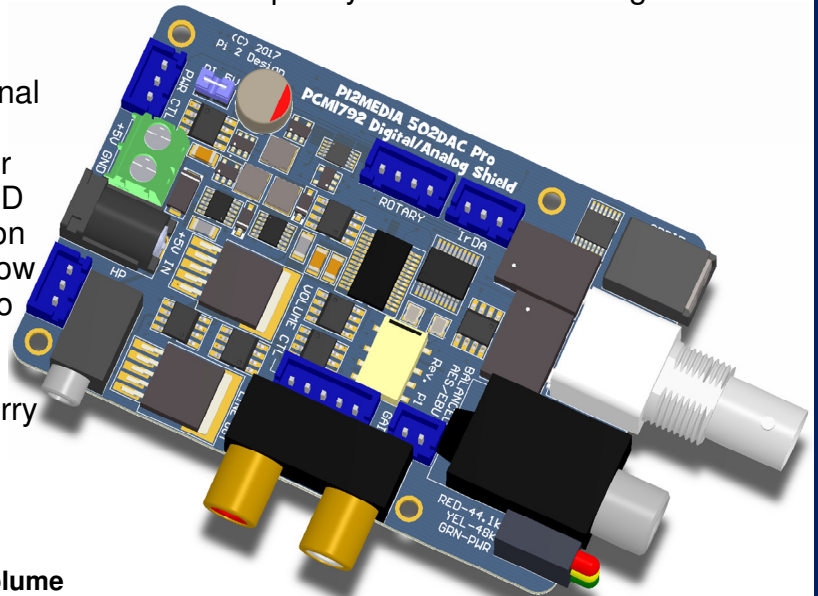# PI2MEDIA 502DAC Pro Audio Shield
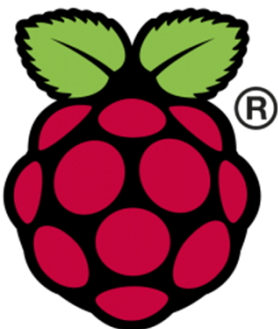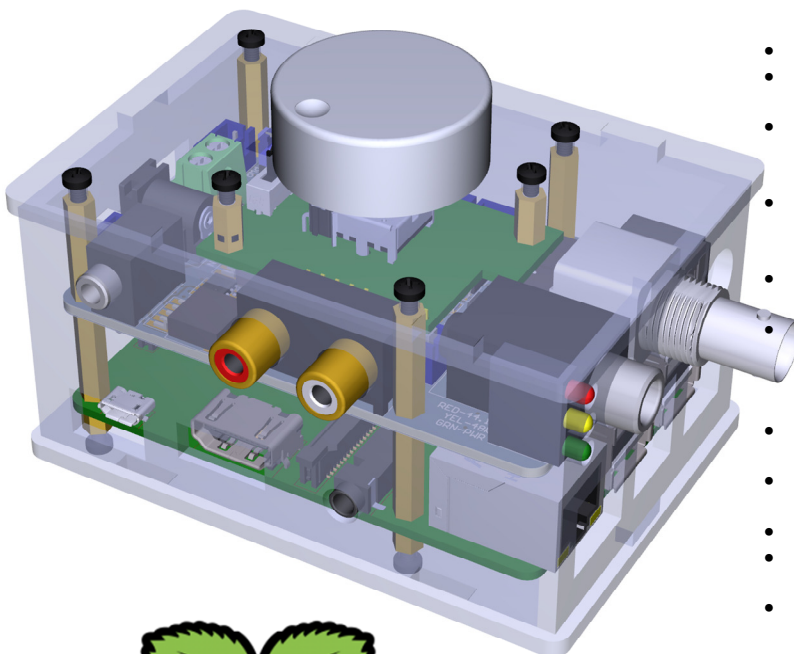
Introduction and Overview

The 502DAC Pro, designed and manufactured by Pi2Media (a division of PI 2 Design), is a professional I/O Shield designed to bring audiophile quality to the Raspberry PI ® family of Single Board Computers. The 502DAC Pro converts the Raspberry Pi ® I2S Port to High Resolution Pro-Audio, Analog and Digital.

The 502DAC Pro combines the Professional Grade 24-Bit@192Khz PCM1792 DAC, WM8804 Digital Audio S/PDIF Transmitter along with Ultra-Low Jitter NDK NZ2520SD Oscillators. The 502DAC Pro digital section delivers bit-perfect audio with THD+N below -144dB! The analog section provides up to 2Vrms at THD+N below -100dB.

The 502DAC Pro may be the last Raspberry Pi Audio Shield you will ever buy!
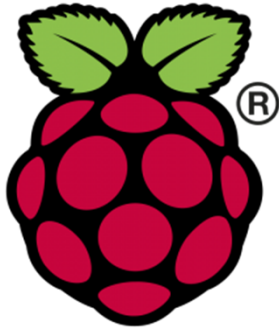
Acrylic Case w/Volume Control Board and Knob

Specifications and Features

- **FORM FACTOR –** Raspberry Pi ® Full Size Shield.
- **24-Bit DAC –** Professional Grade PCM1792 running in Slave Mode converts the I2S Stream to Analog at 24-Bit up to 192Khz
- **DIGITAL AUDIO** – Industry standard WM8804 running in master mode converts the I2S stream to Pro-Audio Standard AES/EBU and SPDIF formatted data at 24-Bit up to 192Khz Frame Rate
- **ULTRA-LOW NOISE CLOCKS** – Two NDK NZ2520SD Oscillators feed the WM8804 I2S Master to insure the lowest possible Jitter and Phase Noise
- **ANALOG OUT –** 2Vrms Stereo Line Out, buffered by a pair of LME49720's, is available via Dual RCA Gold Plated Jacks
- **HIGH POWERED HEADPHONE AMP** – A pair of LME49720 Op Amps and LME49600 Buffers drive up to 8V RMS @ 200ma and can handle high and low impedance headphones with ease. Integrated DC Servo protects Headphones from DC bias
- **BALANCED OUT –** Isolated Balanced AES/EBU Pro-Audio is via ¼" Connector, XLR Male Adapter included
- **COAX OUT -** A BNC COAX connector provides single ended, isolated S/PDIF with RCA Adapter included
- **OPTICAL OUT** – Via TX179 TOSLINK Transmitter
- **HIGH-PSRR LDO** – A Low-Noise Linear Tech LT3042 delivers 3.3V to all sections with 88db+ PSRR from 10hz to 100khz
- **EXTERNAL 5V** – This option allows the 502DAC Pro to be powered from an external low noise supply if desired
- **EXPANSION CONNECTORS** – A number of JST XH connectors allow access to functions and GPIO for IrDA, Rotary and Power Control.

Pi 2 Design

www.Pi2Design.com

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External 5V Input

Backpower Protection Circuit

2.5MM DC Jack

2-POS Screw Terminal

LT3042 ULTRA-LOW NOISE LDO → +3.3V

3-PIN XH

3.5MM Headphone Jack

LOW NOISE SPLIT RAIL SUPPLIES +/- 12V

LME49720 w/LME49600

LME49720 w/LME49600

5-PIN XH

LEFT OUT +/-
RIGHT OUT +/-
MUTE IN
I2S OUTPUT
I2C CONTROL
MCLK IN

PCM1792 24-Bit 192Khz DAC (Slave Mode)

LME49720 I/V & LOW PASS FILTER

LME49720 I/V & LOW PASS FILTER

BLACK RCA JACK

RED RCA JACK

NDK NZ2520SD 24.576Mhz

NDK NZ2520SD 22.792Mhz

EN
EN
+3.3V

LED

RS422 Differential Driver

6.35MM/¼'' Neutrik Jack

Line Driver

75 OHM BNC

XCLK IN
MCLK OUT
I2C CONTROL
SPDIF OUTPUT
I2S INPUT

WM8804 24-Bit SPDIF Transmitter (Master Mode)

TX179P TOSLINK

USB-A HOST / USB-A HOST / USB-A HOST / USB-A HOST

10/100 RJ45 w/Transformer

40-Pin Expansion Header

+5V
GPIO 6
GPIO 5
I2C
I2S Slave Mode
GPIO 23, 24, 27
GPIO 25
GPIO 4, 17, 22

40-Pin Socket

Raspberry Pi ® w/40-PIN GPIO Header

HDMI

Rotary SW. 4-PIN XH

IrDA 3-PIN XH

PWR CTL 3-PIN XH

502DAC Pro
BLOCK DIAGRAM