #Optional Pin Assignment #
AT4	A6 (122) #A2 (126)	A6. A/C request (no Immobiliser) A2. A/C request (with Immobiliser)		Function: 5 Air conditioning Request Parameters: Logic Polarity 1 Set AT Levels: AT5 Lo Level 5.5 AT5 Hi Level 6.0
AT5	B24 (114)	B24. Power steering switch		Function: 18 Power Steering Set AT Levels: AT5 Lo Level 2 AT5 Hi Level 3
AT6	LA2 - 4	Lambda Calibration Resistor		
AV1	B7 (93)	Throttle Position Sensor		Calibration : #9
AV2	B8 (92)	Manifold Pressure Sensor		Calibration: Select -15 and refer to MAP Sensor calibration table.
AV3	E13 (87)	Mass Air Flow sensor (MAF)		Calibration: Select -48. Refer to Mass Air Flow sensor calibration table.
AV4		Internal Barometer		Calibration: #62

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AV5	K9 #B16 (103)	TCK Knock	# Spare AV input	#Join Link28
AV6	K10 #B4 (96)	TCK EGT	# Spare AV input	Join Link26, cut Link27
AV7	B25 (113)	Fuel level sensor		
AV8	B13 (106) B23 (115)	B13, B23. TGV position sensor (not Sti) Combines signals from LH and RH sensors		
DIG1	A1 (127)	Speed Measure		Function: 1 Speed Measure Parameters: Units 1 Calibration 264 Active Edge 0
DIG2	A20 (138)	Spare input	#ORB Select Function. Requires patch, see Spray Bar Control section for details. Uses Auto Spray Bar switch (Spec C) connected to Pin B12.	#Function: 25 ORB Select Toggles ORB between Off, Table Set 1 and Table Set 2 Parameters: Polarity 0 Spray Bars 1 Logging As required, this can be set so that logging will only start when ORB table 1 or 2 are selected.
DIG3	E9 (80)	LH Cam Position (Sti only)		Function: 19 Cam Position Parameters: Edge 0 Offset 13 Channel 3 Teeth 4 Filter 1
DIG4	E2 (75)	RH Cam Position (Sti only)		Function: 19 Cam Position Parameters: Edge 0 Offset 13 Channel 5 Teeth 4 Filter 1
LA1S	D19 (12)	Front lambda sensor		# Use if wiring is being modified to use a wideband sensor.
LA1P	D29 (24)			
LA2S	C20	Wide band lambda using internal Lambda 2 connector		Calibration: 38 LA-2 connector on Adaptor

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
LA2P	C30	Wide band lambda using internal Lambda 2 connector		
Communications				
RS232 TX	A21 (137) D23 (30)	A21. Tx - RS232 to data link connector pin 10. D23. Tx - RS232 to RS232 and CAN comms connector		
RS232 RX	D22 (31)	D22. Rx - RS232 to RS232 and CAN comms connector		
CAN LO	D25 (28)	CAN-Lo to RS232 and CAN Comms connector		
CAN HI	D26 (27)	CAN-Hi to RS232 and CAN Comms connector		

OEM ECU Pinout



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OEM Pin	Alt Pin	M800 Pin	Function
A1	127	DIG1	Speed measure
A2	126	AUX7 #AT4	Power Hold (imm) / # A/C request(no imm)
A3	125	O/C	Not used
A4	124	O/C	Not used
A5	123	AT3	Ignition switch (no imm)
A6	122	AT4#AUX7	A/C request (imm) / # Power Hold (no imm)
A7	121	GND	ECU Ground
A8	135	DIG2	Neutral or GCIC (user option)
A9	134	O/C	Not used
A10	133	O/C	Not used
A11	132	O/C	Not used
A12	131	O/C	Not used
A13	130	O/C	Not used
A14	129	AT3	Ignition switch (imm)
A15	128	GND	ECU Ground
A16	142	O/C	Not used
A17	141	O/C	Not used
A18	140	O/C	Not used
A19	139	O/C	Not used
A20	138	DIG2	Spare DIG input (Beacon - user option)
A21	137	TX232	TX232 to ADL via Data Link connector pin 10
A22	136	GND	ECU Ground
B1	99	SYNC	SYNC sensor input
B2	98	REF	REF sensor input
B3	97	#8V-AUX	#Spare 8V supply
B4	96	K1 #AV6	Knock voltage sensor (TCK) / Spare input
B5	95	O/C	Not used
B6	94	O/C	Not used
B7	93	AV1	Throttle Position Sensor
B8	92	AV2	Manifold Pressure Sensor
B9	91	5V-ENG	5V sensor supply
B10	109	GND	SYNC sensor ground
B11	108	GND	REF Sensor ground
B12	107	5V-AUX	Spare 5V pin / #Auto spray bar switch Sti-RA (requires patch)
B13	106	#AV8	#TGV position (uses both sensors combined)
B14	105	O/C	Not used

OEM Pin	Alt Pin	M800 Pin	Function
B15	104	K13	
B16	103	K12#AV5	TCK - ECT / # spare input
B17	102	O/C	Not used
B18	101	AT2	Engine Temperature Sensor
B19	100	0V-ENG	Sensor 0V
B20	118	0V-AUX	Spare 0V supply
B21	117	GND	REF sensor shield
B22	116	GND	SYNC sensor shield
B23	115	#AV8	#TGV position (uses both sensors combined)
B24	114	AT5	Power steering switch
B25	113	AV7	Fuel level sensor
B26	112	GND	Sensor ground
B27	112	AT1	Air Temperature Sensor
B28	110	O/C	Not used/ #Intercooler Air Temperature Sensor (ICAT) 2002 Spec C (requires patch)
C1	47	O/C	Not used
C2	46	O/C	Not used
C3	45	INJ5	Spraybar output or diff control (user option)
C4	44	INJ4	Injector Cylinder 4
C5	43	INJ2	Injector Cylinder 3
C6	42	INJ3	Injector Cylinder 2
C7	41	O/C	Not used
C8	56	GND	ECU Ground
C9	55	INJ7	Tacho
C10	54	AUX4	Idle control valve
C11	53	O/C	Not used
C12	52	O/C	Not used
C13	51	#INJ6	#Rear lambda heater
C14	50	O/C	Not used
C15	49	AUX8	Fuel Pump (no immobiliser)
C16	48	AUX8	Fuel Pump (with immobiliser)
C17	64	GND	ECU Ground
C18	63	GND	ECU Ground
C19	62	O/C	Not used
C20	61	O/C	Not used
C21	60	IGN4	Ignition Cylinder 4
C22	59	IGN2	Ignition Cylinder 3
D23	58	IGN3	Ignition Cylinder 2
D24	57	IGN1	Ignition Cylinder 1
D1	9	INJ1	Injector Cylinder 1
D2	8	V-BAT	12V from main relay
D3	7	V-BAT	12V from main relay
D4	6	#INJ6	#Front lambda heater - LA1
D5	5	#INJ6	#Front lambda heater- LA1

OEM Pin	Alt Pin	M800 Pin	Function
D6	4	#INJ6	#Front lambda heater- LA2
D7	3	#INJ6	#Front lambda heater- LA2
D8	2	GND	ECU Ground
D9	1	GND	ECU Ground
D10	21	O/C	Not used
D11	20	O/C	Not used / #Spraybar output 2002 RA Spec C (requires patch)
D12	19	#IGN6	Alternator control Sti (optional)
D13	18	GND	0V RS232 and CAN comms connector
D14	17	8V-AUX	8V - RS232 and CAN comms connector / ICAT 2003 RA Spec C (Requires patch)
D15	16	IGN5	Driver Warning Light
D16	15	IGN6	Canister purge
D17	14	AUX5	A/C Fan
D18	13	GND	Sensor Ground
D19	12	LA1-S	Lambda 1 sensor
D20	11	#LA2-S	#Lambda 2 sensor
D21	10	0V-AUX	Sensor 0V
D22	31	RX-232	RX-232 - RS232 and CAN comms connector
D23	30	TX-232	TX-232 - RS232 and CAN comms connector
D24	29	AUX3	Boost Control Solenoid
D25	28	CAN-Lo	CAN-Lo - RS232 and CAN comms connector
D26	27	CAN-Hi	CAN-Hi - RS232 and CAN comms connector
D27	26	INJ8	A/C Clutch
D28	25	AUX6	Thematic Fan
D29	24	LA1-P	Lambda 1 sensor (requires wiring modification)
D30	23	#LA2-P	Lambda 2 sensor (user option)
D31	22	O/C	Sensor 0V
E1	76	GND	ECU Ground
E2	75	DIG4	RH Cam position (Sti)
E3	74	GND	Sensor Ground
E4	73	#AUX1	#TGV (not Sti - optional)
E5	72	#AUX2	#TGV (not Sti - optional)
E6	71	#V-BAT	12V to RH cam solenoid
E7	82	0V-ENG	Sensor 0V
E8	81	GND	Sensor Ground
E9	80	DIG3	LH Cam position (Sti)
E10	79	#AUX1	#TGV (not Sti - optional)
E11	78	#AUX2	#TGV (not Sti - optional)
E12	77	AUX2	RH Cam Control (Sti)
E13	87	AV3	Mass Air Flow Sensor
E14	86	GND	Sensor Ground
E15	85	GND	Sensor Ground
E16	84	AUX1	LH Cam Control (Sti)
E17	83	#V-BAT	12V to RH cam solenoid

Calibration Tables

Engine Temperature Sensor (AT2)

Degrees C 1 Decimal place

Temp	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
Input(V)	5.468	5.322	5.175	4.980	4.672	4.321	3.955	3.569	3.071	2.597	2.080	1.660	1.352
A/D	1120	1090	1060	1020	957	885	810	731	629	532	426	340	277

Temp	80	90	100	110	120	130	140	150	160	170	180	190	200
Input(V)	1.137	1.005	0.834	0.693	0.610	0.556	0.502	0.449	0.400	0.356	0.322	0.283	0.244
A/D	233	206	171	142	125	114	103	92	82	73	66	58	50

Intercooler Air Temp Sensor – Sti RA (AV8)

Degrees C 1 Decimal place

Temp	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
Input(V)	5.341	5.302	5.263	5.200	4.833	4.541	4.101	3.759	3.271	2.880	2.490	2.148	1.904
A/D	1094	1086	1078	1065	990	930	940	770	670	590	510	440	390

Temp	80	90	100	110	120	130	140	150	160	170	180	190	200
Input(V)	1.757	1.611	1.376	1.162	0.991	0.849	0.772	0.629	0.551	0.473	0.411	0.336	0.288
A/D	360	330	282	238	203	174	148	129	113	97	84	69	59

MAP Sensor (AV2)

MAP Sensor (AV2)

For MY 2000-2003 260 kPa Sensor

MAP kPa

MAP	0	20	40	60	80	100	120	140	160	180	200	220	240
Input(V)	0.859	1.098	1.367	1.674	1.909	2.260	2.548	2.846	3.139	3.413	3.710	4.008	4.296
A/D	176	225	280	343	391	463	522	583	643	699	760	821	880

MAP	260	280	300	320	340	360	380	400	420	440	460	480	500
Input(V)	4.575	4.785	5.058	5.336	5.610	5.883	6.162	6.435	6.713	6.987	7.260	7.539	7.812
A/D	937	980	1036	1093	1149	1205	1262	1318	1375	1431	1487	1544	1600

For MY 2004 260 kPa Sensor

MAP kPa

MAP	0	20	40	60	80	100	120	140	160	180	200	220	240
Input(V)	0.786	1.137	1.484	1.835	1.992	2.392	2.656	2.954	3.251	3.588	3.891	4.194	4.501
A/D	161	233	304	376	408	490	544	605	666	735	797	859	922

MAP	260	280	300	320	340	360	380	400	420	440	460	480	500
Input(V)	4.804	5.107											
A/D	984	1046	1108	1170	1233	1295	1357	1419	1481	1543	1616	1668	1730

For MY 2005-2006 Sti8 300 kPa Sensor

MAP kPa

MAP	0	20	40	60	80	100	120	140	160	180	200	220	240
Input(V)	0.585	0.874	1.166	1.455	1.743	2.036	2.324	2.612	2.905	3.193	3.481	3.774	4.062
A/D	120	179	239	298	357	417	476	535	595	654	713	773	832

MAP	260	280	300	320	340	360	380	400	420	440	460	480	500
Input(V)	4.350	4.643	4.931	5.219									
A/D	891	951	1010	1069	1084	1098	1113	1127	1142	1156	1171	1185	1200

MAF sensor (AV3)

MAF g/s

MAF	0	10	20	30	40	50	60	70	80	90	100	110	120
Input(V)	0.683	0.157	1.953	2.216	2.421	2.597	2.749	2.880	3.007	3.115	3.222	3.320	3.408
A/D	140	321	400	454	496	532	563	590	616	638	660	680	698

MAF	130	140	150	160	170	180	190	200	210	220	230	240	250
Input(V)	3.496	3.579	3.657	3.730	3.803	3.872	3.935	3.999	4.062	4.121	4.179	4.233	4.291
A/D	716	733	749	764	779	793	806	819	832	844	856	867	879

Setup

Parameter	Value	Notes
Injector Current	0	
Injector Battery Comp	4	See Injector Battery Comp Table
Eff Calc Method	4	
Load Calc Method	4	
Number of Cylinders	4	
Ref/Sync Mode (REF)	26	
Crank Ref Teeth (CRT)	6	
Tooth Ratio	50	
Crank Index Position(CRIP)	580	
Ignition Type (IGN)	1	
Number of Coils (COIL)	4	
Ignition Dwell Time (DELL)	1.9	See Ignition Dwell Table
Ignition Delay Time	50	
Firing Order	1, 3, 2, 4.	

Injector Battery Comp

Bat V	5	6	7	8	9	10	11	12	13	14	15
U sec	2500	2500	2400	2140	1660	1320	1060	880	740	660	580

Ignition Dwell Table

Bat V	10	11	12	13	14	15
Dwell	3.3	2.9	2.5	2.3	2.0	1.9

Link Table

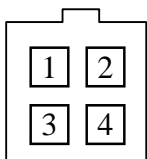
Open Links	Closed Links	Function
2, 3, 5, 6	1, 4	Factory engine immobiliser*
1, 4	2, 3, 5, 6	No engine immobiliser
	7	TX-232 via data link connector pin 10*
7		No Transmit
	8, 9, 10	B20 0V-AUX, B3 8V ENG, B6 5V AUX*
8, 9, 10		No 0V, 5V, 8V on spare pins
12, 14	11, 13	Aux 1 &2 Cam control / TGV open*
11, 13	12, 14	Aux 1 &2 TGV control, (No Cam Control)
15, 16, 19, 25		LA2 via Lambda 2 connector*
16, 19, 25	15	LA1 Via OEM wiring
15	16, 19, 25	LA2 via spare pins
17		INJ6 canister purge*
	17	INJ6 alternator control (remove purge solenoid)
	18, 20, 21, 22, 23	Comms via spare pins*
18, 20, 21, 22, 23		No Comms via spare pins
	24	CAN terminator*
24		No CAN terminator
27	26, 28	TCK Module installed*
26, 28	27	AV5 & AV6 spare voltage inputs
	29	Thermocouple to 0V in loom*
29		Two wire thermocouple

* Denotes the default link setup

Comms via OEM pins

OEM	CAN	D9F pin	Function	Colour
D13	1	5	GND	black
D14	3	8	8V	red
D22	-	3	Rx	grey
D23	-	2	Tx	violet
D25	4	6	CAN LO	green
D26	5	1	CAN HI	white

Lambda 1 Connector Modification



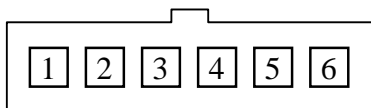
Looking at pins of factory connector B18

B18	M800	Function
3	LA2-P	La1 – Pump
Note 1	0V-AUX	La1 – 0V to sensor
4	LA2-S	La1 – Sense
N/C	AT6	La1 – calibration resistor
2	VBAT	La1 – +12 heater
1	INJ6	La1 – heater

Note:

1. Sensor 0V must be connected to the shield around the wires to pins 3&4. The loom must be modified to achieve this
2. Links must be changed for INJ6 to be connected to pin 1 on this connector

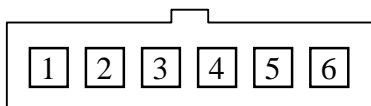
Lambda 2 Connector



Looking at pins on male plug (into connector)

OEM	M800	Function
La2-1	LA2-P	La2 header – Pump
La2-2	0V-AUX	La2 header – 0V to sensor
La2-3	LA2-S	La2 header – Sense
La2-4	AT6	La2 calibration resistor
La2-5	VBAT	La2 header - +12 heater
La2-6	INJ6	La2 header – heater

Comms Connector



Looking at pins on male plug (into connector)

OEM	M800	Function
C-1	CAN-HI	to D9 pin 1 - CAN Hi
C-2	CAN-LO	to D9 pin 6 - CAN Lo
C-3	TX-232	to D9 pin 2 - Tx RS232
C-4	RX-232	to D9 pin 3 - Rx RS232
C-5	8V-AUX	to D9 pin 8 – 8V AUX
C-6	GND	to D9 pin 5 – 0V COMMS

