Block Diagram and Interfaces

Bluetooth Controlled AC Switch

Group 5:

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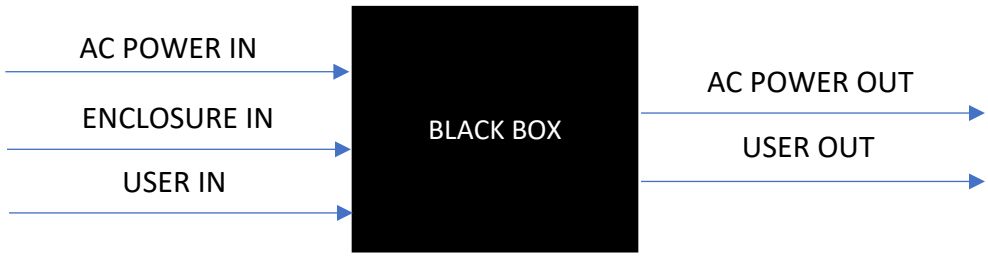
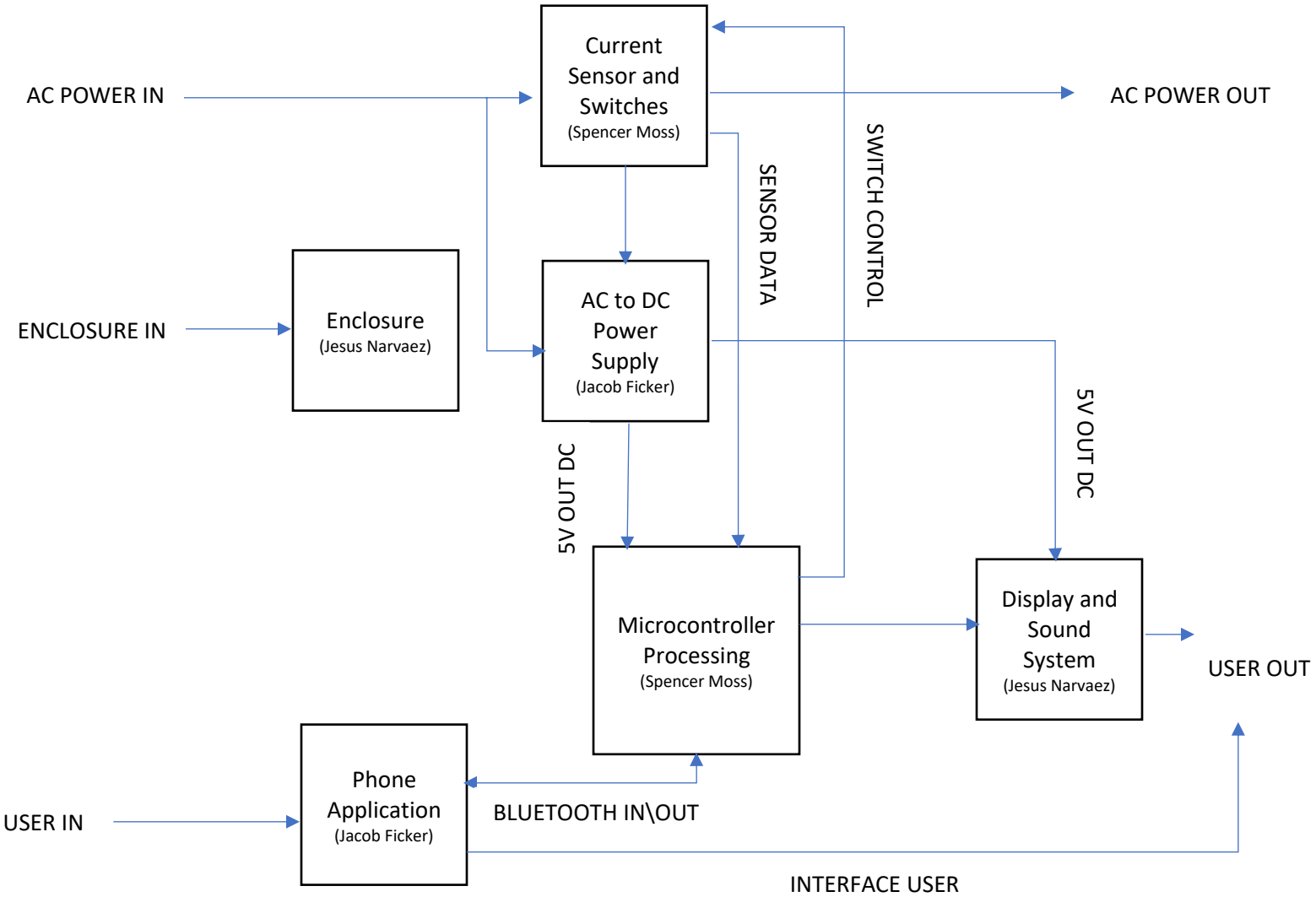
Black Box System:



Complete Block Diagram:



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 bit packet representing channel state (on/off, one bit) and timer setting (7 bits per channel, 30 second increments up to 1 hour). • OUT: One 20 bit packet representing current/power consumption, 10 bits per channel • One packet out 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 • At least 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 • Read via 10-bit ADC by MCU for data transmission
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 (2 digits for timer, 2 digits for current, 4 total per channel) • 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 power usage data at least once per minute

Interface	Type	Specifics
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 fisve seconds of the actual time remaining.