

# 144MHz Transverter for Optical Subcarriers

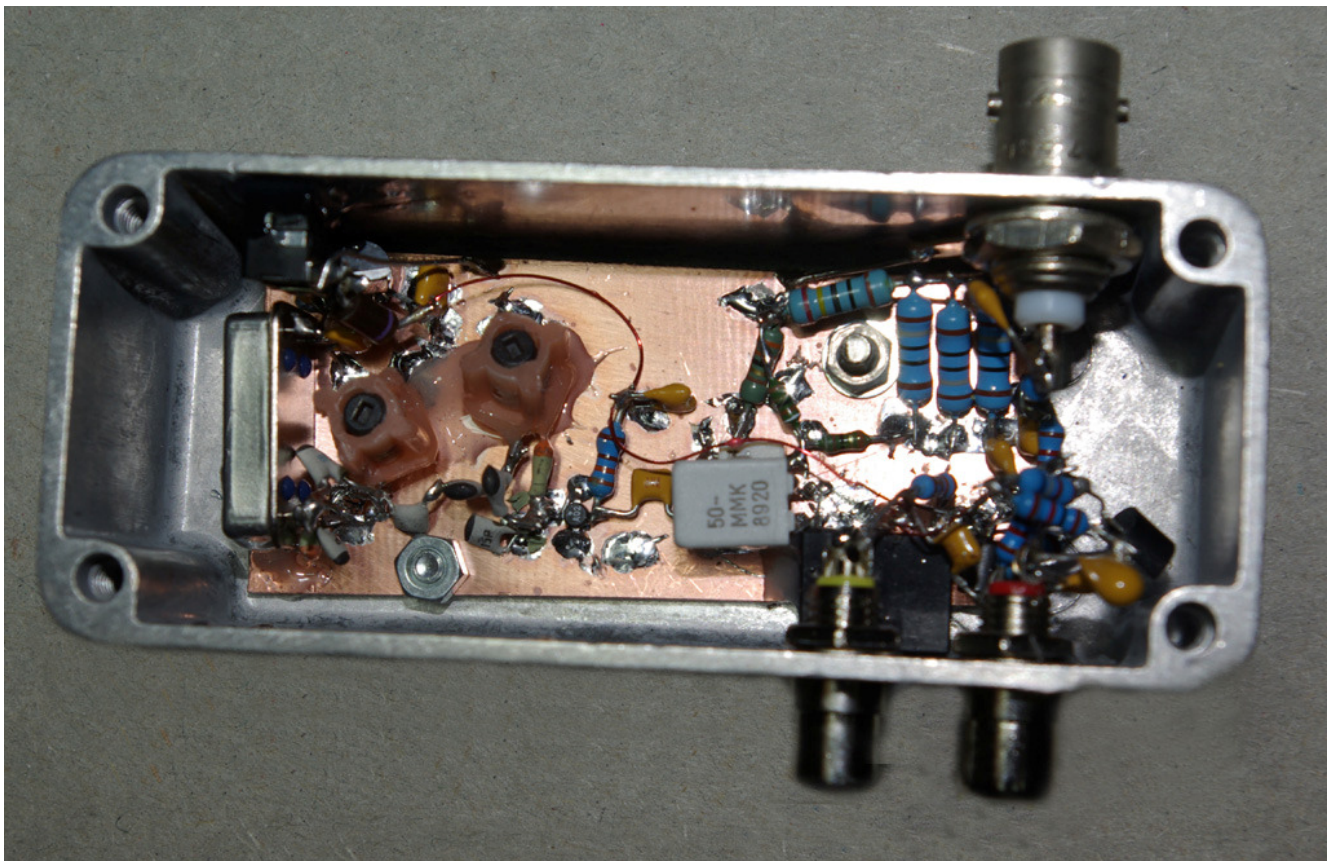
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This is probably the simplest way to generate and receive an optical subcarrier in the 10 – 50kHz range when a small low power 144MHz transceiver like the IC202 or FT221 (favourites amongst microwavers) is the only driver rig available. The LO is generated from a 48MHz TTL oscillator module (Farnell part no. 971-2631). The third harmonic at 144MHz is selected and amplified to a level of around +10dBm which is the LO for an SRA-1 Double Balanced Mixer (or an ADE-2 or SBL- or, or... There are many suitable types). The mixer is bidirectional and is used for transmit and receive.

On transmit a 30dB power attenuator reduces the 1 watt Tx output to 0dBm drive for the mixer. Since most optical head amplifiers have considerable gain, this attenuation can be left in on receive where there is still ample system gain. This avoids the complication and risk of having a switchable RF chain. Output from the mixer on Transmit is raised to 1VRMS in a single transistor feedback amplifier.

The DC level present on the antenna feed from the transceiver is used to switch a relay directing the low frequency signal to Tx and Rx ports. For the IC202 the polarity of this DC level is +V on receive, 0V Tx. The FT221 is the other way round. (Choose the relay contacts appropriately)

Tune the transceiver to a suitable frequency in the range 144.01 to 144.05MHz, connect the low frequency ports to the optical head amp output and LED driver and that's it There is a 3dB noise degradation introduced on receive by having no image filtering, but there is no equivalent Tx degradation.



**Figure 1** Built rats-nest style. The mixer is an ADE-2, hidden under the white capacitor in the middle

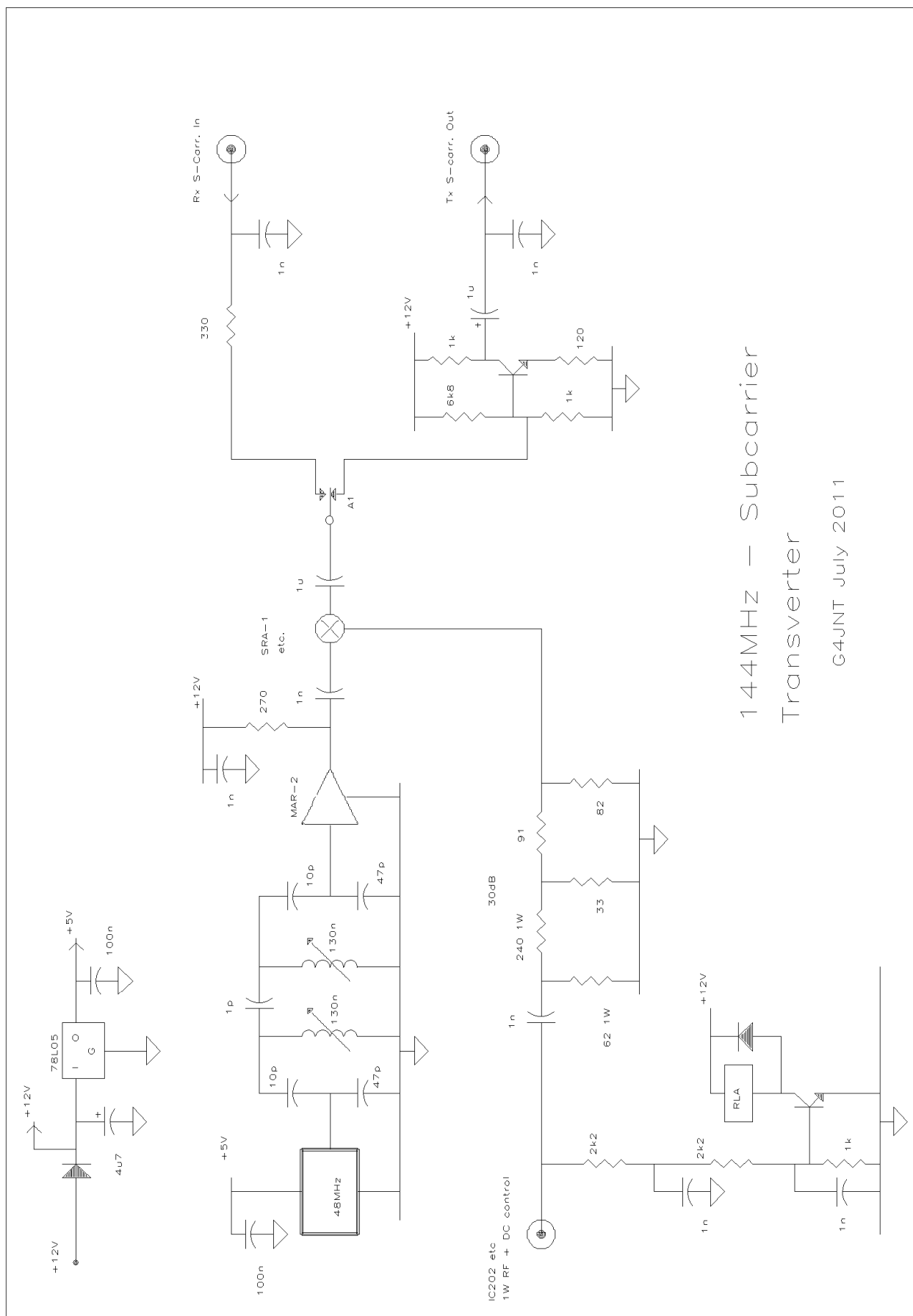


Figure 2 Circuit Diagram of the 144MHz – Subcarrier transverter