BEL CANTO
e1X DAC/CONTROL & e1X AMPLIFIER

PREAMP & STEREO POWER AMPLIFIER

Why Minneapolis-based John Stronczer, the founder and chief designer of Bel Canto, who once described himself to an interviewer as "American by birth and French by orientation" decided on an Italian name for his company was always a mystery to me until I read a review of one of his Evo amplifiers in which the reviewer (Steven Stone) wrote "Bel Canto's original products were single-ended tube amplifiers. These large, hot, low-powered behemoths have very simple circuits that, although inefficient, produce wonderfully lush, beautiful sound. That's why founder John Stronczer named his company Bel Canto, which is Italian for beautiful singing."

E1X DAC/CONTROL PREAMP

Bel Canto's e1X DAC/Control Preamp is a complex device, though you'd never know it by looking at its front panel, which has a single rotary control and a headphone socket. Which begs the question of which is better: a single multi-function control or a front panel full of buttons?

Funnily enough, my answer changed from the one to the other over a single weekend. On Friday, which was the day my review sample arrived, I was all for buttons.

On Monday, just three days later, I was a firm believer in multi-function controls. It all had to do with my experience over the weekend.

My wife and I had been asked by friends to stay the weekend. After a very pleasant day touring vineyards in the Barossa we were back at their place enjoying some of what we'd purchased from the cellar doors when Mike (not his real name) asked if I'd look at his system for him, because he didn't think that it was sounding as it should. Now Mike absolutely loves his music, has a huge collection of LPs and a somewhat smaller one of CDs, and his system is very nice, with a carefully curated assembly of synergistic components into which I had absolutely no input at all.

The first problem was that I couldn't help him with his sound problem because he couldn't get any sound from his system at all. "Funny, it was OK yesterday," he said. He was pressing buttons rather randomly on the front panel of his amplifier, and every time he adjusted the volume to see if he'd got a result, I heard a scratchy sound from the left loudspeaker, so something was amiss. So of course I offered to take over.

My first problem was that his amplifier was on the floor and his system was in his 'man-cave' at the back of the house, which had only one window and a single light. I had to lie down on the floor (literally) in order to see the front panel at all. Then when I was down there, it was so dark and the writing on the front panel was so small that even using the light on my phone it was difficult to see which button did what.

The no-sound problem was quickly solved. It turned out that his son, who was visiting in the school holidays,

had plugged his phone into the system and switched it to the auxiliary input, which Mick never uses. He simply leaves the input selector on phono and presses the CD Direct button whenever he wants to listen to a CD. But once we had sound, it was obvious there were some fairly glaring anomalies, again attributed to his son, who was unfamiliar with his system, so various other controls were inappropriately set. Trying to work all this out while lying on the floor using my phone to illuminate the buttons and work out what was what had me cursing buttons (silently of course!). But the harsh light of the phone also revealed that the amp's proximity to the floor, along with the fact that Mick's wife refused to set foot in his domain (or was not allowed, I got two different stories on that one!) meant that all the knobs and buttons had a fairly generous covering of dust and carpet particles, so I immediately had a fairly good idea of why the volume control made scratching sounds (although this wasn't the problem I'd been asked to trouble-shoot) and why some of Mick's button-pressing might not have been terribly effective.

All this meant that we spent Sunday disassembling his system, moving it all to his studio (he's a very talented artist, and the difference in the lighting conditions between his man-cave and his studio was more than dramatic), then doing more disassembly and spending several hours with an air compressor, several of his artists' brushes, cleaning solvent, side-cutters and P2000 wet 'n dry before re-assembling the entire system.

All of which reveals why, on the Monday, when I resumed writing this review, I was now a fan of multi-function controls! For a start, you don't even have to see the control in order to use it. Then there's only a single control, so there's far less to go wrong (or get dusty). And a multi-function rotary control will be an optical encoder, so it really doesn't matter if it does get dusty.

But there are rotary controls and there are rotary controls, because some are more difficult to use than others, due to poor programming decisions made by the manufacturer. So, for the record, Bel Canto's control is so easy and intuitive to use that most people won't need to refer to the *Owners' Manual* at all. But if you do, the fact that Bel Canto can explain every single one of its functions in just a single page (page 5) is proof of how easy it is to use.

The only 'non-intuitive' issue with using the control is that you have to know what options are available for each sub-menu, because they're not 'previewed' on the front-panel display. So, for example, you have to know that the built-in phono stage allows you to choose between four different gain settings (40, 46, 60 and 66dB) before you start setting this particular parameter. You should, however, already know what features are on offer as a part of the purchasing process itself — such as reading this or some other review of the e1X DAC/Control Preamp, or simply having them shown to you by your retailer.

> "I was intrigued by Bel Canto's provision of a Tilt control rather than the usual bass and treble controls, which it 'kind of' replicates

In the extremely unlikely event that you don't know what settings are available, they are all explained in detail on pages 6 and 7 of said *Owners' Manual*, complete with handy and informative graphs to explain the e1X's Tilt, Bass Eq and Main HP options.

I was intrigued by Bel Canto's provision of a Tilt control rather than bass and treble controls, which it 'kind of' replicates. I say 'kind of' because whereas with bass and treble controls you can boost both high frequencies and low frequencies at the same time, with a Tilt control whenever you boost the bass frequencies you reduce the high frequencies at the same time and whenever you boost the high frequencies you simultaneously reduce the low frequencies. So in essence you're 'tilting' the otherwise-flat frequency response one way or the other which, I guess is exactly why it's called a Tilt control.

Interestingly, after not having seen any component fitted with a Tilt control for at least twenty years, I've recently seen half-a-dozen, so I guess it's now either a 'flavour of the month' control or manufacturers are using the same OEM software/hardware IC.

In the case of the e1X, you get ten different tilt options, from –5 to +5, with the maximum settings offering a maximum of 3dB of boost and cut. So if you choose the –5 setting, for example, you'll get –3dB of cut at 20Hz and +3dB of boost at 20kHz. The centre frequency (or the tilt axis or hinge point if you prefer) is at 775Hz.

The Bass Eq button is 'kind of' a bass tone control control in that it allows you to cut or boost low frequencies, again from –5 to +5, with the 'maximum' settings offering a 3dB of boost and cut. The difference between Bel Canto's Bass Eq control and a bass tone control is that whereas a bass tone control will have an effect on frequencies all the way up to 1kHz, Bel Canto's Bass Eq control has no effect on frequencies above 350Hz. Unlike some Bass Eq controls, which are peaking types, Bel Canto's Bass Eq control action is 'shelved' so that if you choose, say, +1.6dB of bass equalisation, the frequency response below 350Hz will progressively boosted with decreasing frequency to end up at +1.6dB at 120Hz, after which it will remain at this level all the way down to 20Hz.

As for the that 'Main HP' control, it implements a second-order high-pass filter for the main loudspeaker output so that you can better-integrate a subwoofer into your system (about which I'll talk later in this review). It gives you nine turnover points, starting at 40Hz then moving up in 10Hz increments to the maximum of 120Hz. Not planning on using a subwoofer? Then you can turn the filter off completely.

There's also a 'Sub LP' (Subwoofer Low-Pass) filter that allows you to interpose a complementary 2nd-order low-pass filter into the circuit of the e1X's analogue line output (not the main line output!).

Obviously, being a complementary circuit, you again get nine turnover points, starting at 40Hz then moving up in 10Hz increments to the maximum of 120Hz, plus the option of not having the filter in-circuit at all. You can also adjust the output voltage of the line output from –6dB to +6dB in 1dB steps. I am not 100 per cent sure of the usefulness of this particular circuit, but I guess it's better to have the ability to do this at this point in the signal chain than not.

△ THE BEL CANTO E1X DAC/CONTROL-PRE PROVIDES ALL THE DIGITAL INPUTS YOU COULD NEED, PLUS IT'S BOTH ROON AND MQA COMPATIBLE SO IF YOU HAVE A ROON ACCOUNT, YOU CAN USE ROON REMOTE TO CONTROL PLAYBACK OF YOUR DIGITAL FILES

> If you have a stereo system that includes a subwoofer, you should make listening to this Bel Canto pair a priority

ANALOGUE INPUTS

The Bel Canto e1X has three analogue inputs one of which is a phono input and the other two line inputs. All are accessed via RCA terminals. The phono input has four different gain settings — 40dB, 46dB, 60dB and 66dB — as mentioned previously, which means you can deploy phono cartridges with nominal outputs of 0.25mV, 0.5mV, 2.5mV or 5.0mV. In order that these can be either moving-coil or moving-magnet designs, you are also able to select the load applied: 50Ω, 100Ω, 500Ω, 1kΩ or 47kΩ. If you don't need one or more of these inputs, they can be "hidden" from the input selector switch so that you won't have to scroll through them. And if you'd prefer to name them to reflect components in your own system, rather than the default 'PHON', 'LIN1' and 'LIN2' you can — so long as you stick within the four character limit and use only upper or lower case letters or numerals. At the very least you should change these to 'Phon', 'Lin1' and 'Lin2' because it looks so much better on the e1X's otherwise basic front panel display.

DIGITAL INPUTS

The Bel Canto e1X DAC/Control Pre provides all the digital inputs you could need, plus it's both Roon and MQA compatible so if you have a Roon account, you can use Roon Remote to control playback of your digital files. To do this you will, of course, have to use the Ethernet input, which accepts up to 24-bit/192kHz files and DSD64 in DSF format. For higher rates you'll need to use the USB input, which accepts up to 24-bit/384kHz in PCM, and MQA and up to DSD128 in DoP format. The other digital inputs (AES, SPDIF and Toslink) are all capable of 24/192 performance.

If you don't subscribe to Roon, you can instead use Bel Canto's free SEEK app to browse through your stored digital music (no matter where it's stored), then play it back. You can load the SEEK app onto your tablet or smart phone but at the time of writing, that device would have to be made by Apple, because the app is iOS-only.

REMOTE CONTROL

The Bel Canto e1X is provided as standard with a very handsome infra-red remote control that is also heavy. So heavy ,in fact, (362 grams) that if you needed to grab a weapon for self-defence, it would be a very good choice! This remote controls only the hardware-related components of the e1X: you can't use it to select and play music. For that, you need to use Bel Canto's free SEEK app.

SPECIFICATIONS

I know it's unfashionable to refer to specifications these days, but I usually can't help myself and when I looked at those provided with the e1X DAC/Control Preamp I saw that in an otherwise extremely comprehensive set of specs there was one that was missing — the frequency response. It only took a moment to realise that Bel Canto is implementing its many response-tailoring features including Tilt, Bass EQ, High-Pass and Low-Pass filter options digitally, rather than by analogue means. This means that all analogue audio signals delivered to the e1X's input are converted to digital internally by an A–D converter for processing before being converted back to analogue by a D–A converter and the sampling and conversion processes required to do this place an upper limit on the unit's high-frequency response.

The same high-frequency limitations apply to the e1X Stereo Power amplifier but this time it's not because of A-D-A conversion but because of the use of Class-D amplification (Bel Canto puts the –3dB point of the e1X Stereo power amplifier at 50kHz.)

Although the upper frequency response limit of this pair will be dictated by the power amplifier, I think I would have liked some kind of bypass circuit to be fitted to the DAC/Control Preamp.

FRONT PANEL DISPLAY

I rather liked that the very first thing the e1X does when it turns on is light up every single element in the front panel display (in three additive stages) to create a large, blu-ish white rectangle so you can see if you have any dead pixels. After this it shows in turn the company's name, the product's model number and then the software version it's running until finally showing the active input (at the left of the display) and the volume setting at the right.

E1X STEREO POWER AMPLIFIER

The weight of the e1X is a dead giveaway that it's a Class-D design with a switch-mode power supply, but even if you don't pick it up you can tell from its size, because there's no way you could cram the power supply required for a Class-AB design rated at 250-watts per channel into such a small chassis. But what type of Class-D amplifier stage is it using? Is it one from Hypex, or Purifi, or IcePower? (Between them, these three manufacturers supply Class-D modules to almost every high-end manufacturer that's building Class-D amplifiers.)

Look inside the e1X and you'll find that Bel Canto is using two 400-watt NCore Class-D modules from Netherland-based company Hypex's NCcore range. "The output stage is a low gain NCore Class-D stage that provides extremely low noise and distortion while delivering up to 30 amperes of current," says Stronczer. "The overall architecture of this amplifier — along with the other NCore-based products in our line — is a two-stage architecture with no global feedback."

Hypex says of its NCore 500 OEM module: "The NC500 OEM amplifier module is an extremely high-quality audio power amplifier module which operates in Class-D. Not only does it offer a way for audiophile music reproduction to continue in an ever-more energy-conscious world, its measured and sonic performance actually raises the bar for audio amplifiers of any description. Operation is based on a non-hysteresis 5th-order self-oscillating control loop taking feedback only at the speaker output. Furthermore, the NC500 OEM is an unbuffered amplifier leaving the implementation of an input buffer up to the manufacturer. The NC500 is practically devoid of any sonic signature so this external buffer is a good way of tuning in a 'house sound'."

Hypex rates each NC500 OEM Class-D module with an output of 400-watts into 8Ω, and 700-watts into 4Ω but these are peak figures based on a single test frequency (1kHz) and a distortion level of 1 per cent. Bel Canto rates the e1X somewhat lower, claiming an output of 250-watts per channel into 8Ω, and 500-watts into 4Ω. Interestingly, Bel Canto used IcePower Class-D modules (made by Bang & Olufson) in its REF500 amplifiers and Hypex modules here.

Stronczer may not have designed the second stage of the e1X's two-stage architecture, but he did design the first (input buffer) stage, which is a very fast, low-noise Class-A amplifier with a single-stage folded cascode architecture and more than 500mA of peak current output capability that has a very high open-loop bandwidth in order to enable low distortion levels through the audio band. Bel Canto says this single-stage high-current amplifier stage (which it refers to as an SSHA) is implemented using a vertical modular design to permit the best use of IC-based and discrete component design. "The SSHA module brings a further element of dynamic resolution and contrast to the NCore amplifier," says Stronczer. The SSHA stage delivers either 14dB or 20dB of gain, depending on which internal switch setting you use while the NCore module adds a further 13dB, so the overall voltage gain of the amplifier is either 27dB or 33dB.

Rather than design his own power supply Stronczer again turned to Hypex for an off-the-shelf one. He uses that company's SMPS (Switch Mode Power Supply) S1200 which is a 1,200-watt supply specifically designed to be used in combination with Hypex's range of UcD and NCore amplifier modules.

LISTENING

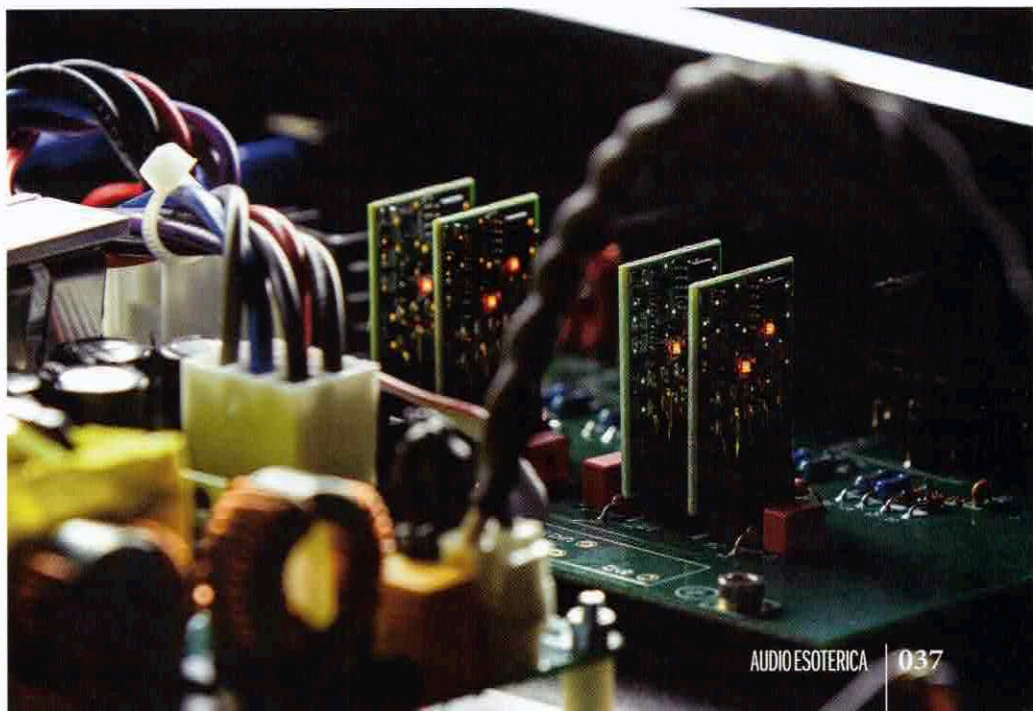
It was only when I came to actually use the remote control to adjust volume during my listening sessions that I realised it has a fixed scrolling speed and scrolls through every one of the 0.5dB steps that Bel Canto makes available in order that you can precisely set your desired volume level. This means that should you decide to use it to ramp up from minimum to maximum volume, you'll be waiting around 22 seconds.

So if you decide to make major volume control changes, you'd be better-advised to use the 'Mute' button on the remote.

If you follow my advice you'll find a 'hidden' feature of Bel Canto's remote, which is that it has two settings: 'Soft' and 'Mute'. 'Mute' mutes the volume entirely, while 'Soft' knocks it back by not quite so much (10dB, actually). I say it's a 'hidden' feature because it's not mentioned in Bel Canto's *Owners Manual*.

I rather expected that the e1X's front panel display would show 0.0 to 100, but in fact, if you press the 'Up' volume button once you've reached 100, the display shows 'Max'. Because of this, I rather expected that if the display was showing 0.0 and I pressed the 'Down' volume button, the display would show 'Min', but it doesn't. (And so far as I could tell, '100' and 'Max' are exactly the same volume level.)

▽ BELOW YOU CAN SEE THE FOUR SINGLE-STAGE HIGH-CURRENT AMPLIFIER STAGES SITTING VERTICALLY ON THE MAIN PRINTED CIRCUIT BOARD. BEL CANTO CALLS THESE SSHA MODULES



SPECIFICATIONS

Bel Canto e1x Stereo Power Amplifier

Price: $10,100 (RRP)

Power Output (8Ω): 250w/ch
Power Output (4Ω): 500w/ch
Minimum Load: 2Ω
Frequency Response: 0Hz–50Hz ±3dB
THD+N: 0.002% (1w/1kHz/4Ω)
IMD (CCIF): 0.0003%
Output Noise: 35μVRMS (A)
Gain: 27 or 33dB (Selectable)
Damping Factor: >500
Output Impedance: <16mΩ
Power Consumption: 44W
Standby Consumption: 0.5W
Dimensions (WHD): 451×400×83mm
Weight: 5.9kg

Bel Canto eX1 DAC/Control Preamplifier

Price: $11,000

MM/MC Input:
Input Sensitivity: MM: 2.5–5mV; MC: 0.25–0.5mV
Input Load: MM: 47kΩ; MC: 50ΩΩ, 100Ω, 500Ω, 1kΩ
RIAA Accuracy: 50Hz–15kHz ±0.25dB
THD+N: <0.01% (A-weighted)
S/N Ratio: >70dB (A-weighted)

Line Inputs:
Maximum Input: 2.2 VRMS
Input Impedance: 10kΩ
THD+N: 0.003%
Dynamic Range: 110dB(A)

General:
Dynamic Range: 126dB (A)
THD+N: <0.001%
IMD (CCIF): <0.001%
Power Consumption: 20-watts
Dimensions (WDH): 451×400×83mm
Weight: 6.4kg

Contact: Absolute Hi End on 04 8877 7999 or at www.absolutehiend.com.au

The very first music I played using this Bel Canto combo was Fiona Apple's wonderfully titled album "The Idler Wheel Is Wiser Than the Driver of the Screw and Whipping Cords Will Serve You More Than Ropes Will Ever Do." It's a title that captured my imagination even though I have no idea of what it means. The first first track (*Every Single Night*) had me impressed by just how quiet this Bel Canto combo is. There was absolutely no background noise at all, meaning that I could really hear all those weird things Apple has going on in the background that are usually lost in the noise floor of most amplifiers.

The same was true of *Daredevil* which is an outlandish track that just doesn't work unless you have a first-class sound system. First there are the rhythmic textures of the various disparate percussion instruments, and the stabbing sounds of Apple's piano, all of which are fiendishly difficult to reproduce, yet the Bel Cantos e1Xes made it seem easy. But then listen to how well the Bel Canto e1Xes deliver the multiple acoustic spaces Apple used when creating the various sound effects. If you listen using ordinary amplification, you just won't hear this — everything will appear to have been recorded in the same acoustic space.

The sub-bass throb that leads in on *Valentine* was delivered perfectly by the Bel Cantos, neither too dry nor too wet, which are the two most usual mistakes made by many amplifiers. Listen, too, to how Apple's vocal strategies change during the song — the catches in her voice, the inflexions — and you're just going to love the fade at the end. These strategies are all magnificently rendered by the Bel Canto e1Xes.

If you've never heard anything of Fiona Apples, you simply have to listen to *Jonathon*. The sounds are amazing, but it's the actual composition itself that is flawless — musically, this is a straight-out genius composition. The minor keys against the majors, the use of semitones, it's a jaw-dropping musical experience. The very first time I heard it, I was so amazed by the music that I didn't even notice the lyric, much less Apple's voice. Once again, the Bel Canto e1Xes were more than up to the task of delivering her genius. Pay very special attention to the closing moments!

Listening to Bjork's *Cocoon* (from "Vespertine") revealed that the ability of the Bel Cantos e1Xes to deliver transients (the glitches) is second to none. These are superbly fast amplifiers, so fast that the effects Bjork incorporates may well have you fearing for your tweeters, so turn up the volume at your peril. Listen to the beautiful high-frequency sounds she's captured a few tracks later on *Pagan Peril* and marvel that the Bel Cantos can deliver them so effectively. On *Frosti*, which follows, the rhythmic perfection of their delivery is awesome.

The same transient capabilities were again ably demonstrated to me when I fired up Radiohead's "In Rainbows", particularly in the opener *15 Steps*, but also right throughout the album. In *15 Steps* I admired the way the Bel Cantos were able to keep such incredible separation between the left and right channels whilst at the same time keeping the vocals and bass perfectly centred. There's absolutely no bleed at all!

Turn up the volume on *Nude* and you'll be able to appreciate the massive power delivery of the Bel Cantos, which includes the almost second-sense knowledge that there's still plenty of power in reserve. The fullness of the sound stage and the complete lack of distortion are also stunners and you can hear that Yorke's really into it, putting his utmost best into his performance, and you sense that Phil Selway and Colin Greenwood realise this and lift their usually tight partnership to a point where they sound arc-welded together. The sound of the finger-picked acoustic guitars on *Faust Arp* is perfect, as is the string sound of the Millennia Ensemble. On lesser amplifiers, these strings can sound syrupy, sweetened, and lacking in texture, but with the Bel Canto e1Xes the sound was accurately and authentically realised.

Another album you need to hear loud via the Bel Cantos and a great pair of speakers is The Strokes' "This Is It". Do this and I'll guarantee you'll be in for the duration right from the title track opener. The sounds of Nikolai Fraiture's bass and Fabrizio Moretti's kit are totally real, bursting from the speakers, driven by the Bel Canto e1Xes. The pair are again front and centre on *Someday* and again on *Last Nite* and yet again on my personal favourite *Hard To Explain*. It's all just rock n' roll, but that's the beauty of it, really, and the Bel Canto e1Xes do it oh-so-well.

CONCLUSION

If you have a stereo system that includes a subwoofer, you should make listening to this Bel Canto pair a priority, because integrating a subwoofer into a high-end two-channel system is very tricky to do without the tools at hand to do it. And by 'tools' I mean the high-pass, low-pass, phase and sub-gain circuits that are fitted to the Bel Canto e1X DAC/Control Preamp. These are what will enable you to integrate a subwoofer perfectly with your main loudspeakers so that you will always be guaranteed an improvement in the sound of your hi-fi system. (And a subwoofer will improve the sound of any hi-fi system, no matter how large your main speakers might be).

And if you're not planning on using a subwoofer, you should still make listening to these Bel Canto e1Xes a priority, simply because they work so well and sound so amazing.