Genboard V.3 ECU Manual

Versatile Engine Managment Systems

Genboard V.3 ECU Manual: Versatile Engine Managment Systems

Table of Contents

List of Figures

List of Tables

Chapter 1. Introduction

The Genboard V.3 ECU is an open source, Do-It-Yourself, programmable controller that can be used for multiple applications. The primary and most popular use of the Genboard is for Electronic Fuel Injection on internal combustion engines. The goal of this manual is to explain what is involved in using the Genboard for use in an EFI system and to lead you through the construction, installation, programming, and tuning of this application.

The Versatile Engine Management Systems (VEMS) website is run by volunteers and is a vehicle for the research, design, and implementation of open source engine solutions that target performance, reliability, low cost, and versatility. It is also a vehicle of self-learning and fun.

Do-It-Yourself engine management became very popular around 2000 to 2001 with entry-level systems supporting batch injection only. VEMS took it to another level with the added functionality of sequential injection, direct ignition control, wideband oxygen monitoring, detonation detection, exhaust gas temperature monitoring, and the ability to expand.

While there is a large network of resources and people for helping you with the Genboard use, you are ultimately responsible for any errors, problems, and subsequent damage that may occur to any engine running on Genboard. You must read and understand this manual before starting your Genboard project so that you may understand what is involved and successfully complete your Genboard installation.

Features

The VEMS Genboard is powered by the Atmel Mega128 processor. The items contained on the board are included on the following list. These features make Genboard V.3 the most powerful and inexpensive EFI and Ignition Unit ever available.

Drivers

- 8 High Current Ignition Drivers
- 8 injection drivers supporting peak-hold injectors.
- 2 High current miscellaneous outputs. These drivers, as well as the 8 injector drivers can be configured as high current (14 to 15 A) drivers for special outputs (Idle Solenoid, ON/OFF solenoid, NOS Injector, Variable Intake actuator, etc...)
- 1 Idle stepper driver. (Can be used as four individual 1A push-pull drivers)
- 4 350mA protected open collector drivers with pull-up.
- 1 350mA protected open collector driver for fuel pump relay.
- 1 350mA protected open collector driver for small idle solenoids.
- 2 350mA protected open collector drivers driving LED's. Available for other applications if connected on board.

Communications

- 2 RS232 ports for Updates and Data Logging.
- 1 One-wire communications port. (Can replaces one RS232)
- 1 Onboard LCD support.
- 1 Onboard PS/2 Keyboard support
- Feature connector for CAN bus and MMC (Multimedia Card) add-on boards.
- Fast serial boot loader for firmware updates.

Sensor Inputs

- 2 VR/Hall sensor inputs.

- 2 knock sensor inputs with advanced DSP based signal conditioning.
- Onboard 2.5-bar Manifold Absolute Pressure Sensor (MAP)
- Coolant temperature sensor (CLT)
- Intake Air Temperature sensor (IAT)
- Throttle position sensor (TPS)
- 2 miscellaneous inputs for resistive sensors, like exhaust back pressure and fuel pressure.
- 2 LSU4 Wideband O2 controllers. (fast and precise digital control)
- 2 Type-K EGT sensor amplifiers.
- Several internal sensor inputs for custom applications.

Enclosure and Connectors

- Automotive grade AMP Econoseal III connectors.
- Extruded Alubos enclosure with CNC machined endplates.

Genboard V.3 ECU Target Features

- Support for most common trigger arrangements.
- 1-8 cylinder full sequential injection with coil on plug/coil near plug, wasted spark, or 1-2 distributors. Or, 10-16cylinder semi sequential with wasted-spark/ 1-2 distributors.
- Wide open throttle closed loop Lambda control (WOT closed loop) - lambda (AFR) mapable through entire loadsite-range (kPa, RPM)
- Self learning VE table

Required Tools

Add the nessecary information here

Purchasing The Genboard V.3 ECU

The VEMS market is literally worldwide. We currently have headquarters in Europe and the United States of America. Currently, orders are placed through a common website at http://shop.x-dsl.hu/catalog/index.php?cPath=1 and then the order is put together and sent out accordingly.

Each unit comes fully assembled with the few exceptions being developers and special requests. A fully assembled Genboard will come with the following installed: 12 FETs (injector/high current drivers), 8 IGBTs (ignition drivers), and Econoseal III 36-pin & 18-pin automotive grade connectors. Each of these boards will be tested to make sure they have been assembled correctly. Wideband LSU4 sensors, EGT probes, engine harnesses, LCDs, Rescue Kits, spare parts, and other miscellaneous parts can also be purchased to make your installation complete.

Payment Methods

- IBAN (International Bank Account) Transfer Formerly Swift and works worldwide.
- Ikobo.com - http://Ikobo.com
- MoneyBooker.com - http://www.moneybooker.com
- Money Order (USA Only)
- PayPal.com (Not recommended; may incur surge charge.)

Chapter 2. The Nature Of Genboard

Briefly add stuff here about the history of Genboard and some of the downfalls of other DIY EFI systems without naming names.

Processor Overview

The powerful core of Genboard V.3 ECU is the Atmel Mega128 that contains an advanced Reduced Instruction Set Central Processing Unit. The processor has 128K Byte flash memory, which can be written during operation of the unit. Other key features are as follows:

- 4K Byte EEPROM
- 4096 Byte SRAM
- 16 MIPS throughput at 16MHz
- 8x 10-Bit A/D inputs
- Several program counters
- Programmable in C
- Low cost

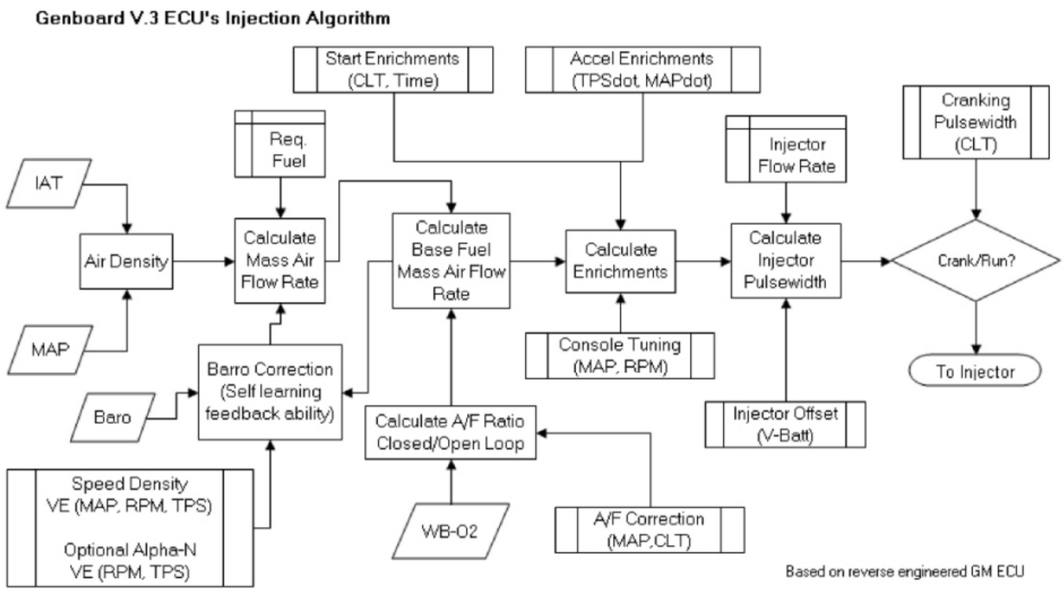
Atmel Product Sheets: http://www.atmel.com/dyn/products/product_card.asp?part_id=2018

See Appendix C for a block diagram.

The EFI & Ignition Process

Add stuff here about basic EFI and ignition processes and principles. Flow charts would be ideal. Keep it generalized, in other words, talk about the theory, not how we do it in code.

Figure 2.1. Ignition Flowchart



Code Overview

Need general introduction to this section.

As with many embedded processing units, one must deal with times events, and our application is no exception. These timed events can trigger algorithms, outputs, inputs, etc. There are several ways to implement timed events

- Busy-Loops
- Timer-Based Events

For example, when you sleep at night, do you watch your clock every 5 minutes to know when to wake up? You don't do that, do you? Most people will set an alarm clock to wake them up. This enables them to do what they really want; to sleep. In this example, the busy-loop does not allow people to do what they want.

This leads us to a timer-based event execution, which we control through software. It finds what needs to be done next, knows when it is due, and also executes it. This allows us to set the alarm clock and execute some task when it goes off. Timer based events keep us from using a busy-loop, which can waste many processor cycles.

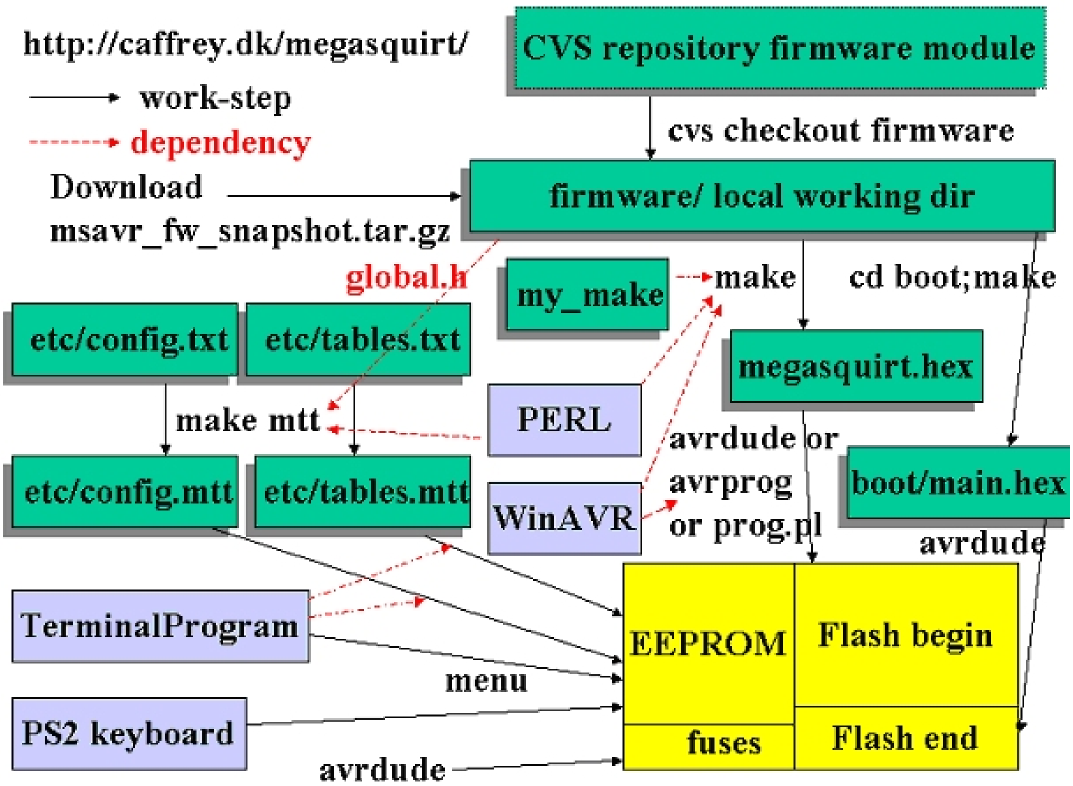
Collectively this is called event-queuing; the process of scheduling events precisely, with little overhead. The Event-Queue s precision is implemented at 4 -sec, however worst case has shown to take around 28 -sec, although this rarely happens. This idea has allowed the Genboard to remove frequent no-op interrupts by using hardware counters and output compare registers as our alarm clock. Neither sequential injector nor precise ignition timing would be practical otherwise. Allowing for more available functions, the Genboard V.3 ECU is fast, precise, and inexpensive.

How to we get Heap-Structure in here in a clear concise manner?

Here we need to introduce a code flowchart, etc.

Now we want to introduce the Code Layout of the different modules etc. Need a good paragraph to introduce this diagram. We should really create a cleaned up version of thsi software layout picture.

Figure 2.2. Software Layout



The following paragraphs will give a little better description of the elements and categories listed above.

Talk about the main loop of the code and briefly mention each of the main functions that get called. Include information about how Eventqueue, etc works.

Include basic information about our efforts with the CVS on SourceForge.

Chapter 3. The Hardware

This chapter has been designed to help you, the user, to assemble, customize, and install the remainder of Genboard V.3 ECU. We intend to accomplish some teaching of the following items in this chapter:

- Basic hardware functions of the ECU.
- ECU Connections
- Basic wiring diagrams
- Standard sensor inputs
- Standard outputs/drivers
- Interfacing

We want to make this as painless as possible. The following sections will hopefully give you a basic idea of what goes on in the circuitry, a glance of Genboard potential, and a follow-up of some straightforward standard automotive wiring. Finally, we will discuss different ways to interface with your Genboard V.3 ECU. More advanced topics will be covered in the appendix and will be noted as such.

Basic Hardware Functions

The features described in Chapter 1 touched on this section. However, here the discussion will help to relate those basic features into what they can be used for generally, and then some more advanced uses will be touched upon.

The 8 ignition drivers are composed of a logic level IGBT that supports continuous 14-amps. Ignition coils, DI or DIS, are generally connected with their positive terminal to 12 volts and the negative terminal is connected to the Genboard. These drivers take the negative terminal and connect it to ground when the gate input is triggered.

The 8 injection drivers support peak-hold injectors. Each injector's positive terminal is connected to a fused common 12-volt supply while the ground is run back to the board. These injection drivers connect the injector's ground to an actual ground when the gate input is triggered in a pulse width modulated (PWM) format. Each injector uses a15A, 9.5nC, Rds = 0.055, logic level, insulated FET and we have incorporated flyback protection into the driver circuit itself.

There are 2 High current outputs used for miscellaneous functions. These drivers are built the same as the injector drivers and can be configured as high current (14 to 15 A) drivers for special outputs. Examples of these include:

- Boost control with vacuum or electronic actuator
- Nitrous control
- Water injection
- Alcohol injection
- Variable intake actuator
- Relay/Solenoid for whatever you need

Stepper driver circuit goes here just like above...

Open collector driver circuit goes here just like above …

Pulse width modulated inputs for triggers here just like above …

Analog to digital inputs for sensors here just like above …

Flyback circuits are used to protect the switching equipment (the injector driver FETs) from extremely high voltages that could occur when the inductive load is switched off. While the load is switched off, voltage builds up and must be dissipated somehow so that we don't burn up the FETs. Some FETs can handle some abuse in this manner, but still, their ability to deal with the high voltage is not sufficient, so we use a high voltage switching flyback to take care of it. Compared to a Zener diode setup, the switching flyback allows quicker switching (for quicker closing of injectors), longer life, less heat buildup, and returns the voltage to the injector common (12-volt VBATT) instead of to a ground connection, as is used in other systems.

Anything else?

ECU Connectors

The Econoseal Connectors

The Econoseal III connection is where your Genboard V.3 ECU connects to the rest of the automobile. The Econoseal III connector is of industrial grade and serves to limit vibrations and contains a seal to keep out fluids like oil and water in almost all cases.

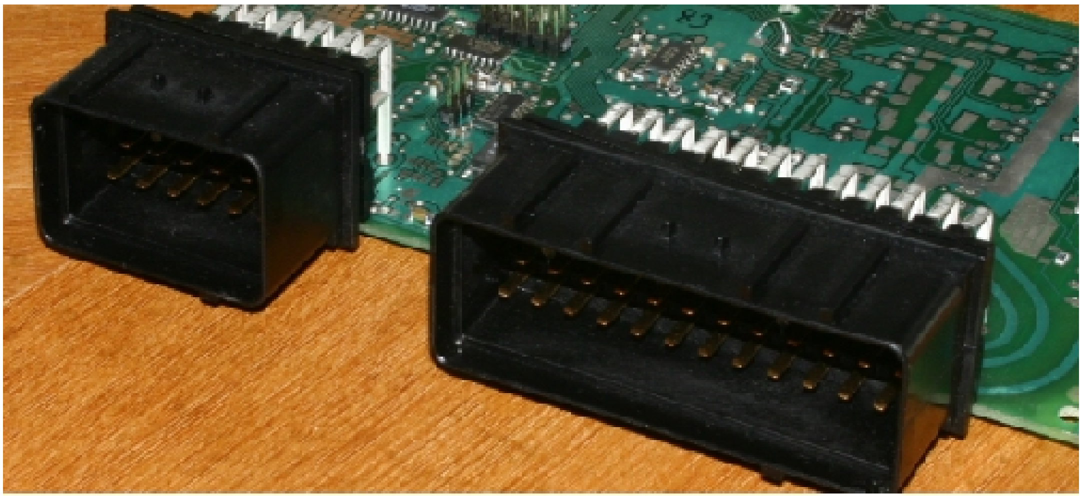
Table 3.1. The 36-pin Econoseal Pinout

Pin 01 - Throttle Position Sensor Signal	Pin 19 - Injector Driver B (INJB)
Pin 02 - Idle Air Temperature Input	Pin 20 - Injector Driver D (INJD)
Pin 03 - Fast Idle Solenoid Driver (IDL)	Pin 21 - Analog Ground (GND)
Pin 04 - Coil Driver 08	Pin 22 - Flyback Rail (FLY)
Pin 05 - Analog Ground (GND)	Pin 23 - Flyback Rail (FLY)
Pin 06 - Injector Driver G (INJG)	Pin 24 - Coil 6 Driver
Pin 07 - Injector Driver A (INJA)	Pin 25 - Voltage Supply (V-Batt)
Pin 08 - Injector Driver C (INJC)	Pin 26 - Ground (GND)
Pin 09 - Injector Driver E (INJE)	Pin 27 - Primary Trigger Signal (TRIG1)
Pin 10 - Coil Driver 07	Pin 28 - Trigger Supply (HALL/VR)
Pin 11 - Coil Driver 04	Pin 29 - Throttle Position Voltage Divider (TPS)
Pin 12 - Coil Driver 05	Pin 30 - Coil Driver 11
Pin 13 - Secondary Trigger Signal (TRIG2)	Pin 31 - Coil Driver 10
Pin 14 - Coolant Air Temperature Input (CLT)	Pin 32 - Analog Ground (GND)
Pin 15 - Fuel Pump Relay (FPR)	Pin 33 - Coil Driver 01
Pin 16 - Coil Driver 09	Pin 34 - Coil Driver 02
Pin 17 - Injector Driver H (INJH)	Pin 35 - Coil Driver 00
Pin 18 - Injector Driver F (INJF)	Pin 36 - Coil Driver 03

Table 3.2. The 18-pin Econoseal Pinout

Pin 01 - Nernst Cell Signal (WBO2 #2)	Pin 10 - Idle Stepper Driver B (STEP B)
Pin 02 - Exhaust Back Pressure Input (EBP)	Pin 11 - Idle Stepper Driver D (STEP D)
Pin 03 - Fuel Pressure Input (FP)	Pin 12 - High Current Driver A
Pin 04 - Idle Stepper Driver A (STEP A)	Pin 13 - Nernst Cell Signal (WBO2 #1)
Pin 05 - Idle Stepper Driver C (STEP C)	Pin 14 - Blank
Pin 06 - High Current Driver B	Pin 15 - Blank
Pin 07 - Wideband O2 Pump (WBP-)	Pin 16 - Dallas Digital Output (1-Wire)
Pin 08 - Wideband O2 Pump (WBP+ #2)	Pin 17 - Wideband O2 Heater (WBH- #2)

Pin 09 - Wideband O2 Pump (WBP+ #1)	Pin 18 - Wideband O2 Heater (WBH- #1)

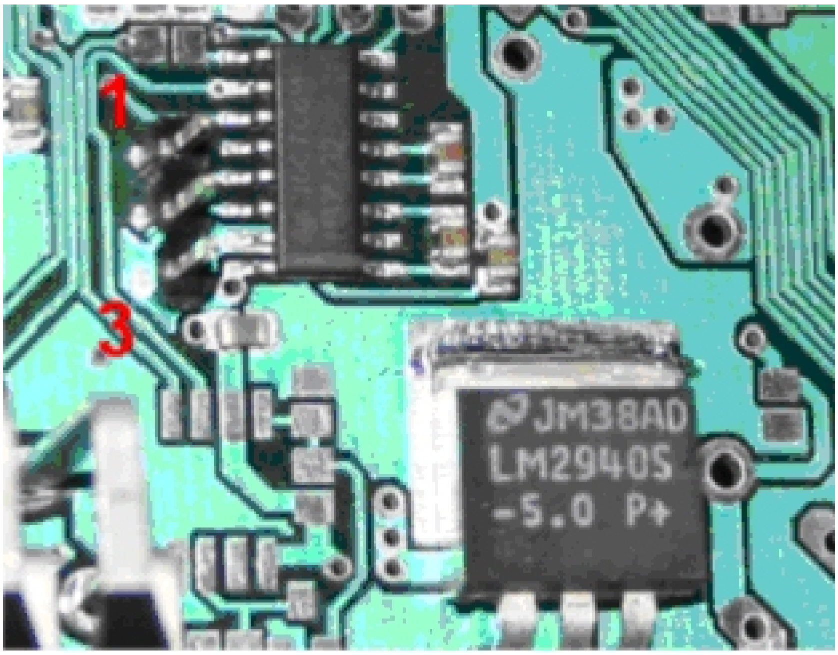


RS-232 Serial Connector

Here we need to talk about the RS-232 Serial Connector........

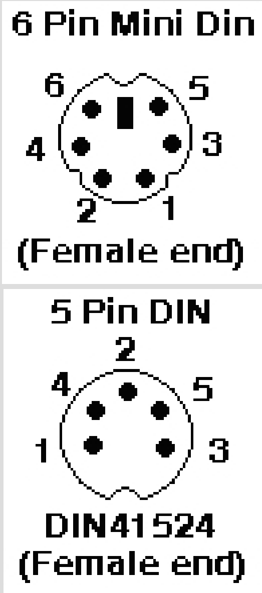
Table 3.3. RS-232 Serial Pinout

Pin 01 - Genboard Transmit to DB 9 Pin 3
Pin 02 - Genboard Recieve to DB 9 Pin 2
Pin 03 - Data Ground to DB 9 Pin 5



Keyboard Connection

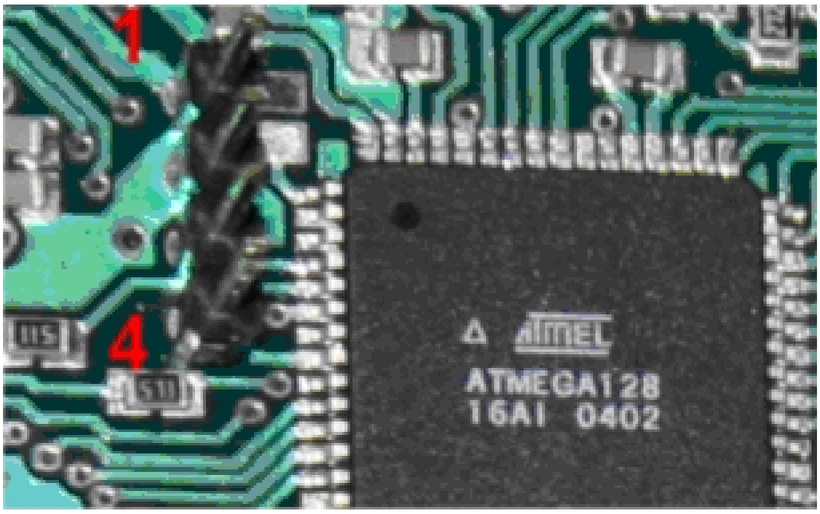
Keyboard Plugs



The Keyboard connector allows for a simple and versatile interface for inputing commands into the Genboard ECU. It is located to the left of the ECU's Atmel processor. You can interface with either a PS2 or an AT Connector. The PS2 connector is also refered to as a "6 Pin Mini DIN", while the AT connector is refered to as a "5 Pin DIN". Either can be used as noted in the table below.

Table 3.4. PS2 Keyboard Pinout

Pin 01 - Vcc to DIN 6 Pin 4, or DIN 5 Pin 5
Pin 02 - Ground to DIN6 Pin 3, or DIN 5 Pin 4
Pin 03 - Data to DIN 6 Pin 3, or DIN 5 Pin 4
Pin 04 - Clock to DIN 6, Pin 5, or DIN 5 Pin 1

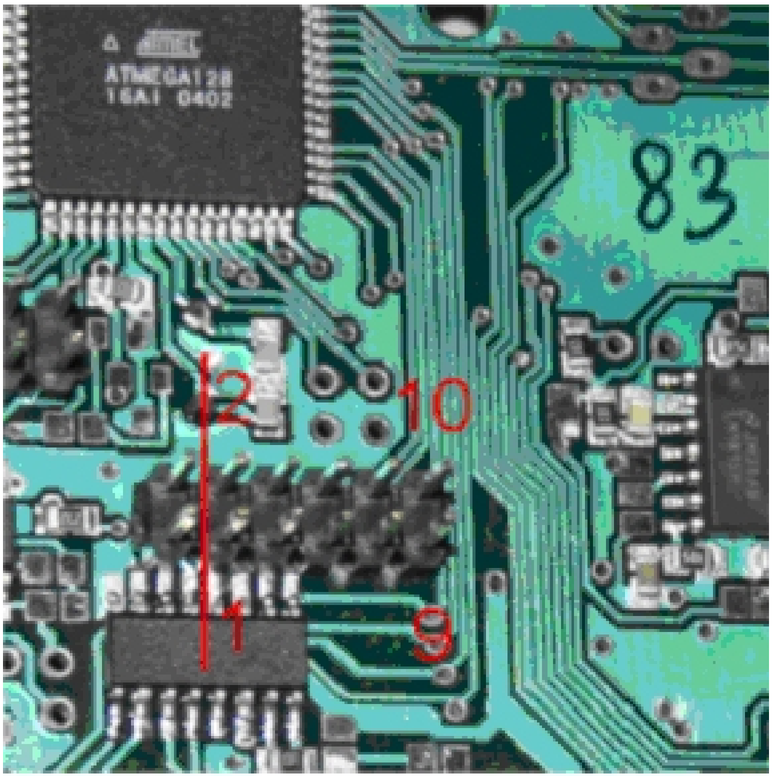


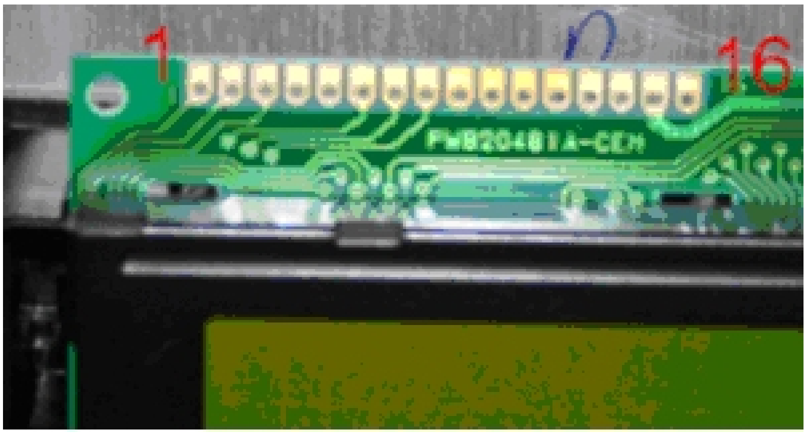
LCD Connection

The LCD Header is located directly below the ECU's Atmel processor and is used to interface a ____ compatable LCD. Please note that the LCD header does not start at Pin 1, but rather at Pin -1. This was done to make Pin 1 the first LCD pin. Please note that all following information assumes that you are using the LCD supplied from the VEMS Webstore. For contrast adjustment, a 470 to 1000 ohm potentiometer can be connected between LCD Pin 3 and Ground. The backlight feature is available by inserting a 100 ohm resister between LCD Pin 15 and Vcc. The backlight feature can be switched on or off by using a switch between LCD Pin 16 and Ground.

Table 3.5. LCD Pinout

Pin 01 - RS to LCD Pin 4
Pin 02 - Ground to LCD Pin 1
Pin 03 - Databit 7 to LCD Pin 14
Pin 04 - Databit 6 to LCD Pin 13
Pin 05 - Databit 5 to LCD Pin 12
Pin 06 - Databit 4 to LCD Pin 11
Pin 07 - R/W to LCD Pin 5
Pin 08 - Enable to LCD Pin 6
Pin 09 - Not Used
Pin 10 - Vcc to LCD Pin 2





Standard Wiring Diagrams

Diagrams of common Genboard V.3 ECU configurations need to be added to the appendix as noted here. These need to be similar to the ones located on http://www.vems-group.org/index.php?page=GenBoard/Manual/MainWiringDiagrams Full explanations needed with them.

Standard Sensor Inputs

Throttle Position Sensor

The throttle position sensor (TPS) reads back to the computer the position of the throttle plates in the throttle body. The TPS is used as an input for several different control loops including deceleration fuel cutting, acceleration enrichment, etc. As noted in the Genboard V.3 ECU pin out the following pin(s) are used for the TPS.

- EC36 Pin 29 - TPS Supply (5VDC)
- EC36 Pin 21 - Ground
- EC36 Pin 1 - TPS Signal Return

Self check steps?

Intake Air Temperature Sensor

The intake air temperature is used in conjunction with manifold air pressure to determine the exact air density for the proper amount of fuel. Like the CLT sensor, the Genboard V.3 ECU was designed to be operated with a General Motors (GM) IAT sensor. Any sensor, or thermocouple, can be used; however it will require a recalibration of the ECU’s internal tables. More can be seen about this in the section called EASYTHERM in Chapter 4. The following pin(s) are used to read the resistance of the IAT sensor through chassis ground.

- EC36 Pin 2 - IAT Sensor

Add graph from data sheet to Appendix C of temperature versus resistance. Also include steps for self-checking the sensor using a multimeter and the graph.

Coolant Temperature Sensor

The coolant temperature (CLT) is also used in conjunction with fuel delivery. Different fuel amounts are needed for different engine temperatures to ensure maximum streetability. Like the IAT sensor, the Genboard V.3 ECU was designed to be operated with a General Motors (GM) CLT sensor. Any sensor, or thermocouple, can be used; however it will require a recalibration of the

ECU's internal tables. More can be seen about this in the section called EASYTHERM in Chapter 4. The following pin(s) are used to read the resistance of the CLT sensor through chassis ground.

- EC36 Pin 14 - CLT Sensor

Add graph from data sheet to Appendix C of temperature versus resistance. Also include steps for self-checking the sensor using a multimeter and the graph. Added graph for GM CLT on page 34. Couldn't find a graph online (and I don't have a GM Haynes), so I created one that works, but its not all that nice. Replace if you can find a better looking one.

Manifold Air Pressure Sensor

The manifold air pressure (MAP) is used in conjunction with IAT to determine the exact air density for the proper amount of fuel. The MAP is also used with RPM to look up volumetric efficiency numbers in a customizable table. An assembled Genboard V.3 ECU comes with an onboard 2.5bar Motorola MPX4250A pressure sensor that requires a vacuum hose be run to it. This MAP sensor can be substituted with another however it will require a recalibration of the ECU's internal tables. More can be seen about this in the section called EASYTHERM in Chapter 4. Substitution also requires a modification to the PCB.

Graph from data sheet added to Appendix C of pressure versus V-Out. Also include steps for self-checking the MAP sensor using a multimeter and the graph. Data sheet is here: http://www.vems-group.org/files/sensors/MPX4250A_rev4.pdf

Wideband O2 Sensor

The wideband oxygen sensor (WBO2) is used as feedback to the Genboard V.3 ECU's fuel calculations. When a target air fuel ratio (A/F) is set, the ECU can use the WBO2 sensor to compensate for too much or too little fuel. The WBO2 sensor is similar to the standard, commonly used narrowband oxygen sensor. Since the Genboard V.3 ECU was designed to be used with the Bosch LSU4 Wideband Oxygen sensor, it can provide very accurate, high rate A/F data. Genboard V.3 ECU excels above the rest as it provides for two WBO2 sensors. These can be bought through the VEMS Web Shop. Please read Appendix A's Genboard Wideband License.

The WBO2 sensor is not a common sensor. It contains a heater and pump that must be driven with a controlled 12 volts to maintain proper A/F readings. The following pin(s) allow the WBO2 sensors to connect to the Genboard V.3 ECU:

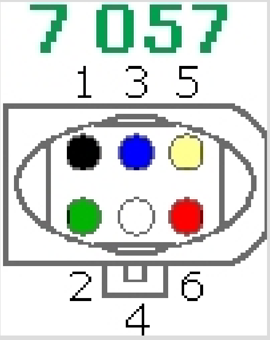
Wideband O2 #1

- EC18 Pin 13 - Nernst Cell 1
- EC18 Pin 18 - Heater 1 Return (-)
- EC18 Pin 7 - Pump Return (-) (Shared)
- EC18 Pin 9 - Pump 1 (+)

Wideband O2 #2

- EC18 Pin 1 - Nernst Cell 2
- EC18 Pin 17 - Heater 2 Return (-)
- EC18 Pin 7 - Pump Return (-) (Shared)
- EC18 Pin 8 - Pump 2 (+)

Wideband O2 Connector



A handy item to purchase from the VEMS Web Shop is the WBO2 sensor connector. This will allow for direct mating of the WBO2 sensor to the harness. An additional 12-volt fused supply is required to run the Wideband O2 sensors. The following pin(s) located on the common WBO2 sensor and are listed below. See right for actual connector.

- O2 Pin 1 - Nernst Cell
- O2 Pin 3 - Fused, Switched 12 volts. VBAT, Heater (+)
- O2 Pin 4 - Heater (-)
- O2 Pin 5 - Pump (-)
- O2 Pin 6 - Pump (+)

A graph of A/F versus V-out is located in Appendix C.

Exhaust Gas Temperature

The exhaust gas temperature probe/sensor is to aid the user in tuning his vehicle and/or allowing safe operation at prolonged or extreme conditions. The EGT probe is a K-Type thermocouple. Like the WBO2 sensor, the Genboard V.3 ECU provides for two EGT probe inputs. The following pin(s) are used to read the EGT sensor:

EGT Probe #1

- EC18 - Get pin information
- EC18 - Get pin information

EGT Probe #2

- EC18 - Get pin information
- EC18 - Get pin information

Add graph from data sheet to Appendix C of temperature versus resistance. Also include steps for self-checking the sensor using a multimeter and the graph.

Triggers

Put the oddels of information here about this subject.

Knock

Put the oddels of information here about this subject

Fuel & Exhaust Pressure Sensors

Put the oddels of information here about this subject

Standard Outputs/Drivers

Injectors

The injector (INJ) outputs on the Genboard V.3 ECU are used to drive High-Z, peak- and-hold injectors. Genboard can be configured to use any combination of these INJ outputs to support between 2 and 16 individual injectors. There are load concerns to think about before trying to hook up the injectors.

Genboard V.3 ECU support either batch, semi sequential, and full sequential. There are different theories about which mode of injection is better. VEMS is in agreement that while sequential does not add more power, its more efficient, lowers emissions, and provides better seat time for an injector since a longer on time is used. Full sequential injection can only support up to 8 injectors. Since the INJ circuitry will only allow two injectors to be connected to one driver, the most Genboard V.3 ECU could support would be 16 cylinders in semi sequential or batch mode. How you setup your triggers in both hardware (Chapter 3) and software (Chapter 4).

For any combination of injectors, the positive terminal on the injector(s) must be connected to fused, switched 12 volts and the negative terminal is connected to the Genboard at the one of the following INJ Pins:

- EC36 Pin 7 - Injector Driver A
- EC36 Pin 19 - Injector Driver B
- EC36 Pin 8 - Injector Driver C
- EC36 Pin 20 - Injector Driver D
- EC36 Pin 9 - Injector Driver E
- EC36 Pin 18 - Injector Driver F
- EC36 Pin 6 - Injector Driver G
- EC36 Pin 17 - Injector Driver H

Associated with injector solenoids is flyback. Please talk briefly here how to hook it up and when to hook it up.

Coils/Misc Drivers

Complete this just like the injector section was done. Note about how the ingition and driver outputs are the same.

Fuel Pump Relay

Again, complete this just lik e the previous sections

Idle Air Actuator

Again, complete this just lik e the previous sections

Idle Air Motor

Again, complete this just lik e the previous sections

Interfacing the Genboard

The remaining hardware abilities of the Genboard V.3 ECU are both direct interfacing and PC/PDA interfacing. Discuss them here… remember hardware only.

Chapter 4. The Software

This chapter discusses a topic equally as important as hardware - software. Let’s recap. If you recall the code overview section in Chapter 2, you will remember that there are two basic areas – firmware and configuration. In Chapter 3, you saw the different ways you can connect a Genboard V.3 ECU to an engine. Also in Chapter 3, you connected your Genboard to a PC/PDA. In this chapter, we will show you how to configure your ECU through a PC/PDA to run your engine through a configuration file.

Firmware

Getting Support Software

It is easiest to first download and install the support software, which includes WinAVR, CVS, and Perl. WinAVR is a compiler, or what breaks our human-readable commands to the processor down into something it can understand. WinAVR also includes a few utilities such as a shell (command line) and compression tools. Theses directions are written to include the use of these tools, however one can substitute a more familiar package if they choose to do so.

CVS, or Concurrent Version Systems, is a program that will download up to the minute updated software from the development site. It is very easy to use, but if you would rather manually download and uncompress a thrice-daily updated package, you can get the snapshot at: http://megasquirtavr.sourceforge.net/msavr_fw_snapshot.tar.gz

Perl is used to automatically synchronize some of the settings used when compiling the firmware. It is also used to automatically build the menu screens for the LCD display.

Download and Install CVS

The latest version of CVS is found at: http://www.cvshome.org/.

If you are looking for a binary (already compiled, you just uncompress and run it) file, look here: https://ccvs.cvshome.org/servlets/ProjectDocumentList?folderID=80&expandFolder=80&folderID=0. If you are having problems with CVS, you can always fall back to the snapshot.

Use the appropriate compression utility to uncompress the file downloaded from the CVS site, which should be a .zip file.

Download and Install WinAVR