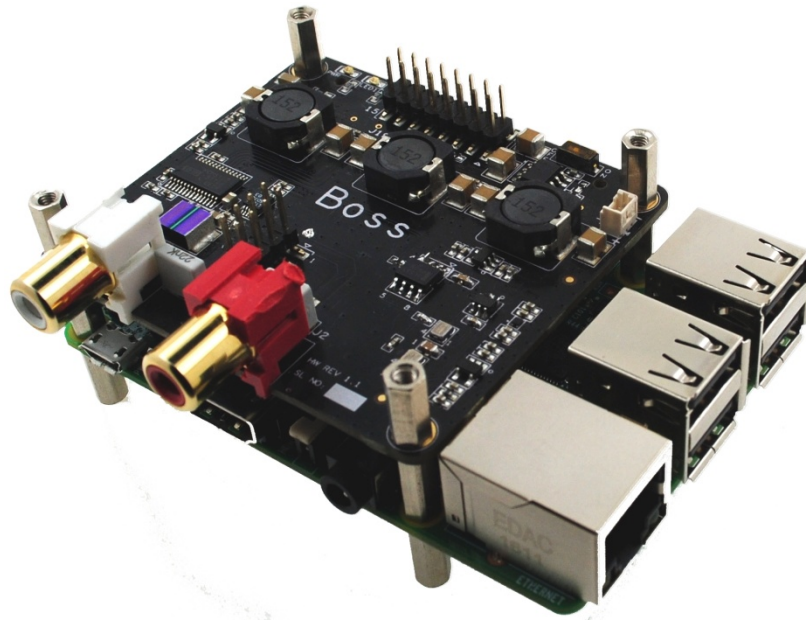


# **BOSS**

# **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.



## 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
- 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.

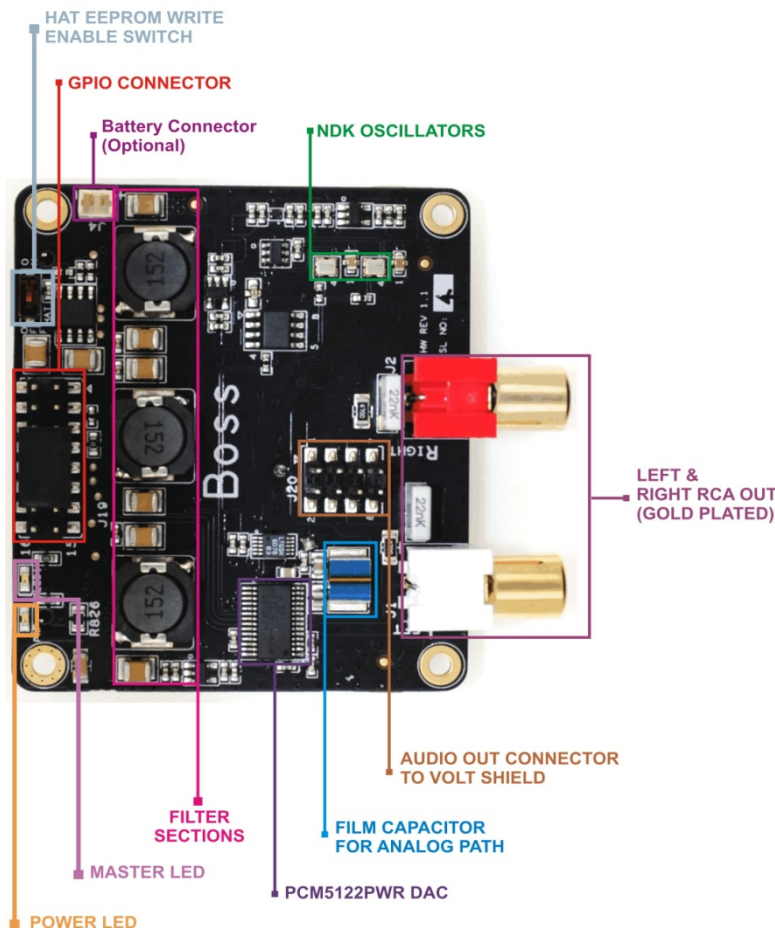
The BOSS will work on I2S Master Mode through the onboard Texas Instruments PCM5122 DAC IC. Master clock auto switching will take care by PCM5122 DAC and generates sample rate based I2S clocks out to RPI.

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

The BOSS can be connected to the RPI compatible 40 way header without any additional cable or soldering.

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.

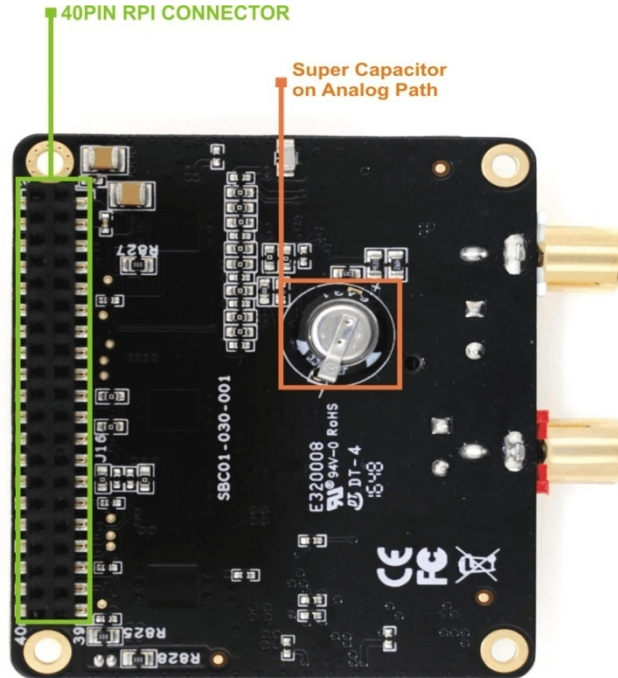
#### Power (5V)

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

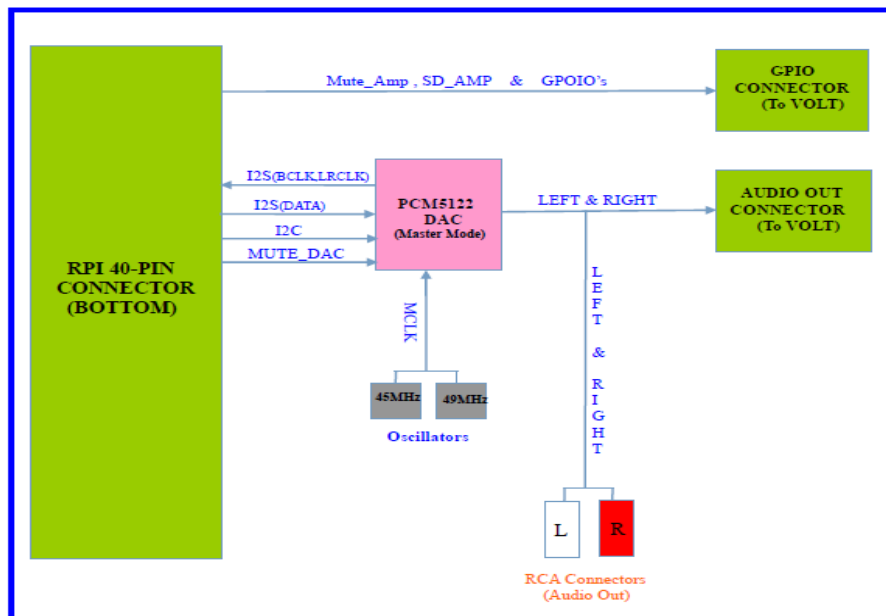
RPI	PIN	PIN	RPI
NC	1	2	DC +5V
SDA1-I2C	3	4	DC +5V
SCL1-I2C	5	6	GND
GPIO4	7	8	UART_TX
GND	9	10	UART_RX
GPIO17	11	12	I2S_BCLK
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
NC	17	18	GPIO24
SPI_MOSI	19	20	GND
SPI_MISO	21	22	GPIO25
SPI_CLK	23	24	GPIO8
GND	25	26	GPIO7
ID_SD	27	28	ID_SC
GPIO5	29	30	GND
GPIO6/DMUTE	31	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	RPI	RPI	RPI
5V	5V	5V	5V
NC	NC	NC	NC
GPIO4	GPIO4	GPIO4	GPIO4
GPIO17	GPIO17	GPIO17	GPIO17
GPIO27	GPIO27	GPIO27	GPIO27
GPIO24	GPIO24	GPIO24	GPIO24
GPIO22 / MUTE_AMP	GPIO22 / MUTE_AMP	GPIO22 / MUTE_AMP	GPIO22 / MUTE_AMP
GND	GND	GND	GND

BOSS J20 PIN OUT DETAILS (Allo VOLT Header)			
SIGNAL	SIGNAL	SIGNAL	SIGNAL
GND	GND	GND	GND
AUDIO LEFT	AUDIO LEFT	AUDIO LEFT	AUDIO LEFT
AUDIO LEFT	AUDIO LEFT	AUDIO LEFT	AUDIO LEFT
GND	GND	GND	GND

## BOSS Hi-Fi DAC BLOCK DIAGRAM



**Software Info:** Add "dtoverlay=allo-boss-pcm512x-audio" to config.txt