BALANCED MIXER

Coils L11 and L12 and diodes D12, D13, D14, and D15 form a balanced mixer which combines the VFO and HFO signals. This produces four signals at the output of the balanced mixer. These are the VFO frequency plus the HFO frequency, the HFO frequency minus the VFO frequency, the VFO frequency, and the HFO frequency. The only frequency that we are concerned with is the HFO frequency minus the VFO frequency.

MIXER AMPLIFIER

The four signals are then coupled through capacitor C61 to FET Q4 where they are amplified and then coupled to the four diode-selected filter circuits. Only one filter circuit is electrically connected to the circuit on any one band. For example, if the 3.5 MHz pushbutton switch on the front panel is depressed, coil L13 and capacitor C64 are electrically connected to the circuit. This tuned circuit filters out the three unwanted signals and leaves only the "on-frequency" signal, which is coupled through capacitor C73 to transistor Q5.

Transistor Q5 is connected as an emitter follower which provides isolation and impedance matching. The output from the emitter of Q5 is coupled through C75 to transistor Q8 and also through capacitor C28 to balanced product detector IC1.

TRANSMITTER

The output of driver transistor Q8 is resonance-tuned by the appropriate diode-switched tuned circuit. Here again, there are four tuned circuits. Only one tuned circuit is electrically connected to the output of Q8 for each band of operation. For the 3.5 MHz band, coil L22 and capacitor C77 and C78 are connected through diodes D31 and D35.

The output from the driver is coupled to final amplifier transistor Q9. Here the signal is amplified and then coupled through the appropriate switch (part of the depressed front panel switch) to the output circuit, which acts as a bandpass filter and impedance matching network.

Zener diode ZD2 prevents excessive collector RF voltage from destroying transistor Q9 if the operator should mistakenly key the transmitter when there is no load present on the output of the Transmitter, or when the SWR is high.

Capacitor C303 is the Loading control and is adjusted for maximum power on the relative power meter. The RF power output is then coupled through antenna switching relay RL1 and to antenna jack J302. A small part of the RF power output is coupled through resistor R302, and capacitor C304 to the relative power meter. This output power is rectified by diode D301.

KEYING

Transistor Q11 provides a keying function when the key is depressed. This transistor provides the keying for the transmitter driving stage, the sidetone oscillator, the break-in delay switching; and the receiver muting. When the key is depressed, the keying transistor places a B+ voltage on the collector of driver transistor Q8 and switches it on. The transmitter is then keyed and provides an RF output signal.

Also, when the key is depressed, pin 11 of sidetone oscillator IC2D is connected to ground through resistor R72 and diode D21 and the key to cause the oscillator to turn on and generate an audible tone. This tone is coupled through capacitor C111, resistor R76, Sidetone Level Adjust control R77, and capacitor C113 to the headphone jack.

BREAK-IN DELAY

Transistors Q12 and Q13 provide an adjustable delay circuit for antenna switching and receiver muting. The emitter of break-in delay transistor Q12 is connected to ground when the key is depressed. This effectively puts the collector of Q12 at ground potential, which causes relay driver transistor Q13 to energize relay RY1 and switch the antenna from receive to transmit. Relay RY1 will remain energized until the base voltage of relay driver transistor Q13 increases to the B+ voltage. The key also turns transistor Q11 on and off which switches the Transceiver between transmit and receive.