

1MHz & 100 KHz Crystal Calibrator With Modulation

A Little Background

A crystal calibrator is a very useful piece of test equipment that is used to generate audible markers across the RF spectrum at precise intervals. This has the benefit of being able to accurately measure, without other equipment, the calibration accuracy of a radio dial or frequency indication. While of more use with vintage equipment the calibrator still finds a use in checking modern radios.

Our version has 1MHz & 100 KHz switch selectable output signal that is a strong square wave into the upper MHz region. In addition the output can have a modulated signal superimposed on the output. This feature assists in hearing the 'Marker' on crowded bands.

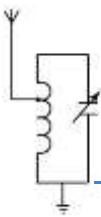
Operation and Usage

The calibrator has several input and output jacks and it is worth taking a moment to review each of these. While examining the PCB, please also refer to the picture below for reference.



The left side has the two power input options, which can be a DC supply from 9 to 20 Volts center positive, the jack is a 2.1 x 5.5 mm barrel style. The screw terminals allow an AC voltage to be used to power the unit; this can be supplied from the heater chain of say a tube radio or a small 6.3 -12 volt transformers.

Please note that the unit should never be powered from both AC and DC Power at the same time



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Below the AC input terminals is the button to allow the modulated signal to be applied to the output marker. This button is no latching so after releasing it the modulation signal is stopped. The output is provided by the BNC jack on the upper right side of the board. Frequency selection is by means of the slide switch located just to the right of the Crystal oscillator.

To use with a radio for actual calibration, the signal from the calibrator BNC jack needs to be coupled to the radio under test, this can be directly to the antenna jack or a looser coupling can be achieved with placing the output lead near the radio LO. Some experimentation may be required, but remember;

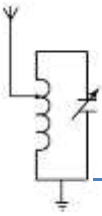
When working on a tube (Valve) based receiver or equipment that is tube based, be aware that high voltages are present and take due caution to avoid contact with these voltages to protect yourself, the radio and calibrator.

After power is applied to the unit, the output is immediately available at the BNC jack and its frequency is determined by the position of the output selector switch.

General usage guidelines

Classically, to use a calibrator, the receiver is tuned to 10.005 MHz, and with the calibrator on and connected, with the frequency selector set to either the 1 Hz or 100 KHz position, the radio is slowly tuned until the dial (analog or digital) reads 10000 MHz, the beat of the calibrator should be heard as the radio is tuned until it nulls at the 10.000 MHz point, tuning up or down, past the null at 10.00 MHz, will produce a new signal and null every 1MHz or 100 KHz, in this way the accuracy of the radio dial can be determined.

The marker signal may prove hard to discern, especially if the marker unit is being used while the receiver is being used with an antenna, in this case pressing the modulation button will increase the audibility by superimposing a tone on the mark signal.



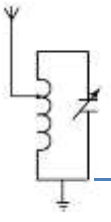
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Troubleshooting

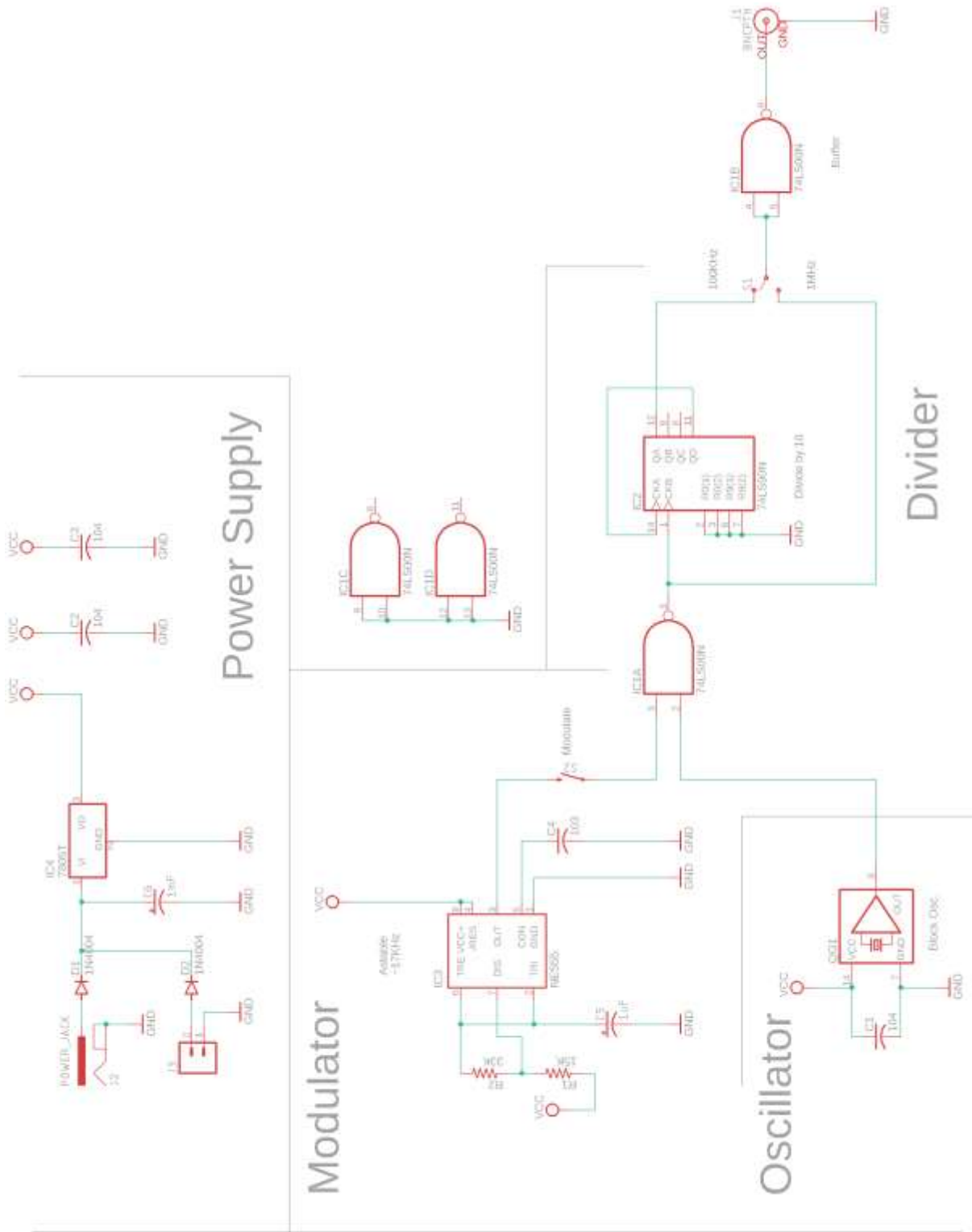
Troubleshooting

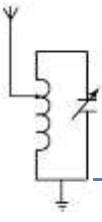
We have designed and manufactured the calibrator to be a robust unit that should give a long service life, however problems can occur and the following quick notes are designed to assist with simple troubleshooting. Please also refer to the schematic in the appendix. If these fail to produce a positive result please reach out to us at Steve@electroresales.com

- 1 **No signal – Check that the unit is receiving power, if using the AC input make sure the heater chain is on, if using DC is the input voltage above 9 VDC**
- 2 **No signal – Check the switch is on the range desired, looking for 100KHz marks with the switch in the 1 MHz position could cause no signal**
- 3 **No signal – Check that the clock oscillator is properly seated in the socket; Press the oscillator gently to make sure it is seated.**
- 4 **No signal – Check your output cable is in good condition, replace or substitute if needed.**



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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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