Audio Networking

A POT POURRI OF COMPUTER NETWORK AUDIO FINDINGS, INCLUDING UPDATES
ON THE NAIM UNITISERVE, GIGABIT SWITCHES, CAT5/6 CABLE AND RIPPING ISSUES

Network audio will run and run. The more we learn, the better equipped we will become, and the better able to help readers optimise this new kind of system.

This issue's project covers a variety of topics which were largely dealt with in a rewarding listening test marathon. While complex and time consuming, these delivered clear and repeatable results. The procedures were inevitably time consuming, because many of the changes and substitutions required the network to be reset. (In the case of the Naim *UnitiServe*, this involves a full power down and power up of the operating system.) Swapping interconnects is so much easier in the analogue domain!

We were intrigued by the results of auditioning several NAS (network-attached storage) drives, reported in *Vol5 No3*, concerning the differences between internal processors, and the sound quality variations found between different data drives, whether solid state or disc. The effect of the recommended gigabit switch at the (data replay) streamer end of the chain needed verifying, and also the influence of the type of network cable type joining it all up.

Talk to computer people (especially those at Hydrogen Audio), and such ideas are derided as pure heresy. These people consider that 'bits are bits' and that a NAS cable (of sufficient bandwidth, which all are of course) cannot possible influence results. However, we do not indulge in such prognostications, which are seemingly made as an article of pseudoreligious faith. Rather, we observe and report on the differences that we find, if any, with a view to understanding better how these connected systems behave, and to seek answers.

Naim UnitiServe Revisited

We were lent a second *UnitiServe*, this time the *-SSD* solid state version, and made careful comparisons against the established standard unit with hard disk drive (HDD). We also tried and report on an unofficial substitution for the *UnitiServe* 12V 6A external plug-in power supply. In fairness Naim do not claim audiophile status for the *UnitiServe*, and in truth it performs very well just as it is, even justifying my use of high end DACs such as the MSB *Platinums*. But I wanted to hear the effect of using an external plug-in 12V linear supply in place of the standard, if line filtered, switch-mode type. It's possible that Naim will release an upgraded power supply for the *UnitiServe*, having appreciated its potential, but I can make no promises in this regard. The final audio tests exploited the fine USB input feature of the *UnitiServe* to assess two contentious Red Book audio rips which have a fascinating history.

UnitiServe is not just limited to CD format audio or its internal storage. It can also replay audio from a USB memory stick and will scan the network for music stored on NAS drives or other network-linked shared files, in WAV, AIFF, FLAC, ALAC, OGG Vorbis, AAC, WMA and MP3 formats at up to 24bit/192kHz resolution.

The *UnitiServe-SSD* has no internal hard-disk storage and is intended for use in network systems where ripped data is stored exclusively on the network (most commonly a NAS drive).

Music access and control is available *via* multiple interfaces, including the *NServe* computer based control software, or the Apps on *iPhone*, *iPod* or *iPad* platforms. It also responds to a conventional infra-red remote control, though connecting an accessory display to the *UnitiServe* is essential to get the most out of this mode.

Comparing the hardware of the two *UnitiServe*s, the official story (and it is a good one) tells of the awful inevitability of hard drive failure, its endlessly spinning mechanism running quite hot from hub, actuator motors and related power supplies. Indeed, it's amazing that hard drives run as well as they do. Naim fits good ones, selected and certainly heavy duty (though not the slower and very costly examples made for commercial servers). HDD failure is measured in years rather than months, but the consequences could nevertheless be severe. Spend a month or so ripping say 800GB of music to the hard disk *UnitiServe*, and you could be lucky and enjoy years of replay pleasure with no other store required,

just a simple network control to choose albums and tracks. I have done this for many months now, well aware of the risks. Breakdown might even be benign, and Naim might be able to recover the tracks and re-compile them when carrying out the repair. But maybe not, and ripping the whole lot again would not be a welcome task.

Protection stage one is therefore to couple up temporarily to a computer *via* NaimNet software and make a 'mirror' backup copy, say on a portable USB-connected terabyte drive (£90 or less). Then *UnitiServe* drive failure can be addressed by reading back from these copy files, simply by plugging that USB drive into the back of the repaired *UnitiServe*. Only Naim can reload the files since its internal drive is set to read-only as far as the customer goes. (This is quite deliberate to prevent the *UnitiServe* becoming corrupted, the resulting defect in practice no different from any mechanical or electrical failure.)

Going for the solid state version of the *UnitiServe* sounds like good advice, even though this version costs about 15 per cent extra. Using a 16GB Single Level Cell (SLC) 'Enterprise Drive', it has just a fraction of the HDD version's memory capacity, but that's not what it's about. With no moving parts 'it should never fail', but that's actually not quite true: the number of possible read/write cycles does have a finite limit, even though Naim fits the top grade of SS memory. Memory operation requires moving the data around the chips resulting in 'electrical wear' to the charge storage property. However, internal routines aim to protect the memory, and if it is relatively little used (as is done in the *UnitiServe*, for example mainly for the resident operating system programming), a long 5-10 years estimated life is likely.

Cited further advantages for the *SSD* are lower power consumption, and hence lowered electrical noise; no moving parts, so lower acoustical noise and vibration, and therefore potentially cleaner CD rips and therefore the promise of better sound quality. A most convenient feature when ripping CDs is that it uploads straight to the NAS drive; where correctly connected to the internet it can look up the metadata and augment the file information.

Sound Quality

The HDD and the SSD *UnitiServe*s sounded fundamentally similar, with very good detail and a strong sense of rhythm and drive. They were substantially involving musically when compared to so much digital audio replay out there, especially that emanating from computer style CD ROM drive machines, rather than classic Red Book 'real-time' players.

Operating with the Naim *DAC* for example, both *UnitiServe* versions delivered a solid performance that matched the standalone Naim *CDX-2*, while those power supply upgrades for the Naim *DAC* continue to chase the sound quality dragon. This continued right up to the heroic *555PS*, though I felt this final step was bordering on the side of diminishing returns.

The *UnitiServe*s did sound different, not by much but enough for us to determine a preference. However, our result is not claimed to be universal. The *SSD* initially seemed to have an advantage, but we had walked into a trap. While it seemed to have higher definition, sounding more evenly tempered, sophisticated, certainly a little clearer and also somehow more vitally connected, there was also an slightly foreign processed quality, almost a coloration – not quite a 'glare' but more as if the lights at the recording venue had been turned up a little too much. Direct comparison with the HDD version showed that the *SSD*'s subtle 'halo' effect was indeed less natural. And the HDD version has a clear advantage on one aspect of sound quality: music flowed a little better and timing was superior too, with more natural dynamic expression. So despite the *SSD*'s advantage in clarity and audible sophistication, in the end we considered that the hard disk version beat the *SSD* by about 13% – a significant margin in a *HIFICRITIC* review context, though in another system the *SSD* might be preferred.

The *SDD* can undoubtedly provide great sound quality, but the regular hard drive version certainly sounded a little better in our review system. The *SSD* is physically silent, the HDD very nearly so, and while the *SSD* sounds cool, sophisticated, pure, smooth, vital, almost crystal clear, it ultimately lacks the full quotient of musical drive and rhythm that we know is possible from our test programme, due, we believe, to a touch of 'processed sound' detachment. That said, we have no hesitation in Recommending both the standard hard drive and the *SSD UnitiServe*s.

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An Experiment: switch-mode vs linear supplies

As standard, both *UnitiServe* models come supplied with switch-mode power supplies. Since such supplies tend to affect system sound quality adversely, we thought it would be interesting to try them with an alternative non-Naim linear supply. We won't go into the extended detail involved in getting the comparisons right, including whether one or both the units were on and which type of supply fed which type of *UnitiServe*. Perhaps inevitably either or both of the standard switch-mode supplies moderately degraded the overall system sound quality, a factor which until now had been accepted as an inevitable component of the overall *UnitiServe* sound quality. Indeed, the latter is inherently so good that it simply survives this factory choice of power supply.

It is only when these *UnitiServe*s are assessed individually with the two different supplies that the magnitude of the performance gain with the linear supply becomes obvious. For these tests I used an inexpensive (less than £100) non-audiophile, semi-industrial 12V 10A Elektro-Automatik *PS 2012-10* supply. It was slightly modified to minimise residual fan noise when located near the listening position (ideally such a supply would be convection cooled), and I had to fit a cable with Naim-compatible DC plug. The full benefit of the linear supply was not achieved until the second *UnitiServe* was powered down, and its switch-mode supply disconnected from the mains.

In my audio system context the sound quality of both types of server improved by no less than 30 per cent when used with the linear supply. (Incidentally, it's a tribute to the MSB *Platinum Signature* DAC used for monitoring these changes that such effects were so readily heard and easily scaled.)

With linear supply the HDD *UnitiServe* sounded more upbeat and flowing, with a purer quality overall and noticeably reduced grain and sibilance – surprisingly, since little such error could be detected prior to the change. The midrange sounded still more natural, with more expressive yet unforced vocals, while rhythmic power increased and bass tune playing was clearer at low frequencies. Reference programme examples in particular sounded closer to the master tape experience.

The *UnitiServe-SSD* with linear supply showed improved image depth and still greater clarity and sweetness. That slightly unreal tinge of 'glare' was significantly reduced, while the low frequency quality was also improved. There's still a hint of 'processing' and a slightly less than natural quality about its sounds, but all was rendered with greater overall definition. It sounded substantially more

upbeat with better flow than when using the standard supply, and was now rated very good in this respect, though we still felt that the HDD version had the advantage here. However, I cannot rule out the possibility that some listeners may prefer the particular quality of sonic precision available from the *SSD* Naim *UnitiServe* when using a superior linear supply

Removing a gigabit switch

Linn amongst others recommends that a fast gigabit switch is placed in the network cable line close to the network music player, to buffer and accurately shape the signals fed to the player, since the NAS drive could be sited some distance away.

Such a switch is likely to have a plug-top switch-mode supply (as in our Netgear example), and such a supply is undesirable if sited so close to audio system electronics. Replacing this supply with a generic linear (transformer) supply did lift system sound quality 3-5%. However, deleting the switch from the chain altogether brought a 10% improvement in sound quality, which for me was an important discovery.

A streamer local gigabit switch is only required if there are further local network components to support and provide shared connection, so we did use it in comparative testing when running two *UnitiServe*s in parallel.

CAT network cable

Most network audio websites and also manufacturers involved discount the idea that the choice of network cable can affect the sound, either because they are sure it does not, or simply because this is a convenient view to take. Since 15m of network cable costs about £13, it was easy to buy two lengths of Belkin Snagless *UPTP* (unshielded and recommended for audio use) in Cat5e and Cat6 varieties. They arrived in tight coils and needed to be stretched out for a day or two to 'relax' and lay flat before gently smoothing out the bends.

With the network audio system up and running, the two test cables were used between the NAS-connected router a hard disk drive Naim *UnitiServe*. Patience was required, as the system had to synchronise after each disconnection. Multiple trials were carried out, but this was not really necessary, as the differences were not trivial. Using Cat6 as the reference, reversion to Cat5e dropped sound quality by around 20 per cent – jaw dropping in view of the trivial cost involved, especially when compared with the price of the whole audio system.

Variations in the sound of digital audio replay don't necessarily correlate with those in the analogue

domain; sometimes different terms are needed. By comparison, Cat5e sounded 'greyer', with less contrast and somewhat dulled detail. Specifically, low level detail and image depth were impaired, unwanted grain and sibilance were increased, and there was a shortfall in coherence and involvement. Dynamics were softened and the sense of rhythm was significantly reduced. Three DACs were tried (the Metrum *Octave*, the MSB *Platinum Signature* and the Naim *DAC*), all with very similar results, so I do not think that the differences are down to failures of the DACs to re-clock or reject jitter, nor the S/PDIF performance of the *UnitiServe*, which has proved a first rate source of data in this format.

We therefore believe that network cables have a significant influence on audio replay. (Incidentally, we have been warned against using screened types.) Other factors may well affect performance too, such as the quality of termination to the plugs and the fit and tightness of these plugs for these not wholly reliable 'telephone' connectors. And we hope to try out some 'audiophile' network cables soon.

New Zealand LOG Rips

After providing some earlier material purporting to show sound quality differences between different rips, even when stored on HDD and sent over the internet, reader Alex Kethel from New Zealand recently sent me three rips of *Love Over Gold*, made from his Red Book CD. This is controversial stuff, since the material was checked to be free of errors using EAC bit check, and as before Alex did not disclose the identity of the rip 'methods' which were to be compared.

Many enthusiasts will be aware that different ripping drives and software do sound different upon replay, despite working to a common and specified lossless format. A contentious test CDR known to *HIFICRITIC* has 23 different error-checked lossless rips from various unmodified computers, drives and ripping software, and nearly all of these can be subjectively differentiated from one another. (We are planning a report on some ripping software and its sound quality.) Furthermore, brief experiments with the *UnitiServe*'s built-in audio grade ripper have revealed small differences in the rip quality resulting from changes in the power supply or the support environment.

Kethel had ripped three versions of the *Private Investigations* track using a ROM drive with various upgrade power supply arrangements, including a shunt regulated version based on a John Linsley Hood design. The files were EAC error checked, zipped, sent to the UK over the internet, unzipped, HDD stored in my computer, and EAC checked

again to be sure they were all numerically the same. They were then copied onto a USB stick, and replayed *via* a Naim *UnitiServe* and MSB *Platinum Signature /Diamond Power Base* into an Audio Research *Reference 5*/Krell *Evo 402e*/Wilson Audio *Sophia 3* analogue replay system, with accessories and supports to match. We made careful comparisons with eight repeats in all, judging as if we were playing the CD which we know very well; we felt the sound quality differences between the files were somewhat like changing CD players.

Rip 1: This gave a sound that was rather mid-fi CD in character. It might be considered perfectly good by those who haven't heard anything better, but for us it was not very communicative or involving. We decided to give this a 50% approximate sound quality score as a reference.

Rip 2: Sounded less dull, more detailed and more transparent than *Rip 1*, with more precise dynamics and better bass definition. There was now more musical expression with better clarity, listener involvement, and unquestionably higher resolution (I have experienced the master tapes). The score was now a comparative 75%, and the sound was considered very natural, accurate, with firmer clearer bass lines, greater depth and atmosphere. Instrumental decays were better extended into the deep silences.

Rip 3: Initially considered better still in some respects but not others, *Rip 3* showed more convincing micro dynamic resolution in the far depth plane, and still more detail and focus. But it was not quite as relaxed, flowing and musically involving, and sounded slightly artificial and mannered with what we call a 'spotlit' character. In consequence the score dropped to around 65%.

Kethel had believed that *Rip 3* would be the best, as he had made further changes to the ripping drive supply. Whereas we had 'correctly' and reliably identified the improvements with *Rip 2*, with no foreknowledge of what changes had been made, we were now in disagreement over *Rip 3*. Subsequent further tests confirmed that we had been correct, and that Kethel had not completed the final modification to the optimum standard for this rip.

It's particularly interesting to try and understand the means by which the power supply quality for a ripper's drive mechanism can be transmitted as sound quality differences *via* error-proofed WAV music files. Computer people tell us: "this is not possible" and "we must be imagining it". However, we are merely reporting what we have found. Ripping hardware and programs simply cannot be taken for granted, even if and when the software reports 'zero errors'.