

DOO 1.1 Rev 1

by

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This is the first mod I have tried on my DOO for a long time, think it turned out quite ok.

First I put in my series resonance crystal to fix the frequency being wrong. With the players original crystal in the DOO frequency was about 11.286308 MHz, almost 300 ppm slow (still within specs though). After exchange it was more like 11.289665 MHz, about 6 ppm fast. (Warming up makes it decrease some.)

Next step was modifying the driver and reclocker some. The 74AC74 was simply replaced by a 74HCT74. The change brought down rail noise on the chip. Its hard to say exactly how much because the close by buffer chip ('244) probably accounts for much of the noise all the way over to the '74. From what I have read lately, AC's are noise makers so it's a good thing to get rid of them though.

Largest improvement rail noise wise was achieved around the '244. Measured rail noise on the 74ACQ244 was as high as 450 mV. Using all 8 buffers in parallel isn't good either from jitter stand point or for rail noise it seems. Best to disconnect all buffers but one, keep the one closest to the 7474. Ground the other 7 inputs. Also disconnect those 7 outputs from each other and the 8's. I tried without grounding the 7 inputs first, just disconnecting outputs, but rail noise decreased further when inputs were grounded instead (not very surprising, just more work).

First I tried with an 74ABT244. Rail noise was brought down to 140 mV (not really very comparable to the value above since I also went for a single buffer at the same time). I know, I could have been more scientific...

Then I tried a CY74FCT2244CTPC. Like the short id's from Cypress :-). It's a pretty cool thing made for silent operation and nice driving. It includes a 25 ohm series resistor on buffer output. This brought down rail noise on both '244 (and '74) to 60 mV. Quite ok for a digital circuit. I believe the S/PDIF output wave form looks smoother now, less ringing.

Changing from the 'AC244 and paralleled buffers also calls for changes in the output resistor network because of another drive voltage as well as the 25 ohm series resistor in the buffer. I used 536/649 ohm (750/499 before). That is R22 = 536R and R23 = 649R in DOO v1.1.

Does it sound differently? Hard to say, not anything to make a good comparison with. It sounds smooth as velvet though, my feeling is that it took the "edges" of the sound, but who knows. After reading the Genesis Digital Lens review in Stereophile I'm starting to think that a good digital output can be a quite good idea no matter what you put after it. All noise coupled into the DAC from the transport are very likely to have an impact on DAC performance. That must have been the reason Robert Harley could hear differences between transports. No matter how the DAC is laid out, it's dead hard to remove this kind of sound correlated noise. Better to attenuate it as much as possible as early as possible.