# 5.52 MHz Oscillator Amplifier. (Atlas 210X and others)

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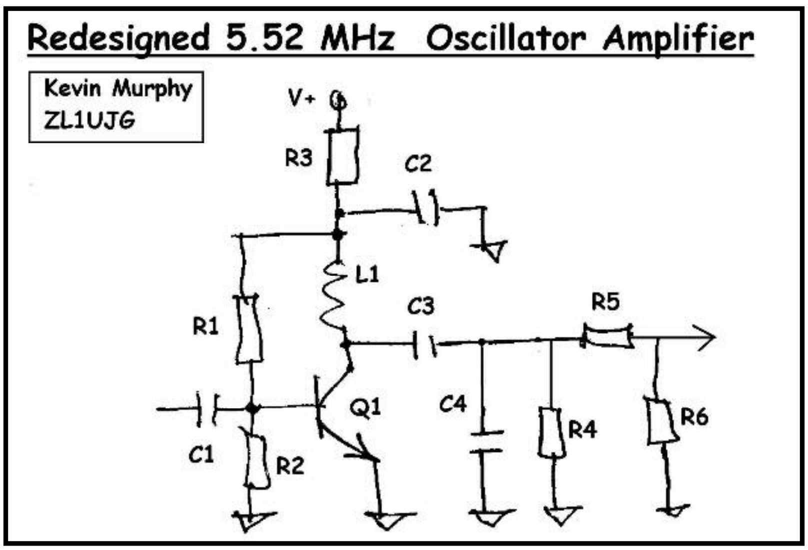
Refer to page 36 & 37 of the Atlas 210X Operation and Maintenance manual, for schematic parts,etc.

The 5.52 MHz crystal oscillator is fed into a bipolar transistor amplifier that then is switched to the 2nd mixer, when the transceiver is used in RX mode. When the transceiver is used in TX mode the 5.52 MHz signal is fed to the 1st mixer, which acts as a balanced modulator.

The original 5.52 MHz oscillator amplifier suffers from some design deficiencies.

1) The collector tuned circuit operates at a low Q, which enables a high level of harmonics to feed the mixers/ modulators, creating unwanted mixing products.
2) The tuned circuit doesn't provide a wideband match to the mixer, which deteriorates mixer performance. During testing the rejection of the carrier improved from 35 dB, to about 55 dB when using an external signal generator.
3) The DC conditions of the transistor may not be stable over temperature/ voltage changes




Some of the existing components are used in the redesigned amplifier.

The transistor is matched to a higher load. This enables a higher operating Q to be used, (of the order of 14, instead of the original 0.5) which significantly reduces the level of 5.52 MHz harmonics. This higher load presented to the collector also enables the transistor to produce more output; typically around +14 dBm (25 mW) An additional attenuator is added to the output to reduce this level to a little less than +10 dBm (10mW)

The amplifier may be run off the regulated supply (+10v in my particular unit) or off +13 or +13.8 v. It is recommended that it be run off the regulated supply as this minimizes any small variations in DC conditions that may cause small frequency changes.

R3 may be changed to suit different supplies. 8.2 volts DC appears on the transistor collector after about 1.8 volts drop across R3. The current (~20 mA) through R3 is primarily due to the collector current through the transistor but also provides some base current. A drop in collector volts will also reduce the base current, so the circuit self stabilizes.

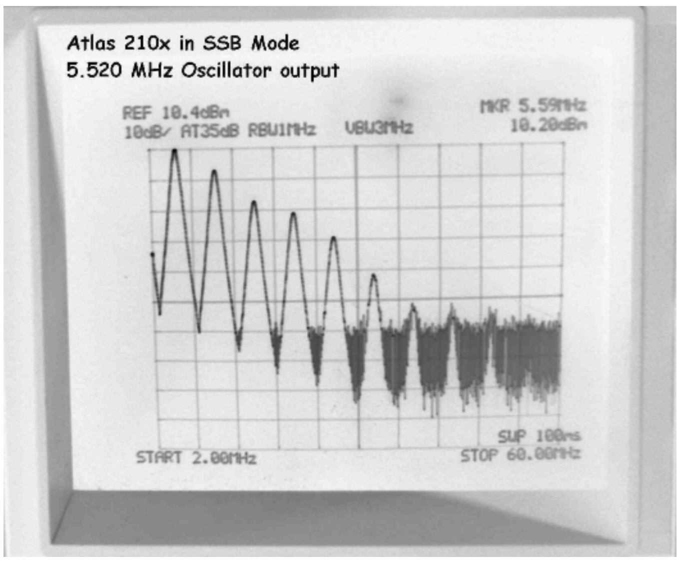
A layout using the existing PCB hasn't been produced as people may use different techniques. Although this idea hasn't been tried there should not be any problems.

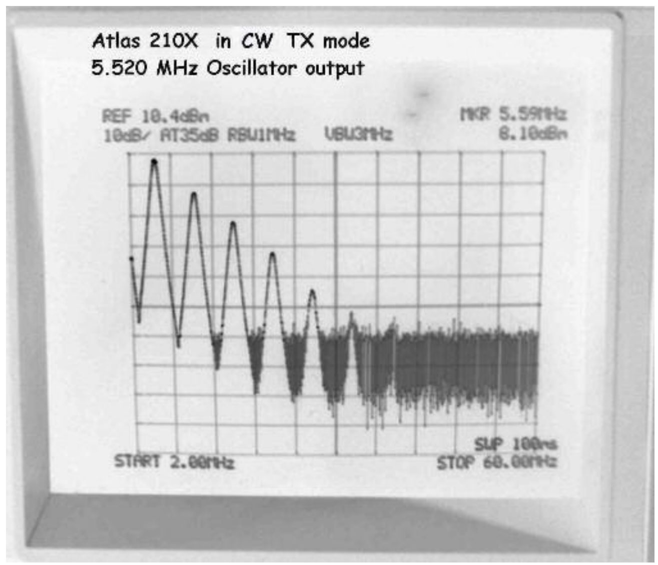
A simple load /detector may be used to confirm RF power. This is nothing more than a schottky diode, such as 1N5711 leading away from a 50Ω load. The other side of the diode is decoupled using a 10nF capacitor. The voltage may be read on a DVM or analogue meter. The DC should be ~ + 0.7 V

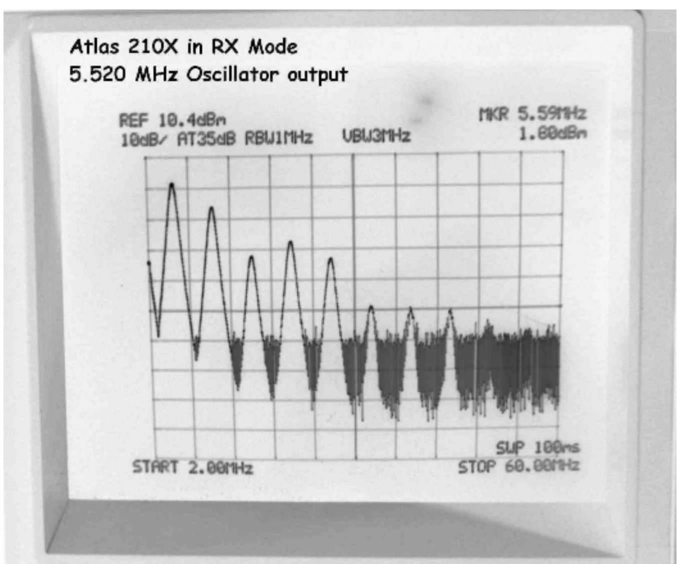
Component values

| | |
|---|---|
| R1 | 5k6Ω |
| R2 | 560Ω |
| R3 | +10 v supply 91Ω (2 x180Ω in //) For+13.8v use 270Ω |
| R4 | 220Ω |
| R6 | 220Ω |
| R5 | 27Ω |
| C1 | 15 pF (Original C603) |
| C2 | 10 nF (2 capacitors C605 or C606 may be used) |
| C3 | 820 pF (Note use close tolerance components +/- 10% or better) |
| C4 | 2200 pF (Note use close tolerance components +/- 10% or better) |
| Q1 | 2N706 (Original device Q602) |
| L1 | 1.4 uH (Original inductor L601) |

Images of 5.520 MHz Oscillator buffer output




Notes

The SSB Carrier level is ~ + 10 dBm. The CW level is ~ +8 dBm. This is probably due to the crystal being pulled to another frequency. The RX level is considerably lower due to different bias on the transistor. The low level is very marginal for demodulator operation (as a FET switch and other resistances are in the path before diode balanced mixer DBM)

Note the high level of odd and even order harmonics. In a DBM, even order harmonics are at a lesser level due to diode balance (when fed with a sine wave)