Block Diagram and Interfaces

**Bluetooth Controlled AC Switch**

Group 5:

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AC POWER OUT

BLACK BOX

USER OUT

AC POWER IN

ENCLOSURE IN

USER IN

**Black Box System:**

**Complete Block Diagram:**

Current Sensor and Switches

(Spencer Moss)

AC POWER IN

ENCLOSURE IN

AC POWER OUT

5V OUT DC

5V OUT DC

INTERFACE USER

BLUETOOTH IN\OUT

USER IN

Enclosure

(Jesus Narvaez)

AC to DC Power Supply

(Jacob Ficker)

Phone Application

(Jacob Ficker)

Display and Sound System

(Jesus Narvaez)

Microcontroller Processing

(Spencer Moss)

SWITCH CONTROL

SENSOR DATA

USER OUT

SOUND AND DISPLAY CONTROL OUT

| Interface | Type | Specifics |
| --- | --- | --- |
| AC In | AC Power | * Standard U.S. Power * 60 Hz * 120 VAC |
| AC Out, 2 channels | AC Power | * 60 Hz * 120 VAC * 5 A / 600 W limit on power draw |
| Enclosure Environment | Environment | * Must not allow any objects larger than 1mm in any dimension inside enclosure. * One master on/off switch |
| Bluetooth I/O | Digital Data / RF Communication | * IN: One 20 byte packet representing channel state and timer setting. * OUT: One 20 byte packet representing current/power consumption, 10 bytes per channel |
| User In | App/Display | * Must be considered easily usable by 9/10 people * Successfully transmit data 90% of the time when within range of the device |
| 5V DC Out | DC Power | * Must supply 5V DC * Up to 1.5A DC |
| Switch Control | Digital Signal | * On/Off 1-bit control signal * 1 signal per output channel (2 total) |
| Sensor Data | Analog Signal | * Analog 0-5V signal * 2 total signals, 1 per channel |
| Display + Sound Control | Mixed Signal | * Digital signals to control local display (7-segment displays) of power/current * Small signal AC for audio output (0-5 V) |
| 7-seg + Speaker | Display | * Must create audible noise and readable display for system state and timers * Must make audible sound from at least 10 meters of open space when current limit is triggered. |
| User Interface | App Display | * Must display current power usage by each channel within 10% * Must update power usage data at least once per minute |
| User Output | Display | * Displays on/off state of each channel and bluetooth pairing state with 99.9% accuracy. * Displays time remaining on each timer in minutes. This feature must be accurate within five seconds of the actual time remaining. |