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DOUBLE WHAMMY

Millennia Media NSEQ2 Dual-channel parametric EQ

Published in SOS July 1999

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Reviews : Processor

Specialist high-end equipment manufacturer Millennium Media have produced an innovative dual-channel parametric equaliser with a difference -- user-selectable valve or solid-state circuit topologies. **Hugh Robjohns** investigates.

American company Millennium Media have acquired quite a track record in producing some of the most highly respected mic preamplifiers currently available, using an unusual true balanced-circuit topology arrived at after many years of exhaustive development. This involved auditioning of each design iteration even down to individual component level.

The Millennium Media NSEQ2 reviewed here (one of the company's more recent products) is a relatively simple 2-channel, 4-band parametric equaliser which has already become popular with mastering houses. Along with a similarly styled compressor unit (the TCL2), the NSEQ2 features a unique 'twin topology'

**MILLENNIA
MEDIA NSEQ2**
£2227

pros

- Superb sound quality.
- Flexibility of circuitry.
- Build quality.
- Not as expensive as it sounds.

cons

- Possible problems with unbalanced I/Os.
- Poor markings on

design whereby the user can choose (and switch between) a solid-state FET-based amplifier chain or double triode valves. Both are optimised to sound as transparent and open as possible, with only the subtle inherent characteristics of the active devices differing between the two operating modes.

The arguments over whether valve or solid-state amplification provides 'the best' solution in any given application have raged long and hard over the years. (The truth is that both offer superb results in the right circumstances.) However, I have never before come across a single machine providing the two options, both operating entirely in Class A and selectable at the press of a button. This is the advantage of the NSEQ2 - a 4-band equaliser with two separate amplifier stages, one a classic valve design and the other a state-of-the-art discrete FET system. Either can be employed independently in each channel, providing the extraordinary possibility of direct comparison between the two approaches in near-identical circumstances.

Hardware

The NSEQ2 is a substantial 2U rackmounting unit weighing over 11kgs and requiring around 300mm of depth in a rack (not including any allowance for I/O or mains connectors). The manual advises supporting the rear of the unit, particularly in mobile applications, as the heavy power supply is positioned towards the back and vibration could easily over-stress the front-panel mountings. It is also advised that 1U of clear space in the rack above and below the equaliser is provided, to permit adequate ventilation, although the machine draws only 40W from the power supply and didn't seem to get more than modestly warm while I was using it.

The rear-panel furniture is very simple: just four XLRs for the audio interfaces, an IEC mains terminal with integral voltage selector and fuse holder, and a small terminal strip. The latter provides a direct connection between chassis and audio earths, which can be broken should there be a problem with ground loops. As standard, the NSEQ2 employs unbalanced audio interfacing, with pin 1 (and the shell terminal) connecting to the chassis earth, pin 3 to the audio earth, and pin 2 carrying the signal. An optional modification provides

gain controls.
• Expensive in a purely relative way!

summary

A superb high-end parametric equaliser which breathes life into all that passes through it. The selectable valve or FET amplification provides a subtle but significant choice of audible characteristics, and transparency and accuracy are the overriding qualities of both modes.

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"The NSEQ2 is not

only remarkably clean and quiet, but also boasts an extremely wide dynamic range."

for true balanced inputs, although the outputs are always single-sided. This unbalanced approach is surprisingly common in high-end equipment where sonic quality is considered of prime importance. Apparently, many high-end designers feel that most balancing techniques introduce an unacceptable degree of signal degradation and, in practice, there are few advantages to balancing high-level signals in a well-engineered studio environment.

The thick metal front panel is attractive, with a simple, stylish and completely intuitive layout. All push-buttons are colour coded and illuminated, and the chunky machined aluminium gain controls help to set this equaliser apart from other equipment in a rack. The two channels, providing four independent equalisers, are equipped identically with 10 rotary controls and 11 buttons. While the rotary bandwidth and frequency controls are easy to use and their positions are obvious, the gain controls have only a small dot on the front and a slight groove on their shafts with which to mark their positions. Consequently, they're almost impossible to see from more than a few inches away in dim lighting, which could be a frustration!

Equalisation

Each band in the NSEQ2 has its own illuminated red 'In' button as well as a green overall 'Channel In' button which operates a relay for a hardwired bypass condition. Normally the maximum gain swing provided in each equaliser section is up to +/-20dB via the large 21-step detented knobs, but a pair of yellow illuminated buttons in the centre of the front panel allows this to be restricted to +/-10dB for each channel, thereby allowing greater finesse for subtle adjustments.

The bottom equaliser band can be reconfigured from a symmetrical bell shape to a conventional 6dB/octave shelving equaliser with a yellow illuminated push-button (the front-panel graphic incorrectly shows a high-pass filter slope). There are six switch-selectable corner frequencies between 20 and 270Hz in shelf mode, and these settings become the centre frequency of the curve in the 'peaking equaliser' mode, which has a fixed Q of 1. There are no high- or low-pass filters in the machine and users should beware of

"The feature which makes this machine so unusual is clearly

feeding the NSEQ2 subsonic or ultrasonic signals which, given the extremely wide bandwidth of the electronics employed, could cause problems in subsequent connected equipment.

the ability to select solid-state or vacuum-tube amplification."

The two mid sections have continuously variable centre frequency controls, the lower band covering the range 20-220Hz, and the upper spanning 250Hz-2.5kHz. Both sections also feature yellow illuminated push-buttons to raise the centre frequency by a factor of 10, such that the low-mid ranges from 220Hz to 2.5kHz and the upper from 2.5kHz to 25kHz. These figures demonstrate that there is no overlap between the band centres, and in an equaliser intended for corrective problem-solving applications this could be rather restrictive. However, the NSEQ2 seems more suited for gentle, creative, shaping equalisation and I found that the lack of band overlaps wasn't an issue.

A further control in each of the two mid sections allows the Q (bandwidth) of the equalisers to be

The Man Behind Millennia

John La Grou, the President of Millennia Media, has been interested in audio since making recordings of his own voice on a domestic quarter-inch tape machine as a child in the early '60s. Later he learned to play electric guitar and built his own guitar amplifier, which led to experimentation with tone control and preamp circuits. Through his work in professional location recording, the vagaries of microphone preamplifiers turned into a passion for La Grou. He worked over many years with the aim of designing and refining the ultimate in mic preamp circuits, honing component selections and optimising PCB layouts, all through meticulous listening and testing in real recording situations.

When he could no longer squeeze any further sonic improvements from his design he started to sell a few units to some of his colleagues and his reputation started to spread. A trade magazine in America included one of his units in a Top 10 mic preamp shoot-out and it won, being recommended as the best preamp for acoustic music recording. The company took off after that and Millennia Media has been building strongly ever since.

La Grou has concentrated on making equipment which he would use in his location recording business, so after the mic preamplifier came a

modular mixing system, the equaliser reviewed here, and a compressor. A 24-bit, 96kHz A-D converter is expected shortly, complete with 'Pow-r' bit-reduction algorithm, and there might even be a full-scale valve console in the wings. All these products share the same design philosophies and ability to process the signal in the most neutral way. They also all have enormous headroom, incredibly low noise and distortion, and very wide bandwidths -- typically from 1Hz to 300kHz.

Innovative designs are the norm at Millennia Media. For example, the mic preamp features a totally balanced topology with mirrored amplifiers for the hot and cold phases of the signal, avoiding the usual unbalancing and balancing stages completely. The unique twin-topology concept of the NSEQ2 equaliser and TCL2 compressor apparently came from one of those "Oh Wow" moments in R&D when, while Millennia were trying to decide whether to employ solid-state or valve circuitry, it suddenly became clear that both could be incorporated into the same machine.

continuously adjusted between a reasonably constricted 0.4 and a broad 4. The widest setting is ideal for gentle overall shaping of the sound, and although the narrowest Q value is too broad for surgically removing narrow-band problems, such as an unwanted resonance, it does still allow usefully specific tonal adjustment.

The top band of the NSEQ2 has similar facilities to the lowest section already described, with selectable shelf or peaking characteristics, as well as six switch-selectable turnover

frequencies between 4.8 and 21kHz. All that remains is a pair of red illuminated buttons, in the centre of the front panel, which select the active circuitry for each channel. Pressing the button engages the FET solid-state amplification, the valve circuitry being operational with the button released. The mains power switch is recessed into the right-hand side of the panel.

All mode switching -- the full bypass, active circuit topology selection, and boost/cut gain range -- is performed via sealed gold-contact relays which can be heard to click loudly when the appropriate button is pressed or released. Most of this switching thumps, clicks or bangs when operated, and the signal even disappears briefly when the active circuitry is changed. Although this may seem incongruous in such an upmarket machine, designing the circuitry to prevent these noises would apparently have made an impact on the sonic quality and, in any case, none of these switching functions are likely to be changed during programme use.

Topologies

The feature which makes this machine so unusual is clearly the ability to select solid-state or vacuum-tube amplification. Specifications for both are most impressive, with separate figures provided for the valve and solid-state modes where there are significant differences. Distortion and noise are quoted as typically 0.002 percent for the valves and 0.0006 percent with the J-FETs (-94 and -104dBu respectively): both figures are astonishingly good, but particularly that for the valve stage, which is quieter than many accepted



solid-state designs! The NSEQ2 is not only remarkably clean and quiet, but also boasts an extremely wide dynamic range: maximum input and output levels are +26dBu for the solid-state amplifier and an extraordinary +32dBu maximum for the valves, which would push over 1.5W through a 600(ohm) termination! The audio bandwidth is similarly over-specified, being virtually DC-to-daylight with -3dB points below 2Hz and over 200kHz (300kHz in the case of the FET amplifier).

As there are two different kinds of active device to perform the input and output buffering (as well as providing the equalisation gain changes), I/O impedances vary slightly depending on the selected topology. Output impedances are a low 55(ohm) for the FETs and a still very workable 150(ohm) for the valves -- either would be perfectly happy to drive any sensible load over 10k(ohm). On the input side, the impedance seen by other equipment is affected by the gain-range switch: over 10k(ohm) in the +/-10dB mode and over 40k(ohm) with the +/- 20dB option. It is possible that these impedance variations could affect the performance of connected equipment in a small (but potentially audible) way, although I did not experience any practical problems at all with a wide variety of equipment interfaced with the NSEQ2. In fact, the only perverse problem I did encounter was when I inadvertently connected the machine using a faulty output cable. This resulted in a truly horrid low-level sound, which might be expected, but also caused some of the illuminated buttons to turn off their lights. Bizarre!

The internal construction of the machine is of a very high standard indeed, with a separately screened internal linear power supply alongside the main amplification circuit board. The latter carries a pair of encapsulated custom J-FET amplifier blocks as well as two pairs of double triodes -- a Sovtek 12AX7 and an unmarked 12AU7 for each channel. The valve amps do not incorporate signal transformers at all and apparently operate with around 300 Volts on their anodes.

The choice of passive components reflects the same critical attention to detail as is seen throughout the NSEQ2, which features Vishay potentiometers, Roederstein resistors, selected Wima and Electrocube capacitors, oxygen-free internal wiring, silver and Teflon power cabling, and gold-plated contacts on the valve holders, switches and connectors. Millennium Media claim to have selected these components after extensive listening tests.

Behind the front-panel controls are an array of 10 small vertically mounted circuit boards, which carry the potentiometers, filtering components, switches, and an unmarked 8-pin integrated circuit. The four cards associated with each channel are interlinked with ribbon cables terminating on the motherboard.

The remaining two central cards carry the mode-switching controls and are also linked back to the main circuit board with a ribbon cable.

The supplied literature claims that the NSEQ2 has only one active stage in the audio signal path although, in the case of the valve circuitry at least, it would appear that four triode sections are involved per channel. The component count and structure of the potted solid-state amplifier block is not available, but I would assume it is rather more than just a couple of FETs. Nevertheless, it is not uncommon to find parametric equalisers employing at least one gain stage per filter band, plus input and output buffering, so the NSEQ2 remains relatively minimalist in comparison.

The idea, of course, is that the fewer the number of gain stages, the lower the noise and distortion --

leading to "greater sonic integrity and heightened musical reality", as the manual says. Laudable as this design approach is, it obviously places far more strain on the 'single' gain stage, as the same amount of overall amplification still has to be provided in handling and processing audio signals. Thus, this kind of design is a lot more critical of component selection and circuit topology and is far less cost-effective. In the case of the NSEQ2, the lone amplifier sections (both valve and J-FET) have apparently been designed to act as input buffer, equalisation amplifier and output driver, all in one, which is asking a lot. However, they operate from very high power-supply voltages which bestow the benefits of an enormous headroom and a wide gain capability, and the specifications clearly prove the effectiveness of this particular design.

"This is an excellent machine capable of very fine results irrespective of the technology employed in the amplification."

Listening

The NSEQ2 is an impressive device and its quality became obvious as soon as it was plugged in. Both active amplification modes performed exceptionally well, with remarkably small and subtle differences between them -- don't expect the classic soft-and-soggy valve sound here! The triodes seemed to add a small degree of extra richness rather than an obvious warmth, and perhaps brought out a little more information -- ambience cues and reverberation details, for example -- but I really was hard pushed to tell the difference sometimes. Few would believe it was possible to extract this kind of performance from a couple of common valves!

Because I'm an engineer at heart I did the obvious engineering thing and connected the same input to both channels, one in valve mode and the other in solid state mode, and combined the outputs in opposite polarity through the desk. Having matched gains at 1kHz, I played a variety of material to try to assess the difference between the two topologies. At normal levels there was little output, but at very high levels the valve stage seemed better able to cope, still producing a usable output without any signs of compression or distortion. At low levels the valve seemed to become non-linear and introduced a degree of compression which would perhaps account for my perception of more low-level detail.

I found I tended to use the top and bottom bands of the equaliser in shelf mode most of the time and thought these excellent for adding a little warmth and air to already good recordings. It also proved superb in taming a slightly over-bright recording without suppressing its detail and clarity. The mid sections were useful in finding a little extra presence or minimising a slightly boxy or honky quality, but had to be used with great care as they were rather more powerful than they initially appeared.

Any high-quality, powerful audio tool such as this, operated by someone with a good pair of ears and a reliable monitoring system, can extract superb results from often quite mediocre recordings. However, it could al

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so inflict a lot of damage if not treated with a lot of respect, and the reasoning behind adding the 10dB gain-range limit became obvious to me very quickly!

Overall, this is an excellent machine capable of very fine results irrespective of the technology employed in the amplification. Although, like most sane people, I would normally find it rather difficult to enthuse about a simple equaliser, this really is something very special and I have only come across one other similar device which I found as audibly exciting. However, it is the provision of both

thermionic and solid-state amplification stages which make this product even more fascinating and flexible. The NSEQ2 sets a new standard in equalisation and, although expensive in relative terms, is actually very attractively priced given its sonic quality and flexibility. Millennia Media's web site already boasts a lot of impressive endorsements from a number of very highly regarded American 'names' in mastering and recording, and I would expect it to become a very common entry in the equipment inventory of most mastering houses and top-end studios over here once the word gets out. **SOS**

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Published in SOS July 1999

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