43-3107 Indoor Unit circuit description

The indoor unit composes of RF circuit part and AC intercom circuit part. RF circuit part operates at 912.45 to 914.45MHz with channel spacing 1MHz. While the AC intercom circuit part operates at 200 to 270KHz. The channel frequency allocation is that channel 1 operates at 200KHz. Channel 2 operates at 270KHz. Channel 3 is operates at 230KHz.

RF transmitter section:
The transmitter VCO composes of transistor Q205, varactor diodes VD201 and PLL IC (U203). The function of the PLL IC (U203) is to lock the desired channel frequency set by MCU. The operation channel frequencies are 912.45MHz, 913.45MHz and 914.45MHz for 3 channels with 1MHz channel spacing. The VCO output is amplified by buffer amplifier Q204 and then further amplified by the power amplifiers Q206 and Q207 respectively. The amplified signal passes through the antenna switching diodes of D202 and then being fed to antenna.

RX section:
The receiver amplifier composes of Q201 and Q202. The received RF signal is amplified by Q201 and Q202 and then being feed into 914MHz SAW filter to cut the image frequency. The output from the 914MHz SAW filter is then applied to mixer IC U201 (uPC2757T). The function of the mixer IC (uPC2757T) is to down convert the input frequency to 10.7MHz IF frequency. The output IF frequency is applied to 10.7MHz ceramic filter (FIL2) and then being amplified by IF amplifier (Q4). The amplified IF signal is applied to FM demodulation IC U1 (TA31161). The demodulated base-band signal is applied to squelch circuit U302A and U302B (LMV324/LMP324) and audio power amplifier U304 (MC34119). Part of the demodulated signal is applied to U305 (NE567) to be modulated with AC intercom carrier frequency.

The audio cut off is controlled by squelch circuit formed by U302A and U302B (LM358), U307 (BAV99).

TX modulation:
The audio input signal is amplified by mic amplifier U303E and U303D and then being feed to TX VCO and U305 (NE567) via Q313. The RF deviation can be adjusted by tuning variable resistor (VR301).

Transistor switches:
Transistors Q304, Q310 and Q311 act as switch that control TX_V+ and RX_V+ on and off. Transistors Q307 controls the AC intercom signal transmit on and off. Transistors Q306 and Q316 acts as muting circuit that controls the receiving AC intercom signal on and off. Transistor Q305 acts as mic muting switch that controls the mic input on and off.

AC intercom circuit
TX operation:

The AC intercom transmit frequency generate by U305 (NE567) which acts as frequency synthesizer and FM demodulator. The generated AC intercom signal is amplified by Q308 and then further amplified by power amplifier Q309. The amplified signal passes through low pass filter formed by L304-L307. Finally, the signal is coupled to AC line via transformer T301.

RX operation:
The received signal is applied to input pin of the amplifier (pin 13 of U303F) via transformer T102. The amplified signal is further amplified by U303A and then coupled to FM demodulator IC NE567. The demodulated signal is then applied to audio amplifier U8 (LM386). The audio level can be controlled by volume control VR302.

Frequency tuning:
The operation frequencies of AC intercom can be adjusted by tuning VR303, VR304 and VR305 for channel 1, channel 3 and channel 2 respectively.