

## RELAY ATTENUATOR

Relay Attenuator shield has been designed for Audio attenuation after Piano DAC output by 1dB step size, Its Compact and simple circuit, Just 6 tiny relays implement a 64-step logarithmic stereo attenuation. The 64 steps of 1.0dB together span a 63dB audio attenuation range. By avoiding any active electronics, a very clean and open sound is maintained.



## Features:

- ◆ Constant Input resistor: **10K**
- ◆ Load resistance: **60K**
- ◆ Resistance standard: **E192**
- ◆ Step Size : **1dB**
- ◆ No.of relays: **6**
- ◆ No.of Steps: **64dB**

**Input audio connectivity:** Stereo inputs through on-board RCA Connectors.

Left Out→white RCA connector.

Right Out→Red RCA connector.

**Output audio connectivity:** Stereo outputs through on-board RCA Connectors.

Left Input→white RCA connector.

Right Input→Red RCA connector.

**PCB Dimension:** 85X67.8X22.2mm (W\*L\*H)

**Weight:** 42gm.

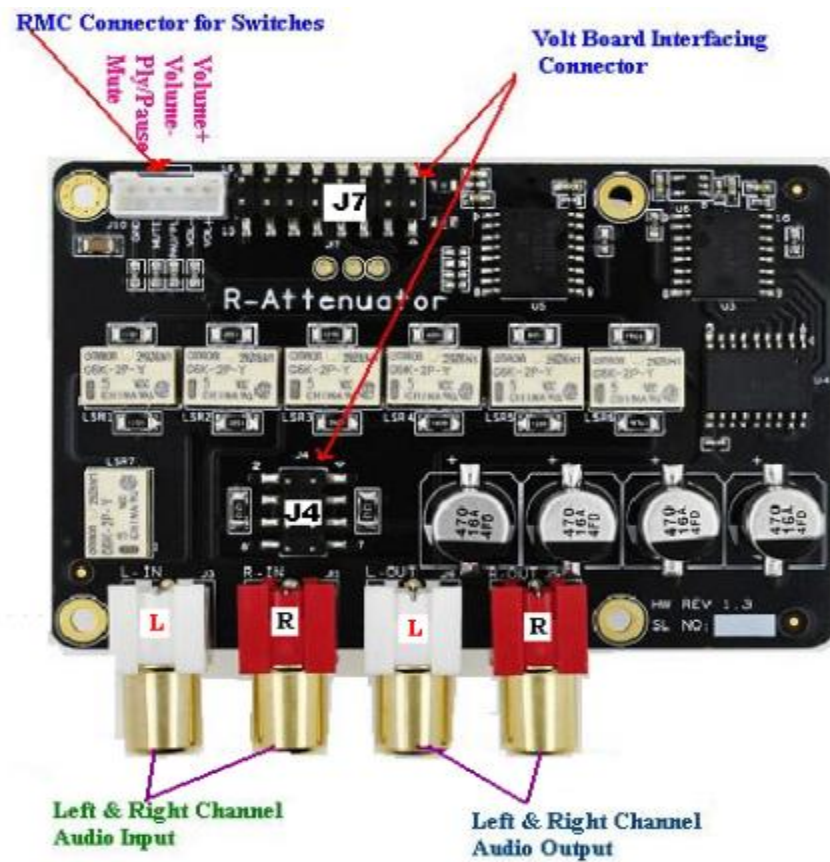
**Operating Temperature:** 0° C to 70°C

**Relay Attenuator** is an add-on stereo sound attenuation card for Sparky / RPI- 2 & 3 version SBCs.

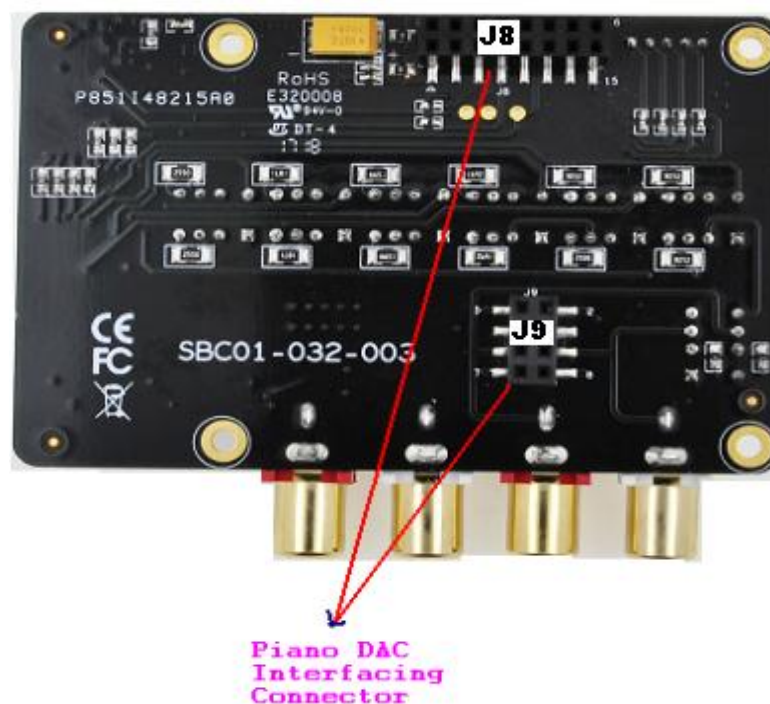
The Relay Attenuator takes the analog audio Input signal from the **PIANO Hi-Fi DAC** through on-board board to board connector or RCA Connector and delivers variable analog audio output to the Piano RCA connectors and Board to Board Connector (to VOLT).

RPI/Sparky sends control signals through I2C interface and I2C EXPANDER (PCF8574) Provides GPIO,s to control Relay Driver(ULN2803), Relay Driver drives 6-stage Relays to achieve 0-63dB (64 steps) logarithmic attenuation.

## Relay Attenuator TOP View



## Relay Attenuator BOTTOM View



## RELAY ATTENUATOR BOARD TO BOARD CONNECTOR PIN OUT DETAILS

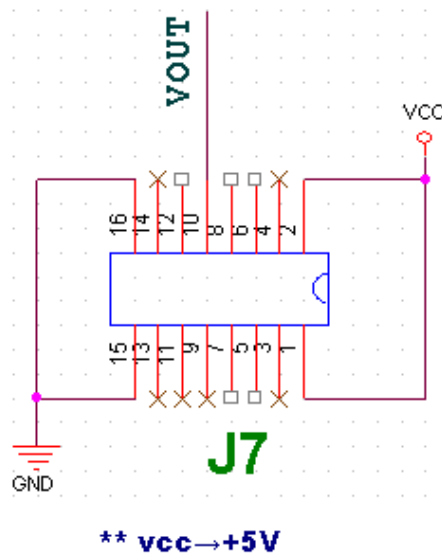
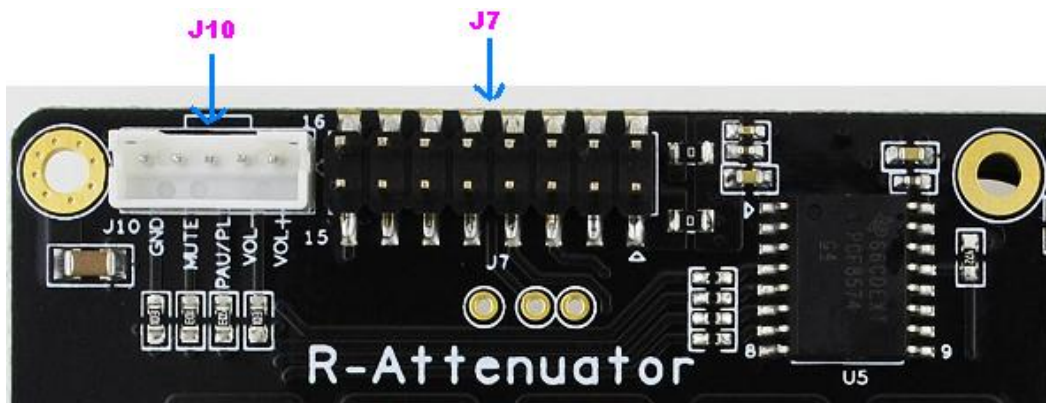
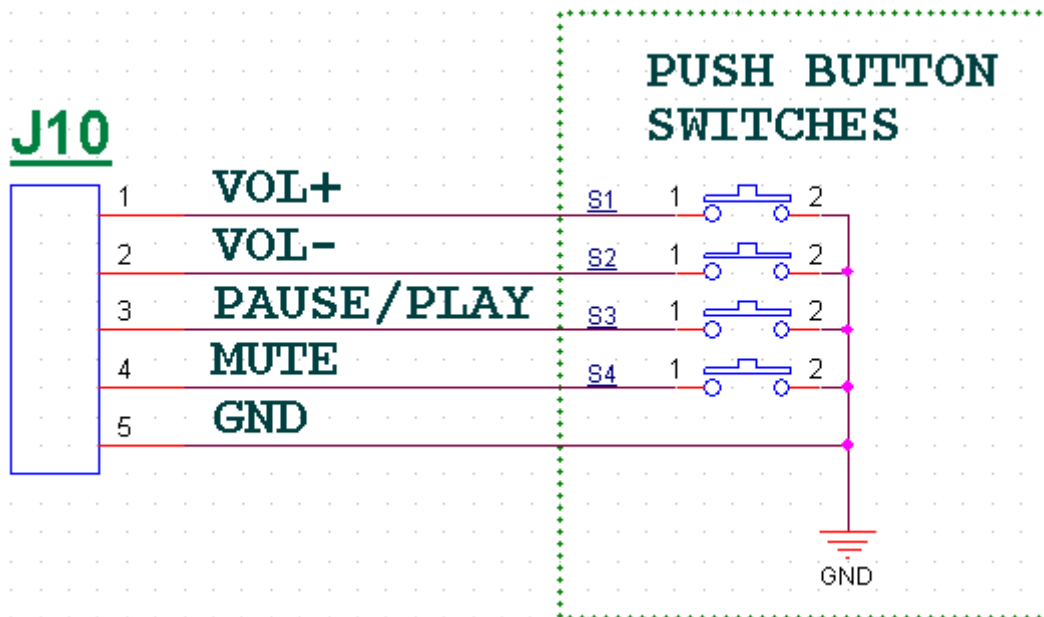
| RELAY ATTENUATOR J8 PIN OUT DETAILS |                  |     |    |                  |           |
|-------------------------------------|------------------|-----|----|------------------|-----------|
| PIANO DAC                           | RELAY ATTENUATOR | PIN |    | RELAY ATTENUATOR | PIANO DAC |
| 5V                                  | 5V               | 1   | 2  | 5V               | 5V        |
| NC                                  | NC               | 3   | 4  | NC               | NC        |
| TWI2_SDA                            | SDA              | 5   | 6  | NC               | GPIOB14   |
| TWI2_SCK                            | SCK              | 7   | 8  | GPIOB15          | GPIOB15   |
| NC                                  | NC               | 9   | 10 | NC               | GPIOB16   |
| NC                                  | NC               | 11  | 12 | NC               | GPIOB30   |
| SDZ_AMP                             | NC               | 13  | 14 | NC               | MUTE_AMP  |
| GND                                 | GND              | 15  | 16 | GND              | GND       |

| RELAY ATTENUATOR J9 PIN OUT DETAILS |                  |     |    |                  |            |
|-------------------------------------|------------------|-----|----|------------------|------------|
| PIANO DAC                           | RELAY ATTENUATOR | PIN |    | RELAY ATTENUATOR | PIANO DAC  |
| 5V                                  | 5V               | 1   | 2  | 5V               | 5V         |
| AUDIO RIGHT                         | AUDIO RIGHT      | 3   | 4  | AUDIO LEFT       | AUDIO LEFT |
| AUDIO RIGHT                         | AUDIO RIGHT      | 5   | 6  | AUDIO LEFT       | AUDIO LEFT |
| GND                                 | GND              | 15  | 16 | GND              | GND        |

| RELAY ATTENUATOR J7 PIN OUT DETAILS |                  |     |    |                  |          |
|-------------------------------------|------------------|-----|----|------------------|----------|
| VOLT                                | RELAY ATTENUATOR | PIN |    | RELAY ATTENUATOR | VOLT     |
| 5V                                  | 5V               | 2   | 1  | 5V               | 5V       |
| NC                                  | NC               | 4   | 3  | NC               | NC       |
| GPIOB14                             | NC               | 6   | 5  | SDA              | TWI2_SDA |
| GPIOB15                             | GPIOB15          | 8   | 7  | SCK              | TWI2_SCK |
| GPIOB16                             | NC               | 10  | 9  | NC               | NC       |
| GPIOB30                             | NC               | 12  | 11 | NC               | NC       |
| MUTE_AMP                            | NC               | 14  | 13 | NC               | SDZ_AMP  |
| GND                                 | GND              | 16  | 15 | GND              | GND      |

| RELAY ATTENUATOR J4 PIN OUT DETAILS |                  |     |    |                  |             |
|-------------------------------------|------------------|-----|----|------------------|-------------|
| VOLT                                | RELAY ATTENUATOR | PIN |    | RELAY ATTENUATOR | VOLT        |
| 5V                                  | 5V               | 2   | 1  | 5V               | 5V          |
| AUDIO LEFT                          | AUDIO LEFT       | 4   | 3  | AUDIO RIGHT      | AUDIO RIGHT |
| AUDIO LEFT                          | AUDIO LEFT       | 6   | 5  | AUDIO RIGHT      | AUDIO RIGHT |
| GND                                 | GND              | 16  | 15 | GND              | GND         |

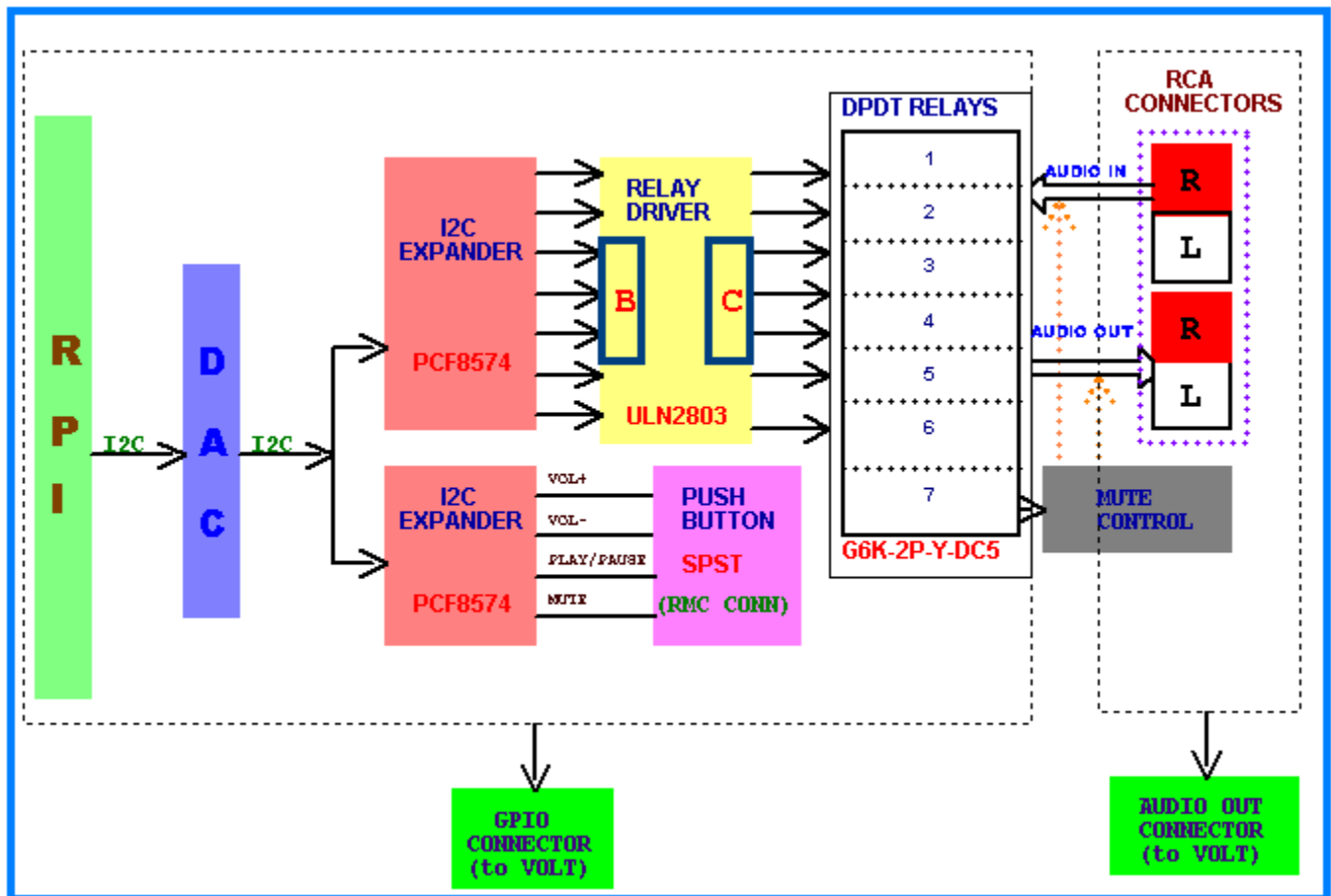
## PUSH BUTTON SWITCHES AND IR SENSOR WIRING DIAGRAM.



**IR SENSOR**



## RELAY ATTENUATOR BLOCK DIAGRAM



**Power (5V):** No need to connect extra power source to Relay Attenuator, 5V power will source from SBC through DAC compatible header.

**Power (3.3V):** 3.3V power Generated with on-board 5V to 3.3V LDO.