

DC VOLTAGES AND CURRENTS IN ALL ELEMENTS OF THE FINAL RF STAGE

Refer to schematic page 2. The transmit and receive oscillator is composed of a VCO phase-locked by a 2-ppm crystal oscillator at 20.94MHz. The PLL IC2 is programmed by the microprocessor to have a reference frequency of 12.5KHz which is phase-compared to the divide-down VCO to generate the error voltage which is used to control the VCO. The VCO is composed of the dual-gate mosfet Q7, the main oscillator, and the buffer amp Q6. The tuning range of the VCO is 20Mhz per volt and covers the frequency for both receiver and transmitter. The supply to the whole circuitry is controlled by the microprocessor and is regulated to 3V by low-drop-out regulator.

1.0 Microprocessor plus control interfacing

The microprocessor has interface to the inputs, namely, keyboard, channel switch and temperature limit detector. Different functions will be performed according to the inputs and details can be found in the operating manual. Outputs include LCD display (optional), audible alarm tones, LED display and power supplies to receiver, transmitter and PLL oscillator circuitry.

2.0 Receiver

Refer to schematic page 2. RF signal comes through the antenna, low-pass filter and band-pass filter and enters gate 1 of the dual-gate mosfet Q9 which amplifies it. It then goes into the mixer which is composed of dual-gate mosfet Q8. The local oscillator, which is 21.4MHz displaced from the RF input, is buffered by Q5 and injected into gate 2 of Q8 which is slightly biased to 0.6ma. The 21.4MHz IF is band-limited by B2 and filtered by the crystal filter F2. The IF enters IC1 which further down-converts the IF to 450KHz. This second IF is amplified and filtered by ceramic filter F1 and then demodulated to recover the audio signal. IC1 has an RSSI output which is a voltage proportional to the signal strength. This RSSI is compared with a fixed voltage and the resultant high or low is input to the microprocessor to determine whether a reasonably well received signal is present. If positive, the microprocessor will turn on the supply to the audio amplifier IC3, otherwise it will