

TRANSMIT SECTION

MIC and LINE Input

The MIC or LINE input is selected by MCU through the control of Q202. When it is ON, the bias of Q202 is cut off and Q203 bias by R211. The signal from LINE could be fed through the switching transistor Q203. If it is off, then bias current can flow through R205 to turn on Q201 and switches off Q203 with a reverse bias voltage at the same time. In return, only the signal from MIC could be fed through Q201 to the audio amplifier and compressor.

Audio Amplifier and Compressor

Q204 and Q208 amplify the audio signal. After the audio signal has been compressed by U201, it delivered to the high pass filter (U105) through the analog switch U11-B to remove the low frequency portion. And it is pre-emphasized by a high pass filter (C139 and R153) to improve the S/N ratio and dynamic range. The audio output is routed to the RF board to modulate the transmitter through a buffer amplifier Q215.

Auto Level Control (ALC)

To prevent the transmitter from over-modulation, Q205, Q206, Q207 and D201 are utilized as a simple ALC circuitry. It amplifies the audio signal and injects the signal into the rectifier D201. With strong signal, the rectifier will provide a sufficient current to bias the transistor Q206 and turn on the transistor Q207. In return, Q207 shunt the input signal to ground, and maintain constant output amplitude to the compressor.

VOX detection

To detect if there is any signal presenting at the LINE input terminal for the broadcasting purpose, a VOX detection circuitry is built with Q212, Q213, Q214 and D202. It amplifies the signal at the LINE input and rectifies it into DC to switch on the Q214 and provides a signal of "signal presented" to the MCU with a low level (0V DC) at pin 8 of U202.

Sub-tone and Call Tone

Those two tones are generated by MCU. After they have filtered by individual filter networks, they are mixed with audio signal and deliver to the modulator for transmission.

Oscillator and Modulator

The oscillation frequency is derived from a single 4MHz crystal by means of a phase locked loop. Frequency modulation is provided by a varactor diode VD2 when the audio signal is applied through the resistor R37.

RF Power Amplifier and switching circuitry

Q8 and Q9 are adopted as the power amplifier to drive the antenna through the low pass filter (L15, L16, and C73 to C76).

D1, D2 and D3 constructed as a switching circuit which intends to isolate the signal flow between the transmission and receiving mode, and preventing any unstable situation from the normal operation.

Low Battery Detector

The voltage detector U102 pushes the pin 9 of the MCU to low, as the battery is weak. And the Low Battery LED will be flashed by the MCU

Weather Radio Alarm Input

This is a polarity-protected input, which is ready for both normal and reverse DC input from the Radio Shack Weather Radio products. The protection circuitry is completed by two dual diodes D203 and D204. When a 5VDC was detected from this terminal, Q222 will be turned on and provides a 0VDC to pin 10 of the U202. To inform the MCU to engage into the Alarm mode.