



## 318 SAFETY TURTLE™ RECEIVER DESCRIPTION

REVISION	1.0	2.0				
DATE	98/09/08	04/04/04				

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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.

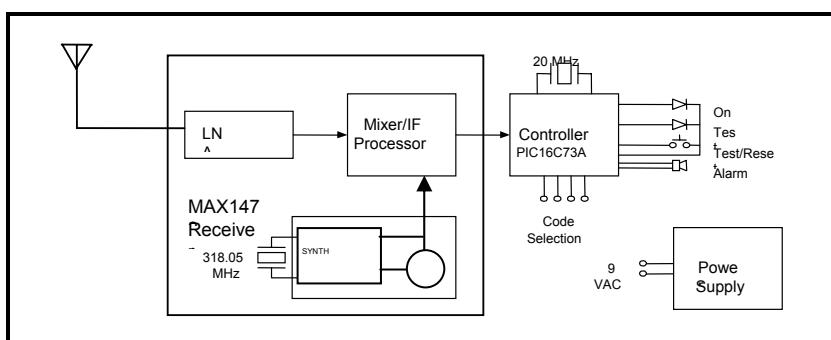
The receiver is line-powered via a wall-mount low-voltage transformer and employs an internal monopole antenna. There are no adjustments or user-serviceable parts. The case is not intended to be opened by the user.

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