



Instruction Manual

P/N 30-2500 AQ1 Data Logger



WARNING:

This installation is not for the electronic novice or the PC illiterate! Use this system with **EXTREME** caution! If you are not well versed in electronics and vehicle instrumentation or are not PC literate, please do not attempt the installation. Refer the installation to an AEM trained tuning shop. A list of AEM trained tuning shops is available at http://www.aemelectronics.com/dealer_locator.php or by calling 800-423-0046. You should also visit the AEM Tech Forum at <http://www.aemelectronics.com>

NOTE: AEM holds no responsibility for any engine damage that results from the misuse of this product!

KIT CONTENTS

- 1 x 35-2500 AQ1 DATA LOGGER MODULE W/ 2GB SD CARD
- 1 x DUST COVER
- 4 x MOUNTING SCREW
- 4 x HEX NUT
- 1 x INSTRUCTION MANUAL
- 1 x USB CABLE

INSTALLATION TIPS

1. Read through the entire manual and instructions before beginning the installation.
2. Disconnect the negative battery cable(s) before beginning any work.
3. Maintain a clean and neat work area through out the installation.
4. When raising or working under a vehicle, use properly rated stands/jacks.
5. Make sure all connectors are fully seated and inserted.
6. Make sure all components and cables are routed and installed away from any direct heat sources or sharp objects.

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INSTALLATION

MOUNTING THE AQ1 DATA LOGGER MODULE

Find a suitable mounting location for the AQ1 Data Logger module that is shielded from the environment (water, dirt, dust, etc) and away from any direct heat sources. The AQ1 Data Logger comes with a flexible dust cover, but is not a sealed module. Submerging the module or exposing the module to a direct source of moisture may cause damage. The dust cover must be used if the module is mounted outside of a sealed cab. The AQ1 Data Logger module must be properly oriented in order for the accelerometer to give accurate data. A few of the more common mounting orientations are shown below in Figure 1. A complete list is available in the software.



Figure 1. Common Mounting Orientations

A drill template for the AQ1 Data Logger is provided on the last page of the instruction manual. Drill the four mounting holes with a 3/16" drill bit. With the dust cover on the AQ1 Data Logger module, secure the module using the supplied 6-32 x 1 1/4" stainless screws and nuts. Some resistance will be felt when inserting the mounting screws for the first time as the screws will pierce the dust cover. A sharp pick or paper clip can be used to make pilot holes in the dust cover if desired. **Note: the dust cover is made of a specially selected material that allows the cover to be flexible, yet does not rip or tear.**

WIRING

Power Connections

RED (PERM PWR)- Connect to a fused (5 Amp) constant 12 volt power source.

RED (SWIGN) – Connect to a fused (5 Amp) switched 12 volt power source.

BLACK (BATT GND) – Connect to a clean power ground. (Do not connect to a sensor ground)

AEMnet

AEMnet is an open architecture software and hardware interface based on the CAN 2.0 specification, which provides the ability for multiple enabled devices to easily communicate with each other through a single cable. The hardware connection is made through a Deutsch 4P DTM connector and contains 12 volt switched power and ground (2A max) as well as the CAN data lines. Devices connected to the AEMnet transmit data through this one connection and most of these devices receive power from this same connection as well.

The following AEM products are currently AEMnet enabled:

Series 2 Engine Management System

EMS-4 Universal Standalone Engine Management System

4-Channel Wideband UEGO Controller

AQ-1 Data Logger

Plug the Deutsch 4-pin DTM connector on the AQ1 Data Logger harness into the mating connector on other AEMnet compatible devices. See “Using the AQ1 Data Logger” for more information on configuring the AEMnet.

INPUT SIGNALS

Analog 1-4 are 0-5V analog inputs with optional pull-up resistor for RTD/Thermistor-style sensor. Examples: AEM gauges, MAP/pressure sensors, TPS/APP/shock travel/load cell sensors, analog MAF sensors, any 2 wire RTD or thermistor style temp sensor. See “Using the AQ1 Data Logger” for more information on configuring Inputs 1-4. The corresponding wires in the harness for Analog 1-4 are Yellow and are labeled INPUT 1, INPUT 2, INPUT 3 and, INPUT 4.

Analog/Frequency 5-8 are analog inputs for that can optionally measure frequency (0-5 V or 0-16 V) Examples: RPM, vehicle speed, frequency based MAF, injector duty cycle, boost control solenoid, flow sensor, hall sensor, any 3 wire pressure sensor. See “Using the AQ1 Data Logger” for more information on configuring Inputs 5-8. The corresponding wires in the harness for Analog/Frequency 5-8 are Yellow and are labeled INPUT 5, INPUT 6, INPUT 7, and INPUT 8.

Connection diagrams are shown below for some of the more common sensors/signals to be used with Inputs 1-4 and Inputs 5-8. See Figure 2.

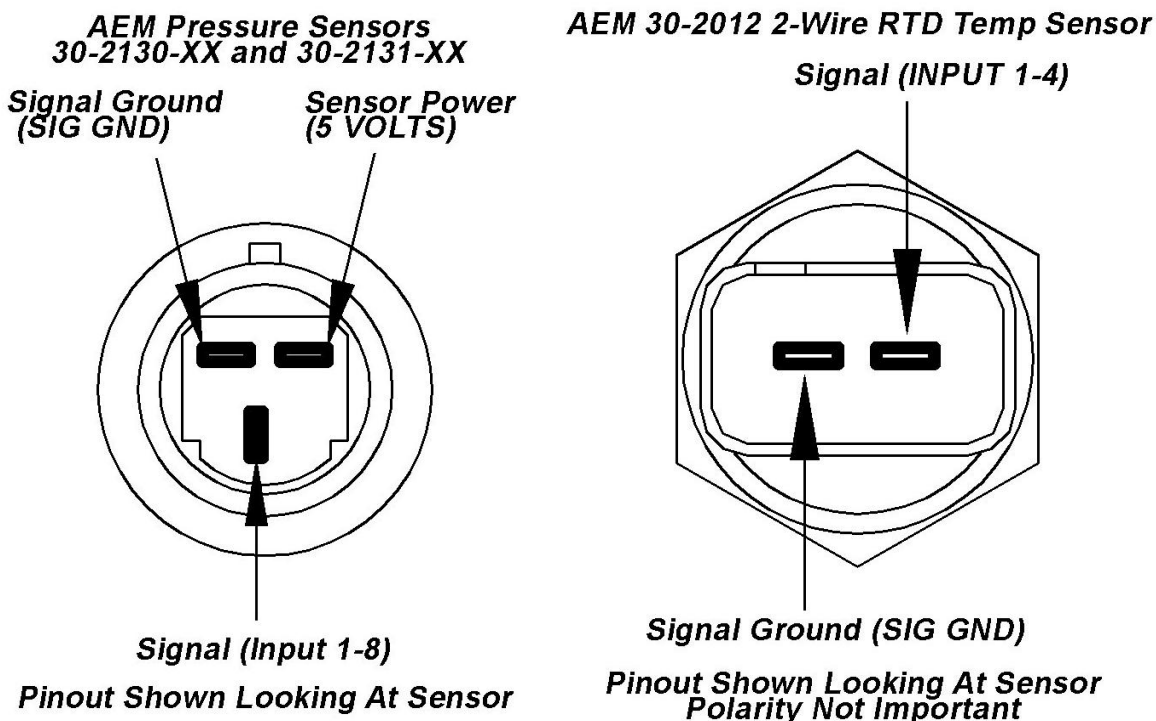


Figure 2. AEM Pressure Sensors(Left) AEM Temp Sensor (Right)

Figure 3 below shows the connection for an engine speed signal using an AEM Twin Fire CDI.

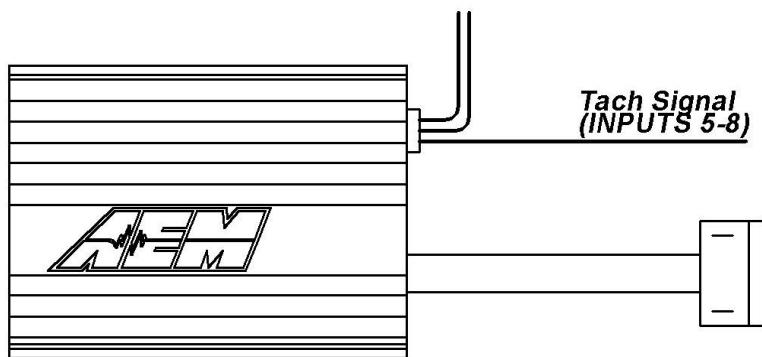


Figure 3. Engine RPM Signal From CDI

Digital 1-3 are switched to ground digital inputs, 16.5 V MAX tolerance.

Examples: Clutch/brake/cooling fan ground switch, nitrous solenoid ground or ground switch input to start/stop Logger (Ground activated input). Figure 4 below shows wiring diagrams for an on/off activation switch and a nitrous solenoid. The corresponding wires in the harness for Digital 1-3 are Brown and are labeled SW 1, SW 2, and SW 3.

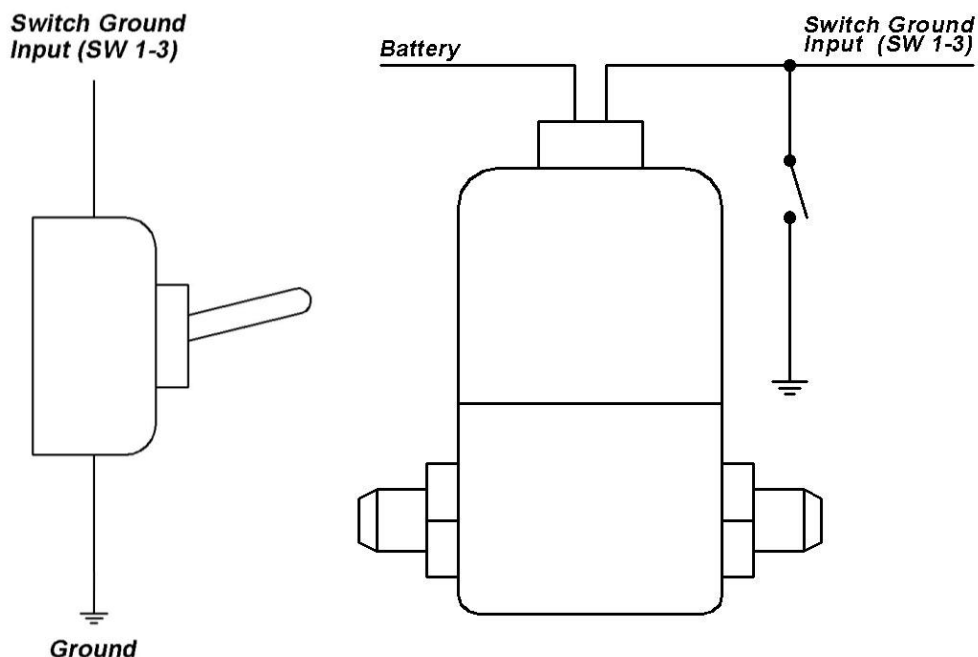


Figure 4. Activation Switch (Left) and Nitrous Solenoid (Right) Connections

SENSOR POWER

The AQ1 Data Logger has an internal low current 5 volt power supply that is used for powering sensors that require a 5 volt excitation. The corresponding wires in the harness are Red and are labeled 5 VOLTS.

SENSOR GROUND

The AQ1 Data Logger also has an internal low current sensor ground that is used for sensors that require a signal ground. The corresponding wires in the harness are Black and are labeled SIG GND.

RS 232

The RS232 serial input on the AQ1 Data Logger is configurable to read either a standard NMEA GPS data stream or the data stream from an AEM EMS. See “Using the AQ1 Data Logger” for more information on configuring the RS232 input. The AQ1 Data Logger harness comes with a male DB9 connector. When connecting to an AEM EMS, the male DB9 connector plugs directly into the mating connector on the back of the AEM EMS. The pinout for a GPS connection is shown below in Figure 5. AEM recommends using one of the Garmin GPS models listed below.

Garmin GPS 18x PC – 1 Hz model with DB9 connector and 12 volt power adapter
Garmin GPS18x 5Hz- 5 Hz OEM model, some wiring required.

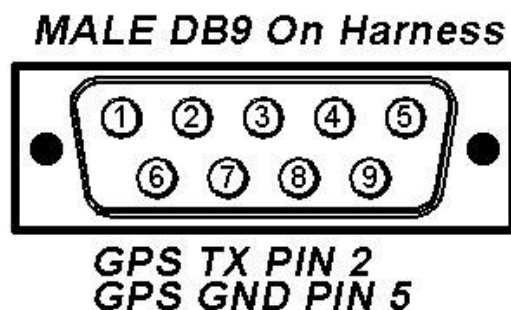


Figure 5. Typical GPS Connection

CAN BUS 2

Not used with AQ1 Data Logger PN 30-2500

USB

The AQ1 Data Logger has two USB ports for easy connection and programming. The AQ1 Data Logger receives low voltage power from the USB port, allowing users to access the SD card and make configuration changes at all times, 12 volt power is not necessary. The black remote mount USB port in the harness is designed for easy in vehicle programming and data downloads. The USB port on the back of the enclosure allows for easy bench top programming and data downloads when the module is removed from the vehicle. See Figure 6 below.



Figure 6. AQ1 On-Board (Left) and Harness (Right) USB Ports

USING THE AQ1 DATA LOGGER

INSTALLING THE SOFTWARE

The latest version of the AQ1 Data Acquisition Software can be downloaded from the downloads section of the AEM Performance Electronics forum at www.aemelectronics.com/downloads. Download the AQ1 Data Logger software and run the installer. A copy of AEMdata analysis software is included with the AQ1 Data Logger software for viewing and analysis of log files.

USING THE SOFTWARE

Double click on the AQ1 Data Acquisition software icon and open the AQ1 Data Logger software. The icon for the AQ1 Data Acquisition software is shown below in Figure 7.



Figure 7. AQ1 Data Acquisition Software Icon

OPEN AND SAVE CONFIGURATION FILES

AQ1 Data Logger configuration files have a .loggercfg suffix and contain the settings and sensor calibrations of the AQ1 Data Logger. Configurations are opened and saved using the AQ-1 drop down menu. See Figure 8 below.

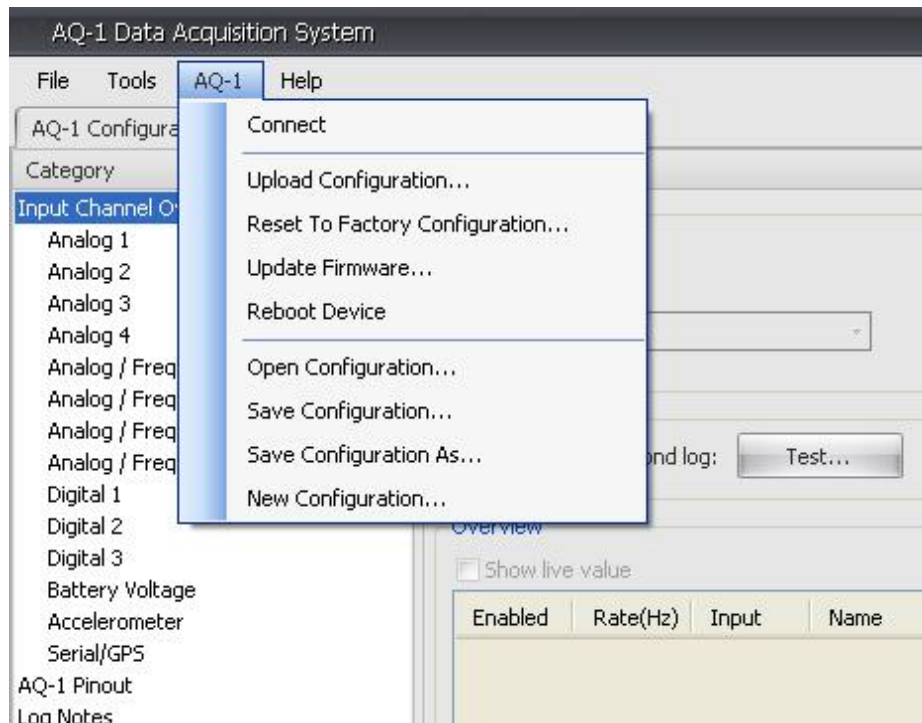


Figure 8. AQ-1 Dropdown Menu

HELP PANE

The help pane on the right side of the AQ1 Data Logger software provides a quick reference to detailed information about the options and functionality for each page in the software. See Figure 9 below.

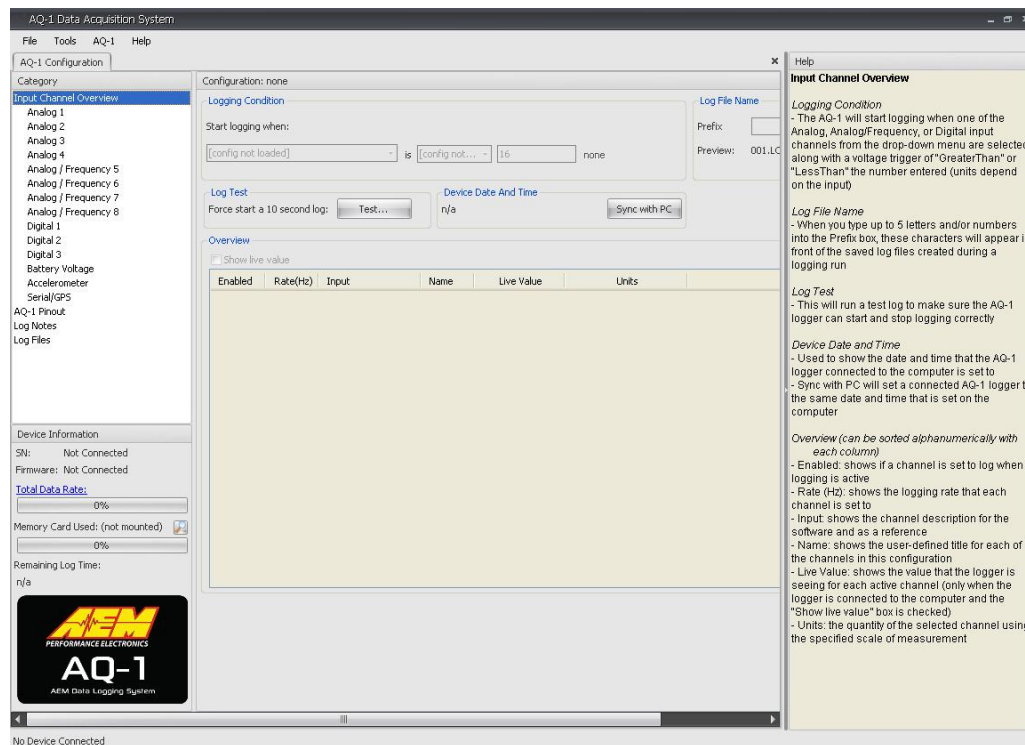


Figure 9. AQ1 Software Window With Help Pane showing

INPUT CHANNEL OVERVIEW

The input channel overview page shows an overview of the input channels and is used for setting the logging condition, as well as naming log files. The Logging Condition determines when the AQ1 Data Logger starts logging. In the example below, the AQ1 Data Logger will start logging when digital input 1 is turned on (grounded). Input channels are enabled/disabled with the check box in the enabled column. The Sync with PC button is used to sync the internal AQ1 Data Logger clock with the PC clock. The internal AQ1 Data Logger clock is used for the time stamp on log files. The clock must be re sync'd after perm power has been removed. See Figure 10 below.

Configuration: Device*

Logging Condition

Start logging when:

Digital 1 is ON.

Log File Name

Prefix: AEM

Preview: AEM001.LOG

Log Test

Force start a 10 second log: Test...

Device Date And Time

6/8/2011 6:58:33 AM Sync with PC

Overview

☐ Show live value

Enabled	Rate(Hz)	Input	Name	Live Value	Units
☒	50	Analog 1	Analog 1		V
☒	50	Analog 2	Analog 2		V
☒	50	Analog 3	Analog 3		V
☒	50	Analog 4	Analog 4		V
☒	50	Analog / Frequency 5	Analog/Frequency 5		V
☒	50	Analog / Frequency 6	Analog/Frequency 6		V
☒	50	Analog / Frequency 7	Analog/Frequency 7		V
☒	50	Analog / Frequency 8	Analog/Frequency 8		V
☒	20	Digital 1	Digital 1		n/a
☒	20	Digital 2	Digital 2		n/a
☒	20	Digital 3	Digital 3		n/a
☒	5	Battery Voltage	n/a		V
☒	10	Serial / GPS	n/a		n/a
☒	100	Accelerometer	n/a		n/a

Figure 10. Input Channel Overview Page

ANALOG 1-4 INPUTS

The pages for analog 1-4 are used to configure the analog 1-4 inputs, as well as show live data for easy setup and troubleshooting. Channels are enabled by the enabled check box. Both calibrated and raw (non-calibrated) live data are shown in the Live Data section. The sample rate is selected in the Sample Rate box. Users are able to name channels in the Name window. The optional 2200 ohm pullup resistor is enabled by the Enable 2200 Ohm pull-up resistor check box. The 2200 ohm pullup resistor should only be enabled when an input from an RTD or Thermistor type temp sensor is

being used. Sensors are selected by clicking on the browse button in the Wizard Name box. A graph and table of the sensor calibration data are also shown at the bottom of the page. The units can be changed by clicking on the browse button in the Units box. Figure 11 below shows Analog 1 configured for a GM style water temp sensor. Figure 12 below shows the GM style water temp sensor in the sensor wizard.

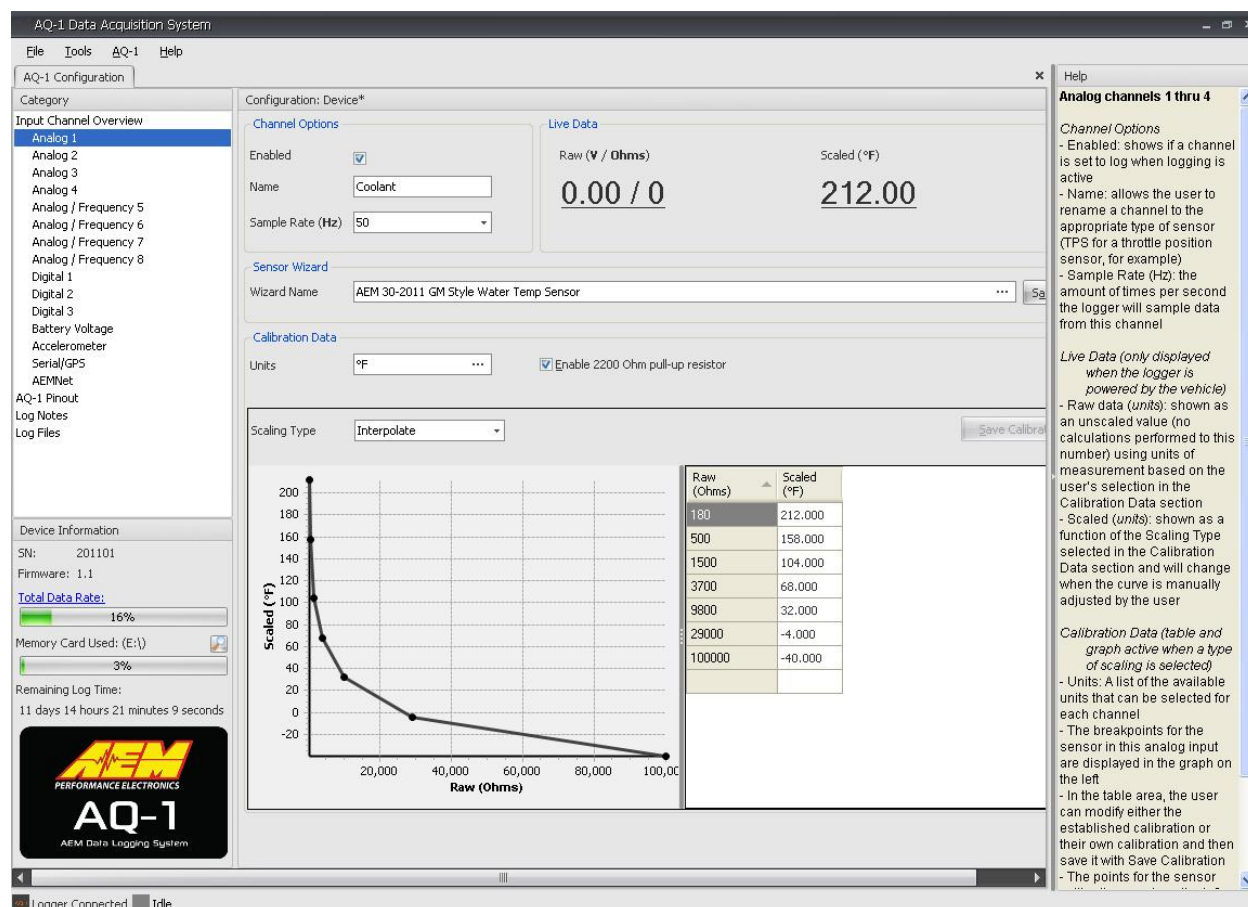


Figure 11. Analog 1 Configured for GM Style Water Temp Sensor

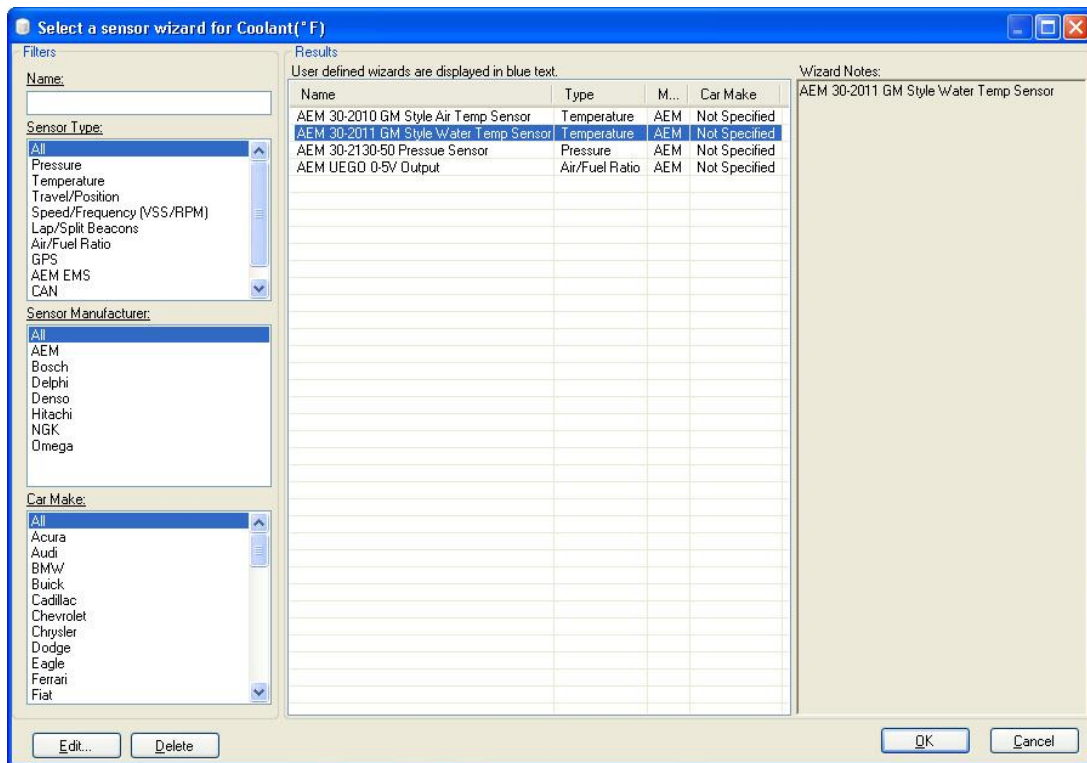


Figure 12. Selecting A Sensor

ANALOG/FREQUENCY 5-8 INPUTS

The analog/frequency 5-8 pages are similar to the Analog 1-4 pages. In addition to measuring voltage signals, Analog/Frequency channels 5-8 are also capable of measuring pulse based signals. Some examples of pulse based signals are engine rpm, MAF, vehicle speed, wheels speed, and driveshaft speed. The analog/frequency channels can also measure signals up to 16.5 volts. The maximum input voltage is selected by clicking on either 5V or 16.5V in the Calibration Data section. The Input Mode is user selectable from the following six options; Analog, Frequency, Period, Duty Cycle, Vehicle Speed, and Engine Speed. Figure 13 below shows Analog/Frequency 5 configured for engine speed.

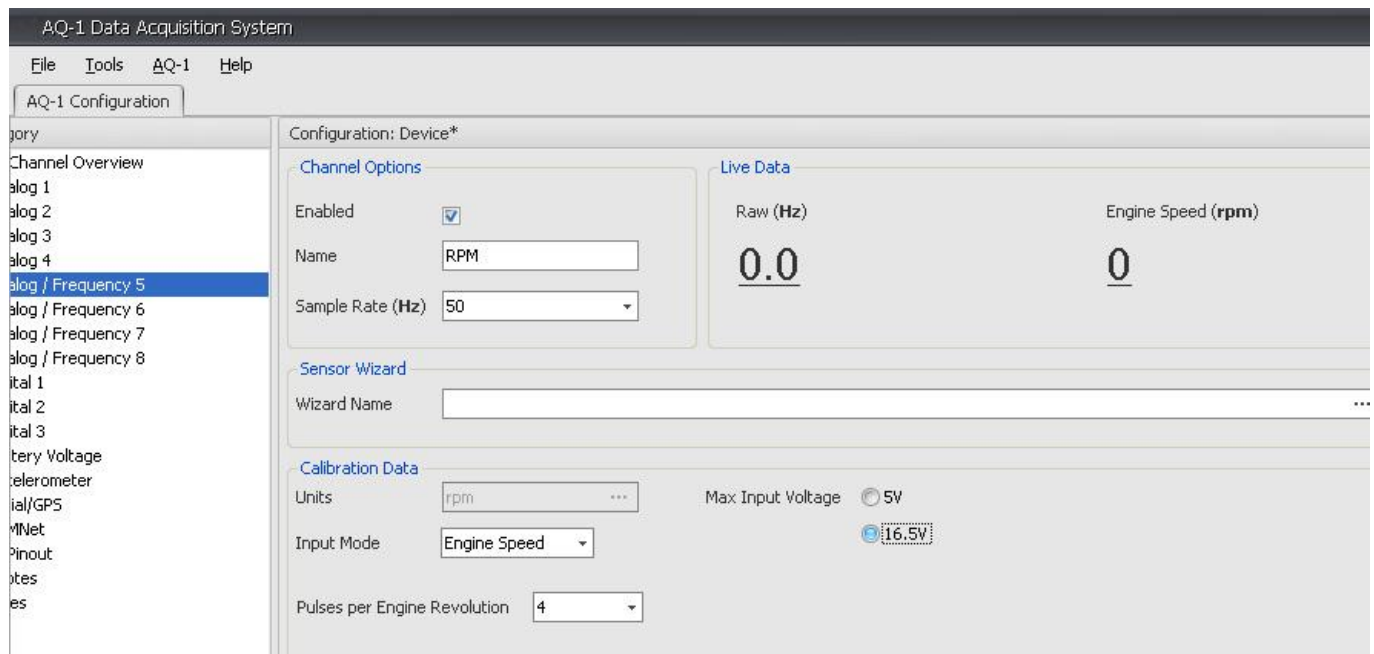


Figure 13. Analog / Frequency 5 Configured for RPM

DIGITAL 1-3 INPUTS

The Switched to Ground Digital 1-3 pages are used to configure the digital ground inputs. The Channel Options, Live Data, and Sensor Wizard function the same as the previously discussed analog pages. By default, the digital value is “OFF” when the input is grounded. If the Invert box is checked, the scaled value will display “ON” when the input is grounded. Figure 14 below shows Digital 1 configured to read “ON” when the input is grounded.

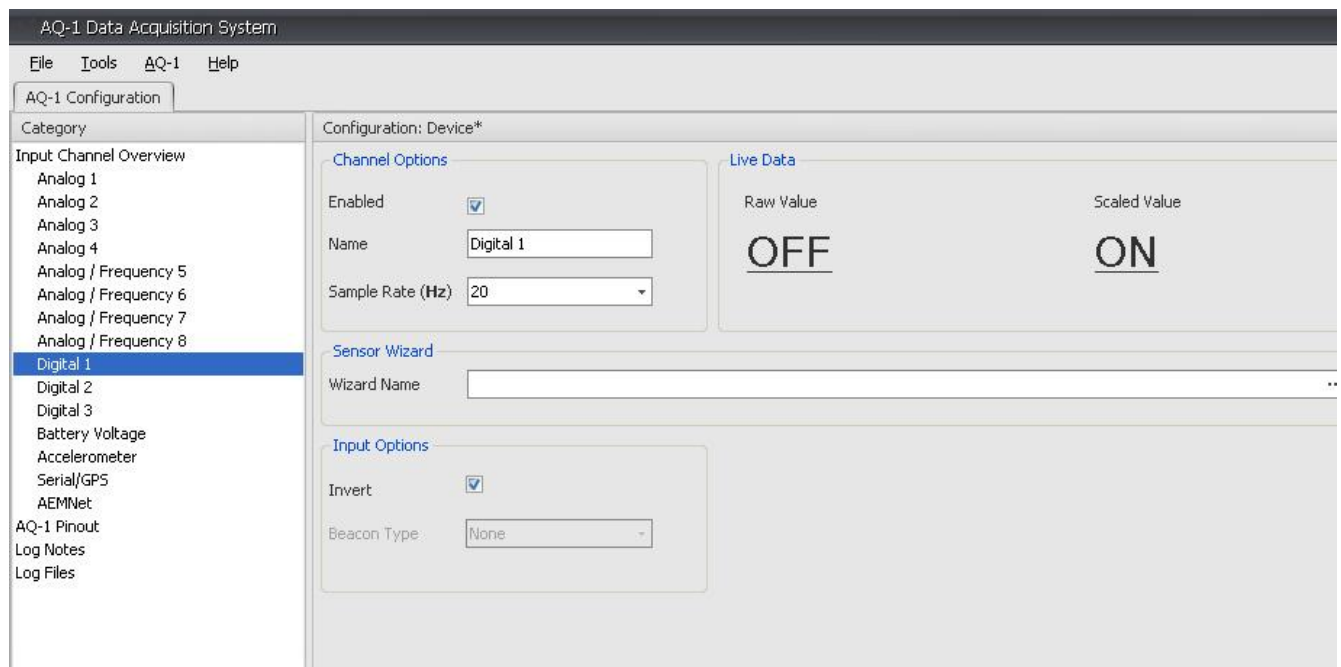


Figure 14. Digital 1 Page with Inverted Input

BATTERY VOLTAGE

The Battery Voltage page is shown below in Figure 15. The battery voltage is measured on the red switched ignition wire (SWIGN). See the section on “Power Connections” for wiring information.

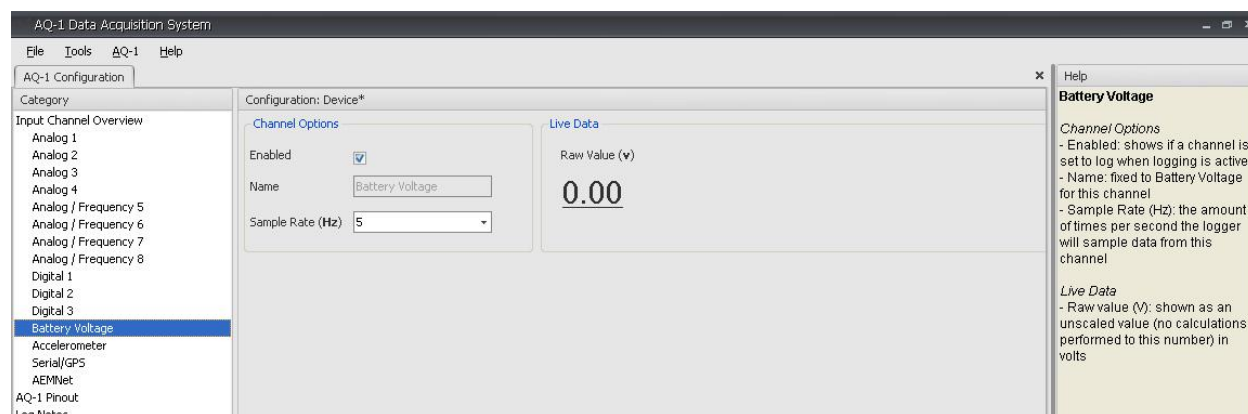


Figure 15. Battery Voltage Page

ACCELEROMETER

The Accelerometer page is used for calibrating the accelerometer. After mounting the AQ1 Data Logger module, the accelerometer must be calibrated in order to display accurate data. Click on the Choose and Calibrate button in the Accelerometer Mounting Position section. Follow the on-screen instructions to calibrate the accelerometer. The Accelerometer page is shown below in Figure 16.

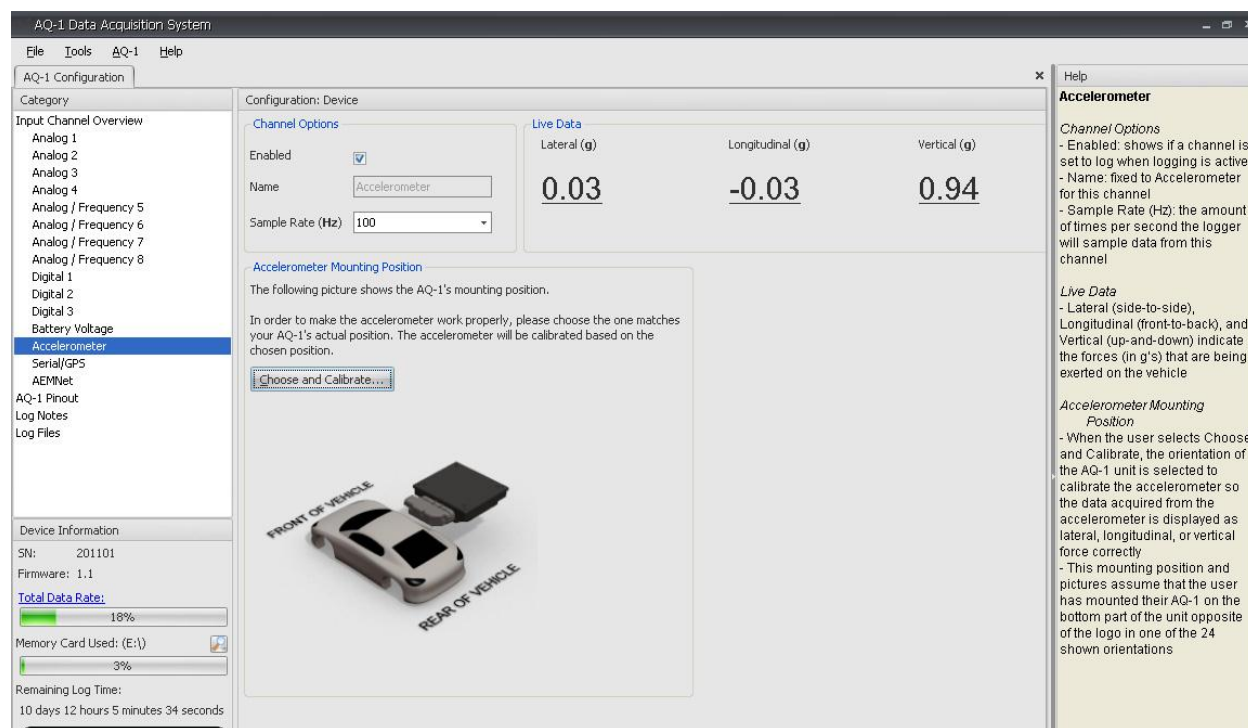


Figure 16. Accelerometer Page

SERIAL/GPS

The Serial/GPS page is used to configure the AQ1 Data Logger to read data on the RS232 input. When using a GPS, the input mode must be set to GPS. The baud rate selected must match the GPS baud rate. (See the GPS instructions for the GPS baud rate.) The sample rate is the rate at which the AQ1 Data Logger records the data. When logging the data stream from an AEM EMS, the input mode must be set to AEM EMS. The baud rate must be set to 19200. Figure 17 below shows the AQ1 Data Logger configured to log an AEM EMS.

Recommended GPS Sensors – Refer to page 6 for wiring instructions.

Garmin GPS 18x PC – 1 Hz model with DB9 connector and 12 volt power adapter
Garmin GPS18x 5Hz- 5 Hz OEM model, some wiring required.

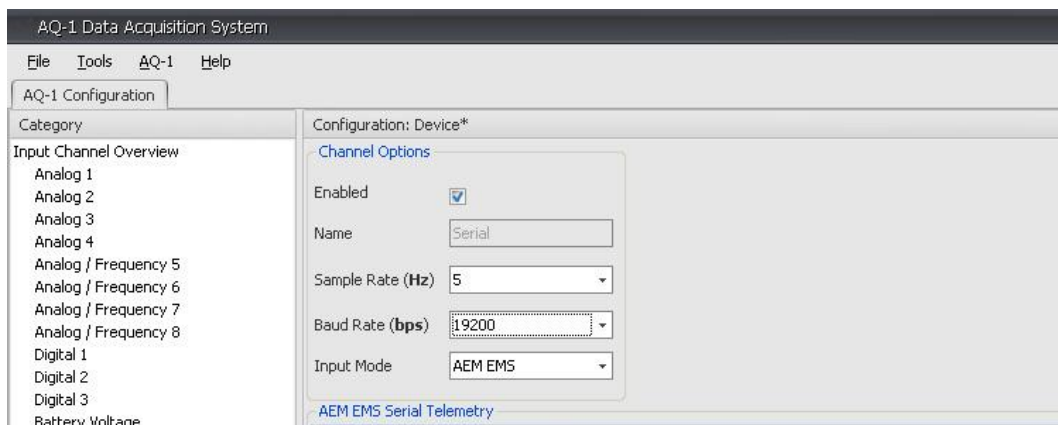


Figure 17. AQ1 Configured To Read AEM EMS Data Stream

AEMnet

The AEMnet page is used to select what parameters are logged from the AEMnet. Devices connected to the AEMnet are automatically detected and require no configuration. The AEMnet page is shown below in Figure 18.

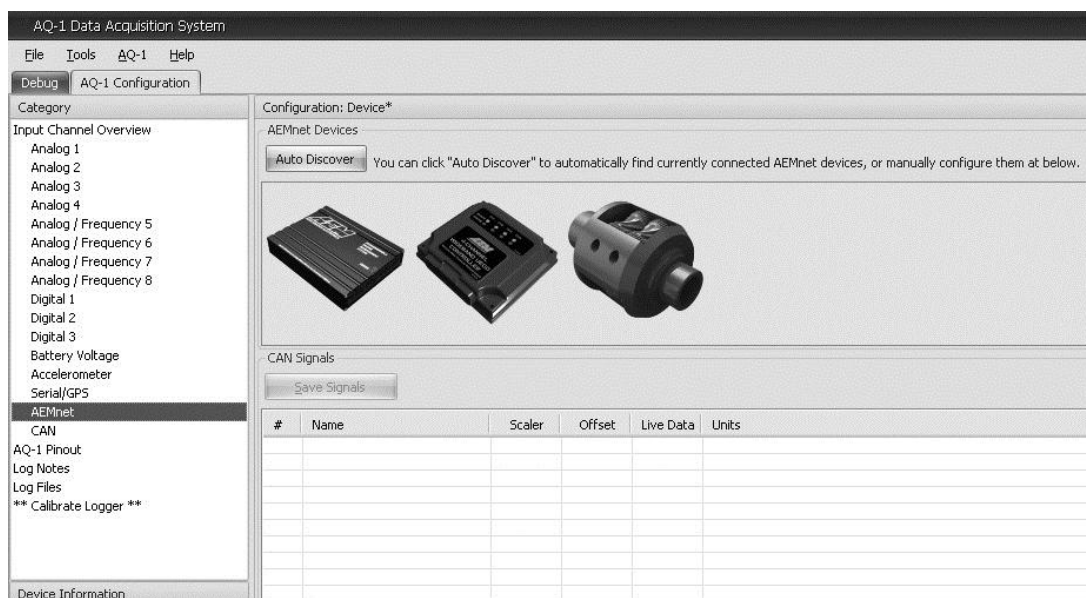


Figure 18. AEMnet Page

LOG NOTES

User notes can be entered in the Log Notes page. Notes will be saved with the log file. Figure 19 below shows the Log Notes page.

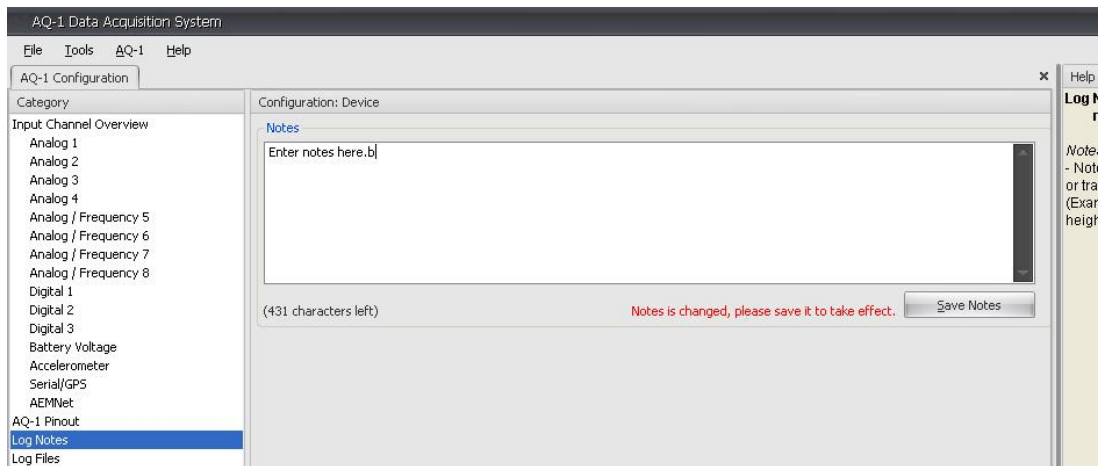


Figure 19. Log Notes

LOG FILES

Log files are automatically stored in the SD card with a .LOG file extension. Before viewing the data, the .LOG files must be converted to a .daq file format for viewing in AEMdata. The Log Files page is used for converting and downloading .LOG files from the SD card. To convert and open a .LOG file, select a file and click the open button. See Figure 20 below.

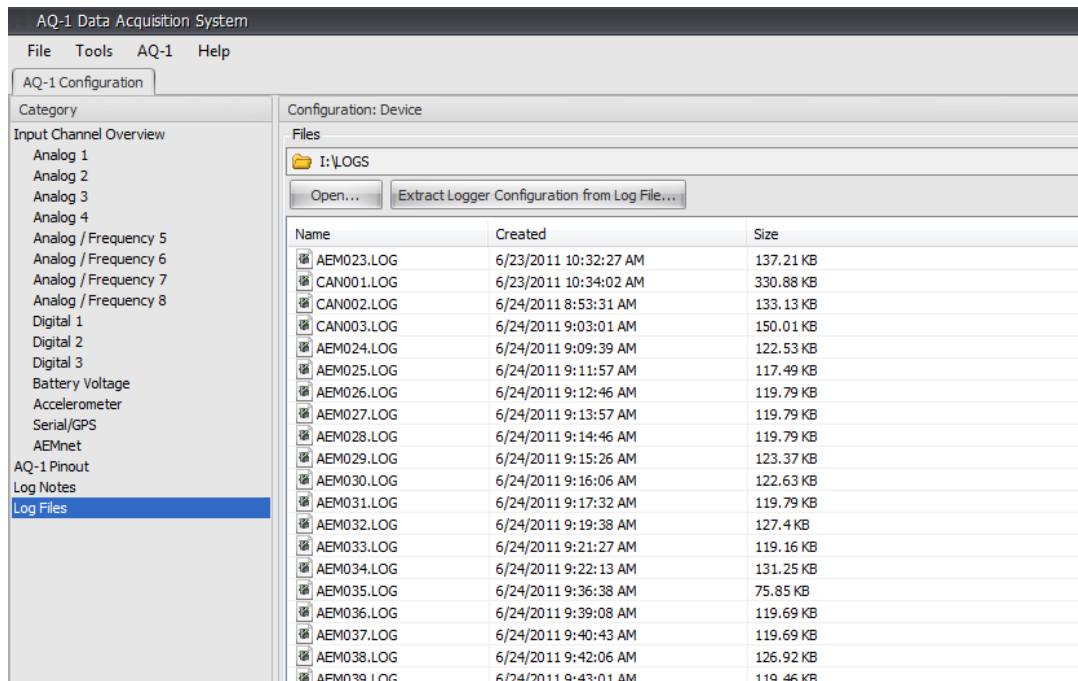


Figure 20. Log File Selected

The convert pop-up window will appear showing the selected file and the destination for the converted file. Click on the Convert button to convert the .LOG file. The file will be saved in the stated location and opened in AEMdata. Note: A copy of AEMdata must be installed on the computer in order for files to be opened. See Figure 21 below.

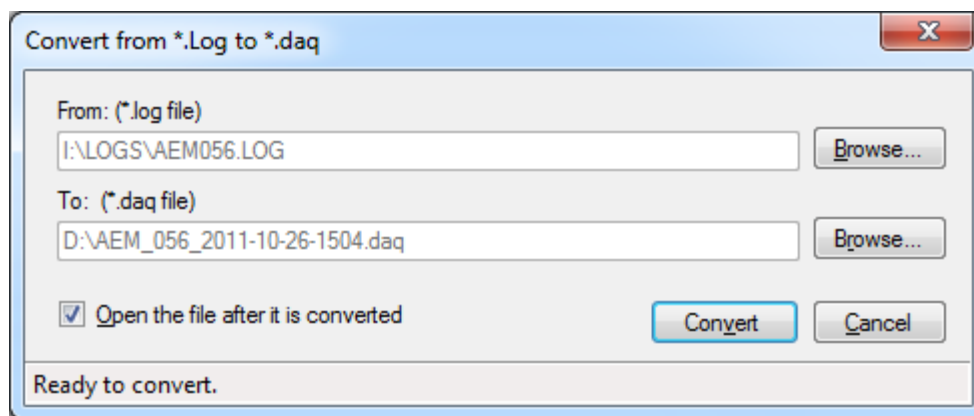


Figure 21. Convert File Window

DEVICE INFORMATION

The Device Information section of the AQ1 Data Logger software is in the lower left corner of the screen and is visible in every page. The total data rate, memory card usage, and remaining log time are shown, as well as the device serial number and firmware version. The status of the AQ1 Data Logger is also shown at the bottom left corner of the screen. When the AQ1 Data Logger is connected to the software, "Logger Connected" will appear. The software will read "No Device Connected" when the AQ1 Data Logger is not connected. See Figure 22 below.

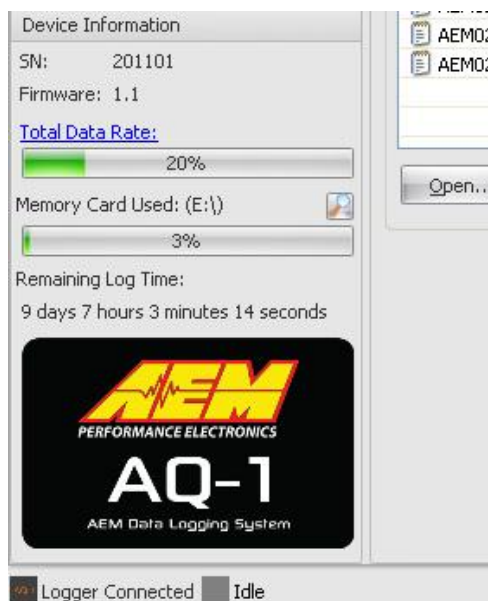


Figure 22. Device Information

SD CARD

The AQ1 Data Logger comes with a removable 2GB card that is located on the back of the logger. To remove the SD card, push the card in until a soft click is heard. The card will release and can be pulled out. To insert the card, push the card in until a soft click is heard. The card will remain locked in place. See Figure 23 below.



Figure 23. SD Card Location On Back Of AQ1

FIRMWARE UPDATES

Before doing any firmware updates, save a backup copy of any logger configuration files. Go to AQ1 > Update Firmware and the AQ-1 Bootloader pop-up window will appear. Click on the Open Firmware File button and follow the on-screen instructions to update the firmware. See Figure 24 below.

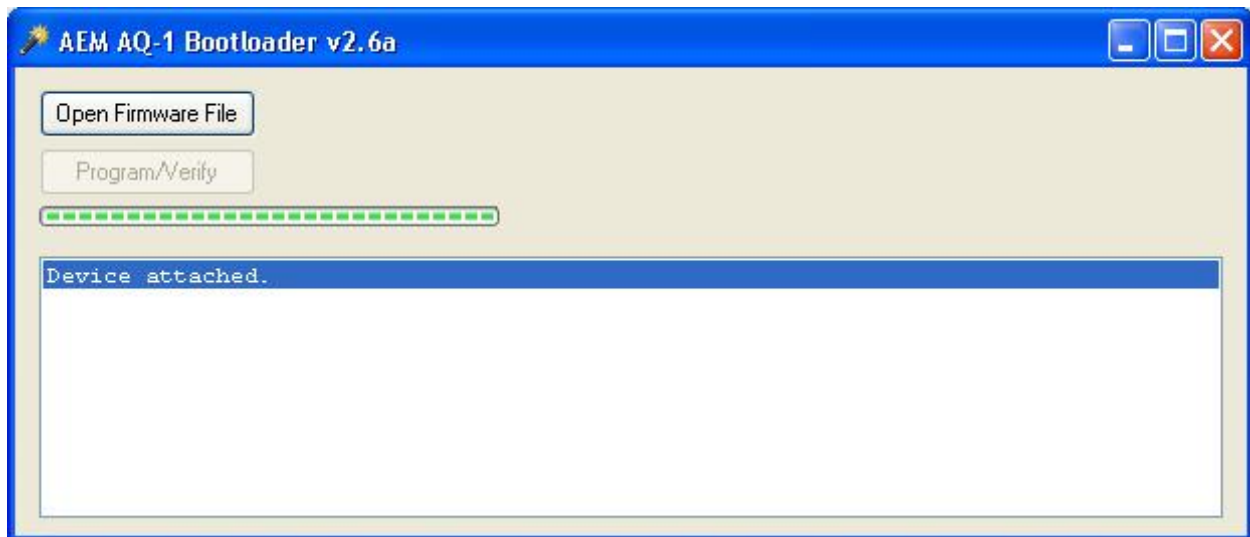


Figure 24. AQ1 Bootloader

AQ1 DATA LOGGER CONNECTOR PINOUT

Pin	Description	Wire Stamping
1	Switched 12V	SW IGN
2	Switch to Ground Digital Input 1 (16V Max)	SW 1
3	Switch to Ground Digital Input 2 (16V Max)	SW 2
4	Switch to Ground Digital Input 3 (16V Max)	SW 3
5	Ground/Sheild	NOT APPLICABLE
6	Permanent 12V	PERM PWR
7	Sensor Ground	SIG GND
8	Analog 1 (5V Max)	INPUT 1
9	Analog 2 (5V Max)	INPUT 2
10	Analog 3 (5V Max)	INPUT 3
11	Analog 4 (5V Max)	INPUT 4
12	Analog / Frequency 5 (5V / 16V Max)	INPUT 5
13	Analog / Frequency 6 (5V / 16V Max)	INPUT 6
14	Analog / Frequency 7 (5V / 16V Max)	INPUT 7
15	Analog / Frequency 8 (5V / 16V Max)	INPUT 8
16	RS-232 Tx (Output)	NOT APPLICABLE
17	RS-232 Rx (Input)	NOT APPLICABLE
18	RS-232/USB GND	NOT APPLICABLE
19	Power Ground	BATT GND
20	Sensor 5V	5 VOLTS
21	NOT POPULATED	NOT APPLICABLE
22	NOT POPULATED	NOT APPLICABLE
23	NOT POPULATED	NOT APPLICABLE
24	NOT POPULATED	NOT APPLICABLE
25	NOT POPULATED	NOT APPLICABLE
26	NOT POPULATED	NOT APPLICABLE
27	AEMnet+	NOT APPLICABLE
28	AEMnet-	NOT APPLICABLE
29	Reserved (Permanent 12)	NOT APPLICABLE
30	AEMnet Negative	NOT APPLICABLE
31	USB-	NOT APPLICABLE
32	USB+	NOT APPLICABLE
33	CAN H	NOT APPLICABLE
34	CAN L	NOT APPLICABLE
35	Shield	NOT APPLICABLE
36	USB 5V	NOT APPLICABLE

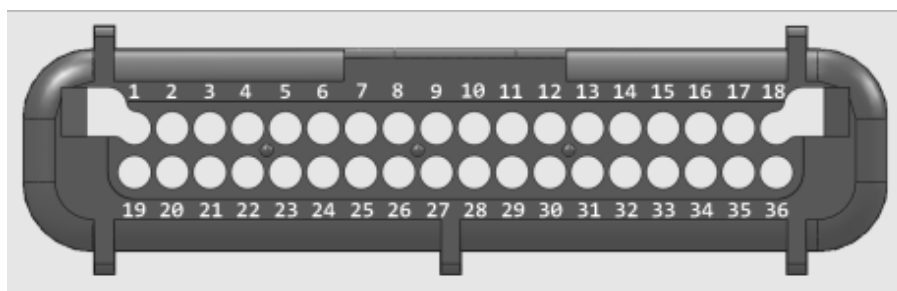


Figure 25. 36 Pin AQ1 Data Logger Connector, Wire Entry View

SPECIFICATIONS

AQ1 Data Logger

Supply Current	150 mA (nominal)
Input Channels	4 x Analog 0-5V with optional pullup resistor 4 x Analog/Frequency 0-5V or 0-16.5V 3 x Switch to Ground Digital
Data Stream	1 x AEMnet 1 x RS 232
Accelerometer	Internal 3 axis +/- 4G
Logging Rate	1000 samples per second (1KHz) Max
SD Card	2 GB included, 32 GB Max
Operating Voltage (nominal)	8-16 volts dc
Max Operating Temp	90C
Enclosure Size	4.8" x 4.55" x 1.44" (122 x 116 x 37mm)
Weight	0.5 lbs

Choosing Logging Rates

Choosing a logging rate for a channel involves considering a few different things.

Response time

The response time of a sensor is how long the voltage will take to change after it has actually changed. This will help you determine what logging rate you should set for a particular channel since there is no reason to have a very high update rate for a sensor that cannot update at the same speed or faster. For example, a coolant temperature sensor has a relatively slow update rate, so 10 Hz in the AQ-1 software should be fast enough.

Log file size

If the sampling rate for many of the inputs to the AQ-1 are set to very high rates, the data log files will become very large since there is far more information to be gathered by the AQ-1. This will result in fewer logs able to be stored on the SD memory card.

SD card limitations

Depending on the grade of the SD card, a high data logging rate could cause a data loss if the data logging rate is set incorrectly. See Total Data Rate in the SD card section below.

SD Card Information

SD vs SDHC

Secure Digital (SD) and Secure Digital High Capacity (SDHC) rated cards are compatible with the AQ-1. SDXC and beyond are not approved for use.

Size

Cards up to 32GB are approved for use with the AQ-1. SD cards 4GB and above may take longer for Windows to mount/recognize due to the file system required (FAT32) for high capacity cards.

Speed

SD/SDHC cards are rated as Class 2, Class 4, Class 6, or Class 10. The class can typically be identified by the Class number within a circle logo on the label of the card. Note: Class 2 cards commonly do not have the class number on the label. The AQ1 Data Logger comes with a 2GB Class 2 SD card that is suitable for most cases. Extremely high total logging rates may require use of a class 4, 6, or 10 SD/SDHC Card.

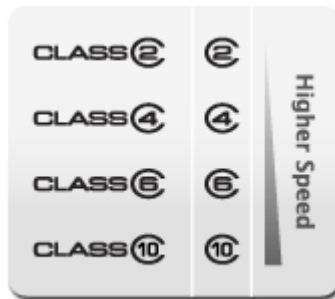


Figure 26. SD Card Speed Classes

If using a Class 4 or higher card, the "Total Data Rate" can be increased by clicking the Total Data Rate link label in the lower left pane of the AQ-1 software. Use caution when increasing the "Total Data Rate". Data will be lost if the Total Data Rate exceeds the capability of the SD/SDHC card. An error message will be displayed during .LOG file conversion if data has been lost.

Total Data Rate

This is the data rate (bytes/second) at which data will be written to the SD card during logging. This rate increases as you enable channels for logging or increase their sampling rate. It decreases when you disable channels or reduce their logging rate.

Fragmentation and Speed

The memory of a card is divided into minimum memory units. The device writes data onto memory units where no data is already stored. As available memory becomes divided into smaller units through normal use, this leads to an increase in non-linear, or fragmented storage. The amount of fragmentation can reduce write speeds, so faster SD memory card speeds help compensate for fragmentation.

Brand

AEM does not recommend any specific brand but it is always suggested to use a "name brand" card made by a reputable manufacturer. Cards by less than reputable manufacturers may not adhere to the SDA specification resulting in data loss.

RECOMMENDED PARTS

30-51XX Analog Style Gauges
30-44XX Digital Style Gauges
30-2340 4 Channel UEGO Controller
30-4100 Digital Gauge Style UEGO Controller
30-5130 Analog Gauge Style UEGO Controller
30-2310 Inline UEGO Controller
30-2320 X-Wifi
30-2130-XX Stainless Steel Body Pressure Sensor
30-2131-XX Brass Body Pressure Sensor
30-2010 GM Style Inlet Air Temp Sensor
30-2011 GM Style Coolant Temp Sensor
30-2012 Fluid Temp Sensor, 1/8" NPT
30-48XX Dyno-Shaft Driveline Torque Sensor
Garmin GPS 18x PC – 1 Hz model with DB9 connector and 12 volt power adapter
Garmin GPS18x 5Hz- 5 Hz OEM model, some wiring required.

REPLACEMENT PARTS

35-2906-0 Plug and Pin Harness Kit
35-2906-18 18" Lead Harness Kit
35-2906-96 96" Lead Harness Kit

If further tuning help is needed be sure to visit the video gallery or performance electronics forum at www.aemelectronics.com for comprehensive instructional videos and information.

WARRANTY

12 MONTH LIMITED WARRANTY

Advanced Engine Management Inc. warrants to the consumer that all AEM High Performance products will be free from defects in material and workmanship for a period of twelve (12) months from date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced at AEM's option, when determined by AEM that the product failed due to defects in material or workmanship. This warranty is limited to the repair or replacement of the AEM part. In no event shall this warranty exceed the original purchase price of the AEM part nor shall AEM be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product. Warranty claims to AEM must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser of product and is non-transferable. All implied warranties shall be limited in duration to the said 12 month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations voids this warranty. AEM disclaims any liability for consequential damages due to breach of any written or implied warranty on all products manufactured by AEM. Warranty returns will only be accepted by AEM when accompanied by a valid Return Goods Authorization (RGA) number. Product must be received by AEM within 30 days of the date the RGA is issued.

Please note that before AEM can issue an RGA for any product, it is first necessary for the installer or end user to contact the AEM Performance Electronics tech line at 1-800-423-0046 to discuss the problem. Most issues can be resolved over the phone. Under no circumstances should a system be returned or a RGA requested before the above process transpires.

Need additional help? Contact the AEM Performance Electronics tech department at 1-800-423-0046 or tech@aempower.com, or visit the AEM Performance Electronics forum at <http://forum.aempower.com/forum/>

DRILL TEMPLATE

A drill template is provided to aid in determining mounting hole locations when mounting the AQ1 Data Logger. Before drilling any holes, make sure the drill template is printed to the proper size. The two vertical lines on the drill template are spaced one inch apart when the drill template is printed to the proper size. Verify the two vertical lines are one inch apart on the printed drill template. Due to variances in printers, the print size may need to be adjusted if the two vertical lines are not one inch apart.

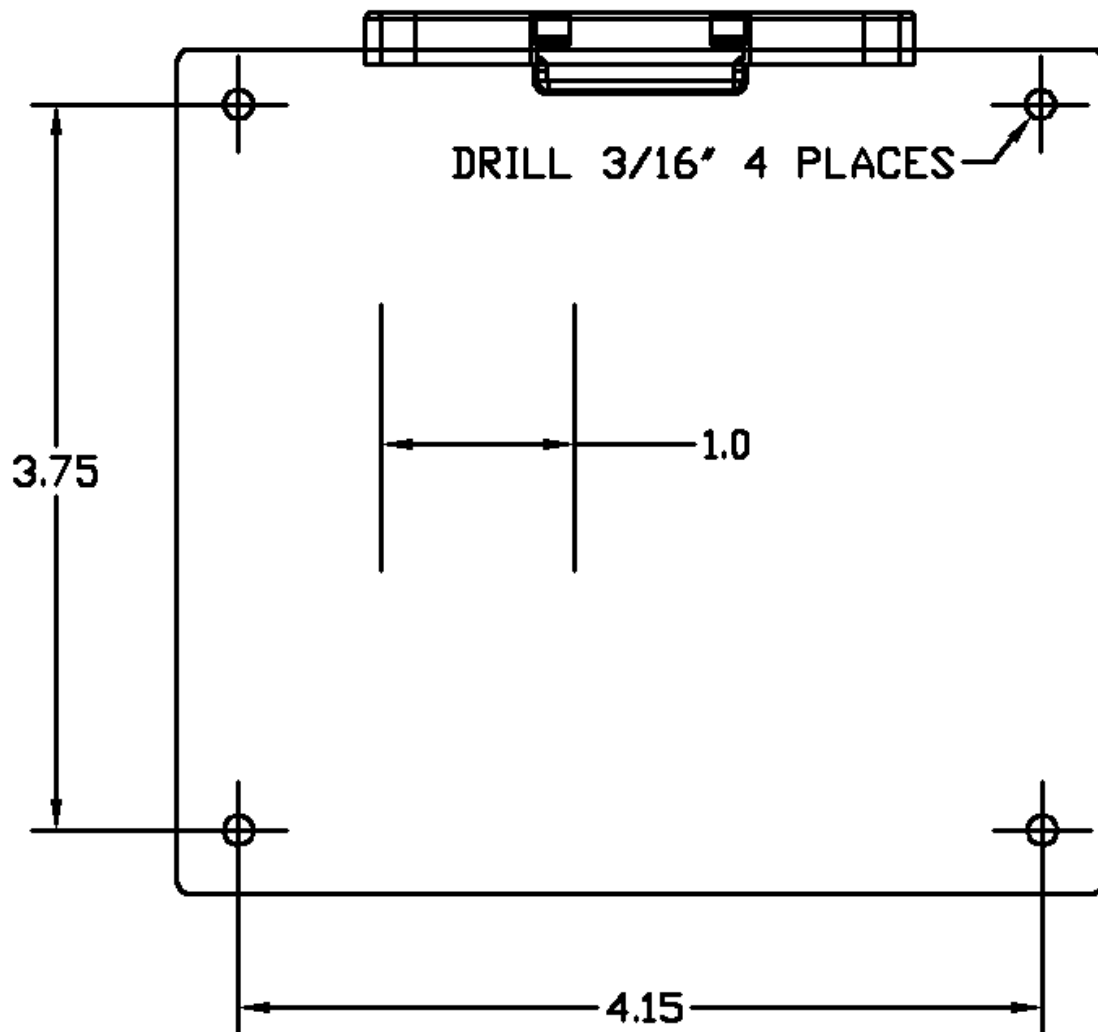


Figure 27. AQ1 Data Logger Mounting Drill Template.