



318 SAFETY TURTLE™ RECEIVER DESCRIPTION

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1. INTRODUCTION

The mission of the Safety Turtle™ system is to alert a supervising adult when a child enters a swimming pool, lake, or other body of water unnoticed, and thus to reduce a significant cause of death and injury among young children.

The system consists of the following elements:

- a *transmitter*, which is worn by the person being monitored;
- a *receiver*, which alerts the supervisor when the remote unit detects immersion in water;
- a radio link, by which the transmitter signals immersion to the receiver.

This document provides a detailed description of the operation of the Safety Turtle™ receiver.

2. DEVICE OPERATION

The transmitter emits a coded radio signal when immersed in water. The signal is detected by the receiver, which generates an audio alarm.

The receiver is line-powered via a wall-mount low-voltage transformer and employs an internal monopole antenna. There are no adjustments or user-serviceable parts. The case is not intended to be opened by the user.

The user interface consists of two LEDs, a momentary-contact switch, and a piezoelectric audio alarm. In addition, a socket on the front panel accepts a coding plug that selects the transmitted code to which the receiver will respond. The plug is colour-coded to correspond to the colour of the matching transmitter.

3. CIRCUIT DESCRIPTION

As shown in Figure 1, the receiver consists of the following elements:

- Power supply
- Antenna
- Input filter
- Preamplifier
- Local oscillator
- Mixer/IF processor
- Controller

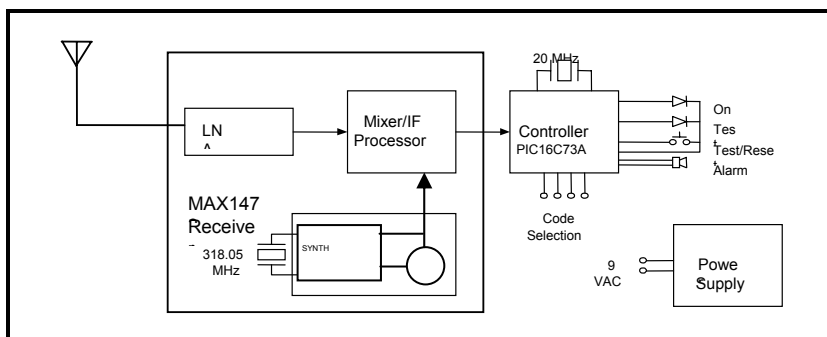


Figure 1 Receiver Block Diagram

3.1 Power Supply

The power supply converts 9 VAC from a wall-mount transformer to +5 VDC regulated for the electronics and to +12 VDC unregulated to drive the audio alarm.

3.2 Antenna

The antenna is a monopole approximately 8.5" in length. It is contained within the receiver case and is directly attached to the receiver PCB.

3.3 Receiver

The MAX1473 is a fully integrated low-power CMOS super-heterodyne ASK receiver. The chip consists of a low-noise amplifier (LNA), a differential image-rejection mixer, an on chip phase-locked-loop (PLL) with integrated voltage-controlled oscillator (VCO), a 10.7 MHz IF limiting amplifier with received-signal-strength indicator (RSSI) and an analog base band data recovery circuit.

3.4 Controller

The controller processes the base band output from the IF processor to detect the presence of the transmitted code. A coding plug corresponding to the associated transmitter applies a pattern of connections to a set of pins to select the code to be recognized.

When the selected code is detected, the receiver drives a piezoelectric bender to generate an audible alarm. A pushbutton switch allows the user to acknowledge the alarm, and to place the unit in a test mode where the alarm volume is temporarily reduced.

Two LEDs indicate the presence of main power and whether the unit is in test mode.

The controller employs a microprocessor with an internal clock oscillator. The clock rate is fixed at 20 MHz by a ceramic resonator external to the processor.

4. REGULATORY COMPLIANCE

The receiver has been designed and tested to comply with the following regulations:

- USA: CFR Title 47, Part 15, Subpart B
- Canada: RSS-210