

# BUILDING IQAUDIO

It started at a hacking event in Edinburgh, now IQAudio is bringing high-end audio within the reach of any Pi owner. Founder **Gordon Garrity** explains how it all happened

**I**QAudio ([iqaudio.co.uk](http://iqaudio.co.uk)) is a small company which makes Raspberry Pi audio add-ons, including the Pi-DAC+ and Pi-DigiAMP+ cards which convert a Pi into a high-quality audio source. But how did it all start?

“My background is software development and I did computer science at university,” says founder Gordon Garrity. “I came across a job posting for software development director at Simple Audio, a hi-fi company in Glasgow. It put two of my passions together, software development and hi-fi.

“Eben Upton [Pi founder] was at the Edinburgh Music Hack as

a sponsor. The Pi had just been launched and Eben was providing five or six Raspberry Pis to the hacking community. I was sitting next to him in one of the lectures, said that I worked for Simple Audio and that it would be great to get some music onto Raspberry Pi. He said yes, cool, carry on and let us know what happens. He has been very supportive because we are bringing a real use to the Pi.

“Simple Audio was sold and I decided that I wanted to work on the Pi. My daughter was going to university and she wanted to have some high-quality music playback. I didn’t want to spend £700 on a hi-fi system for her.

“There were two or three of us sitting around a dining room table having curry and chilli for a few nights, coming up with ideas, and we put some prototypes together.

“From initial concept to having a prototype was relatively quick; the problem was the software. At the time, there was no solid and reliable digital audio driver for the Raspberry Pi. There was a student in Germany, Florian Meier, who was doing his thesis on digital audio playback. He wrote the I<sup>2</sup>S drivers for the Raspberry Pi, and that was the real enabler.”

The I<sup>2</sup>S interface enables audio to be passed between devices without using USB. “The disadvantage of using USB on the Pi is that the USB and the Ethernet share the same bus,” says Gordon. “Transferring files to the Pi, such as connecting to a NAS, takes bandwidth away from the processor. This was especially important when the Pi was a single-core processor. Now with a quad-core processor, it is a bit less of a problem, but still important.

“We worked with Florian, we sent him some prototypes; we then worked with some of the other community members. It was all done with a community spirit.

We shared our hardware, and that was how we got device drivers and support into software packages such as RuneAudio, Volumio, Pi MusicBox, and Moode Audio.





## Working weekends

“It took six to twelve months of working evenings and weekends because we didn’t have the money to throw at this at the start. Other individuals and companies were doing similar things and as to who was first, it was too close to call. But the market is big enough, we have our own niches.”

IQaudio may be a limited company, but it is still a part-time affair. “We all have full-time jobs,” reveals Gordon. “It is very much a family event. My wife handles all the sales and the shipping, and whenever the kids are on holiday, I have them putting packets together.”

“IQaudio is not just one person. There are three or four of us involved. I have the support of a manufacturer, a couple of hardware designers, a software engineer, and my family too.



## CAN THE PI DISRUPT THE AUDIO INDUSTRY?

A Raspberry Pi with a high-quality audio card can sound as good as much more expensive specialist audio products. Is this having a disruptive effect on the industry? Gordon Garrity does not think so.

“I think the Pi itself is pretty insignificant at the moment in the hi-fi industry,” he says. That said, the Pi with its highly active community has some advantages over the big names. When the BBC changed its streaming services, abandoning most of its SHOUTcast streams, some were caught out. “You see some well-known companies still not being able to deliver a firmware update that allows people to listen to BBC radio

stations. Whereas on the Pi the community had got it sorted within a couple of weeks. People that were using Pi-based music were then in advance of those who had purchased high-end commercial solutions.”

The Pi does have a problem when it comes to supporting proprietary systems like Spotify Connect or Apple Music. “The problem is getting the support of those streaming companies when they are already working with consumer electronics manufacturers who bring them many more customers. Their focus will not necessarily be aligned with the community focus on that,” says Gordon.

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What’s next? “We have a roadmap. We are looking at maybe turning the Raspberry Pi into more of an audio system. It would be great to be able to offer a kit that could be put together as part of a hobby, and that looks good as well.”

What about the industry drive towards high-resolution audio? “This can turn into a religious war,” Gordon tells us. “What is important is that people enjoy the music. The whole end-to-end chain needs to be good. If you have got good-quality audio, then we are

not going to detract from that with the DAC and the DigiAMP. We try to keep the component count and signal lengths as low as possible.

“There will always be specmanship. Rolls-Royce always said that the performance of their engines was ‘adequate’. Going up to 32-bit and 384MHz is fine, but we are approaching specmanship at that point. The hardware we use already supports that bitrate and frequency, but the underlying operating system and drivers are not necessarily there, and the

chances of customers having such source material is diminished. We need to hit the sweet spot, and that is 44.1MHz and above.

“We are continuing to monitor the hardware manufacturers. I am ex-Texas Instruments, and one of the reasons we brought the DigiAMP+ to market was that it uses a new TI chip.

“We are interested in what is happening in the music industry as well. We have got interest from some new players in the market – I can’t mention any names.”