RPI Environmental Control Project
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2/8/2019

I am designing an SBC based grow box monitor & controller project. The project will use an SBC with various components

Requirements
- Monitor in real time:
  - Temp
  - Humidity
  - Date/Time
  - Hours Lights ON
  - Hours Lights OFF
  - Soil moisture level
- Control in real time:
  - Hours Lights ON
  - Hours Lights OFF
  - Temp Alarm
  - Humidity Alarm
  - Exhaust Fan Speed
- Display grow information on screen:
  - Temp
  - Humidity
  - Date/Time
  - Temp Alarm
  - Humidity Alarm
  - Hours Lights ON
  - Hours Lights OFF
  - Soil moisture level
- Save History of:
  - Temp & time measurement taken
  - Humidity & time measurement taken
  - Alarms & time alarms occurred
  - Soil moisture level

- Display grow information on webpage:
  - Temp
  - Humidity
  - Date/Time
  - Temp Alarm
  - Humidity Alarm
  - Hours Lights ON
  - Hours Lights OFF
  - Soil moisture level

Diagram labels:
- MEASURES TEMP → TEMP SENSOR
- MEASURES HUMIDITY → HUMIDITY SENSOR
- MEASURES SOIL MOISTURE → SOIL MOISTURE SENSOR
- SAVE HISTORY → USB/SD CARD
- SMOKE DETECTOR → SMOKE DETECTOR
- RASPBERRY PI & GROVEPI PLUS HAT
- SMOKE ALARM BUZZER — SOUND SIREN IF SMOKE IS DETECTED
- TEMP ALARM LEDS — LEDS INDICATING LOW/HIGH TEMP VALUE
- HUMIDITY ALARM LEDS — LEDS INDICATING LOW/HIGH HUMIDITY LEVEL
- SOIL MOISTURE ALARM LEDS — LEDS INDICATING LOW/HIGH MOISTURE LEVEL
- LCD/LED DISPLAY — DISPLAY INFORMATION ON SCREEN
- FAN CONTROLLER — CONTROL SPEED OF EXHUAST FAN
- LIGHT CONTROLLER — TURN LIGHTS OFF/ON
- IOT/WEBPAGE — USE A WEB BROWSER TO DISPLAY EVERYTHING
- WATER ATOMIZER — INCREASES HUMIDITY IN GROW BOX

GROVE SYSTEM — http://wiki.seeedstudio.com/Grove_System/

- Arduino Based Design

GROVE - TEMPERATURE & HUMIDITY SENSOR	https://store.arduino.cc/usa/grove-temperature-humidity-sensor	$11.00		
COMPANY & SOFTWARE LIBRARY	http://wiki.seeedstudio.com/Grove-Temperature_and_Humidity_Sensor_Pro/			
I2C LCD	http://wiki.seeedstudio.com/I2C_LCD/			
GROVE - OLED DISPLAY 1.12"	https://store.arduino.cc/usa/grove-oled-display-1-12	$13.50		
GROVE - RELAY	https://store.arduino.cc/usa/grove-relay	$3.90		
SoilWatch 10 - Soil moisture sensor	https://www.tindie.com/products/pinotech/soilwatch-10-soil-moisture-sensor/	$22.00	analog output	
Pi-mote Control starter kit with 2 sockets	https://energenie4u.co.uk/index.php/catalogue/product/ENER002-2PI	$22.00	brit pounds	**for rpi**
DHT22 Temp/Humid Sensor	https://www.digikey.com/products/en/sensors-transducers/humidity-moisture-sensors/529?k=dht22	$10.00	AL OUT - will work w/ RPI	
Grove - Water Atomization	http://wiki.seeedstudio.com/Grove-Water_Atomization/			

RPI Based Design

Single Board Computer

Raspberry Pi 3 Model B+	https://www.newark.com/raspberry-pi/rpi3-modbp/sbc-arm-cortex-a53-1gb-sdram/dp/49AC7637	$35

Interface to RPI

Grove Base HAT — http://wiki.seeedstudio.com/Grove_Base_HAT/ — $15.00 — 2 D, 2 A, 3 i2c, 1 UART, 1 Pwr Switch
https://www.amazon.com/Studio-Support-Raspberry-8-Channel-Digital/dp/B07LD8C51J/ref=sr_1_1?s=electronics&ie=UTF8&qid=1546388688&sr=1-1&keywords=Grove+Base+HAT

Grove Base Hat for Raspberry Pi — http://wiki.seeedstudio.com/Grove_Base_Hat_for_Raspberry_Pi/ — $10.00 — 6 D, 4 A, 3 i2c, 1 PWM 1 UART
https://www.seeedstudio.com/Grove-Base-Hat-for-Raspberry-Pi-p-3186.html

GrovePi+ — http://wiki.seeedstudio.com/GrovePi_Plus/ — $30.00 — 7 D, 3 A, 3 i2c, 1 SER to Grove, 1 SER to PI
https://www.seeedstudio.com/GroveP-p-2241.html

Temp/Humid/Moisture

Grove - Temperature&Humidity Sensor Pro — http://wiki.seeedstudio.com/Grove-Temperature_and_Humidity_Sensor_Pro/ — $10

Grove - Moisture Sensor — http://wiki.seeedstudio.com/Grove-Moisture_Sensor/ — analog output
https://www.seeedstudio.com/Grove-Moisture-Sensor-p-955.html — $3.00

SoilWatch 10 - Soil moisture sensor — https://www.tindie.com/products/pinotech/soilwatch-10-soil-moisture-sensor/ — $22.00 — analog output

Display

Grove - LCD RGB Backlight — http://wiki.seeedstudio.com/Grove-LCD_RGB_Backlight/ — $12.00 — I2C interface
https://www.seeedstudio.com/Grove-LCD-RGB-Backlight-p-1643.html

Water Atomizer (Humidifier)

Grove - Water Atomization — http://wiki.seeedstudio.com/Grove-Water_Atomization/ — $10.00 — 1 Digital input
https://www.seeedstudio.com/Grove-Water-Atomization-v1-0-p-2542.html

Fan/Light Control

Grove - 2-Channel SPDT Relay — http://wiki.seeedstudio.com/Grove-2-Channel_SPDT_Relay/ — $7.00 — 2 Digital inputs, 5V signal, 250VAC @ 10A
https://www.seeedstudio.com/Grove-2-Channel-SPDT-Relay-p-3118.html

Air Quality/Smoke Sensor
MQ2 Sensor — http://wiki.seeedstudio.com/Grove-Gas_Sensor-MQ2/ — $7.00
https://www.seeedstudio.com/Grove-Gas-Sensor-MQ-p-937.html

LED Alarms
Temp Alarm LED — - — 4 digital outs
Humid Alarm LED
Moisture Alarm LED
Smoke Combustion LED

Total Cost: $92.00