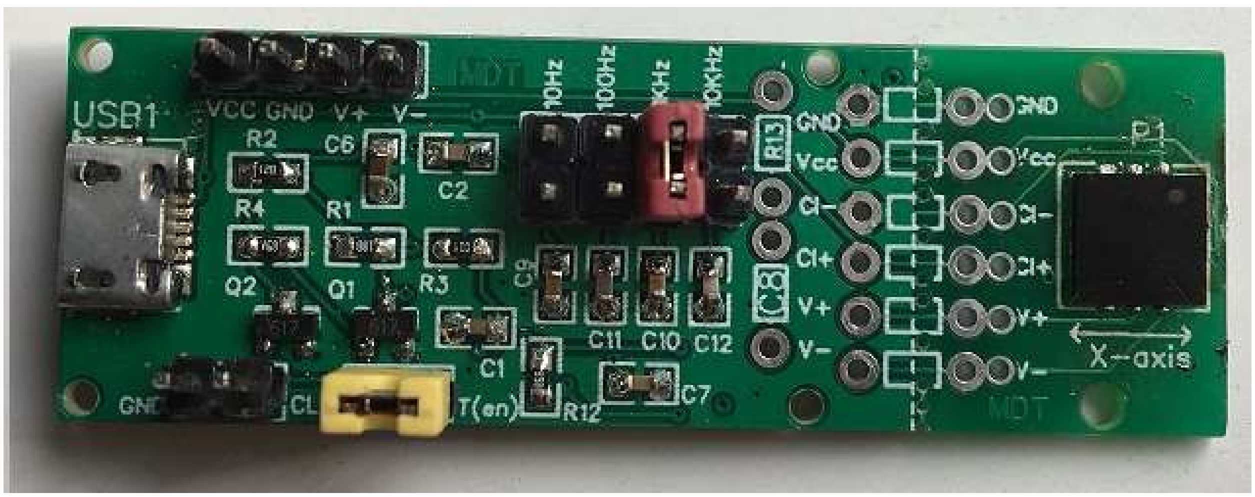
TMR9112D

TMR9112 Pulse Initialization Demo Board

General Description:

The TMR9112 demo board was developed to support evalution of the TMR9112 single-axis sensor. The demo board comes with the fast bipolar current pulsing circuit needed for initialising the TMR9112 sensor, and it can be powered from a USB port or any external 5V power supply. For user convenience, the demo board has an optional on-board timer clock with four selectable frequency settings. The On-board timer clock and frequency output can be enabled using the jumper pins. This demo board is divisable along the dotted line so that the sensor board can be seperated from the pulsing circuit board.



Features:

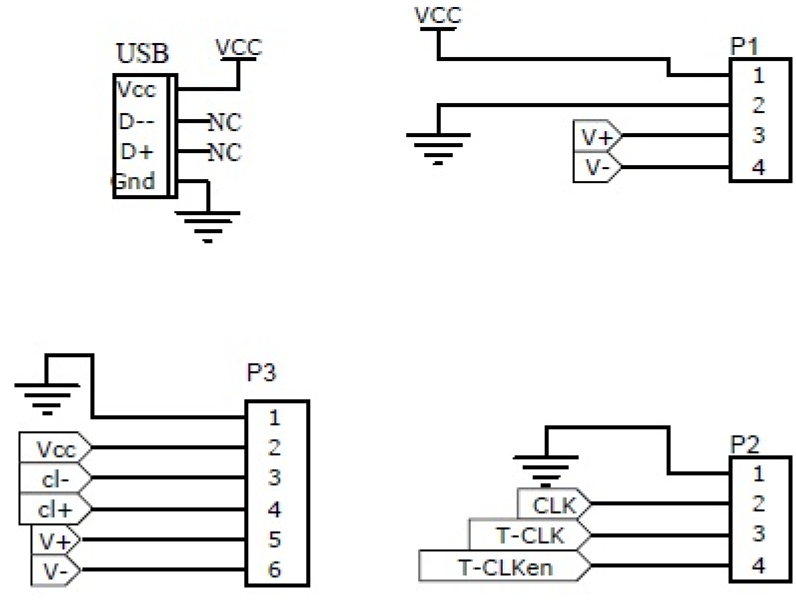
- Operate using 5 Volt external supply or through USB port.
- On board timer clock with four selectable frequency options.
- Bipolar fast current pulsing circuit and Voltage tripler circuit.
- Clock Input signal can be 3.3V or 5V logic.
- Demo board can be split along the dotted line to separate the sensor from the pulse electronics board

Pin descriptions:

Pin Name	Description
Vcc	Positive power supply
GND	Ground
V+ and V-	Differential output from the sensor
CLK	Clock input
T(en)	On board Timer output enable
C8, R18	Through hole pads for adding low pass filter resistor and capacitor for user selectable filtering.

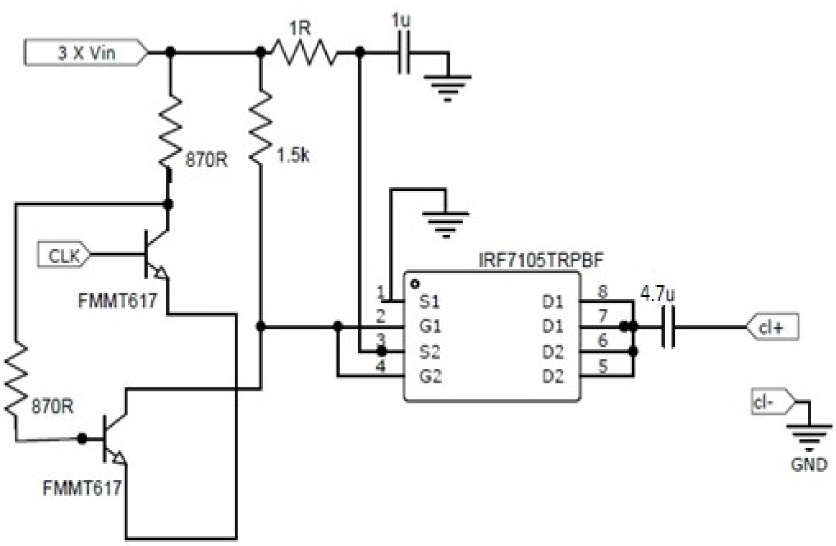
Schematic Diagram:

Figure. 1



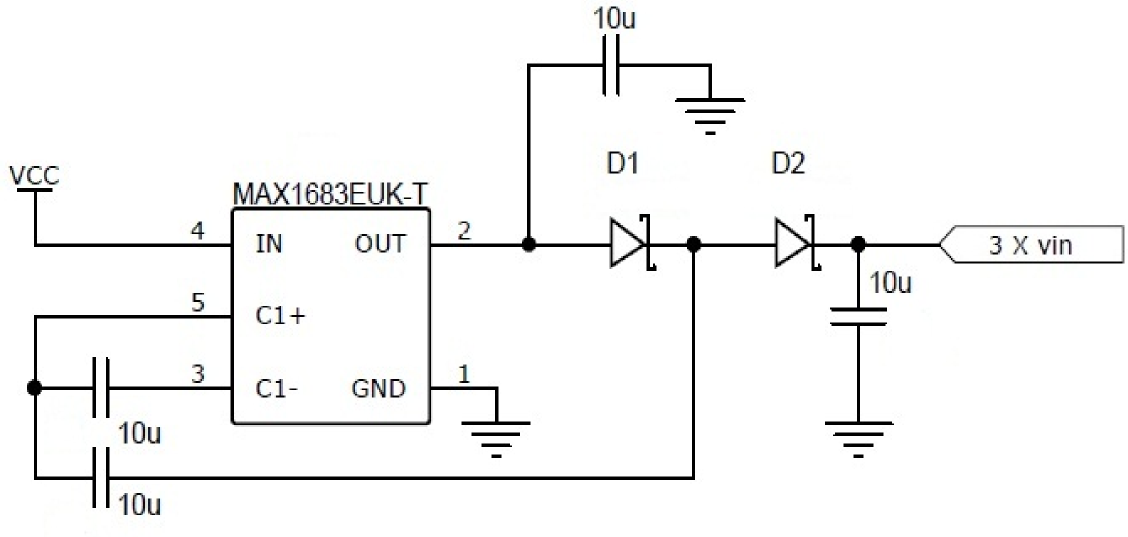
Power Port and Output Connections

Figure. 2



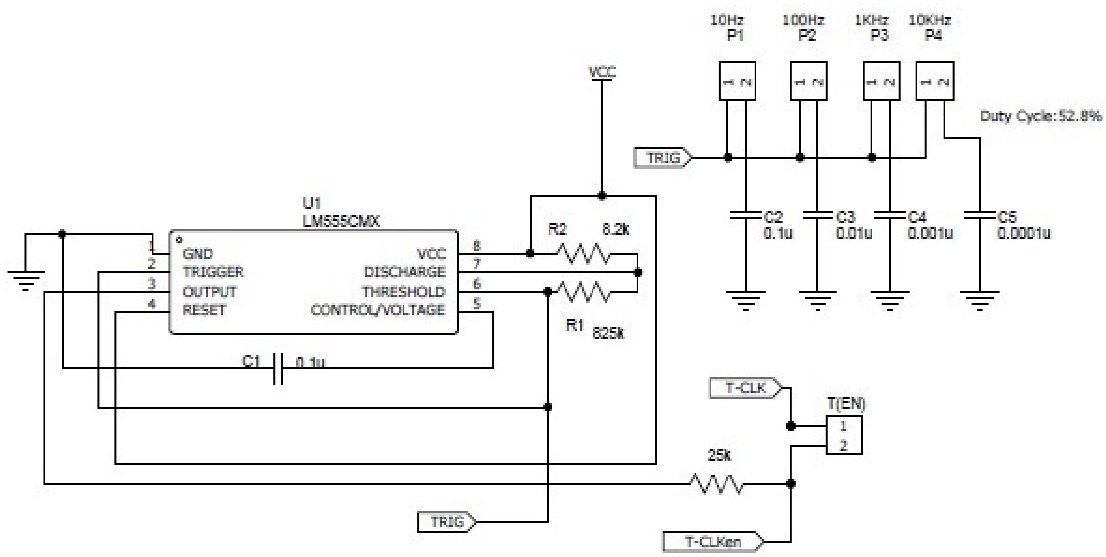
Fast Bipolar Current Pulsing Circuit

Figure. 3



MAX1683 Configured as Voltage Tripler

Figure. 4



LM555 Configured as Clock Source

Interfacing the TMR9112 Single-Axis Demo Board:

The diagram below illustrates a method to interface the TMR9112 demo board with data acquisition equipment. The sensor output can be read with the on-board timer enabled or from using external waverform to initalize the sensor on demand or as needed based on a user's custom algorithm.

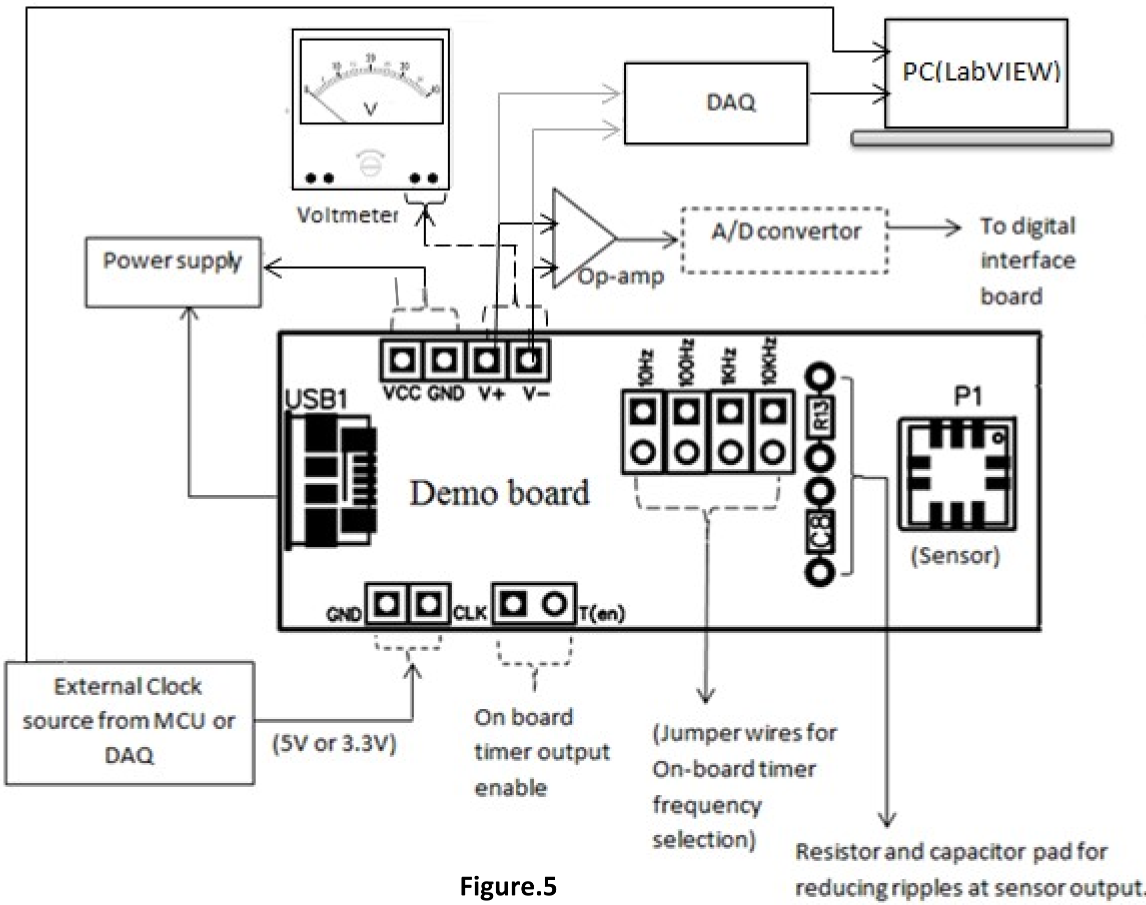


Figure.5

1. Using a Continous Pulse from the On-board Timer:

To enable the On-board timer, place the jumper pin onto the "T-en" terminal pins. Additionally select the appropriate frequency output, by placing a jumper onto the desired labeled frequency pins. The duty cycle of the timer ouput is roughly 52 .3%. The sensor output at V+ and V- is the analog output, with reduction of unwanted hysteresis. Some residual high frequency ripple may appear in this output, and to remove its high harmonic content from the sensor output, a resistor and Capacitor should be added at the R18 and C8 through hole pads. The cut off frequency(f_c) must be choosen with respect to the pusle width, but a good rule of thumb would be to set it at clock freq(f_p) , f_p >5 fc, where f_c=1/2πRC.

2. Using a Timing Pulse from an MCU or External Clock Source:

An external timing pulse is often more efficient in terms of power efficiency and further hysteresis reduction. The timining cycle for one possible clock input and sensor read is shown in the figure below.

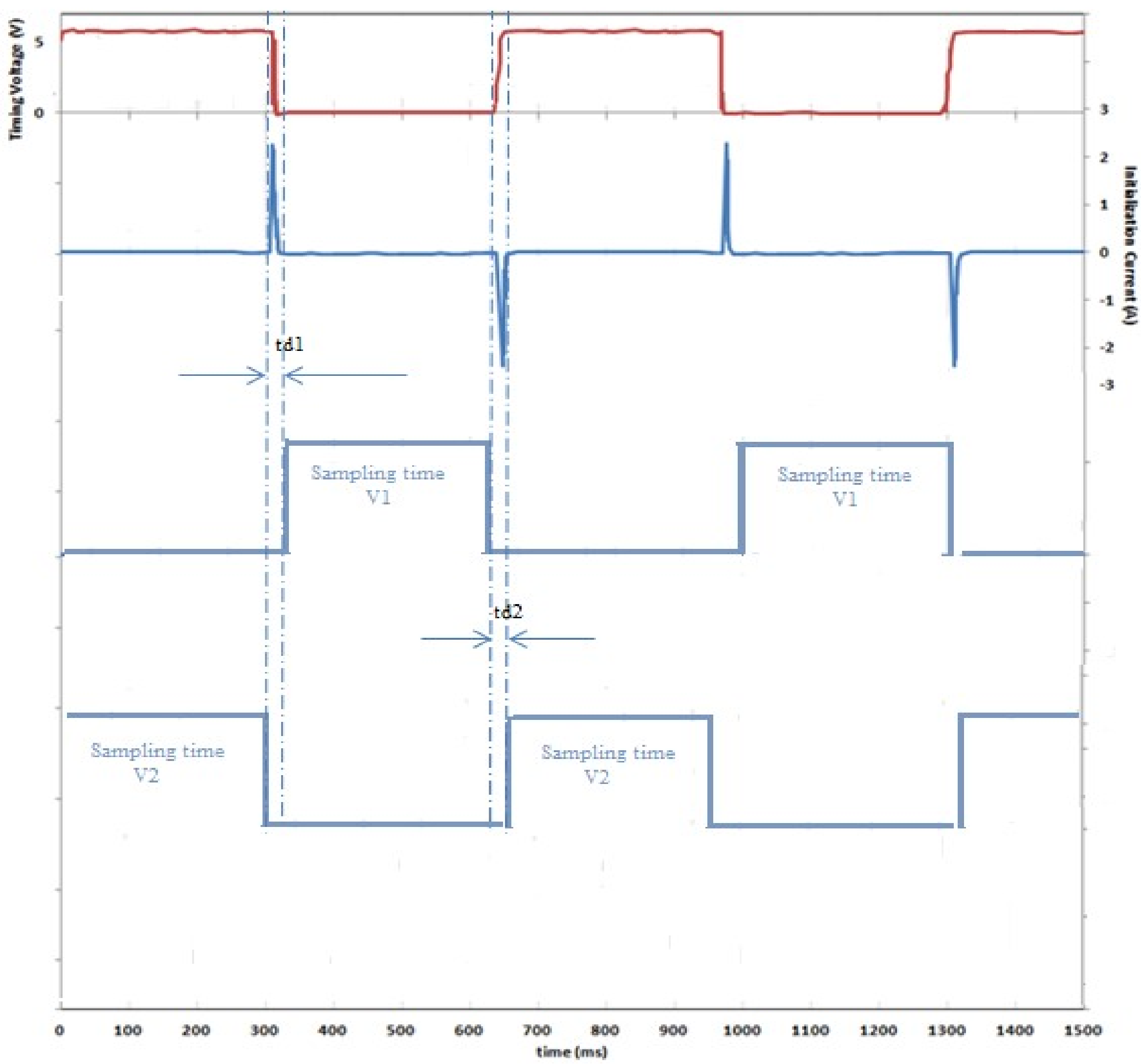


Figure.6

The ideal clock input waveform should be held high, and when the clock input goes LOW , a positive current pulse will be induced in the sensor initialization coil and negative current pulse will be induced when the clock input goes HIGH. The sensor value V1 should be sampled after the completion of positive current pulse with the time delay td1 and sensor value V2 should be sampled after the completion of negative current pulse follwed by the time delay td2. The final sensor output V, should be calculated as, V= (V1+V2) /2.

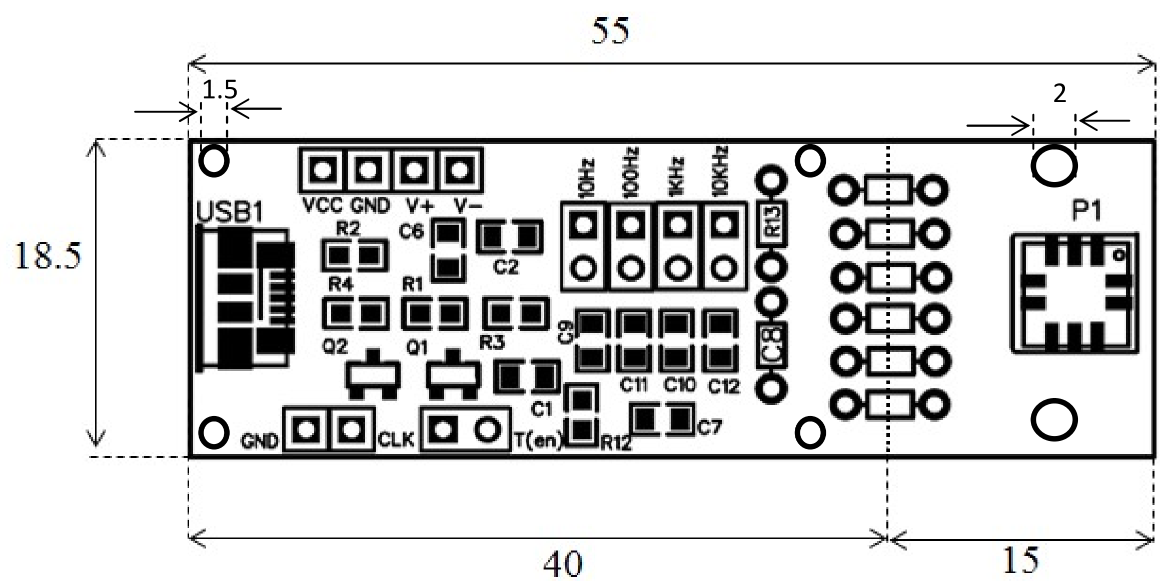
Electrical Specification:

Tested at room temperature, T=25^{0}C.

Parameters	Min	Typ	Max	Units
Supply voltage	4.5	5	5.5	V
Supply current Without using pulse 1. Clock freq=1Hz 2. Clock freq ≤10H 3. Clock freq >10Hz<100Hz 4. Clock freq >100Hz<1KHz 5. Clock freq>1KHz<10KHz	 -- -- -- -- -- --	 -- -- -- -- -- --	 27 32 45 163 187 190	 mA mA mA mA mA mA
Clock Input	3.3	5	Vcc	V

Mechanical Dimensions:

(Top view)



*All Dimensions are in millimeters (mm)

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