Circuit Description, Instant Messenger 08 May 2003

The Instant Messenger (IM) is a MCU controlled transmitter/receiver working at 315MHz, powered by 3 pcs AAA battery. The circuit of IM has 4 main parts, MCU circuit, user interface, transmitter and receiver.

User Interface

There is a 1/16 duty LCD which displays received data, shows the operating mode and input from keyboard. The keyboard and LCD are connected to the MCU. The transistor Q6 outputs audio sound to the buzzer.

MCU

The MCU (MLC852A) is the heart of IM, the system clock is set up by a external resistor (R1). In sleep mode, the system clock is control by a crystal (32.768KHz) to lower the consumption. The MCU will decode incoming signal from Port 0-7 and send periodic signal via Port 1-0. It will switch on/off the receiver hardware via Port 1-1.

Transmitter

The oscillator (Q8) working at 315MHz is controlled by a SAW resonator, the output is coupled to the RF amplifier (Q9) via C26. A band pass filter (C13, C28, L2 and C29) is placed between the output amplifier (Q9) and the built-in antenna. The RF signal is generated when the positive (refer to ground) part of an encoded pulse. A pulse width modulation RF signal is being sent.

Receiver

The receiver power is obtained by a voltage regulator (Q2, Q3) and is switched on/off by a transistor Q4, which is controlled by the MCU. RF signal goes into a built-in antenna and RF amplifier (Q7) and, followed by a super-regenerative circuit (Q1). The super-regenerative (Q1) demodulates RF signal and sends recovered square wave to the slicer circuit (LM358) and, recovered signal goes into the Port 0-7 of the MCU.

Most of the time the receiver is turned on to pick up RF signal sent by other IMs. It will, at a specific interval turns on the transmitter and sends out a package of data. When a signal is received which matches with a preset code, data will be received and stored and, a beep sound comes out from the buzzer.

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