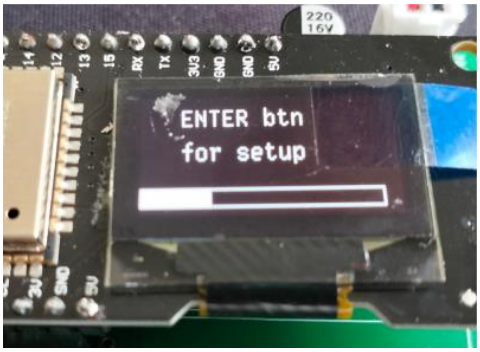
Ignition Timing Meter

TRANSMIC.FR V1R10C0

Power on the Timing Meter. A Splash screen appears during 5sec



To launch the SETUP mode, touch "**ENTER**" button, otherwise wait 10 seconds until it goes into RUN mode:



Don’t touch the 3 touchpads during Calibration :



SETUP MODE

All setup are saved for the next power cycle.

In SETUP mode, touch "**+**" or "**-**" touchpad to select **Strokes** number:

"2 strokes" or *"4 strokes with Wasted Spark"*, pickup on crankshaft, so 1 spark every 360 degrees: choose "2"

"4 strokes without Wasted Spark", pickup on camshaft, so 1 spark every 720 degrees: choose "4"

Touch **Enter** when done.

Touch "**+**" or "**-**" to increase **Pickup Position** relative to TDC:

Can be adjusted from 0 to 360° BTDC.
This value is used to directly display the advance in degrees BTDC.

If you let Pickup Position to zero, the time between the pickup and the spark will be displayed in microseconds and degrees.
I.e.: "ADV: -19.5 deg" means: "Spark appends 19.5degrees AFTER the first pulse of the pickup."

So you have to do the subtraction by yourself, say pickup is set at 50° BTDC, then true advance is:
50 – 19.5 = 30.5 degrees BTDC)

Touch **Enter** when done.

Touch "**+**" or "**-**" to select **Pickup Type**:

Choices are:
NP: for VR pickup that gives a Negative pulse first then a Positive one or for a **Hall Effect** Sensor.

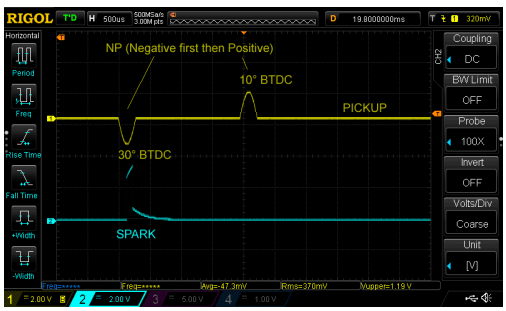
PN: for VR pickup that gives a Positive pulse first then a Negative one.

AUTO: ITM tries to detect the type of pickup.

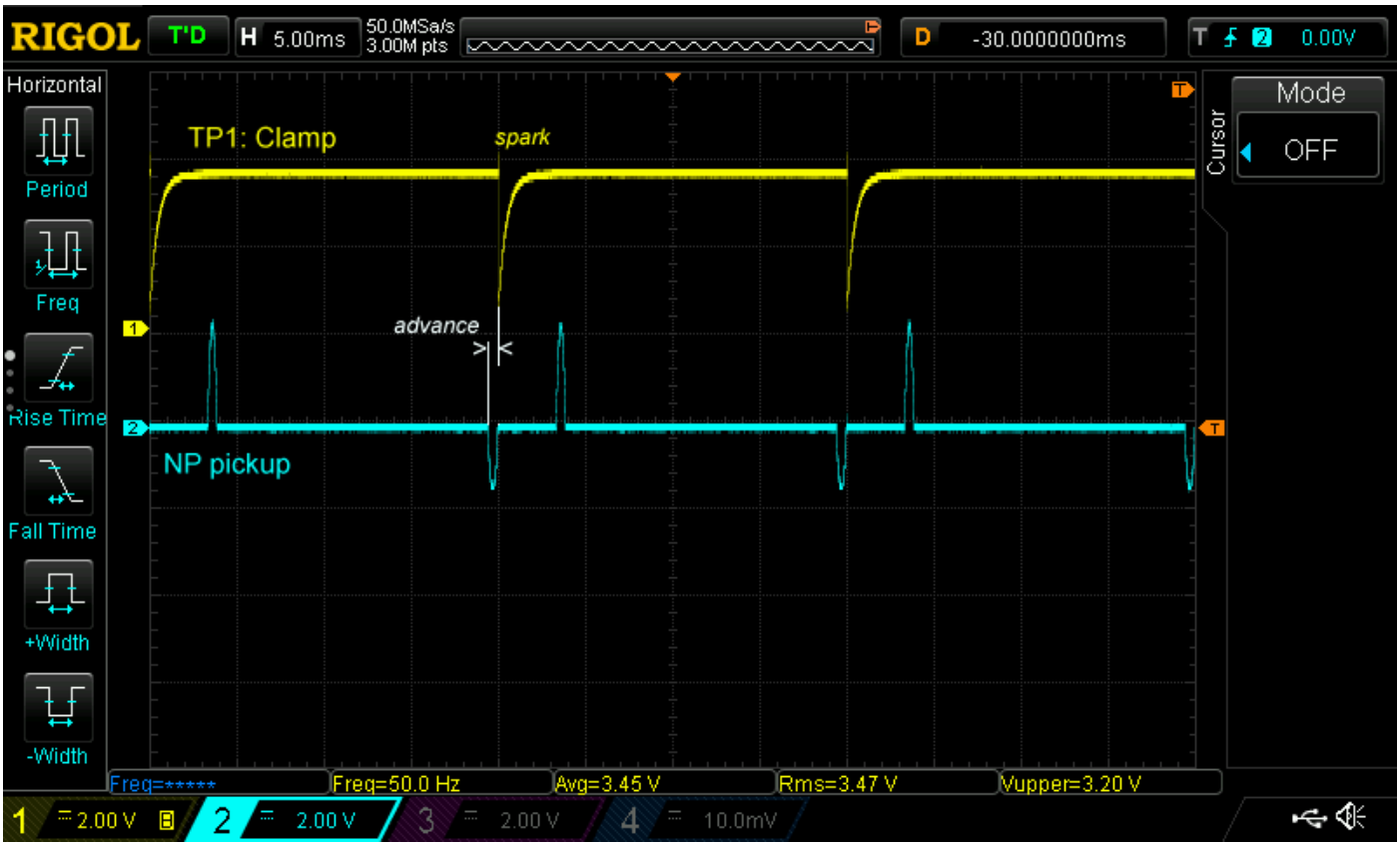
If you are already sure of the polarity, avoid automatic detection and set it directly

Touch **Enter** when done.

NP :



It's important to understand that calculation starts at the pickup pulse polarity that you have chosen during setup .



If the "Pickup Type" is set to NP while the real form is PN, the device may report incorrect figures, such as -270° instead of 20°.

Touch "**+**" or "**-**" to select Display **Refresh Rate**:

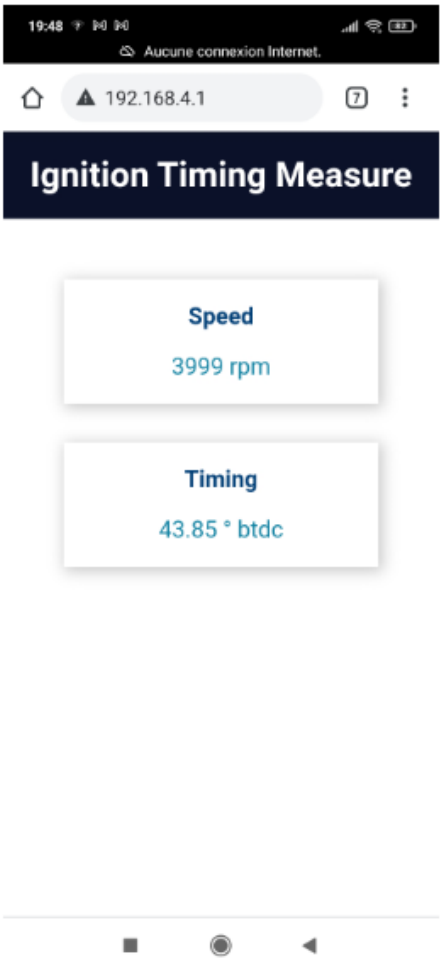
Results are displayed on the screen and on the USB output at 1 to 9 seconds interval.

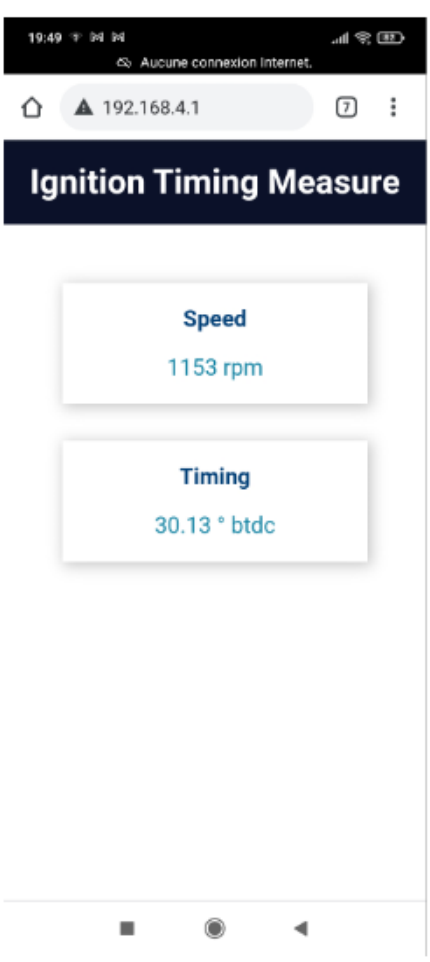
Touch **Enter** when done.

Touch "**+**" or "**-**" to select Display **Console Output**:

Either USB: Results are available in .CSV mode on **USB micro-B** Serial port at 115200 N.8.1. (*You may need a driver*)
or
Wifi: Results are shown on any web browser on any device connected to **Transmic_ITM** Access Point
at http://192.168.4.1/console SSID password: nothing or "password"

Touch **Enter** when done.





Touch "**+**" or "**-**" to change **Correction** to calibrate the device:

Can be adjusted from -2000µs to +2000µs by 10µ steps

This value is used to change the advance displayed both in µs and in degrees.

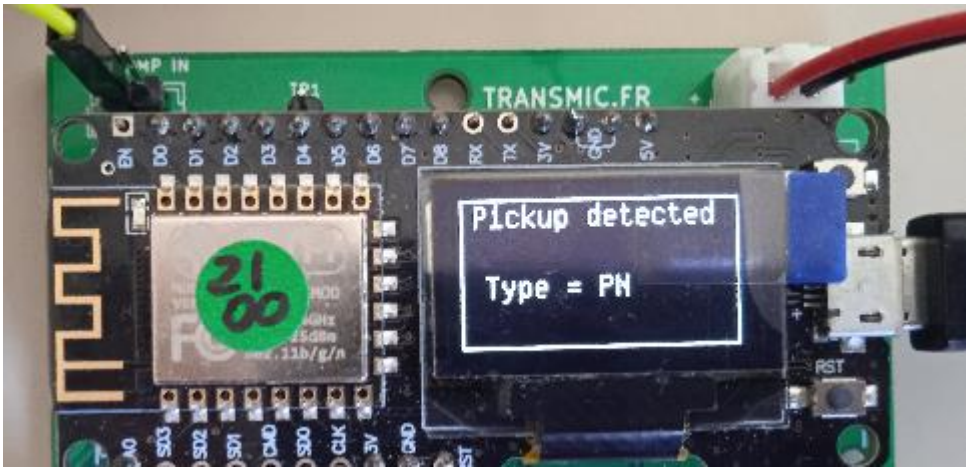
Positive Correction value	=> Increase Delay in µs	=> Lower the advance in °.
Negative Correction value	=> Lower Delay in µs	=> Increase the advance in °.

Touch **Enter** when done.

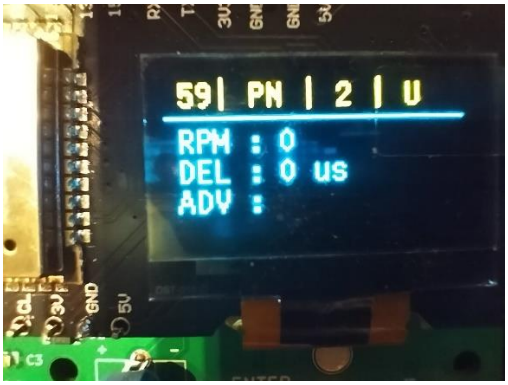
Now ITM unit is ready and waiting for a pickup signal…

In AUTO mode, "***Start Engine***" is displayed until a valid signal has been received and polarity detected.

In AUTO mode, the type of detected Pickup is displayed once a valid pickup has been seen.

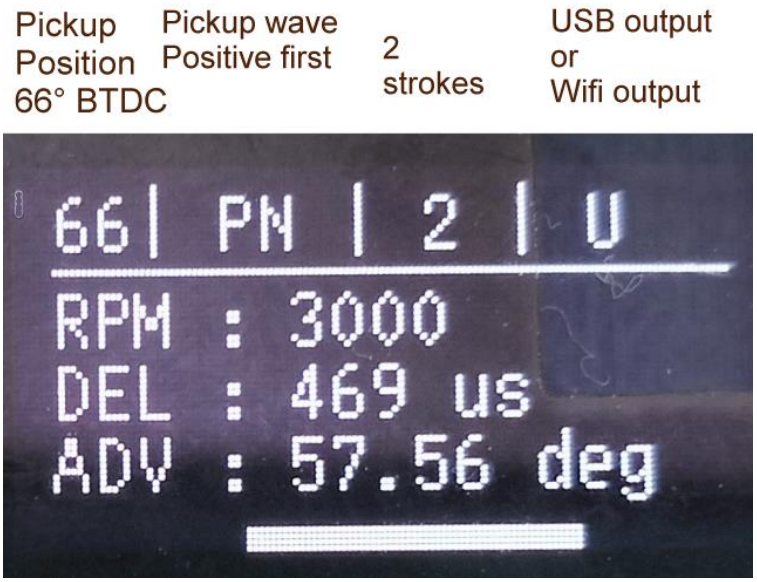


If *Pickup Type* is already set to NP or PN, "*Start Engine*" disappear after 2 seconds and ITM goes into RUN mode:



RUN MODE

First line shows the settings



PN Pickup Type forced by user to **P**ositive first, **N**egative second.
NP Pickup Type forced by user to **N**egative first, **P**ositive second.
APN Pickup Type set to **A**uto and pickup detected as a **P**ositive first, **N**egative second.
ANP Pickup Type set to **A**uto and pickup detected as a **N**egative first, **P**ositive second.

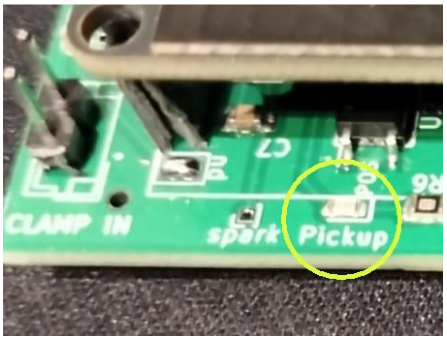
RPM : Measured from PICKUP pulses

DEL: Delay between pickup pulse and spark in microseconds

ADV: This delay for this particular RPM = this Advance timing BTDC
Positive number: Advance BTDC (Before Top Dead Center)
Negative number: Advance ATDC (After Top Dead Center = Retard)

Bottom: Advance bargraph

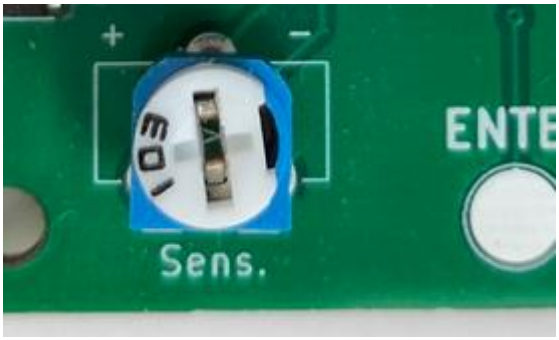
Pickup Led flashes each time a pickup followed by a spark are detected.



SENSITIVITY

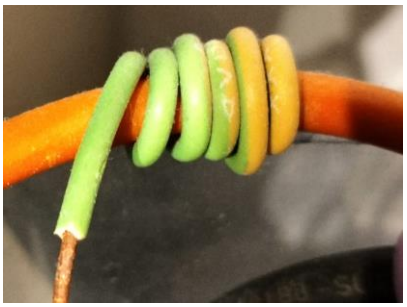
Use an INDUCTIVE probe or just 3 to 10 turns of wire around the sparkplug cable to detects the spark.

Sensitivity is adjustable by the small trimmer:



☞ *Begin with the sensitivity set to the lowest. Turn the trimmer fully CW.*
Start the engine and gradually increase sensitivity by turning CCW until consistent values are displayed.

☞ *You can also add or remove loops around the spark plug cable.*



INDUCTIVE PROBE

You can build your own **Inductive** Probe (*A Capacitive probe won't work*)

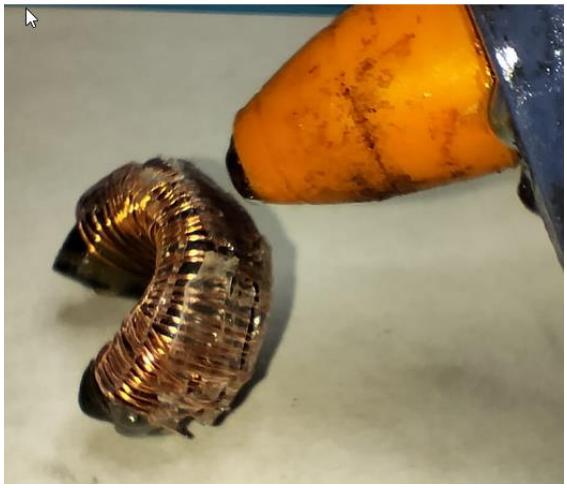
I am using a toroid salvaged from an old PC power supply 	Remove all wires: 
Cut a quarter of the tore: 	

I use **40 turns** of around **0.5mm**/24AWG enameled wire:





Some hot glue to fix the wire :



Solder one pin header (the other end is not connected):

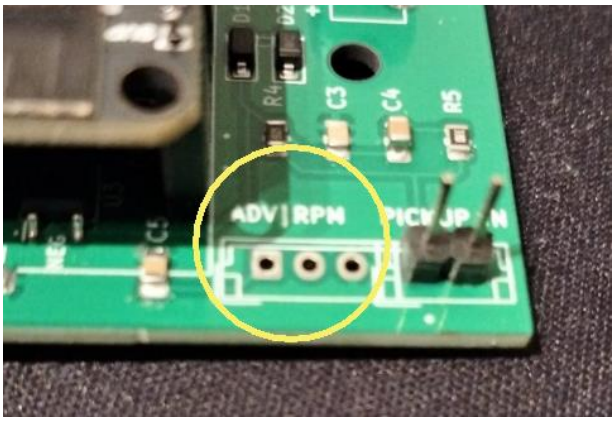


Result:



DAC OUTPUTS

Two optional 8 bits Analog outputs are available:



ADV:

- Max voltage is around +3.1v.
- Output: **Degree = mv*2/100** (ie 3100mv*2/100 = 62°)
- Max output 62° BTDC
- Steps of 12mv *2/100 = **1mv ≈ 0.25°**

RPM:

- Max voltage is around +3.1v.
- Output: **RPM = mv*3225** (ie 3100mv*3225 = 10,000rpm)
- Max output 10,000 RPM
- Steps : 10,000/255 = **1mv ≈ 40 rpm**

DRIVER

To communicate with the device through the USB connector, you will need a driver.
(*You don't need any driver for wifi*)

If you don't have it yet, then install **CH340G** driver:

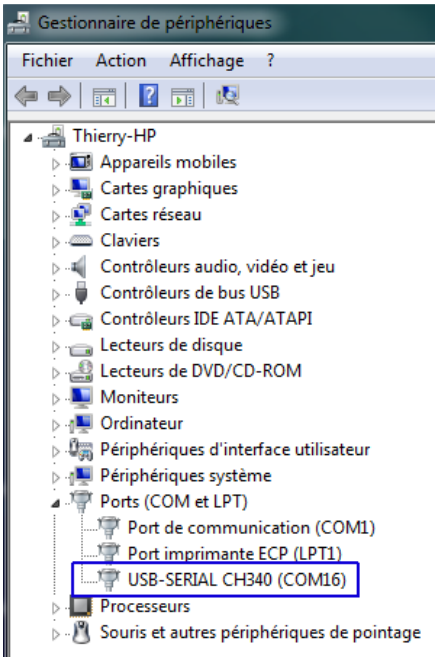
Windows:	http://www.arduined.eu/tag/windows-7/ https://learn.sparkfun.com/tutorials/how-to-install-ch340-drivers/all#drivers-if-you-need-them
Mac:	https://wiki.wemos.cc/_media/ch341ser_mac_1.5.zip
Linux :	https://learn.sparkfun.com/tutorials/how-to-install-ch340-drivers/all#drivers-if-you-need-them
Chip Manufacturer driver	http://www.wch.cn/download/CH341SER_EXE.html

Restart the PC

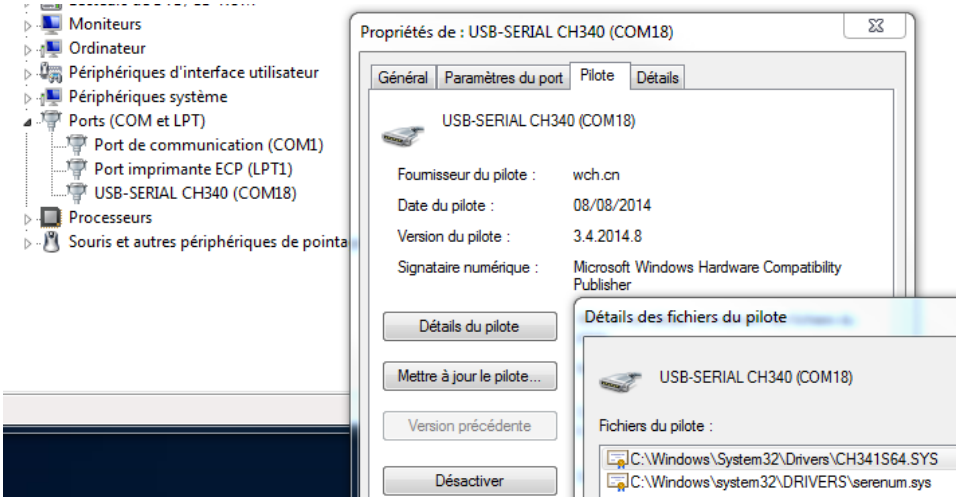
USB CONNECTION

Open "*Device Manager*" Scroll down, under "*Ports (COM&LPT)*"
plug the USB cable to the ITM device, you should notice a new COM-port named "CH340"

Note the Port number (here COM16)



Right click for *Properties > Driver* tab, if another Windows driver is in there, then click on "*Update driver*" find and install the one for CH340.



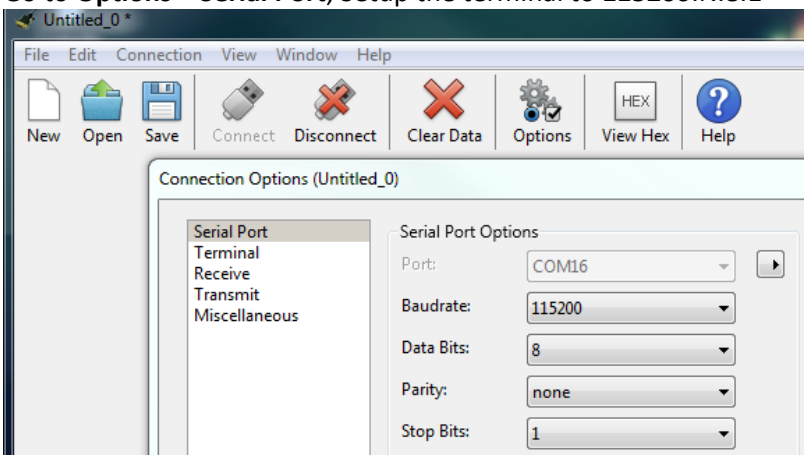
If Windows doesn't recognize the device because the driver is missing, the new Port will appear unknown in the "*Other devices*" folder:



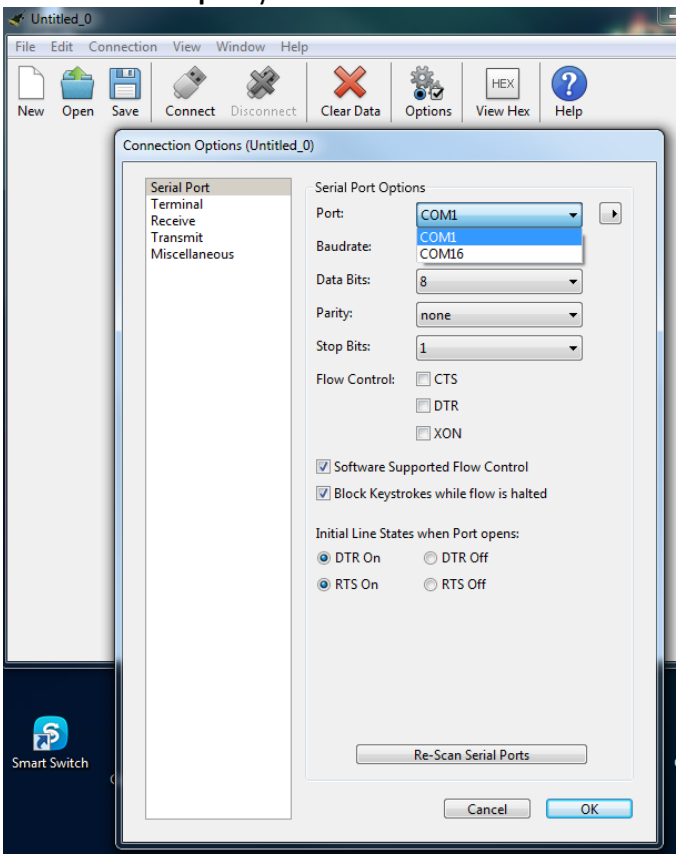
TERMINAL CONSOLE

Once the driver has been installed, launch a terminal on your PC (I recommend **CoolTerm** from http://freeware.the-meiers.org)
But Putty or Kitty, Teraterm are usable too…

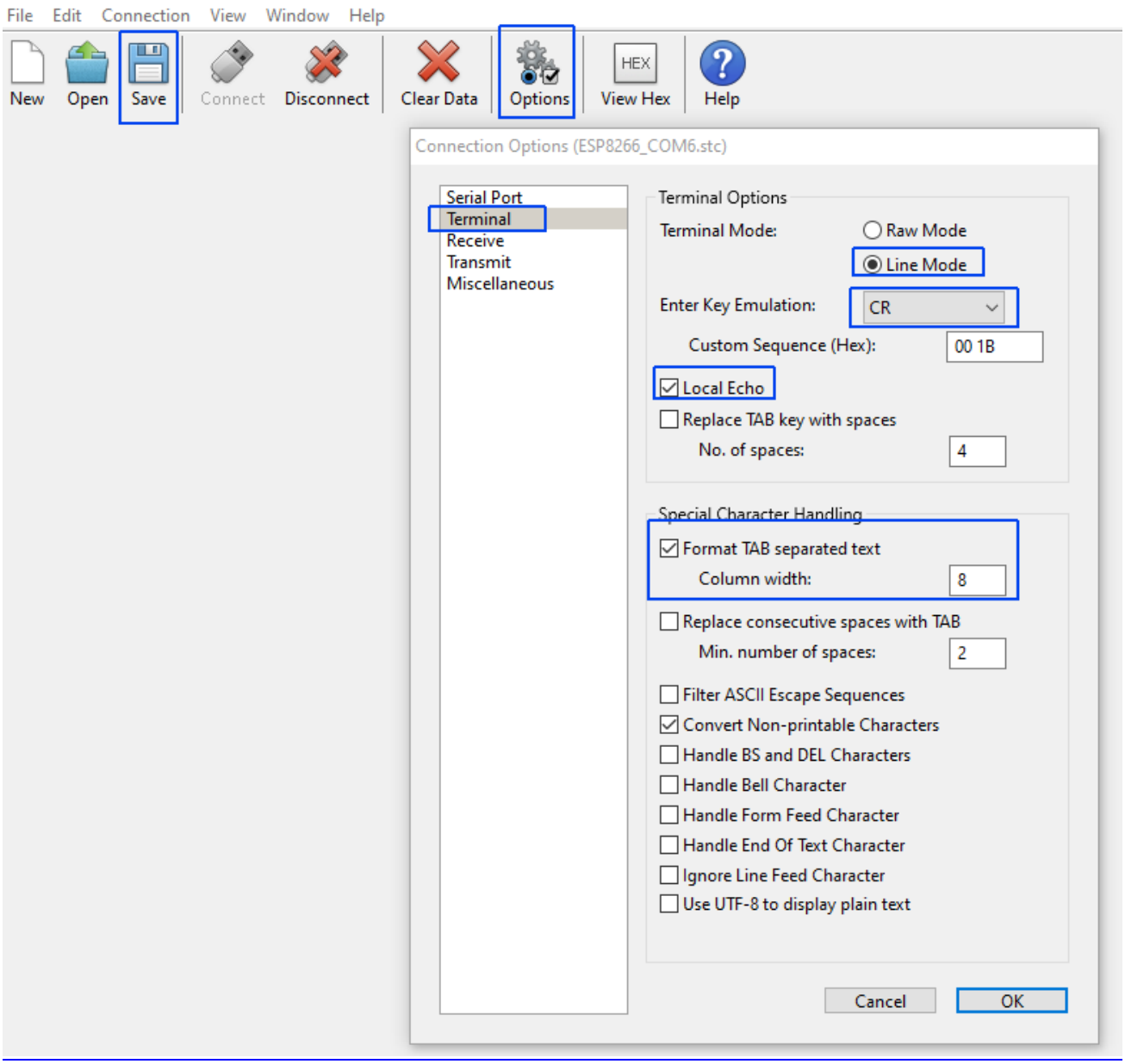
Go to **Options > Serial Port**, Setup the terminal to **115200**.N.8.1



Select the **COM-port** you have noted above.



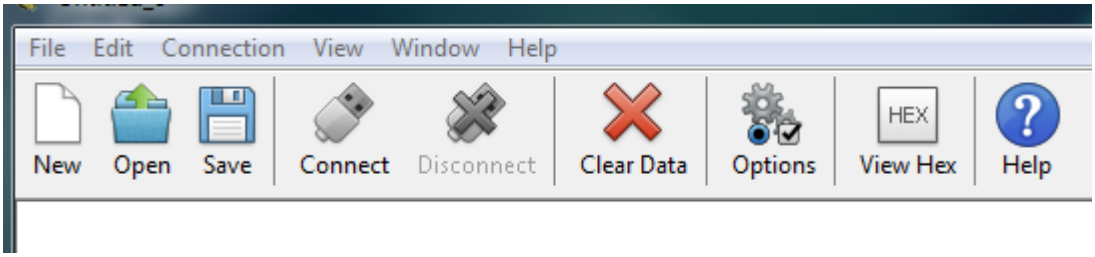
Under **Options > Terminal** check *Line Mode, Enter Key Emulation, local Echo* and *Format TAB* > **OK**.



Save this configuration

Connection

Click on "**Connect**" button



Other OS

-Android

– Use Serial USB Terminal by Kai Morich and a Male-Male USB type-C OTG connector to USB micro-B. (video)

The phone must be OTG compatible with OTG turned on:

settings——additional settings——enable/disable OTG.

Mac

– Shell commands:

```
terminal
ls /dev/*usbserial*
screen /dev/cn.usbserial-xxxxxxxx 115200 -L
screen /dev/tty.usbserial-xxxxxxxx 115200
```

Linux

– Use a Terminal Software as CoolTerm or Putty.

– Use Shell commands to find the COM-port:

```
tail -f /var/log/syslog | grep USB
dmesg | egrep --color 'serial|ttyS'
ls /dev/ttyUSB*
```

Port Configuration:

```
sudo su
stty -a </dev/ttyUSB0
stty -F /dev/ttyUSB0 cs8 115200 time 10
```

Connection to the device:

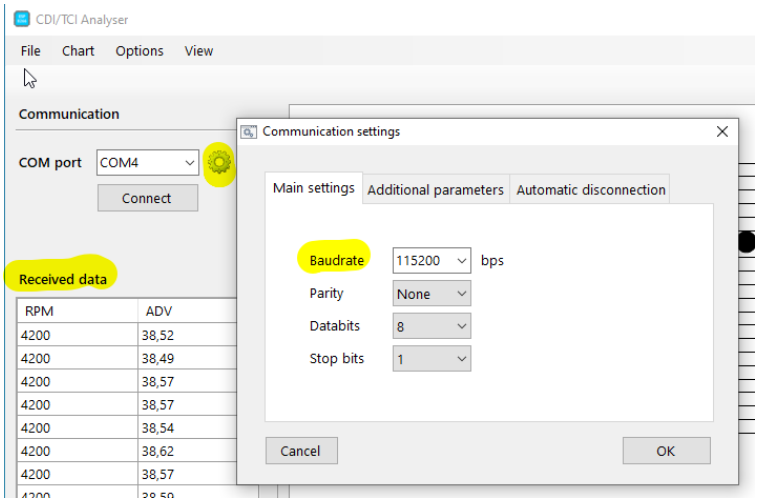
```
cat /dev/ttyUSB0 & cat > /dev/ttyUSB0
```

PLOTTER

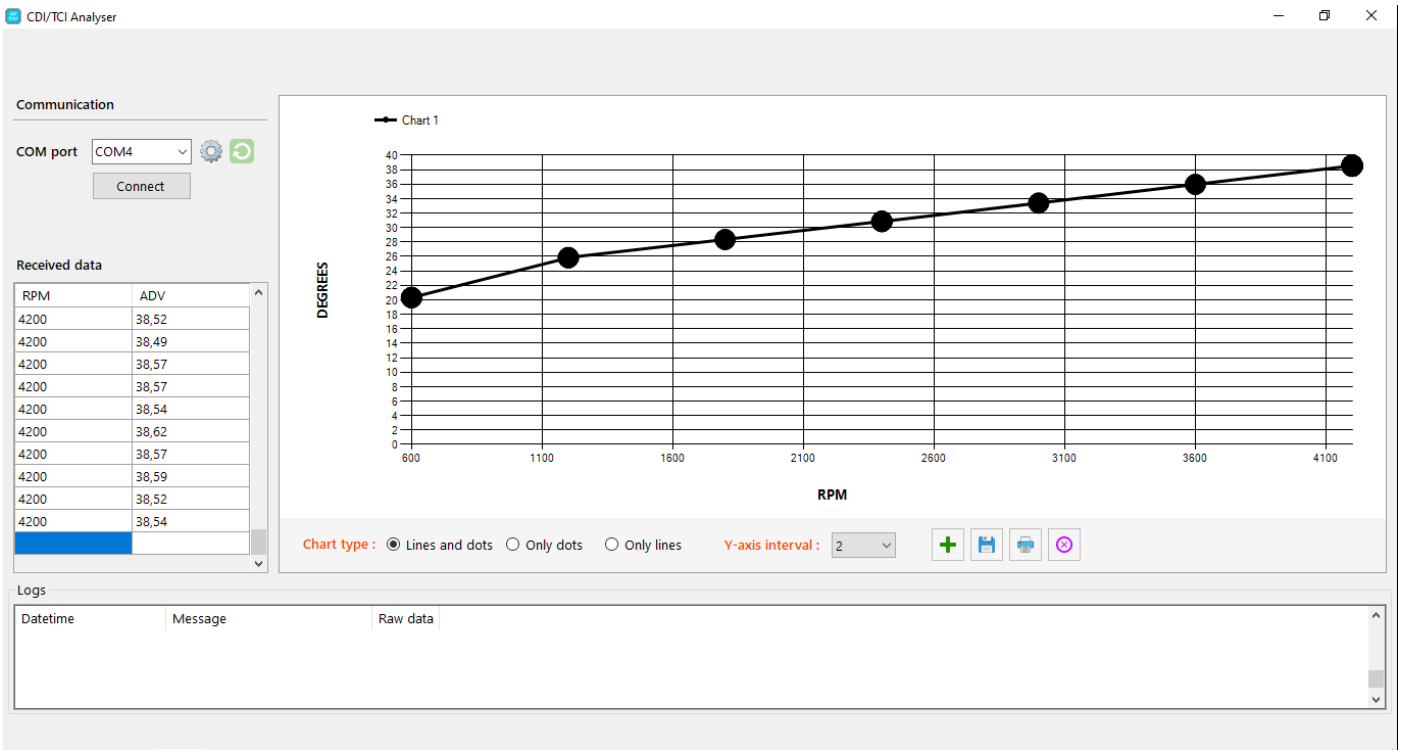
Works exclusively on Windows.

After installing the driver and displaying timing in a terminal, you can use my optional program to show and map advance timing in real time.

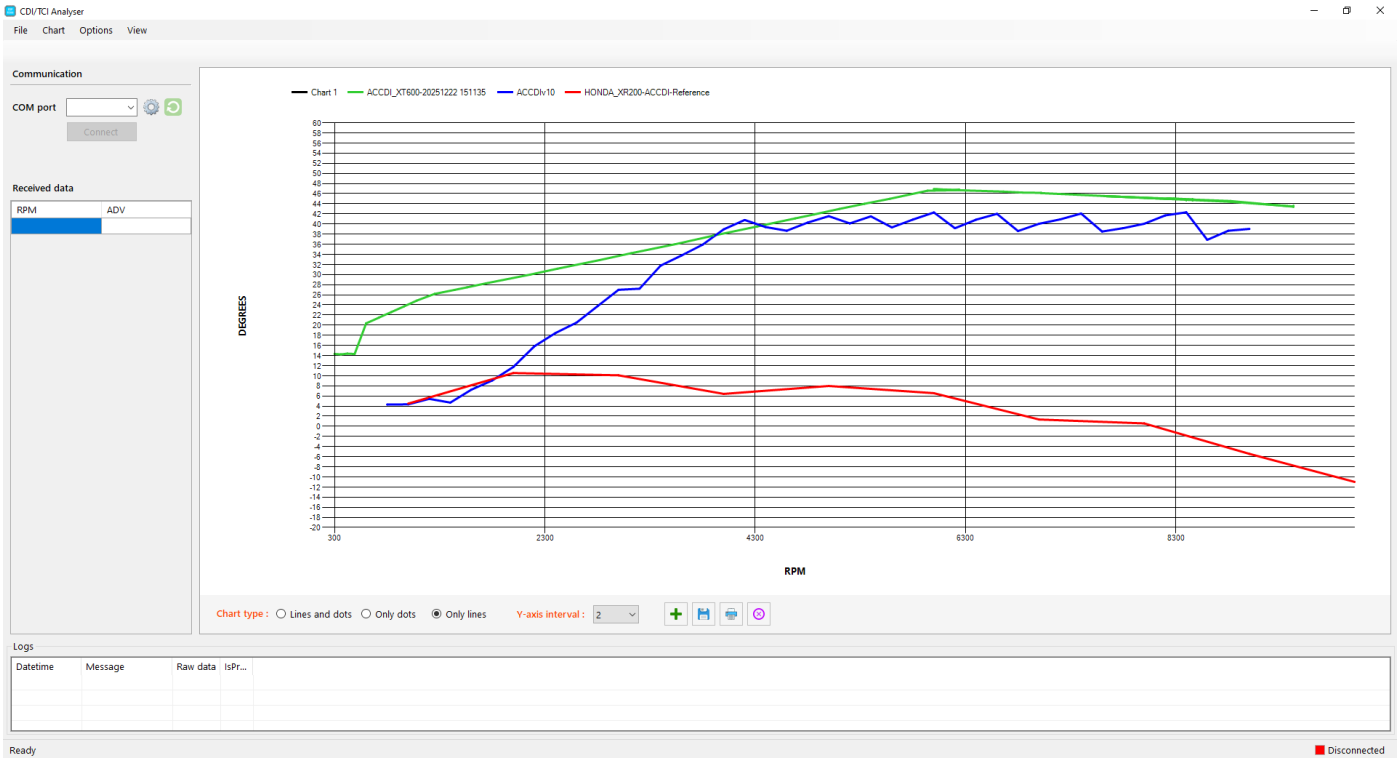
- Connect your laptop to the **USB micro-B** port and the ITM to the bike
- Start the bike, wait for RPM and Advance to display on the led screen
- Launch *CDI-TCI Analyser.exe* on the laptop, Go to *Options > Communication Settings*



- Click *Connect*. The program plots the timing:

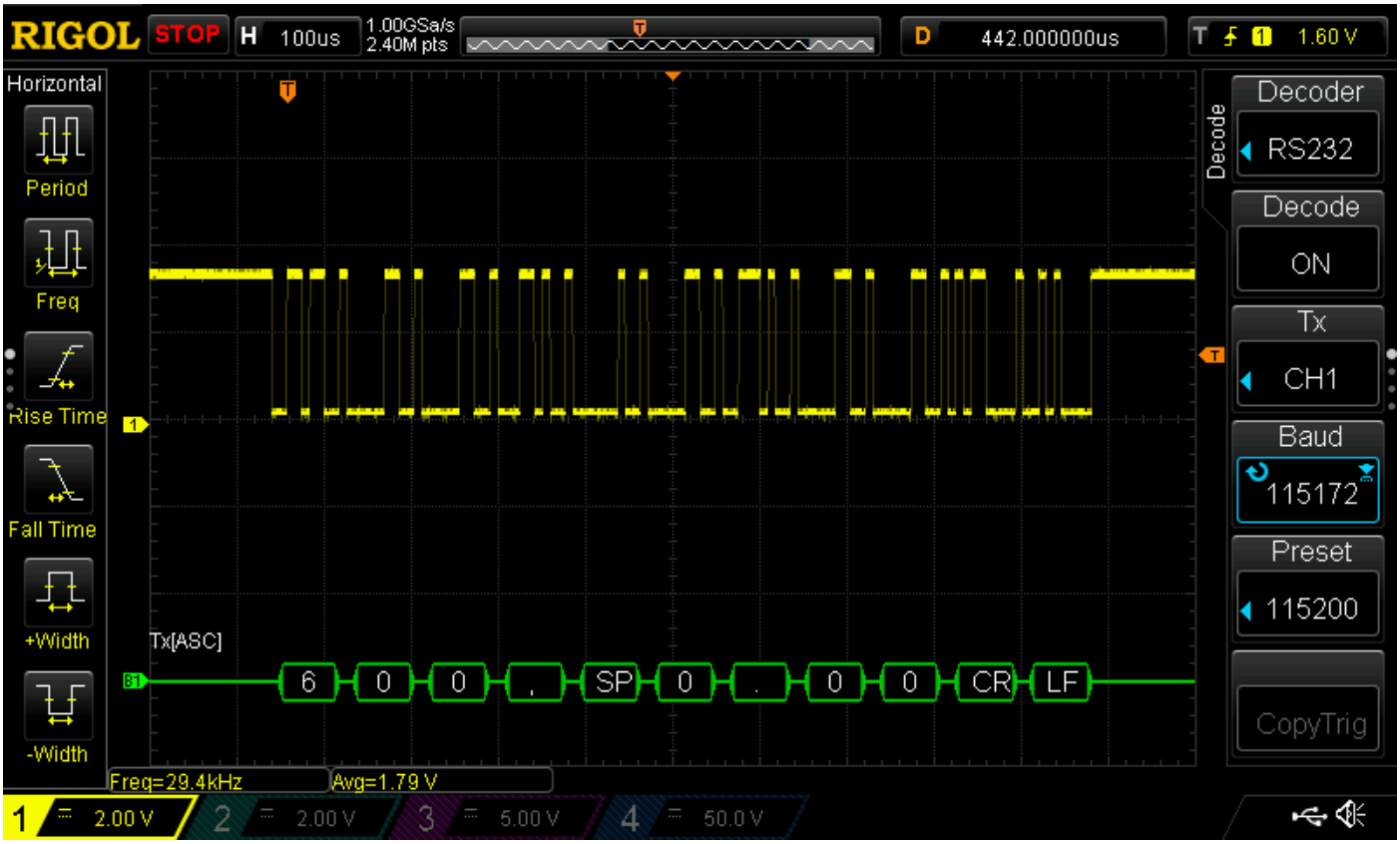


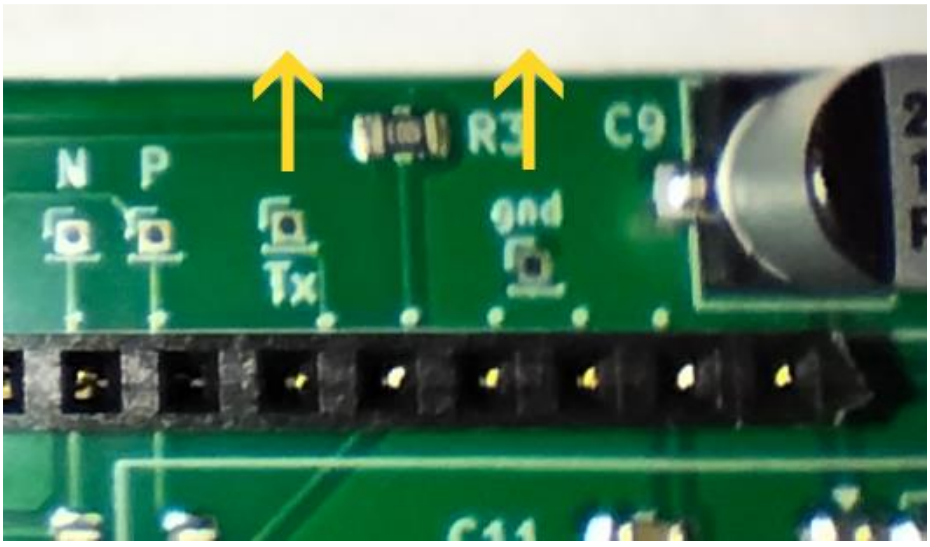
- and can displays numerous charts for comparison:



DIGITAL OUTPUT

You can also interface this device to an external device by using the **Tx** output of the **RS232 serial port** at 115200 N.8.1

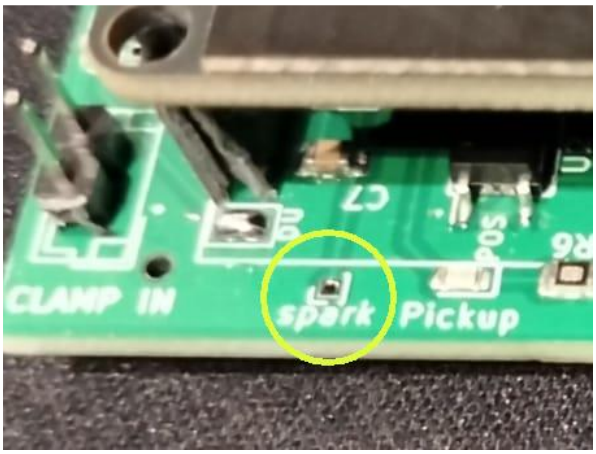


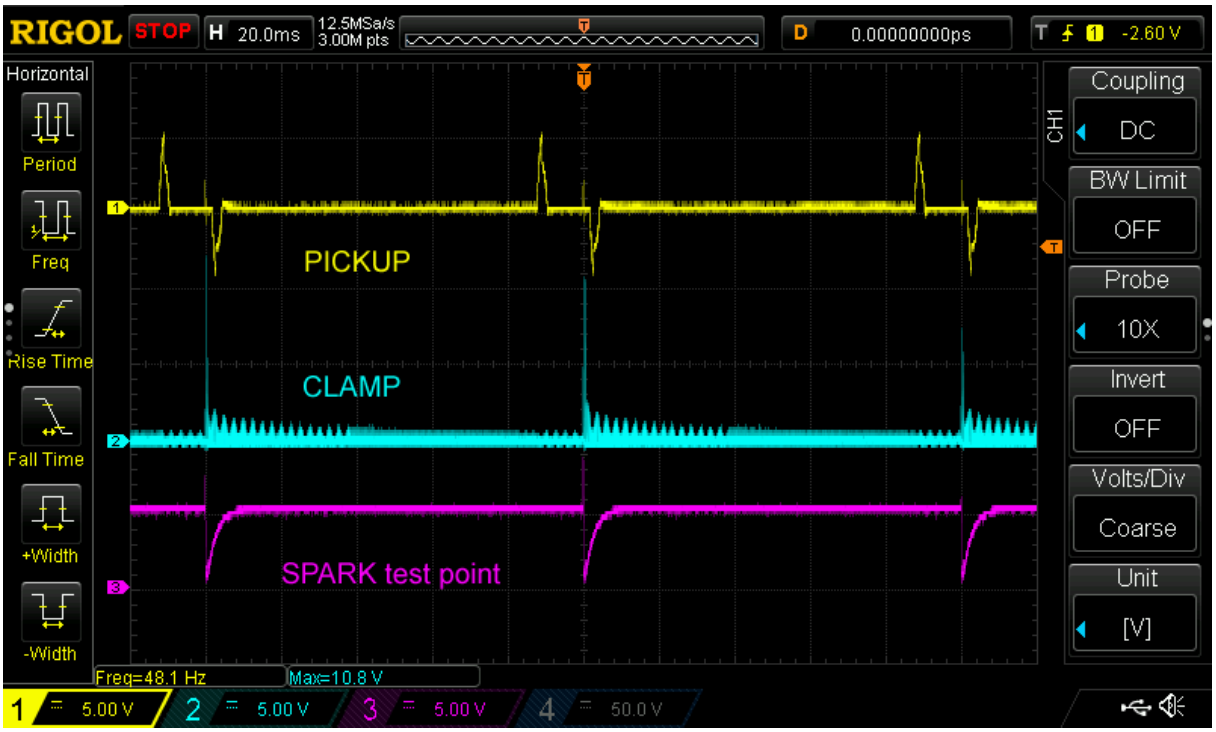


TEST POINTS

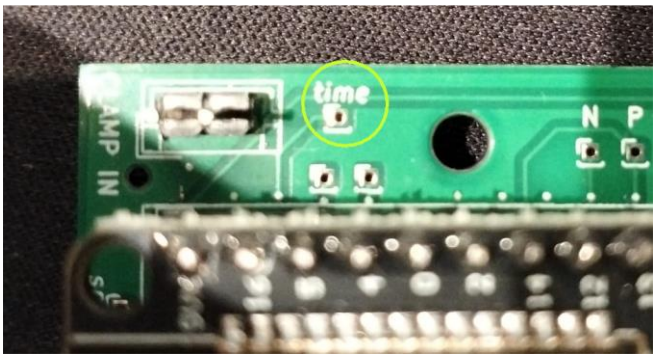
If you own an oscilloscope here are examples of what you can scope on the different Test Points.

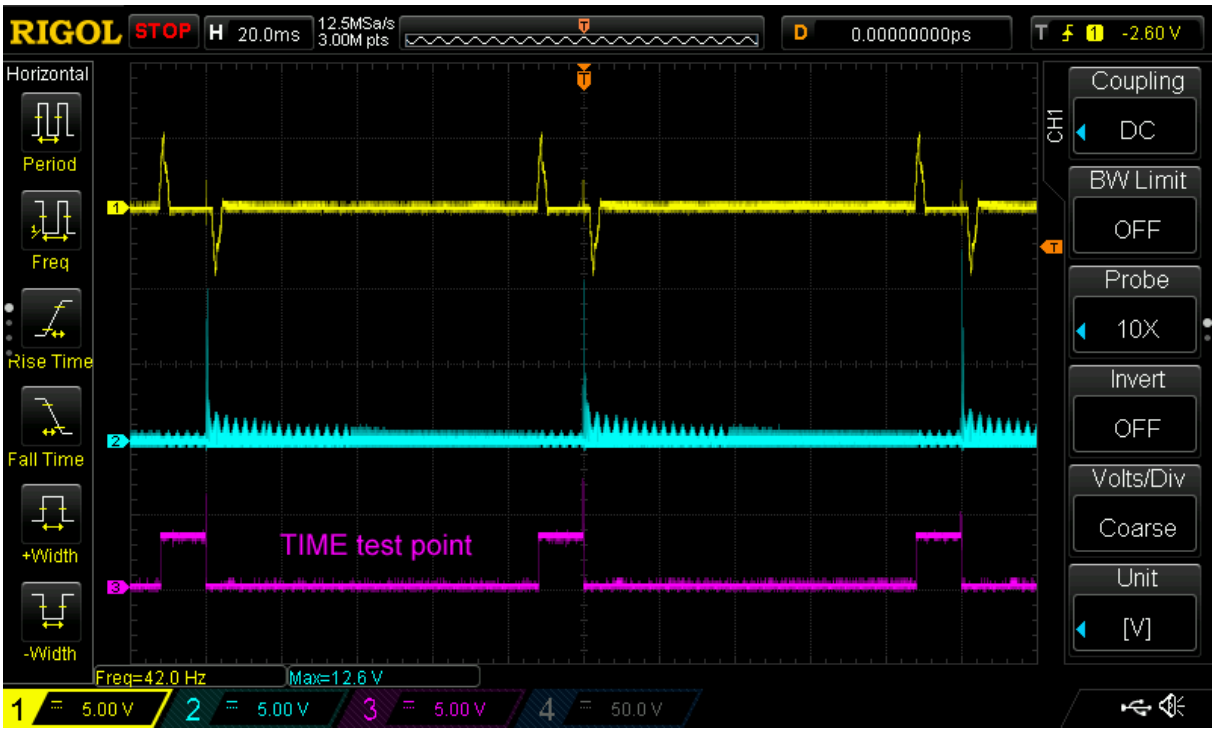
*Use the **SPARK** test pad to visualize the signal detected by the clamp:*



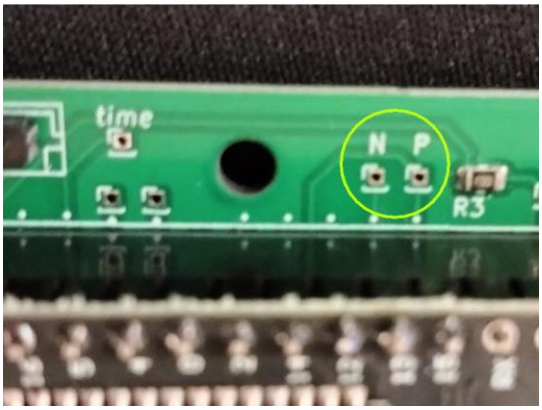


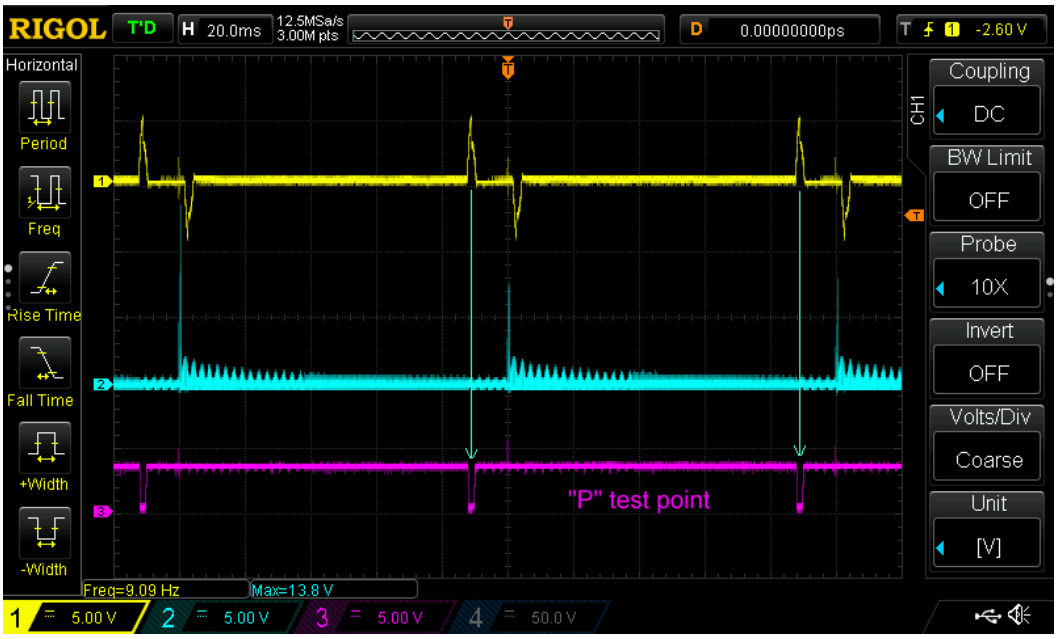
*us the **TIME** Test Point to visualize the delay(µs) between pickup and spark.*

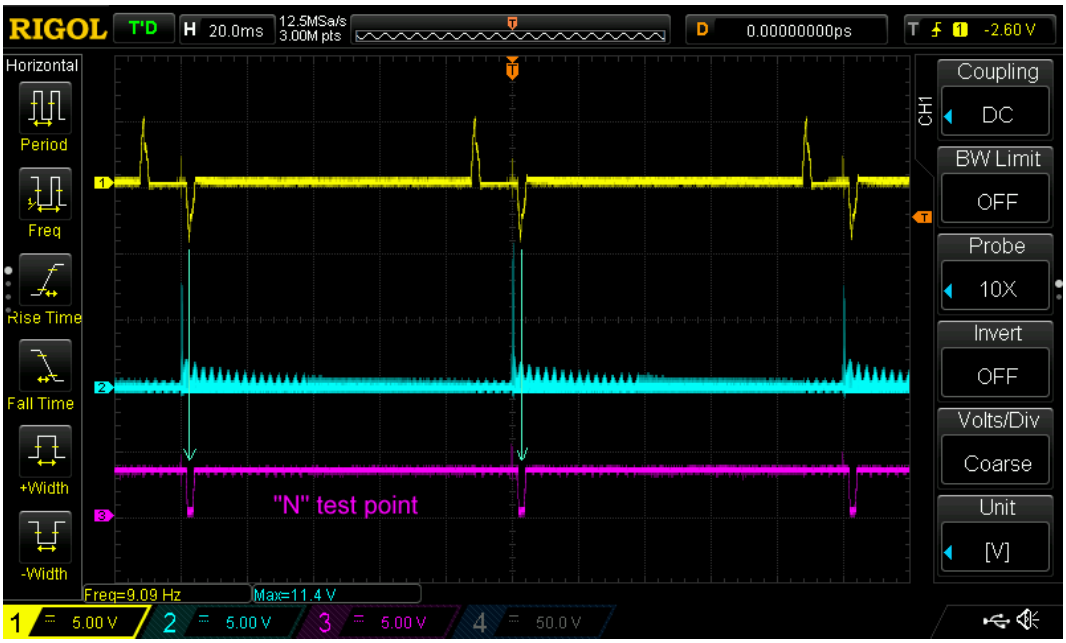




*use **P** or **N** test pads to visualize the pickup signal detected by the device.*







TROUBLESHOOTING

*us the **TIME** Test Point to diagnose if the sparks are detected.*

Expected :



(ch1/yellow: pickup, ch2/blue: clamp, ch3/violet: "Time" test point)

Spark detection failed:

