Voltage Control and Voltage Reference for the ECOC-2522 OCXO

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The ECOC-2522 series of oven-controlled crystal oscillators, or OCXOs, are designed to generate a very clean signal and stabile clocking signal. The series has the capability to offer frequencies from 2 MHz to 100MHz. For a full list of independent frequencies, please reference the list of developed frequencies below. ECS' ECOC-2522 OCXOs feature an SC cut high Q crystal with an internal thermistor to maintain the quartz crystal and oscillator circuits at a constant temperature. This creates a stable environment and prevents the oscillator from experiencing frequency drift. OCXOs provide a highly stable, clean clocking source for telecommunications, cellular base stations, data communications, instrumentation, test and measurement equipment and more where tight frequency stability and signal quality is critical.

Developed Frequencies

10.0 MHz	38.4 MHz
12.8 MHz	38.8 MHz
13.0 MHz	40.0 MHz
16.384 MHz	100 MHz
20.0 MHz	

One of the performance functions of the ECOC-2522 is the voltage control (Vc) port which provides a means to calibrate the output frequency post reflow. The ECOC-2522 supplies a regulated DC voltage output on pin #2 V Ref. The value of this voltage is dependent upon the supply voltage bias. For a 5.0V Vdd, the Vref value will be +4.50V ±0.2V. Similarly when Vdd = 3.3V VDD, the Vref value will be +2.80V ±0.2V. See the following figures for the two preferred methods for utilizing the voltage control port (Vc).

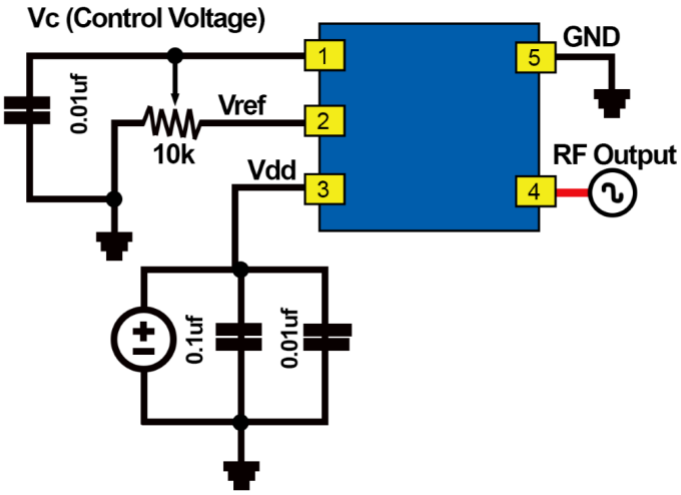


Figure (1) depicts that the simplest way to utilize the Vref output is to connect a potentiometer between Vref and GND. The wiper of the potentiometer should then be connected to the Vc port) of the OCXO. This way, the DC Voltage value at the Vc port can be adjusted by varying the position of the wiper.

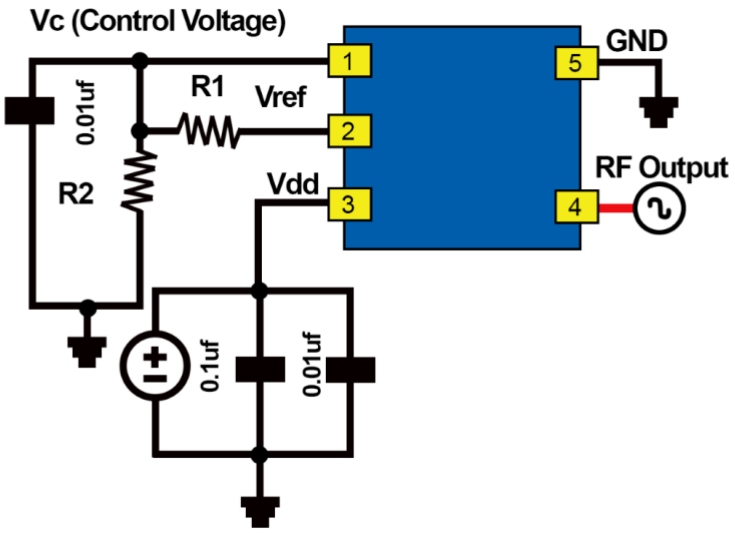
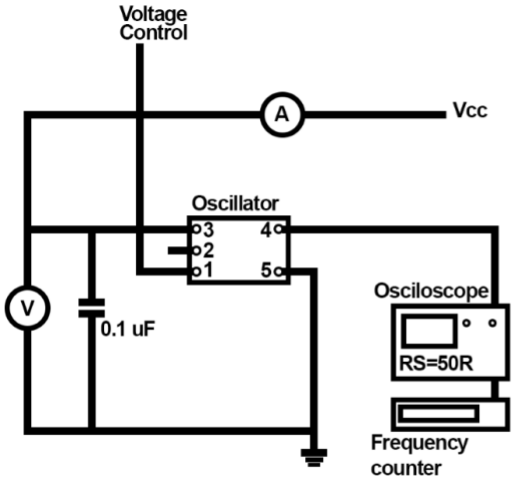


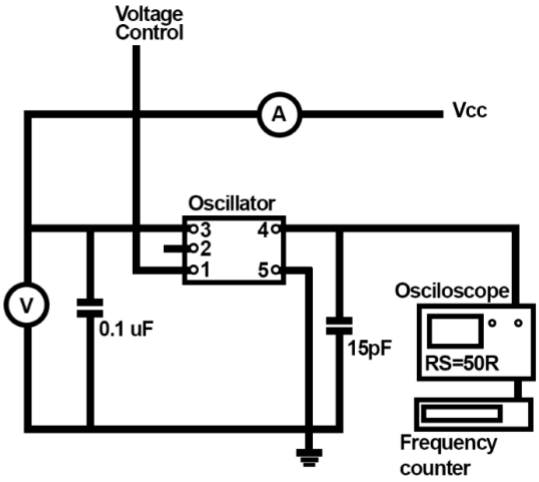
Figure (2) depicts another way to achieve a similar result by using two resistors as a potential divider approach. The Vc voltage will be determined by Vc = (R2 / (R1+R2)) Vref. As shown, R2 can either be fixed or a variable resistor.

Resistor values for a 3.3V supply may vary but a positive starting point would be when R1equals 6.98 kΩ and when R2 equals 10.00 kΩ. Ideal resistor values for a 5.0V supply might be when R1 equals 8.06 kΩ and when R2 equals 10.00 kΩ. If a potentiometer is used in place of R2 for either the 3.3V or 5.0V supply, the wiper should be connected to the Vc port to provide a variable resistance. Note that the bypass capacitors on both the Vdd port and the Vc port are suggested values to help improve noise suppression.

Performance of the OCXO ECOC-2522 series is world class. Test setups for both the HCMOS output ECOC-2522 C and sine wave output ECOC-2522 S components are depicted below.



Test Circuit - Sine Wave



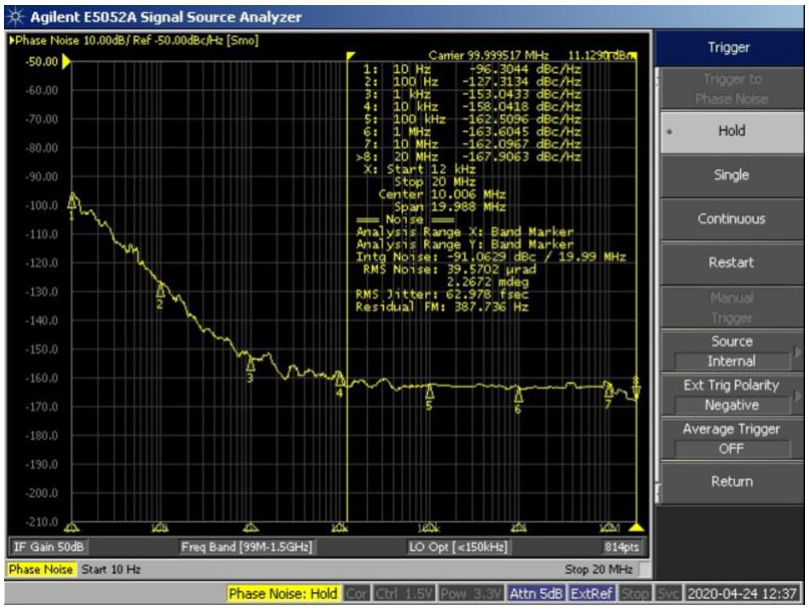
Test Circuit - HCMOS

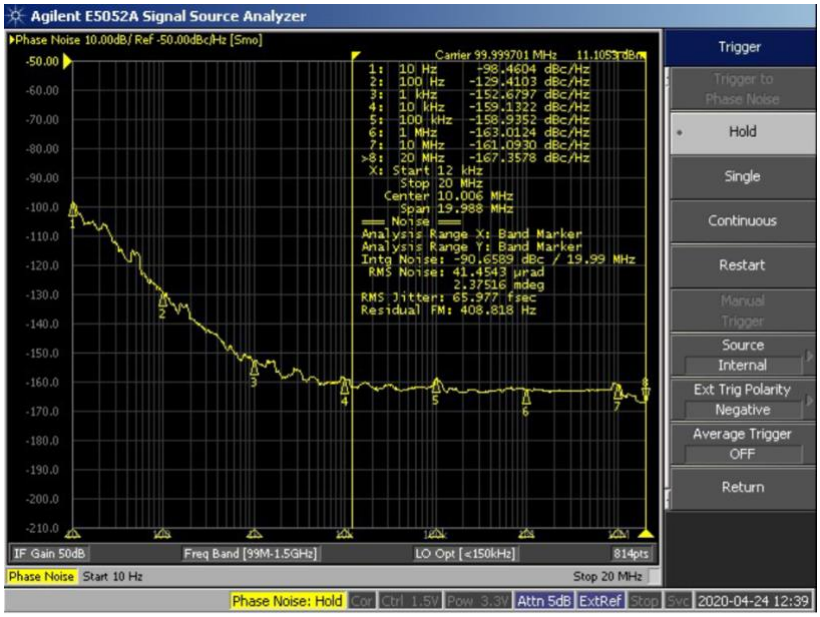
Below are the Phase Noise charts and graphs from three 100MHz test Oscillators.

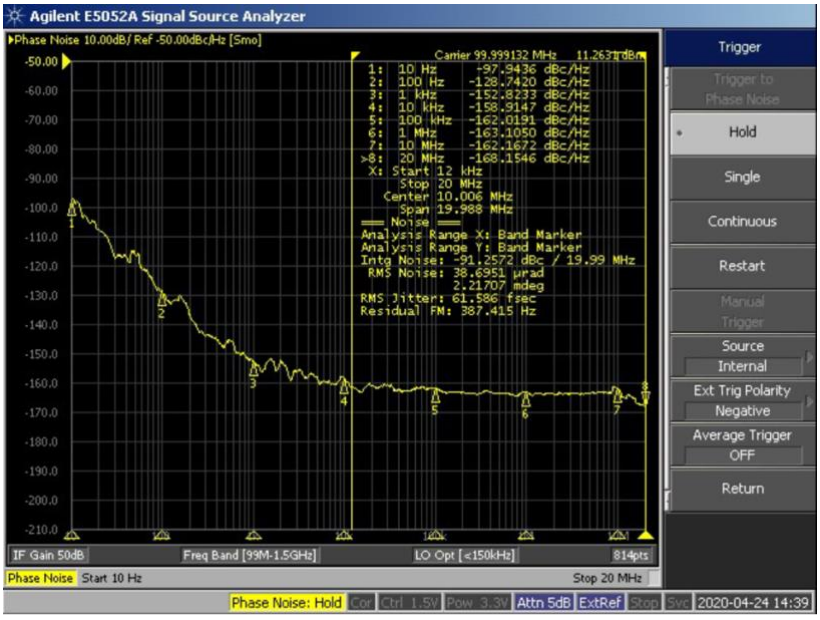
ECOC-2522-100.000-3FC Phase Noise and Jitter

SN	10Hz	100Hz	1KHz	10KHz	100KHz	1MHz	10MHz	20MHz	RMS Jitter
#1	-96.3	-127.31	-153.04	-158.04	162.5	-163.6	-162.09	-167.9	62.978 fs
#2	-98.46	-129.41	-152.67	-159.13	-158.93	-163.01	-161.09	-167.35	65.977 fs
#3	-97.94	-128.74	-152.82	-158.91	-162.01	-163.1	-162.16	-168.15	61.586 fs

ECOC-2522-100.000-3FC Phase Noise and Jitter







ECS Inc. International is committed to offering our customers the best frequency control products on the market. Today, that means taking advantage of the high precision quality “Q” and stability that quartz-based oscillators can offer.

Please contact us if you need additional information or have a specific requirement in your application.

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