Short ride in a fast machine

Chord Electronics new solid-state amplifier technology is now available in their Etude stereo power amplifier. Martin Pipe likes its small dimensions and fast sound.

First seen at the Munich High-End Show last year, the £3,900 Étude stereo power amplifier features the first radically-new Chord Electronics amplifier topology since the firm's 1989 beginnings as a manufacturer of amplifiers for the BBC.

The amplifier's underlying 'feedforward-feedback' principles for the reduction of distortion are based on a paper by Dr. Malcolm J Hawksford, an Emeritus professor at Essex University. This paper, submitted to the Audio Engineering Society in 1980, predates Chord's birth by the best part of a decade! Later that decade, Bob Cordell of Bell Labs in the USA built a vertical-MOSFET amplifier of incredibly high performance around Dr. Hawksford's ideas and detailed his work in a 1984 AES paper.

Thirty or so years later, Chord Electronics' John Franks refined these ideas in the development of his "dual-feedforward error-correction" technology. These form the basis of not only the Étude, but Chord Electronics' flagship Ultima.

Like the esoteric Ultima models, the Étude has Class-AB sliding-bias output stages built around multiple custom-designed lateral-structure MOSFETs in

parallel (four devices per channel). Their individual operating conditions are constantly optimised by Franks' dual-feedforward circuitry to ensure that they behave linearly, thereby assuring distortion as low as 0.05% at full power, claimed to be 150 Watts into 4 Ohms and no less than 300 Watts when monoblocked (see Measured Performance). Low output-impedance ensures good 'speaker drive capability, while a slew rate measured in the hundreds-of-volts per microsecond means the Étude should be a fast and rhythmically-agile amplifier.

John Franks (MD) was also responsible for designing the ultra-high frequency switched-mode power supplies that sustain the power amps.

Despite the small size of the trademark casework – which, as ever, is machined from a billet of solid aluminium for robustness and shielding – Chord Electronics has managed to cram in three of these high-performance supplies. There's one for each active power rail, we are told, and a third for the auxiliary rails. The case has natural heat-dissipation properties, but a fan helps to keep things cool. At no time did its running intrude on the enjoyment of music. Case dimensions are 335mm wide, 70mm high and 155mm deep, weight 3.45kgs.

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The Étude fares well in connectivity terms. XLR (balanced) and RCA phono (unbalanced) inputs accept signals from a preamp, while the 'speaker outputs are on substantial WBT terminals that accept bare wire, spades or 4mm plugs. A standard switched IEC mains inlet, meanwhile, means that choice of mains leads is wide.

Also on the rear panel are phase-invert (actually 'polarity-invert') toggle switches. Chord Electronics told us these have numerous uses. Firstly, they are for bridging purposes where the phase of one channel has to be changed.

Secondly, they allow absolute phase to be changed, so cones go out instead of in, or vice-versa, which can be important when used in a multi-channel AV system to match the other 'speakers.

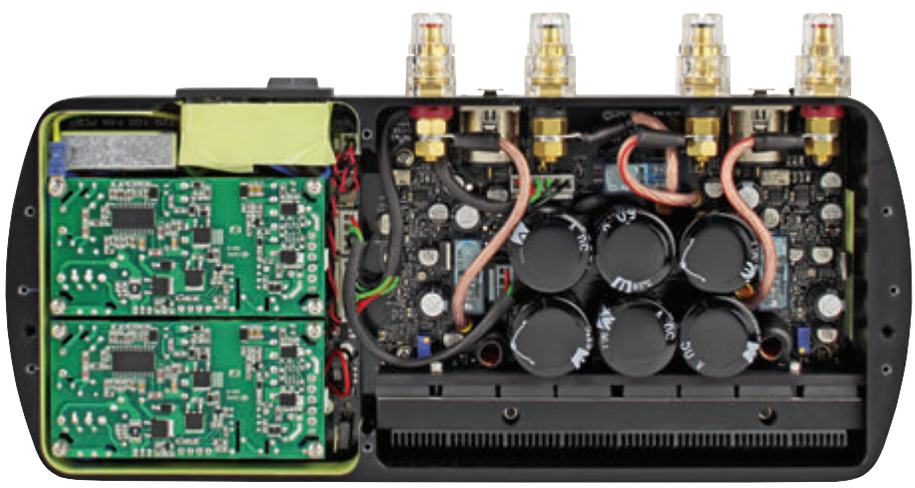
Also, some listeners insist absolute phase in a stereo system is important, so this can be changed.

And finally, should one channel of a stereo system be out of phase – unlikely and a fault – then flipping one switch can right the situation. If you're playing vinyl, a mistake may have been made in the cartridge wiring – possible where the cartridge pins are not colour-coded. Those using XLR interconnections might have an incorrectly-made cable, in which the '-' and '+' wires are transposed.

PERFORMANCE

Blue LEDs confirm that the Étude is powered up, and within ten or so seconds of flipping its power switch the protection relays bring the 'speakers into circuit. In my case, said speakers were Quadral Aurum Wotan VIII with ribbon tweeters. My source was a Chord Hugo TT DAC/preamp/headphone amplifier, fed with NAS and USB-sourced music via a digitally-interfaced Cambridge CXN streamer.

Initial impressions were of



A lot has been crammed into the Étude – possible through extensive use of surface-mounted components on boards of robotic manufacture. In the left section of the case are switched-mode power supplies. The two power amplifiers occupy the larger remaining section. Eight power MOSFETs – four per channel – can be seen sandwiched against the heatsink (bottom of the picture).

The Étude's rear panel has both balanced (XLR) and unbalanced (phono) inputs. Only one can be used at a time as no switching is provided. Note also the chunky WBT speaker terminals, and the polarity-invert switches that enable the two amplifier channels to be bridged, converting the Étude into a claimed 300-Watt mono powerhouse.

"this is one hell of a rhythmic amplifier – snap and pace are both evident"

the solid grip the Étude has on bass drivers – even with older recordings that started life in the analogue domains of the 1960s and 1970s. Paul McCartney's bass on Please Please Me (remastered CD FLAC rip) was taut and easily-definable. So too was the funky Wyman bassline that carries the Stones-go-disco of Miss You (CD rip) – but not to the detriment of the other players.

A completely different composition, the jungle of Goldie's Inner City Life (CD rip) circa 1994, shows that sheer bottom-end depth isn't an issue; other electronic music merely reinforced my opinion.

The low end also happens to be clean, even at listening levels that might annoy your neighbours. That Goldie track, and its insistent electronic rhythms, also revealed the sheer speed and flow of the Étude. This is one hell of a rhythmic amplifier – snap and pace are both evident.

A switch to classical, specifically the LSO Live/Noseda recording of Britten's War Requiem (24-bit/48kHz FLAC), proved that Chord's little amp is capable of taking wide dynamic swings in its stride – the orchestra and choirs were given appropriate perspective and scale. At the same time, the Étude does justice to this dark piece's rich tonal palette with a neutral yet musical presentation.

For sheer resolving power, I turned to Keith Greeninger and Dayan Kai's stripped-back Looking For A Home (DSD64). The subtleties of this recording, including the string chatter of the acoustic guitar and tiny vocal breaths, helped the Étude to impart a stunning sense of realism – this atmosphere was aided by an accurate ability to recreate the performance space between my speakers. It's difficult to find flaws with an amplifier like this.

CONCLUSION

The principles behind this amp may go back nearly 40 years, but good ideas can't be kept down – especially when Chord Electronics' engineering talents are allowed to bring them into the twenty-first century. Such work has paid off; what we have here is a solid-state amp that transcends its modest physical dimensions in terms of the scale of music reproduction it can muster. Its speed, meanwhile, makes for pace and timing that grip your attention and won't let go. Small, powerful and impressive.

MEASURED PERFORMANCE

Power from the Chord Electronics Etude amplifier measured 74 Watts into 8 Ohms and 132 Watts into 4 Ohms, slightly less than the 150 Watts claimed. Mono blocked it will produce 264 Watts into 4 Ohms.

Both the phono socket and XLR socket inputs need 0.9V for full output, close to the standard 1V, but all the same a preamplifier is necessary except with silver disc players (2V) having a volume control.

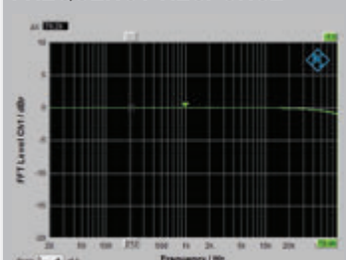
Distortion levels were low in the mid-band at 0.04% (1W) and 0.04% just below (-1dB) full output. There was some rise in distortion at high frequencies (10kHz) however, to 0.27% at 1W as shown in our analysis – not a low figure, so there might be some edge to the sound.

Frequency response measured flat from 6Hz to 80kHz (-1dB), changing little between 8 and 4 Ohms, any output network having little effect.

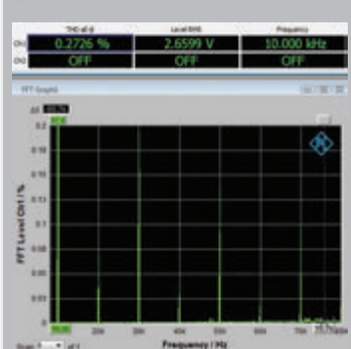
Output impedance measured a low 0.11 Ohms, giving a high Damping Factor of 73. Noise was low at -103dB IEC A weighted.

The Etude measured well enough, but it had more high frequency distortion than is common nowadays. **NK**

FREQUENCY RESPONSE



DISTORTION



Power	**74W**
Frequency response (-1dB)	**6Hz-80kHz**
Distortion (10kHz, 1W)	**0.27%**
Separation (1kHz)	**90dB**
Noise (IEC A)	**-103dB**
Sensitivity	**900mV**
Damping factor	**73**

CHORD ÉTUDE £3,900

OUTSTANDING - amongst the best.

VERDICT
Great sound from a small package – but expensive.

FOR
- rhythmically adept
- dynamic
- small and light

AGAINST
- price

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