
CIRCUIT DESCRIPTION

一、 Receiver Signal Path

1、 RF signal

■ UHF band signal

UHF signal is passed through a high-pass filter network and a low-pass filter network to the antenna switch diodes D303、D304, then passed through BPF tuned filter circuit (D306, D308)

to UHF band RF amplifier T300. The amplified UHF signal is passed through another BPF tuned filter circuit(D309, D310) , then is passed through the first mixer T301. Meanwhile, the UHF local signal from the UHF-VCO(T402) is delivered to first mixer T301, yielding the UHF band first IF frequency 38.55MHz .

■ VHF band signal

VHF signal is passed through a low-pass filter network and a high-pass filter network to the antenna switch diodes(D314, D315 & D317). Then passed through another low-pass filter network to the VHF band RF amplifier T303, yielding the VHF band first IF frequency 38.55MHz.

2、 IF and AF Signals

UHF band and VHF band first IF frequency 38.55MHz is delivered to the crystal filter FL500, F501 through switch(D301, D313) which strips away unwanted mixer clutter, then is passed through IF amplifier T501 to the IF IC U500. Meanwhile, output of 13.0MHz TCXO crystal CR 400 is multiplied threefold by T502 to output the 39MHz second local signal, then delivered to the IF IC U500. Within the IF IC U500, the 39MHz second local signal is mixed with the 38.55MHz first local signal to produce the second IF frequency 450KHz.

The 450KHz second IF is passed through the filter switch D501 to the ceramic filter FL 503 which strips away all but the desired signal, then it passes through the IF amplifier within U500 to the ceramic discriminator CR500, which removes any amplitude variations in the 450KHz IF signal before detection of speech.

The demodulated audio signal is passed through audio volume potentiometer VR1 to adjust the audio sensitivity and then is delivered to the U900 to be amplified and applied to the loudspeaker.

3、 Squelch Control

When no carrier is being received, noise at the output of the detector stage in U500 is amplified and band-pass filtered by the noise amp section of U500. The resulting DC voltage is delivered to CPU(U801), which compares the squelch threshold level to that which set by Menu.

While no carrier is being received, CPU will output a controllable level, to disable the audio output from the speaker through T901.

二、 Transmitter Signal Path

1、AF Signal

The speech signal from the microphone is passed through the MIC jack J1 to the AF amplifier U600. The amplified speech signal is delivered to the limiting amplifier T601, T602 to prevent over-modulation, then is delivered to a low-pass filter network.

■ UHF band

The adjusted speech signal is passed through varactor diodes D402 which frequency modulate the transmitting VCO, made up of UHF-VCO T407.

The modulated transmit signal is passed through buffer amplifiers T402、T400 and diode switches D201、D1011 to the pre-drive amplifier T1002.

The amplified transmit signal from T1002 is passed through diode switch D1013 and the driver amplifier T1003 to the diode switch D1014, then finally amplified by power amplifier TH1005, providing up to 35 Watts of power output. These three stages of the power amplifier are controlled by the APC circuit.

The 35 Watts RF signal is passed through a high-pass filter network to the antenna switch D1005, D1004 and D1003, then passed through a low-pass filter network and another high-pass filter network to the ANT jack.

■ VHF band

The adjusted speech signal is passed through varactor D407, which frequency modulate the transmitting VCO, made up of VHF-VCO T408.

The modulated transmit signal is passed through buffer amplifiers T403, T404 and diode switches D200, D1010 to the pre-drive amplifier T1002.

The amplified transmit signal from T10002 is passed through the diode switch D11012, D11013 and drive amplifier T1003 to the diode switch D1017, then finally amplified by power amplifier TH1005, yielding the output power which is higher than 50W. These three stages of the power amplifier are controlled by the APC circuit.

50Watts RF signal is passed through a low-pass network to antenna switch D1001 and D1002, then is passed through a high-pass network and another low-pass network to antenna jack.

2、APC(Automatic Power Control) Circuit

■ UHF band

A portion of the power amplifier output is rectified by D1008 and D1009, then delivered to APC U1000. As a DC voltage which is proportional to the output level of the power amplifier.

At U1000, the rectified DC voltage from the power amplifier is compared to the reference voltage from the main CPU U801 to produce a control voltage which regulates the supply voltage to the pre- amplifier T1002, drive amplifier T1003 and power amplifier TH1005, so as to maintain stable output power under varying antenna loading conditions.

■ VHF band

A portion of the power amplifier output is rectified by D1006, D1007, then delivery to APC U1000. As a DC voltage which is proportional to the output level of the power amplifier.

At U1000, the rectified DC voltage from the power amplifier is compared to the reference

voltage from the main CPU U801 to produce a control voltage, which regulates the supply voltage to the pre-amplifier T1002, drive-amplifier T1003 and power amplifier TH1005, so as to maintain stable output power under varying antenna loading conditions.

3、PTT(Push to Talk) Circuit

■ UHF band

When the "PTT" switch is pressed, then sends the "PTT" command to CPU U801.

When the "PTT" command is received, then CPU U801 output control signal which activates the TX switch that made up by T712 and T702.

When the TX switch of T712, T702 is activated, it controls the antenna switch diodes D1003, D1004 and D1005, diodes switch D201, D1011 and APC switches T1004, T1000, which activate the UHF transmit circuit.

■ VHF band

When the "PTT" switch is pressed, then sends the "PTT" command to CPU U801.

When the "PTT" command is received, then CPU U801 output control signal which activates the TX switch that made up by T712 and T702.

When the TX switch of T712, T702 is activated, it controls the antenna switch diodes D1001, D1002, diodes switch D200, D1010 and APC switches T1004, T1000, which activate the VHF transmit circuit.

三、PLL Circuit

A portion of the output from UHF-VCO T407 is passed through buffer amplifier T401 to the programmable divider of the PLL IC U400, where it divided according to the frequency dividing data from the main CPU U801. It is then sent to the phase comparator.

A portion of the output from VHF-VCO T408 is passed through buffer amplifier T405 to the programmable divider of the PLL IC U400, where it divided according to the frequency dividing data from the main CPU U801. It is then sent to the phase comparator.

The phase comparator of U400 compares the phase between the frequency-divided oscillation frequency of the VCO circuit and the comparative frequency, and its output is a pulse corresponding to the phase difference. This is integrated by the loop filter into a control voltage(VCVO) to control the oscillation frequency of the VCOs.