

THEORY OF OPERATIONS

1. TRANSMITTER

1-1. RF Amplification

The output of pre driver AMP Q201 and Q202. The output is then supplied to RF driver AMP Q203. The output of Q203 is supplied with tuning circuit L206 and C212, C214, C215 and goes to the base of final RF AMP Q204. The output of Q204 is supplied to the antenna through L-C tuning circuit.

1-2. Circuit for Suppression of Spurious Radiation

The tuning circuit between the output of final AMP Q204 and antenna, 4-stage network L208, C216, C221, L210, C230, C228, C229, C231, C232, C226, C227, L211, C233, C234, C235, C222, C224, L212, C236, C237, C238, C240 serves as a spurious radiation suppressor. This network also serves to match the impedance between TX power AMP Q204 and the antenna.

1-3. Circuit for Limiting Power

After finished all alignment, the constant voltage supply circuit limits the available power 4 W or slightly less. RV202 and corresponding three transistors Q207, Q208, Q209 control supply voltage of RF amplifier and other circuits.

The RV201 to make 4 w indication of RF power meter.

The tuning is adjusted so that the actual power is from 3.8 to 4.0 W. There are no other additional controls for adjusting the TX output power.

1-4. Modulation Control

1-4-1. FM

The microphone input is fed to microphone audio amplifier IC806 KIA4558 which drives modulation varicap diode D501 and D502 in the VCO circuit. RV501 limits the incoming modulation audio levels to inhibit over modulation. While reading the modulation factor on the modulation analyzing equipment, adjust RV501 shall not exceed ± 1.8 KHz/Dev. After 20 dB up from 1.25 KHz/1.2 KHz/Dev. Audio level

1-4-2. AM

The microphone input is fed to modulation the audio power AMP IC IC201 to make nominal signal level to achieve wanted modulation. To control incoming audio signal, diode D203 and corresponding ALC circuit limits the modulation shall not exceed $\pm 65\%$ adjust RV203 modulation under 1.0 KHz AF 60% mod plus 20 dB of audio signal.

2. Receiver

CB receiver is dual conversion super-heterodyne type with the 1st IF 10.695 MHz and 2nd IF 455 KHz. Receiver is separated two blocks, 1st IF section and 2nd IF section. The PLL synthesizer supplies first local frequency 37.26 MHz ~ 38.10 MHz. (for EU) and 38.29625 MHz ~ 37.68625 MHz (for UK) With the provided first local frequencies Q102 mixes the incoming RF signal to generate first IF signal. Mixed signals were filtered with the CF101 (10.695 MHz) crystal filter and other tuning circuits. Output signal of mixer is filtered with CF102 (455 KHz ceramic filter). The 455 KHz signal from the 2nd IF filter was amplified and limits internally. After amplification the signals fed the quadrature detector loop T101. Then we can see the recovered audio signals on Pin 11 for FM and Pin 14 for AM of IC101. With the amplitude of recovered signals, IC805 serves as an audio amplifier.

3.PLL synthesizer

3-1.Reference frequency

The crystal, X501 (10.240 MHz) and other components of IC501 can make a reference frequency oscillator with internal amplifier.

3-2.VCO

The Q502 and surrounding parts are consisting a clapp oscillator works as a VCO, the VCO can be oscillate over the required of 26.565 MHz to 38.68625 MHz

3-3.Phase detector and VCO control

The detector is a digital phase comparator which compares the phase of the reference signal with programmable divider output square waves and develops a series of pulses whose DC level depends on the phase error of each signal.

3-4.Switching of tuning capacitor in VCO

The VCO circuit must tune with a wide rang of frequencies 37.26 MHz ~ 38.10 MHz (EU), 38.29625 MHz ~ 38.68625 MHz (UK), for receiver and 26.5650 MHz ~27.4050 MHz (EU), 27.60125 MHz ~ 27.99125 MHz (UK) for transmitter. To comply above rang of VCO, the tuning capacitance should switched for transmission or reception by C523, D503.

3-5.Transmitter/Receiver buffer AMP

Output signal of Q502 is fed into buffer AMP Q503 and Q504.