



## Vehicle Installation Notes

<b>Document Number</b>		DVIN0014	
<b>Title</b>		M800 Plug-in to WRX9-10 Installation Notes	
<b>Approved By</b>		DC/RR	
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1	27/02/2008	RB	
2	14/08/2008	RB	Updated Cam Control settings and added 2.0 STI 10 setup
3	3/06/2014	PC	Updated Input table

### Subaru WRX9-10

This Document refers to MoTeC M800 Plug-in installations to Subaru WRX and Sti Versions:

- MY 2006 WRX, WRX Sti 2.5 litre only
- MY 2007 WRX, WRX Sti 2.5 litre only
- MY 2008 WRX, WRX Sti 2.5 and WRX Sti N14 2.0 litre Versions

These vehicles use the WRX9-10 adaptor (**MoTeC Part No. 13012A**). For all other applications please refer to the correct installation notes.

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## Introduction

The MoTeC M800 Plug-in 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 Plug-in. Only high impedance injectors can be used with the M800 Plug-in.

The WRX9-10 M800 Adaptor is an interface that allows an M800 Plug-in to be mounted in the factory ECU case. It is suitable for the following applications:

2.5 Litre Subaru WRX or Sti version 9 MY2006 &2007 (Denso ECU).

2.0 Litre Subaru WRX or Sti (N14) version 10 MY2008.

2.5 Litre Subaru WRX or Sti version 10 MY2008.

The M800 WRX9-10 is not suitable for 2005 vehicles as sold in USA (Hitachi ECU). Connecting the ECU to these vehicles will cause damage to the ECU.

The MoTeC M800 WRX9-10 Plug-in is supplied as an assembly which consists of the M800 Plug-in 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 Plug-in ECU 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.



### ESD – Antistatic

All necessary antistatic precautions must be taken while handling circuit boards.

## Disabled Functionality

### 2006-2007 Models (Version 9)

Cruise control

Tumble Valves – wired to fully open.

Secondary air pump – Emission control.

### 2008- Models (Version 10)

The 2008 Subaru is equipped with a CAN Bus. The MoTeC M800 Plug-in ECU will run all the standard functions on the engine (DBW, cam control, etc.) using the standard factory sensors.

The standard DCCD centre diff controller will be in a limp mode so installation of a MoTeC SDC3 is recommended to enable tuning of the centre differential.

ABS, cruise control, immobilizer and stability control will all be in limp mode and will generally not be functioning. However, the ABS ECU needs to be retained as it transmits wheel speed information to the rest of the car.

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**Parts Required**

MoTeC Part No.	Description	Notes
13012A	M800 Plug-in ECU WRX9-10	MoTeC M800 ECU and WRX9 Adaptor board assembly
28116	M800 Cam Control upgrade	Variable Camshaft Control
28112	M800 Drive By Wire upgrade	Electronic throttle control
61046	M800 Plug-in to CAN Loom	For PC connection to the ECU. Connects to the Communications connector on the adaptor board to provide an external CAN communications connection.

**Optional**

MoTeC Part No.	Description	Notes
61044	M800 Plug-in to Lambda loom	For Lambda sensor connection to the Lambda 2 connector on the adaptor board. One end has a connector which connects to the Lambda 2 connection on the Plug-in ECU, 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 Plug-in to 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 upgrade	ECU upgrade required to control a wideband Lambda sensor (included free for the first 8 hours of engine running time).
28101	M800 Logging 1 Mb upgrade	ECU data logging (included free for the first 8 hours of engine running time).
26105	M800 Advanced Functions upgrade	ECU upgrade to enable the following functions: Over-run boost (ORB), Launch Control, Traction Control, Gear Change Ignition Cut.
28117	M800 Over-run Boost upgrade	ECU upgrade to enable Over-run boost (ORB) only without other advanced functions.

## Model Specific Information

### Software Upgrading

The MY08 2.0 and 2.5 Litre WRX and STI models are fitted with a CAN bus allowing various devices to share information. This CAN bus operates at 500 Kbps. While connected to this CAN bus the MoTeC Plug-in ECU is unable to have its firmware upgraded. The M800 upgrade process is only supported at a CAN bus speed of 1 Mbps. In order to perform an ECU upgrade the M800 Plug-in must be removed from the car and powered externally. Contact MoTeC for the procedure of upgrading these ECUs.

### TGV Control

The 2.0 and 2.5 Litre WRX and STI 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 ECU 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 Plug-in ECU Operation

The TGV valves are not controlled by the M800 Plug-in ECU. The adaptor is wired to simply hold the valves open at all times.

### Drive by Wire Throttle

All models are fitted with a Drive by Wire Throttle (Electronic Throttle). For safety reasons the setup for the Drive by Wire throttle must be done by a MoTeC dealer and must match the vehicle correctly.

### Setup Parameters

The control parameters **must** be set up in accordance with the setup sheet for the particular DBW motor. See the relevant MoTeC drawing for details. When ECU Manager is in the parameter setup screen and RPM is zero and the Highs and Lows have been set the throttle will step from 10% to 90% and back at a 1 Hz rate. Setup parameters are provided by MoTeC, these **must not** be altered.

The start file supplied with the ECU will have the correct settings already configured. The scaling for the throttle pedal and throttle positions will need to be set on each installation. If it is not set the throttle may not operate or may go into error and stop working.

### Setting the High and Low for TP & TP2

When setting the high & low TP (on the Adjust menu, select Sensor Setup > Throttle Position Hi/Lo) values for the two pots on the Throttle Body (TP and TP2), the throttle must not move while setting the Lo value on each pot, and similarly for the Hi value. This is to ensure that both pots read the same - otherwise a diagnostic error may occur.

It is recommended that one or both of the Auxiliary output wires that control the DBW motor are disconnected whenever calibration is being carried out.

Using a feeler gauge of approx. 0.5 mm, press on the butterfly until it clamps the feeler gauge and then set the Lo position for TP and TP2. Then move the butterfly to full throttle, i.e. 90 degrees. Ensure not to close the throttle butterfly to its physical stop, or open the butterfly past the fully open position. This will upset the control and cause the servo to draw excessive current.

## Setting TPD & TPD2 High and Low

The TPD and TPD2 Hi and Lo positions (on the Adjust menu, select Sensor Setup > Throttle Position Hi/Lo) are set using the foot pedal. Again ensure that the pedal doesn't move while setting the Lo (and Hi) position on each pot.

When setting the TPD and TPD2 Hi position make sure the pedal is fully depressed taking into account floor carpet and pedal flex. Any over travel during operation will cause an error.

### Errors

If any error is detected then the power to the servo motor is shut off. This includes both the high and low side drivers so that a single short to 0 V or +12 V, either in the wiring or the driver, will not prevent the power from being shut off. When the power to the throttle body is removed, springs will return it to a default position of about 10%. If the control loop has shut down, the only way to restart it is to cycle the power (ECU re-start).

Note: during DBW shut-down, Engine RPM is limited to 2500 rpm regardless of throttle opening.

## DBW Idle Control

The DBW function also has an associated 'DBW Idle Speed' function which can be set up on Auxiliary Output 2. The idle speed is maintained by a PID control loop. Experience in this area is essential for determining the correct operating parameters.

## Wideband Lambda

The adaptor board 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.

## 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.

## MoTeC Subaru Diff Controller - SDC

The MoTeC M800 WRX9-10 Plug-in ECU can communicate via half duplex RS232 with MoTeC Subaru Diff Controllers - SDC2 (suitable for MY06 and MY07) and SDC3 (suitable for MY08). Link15 and Link16 need to be closed to allow SDC communications. Refer to the SDC2 or SDC3 Manual for further information and configuration details. The Manuals are installed onto your computer with the SDC software and can be found in the folder C:\motec\SDC-v12.

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

## M800 Pinout

**A** (B134)

7	6	5	4	3	2	1
17	16	15	14	13	12	11
27	26	25	24	23	22	21
34	33			32	31	30

**B** (B135)

7	6	5	4	3		2	1
19	18	17	16	15	14	13	12
27	26		25	24		23	22
35	34		33	32		31	30

**C** (B136)

6	5		4	3	2	1
16	15	14	13	12	11	10
27	26	25	24	23	22	21
35	34	33	32	31		30

**D** (B137)

7	6	5	4	3	2	1
17	16	15	14	13	12	11
25	24		23	22	21	20
31	30		29	28		27

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
<b>Power</b>				
12V	A7 C1 D15 D17 D12 D22 D25 D31	12 V Switched (ECU Relay)		
GND	A5 A24 A25 B1 B35 C6 C14 C15 C20 D1 D2 D3 D6 D7 D13 D23 D26	ECU Earth		
8V ENG	INT	8 V to TCK Module		
5V ENG	A19 B21 B22	5V sensor supply		
0V ENG	A14 A22 A29 B29 B30 B34 C6	0 V sensor supply		

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
8V AUX	INT	8 V to internal comms connector		
5V AUX	INT	5 V to internal barometer		
0V AUX	INT	0 V to internal Comms Connector and Internal barometer		
<b>Outputs</b>				
INJ1	D8	Injector Cylinder 1		
INJ2	D10	Injector Cylinder 3		
INJ3	D11	Injector Cylinder 2		
INJ4	D9	Injector Cylinder 4		
INJ5	D27	Boost Control		<b>Function:</b> 1 Boost Control Parameters: Frequency      16 Polarity          0 Output Mode    0
INJ6	LA-2 (6) #C2, C3 ##C4	LA-2 Connector for wideband lambda	#C2, C3. Front Lambda Heater (For Narrow band only) ##C4. Rear Lambda Heater (For narrow band only)	<b>Function</b> 9 Lambda Heater Parameters Lambda Sensor    2 <b># &amp; ##Function</b> 9 Lambda Heater Parameters Lambda Sensor    1 # Join Link11 and Link12 ## Join Link13
INJ7	C18 C29	C18. Fan Relay 1 C29. Fan relay 2		<b>Function:</b> 103 Air Conditioner Fan On Temp            96 Off Temp           92
INJ8	C9 C18	A/C Clutch relay		<b>Function:</b> 104 Air Conditioner Clutch
IGN1	D18	Ignition Cylinder 1		
IGN2	D20	Ignition Cylinder 3		
IGN3	D19	Ignition Cylinder 2		
IGN4	D21	Ignition Cylinder 4		
IGN5	C22	C22. Tacho		<b>Function:</b> 4 Tacho Signal Parameters: Calibration       2
IGN6	C11, C23	C11. Driver Warning Light C23. Main Relay coil.		<b>Function:</b> 108 Driver Warning

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
AUX1	D5	DBW +		<b>Function:</b> 5 Drive By Wire
AUX2	D4	DBW -		<b>Function:</b> 6 Drive By Wire Idle Speed Control
AUX3	D14	Cam Control (LH Inlet)		<b>Function:</b> 117 Cam Control 1 Parameters: <b>2.5 Litre EJ257 Engine</b> Source Channel    3 Proportional Gain   2.0 Integral Gain       1 Derivative Gain    0.08 Dead Band          0.3 Aim Source          0 Frequency           300 Polarity             0 Lo Limit             30.0 Hi Limit             50.0 <b>2.0 Litre EJ207 Engine</b> Source Channel    3 Proportional Gain   1.1 Integral Gain       0.5 Derivative Gain    0.04 Dead Band          0.3 Aim Source          0 Frequency           300 Polarity             0 Lo Limit             30 Hi Limit             55



M800 Pin	OEM Pin No.	Function	Optional Function	Notes
AUX4	D16	Cam Control (RH Inlet)		<b>Function:</b> 117 Cam Control 1 Parameters: <b>2.5 Litre EJ257 Engine</b> Source Channel    5 Proportional Gain   2.0 Integral Gain       1 Derivative Gain    0.08 Dead Band          0.3 Aim Source          3 Frequency          300 Polarity            0 Lo Limit            30.0 Hi Limit            50.0 <b>2.0 Litre EJ207 Engine</b> Source Channel    3 Proportional Gain   1.1 Integral Gain       0.5 Derivative Gain    0.04 Dead Band          0.3 Aim Source          3 Frequency          300 Polarity            0 Lo Limit            30 Hi Limit            55
AUX5	D24 #D29	D24. Cam Control RH Exhaust) 2.0 Litre Engine	#D29. Canister Purge	<b>Function:</b> 117 Cam Control 1 Parameters: <b>2.0 Litre EJ207 Engine</b> Source Channel    6 Proportional Gain   1.1 Integral Gain       0.8 Derivative Gain    0.06 Dead Band          0.3 Aim Source          4 Frequency          300 Polarity            1 Lo Limit            45 Hi Limit            70 <b>#Function:</b> 3 Aux Table #Join Link19

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
AUX6	D30	Cam Control (LH Exhaust) 2.0 Litre Engine		<b>Function:</b> 117 Cam Control 1 <b>Parameters:</b> <b>2.0 Litre EJ207 Engine</b> Source Channel     4 Proportional Gain   1.1 Integral Gain       0.8 Derivative Gain     0.06 Dead Band           0.3 Aim Source           0 Frequency            300 Polarity              1 Lo Limit              45 Hi Limit              70
AUX7	C12	C12. Fuel Pump		<b>Function:</b> 101 Fuel Pump <b>Parameters:</b> Delay                 5.0 Polarity               1 Output Mode          1
AUX8	C10	C10. Alternator		Not Used

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
<b>Inputs</b>				
REF	A13	Ref Sensor		Ref and sync to ref input
SYNC	A13	Sync Sensor		Ref and sync to ref input
AT1	B18	Air Temp		See Calibration Table
AT2	A34	Engine Temp		See Calibration Table
AT3	B19	Ignition Switch		
AT4	C24	C24. A/C Request		<b>Function:</b> 5. A/C Request Parameters: Logic Polarity            1 Set AT Levels Lo Level                    6.0 Hi Level                    8.0
AT5	A33 #A3 ##B13 ###B14	A33. Power Steering Switch	#A3. Rear Defog switch Can be used for ORB Select or Multi Config map select  ##B13. Cruise Control resume button. Can be used for B14 ORB Select or Multi Config map select  ###B14 Rear Defogger timer. Can be used for ORB Select or Multi Config map select  #### A4 (Requires patch wire) Inlet Manifold Air Temp Sensor (2.0 STI N14 Version)	<b>Function:</b> 18 Power Steering Parameters: Logic Polarity            0 Set AT Levels: Lo Level                    2.0 Hi Level                    3.0  <b>#Function:</b> #Cut Link3, Join Link1 ## Cut Link3, Join Link8 ### Cut Link3, Join Link9  <b>#### Function:</b> Air Temp Sensor See Calibration Table #### Cut Link3. Wire link wire from M800 side of Link3 to Pin A4
AT6	B20 #B12 ##C25 ###C31	B20. Brake Light Switch	#B12. Cruise Control main switch. Can be used ORB Select or Multi Config map select  ##C25. Clutch Switch  ###C31. Neutral Switch	<b>Function:</b> 10 Brake (status) Logic Polarity            0 Set AT Levels: Lo Level                    5.0 Hi Level                    6.0  <b>#Function:</b> #Cut Link10, Join Link7 ## Cut Link10, Join Link17 ### Cut Link10, Join Link18
AV1	A18	TP1		Calibration #11 – Default 0
AV2	A6	MAP		See Calibration Table
AV3	B26	Mass Air Flow		Calibration #48
AV4	INT	Internal Barometer		Calibration #62
AV5	B23	TPD1		Calibration #11 – Default 100

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
AV6	B31	TPD2		Calibration #11 – Default 0
AV7	B4 ##K10	B4 Rear narrow band lambda	#B4 Temperature Sensor (user option)  ##K10. Thermocouple input via TCK module (Requires TCK module)	# Adds 1 Ohm pull up resistor for NTC temperature sensor (User option)  Join Link5  ##Cut Link4, Join Link21
AV8	A28	TP2		Calibration #11 – Default 100
DIG1	A21	Cam Position (LH Inlet)		<b>Function:</b> 19 Cam Position Parameters: <b>2.5 Litre EJ257 Engine</b> Edge 0 Offset 131 Channel 3 Teeth 4 Filter 2 Zero 0 <b>2.0 Litre EJ207 Engine</b> Edge 0 Offset 312 Channel 3 Teeth 4 Filter 2 Zero 0
DIG2	A11	Cam Position (RH Inlet)		<b>Function:</b> 19 Cam Position Parameters: <b>2.5 Litre EJ257 Engine</b> Edge 0 Offset 108 Channel 5 Teeth 4 Filter 2 Zero 0 <b>2.0 Litre EJ207 Engine</b> Edge 1 Offset 317 Channel 5 Teeth 4 Filter 2 Zero 0

M800 Pin	OEM Pin No.	Function	Optional Function	Notes
DIG3	A12 #C13	A12. Cam Position (RH Exhaust) 2.0 Litre Engine	#C13. Speed Measure. 2.5 Litre Engine (MY 06/07)	<b>Function:</b> 19 Cam Position Parameters: <b>2.0 Litre EJ207 Engine</b> Edge 1 Offset 675 Channel 6 Teeth 2 Filter 2 Zero 0 <b>#Function:</b> 1 Speed Measure Parameters: Measurement Type 1 Calibration 264 Active Edge 0 #Cut Link 2, join Link14
DIG4	A31	Cam Position (LH Exhaust) 2.0 Litre Engine		<b>Function:</b> 19 Cam Position Parameters: <b>2.0 Litre EJ207 Engine</b> Edge 1 Offset 673 Channel 4 Teeth 2 Filter 2 Zero 0
LA1S	B9			
LA1P	B8			
LA2S	INT	Wide band lambda using internal lambda connector		Calibration: 38
LA2P	INT	Wide band lambda using internal lambda connector		
<b>Communications</b>				
RS232 TX	#C16		C16. #SDC2 Comms connection using Half Duplex Rs232	
RS232 RX	#C16		C16. #SDC2 Comms connection using Half Duplex Rs232	
CAN LO	C35 Comms 2			
CAN HI	C27 Comms 1			

## OEM ECU Pinout

**A** (B134)

7	6	5	4	3	2	1
17	16	15	14	13	12	11
27	26	25	24	23	22	21
34	33			32	31	30
				29	28	

**B** (B135)

7	6	5	4	3		2	1
19	18	17	16	15	14	13	12
27	26		25	24		23	22
35	34		33	32		31	30
						29	28

**C** (B136)

6	5		4	3	2	1
16	15	14	13	12	11	10
27	26	25	24	23	22	21
35	34	33	32	31		
					30	29

**D** (B137)

7	6	5	4	3	2	1
17	16	15	14	13	12	11
25	24		23	22	21	20
31	30		29	28		
						27

OEM Pin	M800 Pin	Function	Wire Colour
A1	K12	TC-	-
A2	K13	TC+	-
A3	#AT5	Rear window defog timer. Can be used for ORB Select with mod.	-
A4	O/C	Manifold Air Temp Sensor (2.0 Litre STI) Requires patch to AT5	-
A5	GND	GND	Green/white
A6	AV2	MAP Sensor	Yellow/black
A7	12V	Control Module power supply from EFI relay	Yellow
A8	O/C		-
A9	O/C		-
A10	O/C		-
A11	DIG2	Cam Position (RH Inlet)	Blue
A12	DIG3	Cam Position (RH Exhaust) 2.0 Litre engine only	
A13	REF & SYNC	Crank Sensor +	White
A14	0V	Ref sensor 0V	Black
A15	K1	Knock sensor signal TCK	Yellow
A16	O/C	LH Tumble valve (not used)	Blue
A17	O/C	Lighting switch (not used)	-
A18	AV1	TP1	White
A19	5V ENG	Sensor 5 volt (TP, TP2, MAP, TGV, SACV LH)	Blue
A20	O/C		-
A21	DIG1	Cam Position (LH Inlet)	Red/black dot
A22	0V	Cam sensor 0V LH & RH	Brown
A23	O/C	Main relay (earths relay coil) Not used	-
A24	GND	Crank Sensor shield	Grey
A25	GND	Knock sensor shield	Grey/red
A26	O/C	Tumble valve RH (not used)	Red
A27	O/C	Secondary air pipe pressure sensor (not used)	Blue/red
A28	AV8	TP2	Green
A29	0V ENG	Sensor 0V	Red/green
A30	O/C	Blow-by leak signal (USA Version) Not used	-
A31	DIG4	Cam Position (LH Exhaust) 2.0 Litre engine only	
A32	O/C		-
A33	AT5	Power steering pressure switch	Orange/black
A34	AT2	Engine Temp	Black/yellow

OEM Pin	M800 Pin	Function	Wire Colour
B1	GND	Front & rear lambda shield	Yellow/blue
B2	12v	Control Module power supply from EFI relay	Yellow/black
B3	O/C	Cruise Control Set Indicator (USA)	-
B4	AV7	Rear lambda sensor signal	White
B5	O/C	Constant 12 V (Not used)	Black/red
B6	O/C	Cruise control main light	Blue/red
B7	O/C		-
B8	LA1-P	Front lambda -	Black
B9	LA1-S	Front lambda +	White
B10	O/C	Fuel Sub Level Sensor	Brown/white
B11	O/C		-
B12	#AT6	Cruise Control main switch	Green/red
B13	#AT5	Resume/Acc switch	Red/white
B14	#AT5	Rear defogger switch	Blue/black
B15	O/C	Small light switch	Black/white
B16	O/C	Blower fan switch	Green/red
B17	O/C	Fuel temp sensor (USA Version)	-
B18	AT1	Air Temp Sensor (MAF)	Blue/white
B19	AT3	Ignition Switch – 12V power	Green/red
B20	AT6	Brake switch 1	Yellow/red
B21	5V ENG	Sensor 5V	Blue/red
B22	5V ENG	Sensor 5V TPD2	Lt blue
B23	AV5	Throttle pedal sensor TPD1	Blue
B24	O/C	Set/Coast switch	Green/black
B25	O/C	Wiper switch	Green/yellow
B26	AV3	MAF Meter	Yellow/green
B27	O/C	Test mode connector	Orange
B28	O/C	Brake switch 2 (stop light)	White/black
B29	0V ENG	Sensor 0V	Orange
B30	0V ENG	Sensor 0V TPD2, rear lambda	Blue/black
B31	AV6	Throttle pedal sensor TPD2	White/blue
B32	O/C	Fuel Tank Pressure sensor (USA Version)	-
B33	O/C	Fuel Pump control unit pin9 (STI) pin5 (WRX)	Green/red
B34	0V ENG	Sensor 0V	Black
B35	GND	MAF Shield	Grey

OEM Pin	M800 Pin	Function	Wire Colour
C1	O/C	DBW relay (not required)	Blue/white
C2	#INJ6	Front lambda heater 1	Black/red
C3	#INJ6	Front lambda heater 2	Black/red
C4	#INJ6	Rear lambda sensor heater	Red/white
C5	O/C		-
C6	GND	Shield	Green/white
C7	O/C		-
C8	O/C	Secondary air pump relay active low	Brown
C9	INJ8	Air con clutch relay	Brown/red
C10	AUX8	Alternator	Blue
C11	IGN6	Driver warning light	Red/white
C12	AUX7	Fuel pump control pin 8 (STI) Pin2 WRX	Green/black
C13	#DIG3	Speed Measure (2.5 litre MY06-MY07)	Green/yellow
C14	GND	GND	Green/white
C15	GND	GND	Green/white
C16	RS232	input to diff cont. Data link pin 10	Green/black
C17	O/C	Drain Valve (USA Version)	-
C18	INJ8, INJ7	Fan relay 1 A/C Fan	White/blue
C19	O/C	Secondary air relay2 (USA Version)	-
C20	GND	Starter enable relay (some models)	-
C21	O/C	DBW relay	Red/blue
C22	IGN5	Tacho / DCCS pin A6	Orange/white
C23	IGN6	Main relay coil to GND (USA Version)	Green black
C24	AT4	A/C Request	Pink/black
C25	#AT6	Clutch Switch	Yellow/red
C26	O/C	IMM ECU	Yellow/black
C27	CAN-HI	MY 2008	-
C28	O/C	Pressure valve (USA)	-
C29	INJ7	Fan relay 2 Thermo Fan	Green/red
C30	O/C	Secondary air combination valve relay	Brown/black
C31	#AT6	Neutral Pos Switch/ DCCD pin A15 (optional)	Green/red
C32	O/C	Cranking signal	White/red
C33	O/C		-
C34	O/C	IMM ECU	Red/yellow
C35	CAN-LO	MY 2008	-



OEM Pin	M800 Pin	Function	Wire Colour
D1	GND	GND	Black/yellow
D2	GND	GND	Black/white/brown
D3	GND	GND	Red/white
D4	AUX2	DBW-	Blue/silver
D5	AUX1	DBW+	Brown/red/silver
D6	GND	Ignition GND	Black
D7	GND	GND	Black/white
D8	INJ1	Injector Cyl 1	Blue
D9	INJ3	Injector Cyl 2	Yellow/red
D10	INJ2	Injector Cyl 3	Yellow
D11	INJ4	Injector Cyl 4	Green/red
D12	12V	Tumble valve generator LH	Blue/red
D13	GND	Tumble valve generator LH	Blue/yellow
D14	AUX3	Cam Control LH Inlet (-ve)	Green/black
D15	12V	Cam Control LH Inlet	Red/white
D16	AUX4	Cam Control RH Inlet(-ve)	Green/white
D17	12V	Cam Control RH Inlet	Red/black
D18	IGN1	Ignition Cyl 1	Yellow/brown dot
D19	IGN3	Ignition Cyl 2	Yellow/black
D20	IGN2	Ignition Cyl 3	Yellow/red/brown
D21	IGN4	Ignition Cyl 4	Yellow/green/brown
D22	12V	Tumble valve generator RH	Yellow
D23	GND	Tumble valve generator RH	Yellow/green
D24	AUX5	Cam Control RH Exhaust (-ve) 2.0 Litre Engine.	-
D25	12V	Cam Control RH Exhaust 2.0 Litre Engine	-
D26	GND	Ignition GND	Black
D27	INJ5	Boost control solenoid	Black/white
D28	O/C		-
D29	#AUX5	Purge canister	White/blue
D30	AUX6	Cam Control LH Exhaust (-ve) 2.0 Litre Engine.	-
D31	12V	Cam Control LH Exhaust 2.0 Litre Engine	-

## 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

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

### Air Temp Sensor (AT1)

Degrees C, 1 Decimal place

Temp	-10	0	10	20	30	40	50	60	70
Input(V)	5.371	4.589	3.896	3.315	2.988	2.430	2.148	1.801	1.469

Temp	80	90	100	110	120	130
Input(V)	1.215	0.960	0.707	0.453	0.199	0.100

### Air Temp Sensor (AT5) 2.0 STI/N14 Version

Degrees C, 1 Decimal place

Temp	-10	0	10	20	30	40	50	60	70
Input(V)	4.463	4.253	3.918	3.442	3.000	2.662	2.111	1.700	1.376

Temp	80	90	100	110	120	130
Input(V)	1.068	0.888	0.637	0.555	0.476	0.446

### MAP Sensor (AV2)

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

Temp	260	280	300
Input(V)	4.575	4.785	5.058

## Ref/Sync Setup

Parameter	Value	Notes
Ref/Sync Mode (REF)	38	
Crank Ref Teeth (CRT)	36	
Tooth Ratio	N/A	
Crank Index Position(CRIP)	549 (2.0 Litre EJ207 engine 547)	
Ref Sensor Type	2	
Ref Sensor Polarity	0	
Sync Sensor Type	2	
Sync Sensor Polarity	0	

## Ignition Setup

Parameter	Value	Notes
Ignition Type (IGN)	1	
Number of Coils (COIL)	4	
Ignition Delay Time	50	
Firing Order	1 3 2 4	

## Fuel Setup

Parameter	Value	Notes
Injector Current	0	
Peak Hold Ratio	N/A	

## Injector Battery Comp 3.0 Bar

Bat V	5	6	7	8	9	10	11	12	13	14	15
U sec	2500	2500	2320	2000	1660	1360	1160	1000	880	780	700

## Injector Battery Comp 5.0 Bar

Bat V	5	6	7	8	9	10	11	12	13	14	15
U sec	2500	2500	2400	2400	2000	1800	1440	1200	1060	900	820

## Ignition Dwell Table

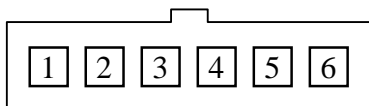
Bat V	5	6	7	8	9	10
Dwell	15.3	11.3	6.6	4.9	3.9	3.3

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

## Link Table

LINKS (BY LINK#)	OPTION (* Denotes Defaults)
LK03 closed, LK01, 08, 09, 23 open LK08 closed, LK01, 03, 09, 23 open LK01 closed, LK03, 08, 09, 23 open LK09 closed, LK01, 03, 08, 23 open LK23 closed, LK01, 03, 08, 09 open	AT5 Power Steering input * AT5 Cruise resume button AT5 Rear Window defog input AT5 Rear Window defog timer AT5 Spare A4
LK02 closed, LK14 open LK14 closed, LK02 open	DIG3 right Exhaust Cam position input (4 var cam) * DIG3 Ground speed input (2 var cam)
LK04 closed, LK05, 21, 23, 24 open LK04, 05 closed, LK21, 23, 24 open LK21 closed, LK04, 05, 23, 24 open LK24 closed, LK04, 05, 21, 23 open	AV7 Rear Narrow Band Lambda sensor * AV7 EGT NTC sensor using Rear Lambda wiring AV7 EGT Thermocouple input via TCK module AV7 Spare A4
LK06 closed, LK20 open LK20 closed, LK06 open	LA1-S Narrow Band Lambda sensor (front) * LA1-S Knock input via TCK module
LK10 closed, LK07, 17, 18 open LK18 closed, LK07, 10, 17 open LK17 closed, LK07, 10, 18 open LK07 closed, LK10, 17, 18 open	AT6 Brake Switch input * AT6 Neutral Switch input AT6 Clutch Switch input AT6 Cruise Control main switch
LK11, 12, 13 open LK11, 12 closed, LK13 open LK13 closed, LK11, 12 open	INJ6 Lambda Heater on Lambda-2 connector * INJ6 Front Lambda Heater INJ6 Rear Lambda Heater
LK15, 16 open LK15, 16 closed	OEM DCCD * MoTeC SDC
LK19 open LK19 closed	Cam control output RH exhaust (4 var cam) * Carbon cannister purge out (2 var cam)
LK21 closed LK21 open	CAN terminator on OEM PCB * No CAN terminator on OEM PCB
LK10, 27 Closed, LK25, 28 open LK28, 25 Closed, LK10, 27 open	Key Start * AUX8 Push Button Start
LK26 Open LK26 Closed	No Alternator Control * AUX8 Alternator Control

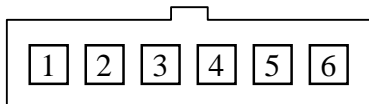
## Lambda 2 Connector



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		
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