

# 6.78MHz Transmitter with 433MHz Cut-band

## Circuit Function and Device Operation

### 1. Circuit functions:

The 6.78MHz Transmitter uses a PIC16F688 microcontroller running on an internal oscillator to control the functioning of the device. This processor is used to control the broadcast of low frequency 6.78MHz signals and high frequency 433.92MHz signals..

The low frequency transmit section uses a 6.78MHz crystal, transistor amplifier, tuned tank circuit and ferrite antenna to generate the 6.78MHz carrier. On/off keyed modulation is controlled by the microcontroller.

The low frequency 6.78MHz receive circuit uses a ferrite antenna, a tuned tank circuit and transistor amplifier for the active receiver. Incoming signals are decoded by the microcontroller.

The high frequency 433.92MHz “cut-band” signal is output from a 433.92MHz radio module. This module uses a 13.56MHz crystal to generate the high frequency signal. The microcontroller keys this module to produce the cut-band RF signal which is broadcast via a PCB trace antenna..

The 6.78MHz Transmitter is powered directly from a 3V lithium battery.

### 2. Device Operations:

The Transmitter is used to prevent dementia patients and newborn infants from wandering off, being abducted or otherwise leaving a safe and controlled environment in customer's facility.

The low frequency signals are used to manage access/egress through monitored doorways.

The high frequency signals send transmitter status (normal operation, or tamper alarm) to the system cut-band receivers.

The transmitter also has an active short range 6.78 MHz receiver used for control and communications with the system tester.