

EE 451 Functional Description

Microcontroller-Based Remote Locator Using Asynchronous Serial Communication

Steve Yessa

Project Advisors:

Mr. José Sánchez

Dr. Brian Huggins

Description

The goal of this project is to develop a remote locator device that is used to find lost items by sending an RF signal to small remote units connected to various items in the home, such as keys, TV remotes, etc. When an item is lost, the user scrolls through an LCD screen. The name of the lost item is found in the locator menu and the locator button is then pressed. The remote unit attached to the desired item receives the signal from the base unit and produces an audible alarm to allow the user to locate the item. Each additional remote unit also receives the signal, but they do not produce the audible alert. The user is able to turn the alarm off on the portable device or use a button on the base unit.

The base unit is microcontroller based and interfaces with an LCD screen and a keypad. The user menu is displayed on the LCD and allows three different modes of operation: save mode, alert mode, and load mode. These modes are described in the modes of operation section below. Figure 1 shows the block diagram for the hardware system of the base unit. Figure 2 shows the block diagram for the hardware system of the remote unit.

This product will benefit those people that have multiple items in their home that tend to get lost on a regular basis. The user will no longer have to spend time searching their home for remotes, keys, or other items that are used and misplaced regularly. The target audience for this device will be homeowners or renters between the ages of 25 and 55 that own TVs, VCRs, stereos, and/or a car. These people will have multiple remote controls and keys that may be misplaced on a regular basis. Consumers that have enough money to purchase these items will have enough money to purchase this device. This product will end the frustration of having to search one's home repeatedly for lost items.

Modes of Operation

Save Mode: This mode is used to save the name of each item to be located and to assign each item to its remote device. The names are entered into the list using the keypad. When the names of the items are saved into the menu, the user is then able to scroll through the list of names and locate the desired item when in the Alert Mode.

Alert Mode:

The user uses the keypad to scroll down the list of saved items in order to find the desired item. He/she can then select the item and press the alert button to transmit the RF signal to each remote unit. The remote units then receive the transmitted signal and demodulate it. The demodulated signal is delivered to the UART circuitry, where the packed demodulated signal will be unpacked for decoding. From there, the signal is sent to the digital decoding and comparator circuitry, where each remote unit can compare the signal to its own ID number. When the correct remote receives the signal, it sounds the alarm on the remote so that the item can be found.

Load Mode:

The load mode is used when the user wants to add or replace a remote device in the system. The additional remote units each have a preset code that is entered into the base unit, using the load mode, and stored so that the base unit knows what signal to send in order to activate the remote.

Figure 1
Base Unit System Diagram

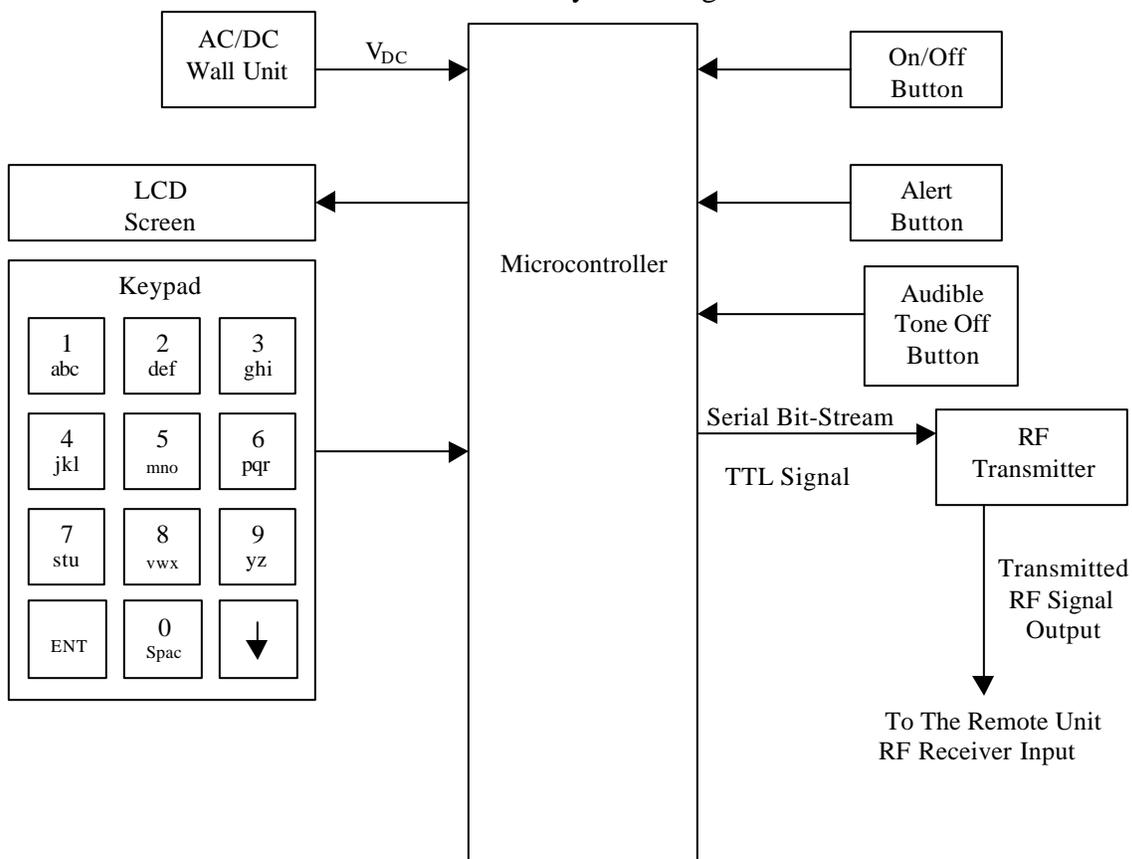


Figure 2
Remote Unit System Diagram

