DEMI LWSS / LWSHS

Description:

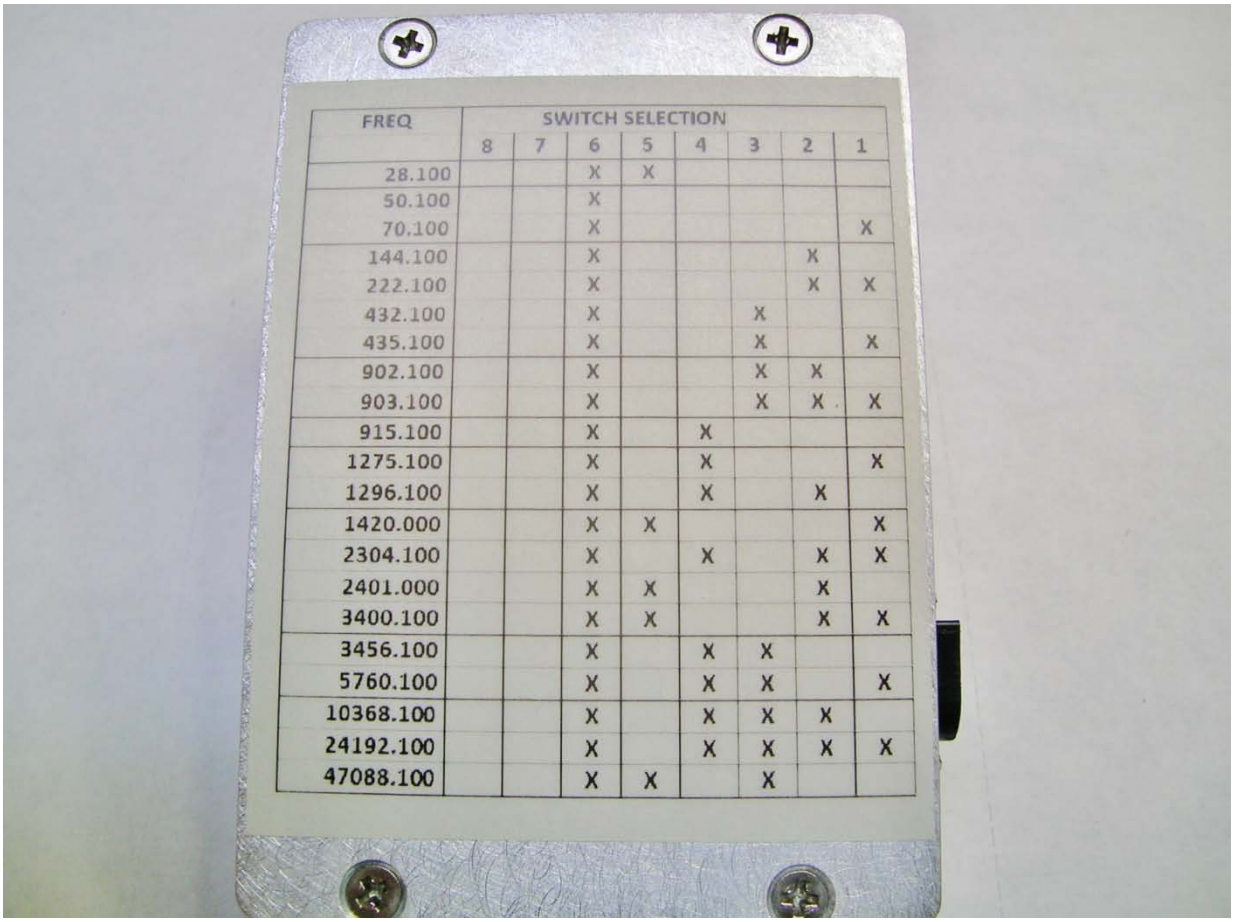
The LWSS and LWSHS are standalone VHF through microwave Amateur Radio band signal sources derived from the DigiLO synthesizer developed by Q5 Signal. It is provided in a custom machined enclosure that measures 3.5” x 2.5” x .9” (not including connectors) and is chemically etched to prevent oxidation. The output signal is delivered through a common SMA connector. Both versions operate at any voltage between 9 and 17 VDC @ 300 mA. Both units cover all amateur Radio bands between 28 MHz and 47 GHz. Specific frequencies are pre-programmed and are simply selected with an 8 pole dip switch (show above) utilizing a supplied Frequency chart.

The LWSS’s have their own internal stable references but for the best possible frequency accuracy, an external 10 MHz source such as one that is GPS based may be connected to the second SMA connector and the internal source is automatically bypassed. The LWSHS is a special unit with a 0.28 PPM stability internal reference to be utilized when accuracy is important but an external 10 MHz is not available. It is an option with additional pricing. A specification sheet of this High Stability source is found at the end of this document. A link to the DigiLO synthesizer is found here where its specifications may be reviewed.

http://01895fa.netsolhost.com/PDF/Manuals/digiLOr18_9_1.pdf

The LWSS and LWSSHS generate direct frequencies through the 6 GHz range. Available frequencies in the 10, 24 and 47 GHz bands are derived through a harmonic generator built in to the units utilizing a base frequency in the 3.5 GHz range. This is important to understand because the signal level at the higher microwave frequencies may be low, understand that the base frequency will be at a level near +0 dBm and generated through the RF connector. All of the LWSS and LWSSHS amateur band frequencies are listed in the table on the third page.

All other DigiLO frequencies are available with the unit if you desired to use it as a local oscillator. Those frequencies are listed in the DigiLO document. For convenience, a converted frequency chart of all of the weak signal amateur band frequencies matching the Dip Switch numbering is available with the LWSS/LWSSHS user document. PLUS- the finished unit is provided with a handy copy of this chart attached to the back side of the LWSS/LWSSHS for ease of use when portable.



FREQ	SWITCH SELECTION							
	8	7	6	5	4	3	2	1
28.100			X	X				
50.100			X					
70.100			X					X
144.100			X				X	
222.100			X				X	X
432.100			X			X		
435.100			X			X		X
902.100			X			X	X	
903.100			X			X	X	X
915.100			X		X			
1275.100			X		X			X
1296.100			X		X		X	
1420.000			X	X				X
2304.100			X		X		X	X
2401.000			X	X			X	
3400.100			X	X			X	X
3456.100			X		X	X		
5760.100			X		X	X		X
10368.100			X		X	X	X	
24192.100			X		X	X	X	X
47088.100			X	X		X		

To use, either connect an antenna or a suitable 50-ohm cable connection to the RF connector. Apply DC Power and notice the Red “On” light. If you chose to connect an external 10 MHz source, the LED will be Yellow. Select a frequency by setting the switch to match the chart. The output frequency will be as accurate as your external 10 MHz reference is or after a brief warm up, as accurate as it can be with the standard or optional internal source choice.

You are now ready to test your receiver, low level TX stage or tune an antenna if you have a return loss bridge. It is capable of driving a low level input transverter for testing. Connected to a GPS locked 10 MHz source, you can calibrate the frequency of any receiver 28 MHz through 47 GHz. You will find that having the LWSS or LWSSHS with you portable equipment is a perfect piece of test gear.

Output power will be approximately +2dBm from VHF through 2.4 GHz. The 3 GHz range slopes down to +0dBm and the 5-6 GHz range may be as low as -10dBm

LWSS/LWSSHS Frequency Select List

Frequency	Switch Selection								Notes
	1	2	3	4	5	6	7	8	
28.100					X	X			
50.100						X			
70.100	X					X			
144.100		X				X			
222.100	X	X				X			
432.100			X			X			
435.100	X		X			X			
902.100		X	X			X			
903.100	X	X	X			X			
915.100				X		X			
1275.100	X			X		X			
1296.100		X		X		X			
1420.000	X				X	X			
2304.100	X	X		X		X			
2401.000		X			X	X			
3400.100	X	X			X	X			0 dBm level
3456.100			X	X		X			-1dBm level
5760.100	X		X	X		X			-8dBm level
10368.100		X	X	X		X			3456.033 x 3
24192.100	X	X	X	X		X			3456.014 x 7
47088.100			X		X	X			3139.207 x 15

The 10, 24 and 47 GHz frequencies are derived from multiplied 3 GHz range frequencies. The multiplication factor is listed in the NOTES column.

IMPORTANT NOTE: Because of the numbering on the Dip Switch, (1-8) if you select frequencies from the standard DIGILO frequency select, you will need to offset the switch by one. The #1 position on the switch is the “0” position on the DIGILO board.

The IQD TCVCXO is an option only utilized in the *LWSSHS* unit.

IQD

TCVCXO Specification

Part No. + Packaging: ***LFTVXO075802Cutt***

Description

- Temperature compensated voltage controlled crystal oscillator (TCVCXO) in a hermetically sealed 3.2x2.5mm SMD package.
- Model IQXT-220-2
- Model Issue number 1

Frequency Parameters

- Frequency 10.0MHz
- Frequency Tolerance ±1.00ppm
- Frequency Stability ±0.28ppm
- Operating Temperature Range -40.00 to 85.00°C
- Ageing ±0.02ppm max/day, ±1ppm max/year
- Frequency Tolerance: Measurement referenced to frequency observed with TA=25°C, Vs=3.3V, VC=1.5V and load=10kΩ//10pF, within 30 days after ex-works.
- Frequency Stability: TA varied across the operating temperature range, measurement referenced to frequency observed with fref=(fmax+fmin)/2, Vs=3.3V, VC=1.5V, load=10kΩ//10pF and temperature variable speed less than 2°C/min.
- Ageing: Vs, VC, TA and load constant, measurement referenced to frequency observed with TA=25°C, Vs=3.3V, VC=1.5V, load=10kΩ//10pF and after 1hr of operation.
- Supply Voltage Variation (measurement referenced to frequency observed TA=25°C, Vs varied from 3.13V to 3.47V, VC=1.5V and load=10kΩ//10pF): ±0.1ppm max
- Load Variation (measurement referenced to frequency observed with TA=25°C, Vs=3.3V, VC=1.5V and load change=10kΩ//10pF ±5%): ±0.1ppm max
- Developed Frequencies: 10.0MHz, 12.80MHz, 16.320MHz, 16.3840MHz, 19.20MHz, 20.0MHz, 30.720MHz, 32.7680MHz, 38.880MHz, 40.0MHz.

Electrical Parameters

- Supply Voltage 3.3V ±5%
- Current Draw 5.000mA
- Current Consumption (@ TA=25°C, Vs=3.3V, VC=1.5V and load=10kΩ//10pF): 5mA max

Frequency Adjustment

- Pulling ±10ppm min to ±15ppm max
- Control Voltage 1.5V ±1.0V
- Input Impedence 100kΩ min
- Linearity: 10% max
  Slope: Positive

Output Details

- Output Compatability Clipped Sine
- Drive Capability 10kΩ//10pF
- Output Voltage Level: 0.8V pk-pk min

Noise Parameters

- Phase Noise @ 25°C (F=10.0MHz, typ):
  -90dBc/Hz @ 10Hz
  -120dBc/Hz @ 100Hz
  -140dBc/Hz @ 1kHz
  -145dBc/Hz @ 10kHz
  -148dBc/Hz @ 100kHz

Outline (mm)