

COE 115 Project Proposal  
**Home Assistant: Personal Digital Assistant + Home Control**

Kirsten Rae C. Hipolito  
2015-00399

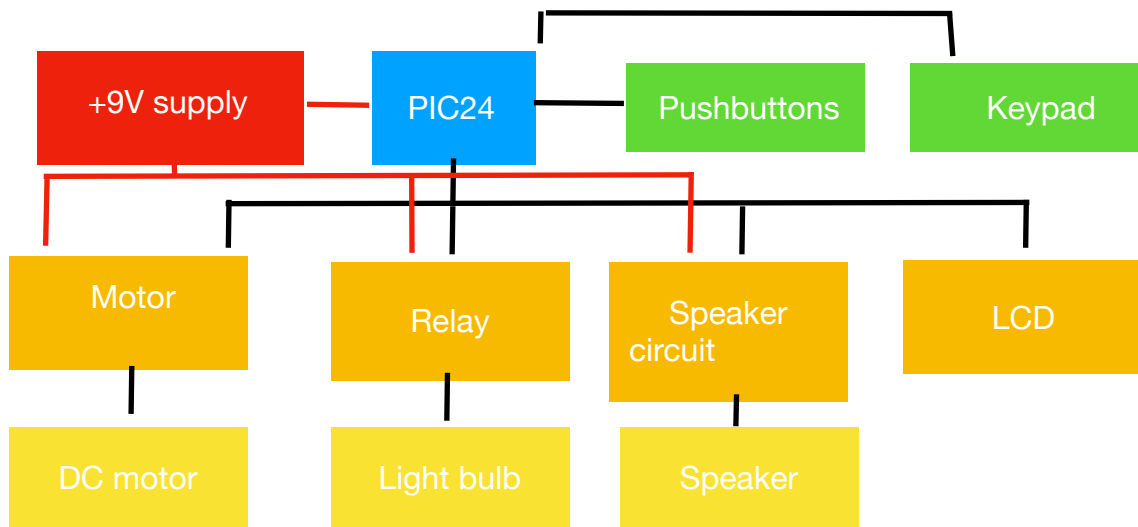
## I. Description

The project is a Home Assistant, which is a combination of a personal digital assistant and home control utilities. Its features are the following:

- Display time and date
- Set alarm at a particular time (sound through a speaker)
  - Choose an alarm sound
  - Set what text will be displayed upon alarm
- Set a particular time to automatically:
  - Turn on/off lights
  - Open curtains

## II. Block Diagram

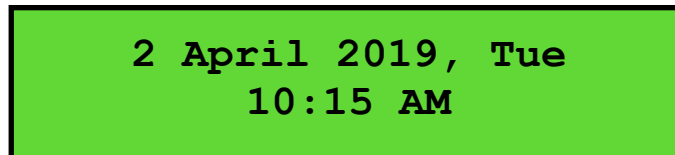
The following are the components: the PIC24 which is the main controller, DC motors, and their respective motor driver (L9110S), light switches (relays), an 8 ohm speaker, and the speaker circuit.



The following diagram outlines how the screen will look at a certain stage.

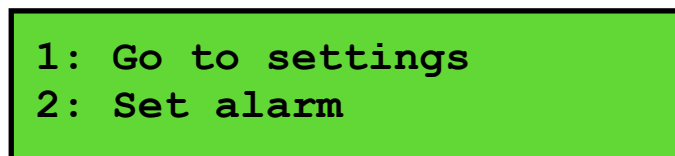
### Screens:

1. Default screen: cycles between the three upon pressing the “enter” pushbutton
  - displays time and date




**2 April 2019, Tue  
10:15 AM**

- displays the following options:



**1: Go to settings  
2: Set alarm**

- displays the following options:



**3: Set light  
4: Set curtains**

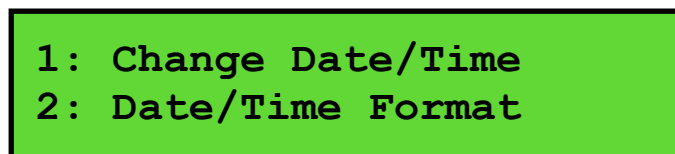
- displays the following options:



**5: View alarms**

Pressing the number of the button corresponding to the options takes you to the option.

2. Settings screen



**1: Change Date/Time  
2: Date/Time Format**

Pressing the number of the button corresponding to the options takes you to the option.

1: Change date/time (the different time periods blink, and cycle through each other when “enter” is pressed, toggled by “back” and the changes are kept when “OK” is reached and “enter” is pressed)

2 April 2019, Tue  
10:15 AM OK

2: Date/Time Format (the different time periods are again blinking, and cycle through each other, with the same controls as above, but the time period toggles format, not value)

Formats that can be toggled are: Month (word or number), Year (2 numbers or 4 numbers), Time (12 or 24 hour format)

2 4 2019, Tue  
10:15 AM

2: Set alarm: controls same as changing date and time, but now there is an available “—” option for time periods to make it repeatable (e.g. setting year to “—” makes the alarm repeat every year)

2 April 2019, Tue  
10:15 AM OK

Pressing “enter” upon reaching ok takes you to the next screen. Pressing a number plays the alarm sound, and pressing “enter” after a number chooses that sound. That takes you to the next screen, where a text description of the reminder can be typed.

Sound:  
1 2 3

Reminder:

Alarm set!

3: Set light: Allows you to set a time to turn on the light, and turn it off. Controls are similar to the alarm setting.

Turn on:	5:30 AM	OK
Turn off:	10:00 PM	OK

4: Set curtains: Allows you to set a time when to open, and to close the curtains. Controls similar to the alarm setting.

Open:	5:30 AM	OK
Closed:	10:00 PM	OK

5: View alarms

Alarm 1:	5:30 AM	ON
Alarm 2:	7:00 PM	ON

The state at the right of the alarm can be toggled through “ON”/“OFF”/“DEL”, which are respectively for turning on, off, and deleting.

After setting the options, the screen goes back to the default screen.

### III. Peripherals Used

The peripherals involved for input include:

- GPIO (keypad and pushbutton)

The peripherals involved for output include:

- GPIO (LCD, Relay)
- Output compare (DC motor, speaker circuit)
- RTCC (Keeping track of the time)

### IV. Implementation Plan

The project will be implemented on a separate board, which integrates the driver modules for the different outputs.

The user uses a keypad and a pushbutton to interact with the system, and views the output on the LCD screen. The keypad acts like the letter keypad (like the ones in old phones where a key is pressed a number of times to get a letter). The pushbuttons are for “enter” and

“back”. The controls for the output are outlined in the peripherals section, which are made feasible due to the driver modules to be used for the outputs.

The sounds that are available for the alarms will be three different short 8bit tunes.

Testing and demonstration of the default screen and the settings can be done immediately. Testing of the setting of alarm, light, and curtains can be done by setting the time to a near enough future time eg 1 min from current.

## **V. Milestones**

- A. Milestone 1 (25%)
  - 1. All screens implemented
  - 2. Pushbuttons working
  - 3. Keypad working as numeric keypad
  - 4. Transition between screens
- B. Milestone 2 (40%)
  - 1. Set alarm working (no speaker output)
  - 2. Settings and all set events are kept and implemented
- C. Milestone 3 (60%)
  - 1. Keypad working as alphanumeric keypad
  - 2. Set light working (with actual light bulb control output)
- D. Milestone 4 (85%)
  - 1. Set curtains working (DC motor driver output)
  - 2. Set alarm working (with speaker output)
- E. Milestone 5 (full functionality, 100%)
  - 1. All modules fully working
    - a) Set curtains working (DC motor output)