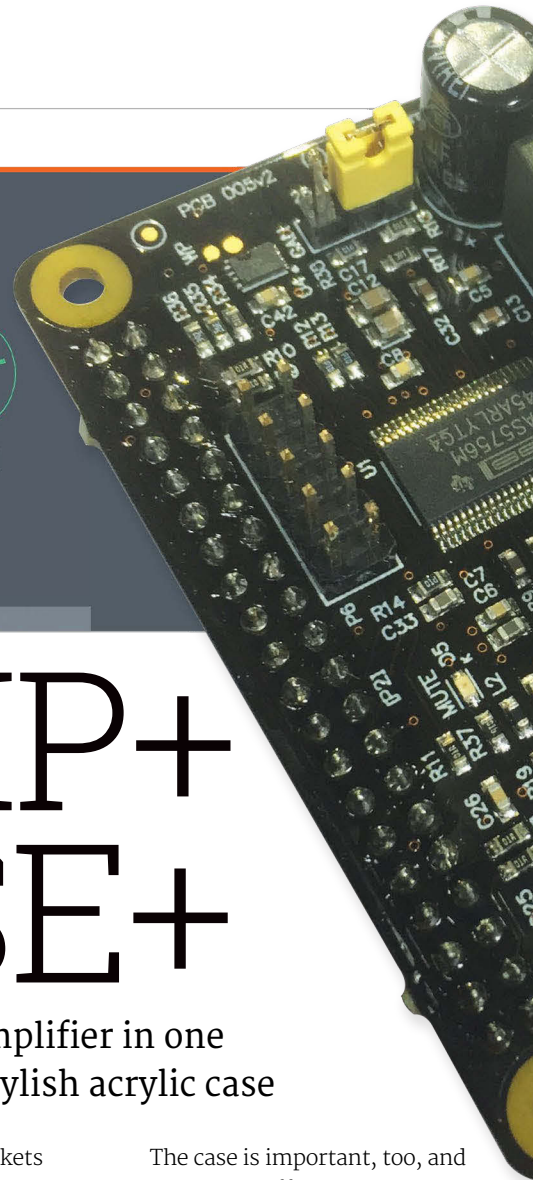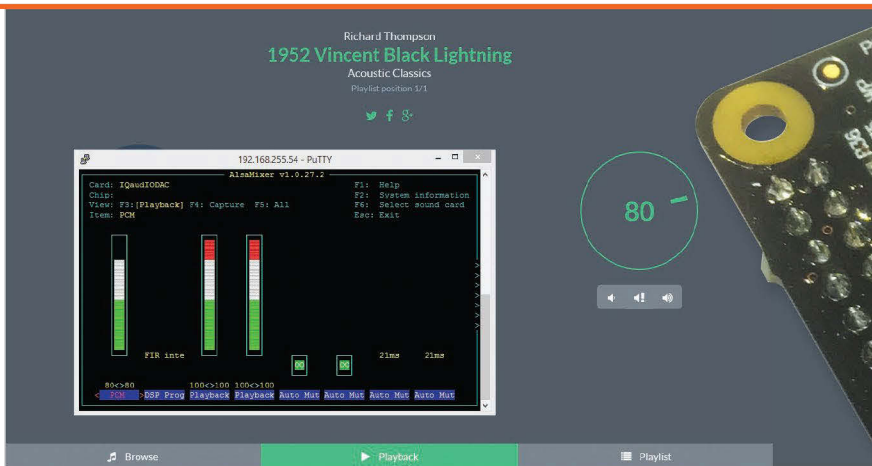## Maker Says

❝ A full-HD audio quality DAC and amplifier for the Raspberry Pi
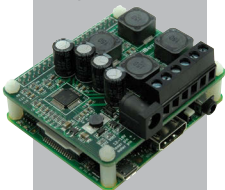**IQaudIO**

# PI-DIGIAMP+ WITH PI-CASE+

Just add speakers: a complete hi-res audio DAC and amplifier in one small board, no soldering required, with an optional stylish acrylic case

**A** Raspberry Pi makes a great audio streaming device, and with the right add-ons is capable of high-end performance as well as being cheap and convenient. The Pi has its own basic on-board audio, but for the best sound you need either an external USB DAC (digital to analogue converter), or an add-on board. An add-on is preferable, since it will use the Pi's I²S interface, a dedicated digital connection that avoids USB and reduces CPU load. IQaudIO already offers a DAC (the Pi-DAC+), as well as a second board (Pi-AMP+) which provides a 2×20W Class D amplifier on a board that mounts on the Pi-DAC+.

Now the firm has combined the two products into the Pi-Digi-AMP+, a single-board solution which also saves around 30% compared to buying the two previous products. The DigiAMP+ is based on the Texas Instruments TAS5756M chip and supports up to 24-bit/192kHz PCM audio. It is not all gain: you lose the

line out and headphone sockets which you get with the Pi-DAC+. The result is still spectacular, though: a complete audio streamer to which you only need add speakers and your preferred music source, such as Logitech Media Server, Apple AirPlay, Spotify, or simply an attached hard drive full of music.

The Digi-AMP+ can also be used in other projects where you need audio, such as in-car entertainment, custom digital jukeboxes, robotics, and more. The board is HAT (Hardware Attached on Top) compliant, which means it complies with the official Pi recommendation for size and auto-configuration.

The Pi does not supply enough power for an audio amplifier, so the DigiAMP+ requires an additional 15V power supply, such as the XP Power VEH60US15 available from IQaudIO. This also powers the Pi itself, and it is important NOT to connect USB power as well, once the DigiAMP+ has been fitted.

The case is important, too, and IQaudIO also offers a good-looking acrylic case which has cut-outs for the speaker and power connections.

## Getting started

Assembling the DigiAMP+ is a matter of screwing four spacers to the Pi, mounting the board, and securing it on the spacers with screws. Note that if you are using the IQaudIO case, you also need four small spacers which fit on the underside of the Pi. We were using the case, so the next thing to think about is fitting the assembled unit into the case and attaching the speaker cables.

This is a slightly tricky operation, the reason being that the speaker cables are secured with small screws that are not accessible once the top of the case is fitted. Just to make this more fun, the case is a jigsaw-like construction that falls apart until the top is fitted, which is why the guide suggests

**Pi-DigiAMP+ £50/$77 · Pi-CASE+ £15/$23
15V/60W power supply £21/$32**
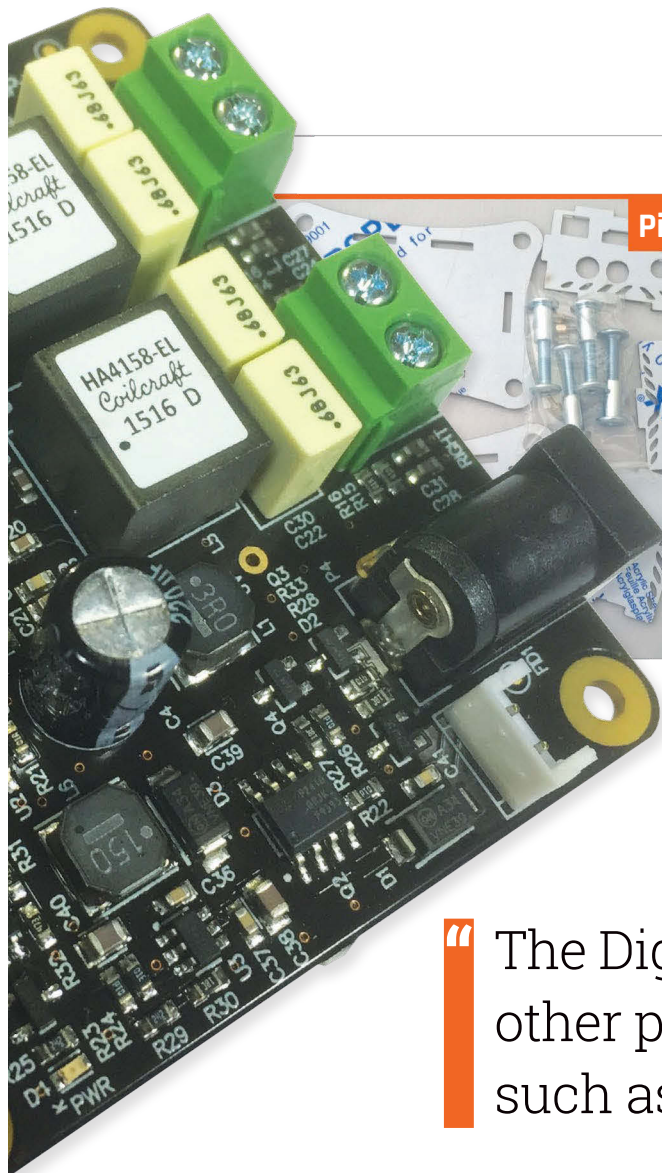


**Far Left** Volumio running with the DigiAMP+, also showing the AlsaMixer control panel running over SSH

**Above** The DigiAMP+ assembled with the Pi-Case, showing the attached speaker cables and power supply

> " The Digi-AMP+ can also be used in other projects where you need audio, such as in-car entertainment "

that you use tape to hold the case together temporarily.

It is not too difficult, but we don't really like the way the speaker cables attach in combination with this particular case. The terminals are on the small side (you can forget your chunky audiophile speaker cables), but more importantly, you have to remove the top of the case if you want to change or remove the cables, whereupon it falls apart. A better solution would be binding posts on the outside of the case, though this would add to the cost. The Pi's microSD card is also hard to fit once the case is assembled, so it's best to get this all in place first.

## Playing music

On the software side, IQaudIO offers suitable Pi OS images on its site; there is also documentation to configure your existing installation. In our case, we were already using Volumio

1.55, a popular streaming client, which includes IQaudIO drivers. Configuration was a matter of booting the Pi, connecting the Volumio's browser-based user interface, and enabling I²S support with the IQaudIO DAC+ driver.

There was one other thing, which was a slight annoyance. The DigiAMP+ starts up muted, so you do not get any music until you have made an SSH connection to the Pi as root and run a script. The problem is that without this feature, you may get a loud start-up thump to your speakers. You can add the script (which is on the IQaudIO site) to /etc/rc.local if you want it to run automatically. While you are there, you should also run AlsaMixer and set the two Playback volumes to 100%.

With all that in place, we plugged in the speakers (a pair of classic Quad bookshelf models), browsed back to Volumio, and started playing music. The Volumio

volume control worked fine with the DigiAMP+, using the optimal 'hardware' setting.

And how is the sound? In a word, great. This is real hi-fi, not just a cheap and cheerful streamer. We compared it to a Squeezebox playing through a traditional integrated amplifier and felt that, if anything, the DigiAMP+ beat it on clarity, with the Squeezebox sounding slightly soft in comparison. The DigiAMP+ goes loud, too: not enough for a wild party or room-shaking bass, but plenty for day-to-day listening.

## Last word

This is true hi-fi in a compact and good-value package. The results are superb, though with a few small annoyances and no headphone socket.

★★★★☆