

Circuit Description

The following circuit description is based on the circuit diagram and block diagram

Handset:

1. Receiving Path

The receiving path is established by below sections.

Low Noise Amplifier (LNA)

RF signal is being filtered by the SAW Duplexer FL501, and input to the Low Noise Amplifiers Q555 & Q556 before output to mixer.

Mixer and RXVCO

Mixer is composed of the Q512. The amplified RF signal is mixed with the Local Oscillator (RX_LO) Q506, which is controlled by the RXVCO section of the Combo IC IC1 (I/O pins 44 & 46). The 10.7MHz IF is trimmed through a Ceramic Filter CF501.

IF Amplifier

The composite IF is input and further amplified by the IF Amplifier section of U1 (input pin 37). The amplified IF is again trimmed through the 2nd Ceramic Filter F1. The filtered IF is input to the FM Demodulator section of IC1 (input pin 33).

FM Demodulator and Expander

The 2nd composite IF is demodulated by the Quadrature tank coil T1. The recovered audio is then input to the Expander section of IC1 for de-emphasis.

AF Amplifier

The de-emphasized signal is then trimmed and amplified through the AF Amp section of IC1 (output pin 15/16) before being output to the Speaker.

2. Transmitting Path

The transmitting path is established by below sections.

Microphone Amplifier and Compressor

Audio Frequency picked up by the handset microphone is amplified by internal Mic Amplifier section of IC1 through input pin 9. The amplified AF signal is then input to the compressor section of IC1 for pre-emphasis, after which the signal is fed to the Modulator circuit (TXVCO).

Modulator and TXVCO

The Transmit LO is composed by Q509 which is controlled by the TXVCO section of IC1. Both AF and Data signals are input to the TXVCO which will cause Frequency Modulation to progress.

RF power amplifier

The Frequency Modulated signal is amplified by the RF Amp Q510, which also acts as a frequency doubler, and is propagated through the Antenna via the Duplexer.

Low-Pass Filter

A discrete low-pass filter is composed of strip-lines L1, L3, C575, & C578 which are configured to attenuate unwanted spurious signal.

3. Power Supply Circuitry

The supply voltages to various parts of the circuit is controlled by the following blocks:

Power-down Block

The RF combo IC monitors the battery voltage level. When the battery voltage becomes low to a pre-determined level, transistor combination circuit of Q1 & Q4 will act as a switch to cut the voltage supplied to most of the circuit.

RX/TX ON/OFF Block

Transistor Q2 acts as the RX-VCC control switch, while Q5 as the TX-VCC control switch. Both transistors work independently.

Base Unit:

1. Receiving Path

The receiving path is established by below sections.

Low Noise Amplifier (LNA)

RF signal is being filtered by the SAW Duplexer FL501, and input to the Low Noise Amplifiers Q555 & Q556 before output to mixer.

Mixer and RXVCO

Mixer is composed of the Q512. The amplified RF signal is mixed with the Local Oscillator (RX_LO) Q506, which is controlled by the RXVCO section of the Combo IC IC1 (I/O pins 44 & 46). The 10.7MHz IF is trimmed through a Ceramic Filter CF501.

IF Amplifier

The composite IF is input and further amplified by the IF Amplifier section of U1 (input pin 37). The amplified IF is again trimmed through the 2nd Ceramic Filter F1. The filtered IF is input to the FM Demodulator section of IC1 (input pin 33).

FM Demodulator and Expander

The 2nd composite IF is demodulated by the Quadrature tank coil T1. The recovered audio is then input to the Expander section of IC1 for de-emphasis.

AF Amplifier

The de-emphasized signal is then trimmed and amplified through the AF Amp section of IC1 (output pin 15/16) before being output to the Line Interface circuitry.

2. Transmitting Path

The transmitting path is established by below sections.

AF Amplifier and Compressor

Audio Frequency from the Line Interface is amplified by internal Mic Amplifier section of IC1 through input pin 9. The amplified AF signal is then input to the compressor section of IC1 for pre-emphasis, after which the signal is fed to the Modulator circuit (TXVCO).

Modulator and TXVCO

The Transmit LO is composed by Q509 which is controlled by the TXVCO section of IC1. Both AF and Data signals are input to the TXVCO which will cause Frequency Modulation to progress.

RF power amplifier

The Frequency Modulated signal is amplified by the RF Amp Q510, which also acts as a frequency doubler, and is propagated through the Antenna via the Duplexer.

Low-Pass Filter

A discrete low-pass filter is composed of strip-lines L1, L3, C575, & C578 which are configured to attenuate unwanted spurious signal.

3. Telephone Line Interface

The Telephone Line Interface is established by below sections.

Audio Power Amplifier

IC2-C and IC2-D are built as AF Power Amplifier for a higher AF level output requirement for the Line Interface.

Line Isolation Transformer and Relay

T4 is utilized as Line Isolation Transformer. Both AF input and output are coupled to the Line Interface through this transformer. RL1 is a reed relay for line seizing, which is controlled by Q3 through CPU (IC3) pin 24. This is also the circuit performing the Pulse Dialing process.

Ring Detect Circuit

IC2-A and IC2-B are configured as a differential amplifier to pick up the ring signal, which is coupled through two 20M ohm resistors (R44 and R45) to isolate the circuit from the Telephone Line.

1. Frequency Allocation Tables

1. Base Unit Frequencies

Channel spacing: +/-50KHz

Channel #	Transmit Frequency (MHz)	Receive Frequency (MHz)	Rx Lo Frequency (MHz)
1	902.1	925.9	936.6
2	902.15	925.95	936.65
3	902.2	926	936.7
4	902.25	926.05	936.75
5	902.3	926.1	936.8
6	902.35	926.15	936.85
7	902.4	926.2	936.9
8	902.45	926.25	936.95
9	902.5	926.3	937
10	902.55	926.35	937.05
11	902.6	926.4	937.1
12	902.65	926.45	937.15
13	902.7	926.5	937.2
14	902.75	926.55	937.25
15	902.8	926.6	937.3
16	902.85	926.65	937.35
17	902.9	926.7	937.4
18	902.95	926.75	937.45
19	903	926.8	937.5
20	903.05	926.85	937.55
21	903.1	926.9	937.6
22	903.15	926.95	937.65
23	903.2	927	937.7
24	903.25	927.05	937.75
25	903.3	927.1	937.8
26	903.35	927.15	937.85
27	903.4	927.2	937.9
28	903.45	927.25	937.95
29	903.5	927.3	938
30	903.55	927.35	938.05

31	903.6	927.4	938.1
32	903.65	927.45	938.15
33	903.7	927.5	938.2
34	903.75	927.55	938.25
35	903.8	927.6	938.3
36	903.85	927.65	938.35
37	903.9	927.7	938.4
38	903.95	927.75	938.45
39	904	927.8	938.5
40	904.05	927.85	938.55

2. Handset Frequencies

Channel #	Transmit Frequency (MHz)	Receive Frequency (MHz)	Rx Lo Frequency (MHz)
1	925.9	902.1	891.4
2	925.95	902.15	891.45
3	926	902.2	891.5
4	926.05	902.25	891.55
5	926.1	902.3	891.6
6	926.15	902.35	891.65
7	926.2	902.4	891.7
8	926.25	902.45	891.75
9	926.3	902.5	891.8
10	926.35	902.55	891.85
11	926.4	902.6	891.9
12	926.45	902.65	891.95
13	926.5	902.7	892
14	926.55	902.75	892.05
15	926.6	902.8	892.1
16	926.65	902.85	892.15
17	926.7	902.9	892.2
18	926.75	902.95	892.25
19	926.8	903	892.3
20	926.85	903.05	892.35
21	926.9	903.1	892.4
22	926.95	903.15	892.45

23	927	903.2	892.5
24	927.05	903.25	892.55
25	927.1	903.3	892.6
26	927.15	903.35	892.65
27	927.2	903.4	892.7
28	927.25	903.45	892.75
29	927.3	903.5	892.8
30	927.35	903.55	892.85
31	927.4	903.6	892.9
32	927.45	903.65	892.95
33	927.5	903.7	893
34	927.55	903.75	893.05
35	927.6	903.8	893.1
36	927.65	903.85	893.15
37	927.7	903.9	893.2
38	927.75	903.95	893.25
39	927.8	904	893.3
40	927.85	904.05	893.35