

Electro-Resales

A 10 MHz & 100 KHz Frequency Source

Introduction

This short guide is designed to assist in setting up the frequency source, and giving some basic information on the product, the output(s) available, and its limits.

First it is important to know that this frequency source is not a temperature controlled unit, neither is it GPS locked. What it is though, is a very stable frequency source that has a stability that is +/- 50PPM

As such the unit can be used for a variety of frequency measuring activities that are commonly encountered in the home laboratory or Amateur Radio Station.

Circuit description

The heart of this unit is a 10.00MHz block oscillator that outputs a HCMOS clock signal (TTL compatible) this output is a square wave, this output signal is fed through a low pass filter to 'clean' the signal and produce a quality sine wave.

Following the filter the signal is then passed to a 20dB attenuator, thus providing two outputs, one at the full output level of the block oscillator, and one at the attenuated signal level. These outputs are simultaneously available at the SMA sockets.

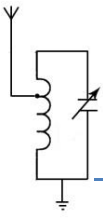
To obtain the 100 KHz output the 'raw' 10 MHz oscillator signal is fed to a pair of 74LS90 counters setup as divide by 10 to achieve the 100 KHz signal.

This signal is a square wave and can be used to provide calibration marks as required or divided further by external circuitry. This signal is available on a separate output SMA, and is available simultaneously to the 10 MHz signals

For further details on the circuit please refer to the appendix at the end of this document for the circuit diagram and other useful data.

How to use

As supplied the frequency source is a completed PCB with all connectors and components mounted, to keep the PCB to a manageable size, surface mount components have been employed for the attenuator



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and dividers.

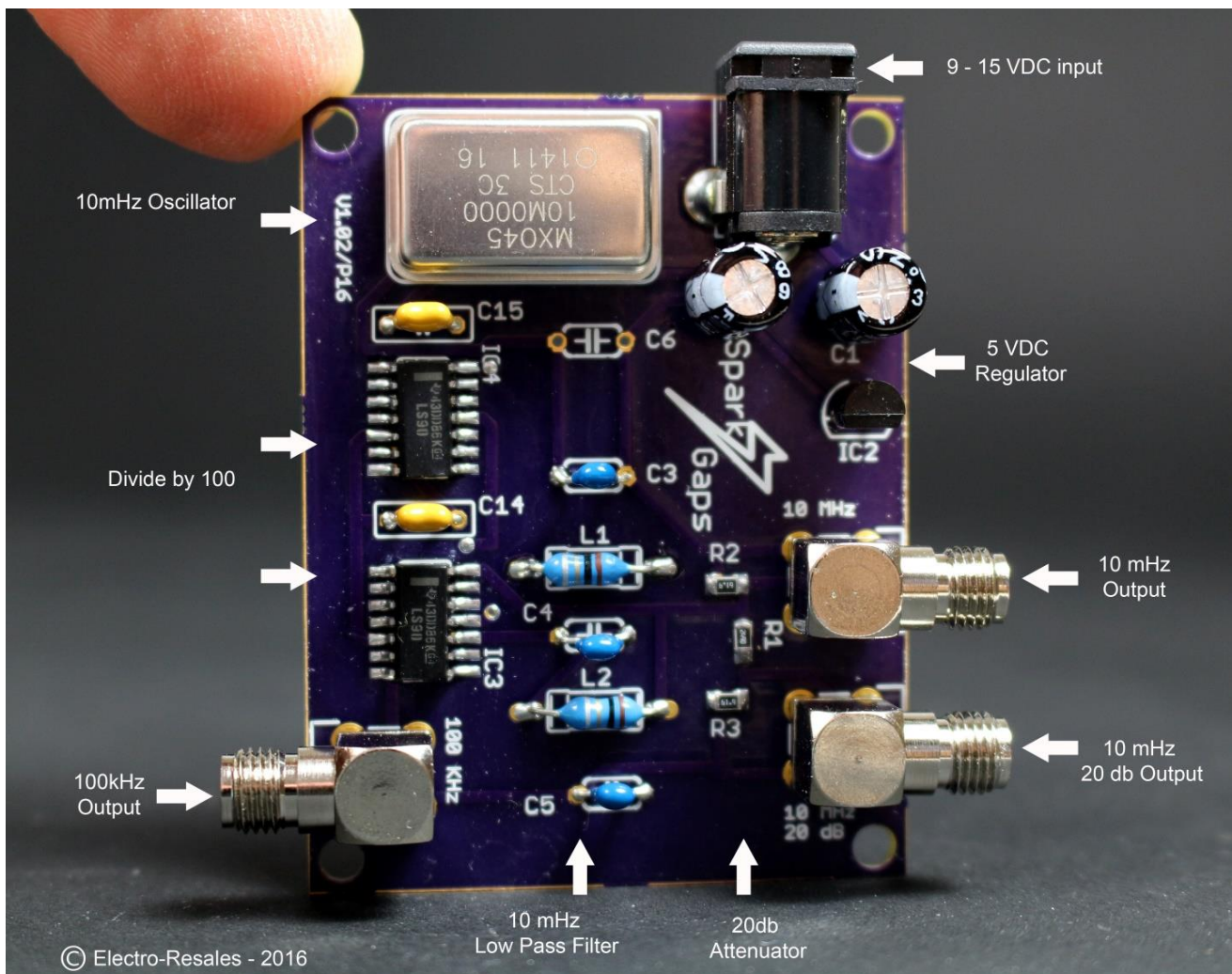
Mounting holes for 4 x 4-40 bolts are provided, one in each corner of the board, it is recommended that the PCB is fixed to a stable surface or mounted in a box prior to use, using these holes.

The frequency source has an on-board 5 volt regulator that accepts DC from 9 to 20 volts at the barrel jack (5.1mm, center positive). Providing a suitable source of DC at the barrel jack starts the main oscillator and the three outputs will have their respective frequencies available for immediate use.

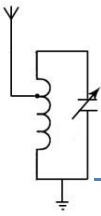
It should be noted that all outputs can be used simultaneously if needed.

To help understand the board and layout, this annotated photo is provided:-

Note; C6 is not populated



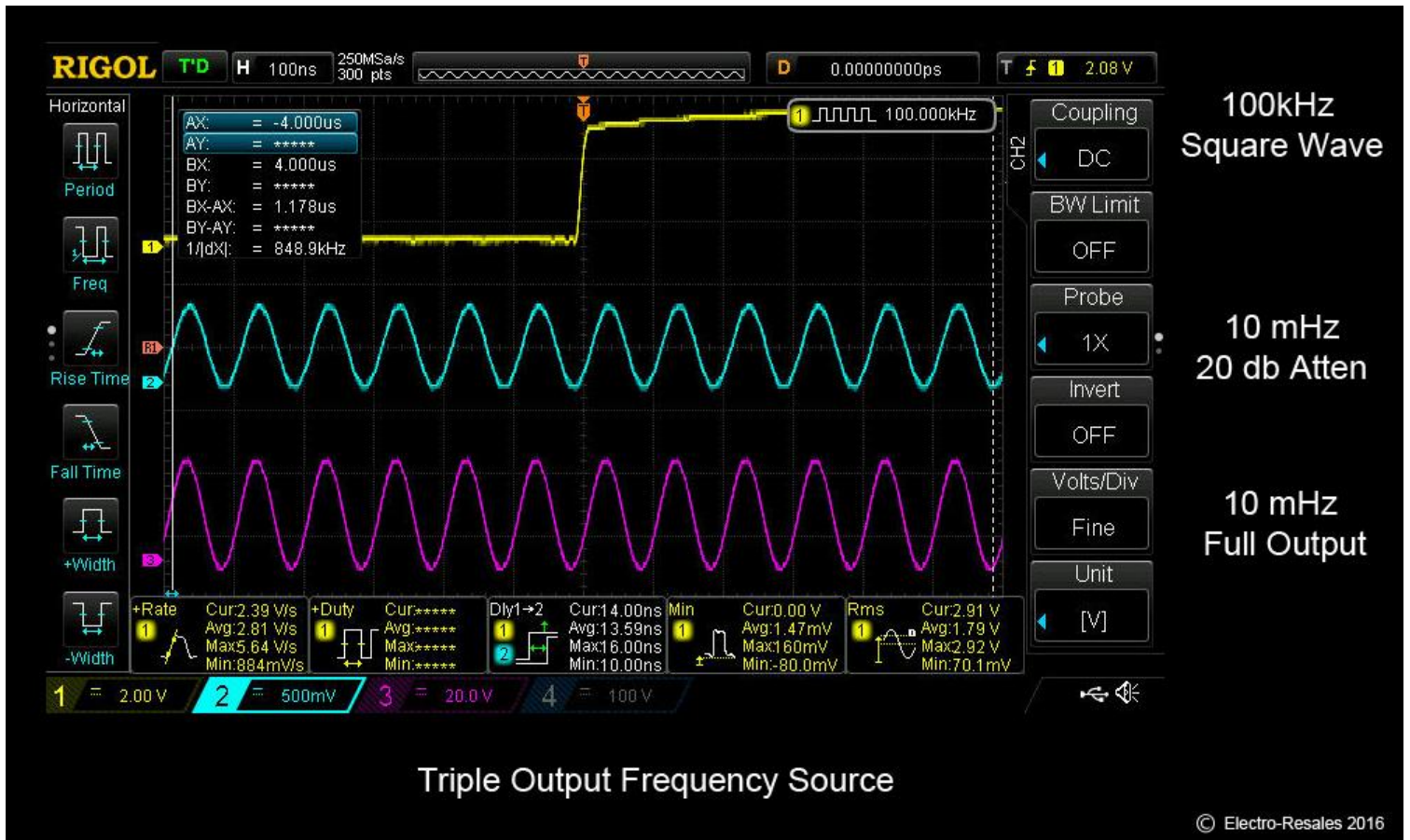
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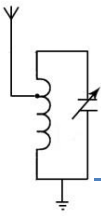


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In use data

The following information has been obtained by measuring an actual production version of this frequency source, and is provided in good faith to allow a better understanding of the products capability. This image shows the three outputs available from this unit, 100 KHz, 10 MHz & 10 MHz attenuated.

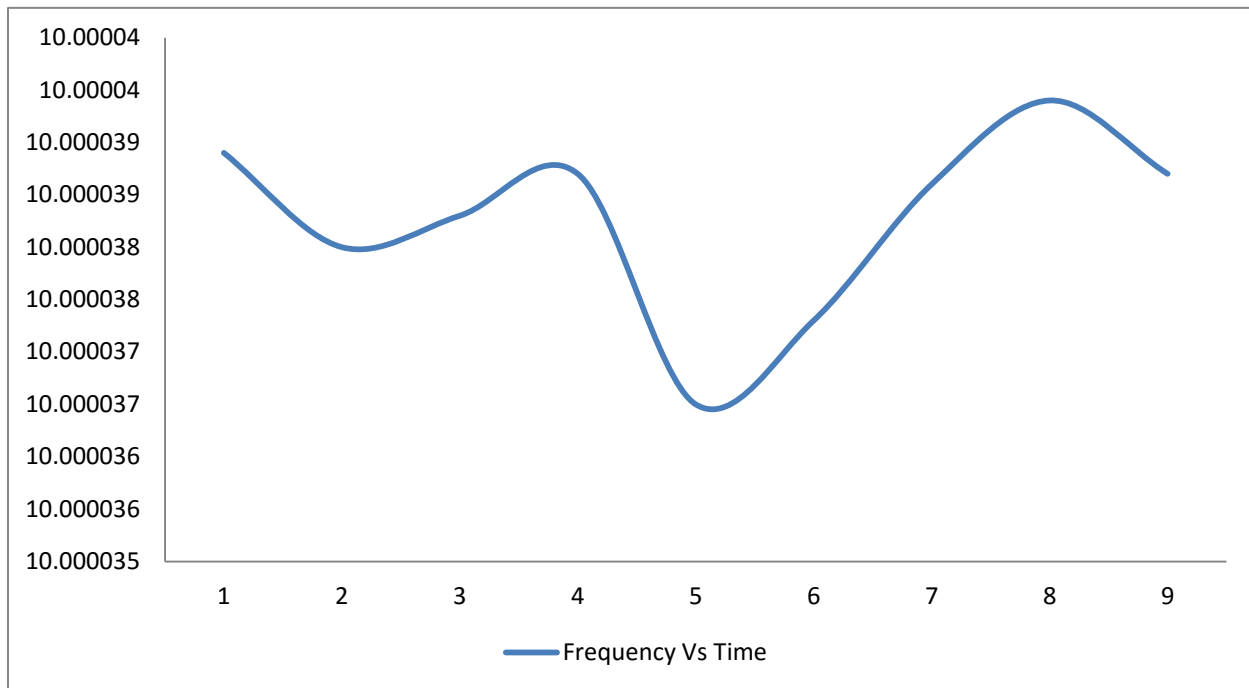


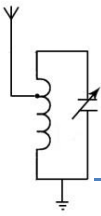


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The chart shown here is a plot of the 10 MHz frequency output measured over a 10 hour period, using a Fluke 7220 A Frequency counter locked to a Thunderbolt GPS Locked 10 MHz standard.

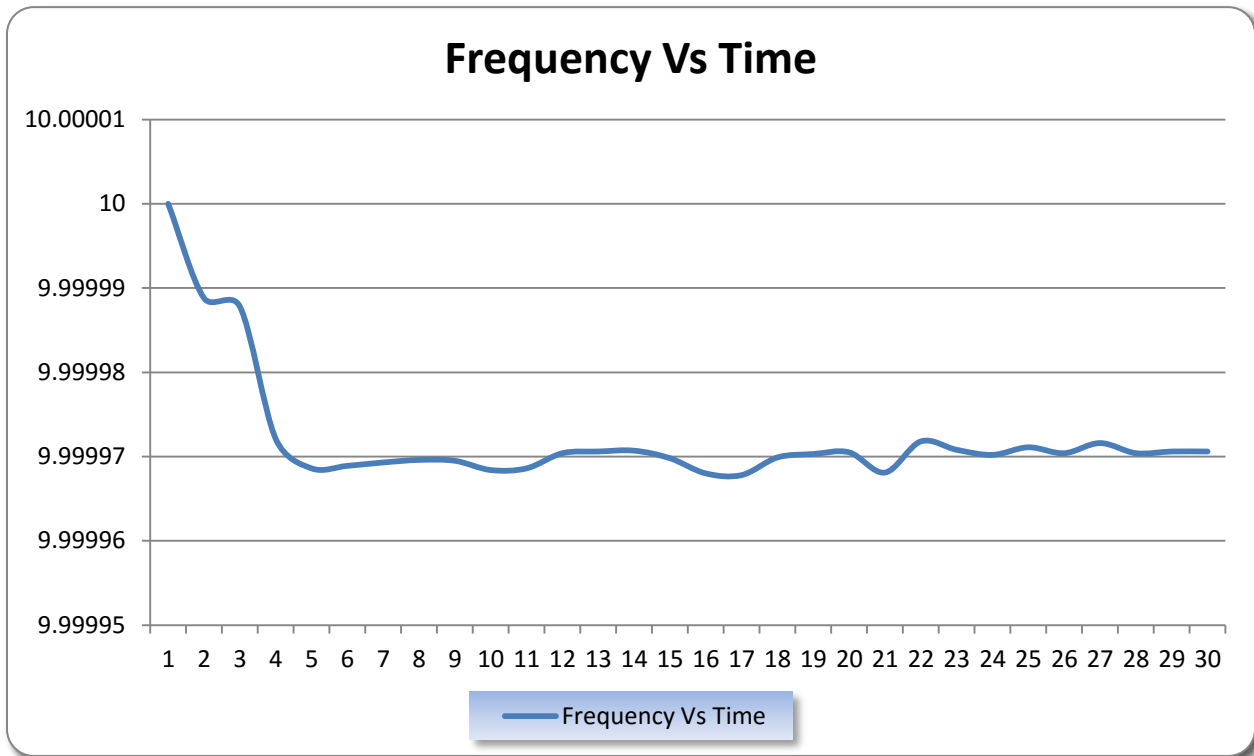
An average change of + 0.00035 - +0.0004

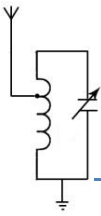




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This chart shows the frequency variation of the 10 MHz GPS standard as measured by the Fluke 7220A when the 10 MHz frequency source is used as the 10 MHz clock for the frequency counter – an average deviation of -0.0003 over a 30 hour measurement period





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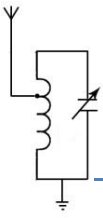
The small Print

DISCLAIMER

Any person who constructs or works on electronic equipment may be exposed to hazards, including physical injury, the risk of electric shock or electrocution.. These hazards can result in health problems, injury, or death. Only qualified persons who understand and are willing to bear these risks themselves should attempt the construction of electronic equipment. By purchasing this item, the buyer acknowledges these risks.

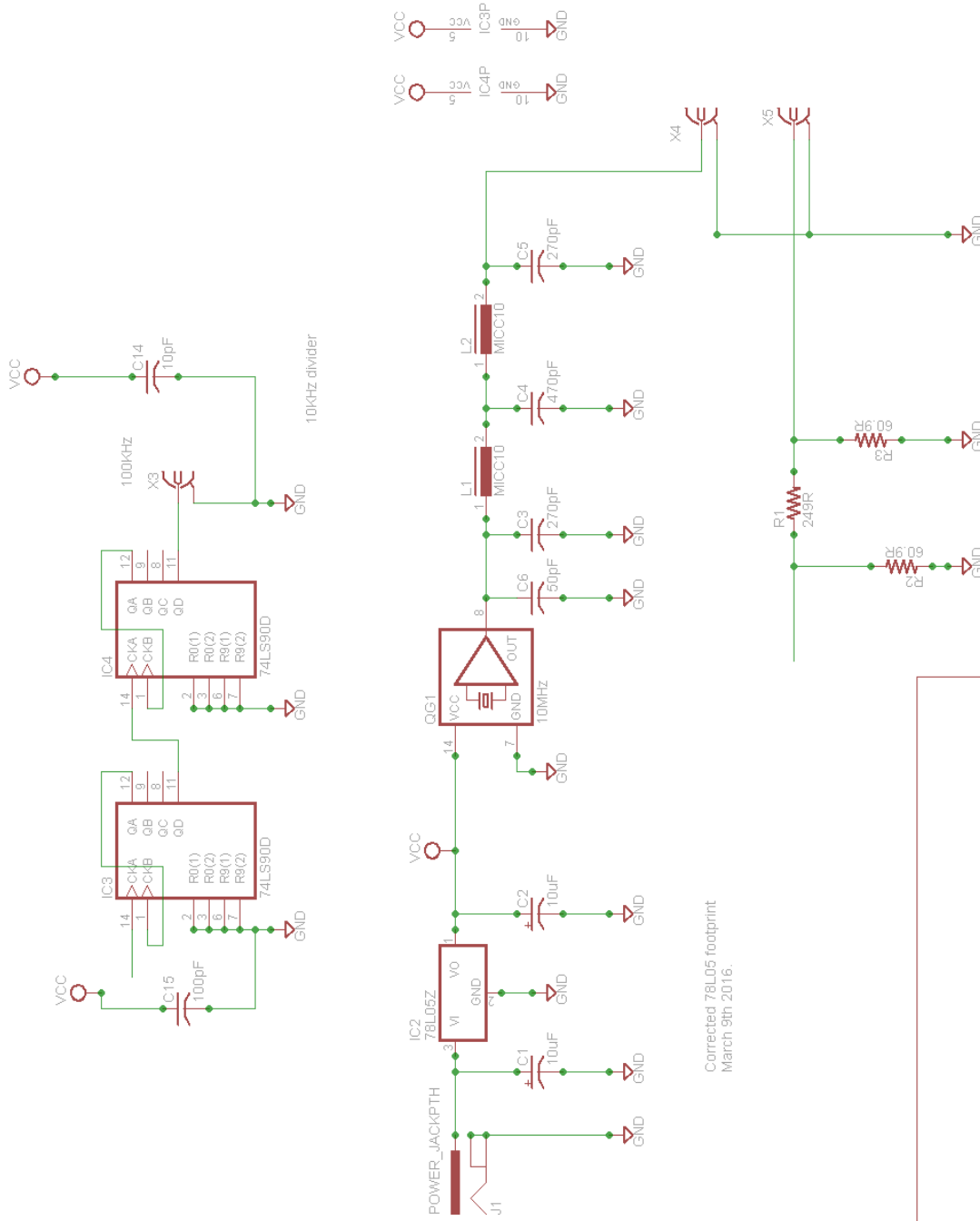
There is a risk of electric shock, electrocution, burns, or fires that is inherent in the construction and use of electronic equipment. By purchasing this item, the buyer acknowledges these risks.

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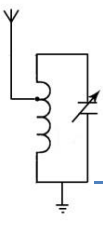
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Appendix A - Schematic



Corrected 78L05 footprint
March 9th 2016.

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Appendix B – PCB Layout

