RTC ALARM CLOCK DESIGN PROFILE

Apurva Abhyankar (aabhyank)
Aashish Kanade (akanade)

Overview:

The RTC alarm clock is a device that uses the Real Time Clock to display the current time on the STM32 board via the LEDs. It also provides the functionality to set an alarm for a user specified time. This alarm can be set directly from the board using two buttons. The alarm is configured to repeat every day at the specified time. The timestamp of certain events on the board are logged into a file on an SD card.

Background:

The clock/calendar provides seconds, minutes, hours, day, date, month, and year information on the workstation and a time display on the board. The alarm clock has a time-of-the-day alarm which rings using the GPIO controlled buzzer. This design is similar to the existing systems with the added feature of time display using the LEDs on the board. The time display is in 12 hour format with designated LEDs to indicate hours/minutes and am/pm.

Assumptions:

Usage: The device uses runs on the power supplied by the workstation when connected via USB. It also functions when not connected to the workstation using a battery. The user sets the alarm directly from the board in the 12 hour format. The time display is calibrated so as to emulate an analog clock using 8 LEDs.

Environment: The device is not affected by external conditions such as temperature, humidity, etc.

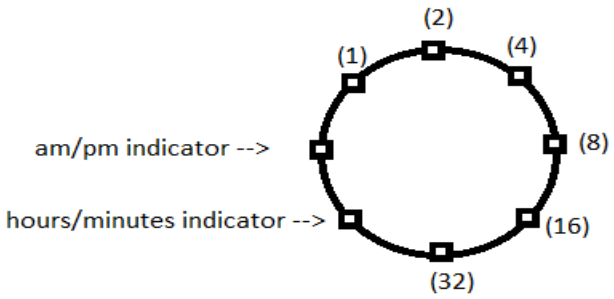
Objectives/Deliverables:

Category	Design Objective	Deliverable	Status
Power	Battery availability	Uses standard 9V batteries	Completed
Power	Battery life	Depends on usage	Completed
Communication	Setting alarm directly from the board	Use the extra button to go into alarm mode and set the alarm in 12 hour format using a toggle interface.	Completed
User Interface	Alarm ring	Provides audio output which beeps 10 times using the GPIO controlled buzzer.	Completed
User interface	Time display	Use the 8 LEDs provided on the board to display time in 12 hour format.	Completed
Data storage	Event logging	Store the timestamps for various events taking place on the board.	Completed

RTC ALARM CLOCK DESIGN PROFILE

Apurva Abhyankar (aabhyank)
Aashish Kanade (akanade)

Time display manual:



The time is displayed in binary format using 6 LEDs as shown in the figure. There are two designated LEDs used as indicators. The hours and minutes display can be toggled using the USER button and SW LED will indicate the current display mode (ON for hours, OFF for minutes). The W LED is the am/pm indicator (ON for pm, OFF for am).

Data Logging:

1. For every event that takes place on the board, a timestamp along with the event is logged into a file which is stored in an SD card.
2. The events for which the timestamp are stored:
    a. User button press
    b. Setting alarm time
    c. Setting time for the first time
    d. The alarm going on
    e. The alarm going off
    f. Movement of the board.