Document Number		DVIN0006	
Title		M800 OEM WRX78 Installation Document	
Approved By		*JA*	
Revision	**Date**	**Prepared By**	**Change History**
1	12/09/2005	RB	
2	4/4/2006	RB	Corrected pin num for Dig I/P 2 notes
3	15/8/2006	RB	New format
4	18/12/2006	RB	Correction to link table information

Subaru WRX78

This Document refers to MoTeC M800 OEM installations to Subaru WRX and Sti Versions 7 and 8 using the WRX78 adaptor **(MoTeC Part No. 13008A)**. For all other applications please refer to the correct installation notes.

Contents

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 WRX78 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 or version 8. The version 7 and 8 cars were produced from 2001 – 2005. This adaptor will also suit 2006 model cars fitted with the 2.0 litre engine (Spec C and JDM models). This document describes the details of the WRX78 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.

Note: The M800 WRX78 supersedes the M800 WRX7 (MoTeC Part No. 13006A) and incorporates all patches and functionality that have become necessary on later model vehicles. M800 pin assignments and links have been altered to accommodate these changes which means that ECU configurations created for the older WRX7 adaptor will not work on the WRX78 without configuration changes to input and output setup .

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
13008A	ECU M800 OEM WRX78	MoTeC M800 OEM and WRX78 Adaptor board assembly
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 without an engine immobiliser. **If the vehicle has an immobiliser fitted the links must be changed, otherwise the ECU will not receive battery power**. The links must be changed from "No engine immobiliser" to "Factory 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. Setup INJ5 as spray bars.
2. Setup INJ5 parameters.

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

1. Setup AT6 as a switched input for "Overrun boost Select".
2. Set parameters "logic polarity" to "0" and "Spray Bars" to "1".

Intercooler Air Temperature Sensor – STi RA

The WRX78 OEM has a link to enable the intercooler air temperature sensor as found on some models. This sensor can be found on two different pins depending on the model year of the car. The sensor, where fitted, is connected to AV8. 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	Join link16 to connect AV5 to pin B4.
AV6	Cut Link10 & Link21 and Join Link 19 for spare AV input on pin B16.
AV8	Could be used if Intercooler Air Temp Sensor (ICAT) is not present (Sti) and TGV position sensor is not being used (WRX).I Join Link20 (default setting)

Subaru Diff Controller (SDC2)

The M800 OEM can communicate with the MoTeC SDC2 via half duplex RS232. Link 12 and Link 13 are joined as a default setting to make this connection. 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.

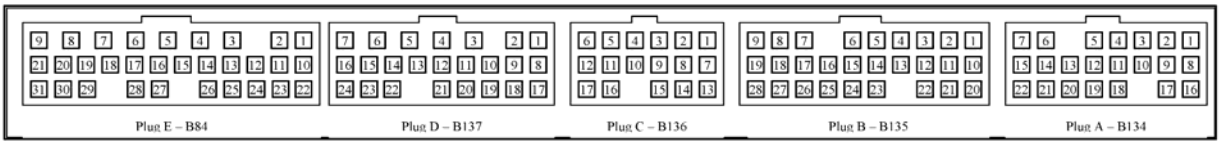
Using the Pinout Diagram

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 was different in Manuals for earlier models (2001 & 2002 was D, C, E, 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	C6 (71) C17 (83) E2 (8) E3 (7)	12v Switched (ECU Relay) C6. 12V to RH cam solenoid C17. 12V to LH cam solenoid		
GND	A7 (121) A15 (128) A22 (136) B10 (109) B11 (108) B21 (117) B22 (116) B26 (113) C1 (76) C3 (74) C8 (81) D8 (56) D10 (64) D18 (63) E8 (2) E9 (1) E18 (13)	ECU Earth B10. Sync sensor – B11. Ref Sensor – B21. Ref shield B22. Knock shield B26. Rear lambda shield C3. RH Cam sensor – C8. AFM shield E18. Front lambda shield		
8V ENG	#B3 (97)	8V to TCK Module	#B3. Spare 8V sensor supply	#Join Link15 to connect 8V to pin B3.
5V ENG	B9 (91)	5V sensor supply		
0V ENG	B19 (100) C7 (82)	OV sensor supply		
8V AUX	B3 (97)	8V to internal comms connector		
5V AUX	#B6 (94)	5 V to internal barometer	#B6. Spare 5V sensor supply	#Join Link17 to connect 5V to pin B6.
0V AUX	E21 (10) #B20(118)	E21. OV sensor supply 0V to internal Comms Connector and Internal barometer	#B20. Spare sensor 0V	#Join Link14 to connect 0V to pin B20.
Outputs				
INJ1	E1 (9)	Injector Cylinder 1		
INJ2	D5 (43)	Injector Cylinder 3		
INJ3	D6 (42)	Injector Cylinder 2		
INJ4	D4 (44)	Injector Cylinder 4		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
INJ5	E11 (20)	Spraybar output. 2002 RA Spec C and some later Sti Models	Alternator control (some vehicles)	**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	#D13 (51) ##E4 (6) ##E5 (5)	Lambda Heater using Lambda 2 connector on adaptor board.	#D13. Rear Lambda heater ##E4 & E5. Front Lambda heater.	**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.
INJ7	E16 (15) #E12 (19)	E16. Canister purge	#E12. Alternator control (Sti – optional)	**Function:** 3 Aux table **#Optional Function:** 113 Alternator Control Parameters Set as required. The alternator can be switched off at full throttle if desired. Use battery voltage and throttle position as table axis and configure so that the alternator is only cut when battery voltage is sufficiently high.
INJ8	E27 (26) #A6 (122)	E27. A/C Clutch	#A6. ORB Status. Output to demister light for vehicles with immobiliser. Requires modification to vehicle wiring.	**Function:** 104 Air Conditioner Clutch Parameters can be set to switch compressor off at high speed.
IGN1	D24 (57)	Ignition Cylinder 1		
IGN2	D22 (59)	Ignition Cylinder 3		
IGN3	D23 (58)	Ignition Cylinder 2		
IGN4	D21 (60)	Ignition Cylinder 4		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
IGN5	E15 (16)	Driver Warning Light (uses engine check light)	#Shift light	**Function:** 108 Driver Warning Alarm Parameters: Hold Time 2 Logic Polarity 0 Output Mode 0 Power Hold 1 (minimum) **#Optional Function:** 107 Gear change light Set Parameters as required.
IGN6	D9 (55)	Tacho output		**Function:** 4 Tacho Signal Parameters: Calibration 2
AUX1	C16 (84) #C4 (73) #C10 (79)	C16. LH Cam control solenoid – Sti only	#C4, C10. TGV (Not Sti)	**Function:** 117 Cam control 1 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. **#Optional function:** 3 Aux Table Load/RPM aux table #Cut Link22 and join Link23

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX2	C12 (77) #C5 (72 #C11 (78)	C12. RH Cam control solenoid – Sti only	#C5, C11. TGV (Not Sti)	**Function:** 117 Cam control 1 Parameters: 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 Table: Set as required. **#Optional function:** 3 Aux Table Load/RPM aux table #Cut Link25 and join Link24
AUX3	E24 (29)	Boost control valve		**Function:** 1 Boost control. Parameters: Frequency 15 Hz
AUX4	D10 (54)	Idle control valve		**Function:** 2 Idle Speed Control Parameters 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 Note: PID parameters are a suggested starting point only and are based on M800 V2.3. V3.3 values will differ Active low duty cycle idle control.

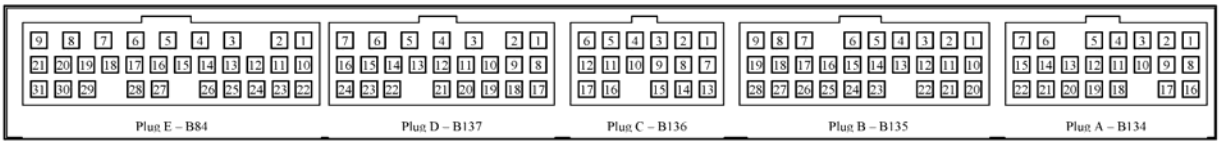
M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
AUX5	E17 (14)	A/C Fan		**Function:** 103 A/C Fan Parameters: On Temp 94 Off Temp 90 On Speed 0 Off Speed 0 Speed Channel 0 Time Out 0
AUX6	E28 (25)	Thematic fan		**Function:** 102 Thematic Fan Parameters On Temp 96 Off Temp 92 Time Out 2 Frequency 0 Polarity 0 Output Mode 0 Min Duty 0
AUX7	A6 (122) #A2 (126)	A6. Power Hold (no immobiliser) #A2. 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	D15 (49) D16 (48)	D15. Fuel Pump (no Immobiliser) D16. 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	B17 (101)	Engine Temp Sensor		Calibration: Select -1 refer to Engine temperature Sensor calibration table.
AT3	A5 (123) #A14 (129)	A5. Ignition Switch (no immobiliser) #A14. Ignition Switch (with 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** # Pin A14: Cut Link6 and join Link7
AT4	B24 (114) #A16 (142)	B24. Power steering switch	#A16. Clutch switch (user option)	**Function:** 18 Power Steering Set AT Levels: AT4 Lo Level 2 AT4 Hi Level 3
AT5	A2 (126) #A6 (122) ##A3 (125)	A2. A/C request (no Immobiliser) #A6. A/C request (with immobiliser)	##A3. ORB Mode. May be used as a momentary switch to change ORB mode. Requires modification to demister timer. Cut Link5, Join Link2	**Function:** 5 Air conditioning Request Parameters: Logic Polarity 1 Set AT Levels: AT5 Lo Level 5.5 AT5 Hi Level 6.0
AT6	B12 (107)	ORB Select Function Uses Auto Spray Bar switch where fitted. 2002 Spec C and some later Sti models		**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.
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	C13 (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	#B4 (96)		#Spare AV input	#Join link16 to connect AV5 to pin B4.
AV6	#B16 (103)		# Spare AV input	# Cut Link10 & Link21 and Join Link 19 for spare AV input on pin B16.
AV7	B17 (102)	Rear lambda sensor		
AV8	B28 (110) #B13 (106) #B23 (115) #E14 (17)	B28. Intercooler Air Temp sensor (2002 RA Spec C) #E14. Intercooler Air Temp sensor (2003 & later RA Spec C)	#B13, B23. TGV position sensor (not Sti) Combines signals from LH and RH sensors. ## E14. Spare AV input (no ICAT)	Calibration: Select -1 and refer to # Cut Link20 ## Join Link20
DIG1	A1 (127)	Speed Measure		**Function:** 1 Speed Measure Parameters: Units 1 Calibration 264 Active Edge 0
DIG2	A8 (135)	A8. Neutral Switch		
DIG3	C9 (80)	LH Cam Position (Sti only)		**Function:** 19 Cam Position Parameters: Edge 0 Offset 13 Channel 3 Teeth 4 Filter 1
DIG4	C2 (75)	RH Cam Position (Sti only)		**Function:** 19 Cam Position Parameters: Edge 0 Offset 13 Channel 5 Teeth 4 Filter 1
LA1S	E19 (12)	Front lambda sensor		# Use if wiring is being modified to use a wideband sensor.
LA1P	E29 (24)			
LA2S		Wide band lambda using internal Lambda 2 connector		Calibration: 38 LA-2 connector on Adaptor
LA2P		Wide band lambda using internal Lambda 2 connector		

M800 Pin	OEM Pin No.	Standard Function	Optional Function	Setup Notes
Communications				
RS232 TX	A21 (137)	A21. MoTeC Centre diff controller (SDC2)		Join Link12 and Link 13 for MoTeC SDC2 (default setting), connects communications to pin A21
RS232 RX	A21 (137)	A21. MoTeC Centre diff controller (SDC2)		Join Link12 and Link 13 for MoTeC SDC2 (default setting), connects communications to pin A21
CAN LO	A10 (133)	A10. Loop vehicle connector B300 pin1 to pin4 for CAN-Lo on data link connector pin6.		
CAN HI	A20 (138)	A20. Loop vehicle connector B300 pin6 to pin3 for CAN-Hi on data link connector pin8.		

OEM ECU Pinout



NOTE: The connector numbering scheme was changed by Subaru around 2003. The numbering was different in Manuals for earlier models (2001 & 2002 was D, C, E, B, A). Also note that Japanese manuals use an alternate pin numbering scheme and are shown in the second column.

OEM Pin	Alt Pin	M800 Pin	Function
A1	127	DIG1	Speed measure
A2	126	AT5 #AUX7 #INJ8	A/C request(no imm) /# Power Hold (imm) / #ORB Status (no imm user option)
A3	125	#AT5	ORB Mode (user option)
A4	124	O/C	Not used
A5	123	AT3	Ignition switch (no imm)
A6	122	AUX7 #AT5 #INJ8	Power Hold (no imm) / #A/C request (imm) / ORB Status (imm user option)
A7	121	GND	ECU Ground
A8	135	DIG2	Neutral or GCIC (user option)
A9	134	O/C	Not used
A10	133	CAN-Lo	
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	#AT4	Starting signal / Clutch switch (user option)
A17	141	O/C	Not used
A18	140	O/C	Not used
A19	139	O/C	Not used
A20	138	CAN-Hi	
A21	137	RX232 TX232	Communications with MoTeC centre diff controller (SDC2)
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 #AV5	Knock voltage sensor (TCK) / Spare input
B5	95	O/C	Not used
B6	94	#5V-AUX	#Spare 5V supply
B7	93	AV1	Throttle Position Sensor
B 8	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	AT6	ORB Enable
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	
B17	102	AV7	Rear Lambda sensor
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	AT4	Power steering switch
B25	113	O/C	Not used
B26	112	GND	Sensor ground
B27	112	AT1	Air Temperature Sensor
B28	110	AV8	Intercooler Air Temperature Sensor (ICAT) 2002 RA Spec C
C1	76	GND	ECU Ground
C2	75	DIG4	RH Cam position (Sti)
C3	74	GND	Sensor Ground
C4	73	#AUX1	#TGV (not Sti – optional)
C5	72	#AUX2	#TGV (not Sti – optional)
C6	71	#V-BAT	12V to RH cam solenoid
C7	82	0V-ENG	Sensor 0V
C8	81	GND	Sensor Ground
C9	80	DIG3	LH Cam position (Sti)
C10	79	#AUX1	#TGV (not Sti – optional)
C11	78	#AUX2	#TGV (not Sti – optional)
C12	77	AUX2	RH Cam Control (Sti)
C13	87	AV3	Mass Air Flow Sensor
C14	86	GND	Sensor Ground
C15	85	GND	Sensor Ground
C16	84	AUX1	LH Cam Control (Sti)
C17	83	#V-BAT	12V to RH cam solenoid
D1	47	O/C	Not used
D2	46	O/C	Not used
D3	45	O/C	Not used
D4	44	INJ4	Injector Cylinder 4
D5	43	INJ2	Injector Cylinder 3
D6	42	INJ3	Injector Cylinder 2
D7	41	O/C	Not used
D8	56	GND	ECU Ground
D9	55	IGN6	Tacho
D10	54	AUX4	Idle control valve
D11	53	O/C	Not used
D12	52	O/C	Not used

OEM Pin	Alt Pin	M800 Pin	Function
D13	51	#INJ6	#Rear lambda heater
D14	50	O/C	Not used
D15	49	AUX8	Fuel Pump (no immobiliser)
D16	48	AUX8	Fuel Pump (with immobiliser)
D17	64	GND	ECU Ground
D18	63	GND	ECU Ground
D19	62	O/C	Not used
D20	61	O/C	Not used
D21	60	IGN4	Ignition Cylinder 4
D22	59	IGN2	Ignition Cylinder 3
D23	58	IGN3	Ignition Cylinder 2
D24	57	IGN1	Ignition Cylinder 1
E1	9	INJ1	Injector Cylinder 1
E2	8	V-BAT	12V from main relay
E3	7	V-BAT	12V from main relay
E4	6	#INJ6	#Front lambda heater
E5	5	#INJ6	#Front lambda heater
E6	4	O/C	Not used
E7	3	O/C	Not used
E8	2	GND	ECU Ground
E9	1	GND	ECU Ground
E10	21	O/C	Not used
E11	20	INJ5	Spraybar output 2002 RA Spec C / Alternator control
E12	19	#INJ7	Alternator control Sti (optional)
E13	18	O/C	Not used
E14	17	AV8	Intercooler Air Temperature Sensor (ICAT) 2003 and later RA Spec C
E15	16	IGN5	Driver Warning Light
E16	15	INJ7	Canister purge
E17	14	AUX5	A/C Fan
E18	13	GND	Sensor Ground
E19	12	LA1-s	Lambda 1 sensor
E20	11	O/C	Not used
E21	10	0V-AUX	Sensor 0V
E22	31	O/C	Not used
E23	30	O/C	Not used
E24	29	AUX3	Boost Control Solenoid
E25	28	O/C	Not used
E26	27	O/C	Not used
E27	26	INJ8	A/C Clutch
E28	25	AUX6	Thematic Fan
E29	24	LA1-P	Lambda 1 sensor (requires wiring modification)
E30	23	O/C	Not used
E31	22	O/C	Sensor 0V

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)

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

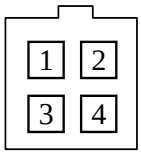
Bat V	10	11	12	13	14	15
Dwell	3.3	2.9	2.5	2.3	2.0	1.9

Link Table

Open Links	Closed Links	Function
4, 7	6, 9	No engine immobiliser*
6, 9	4, 7	Factory engine immobiliser
2, 3, 8, 10	5	A/C, No immobiliser*
2, 3. 5. 10	8	A/C With Immobiliser
5, 8, 10	2, 3	No A/C, INJ8 A/C light, AT5 demist (no Immobiliser)*
3, 5, 8	2, 10	No A/C INJ8 A/C light, AT5 demist (with immobiliser)
1	11	AT4 power steering*
11	1	AT4 Cranking / clutch switch
	12, 13	SDC2 Comms*
12, 13		Factory diff controller
14, 15, 17		No 0V, 5V, 8V on spare pins*
	14, 15, 17	B20 0V-AUX, B3 8V AUX, B6 5V AUX
23, 24	20, 22, 25	Aux 1 &2 Cam control / TGV open, AV8 ICAT for Sti*
20, 22, 25	23, 24	Aux 1 &2 TGV control, AV8 TGV position for WRX
26, 28		INJ6 LA2 heater*
26	28	INJ6 Front LA heater
28	26	INJ6 Rear LA heater
27		INJ7 Purge valve*
	27	INJ7 Alternator control (remove purge solenoid)
29		Pin E21 not used*
	29	Pin E21 0V for wideband lambda sensor
	30	CAN Terminator*
30		No CAN terminator
16		AV5 Knock measure (needs TCK)*
	16	AV5 to pin B4 (Spare input)
19	18, 21	AV6 TC+ on pin B16 (needs TCK)*
18, 19	21	AV6 TC+ on pin B16 TC- on pin B15 (needs TCK)
18, 21	19	AV6 to B16 (spare input)

*** Denotes the default link setup**

Lambda 1 Connector Modification



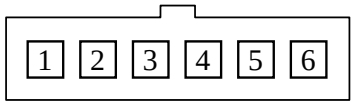
Looking at pins of factory connector B18

B18	M800	Function
3	LA2-P	La1 – Pump
Note 1	0V-AUX	La1 – 0V to sensor
4	LA2-S	La1 – Sense
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

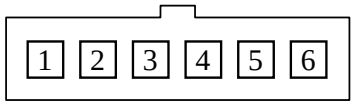
Lambda 2 Connector



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	N/C	
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

M800 WRX7 Configuration Files

Some of the input/output functions have been changed on the WRX78. To use configuration files from M800 WRX7 installations some of the channel assignments will need to be changed.

AT4 now AT5 can be swapped via links to AT5/INJ8 **Re-assign on config conversion**

AT5 Connected to A3 (ORB Mode)

Dig2 Connected to A8 (GCIC)

AT4 Connected to A16 (clutch switch USA & JDM)

AT6 Connected to B12 (ORB Enable) **Re-assign on config conversion**

AT5 Now AT4 (B24) **Re-assign on config conversion**

AV7 Connected to B17 (was on B25)

AV8 Connected to B28 (Intercooler air temperature sensor)

INJ5 Connected to E11 (Spray bars)

INJ7 Now IGN6 (tacho) **Re-assign function on config conversion**

INJ7 Connected to E16