

ME221/442 Engine Management System



HONDA S2000 (AP1) 00-05

Gen1 & Gen2/2B

Plug-In Quick-Start Manual

www.motorsport-electronics.co.uk

UK SUPPORT: +44 (0) 1373 710610

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1 Introduction

Thank you for using our system in your pursuit of power! The Motorsport Electronics core system stems from over 15 years of electronics design and engineering, from a small, active development team. With tuners all across the world, and an ever expanding network of users, the ME experience is more than just a PCB - we are here to help and we actively encourage and welcome feedback, both via our normal support system as well as community support via our “ME Users” facebook group. Get involved - if you have an idea for a feature, there’s no reason it can’t be implemented!

This guide covers the physical installation of the ME221 Plug-In Engine Management System for the Honda S2000. The ME221 is the core control system as used by many of our Plug-In ECUs - so this guide applies to some of them also.

Visiting a rolling road and an experienced mapper will sometimes be the best option for most users (the ones who just want their car to perform how they want, without much interest in as to how to get it to) - for others, the experience of doing it themselves is what matters, and with the ME221 being so flexible, and so many rolling roads and tuners supporting the ME221, as well as a user friendly tuning system, plus a growing support network, both styles of approach are equally accessible.

This guide does not cover the basics of using the MEITE tuning software (i.e the menus, keys etc) - that is covered in the MEITE guide [here](#).

1.1 Safety First!

It must be said first and foremost that tuning an engine can be an exciting experience, as well as a risky one. If you really don't know what you're doing, or even where to start, read all the manuals until you do, and if you're still lost - seek professional advice from one of our world-wide installation agents. **Failure to do so may damage your engine, and even yourself!**

If you have no experience of engine management - follow the manual closely, ask for support if you get stuck, and aim only to get the basic physical install done - leave the rest to a reputable tuner to avoid engine damage or personal injury. NEVER tune your ME221 on the public highway!

1.2 Connectivity & Disclaimer

While we develop the connectivity, products and basemaps on REAL cars in house, that doesn't mean to say there isn't some weird and wonderful cross-over that moved a certain connection - we detail any of these “special” cases in the appendix if applicable. It is however always the installers obligation to check the compatibility of the ECU with the OEM harness - Motorsport Electronics Limited cannot be held liable for any costs incurred through incorrect installation or use of the product.

1.3 Getting Help & Support

There are various avenues for support - the first being the online manuals and documentation. Almost all support can be answered with a simple “it's on this page” - but in those rare cases, you can either raise a support ticket via our website, or call us Mon-Fri 9am-5pm GMT on +44 (0) 1373 710610 where one of our support engineers will be happy to guide you through any queries. Please bare in mind while we will try and offer some tuning support, in most cases a visit to your nearest ME approved agent will be the best advice for tuning. Our basemaps are provided “as-is” and should be used at your own risk. Note they are from REAL cars, tuned on the rolling road at our

headquarters and validated by our agents across the globe - but just like wiring 'oddities' this is no guarantee of their suitability for your specific modifications - using a basemap for more than startup testing prior to calibration is not advised!

There is also a vast and vibrant user community online that can offer helpful insight - check Facebook for "ME Users", and feel free to get involved!

2 Initial Board Setup

Before you install the new ME221/442 PCB into your vehicle, various checks must be carried out.

2.1 Board Switch/Jumper Settings

Please note that some ME221/442 Plug-In ECUs require jumper settings to facilitate different models or functionality.

Honda S2000 ECU

There are no jumper settings to be carried out for the S2000 00-05 Version of the ME221/442

2.2 Connected Hardware & Basemaps

The ME221/442 (and specifically its supplied basemaps) is designed to drive stock hardware & utilise OEM sensors - it is also designed to run only High-Impedance injectors (Low impedance can be used with ballast resistors however.). If you have changed your sensors/coils etc, you will need to configure them using the MEITE tuning studio.

3 ECU Installation

This section provides information on the physical install of the ME221 Engine Management System.

3.1 ECU Handling

You should always handle both the stock ECU (and its internals) as well as the ME221 PCB with due care and attention, protecting them from anti-static discharge. Use a grounded wrist-strap where possible as damage can occur. Also be wary of physical damage to the ECUs which can be caused by applying force or subjecting them to contamination from oil/dirt. A workshop environment is NOT a safe environment for working with electronics!



1. Carry out the install on a conductive, and earthed metal workspace.
2. Wear a grounded to earth wrist-strap when working with electronics.
3. Avoid contact with any of the components, contacts or metal work of the PCBs.

3.2 Fitting of the ECU

The ECU is designed to fit into the OEM casing, therefore retaining the OEM mounting hardware, fit, and finish.

The below outlines a simple guide for all models of the ME221 Plug-In range. Specific models are detailed (where available) on our youtube channel.

1. Ensure the ignition is off, and disconnect the negative terminal of the battery. Note saved stereo settings etc may be lost.
2. Locate the factory ECU, which in most cases is in the left hand kick plate or passenger footwell.
3. Remove any security bolts to allow removal and disconnection of the factory ECU.
4. Working in an ESD safe, well lit environment, open and remove the factory PCB from the casing, and place into an antistatic bag for storage.
5. Install the new core - be sure any jumper settings (detailed in section 2.1 above) are set for your model.
6. Ideally, install a tuning cable, modifying the OEM casing to allow the cable to run through.
7. Some models of the ME221 feature an on-board MAP sensor - you may need to run a vacuum hose to inlet manifold, see the relevant section below (if applicable) on MAP sensor plumbing.
8. Close the ECU casing, and reinstall into the vehicle.
9. Reconnect the battery, but do not attempt to start - follow the manual through entirely first.

4 Additional Sensors & Inputs/Outputs

The ME221 offers more connectivity than the factory ECU, allowing upgrades such as MAF-Less fuelling (utilising an IAT & MAP sensor), or spare control lines for nitrous, boost control etc.

4.1 Honda S2000 Sensors

The Honda S2000 GEN1 version of the ME ECU relies on the factory MAP sensor. This can of course be upgraded to any 5V MAP sensor (for turbo/supercharged applications). You can also add a MAP sensor to one of the spare analog connections.

There is also an on-board 4-BAR sensor on the GEN2 version. You can use either by assigning the chosen ANA-V line to MAP RAW (and the other to dummy). Remember to plumb the MAP sensor up if you plan to use it to the inlet manifold. Use the table below to correctly set the Input Analog Settings (Under IO Settings) to select which MAP sensor you want to use:

To use the **OEM** Map sensor:

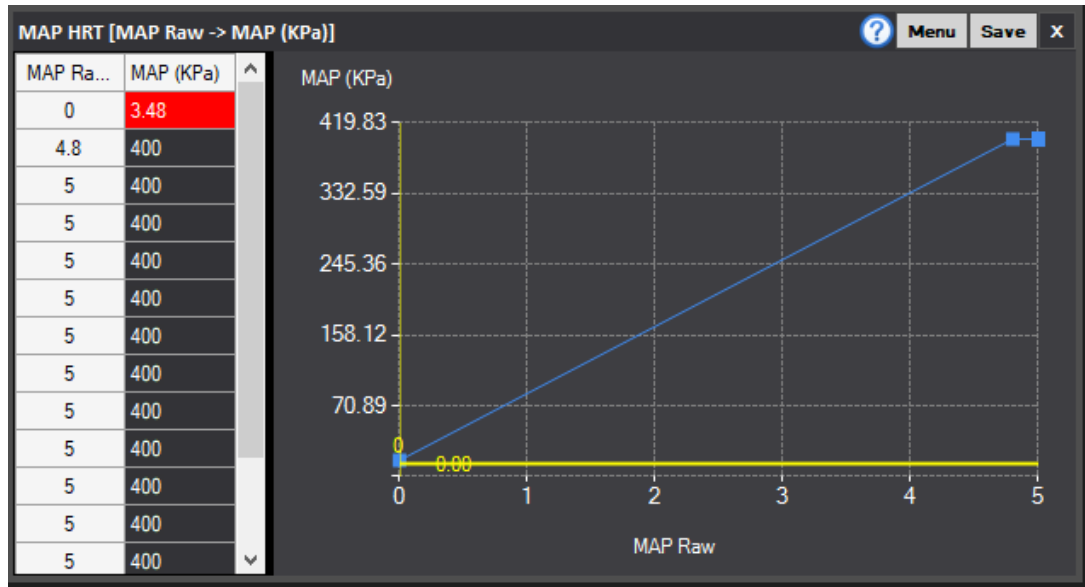
ANALOG V1	MAP RAW
ANALOG V4	Dummy (3000)

To use the **GEN2s** On-board 400Kpa Map sensor:

ANALOG V1	Dummy (3000)
ANALOG V4	MAP RAW

Be sure to calibrate the MAP Sensors 'HRT' table in the MEITE tuning software if you change from the OEM one.

The On board sensor MAP HRT should mirror the below:



The stock IAT sensor is also retained for fuelling calculations. You should always measure the temperature of the air AFTER any turbo charging or intercooling stages, ideally just in front of the throttle body - take care to avoid heat soak where possible.

4.2 Additional Inputs/Outputs

The normally unused "Connector D" of the OEM ECU plug is used for additional IO - this is detailed in the Connectivity table in later sections. You can set the function of these additional IOs using the IO Settings tab of the MEITE.

5 Connecting for Tuning

5.1 MEITE Tuning Software

ME221/ME442 ECUs utilise the Motorsport Electronics Integrated Tuning Environment (MEITE for short) for carrying out diagnostics, calibration and setup. You can download the latest copy of MEITE from the www.motorsport-electronics.co.uk website. After downloading, install, and if prompted to auto-update, be sure to, to bring the PC tuning software to the most current version. MEITE supports Windows x32 and x64 versions 7/8/10 and above.

5.2 Serial/USB Connectivity

If using an ME221 based PnP, you will likely be using a serial connection to connect to the laptop/PC, and we advise the use of a genuine FTDI Serial->USB adapter if your laptop does not feature a serial connection. Always ensure you download the latest drivers from the FTDI website - which are also listed under support on our website.

5.3 Initial Connection

Once you have installed MEITE, and the USB->Serial Drivers, connect the ECU to the laptop, and turn the ignition to position 2 - also, be sure to disable any immobiliser so the dashboard Check Engine Light is illuminated.

Open MEITE. If MEITE is already running, press 'Connect' under the 'File' menu. A green bar will progress across the screen as the ECU data is downloaded to the laptop. If this does not happen, check that the correct comm-port is selected in the lower right section of the MEITE window. Refer to the [MEITE guide](#) for further help with getting connected.

6 Pre-Start Setup

Be sure to follow this section carefully. Firmware updates, basic sensor checks and calibrations need to be carried out, as well as loading of a default calibration to allow successful operation of the ECU.

6.1 Firmware Update

Because we offer free feature updates and additions through firmware updates, it is always best to check the current firmware version and the version available from the www.motorsport-electronics.co.uk website. You can check which version you have currently by going to Help>About when connected to the ECU. The ECU FW Version is the number to take of. If you have a version that is older than the current latest firmware, then follow the firmware update procedure in the [MEITE Guide](#) to update your ECU to the latest version. Note if your car has been tuned, major FW changes can make the map unuseable - only update if you are aware of changes that could happen.

6.2 Basemaps and Startup

We provide a number of basemaps on our calibrations server which can be accessed from the ME website (Under support). We offer various startup files, one of which will be always provided based on (and calibrated on) an OEM, low mileage car utilizing OEM sensors and hardware. This should only be used as a guide - professional tuning/advice should still be sought.

Ensure you're connected to the ME221, then go to **Calibrations>Load Calibration** to load on a chosen calibration. Try to use a calibration that closely matches your specification. If none are available, or not yet released, start with the OEM basemap for your model. Be sure to load "Tuning data only". A green bar will progress to show the calibration being loaded. Power cycle the ignition after downloading an entire calibration.

6.3 Sensors and Sense Check

Using the 'Sensor Cals' tab of MEITE, check all sensors read sane values. IAT, Coolant, MAP (which should be around 99KpA at sea level, with the engine not running), Throttle (moving from 0-100% with throttle actuation). If they do not, refer ME221 Software guide to tune the HRT tables to suit your sensors.

If you have changed any sensors, such as MAP, or IAT sensors, then you will need to calibrate them using the MEITE. Refer to ME221 Software guide - which details the specifics of the ME221s functions, for details on this.

6.4 Injectors

If you have changed your injectors to ones that have a different flow rate, be sure to enter their cc/min into the **System>Injection Driver** settings window available on the 'START' tab in MEITE.

6.5 Calibrating Base-Offset/Trigger Offset

If all of the above has been carried out successfully, and everything is reading correctly, it is time to attempt a first-start. The base-maps contain trigger offset numbers for the crank/cam sensors that relate to OEM cars. You should still confirm that the ECU's commanded advance (shown under **Ignition>Ignition Advance**) matches the actual advance angle seen when using a timing light (while cranking).

If it does not, adjust it by modifying the Trigger Offset number under the ***System>Engine Driver*** window.

You can turn the fuel supply off to stop wetting of plugs during this stage by going to the ***System>Injection Driver*** and turning Fuelling Mode to “OFF”. Remember to reset this to its original setting (usually ‘Fully Seq’) when trying to finally run the engine.

Once you have the engine running and idling, reconfirm the offset as low RPMs can prove difficult to time truly accurately.

7 First Time Startup

If you have made it this far, a base-map suitable for your engine has been loaded, the engine ignition is timed and all sensors are reading sane values. You're now ready to start the engine!

Follow the below process as a final checklist and startup procedure:

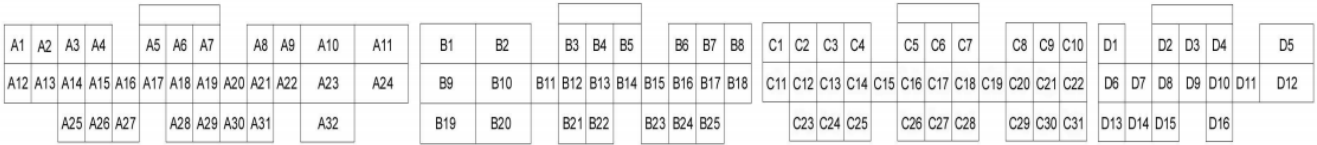
1. With the ignition on, and MEITE connected, check the following from the "MAPPING" tab:
 - a. MAP sensor reads around 98-100KPa (at sea level).
 - b. Battery voltage reads around 12+ volts.
 - c. Engine Coolant and Intake Air Temp values read sanely.
 - d. The TPS/Throttle percent number moves from 0-100% as you sweep the throttle (some models such as Mk1 MX5 do not have a VTPS so this can be ignored in that instance).
2. Rectify any issues with the above checklist - there is no point progressing further if the basics above are incorrect!
3. Turn the ignition OFF then back ON - listen for the fuel pump priming for around 2 seconds (if ECU controlled)
4. Crank the engine - you may need some throttle to help it. While cranking you should see an RPM reading of around 200-300rpm on most engines with charged batteries. The engine may be running excessively rich/lean - adjust the "Engine Size" under the System>Engine Driver to richen/enlean the mixture - note this is a "get you running" hack and it should only need to be changed by around 20% maximum either way - the Engine Size should be reset to the actual size when starting tuning.
5. If you do not get a stable RPM, use the diagnostics tab in MEITE to confirm CRANK and CAM IRQs (pulses from the sensors) - also check for "Lost Sync Count" increasing while cranking as this can indicate failing sensors or electrical noise. Resolve these issues before continuing. If you have attempted multiple starts, check to ensure spark plugs are not wet - ideally replace as opposed attempt drying them.
6. Once the engine is running, allow it to warm, and then adjust the engine size number to get as good a running as possible.
7. Adjust the idle control in "Manual Mode" under the IDLE tab to help maintain a steady idle without throttle use. (Refer to the [ME221 Tuning Manual](#) for more on idle tuning).

Remember that ultimately an engine is a simple mechanical system - it needs, air, fuel, compression and a spark (at the right time, usually around 10° BTDC at idle for most common engines). Check for these basics and you can narrow down the issue. If still in doubt, give us a call, e-mail and we will help you out - if you can have an internet connection available we can remote connect and check things enabling

Congratulations!

You now have a running engine that is ready for full calibration under load. Please visit our website for a list of approved tuning agents, or, contact us about your tuner of choice and we can get in touch to offer training or assistance where needed. That being said, the ME221/ME442, although advanced in areas of knock and boost control etc, is similar to most modern performance ECUs in that it is a VE based engine management system and any competent tuning professional should find it very easy to use.

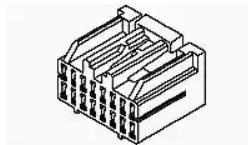
Appendix A | Connectivity



Pin	Function	GEN1 IO Channel	GEN2 IO Channel
A1	Coolant Dashboard Gauge	LS10	LS 3
A2	Air Control Valve	drvSLS7	LS 7
A3	EVAP Bypass Solenoid Vent	drvSLS8	LS 16
A4	EVAP Canister Vent	LS 2	LS 8
A6	Evap Purge	LS 1	LS 4
A9	VSS	HS DIGIN 1	DIGIN 4
A12	Imob Indicator Light	drvSLS4	LS 17
A15	Fuel Pump Relay	drvSLS1	LS 11
A17	AC Clutch Relay	drvSLS5	LS 14
A18	CEL Light	drvSLS2	LS 13
A19	Tacho Output	TACHO	TACHO
A20	Primary Radiator Fan	drvSLS3	LS 15
A27	AC Switch Signal	drvDIGIN3	DIGIN 5
A28	Air Pump Relay	drvSLS6	LS 18
A29	Fuel Tank Pressure Sensor	ANAV 6	ANAV 6
A30	Electronic Load Detector	ANAV 9	ANAV 5
B CONNECTOR			
B1	Switched 12V ignition	12VIGN	12VIGN
B3	Injector 2	LS 5	Injector 2
B4	Injector 3	LS 6	Injector 3
B5	Injector 4	LS 7	Injector 4
B11	Injector 1	LS 4	Injector 1
B12	VTEC Solenoid	LS 12	COIL 5
B14	Spare Low Side 9A Driver	LS 11	LS 1
B15	Spare Low Side 9A Driver	LS 9	LS 2
B23	Idle Control Valve	LS 3	LS 9
C CONNECTOR			
C3	Knock Sensor +ve		Knock 1
C4	Ignition Coil 1	COIL A	Coil 1
C8	Crank Signal +ve		
C9	Crank Signal -ve		
C12	Ignition Coil 2	COIL B	Coil 2
C13	Ignition Coil 3	COIL C	Coil 3
C14	Ignition Coil 4	COIL D	Coil 4
C15	O2 Signal 2	ANA-V7	--
C16	O2 Signal 1	ANA-V3	AnaV 3
C17	Map Signal	ANA-V1 (OEM MAP)	OEM MAP ANAV1 ON_BOARD 4BAR ANA v4
C20/C21	Cam +ve/Cam -ve		

ME221_S2000_HWIG

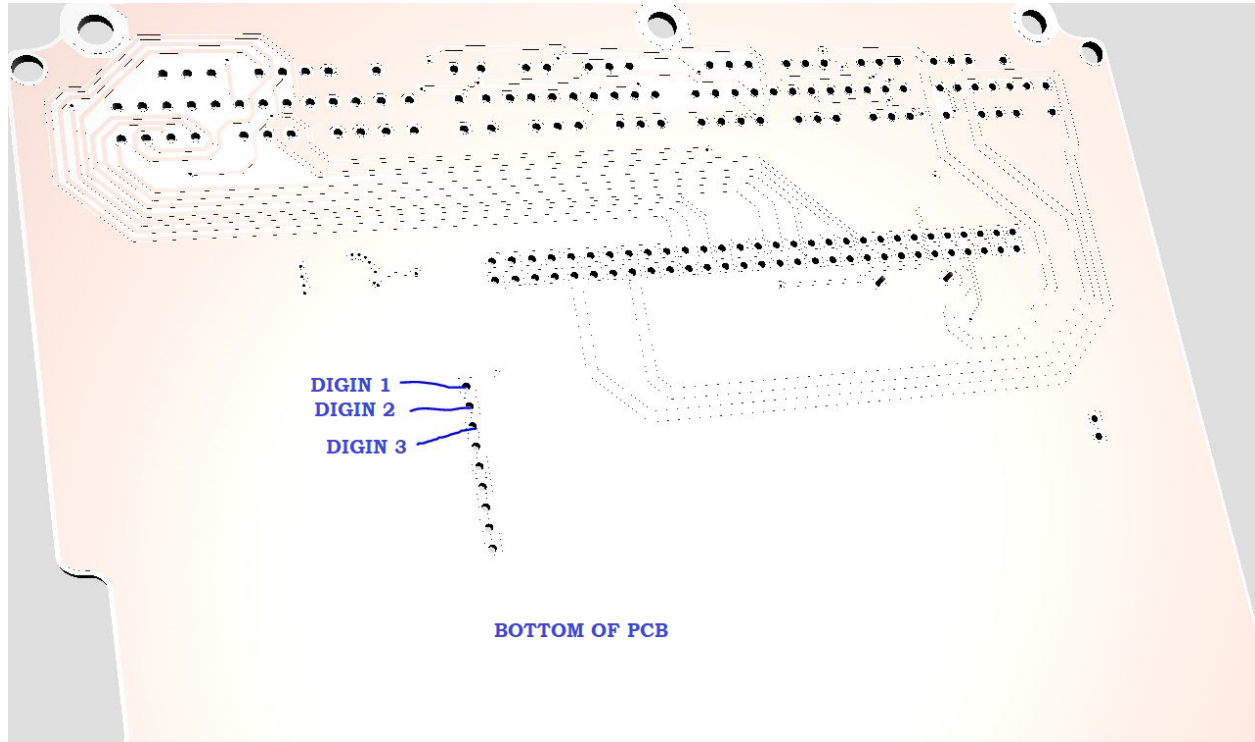
C22	Knock Sensor -ve		
C25	Intake Air Temp. Signal	ANA-T1	ANAT 1
C26	Coolant Sensor Signal	ANA-T2	ANAT 2
C27	Throttle Position Signal	ANA-V2	ANAV 2
D CONNECTOR		GEN1	GEN2/GEN2B
D1	GEN1 -Digital Input / GEN2 Injector	drvDIGIN1	Injector 5
D2	GEN1 -Digital Input / GEN2 Injector	drvDIGIN2	Injector 6
D3	(GEN2 Only) Spare Low Side	--	Injector 7
D4	GEN1 -Digital Input / GEN2 Injector	drvDIGIN4	Injector 8
D5	(GEN2 Only) Spare Analog In	--	ANAT 3
D6	(GEN2 Only) Spare Analog In	--	ANAT 4
D7	(GEN2 Only) DBW HBA 1	--	DBW HBA 1
D8	(GEN2 Only) DBW HBA 2	drvDIGIN5	DBW HBA 2
D9	(GEN2 Only) Low Side	--	LS 10
D10	GEN1 Analog In / GEN2 EGT	Ana-V8	EGT Signal
D11	CANBUS LOW	CANBus	CANBus
D12	CANBUS HIGH	CANBus	CANBus
D13	5V Low Current Sensor Supply	5V	5V
D14	Sensor Ground	GND	GND



The 'D' Connector part number is [TE 179678-6](#) available from Mouser Electronics. The crimps are also available from the same site. (PN TE 175265)

Extra Digital Inputs

Because the D Connector of the GEN2/2B mostly is filled, you can use spare Digital Inputs by directly accessing them on the underside of the PCB and routing to unused pins of your choice. Note this does void warranty and we can carry these mods out for a small fee at our offices.



Appendix B | Known Issues / Model Specifics

Facelift S2000 (MY03 - MY05) - Lack of Power Steering after ECU Fitment

Electric Power Steering may not respond immediately after changing the ECU - this is due to the EPS needing to re-learn. Drive the vehicle approx. five miles with a few ignition cycles and it will return to normal operation.

JDM 1999 - Engine Fails to Start/Runs Briefly/No Fuel Pump

The JDM uses pin A16 as opposed to A15 (as the ME221/USDM/UK) to drive the fuel pump.

To solve, move the wire in the loom from A16 to A15, or, simply link the two pins on the back of the circuit board. (Middle row of pins, pins 4 & 5 from left edge when viewed from bottom of PCB with main plug up).

GEN2 USB Communications Drops at High RPM

The stock Honda COPS can cause high levels of electrical noise which can cause interference with the USB connection.

One solution to this is to cut the wires running to pins B2 and B10, then using the “car side” of the wiring loom, linking them together then grounding them on the chassis. The ECU wires can be left disconnected.

This should stop the issue, but, if it does not, a full and final solution (as also recommended by other ECU manufacturers for the S2000) is to ground the 4x coil ground connections to a single earth point on the cylinder head.