Receiver Section:

1. RF module

The RF signal in the air picked up by the antenna will be amplified by two cascaded LNAs which are composed by transistor Q9 and Q10. The amplified RF signal will be filtered by SAW filter F3 for first image rejection. The first local oscillator is generated by a VCO which is phase locked to a reference crystal oscillator by U3 KB8825. The reference frequency is constructed by a 4MHz crystal X2 and the PLL IC. The first local oscillator will mix with the RF signal in the mixer stage which is constructed by Q11. After passing through the mixer, the first intermediate frequency (IF) signal will input to the first IF filter (F12) at 139MHz. The first IF signal will then enter the FM-IF chip TA31161 for demodulation. Before demodulation, the first IF signal will be beated down to second IF at 10.7MHz and 6.5MHz with the crystal oscillator Q2. The crystal oscillator acts as a second LO which is reference by a crystal at 62.95MHz. The FM-IF chip use quadrature demodulation method to regenerate the audio signal. The amplitude of the demoduated baseband signals are controlled by the Quad coil Q4 and Q8. The demodulated audio signals are then buffered by Q13 and Q12 before feeding to the baseband PCB through the connectors.

2. Baseband main board

The operating voltage of the whole receiver board is 2.8V which is regulated from the battery pack. Regulator U205 is responsible for the DC regulation and stabilization. Before feeding the demodulated audio signal to the amplifier for acoustic output, it will be enhanced by feeding the audio signal to the compander IC U204 TA31101 for further processing. The low battery checking and muting functions are

detected by the op-amp U201. The MCU will monitor the detection signal to confirm the shut down of receiver by disabling the DC supply to the RF module. On the main board, the channel selector switch will help telling the MCU which channel the user is going to select. And the RF channel is commanded by the MCU through proper programming of PLL IC.

3. Acoustic Control

The audio amplifier U202 is responsible for the transducing of electrical to acoustic energy. However, the amplitude control is by limiting the input amplitude to the amplifier IC by a stereo variable resistor VR201. Two 40mm diameter 32 ohm speakers are for acoustic coupling.