BOSS
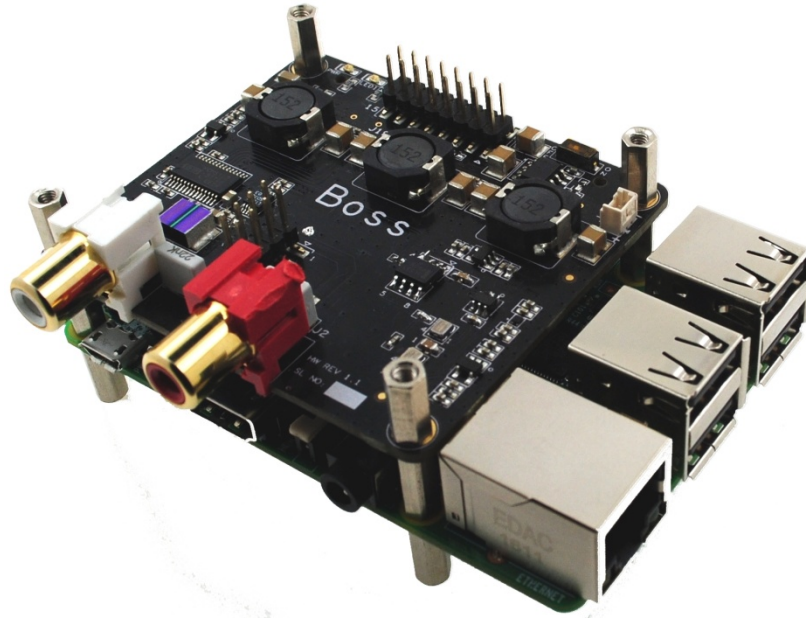
TECHNICAL MANUAL

BOSS Hi-Fi DAC

BOSS Hi-Fi DAC Shield has been designed for those seeking audio perfection. BOSS Hi-Fi DAC comes with built in Dual Master clock Oscillators to support 44.1K & 48K series sampling rate audio playback. These are specially designed sound cards compatible with RPI- 2 & 3 versions of SBCs.

BOSS Hi-Fi DAC Features:

- Dedicated 384 kHz/32bit high-quality DAC PCM5122 for best sound quality
- Audio output connectors: 2 x RCA (Left & Right) & Allo Volt Amp header
- HAT size
- DAC SNR is 112dB
- DAC THD+N @ - 1dBFS are –93dB
- Full Scale Output of DAC is 2.1Vrms
- Dynamic Range of DAC is 112dB
- Sampling Frequency ranges from 8 kHz to 384 kHz
- Ultra-low-noise voltage regulators & LPF for optimal audio performance
- Integrated EEPROM for automatic configuration (with write-protection)
- Automatically switching frequencies according to the input I2S signals
- Dual low jitter NDK crystal oscillators for Master Clock generation
- With **45.1584/49.1520** MHz Ultra Low Phase Noise Oscillators

Operating Temperature	0C to 70C
Board Size	LWH = 67.4mm * 65mm * 22.2mm
Board Weight	28g

BOSS Hi-Fi DAC is a fully HAT size add-on sound card for RPI- 2 & 3 version SBCs.

The BOSS will work in I2S Master Mode through the onboard Texas Instruments PCM5122 DAC IC.

By using 45.1584/49.1520 MHz Ultra Low Phase Noise NDK Oscillators, the DAC generates bit perfect I2S clocks to RPI, this delivers excellent quality audio out through the BOSS RCA connectors.

The BOSS is simply plugged into the 40 pin RPI connector, no additional soldering or installation required.

Component selection, Digital-Analog Partition and track layout have been in the forefront of our design to ensure noise immunity and best possible audio playback with the BOSS. Analog Power section designed with film capacitors and super Capacitor to achieve pure analog power to DAC.

TOP VIEW OF BOSS
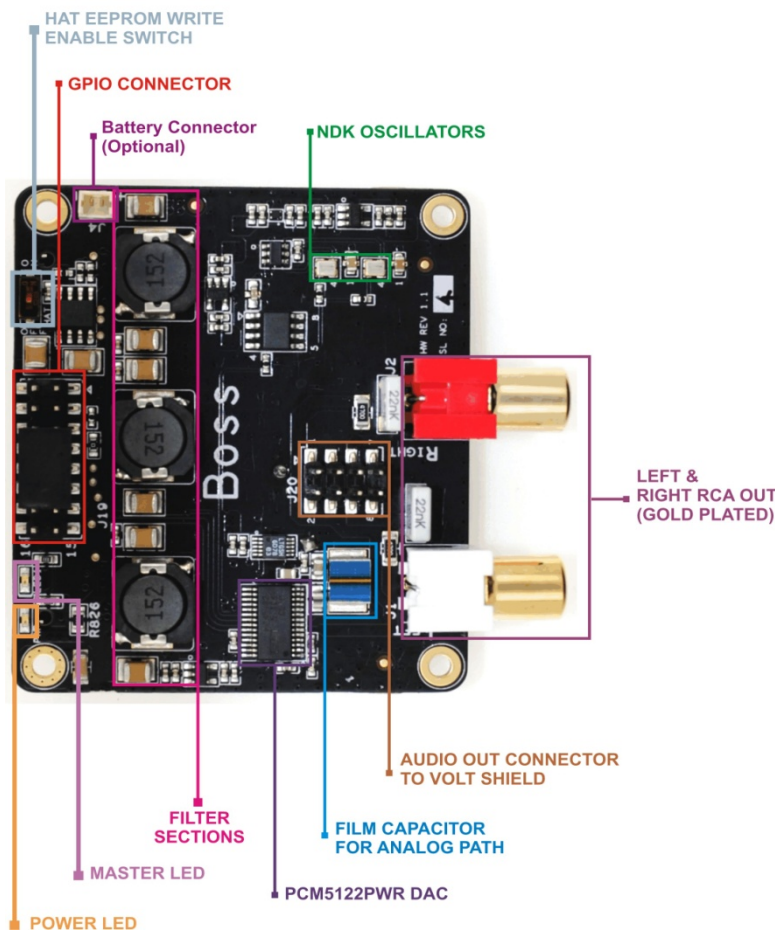
LED STATUS

Green LED'S - Indicates Power up - always glow and Master LED – glows on mode detection.

Power (5V)

No need to connect extra power source to BOSS HI-FI DAC, 5V power will source from SBC through 40 way RPI header.

*Optional 5V battery power in connector (J4) provided for future use. CAUTION: R826 Resistor to be removed (to isolate sbc power from boss power) before connecting external power on J4 connector.

SWITCHES

HAT: switch change to ON position for HAT eeprom write protect disabling, OFF for enable (default state).
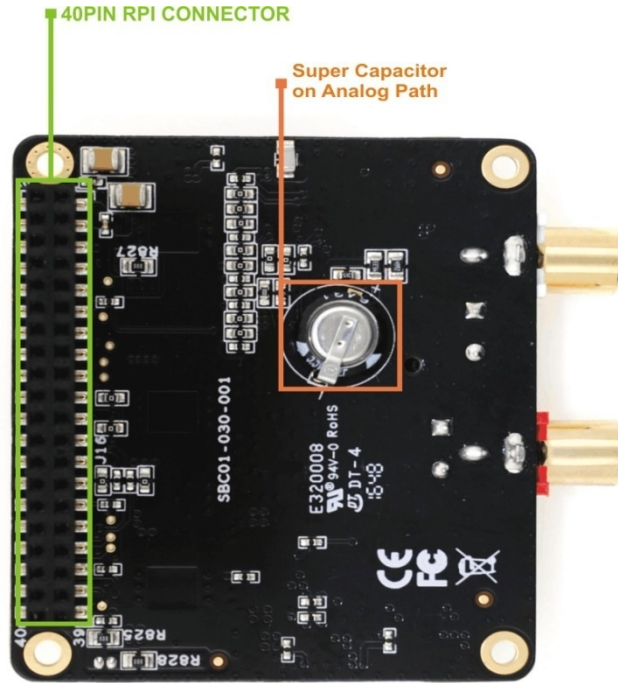
BOTTOM VIEW OF BOSS

BOSS Header PIN-Out Details

RPI	PIN	PIN	RPI
NC	1	2	DC +5V
SDA1-I2C	3	4	DC +5V
SCL1-I2C	5	6	GND
GPIO4	7	8	UART_TX
GND	9	10	UART_RX
GPIO17	11	12	I2S_BCLK
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
NC	17	18	GPIO24
SPI_MOSI	19	20	GND
SPI_MISO	21	22	GPIO25
SPI_CLK	23	24	GPIO8
GND	25	26	GPIO7
ID_SD	27	28	ID_SC
GPIO5	29	30	GND
GPIO6/DMUTE	31	32	GPIO12
GPIO13	33	34	GND
I2S_LRCLK	35	36	GPIO16
GPIO26	37	38	I2S_DIN
GND	39	40	I2S_DOUT

** Highlighted signals are used by BOSS board

BOSS J19 PIN OUT DETAILS (Allo VOLT Header)			
RPI	PIN	PIN	RPI
5V	1	2	5V
NC	3	4	NC
SDA1-I2C	5	6	GPIO4
SCL1-I2C	7	8	GPIO17
NC	9	10	GPIO27
NC	11	12	GPIO24
GPIO23/ SDZ_AMP	13	14	GPIO22 / MUTE_AMP
GND	15	16	GND

BOSS J20 PIN OUT DETAILS (Allo VOLT Header)			
SIGNAL	PIN	PIN	SIGNAL
GND	1	2	GND
AUDIO RIGHT	3	4	AUDIO LEFT
AUDIO RIGHT	5	6	AUDIO LEFT
GND	7	8	GND

BOSS Hi-Fi DAC BLOCK DIAGRAM
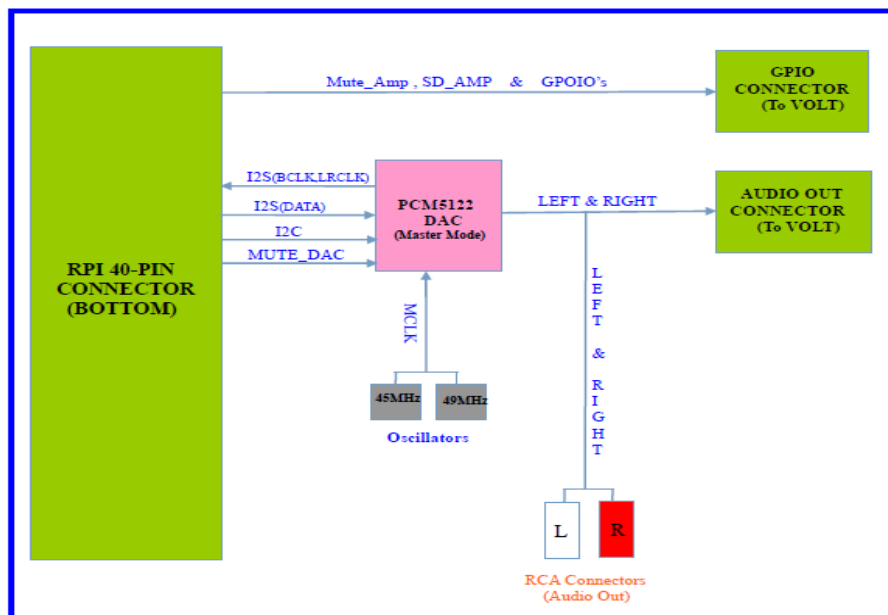
Software Info: *Add "dtoverlay=allo-boss-pcm512x-audio" to config.txt*