

TX-40 Theory of Operation

Audio section

Audio input from the main microphone is fed into J2 (MIC/ANT) on the RF circuit board and then routed through a low pass filter (to eliminate ultrasonic frequencies), jumper 5-3, and switch P1 to the main audio amplifier U4 on the audio and power circuit board. Auxiliary input is fed into P2 on the audio board through a similar LP filter and combined with the mic signal going to U4. The audio amplifier has a feedback compression loop to limit output amplitude. The output of the audio amplifier is routed to the RF board via jumper 6-1 to Q1 which serves as the input to the VCO.

Frequency synthesizer section

The frequency synthesizer consists of a VCO (Q2), a phase-lock-loop synthesizer (U1) and a loop filter (output of Q3). Switches S1 and S2 address a PROM (U3, on the audio board) which generates the code used by the PLL (U1) to determine the operating frequency/channel.

RF section

The audio information modulates the VCO (Q2) and the modulated carrier goes to buffer Q3, which feeds the RF driver and provides the control loop for the PLL. The driver consists of Q4, which feeds the RF power amp (Q6) that drives the antenna (the shield of the mic cord). Filtering is provided in the buffer, driver and power amp to limit spurious emissions.

No FM indicator

If the antenna is broken or disconnected, a logic signal is generated which switches Q7 and Q8. This lights D2 and shuts off Q5, shutting off the transmitter.

Switches S1 and S2 (which control the channel) make it possible to select disallowed channels (channels above 40). Should channel 0 or channels greater than 40 be selected, U3 is programmed to send a logic signal to jumper 5-3, which will cause D2 (no FM) to light and shut off Q5, shutting off the transmitter.

Battery monitor

U2 (DC to DC converter) monitors the battery condition, and if the battery voltage drops too low, Q9 is turned on, which illuminates D4 (low battery indicator).