Base unit

The device is a 10 channels (ch1~10 or ch11~20 is jumper selected) sequential receiver to monitor up to 16 transmitter's state. It contents follows functional blocks:

CPU: It is the core of the unit. It controls 16 units LEDs and other LEDs, push buttons detection, alarm tone frequency, on / off and level control, PLL control, EEPROM read/write, transmitter programming, squelch & data input.

The coding of 16 transmitters are assigned by CPU and download to transmitters via a 3.5mm mono-phone wire. All information is stored into EEPROM to prevent re-programming after power fault.

RF module: It is a 20-channel receiver from 924.875MHz to 927.725MHz (150KHz/channel). RF signal is feed into LNA (Q1, R11, R12, C4, and C13) via 927MHz filter (BPF1). The signal then converts to 10.7MHz after mixing at 1st mixer (Q2, R1, 3, 10, 80 and C2) with VCO signal (U2, Q4, R13, 14, 15, 19, 16, 17, 18, C3, 22, 28, 29, 30, 44 and D1), which is controlled by CPU for corresponded channel. Through the 10.7MHz filter (CF2) and IF amp (Q3, R5, 6, 8 and C12), the IF signal is feed into FM de-mod IC's (U1) mixer to convert 2nd IF signal, 450KHz.

The audio signal is given by FM de-mod IC's detector output. It is feed into data slider via a low pass filter (R7, C51). Also, the audio noise is amplified for squelch triggering (R33 ~40, C53~56).

Data slider: It is built by an op-amp U5-A, R31, 52~55, 57, C39 and Q11. It converts the audio signal from RF module into CPU logic level.

Alarm generator: It contents two parts – 2/3KHz-tone generator and level control.

2/3KHz-tone generator is given by U5-B, Q12, R58~63, C40 and C41. It produces a 2KHz or 3KHz tone that is controlled by CPU, for alarm sound.

Level control is offered by Q13~17, R65~74, D25 and D26. CPU's signals control Q15 on/off and the gain of Q14 for alarm level setting.

Voltage regulator: A 9V AC supply from AC adapter is converted into 3.3V DC supply for system power by a voltage regulator given by D5, 24, 35, 36, R22, 30, Z1, Q10, C34 ~38 and C46.