

Low Noise XTAL Oscillator with built in PLL for VHF/UHF transverters

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The XTAL oscillator (oscillator later in text) can be used as the LO in VHF/UHF transverters. There are three models - 116MHz for 144MHz band transverters with 28MHz IF, 130MHz for 144MHz band transverters with 14MHz IF and 404MHz for 430MHz band transverters with 28MHz IF.

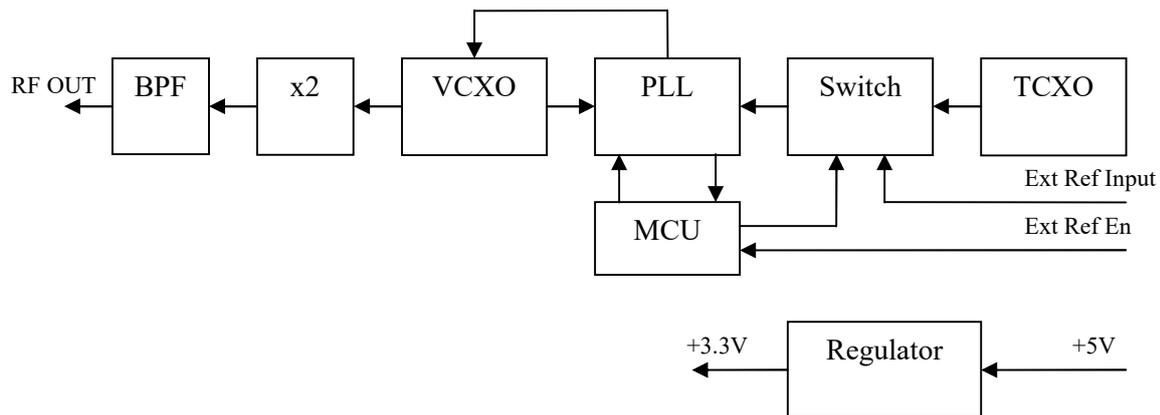


Fig 1. 116MHz and 130MHz models block diagram

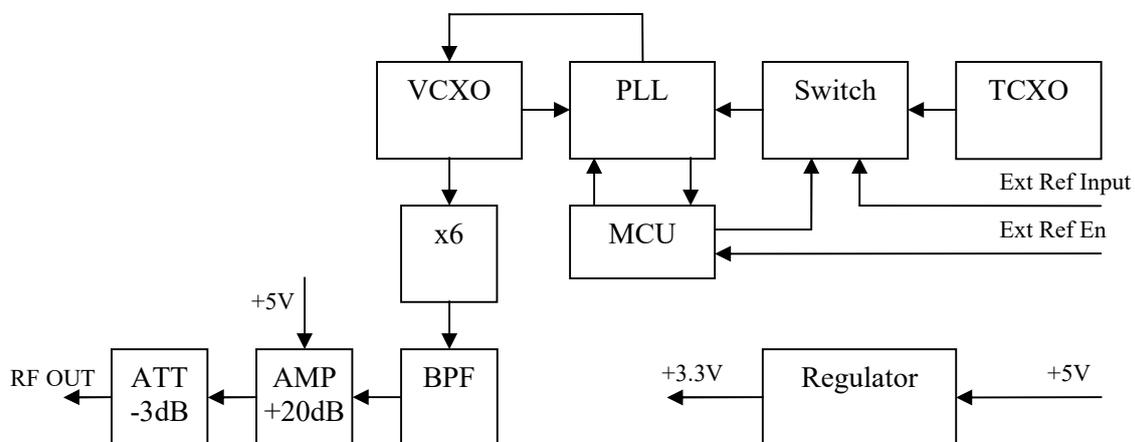


Fig 2. 404MHz model block diagram

The Oscillator consists of VCXO, multiplier, bandpass filter, PLL subsystem (it locks VCXO to the internal TCXO or external reference signal), see Fig.1 and Fig.2. Also there is microcontroller on the oscillator board, which controls PLL. It also automatically determines reference input frequency (when external reference is used) and correctly programs PLL (external reference can be any frequency from 1MHz to 300MHz with 1MHz steps). The ultra low noise voltage regulator provides clean and stable power supply for all oscillator blocks (Note: the output amplifier in the 404MHz models is powered from the +5V rail directly, so please provide clean and low noise +5V power supply for the best results).

The oscillator specifications are in the Table 1 and pin descriptions are in Table 2.

Table 1. Specifications

Parameter		Value
Frequency ¹ , MHz		116, 130, 404
Output Power, dBm		+6dBm typ. (116/130MHz models) +10dBm typ. (404MHz model)
Load impedance, Ohm		50
Phase noise, dBc/Hz	1kHz offset	-150 (116/130MHz models) -125 (404MHz model)
	10kHz offset	-160 (116/130MHz models) -144 (404MHz model)
External Reference Power, dBm		+3..+13dBm
Internal TCXO stability, ppm		0.5
Supply Voltage, V		5
Supply Current, mA		60 (116/130MHz models) 160 (404MHz model)

¹ There are separate models for each frequency

Table 2. Oscillator pins description:

Pin	Description
RF OUTPUT (J1, pin 7)	Oscillator output
LOCK (J2, pin 2)	Lock detector output. High level indicates PLL lock condition
REF en (J2, pin 5)	<u>Connect to ground to activate internal reference TCXO,</u> leave unconnected or apply +3.0..3.3V to use external reference
REF in (J2, pin 7)	External reference input
+5V (J2, pin 9)	Power supply
Other pins	Ground

The photo of the 404MHz oscillator board is on the Fig. 3, 4 and 116MHz version is on the Fig. 5, 6.

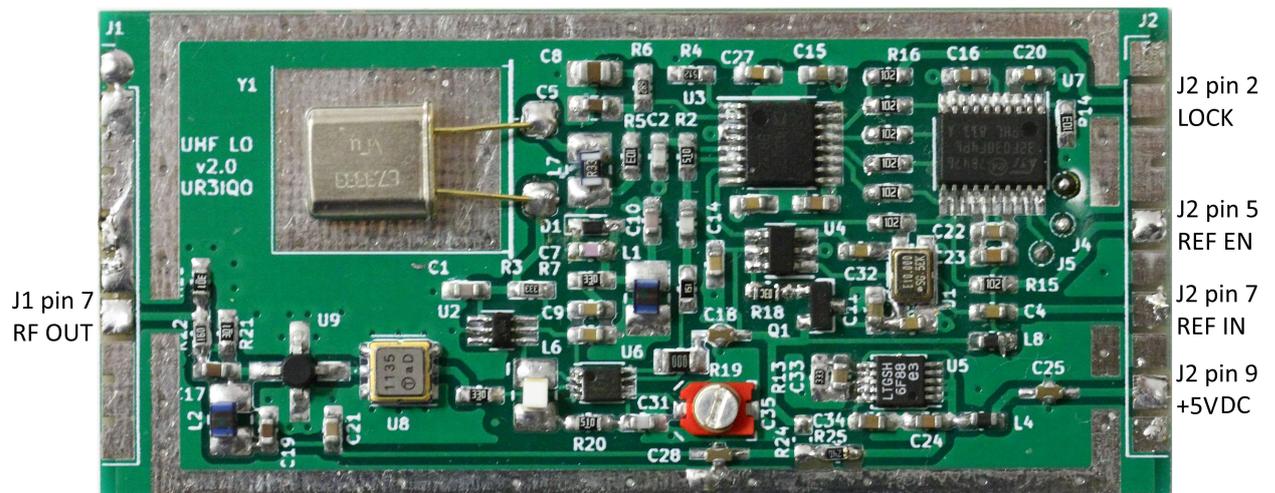


Fig. 3 404 MHz oscillator board



Fig. 4 404 MHz oscillator board with attached screen

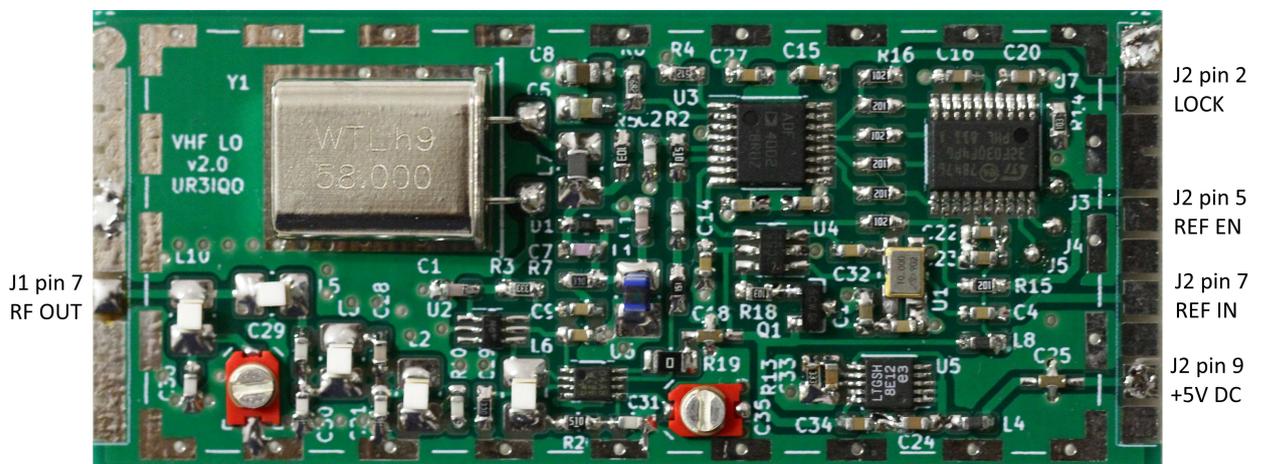


Fig. 5 116 MHz oscillator board



Fig. 6 116 MHz oscillator board with attached screen