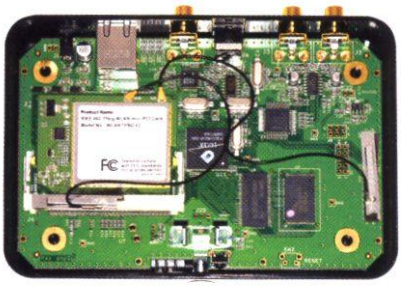
Big Squeeze

Neville Roberts takes the already fine sounding Logitech Squeezebox Duet network music player to a higher level by the simple expedient of tweaking some of its electronic components..

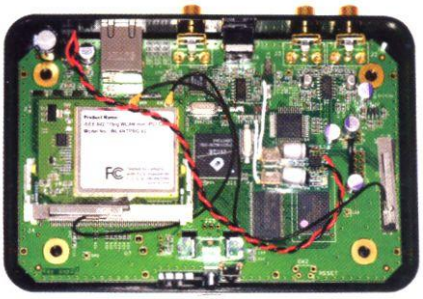
The world turns, and hi-fi moves with it. In the past couple of years we've seen ever more interest in streamed music, with a host of network music players popping up – one of the latest and most easily accessible being Logitech's Squeezebox Touch. Another very popular model is the Duet, from the same company, which despite the different user interface is a very similar thing – basically a good entry level machine with none too much attention paid to the finer details of the sonics.

If you've used and enjoyed your Squeezebox, you may find yourself wanting more. Well, the good news is that there's no need to start saving up for your £10,000 Linn Klimax DS *just* yet, as the Squeezebox is tweakable, just like your budget CD player. The judicious application of a soldiering iron and some choice passive components won't *quite* knock the Linn in to a cocked hat, but it will make what you've already got a far more enjoyable experience – one that sounds less like hi-fi and more like music.

Inside view of an unmodified Squeezebox Duet receiver...



...and the modified receiver inside.



The difference between the new Touch model and the older Duet is that the former is a one-box unit that has the receiver and display together and can accommodate 24bit 96kHz sampling in native mode (i.e. formats up to this resolution do not need to be transcoded down before streaming to the receiver by the Squeezebox Server software). The older Duet however, as the name implies, has two units; a wireless remote control display and a receiver, which can only handle 24bit 48kHz files before transcoding is required. If you're not a prodigious hi res user then the latter is something of a bargain – it can now be picked up for a song (new or secondhand) and as I found, responds well to some choice modding...

Although there are various companies now offering Squeezebox mods packages (and indeed new 'off-the-shelf' modded Squeezeboxes), I opted to invoke the spirt of *Hi-Fi World* and do the mods myself. So I was interested to find that the ever-tweaky Fidelity Audio are happy to supply individual items for the soldiering iron wielders among us, and so that's who I used to source my componentry!

BREAKING IN

The first task was to remove the lid from the Squeezebox Duet's receiver unit to see what was inside. Peeling back the four corners of the self-adhesive mat on the underside, reveals the screws that are removed to loosen the lid. This exposed the modern printed circuitboard (PCB), which alas sported an array of surface-mounted devices (SMDs). Well, I wasn't expecting tag strips, but I had hoped for a more conventional design with plated-through holes and components soldered on the underside! Removing SMDs from a PCB is somewhat challenging, but more about that later...

The standard Duet receiver, being very competitively priced, has to keep discrete component count to a minimum where possible. There are only three electrolytic capacitors in the receiver: one 220µF for the DC input bypass and the other two are 10µF used to couple the output analogue audio from the Wolfson WM8501 DAC to the phono sockets. The remainder of the essential power supply decoupling capacitors are all low value SMDs. The 9V input power is provided by a 'wall-wart' switched-mode power supply and is dropped down to the 5V required to power the DAC by a SMD 7805 regulator on the PCB.

As with good comedy, the secret of good digital reproduction is in the timing – so the clocks were in my sights for upgrading, along with the power supply. Fidelity Audio supply a number of clock modules, including a Micro Clock for £89, which is designed for use in the Duet receiver and features dual oscillators and split low noise 3.3V rails. They will also supply a set of six Oscon 470µF 6.3V electrolytic capacitors at £2.65 each for additional power supply decoupling, plus a Rubicon 1,000µF 16V to go across the 9V DC input.

INITIAL LISTENING

Before getting carried away with my soldering iron, I carried out some listening tests with the unmodified receiver. I had a few digital master recordings at high resolutions and bitrates, as well as a set of the Bach Brandenburg Concertos performed by Musica Florea. The latter

recording is available as a CD from Amazon and also as a free download from www.rozhlas.cz/d-dur/download_eng/_zprava/brandenburg-concertos-free-downloads--366308 in either MP3 or FLAC (Free Lossless Audio Codec) 16/44 format which will play directly on the Duet receiver. This gives the opportunity to compare the CD with an equivalent digital source played through the Duet.

Compared to playing the CD on my PrimaLuna ProLogue Eight Mk.2 CD player, the Duet performed well and gave a fine all-round musical performance. However, A/B tests with the CD revealed that bass on the Duet was a tad uncontrolled and the top end noticeably harsher compared to the CD. Also, the soundstage was somewhat two-dimensional on the Duet. It was time to heat up the soldering iron...

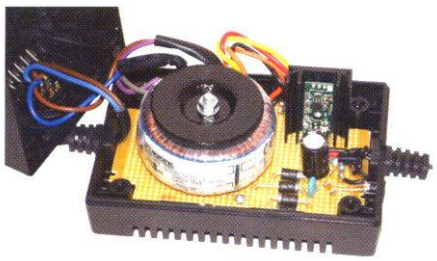
OUT WITH THE OLD

Following the helpful instructions from Brent at Fidelity Audio, I first needed to remove four SMD capacitors and two oscillator crystals from the PCB before I could install the Micro Clock. The problem with removing SMD components is that you need to heat up the component enough to melt the solder, which unfortunately also melts the adhesive that binds the copper track to the PCB! This often means that you end up removing part of the track along with the component and thus you don't have any pad left to solder the replacement to. Furthermore, pads often have two tracks going to them, so removal of a pad breaks part of the circuit! Of course, a highly skilled professional like myself would *never* have these problems (cough!), but should this happen, I can confirm that you can easily scrape some spare track further along from the pad and use a tiny strand of wire to remake any connection that has become inadvertently broken. A good magnifying glass or, better still, a jeweller's loupe eyeglass is useful here.

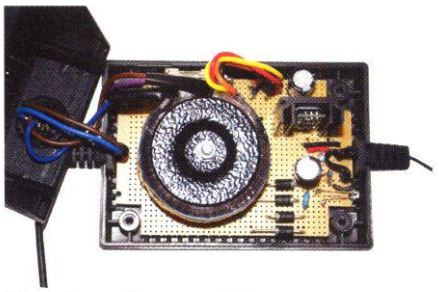
Next, two of the Oscon capacitors were fitted to the Micro Clock (they are not fitted as standard since a variant of the clock can be used in a Squeezebox Touch and there is not enough space to fit the Oscons in the Touch). The Rubicon was then fitted to the spare pads next to the power input socket and the remaining four Oscons strategically soldered into spare pads on the PCB. Finally, the clock was wired to two of the pads that were exposed when the crystals were removed; the power leads were connected to the power supply input socket and the clock module itself fastened to the receiver PCB with a couple of double-sided adhesive pads.

Repeating the listening tests revealed that the top end had been significantly tamed and the raspy edge to strings had completely disappeared. In fact, it was very similar to the CD. However, what was quite surprising was the improvement to the imaging – the performers had clearly moved their chairs around to fill a very three-dimensional area in my living room! In fact, I have to confess that it was now superior to the CD performance in this respect – quite an achievement.

Encouraged by the results to far, I turned my attention to replacing the noisy 'wall-wart' 9V switched-mode power supply with a nice linear design. As can be seen from the attached circuit diagram, a handful of quality components, including a nice toroidal transformer and some Schottky rectifiers from Farnell, can be assembled into a neat case from Maplins, and all for around £35. Incidentally, if anyone is put off by the idea of building a replacement power supply from scratch, Fidelity Audio can supply their own beautifully made complete unit, utilising their Spower voltage regulator, specifically for the Duet. I was not disappointed with the result – the previously loose bass performance had now been reigned in and I was getting sumptuous deep and crisp notes from the double-bass, but also drums were tight and punchy – lovely.



Inside view of the new receiver power supply fitted with the Fidelity Audio Spower voltage regulator.



View from the top of the power supply interior.

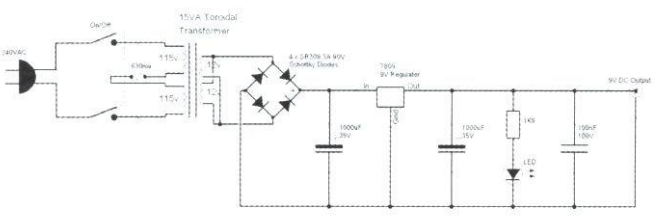
The new power supply showing the On/Off switch.

"you can transform a humble Duet to outperform a good CD player..."

As a final touch, I replaced the LM7809 9V voltage regulator with an Spower regulator from Fidelity Audio – a drop-in replacement for the 7809. At £42, the Spower regulator is a lot more expensive than a 7809, but it is a worthwhile investment nevertheless. With the Spower regulator fitted, the Duet managed to extract more detail from the music – I could now hear the bowing action as the horse-hair excited the strings of the double-bass.

CONCLUSION

The overall result is that the Duet now outperforms the CD equivalent – something I was not expecting. For a relatively modest outlay, you can transform a humble Duet to outperform a good CD player when fed with studio-quality digital sources. All-in-all, a highly enjoyable project yielding an outcome that exceeded expectations – what more could you ask for?



Circuit diagram of the new receiver power supply.

CONTACT:
FIDELITY AUDIO
✆ +44(0) 1302 739998
www.fidelityaudio.co.uk