Musical WC Operator's Guide
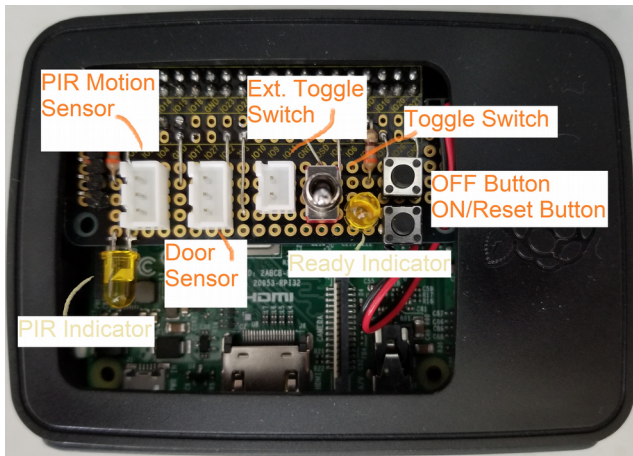
Overview

PIR Motion Sensor: The motion sensor in the bathroom. *The top pin connects to GND, the bottom to 3.3V, and the center pin is pulled high. (Active LOW) The indicator lights when the sensor has been triggered for confirmation.*

Door Sensor: The sensor that reports the state of the door. (Open or Closed) *The top pin connects to GND, the bottom to 3.3V, and the center pin is the signal.*

Toggle Switch: This switch is used to mount and unmount the USB flash memory. BE SURE THE READY INDICATOR IS OFF BEFORE REMOVING USB FLASH MEMORY. When the switch is down (towards HDMI connector) the flash memory will be loaded and the ready indicator will come on if the flash memory file structure is correct. When the switch is up (away from HDMI connector) the flash memory will be unloaded and safely disconnected from the device. This switch can be used to disable music functionality.

Ext. Toggle Switch: Use this connector to bypass the onboard toggle switch with another switch. Be aware that if both switches are on, (closed circuit) they must both be off (open circuit) for the ready indicator to go out.

Buttons: Buttons to turn off the Rasberry pi or to reset it. The reset button will turn the pi on if it is off. Using the reset button while the pi is on is not recommended. See shutdown section.

Necessary File Structure

The file structure of the USB flash memory is crucial for the system to function. When the flash memory is mounted (switch is flipped and memory inserted), the system looks for folders. It then checks every folder (name does not matter) inside for subfolders named entersfx, exitsfx, and music. For each of these folders (if they exist) it collects **all** of the mp3 files inside. entersfx and exitsfx don't have to exist, but Music does. If music has no files in it, the flash memory loading process will finish but of course no music will be played. This implies you can make themes with any combination of the three. Do not use spaces or quotations in mp3 file names as the system cannot read them.

File Structure Example
```
Flash Memory device
|-- theme1
|  |-- exitsfx
|  |  |-exit.mp3
|  |  |-out.mp3
|  |
|  |-- music
|  |  |-track1.mp3
|  |  |-favorite.mp3
|  |  |-funny.mp3
|  |  |-music.mp3
|  |
|  |-- entersfx
|  |  |-in.mp3
|
|-- timeout.txt
```

Operational States

There are 5 possible states for the device to be in
Inactive: When the toggle switch is turned off, the device returns to this state and unmounts the USB flash memory and the device stays idle until the switch is flipped on. (->Unarmed)
Unarmed: When the toggle switch is turned on, the device reads the music files and prepares for operation. If the door is open at this time it will stay in this state until the door is closed. (->Armed)

Armed: When the door is closed after being Unarmed or Detecting, the device waits for the motion sensor to be triggered or the door to be opened. When the door is opened it selects a new theme and plays one opening sound effect. Then either the door is opened or the motion sensor is tripped music begins to play. (->Playing)

Playing: When music starts to play, the device waits for the door to be opened or for the timeout timer to end. If the door is opened, one closing sound effect plays for the selected theme. If either the door is opened or the timer ends, the music stops. (->Detecting)

Detecting: When the music stops, the device uses the motion sensor to determine if the door is closed before another visitor enters or not. If the door is closed, the cycle repeats (->Armed). If the motion sensor is tripped, it starts playing music again from the same theme selected. (→Playing)

Sound Effects

Long sound effects (longer than 10 seconds) can disrupt the operation of the system so keep them short.

Timeout changes

The timeout duration can be modified by adding a text file to the flash memory named timeout.txt. (See the File Structure Example) Write the desired number of seconds that will pass before the timer ends. This file must only contain a number composed of numerals and no other characters. If the file does not exist or is invalid, the system will default to 10 minutes. (600 seconds)

Shutdown

It is recommend to shut the system down if not in use for a long time. When the shutdown button is pressed, a green LED on the main board (located next to the USB power in) will flicker. After a few seconds, the LED will eventually stop flickering and stay off. When it is off, it is safe to cut the power to the device. Note that when the device is reconnected to power, it immediately restarts and boots. In the case that the device is shut off but the power is not removed, use the ON/Reset button to turn it back on. (When the device is on the green LED occasionally blinks)
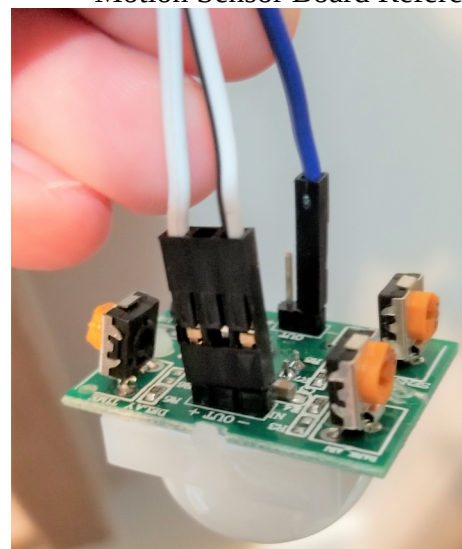
Motion Sensor

The motion sensor has three orange headed potentiometers on the bottom of the board that can be turned. There is an adjustment for sensitivity, darkness and delay. The delay adjustment sets the amount of time that must pass before the sensor can be triggered again, which can be tuned to the user's liking.

Door Sensor Board Reference
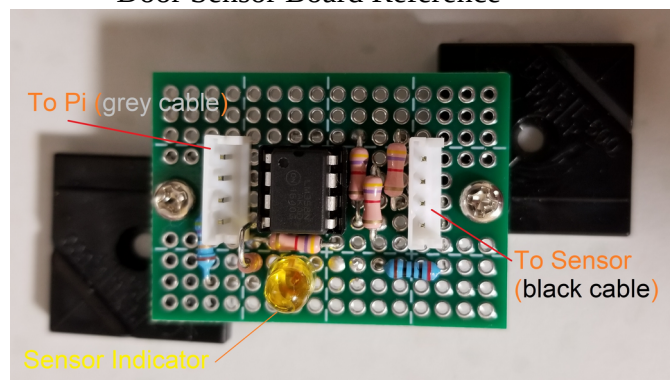
Motion Sensor Board Reference

Pi Password: MusicalWC72