Burson Audio

Buffer

Diplomacy works. We live in an age of converging synergies and compatibilities. Our mobile telephones talk to our computers which in turn talk to our iPods and so on and so forth down the USB line. It's a form of electronic *Esperanto*. Increasingly, modern devices need to mate universally to other equally modern devices and as a result, contradict the convergence theory. Our stockpile of useful/useless things continues to snowball.

As a result, one of the key elements of our modern technology is compatibility. Incompatible devices that don't operate in conjunction and within their technological community therefore are destined to become obsolete. So how does this scenario—simplified though it may be—apply to audio? Well, a surprisingly little-understood yet common malady that affects most hi-fi systems to a greater or lesser extent is the inter-component impedance mismatch—or what you could call a 'component miscommunication'. This incompatibility often arises from the use of cheap op-amps in the output stages of components built to a lower price point, resulting in higher-than-ideal output impedance. The resulting inter-component impedance imbalance can have varying degrees of influence on the sound you hear, from a perception of stunted macro- and micro-dynamics, to a lack of top-end extension, to a weaker, leaner bass…

Enter the Burson Audio Buffer. By substantially lowering the output impedance of the source component, the Burson Audio Buffer claims to remarkably increase perceived dynamics, detail and bass power. This diminutive black box is a true electronic diplomat that increases the amicable interaction and accord between audio components. It facilitates compatibility that allows for a more effective communication between two units that you've decided to mate together.

Burson Audio is a company that was created by a group of Australian audio enthusiasts that first created enhancement products solely for their own enjoyment but then, later, decided to build them for audiophiles in general. A spokesman for Burson told me: '*In recent years, we have been seeing many market-driven manufacturers pulling the pin on quality in exchange for bigger profit margins. Most of them use ICs (integrated circuits) in their products to cut cost. In our opinion, ICs give solid state equipment a bad name (that is, a cold "digital" sound). In terms of stability, consistency and bandwidth, ICs can never match up to a refined discrete circuit. The Burson Audio Buffer is based on well-developed Burson discrete op-amp technologies. We hand-solder each of the Audio Buffers to perfection and set them to work in single-ended Class-A mode for minimum distortion. We then match it with a cost-no-object parallel voltage power supply that allows the Burson Audio Buffer to achieve a whopping 118dB of S/N ratio and less than 0.01% THD (10Hz–10kHz.) Even the power supply is fully discrete. We have even upgraded the three-pin regulators with discrete networks for the best performance.*'

Burson Audio says that the best place to put its buffer is where the audio signal is weakest, which means that typically it would be best-placed between the CD player/DAC and the preamp. Burson says: '*Taking advantage of the transparent sonic signature of our Burson discrete op-amp, the Burson Audio buffer effectively*

reduces the output impedance of a typical CD player to a range between 15–30Ω [from typically 100–1,000Ω—EK]. *That will translate to more micro- and macro-dynamics; better control at the lower end and less effort at the top. Many who have tried it agree that the Burson Audio Buffer is an effective upgrade for any digital source.'*

Aside from the specifications I have quoted, Burson's other design elements are equally impressive: dual mono design with ultra short signal paths; high-quality internal components (including Elna Audio graded caps, carefully matched high-quality audio transistors and Dale military graded resistors); Teflon-coated single-core internal conductors; and a large, fully isolated power supply. The simple brushed aluminium face-plate sports a solitary pushbutton power switch and an associated blue LED. At the rear you will find high-quality and very solid RCA input/output sockets and an IEC power socket. (The unit can also be ordered with XLR signal connectors.)

Buffered Sounds

I connected the Buffer as the intermediary between a Bel Canto DAC-2 and a Supratek Sauvignon preamplifier. A side-effect of the Buffer is a boost in gain that—in my already high-gain system—meant that the 9 o'clock position on the volume control became plenty loud. Thankfully, I found that the Buffer itself is dead quiet so any potential noise problems will stem from systemic issues, not from the Burson itself—though I would have preferred unity gain. (That is, I would have liked to have got exactly the same voltage at the outputs of the Burson as was going into its inputs).

I found the influence on the sonic presentation brought about by the inclusion of the Burson Audio Buffer pretty much summed up by my previous comments. Yes, the buffer subtly increases the perceived impact of transient attacks and seems to extend the treble up further into the 'air' regions. Bass also tends to bloom and acquires a heavier punch as well as a little more perceived depth… but I need to stress that these sonic observations whilst using the DAC-2 while appreciable, were somewhat subtle. Having said that, I was impressed with the total lack of omissions and negatives due to the additional electronics, connecting socketry and interconnecting cables. The buffer is so transparent as to be non-existent and completely gets out of the way of the signal flow.

Let me tell you though, that taking the Bel Canto out of the equation and strapping our electron diplomat at the end of my Sony player (usually run only as a transport) reaped benefits that were anything but subtle. There was a big difference! The unusually high (10kΩ) output impedance of the Sony was the perfect client for the Burson's impedance-lowering portfolio. Bass power improvements were primary in the perception ladder. With the Burson in place, bass became deeper and tighter. Bass speed was not marred by the increase in heft and listening to music became a much more enjoyable and more involving experience. Dynamic contrast throughout the whole frequency range is also much improved. I additionally enjoyed the marked improvement in palpability in the midrange, where vocals tended to move a little forward in perspective.

Further up the frequency range, the Burson Audio Buffer's influence renders hi-hats and cymbals with a crisp and airy extension that shimmers and decays wonderfully. As a result, recorded ambience in live productions sounds more real, and more reminiscent of the live event I imagine would have been had I been there.

Conclusion

I would have to say that the Burson Audio Buffer delivers solid improvements in audio quality from mid-priced CD players, especially those with higher output impedance. Further up in the price scale of CD playback, where output stages may be of higher quality and output impedances lower, the Burson influence becomes more subtle but still recognisable. Furthermore, potential improvements could be had from lowering the preamplifier's output impedance into the power amplifier by using the Burson as mediator between the two. Likely subjects for such a scenario would be certain valve preamps when mated with the low input impedance of typical solid-state power amps. Given the internal parts quality, the hefty power supply, the decently built box and the positive sonic influences, the Burson Audio Buffer represents a bit of a bargain. Further, it should be treated not as tweak but a proper component. Who said diplomacy didn't work? *Edgar Kramer*

- Makes compatible components that may not be otherwise
- Good dynamic range and bass improvements

- Differences less noticeable with upper echelon CD players and higher quality output stages

Burson Audio Buffer

Brand: Burson Audio
Model: Buffer
Category: Buffer Amplifier
RRP: $499
Warranty: 1 Year
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LAB REPORT

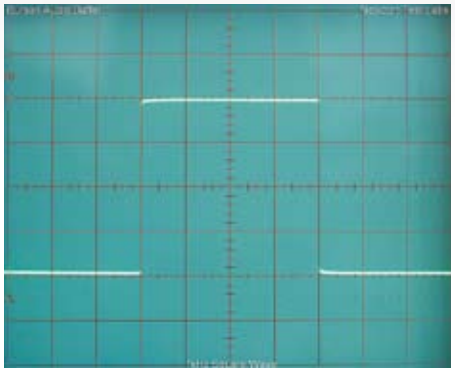
Readers interested in a full technical appraisal of the performance of the Burson Audio Buffer should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

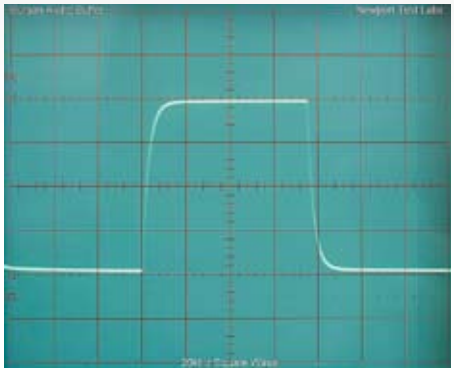
Test Results

The Burson Audio Buffer is yet another one of those components whose superb performance challenges the ability of the devices available to measure it, being possessed of such low levels of noise and distortion itself that one has to take into account the inherent distortion and noise levels of the testing equipment, even though these represent the state-of-the-art, particularly insofar as the test equipment that's used by *Newport Test Labs*, which utilises products from such companies as Audio Precision, Prism Sound, Bruel & Kjaer, Wandel & Golterman, Rhode & Schwartz and others. In the case of the Audio Buffer, this stems partly from the fact that the voltages involved are relatively low, further complicating the issue.

So far as distortion is concerned, you can see on *Graph 1*, which shows total harmonic distortion (THD) referenced to an output of one volt, that there are a few harmonic components visible above the noise floor—a second harmonic at around –105dB (0.0005%), a fourth at around –115dB (0.0001%), a sixth at –120dB (0.0001%) and an eighth at –130dB (0.00003%). (Note that the fourth and fifth are the same percentage despite the dB difference simply because I rounded the –115dB result. In fact, –115dB is actually 0.0001778% and –120dB is 0.0001% exactly. I rounded it because my personal view is that in a distortion measurement, if the decimal point is followed by three zeros, you won't hear any distortion no matter what number occupies the fifth decimal place.) Excellent though this result is, at least a part—around half—of this low level of distortion was introduced by the signal generator itself, so the Burson was simply faithfully amplifying distortion already present in the test signal. Note also that the distortion spectrum (save for a single third harmonic component at –130dB) is all even-harmonic in nature (2nd, 4th, 6th, etc) rather than odd-harmonic (3rd, 5th, 7th, etc) so that even if you could hear any distortion, the even-harmonics would serve to enrich and enhance the sound quality, rather than detract from it.

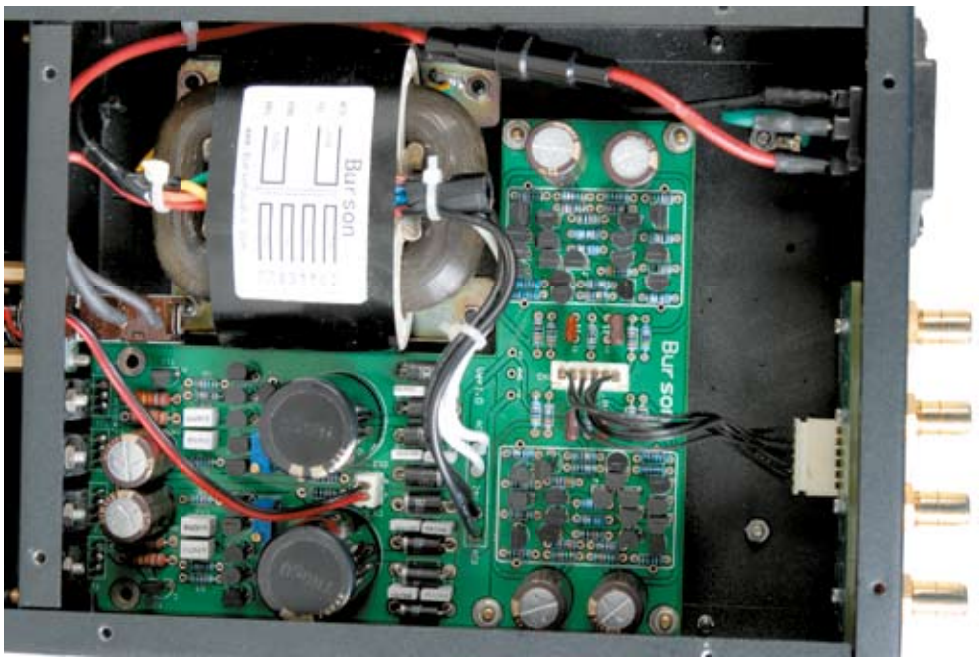
Graph 2 is somewhat different, because it shows THD at 9.5 volts out, at which level the Burson's circuitry is clearly overloaded. There's a spray of both even and odd-order harmonics visible, of which the 2nd and 3rd at around –63dB (0.07%), and 4th and 5th at around –80dB (0.01%), would most certainly have an audible affect on sound quality. This is academic, however, because you should not be operating the Burson at such high output voltages. I would recommend sticking below 5 volts maximum output, but can't see any reason why, in actual use, you would need to exceed 1 or 2 volts, in which case you'd have





Burson Audio Buffer Amplifier - Test Results		
Test	Measured Result	Units/Comment
Frequency Response @ 1 volt out	<1.0Hz–91kHz	–1dB
Frequency Response @ 1 watt out	<1.0Hz–160kHz	–3dB
Channel Separation	112dB/116dB/112dB	(20Hz/1kHz/20kHz)
Channel Balance	0.016dB	@ 1kHz
THD+N	0.0015%	1 volt out
S/N Ratio (unweighted/A-weighted)	110dB/116dB	dB re 1 volt output
S/N Ratio (unweighted/A-weighted)	122dB/130dB	dB re 9 volts output
Maximum Input	5.8	volts
Maximum Output	10.8	volts
Output Impedance	33Ω	@ 1kHz
Input Impedance	550Ω	@ 1kHz
Voltage Gain	5.46	dB
Power Consumption	8.16 watts	1 volt out
Mains Voltage Variation	242–247 volts	Min–Max

"if the decimal point is followed by three zeros, you won't hear any distortion no matter what number occupies the fifth decimal place."

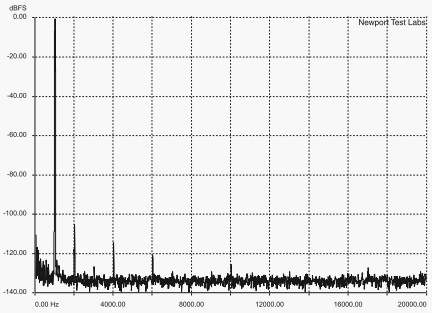


the benefit of the superior performance visible in *Graph 1*.

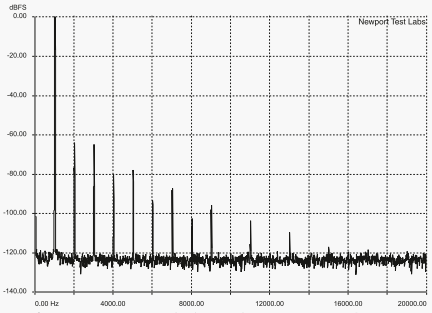
Intermodulation distortion was very low, as evidenced by *Graph 3*. The actual CCIF IMD test signals are shown at 19kHz and 20kHz, and reproduced on the graph accurately by the Burson. There are small (unwanted) sidebands down at around –110dB (0.003%), and the regenerated 1kHz signal is sitting right down at –100dB. I have included two views of the Burson Audio Buffer's frequency response, one with conventional vertical scaling of 0.5dB per division (*Graph 4*), and the other with greatly magnified vertical scale, so the top of the graph is at +0.1dB and the bottom at –0.1dB, with horizontal divisions at 0.05dB intervals (*Graph 5*). You can see that even at this extreme scaling, the Burson Audio Buffer's frequency response is still magnificently visibly flat, just 0.1dB down at 5.5Hz and 35kHz, for a 'normalized' response of 5.5Hz to 35kHz ±0.05dB. Using 'conventional' dB tolerances for stating frequency response, the Burson was tested at <1Hz to 91kHz ±0.5dB and <1Hz to 160kHz±1.5dB. Channel separation was measured at 112dB at 20Hz and 20kHz 'improving' to 116dB at 1kHz, as you can see in the tabulated figures. Separation is also graphed in *Graph 6*. Channel balance was tested as 0.016dB at 1kHz.

The remainder of the Burson's test results are itemized in the accompanying table. In almost every case, they match or exceed Burson's own specifications, even though Burson's specifications appear to have been derived from measuring only one or two samples, rather than measuring, say, 100 production units, then averaging the results. Given that Burson is only a small outfit, this is perhaps not surprising. Where they don't match, the minor differences can be put down to measurement error or the use of different reference levels or measuring techniques, and are of no consequence. Suffice to say that the results measured by *Newport Test Labs* as shown here reveal truly excellent performance, and performance that is of such an extraordinarily high calibre that you can rest assured that this Audio Buffer will never, ever, be the 'weak link' in any audio system, irrespective of the quality of the electronics in that system.

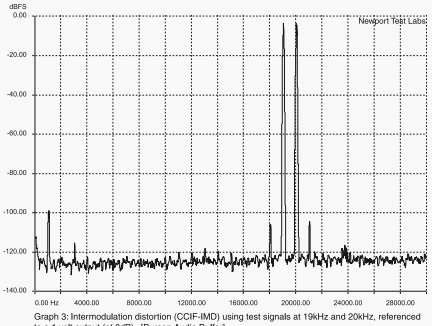
Steve Holding



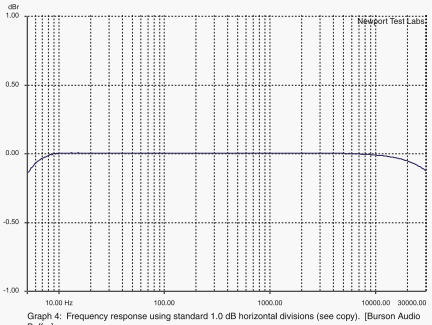
Graph 1: Total harmonic distortion (THD) at 1kHz referenced to 1volt output. [Burson Audio Buffer]



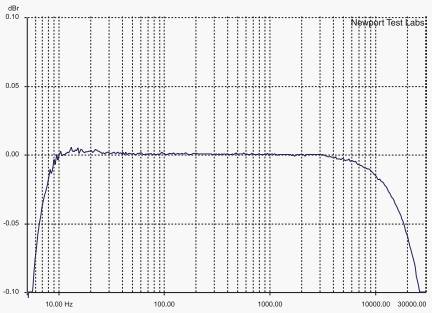
Graph 2: Total harmonic distortion (THD) at 1kHz referenced to 9.5 volts output. [Burson Audio Buffer]



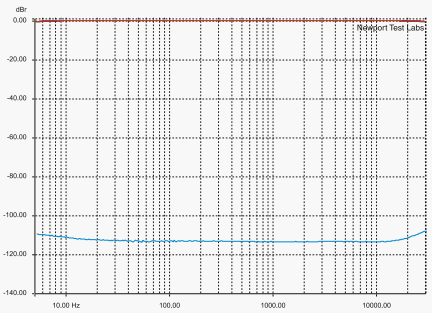
Graph 3: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, referenced to a 1 volt output (at 0dB). [Burson Audio Buffer]



Graph 4: Frequency response using standard 1.0 dB horizontal divisions (see copy). [Burson Audio Buffer]



Graph 5: Frequency response using expanded vertical scaling (horizontal divisions at 0.1dB (see copy). [Burson Audio Buffer]



Graph 6: Channel separation referenced to a 1 volt output (at 0dB). Top (red) trace is left channel frequency response (shifted down from 0dB slightly for clarity). Lower (blue) trace is right channel (separation). [Burson Audio Buffer]