Operational Description

Name of Device: Mini Reminder
Model #: MRR05

Background: The Mini Reminder contains two parts, Transmitter and Receiver. It is designed with Surface Mount Technology and Programmable Integrated Circuit in order to minimize the size as well as the power consumption. When the Transmitter is turned on, the Receiver switches to Vibration/Sound for code learning. This code learning must be done every time the Mini Reminder is switched on. The Transmitter is attached to an object, such as a Notebook, Luggage...etc, and emits coded RF signals every second. The Receiver unit receives coded RF signals from the Transmitter and decodes them. If the Receiver unit receives matching RF signals, the Vibration/Sound will be cut off. If the separation of Receiver and Transmitter is over the preset reception range, the Receiver cannot receive coded RF signals and the Vibration/Sound will be activated. The reception range can be selected as desired for different applications. The Transmitter can be attached on any object while the user carries the Receiver unit. The Vibration/Sound from Receiver can remind the user if the protected object is left behind or taken away by someone. This is the major function for the Mini Reminder. In addition, one Transmitter can work with two or more Receivers. Any one of Receivers can monitor the protected object.

Theory of Circuitry: The Mini Reminder is designed with two separated circuitries, Transmitter and Receiver. I simply describe both circuitries as below:

Transmitter: Refer to TX - Circuit Diagram
The Transmitter is a superheterodyne RF circuit. The PIC (U1 12C508) is programmed with one set of 512 codes and output timing. The 512 combinations of codes can provide extra security for Mini Reminder. The Q1 is to amplify the codes from Pin #3 (D/OUT) of U1 and Q2 is for amplifying RF power. The power source is a 3V Li-Ion button battery (BT3V) and the operating current is about 0.4 mA. The LED (D1) shows the rate of transmitting codes (every ¾ sec). The oscillator components are L1, L2, C1 and SAW1 and it generates 433 MHz frequency. The 433 MHz pulses carry the preset code from U1 Pin #3 and transmit out. The Transmitter consists of an external antenna for better directivity and transmission. The RF transmission time (3/4 sec) is pre-programmed in PIC (U1 12C508). The SW1 is a power On/Off switch.

Receiver: Refer to RX – Circuit Diagram
The Receiver is powered with a 1.5V battery. The D1 (3090) Voltage regulator IC and L1 (330 uH) inductor are used to raise the voltage to 3 Volts for the Vcc of U2 (12C508). The Q3 is acted as a switch. The Receiver also has a built-in external antenna on PCB. The receiving coded RF signals will go through the Q1 RF amplifier and Q2 oscillation circuits. The U1B (LM358) is for amplifying codes and U1A (LM358) also used to amplify codes and filter RF 433 MHz. Then deliver recovered code to U2 D/IN Pin #4 (C12C508). The U2 - PIC is programmed for decoding, code learning and output signals (Activate buzzer and motor). If the U2 Pin #4 receives matching codes, the Pin #7 (Buzzer out) and Pin #6 (Motor out) will have no output. If the U2 Pin #4 (D/IN) does not receive matching signals (No input), the Pin #7 (Buzzer out) and Pin #6 (Motor) will deliver output signals to drive the Buzzer and the Motor (Vibration) respectively. The SW2 switch is to adjust the sensitivity of receiving (Reception range – **L**ong and **S**hort). The SW1 is for power **Off**, Vibration/Sound (**VS**) and Vibration (**V**).