THEORY OF OPERATION

The device is a FM transceiver operating in the 400MHz range which has an output power of 500MW and multi-channels selected by programming the PLL through the use of microprocessor.

The RF part of the circuit is of the traditional analogue type. All display and control functions are performed by microprocessor.

The main functional blocks are the microprocessor plus control interfacings, the receiver block with 2 IF conversions, the transmitter block with transistors amplifiers, PLL synthesizer and the power supply to these blocks. The mechanical construction separates the RF circuitry which contain the reception, transmission and PLL oscillation circuitries , from the control and audio circuitries which contain the microprocessor and audio amplifiers, into two circuit boards and interlinked by a flexible PCB. Following are detailed description of these functional blocks and finally the tunning procedure for all functions.

1.0 Microprocessor plus control interfacings

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