

F. Theory of Operation and About Major Circuitry
Model HL-355Vxx

1. RX Pre-Amp

When DC POWER switch is off, signals to and from the radio will all go through the amp or by-pass. When the RX switch is turned on, LED lamp will light and RL2, RX pre-amp relay is turned on. Then the pre-amp starts to work and incoming signals will be amplified. This pre-amp works independently from TX amp.

2. Power Amp

When the DC POWER switch is turned on, LED lamp for POWER will light. If the amp is driven by the transmitting power of the radio, RF key circuit is activated, and antenna relays of RL1, & 4 are turned on. Then the driven signal is lead to the input point of the RF power amp to produce 300W of amplified signal at output side.

Amplified signal will go through the directional coupler and then to the LPF filter where the unwanted harmonics are rejected, Signal will be lead to ANT jack passing the RL4, antenna relay.

3. TX/RX Switching

Driving signal from the radio will be deleted by D1. Detected signal will be lead to Q8, and RF keying circuit will be turned on.

At collector of Q8 is connected a time constant cap C12. With the selection of MODE switch, keying circuit returns to "RX state" in approx one second with SSB, and or instantly with FM.

Also, when the keying signal from the radio is connected to ACC jack, keying may be made with either positive DC voltage or SHORT/OPEN signal from the radio. In this case, MODE select switch should be set to FM.

When the amp is keyed, dc signal will pass through Q8 to reach Q9. Then RL 1, 4 relays are switched to TX side, and at the same time Q9 and IC1 will supply Q2, 3, 4 and 5, with dc bias voltage.

With VR1 and 2 adjustment, idling current of final RF power transistors is set to 4A.

4. RF POWER LEVEL Indicator

RF output signal is detected by directional coupler/detector and forward power dc signal and reflected power dc signal are obtained by D20 & 21.

In the mean time, reflected signal resulting from D21 being set as protection circuit, driving voltage will be lead to IC3, LED lamp meter driver.

5. Protection Circuit

Protection circuit for high antenna SWR will trip for reflected RF power of 30W or higher. Detected reflection signal is adjusted by VR6 and then is lead to pin13 of PIC IC2, that issued a command to Q12 to turnoff DC main power through RL5 and 6.

Also, when the DC supply voltage to the amp exceeds 16V, PIC IC will issue the same command to Q12. Thermal sensor OHD5 will be switched on, when the heat sink temperature of TX amp reaches 70 deg C. PIC IC will , likewise, issue command to Q12 to totally turn off DC main power supply to TX amp.