AUDIOPHONICS ReceiverPi Pro SPDIF HDMI Interface Receiver User Guide

Contents

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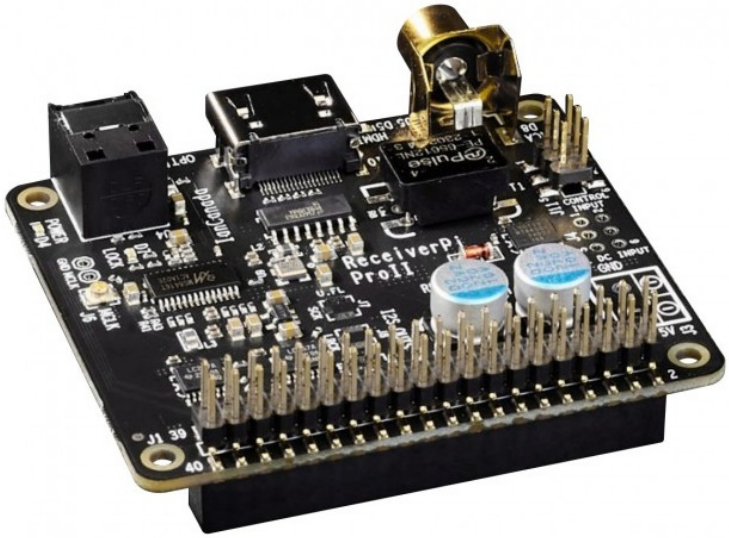


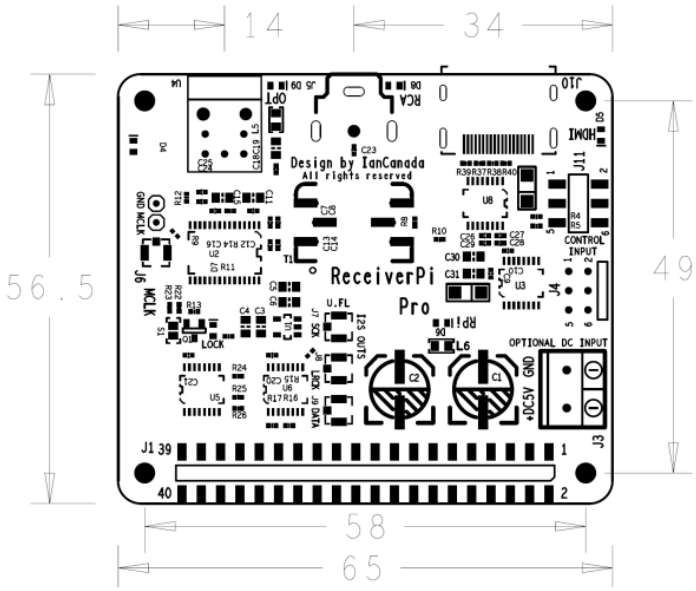
A.Introduction

ReceiverPi Pro is designed for Raspberry Pi based DACs or streamers to extent the ability of playing digital music from multiple sources additional to RPi itself, such as CD/DVD player/transport, TV, TV box, Mac, PC, USB streamer and so on. ReceiverPi can take digital music signals from four inputs: RCA (S/PDIF coaxial), OPT(S/PDIF Toslink), HDMI (I2S/DSD lvds) and GPIO of RaspberryPi.
ReceiverPi Pro can be integrated seamlessly with StationPi Pro and the optional touch screen controller.

B. Highlighted Features and Specifications

- RCA (75 ohm coaxial cable) S/PDIF input up to 192KHz, isolated
- Optical S/PDIF input up to 192KHz
- I2S/DSD over HDMI input up to 768KHz PCM and DSD1024
- I2S/DoP input from RPi GPIO up to 768KHz and DSD1024
- Can be automatically switched to selected S/PDIF source if valid signal is present
- Reserved GPIO port for possible Linux/Web based software control
- Can run RPi DACs or external DACs even without a RPi (RPi free mode)
- Can be easily configured as S/PDIF FIFO by integrating together with FifoPi and TransportPi
- Can be easily configured as HDMI transport by integrating with HDMIpi or TransportPi
- Possible to have independent DC power input
- Optimized for StationPi pro
- DIY friendly and plug and play

C. Layout and Dimensions (in mm)



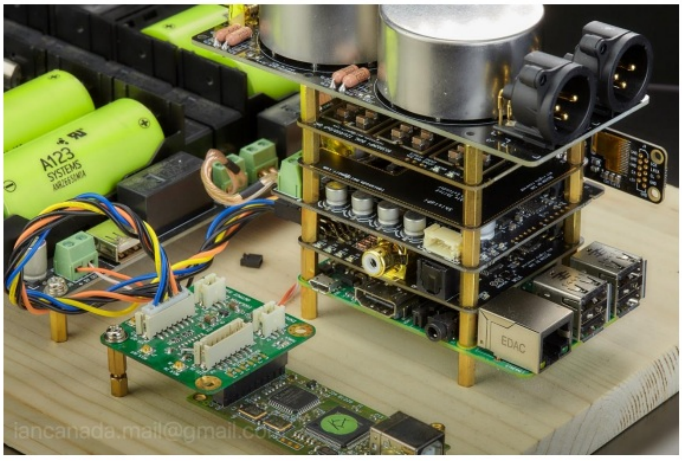
D. Getting start with StationPi pro

1. Upside down the ReceiverPi Pro and then plug it into J1 and J10 of the StationPi pro.
2. Build the rest of the system
3. Control the ReceiverPi Pro by the StationPi touch screen controller or manually from J14 on the StationPi Pro.

E. Works without a StationPi Pro

1. Make sure your RPi DAC stack is working and playing music normally. Power off before going to next step.
2. Install the ReceiverPi Pro onto the GPIO port of the RaspberryPi. And then install the rest of your system (FifoPi or DAC HAT and so on) on top of ReceiverPi Pro through GPIO port. Make sure all other connectionsare connected as same as before. Power on your system as usual.
   Note: Please don't try any master mode DAC with ReceiverPi Pro. By principle, no master mode DAC canwork with S/PDIF music and external I2S/DSD streamer. They can only work with the music source that thecontrol software is running at, which is one of the disadvantages of all this kind of DACs.
3. Select correct music source by J11 or J4.
4. . Enjoy the music.Please Note: With FifoPi installed in the system, OPT and RCA will have no difference in sound quality. However,

OPT has better isolation performance, while RCA is better for high Fs.



A full system configured of a high quality audiophile DAC

1. RaspberryPi
2. ReceiverPi Pro
3. FifoPi
4. ShieldPi
5. ESS9038Q2M dual mono DAC
6. Transformer I/V stage

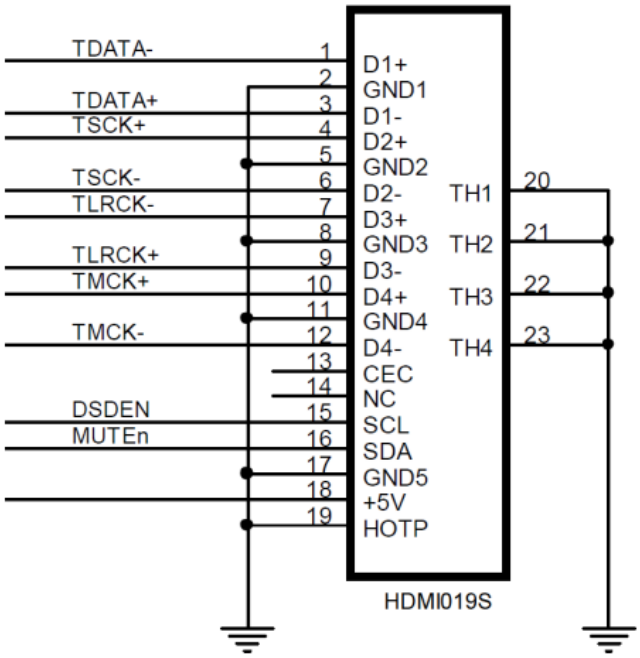
Note: LifePO4 power supply with ultra capacitor conditioner upgraded is highly recommended for best possible sound quality

F. Works as a S/PDIF FIFO or HDMI FIFO

1. Install a FifoPi Q3 on top of the ReceiverPi pro
2. . Install a TransportPi MKII on top of the FifoPi Q3 and connect the MCK u.fl cable
3. Power FifoPi Q3 with a digital 5V power supply and a clean 3.3V power supply

G. Connectors

U4: Optical S/PDIF input
Have to leave the Pin17 of the multi-function connector J4 open (default) to select this optical input as the S/PDIF source. U4 is a standard TOSLINK optical connector.
J5: RCA coaxial S/PDIF input
Have to bridge the Pin17 and Pin18 (GND) with a shunt jumper on the multi-function connector J4 to select this RCA input as the S/PDIF source.
J10: I2S/DSD over HDMI input
ReceicerPi Pro takes I2S/DSD over HDMI in PS audio configuration



J6: MCLK output in u.fl coaxial cable socket

This MCLK is enabled only when valid S/PDIF is in receiving. Lock LED should be lit at same time. FifoPi doesn't need this MCLK signal to function. So normally we don't need J6. It is just for optional

J11: Music sources selector

Music source selection	1-2	3-4	5-6
GPIO (RPi)	OPEN	X	SHORT
HDMI	SHORT	X	SHORT
RCA S/PDIF	X	SHORT	OPEN
OPT S/PDIF	X	OPEN	OPEN

J4: Optional music sources selector

Pin to pin equivalent to J11. Can install a right angle DIP connector or solder the control wires directly to.

40 pin GPIO connectors

pin numbers	**J2** 40 PIN GPIO connector to board below (Normally Raspberry Pi)	**J1** 40 PIN GPIO connector to HAT on top (FifoPi or DAC or other audio board)
1,17	3.3V from preceding board	3.3V from preceding board
2,4	5V from preceding board	5V from preceding board
6,9,14,20, 25,30,34, 39	GND	GND
12	SCK input	SCK output
35	LRCK/DL input	LRCK/DL output
40	SD/DR input	SD/DR output
3	I2C DA	I2C DA
5	I2C CL	I2C CL
8	TXD0	TXD0
10	RXD0	RXD0
All other pins	same pin from preceding board	same pin from preceding board

Note: All input/output signals on the GPIO connectors are in LVTTL (3.3V) logic level except power and ground.

I2S/DSD outputs in u.fl

J7: SCK
J8: LRCK/DL J9: DATA/DR
Note: I2S/DSD outputs in u.fl have better signal quality. So u.fl coaxial cables are highly recommended to connect to external digital audio devices.

J3: Optional independent DC power input

If don't want to take power from GPIO, you can connect a 5V DC / 100mA (minimum) power supply to this 2-pin 5.0mm terminal J3. MAINTAINING CORRECT POLARITY!!! Low noise linear 5V power supply will be good for ReceiverPi Pro. Direct-connected 3.3V ultra capacitor / LifePO4 battery power supply can also be used.

J3 was not installed by default. L1 (at bottom side of the PCB) needs to be removed if you don't want new DC power being connected to GPIO. No need to remove L1 if ReceiverPi Pro works independently without plugged into GPIO.

A.LED indicators

D4: Power indicator, indicating that ReceiverPi Pro is powered
D7: Lock indicator, indicating that valid S/PDIF is received and locked. Either OPT or RCA D9: OPT indicator, indicating that valid S/PDIF signal in OPT is received and switched to D8: RCA indicator, indicating that valid S/PDIF signal in RCA is received and switched to
D6: RPi indicator, indicating that ReceiverPi Pro outputs are currently switched to RPi GPIO input D5: HDMI indicator, indicating that ReceiverPi Pro is currently switched to HDMI I2S/DSD input

B. Application notes

1. How to setup the auto S/PDIF selection function?

ReceiverPi Pro can work in auto S/PDIF selection mode. In this mode, when selected S/PDIF source, such as a CD player is turned on and playing music, the ReceiverPi Pro's will be automatically switched to the S/PDIF source. To enable this auto S/PDIF mode, you need short S1..

2. How to upgrade or remove the S/PDIF isolation transformer?

The S/PDIF transform T1 is installed by default for additional safety and ground isolation.
S/PDIF signal quality can be improved if better transformer is used. To upgrade this transformer you just need to remove T1 and then solder a better one to the PCB. Please make sure the orientation is correct.
Note: With FifoPi installed in your system, finial sound quality may not have business with the transformer.

3. How to use independent DC power supply?

The ReceiverPi Pro was designed to take 5V power from GPIO. With FifoPi installed in the system, ReceiverPi Pro's power supply may not affect the finial jitter performance. However real listening test shows that better power supply before FifoPi can still make slightly improvement to the finial sound quality. Because of the overall EMI noise can still have chance to be reduced when good power supply is used.

To use independent DC power, you will need:

3. Solder the supplied DC connector to the position of J3.
4. Remove FB L1 at bottom side of PCB if you don't want this power supply to be connected to
5. Feed a good 5V linear/ultra capacitor voltage rail or a 3V LifePO4/ultra capacitor rail to J3.

About the possible software control

ReceiverPi Pro can use three reserved GPIO pins for possible Linux/Web based software control.
To do so, you will need short R34, R35 and R36 with 0 to 50 ohm 0805 resistors or just jumper wires. The GPIO

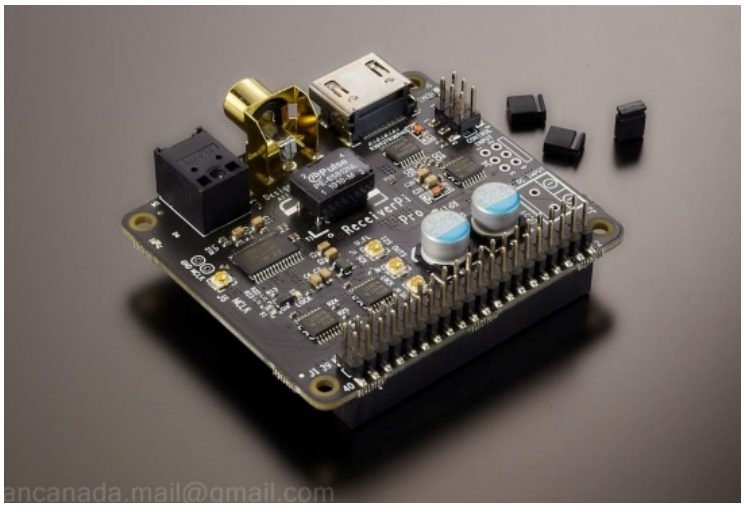
pin numbers and control logic are listed as below:

GPIO pin number	Signal name	Resistor	Control logic
GPIO27	PCM or S/PDIF	R36	High: to select S/PDIF sources Low: to select PCM sources
GPIO17	S/PDIF selection	R35	High: OPT is selected as S/PDIF input Low: RCA is selected as S/PDIF input
GPIO4	PCM selection	R34	High: RPi GPIO is selected as PCM input Low: HDMI is selected as PCM input

Please note:

1. No any official control software is provided so Users need to write code by themselves or use the possible third party software.
2. J4 and J11 have to leave open after R34, R35 and R36 are

C.Pictures ReceiverPi Pro



A.History of revising

Apr. 8, 2022 Ver. 2.0 released

Documents / Resources

	**AUDIOPHONICS ReceiverPi Pro SPDIF HDMI Interface Receiver** [pdf] User Guide ReceiverPi Pro, ReceiverPi Pro SPDIF HDMI Interface Receiver, SPDIF HDMI Interface Receiver, HDMI Interface Receiver, Interface Receiver, Receiver