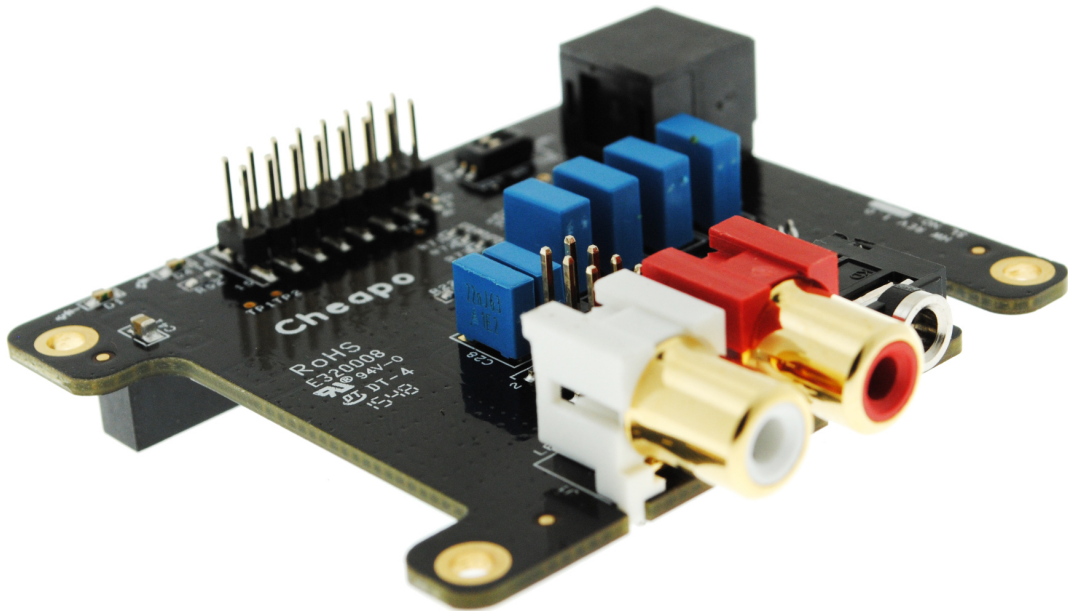


CHEAPO

Technical Manual



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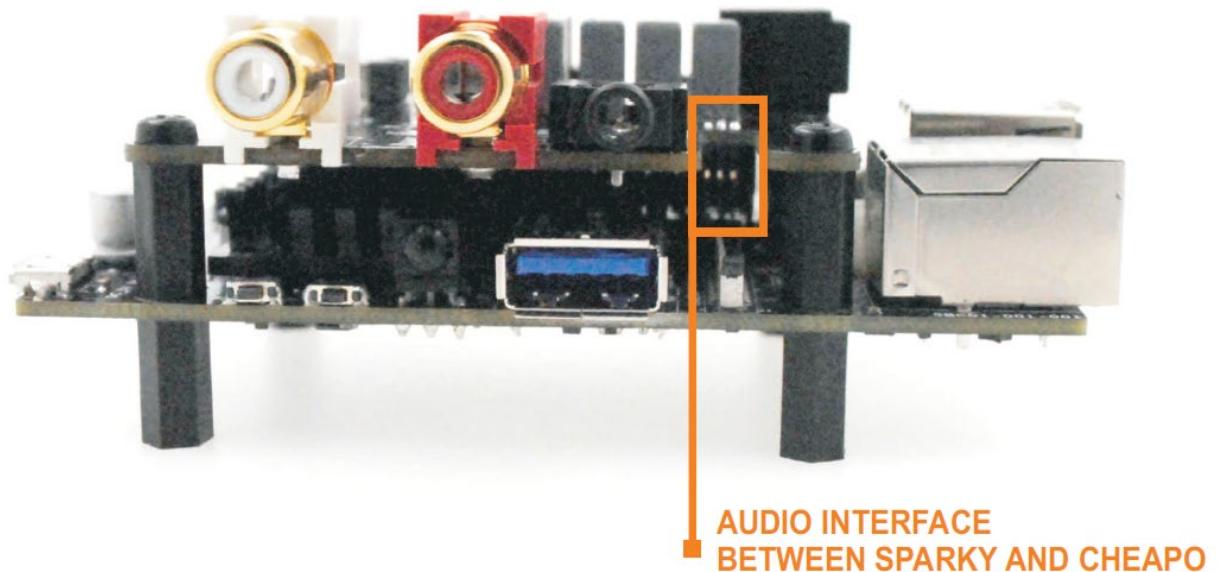


Figure 1: Sparky SBC + Cheapo

CHEAPO Features:

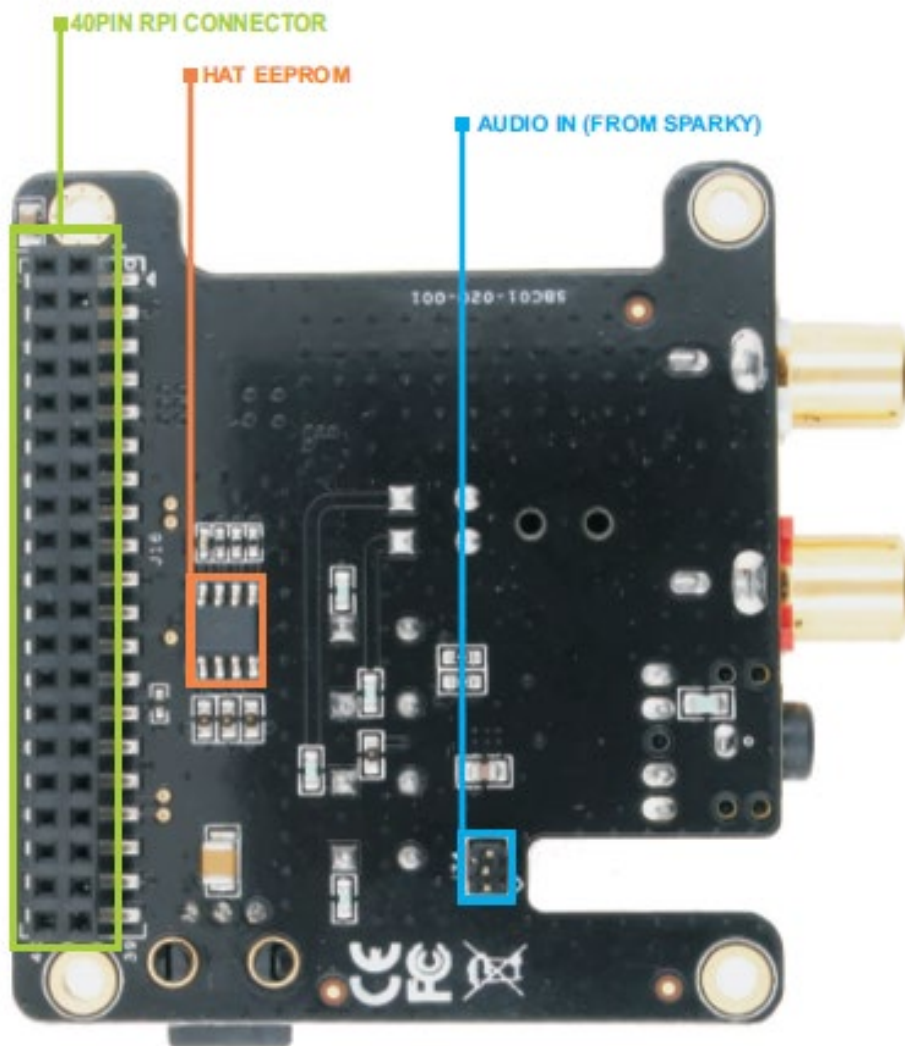
- 192 kHz high-quality DAC out from Sparky board for best sound quality
- 138mW Direct Path™ Stereo Headphone Amplifier TPA6133A2
- Available with different output connectors: RCA, 3.5mm phone jack, Optical
- TOSLINK transmitter (S/PDIF)
- Stereo DAC out SNR is >98dB and THD is <-80dB
- Stereo Headphone Output Power is 138mW
- Stereo Headphone Half Power THD + N @ 1 kHz (%) (KHz) is 0.008
- Stereo Headphone SNR is 93dB
- Stereo Headphone PSRR is 109dB
- Sampling Frequency ranges from 8 kHz to 192 kHz
- Small X2SON Package Ultra-low-noise voltage regulator for optimal audio performance
- Integrated EEPROM for automatic configuration (with write-protection)
- Operating Temperature Range is -25C to 85C
- The Cheapo board size: LWH = 68.7mm * 67.1mm * 23.1mm

Cheapo is an Analog & S/PDIF Audio Interface Shield to Sparky SBC

The Cheapo takes the analog audio signal (L&R) from the Sparky built in DAC through the 3 pin on board header, delivers variable output analog audio to the Cheapo RCA connectors. The Cheapo also, via the Texas Instruments TPA6133A2 headphone amp, supports the direct use of headphones via the Cheapo's 3.5mm audio jack. I2S supports sample rate 192k/96k/48k/32k/24k/16k/12k/8k/88.2k/176.4k/44.1k/22.05k/11.025k.

The Cheapo takes S/PDIF Digital audio signal out from the Sparky SBC through the 40 pin header and out through TOSLINK connector. S/PDIF supports sample rates of 96k/48k/44.1k/32k, biphasic format stereo audio data output. S/PDIF is used to transmit digital signals of a number of formats, the most common being the 48 kHz sample rate format used in DAT and the 44.1 kHz format used in CD audio.

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 Cheapo.



Bottom Side of Cheapo

CHEAPO Header PIN-Out Details

CHEAPO - 40 Pin Bottom Connector			
Sparky signal	PIN	PIN	Sparky signal
3V3	1	2	DCIN +5V
I2C -2 SDA	3	4	DCIN +5V
I2C -2 SCLK	5	6	GND
GPIOB14	7	8	UART5_TX
GND	9	10	UART5_RX
GPIOB15	11	12	I2S_BCLK0
GPIOB16	13	14	GND
MUTE_AMP	15	16	SDZ_AMP
3V3	17	18	GPIOB30
I2C-3 SDA/SPI0_MOSI	19	20	GND
SPI0_MISO	21	22	GPIOB12
I2C -3 SCLK/SPI0_CLK	23	24	SPI0_SS
GND	25	26	S/PDIF
I2C-1 SDA	27	28	I2C -1 SCLK
I2S_MCLK0_2	29	30	GND
GPIOB18	31	32	SD_HEAD (GPIOB3)
GPIOB4	33	34	GND
I2S_LRCLK0_2	35	36	GPIOB13
GPIOB19	37	38	I2S_DIN_2
GND	39	40	I2S_DOUT_2

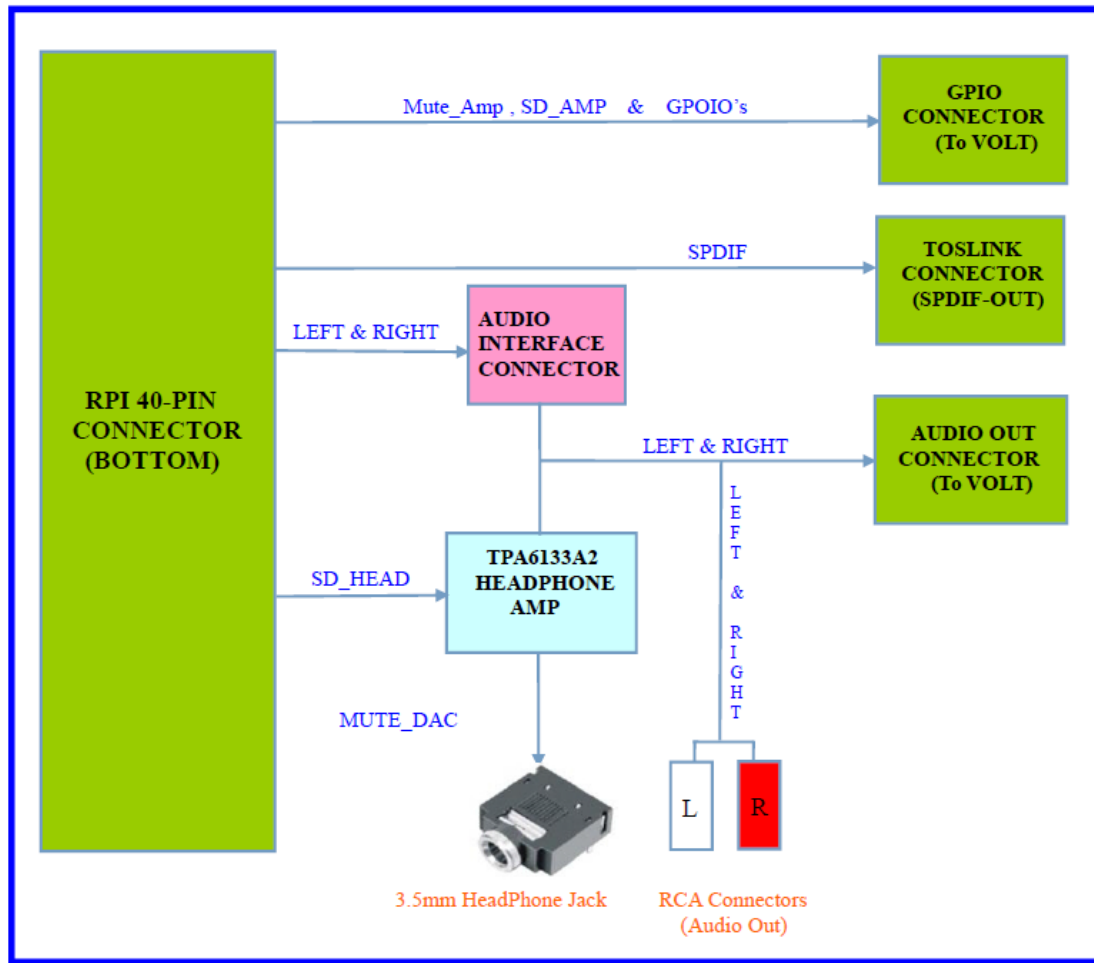
** Highlighted signals are used by cheapo board

CHEAPO - J24 Header (3 PIN Header - Bottom)	
SIGNAL	PIN
AUDIO LEFT	1
GND	2
AUDIO RIGHT	3

CHEAPO - J19 PIN OUT Details					
RPI	SPARKY	PIN	PIN	SPARKY	RPI
5V	5V	1	2	5V	5V
NC	NC	3	4	NC	NC
SDA1-I2C	TWI2_SDA	5	6	GPIOB14	GPIO4
SCL1-I2C	TWI2_SCK	7	8	GPIOB15	GPIO17
NC	NC	9	10	GPIOB16	GPIO27
NC	NC	11	12	GPIOB30	GPIO24
GPIO23	SDZ_AMP	13	14	MUTE_AMP	GPIO22
GND	GND	15	16	GND	GND

CHEAPO - J20 PIN OUT Details			
SIGNAL	PIN	PIN	SIGNAL
GND	1	2	GND
AUDIO RIGHT	3	4	AUDIO LEFT
AUDIO RIGHT	5	6	AUDIO LEFT
GND	7	8	GND

CHEAPO Block Diagram



LED STATUS:

Green LED'S - Indicates Power up and SD (headset shut down) status - always glow

POWER (5V):

No need to connect extra power source to CHEAPO board, 5V power will source from SBC through 40 pin header

SWITCHES:

HAT: switch SW1 position 1 is NC

Position 2 change to

- ON position for HAT eeprom write protect disabling
- OFF for enable (default state)