

## **KNOCK METER from Insane Import Performance**

(c) Leonard R White 2014

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DOWNLOAD GUI

[INSANE IMPORT PERFORMANCE](#)

### **CONNECTIONS**

**If yours was sent assembled**

#### **FOR ONE CHANNEL**

**Red = 12v switched ignition on**

**18g Black = Ground**

**Blue = Digital out**

**\*Gray shielded wire with red and black leads= Knock sensor connection. Red is the knock signal, black is the knock sensor ground (if two wire) , and raw stainless wire goes to the shielding (if 3 wire)E.g. Bosch KS16 found on audi S4**

**Yellow = Analog out**

**\*I switched to supply the shielded wire. You can replace if needed by soldering new wire at the board . as of June 2016**

#### **FOR TWO CHANNEL**

**Red = 12v switched ignition on**

**18g Black = Ground**

**Blue = Digital out**

**\*Gray shielded wire with red and black leads = Knock sensor connection. Two are supplied and labeled. Red is the knock signal, black is the knock sensor ground (if two wire) , and raw stainless wire goes to the shielding (if 3 wire)E.g. Bosch KS16 found on audi S4**

**Bosch 2/3 wire (pin1/white goes to red)(pin2/brown goes to black)(pin3/black goes to Stainless shielding wire)**

**Yellow = Analog out Channel 1**

**Orange = Analog out Channel 2**

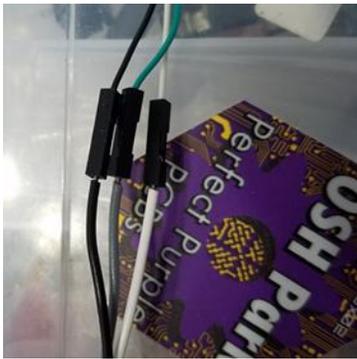
**\*same shielded wire but will be two of them, labeled as to which channel it is connected to.**



**Bosch KS 16 3wire**



**Single wire knock sensor**



**For USB converter**

**The usb wires are under the battery cover .You press down a little in the lower to slide out the cover towards the rear**

**For 1 and 2 channel the shorter wires are for the usb**

**Short White = TX goes to RX (WHITE) on USB converter**

**Short Gray = RX goes to TX(GREEN) on USB converter**

**Black = Ground(BLACK) on USB converter**

**2 channel: Channel 1= top leds / Rt side earphone Channel 2 = bottom leds /Lf earphone**

**MAIN BOARD**

power hookup: +12v to switched ignition, same as ECU hookup

ground: negative connection same as ECU . You may need to ground to the engine if your Ecu doesn't source a ground from the engine. Some grounding schemes incorporate the engine to ecu ground.

knock sensor input: one wire, must be shielded wire from knock meter OR two wire, input and ground, must be shielded wire or 3 wire same as two wire but shielding ends at pin 3

Labeled CH1 for sensor one and CH2 for sensor two

For one, two and three wire hookup. For 1 wire hook up just connect the red in the shielded wire to knock sensor output and trim back the black wire. You must have a ground to the engine with 1 wire sensors. On two and three wire sensors the ground is part of the sensor wiring.

digital output: DO pin on power header 0-5v (if using MS1 or MS2 connect to knock input)

analog output: AO pin on power header 0~5v used only for logging or with MSEXTRA Firmware 3.3.1 (using analog signal to signal knock depending on RPM in MSEXTRA firmware.)

Added gain circuit to the audio in case you want add caps to C23(cuts feedback), C18 and R7 (on bottom). C18 and R7 are for the various gain adjustments. Low voltage sensors may need them installed

Volume for the headphones is located under the battery cover on the newer units

You can add a resistor (4.7k) to C23 instead and it will lower the highs and bring in the bass boost. Just a little harder to hear the pinging.

#### DISPLAY BOARD

Power connections: 5v and ground to 5v and ground on MAIN power header

SER to PD7/pin 5 on MAIN board I/O header

SH to PD3/pin 1 on MAIN board I/O header

ST to PD4/pin 2 on MAIN board I/O header

#### USB CONVERTER

From USB Rx to TX on the MAIN board

From USB TX to Rx on the MAIN board

ground goes to any ground

5v is only connected when NO OTHER POWER is connected (meaning the MAIN board 12v power is not connected when the USB 5v power is in use)

If adjusting in the car with serial monitor open, connect ground and Tx & Rx only, no 5v connection

The newer cabled converter has a Prolific PL2303HX chip inside. A regular usb cable will not work.

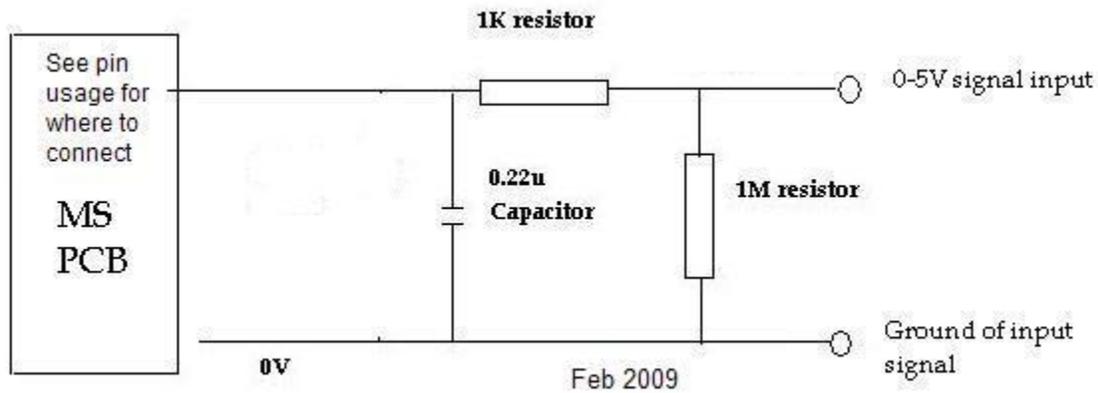
The white wire from the cable goes to the white wire on the gauge .Green goes to grey. Black to black.

The red power 5 volt power will not power the gauge. (unless you open it up and wire it to the 5 volt pin )

You need to go to the [Prolific.com](http://Prolific.com) website for the USB driver. Win 8 may need to find and install older driver to get the cable to work.

## LOGGING

To log analog use second O2 wiring diagram to protect the MSII card



[http://msextra.com/doc/ms2extra/MS2-Extra\\_Hardware.htm#secondo2](http://msextra.com/doc/ms2extra/MS2-Extra_Hardware.htm#secondo2)

Use digital out just like the GM knock module but the Megasquirt settings are knock indicated by going high/pull down active. So if the MAIN board is disconnected it won't pull any timing. With current GM knock module setup, if the module goes bad, timing is pulled down to your maximum settings.

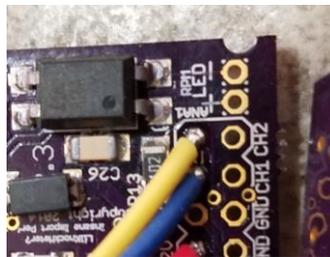
KNOCKOUT = 850 which is 85%

RPM & CYL# are not crucial, can be used with terminal to log by itself

The optoisolator (LTV816) located next to the main header can be used to log the rpm with a HyperTerminal or to display in the GUI. Uses basic trigger, one pulse per cyl fire. The 4 pin header next to it is connected. LED + to 5 volt trigger via 220 resistor, or 12volt trigger via 680 resistor, LED ground to ground on board. Or if negative trigger, LED + to 5V on board via 220 resistor LED - connect to trigger.

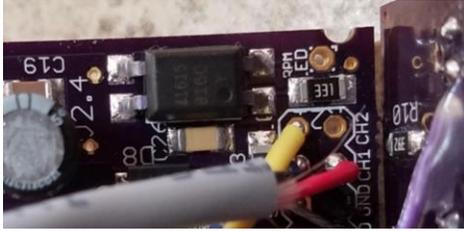


Jumps RPM led to ground



RPM LED positive and negative hookup

On the Newer board Version 2.2 the led ground can be jumpered on the back with a solder bridge and the led positive wired to your 12v or 5 v trigger via a resistor.



On V2.4 Pin labeled RPM LED (far right lower next to the resistor with the numbers 331 on top, not pictured) Give it a ground signal and it will pick up RPM. 1 pulse per cyl fire.

FREQ is the center of the peak of the curve, the display maxes out to the center of your current KHz, anything above that triggers D0 (digital out)

GAIN is the volume, where low = lower readings and high = higher readings. It depends on the amount of voltage the knock sensor produces. Bosch sensors (the wideband through hole type) need more GAIN.

Nissan/ GM/Toyota/Mitsubishi /Toyota tuned sensors (screw-in type) need less GAIN.

THRESHOLD can be lowered to just above max noise @ little less than max rpm

#### TO ADJUST SETTINGS

connect USB converter to MAIN board

- (1) knock meter off
- (2) Plug in USB
- (3) Open LilKnockMeter™ GUI or open a terminal program like HyperTerminal and comm port to USB converter
- (4) Turn on KNOCK METER (MAIN board)
- (5) select com port in GUI and press connect. If com port not shown , click connect if the usb converter is connected . The GUI will update the com port. Then press connect again.
- (6) Select your settings in the dropdown menus
- (7) Click send and the new values will save in the eeprom.

If not connected to 12v power you can connect USB 5v to board (to adjust settings on the bench). If 12v power is connected can connect USB BUT ground only! DO NOT connect the 5v from the USB. Ground must be connected or you'll get gibberish in the terminal.

V2.1 and up boards use the GUI.

If you bought an older board I can either update it for you. I would need it shipped to me. Or if you have an Arduino and know how to use it , I can send the code. There's only about 5 that didn't get code to communicate with the GUI.

It will display current setting and ask if you want to change them "y" for yes, "n" for no, not case sensitive

Once you have entered new settings it will display what you entered. Enter "y" for update, or "n" to use old settings. A "y" saves the new settings in EEPROM on the KNOCK METER, and will remain after power is removed. If you put the wrong values in and want to do it again, press "n" and reenter what you wanted to input.

When the engine is cold it will be louder when warm.

Unshielded wire will be very noisy with headphones.

The lower frequency will pickup a lot of engine noise up top.

Frequency is set first ,then rev motor 2/3 of rev limit and adjust gain to light the lower part of the gauge (around 200-300).

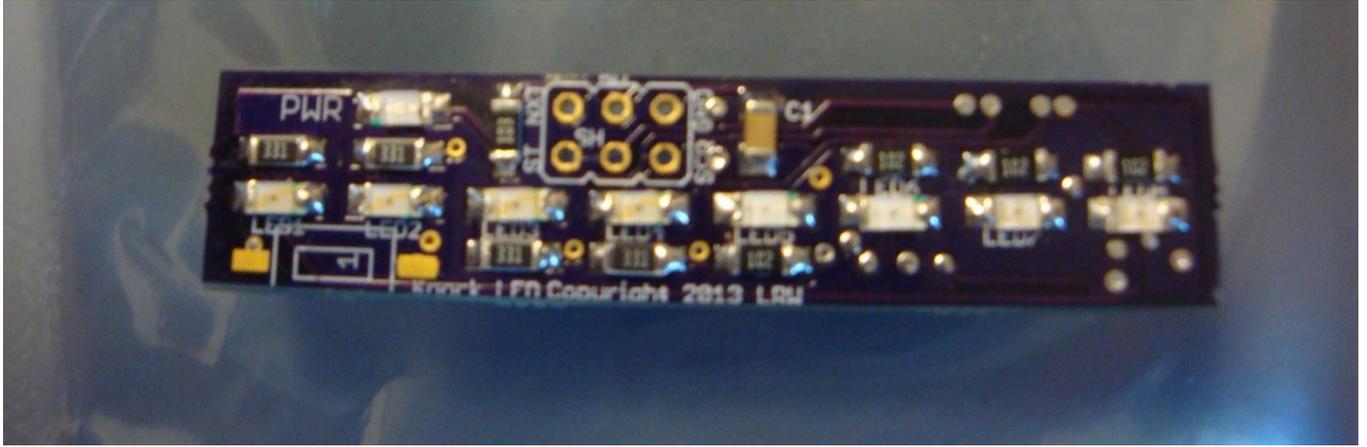
On cars with the Bosch thru hole wideband, you adjust to get the first led flickering. Remember the Bosch style produces less voltage than the screw in style.

Also when connected to the GUI the signal is a little higher than it would be without the PC communications ON. Check by hitting the disconnect button in the gui before you settle on the settings.

Inside a SERPAC M6 Case



MAINBOARD



USB Converter