

861

FROM MERIDIAN

At last, Meridian's 800 series arrives. Here's our assessment of the flexible, futureproof and fiendishly clever 861 digital processor

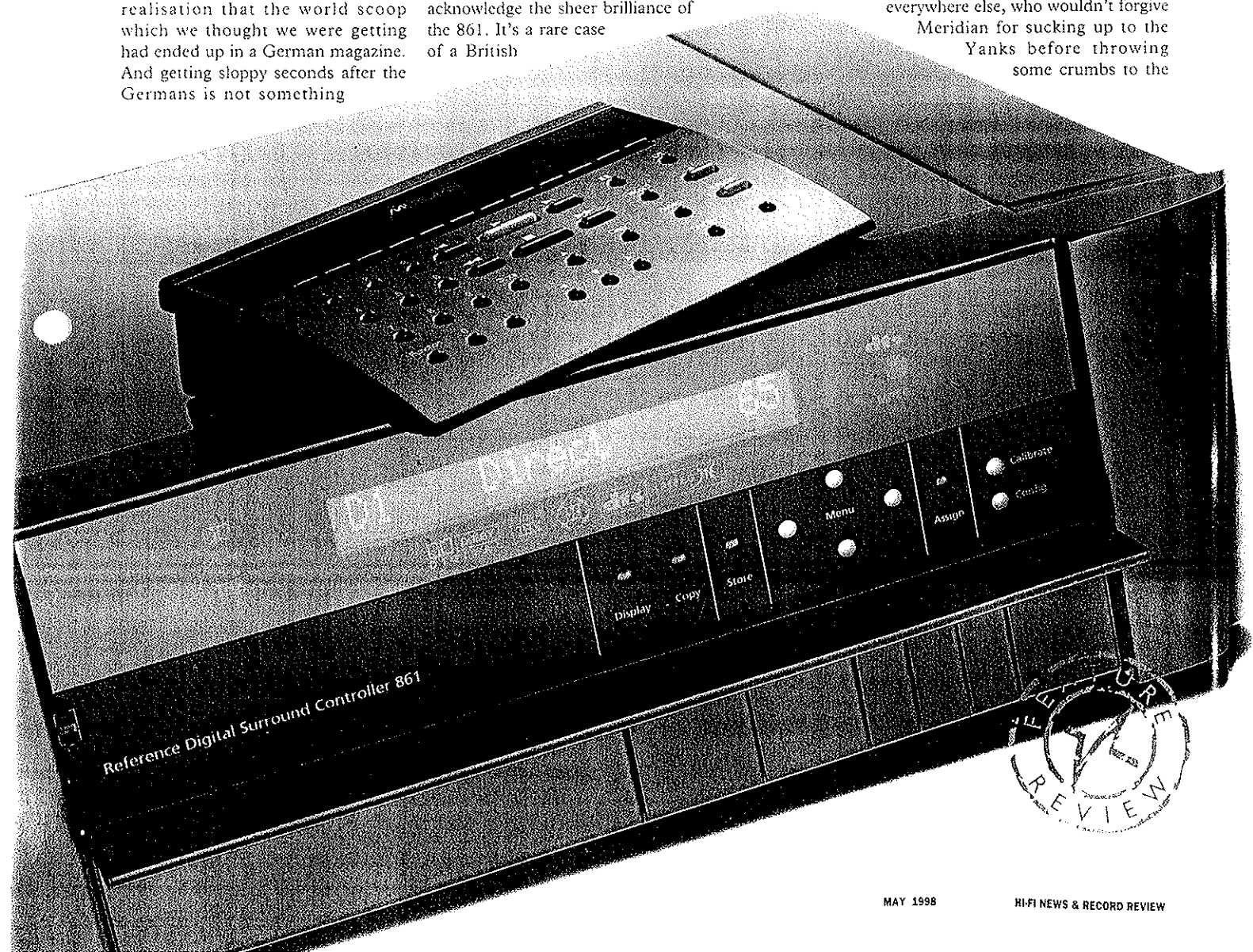
by KEN KESSLER

No reviewer can be unaware that the tone of a review is just as important as the verdict. Thus it's possible to say one thing and imply another. So let me make it clear from the outset that acquiring a Meridian 861 for this review was not a pleasant experience. It involved delays, frustrations, missed deadlines and eventually the realisation that the world scoop which we thought we were getting had ended up in a German magazine. And getting sloppy seconds after the Germans is not something

that this particular Europhobe enjoys. I'm telling you this up front so you know exactly why the final paragraph will be drawn from me like an impacted molar. In other words, I wanted to hate the Meridian 861.

But professionalism must override such concerns. While the bitterness festering in me prevents me from saying 'it was worth the wait', I must acknowledge the sheer brilliance of the 861. It's a rare case of a British

manufacturer leap-frogging over the might of the American high-end, aiming for dominance in a field which all will admit is an American speciality. And if you read that closely, you'll deduce that Meridian also gave an 861 to Americans before they gave one to us. But, because surround sound is a success across the Pond and a virtual disaster everywhere else, who wouldn't forgive Meridian for sucking up to the Yanks before throwing some crumbs to the



depressed, insignificant, quasi-Third World home market?

One look at the 861 offers another reason for it appealing more to 'foreigners': it's enormous. The 861 measures 480x170x415mm (wdh) and weighs 14.5kg — not your typical surround-sound controller-cum-pre-amp. But the girth is a result of the unit's flexibility, providing the space needed to house the PC-like cards which tailor the 861 to an individual's requirements. Those cards, like the ones used in Theta's Casablanca and other modular, customisable control units, cover the types of digital and analogue inputs on offer, as well as offering unexpected delights like phono stages.

INPUTS AND OPTIONS

To the basic £5545 chassis, including the main computer, D/A and A/D DSPs and the very minimum number of digital inputs, are added the specific options. Check out the shopping list:

Analogue input unbalanced, six input pairs; analogue input balanced, two pairs; analogue input unbalanced, three pairs; m-c phono input and/or m-m phono input; digital input, two coaxial and two Toslink optical; digital input, three AES/EBU XLRs and one glass fibre; demodulator; slave patch for Meridian Digital Theatre systems; output, digital, eight channels (coaxial); output, analogue unbalanced, four channels; output, analogue balanced, four channels; tape two variable analogue, one headphone; video, four composite, four S-VHS, tape and monitor; video, eight composite, tape and monitor; video component in/out for on screen display; video, eight S-BS, tape and monitor.

Given that the card prices fall between £340 (for balanced analogue input) and £575 (for analogue outputs), and that a typical listing will feature a sensible mix of analogue and digital inputs and outputs, you can expect the 'average' 861 to cost its owner £8000-£9000. Which places it up against the very best the industry can offer. A Meridian 861 is ordered like a car, with the customer discussing with the retailer what's needed and what's wanted; Meridian then configures the 861 to order. And that means loading it into a computer for final set-up. But more of that anon.

The card system, aside from offering total flexibility, should also provide resistance to obsolescence, in the manner of a computer which can be updated as required. But this depends entirely on both the manufacturer staying in business for the foreseeable future and maintaining an interest in the product. While I expect Meridian to

be around long after I've shuffled off to meet my maker, I am reminded of the radical, forward-thinking Meridian Component System of the mid-1980s. It consisted of long, thin modules like squared-off Toblerone bars which clicked together for 'wireless' connection and which were quite unashamedly designed to work together electronically and aesthetically. And I also remember it being abandoned.

Whatever, the 861 also betrays another form of dependence removing it from the realm of conventional hardware. Because it is so subservient to computerisation and because it is a product of a company which takes hands-on involvement during set-up away from the user, the 861 must be treated as a one would a PC; it imparts in the user the same sense of helplessness unless the owner is a computer boffin. And if you think I'm exaggerating, note that the set-up involves the dealer arriving at the customer's house with a notebook computer bearing special software designed for setting up every parameter on-site.

Beneficially, the dependence on a PC for set-up means easy updating of the 861's software as required, for example, when new digital formats appear. And while I'm not making a value judgement about this — who can argue with a process which ensures that the product is set up perfectly in the user's home? — it must be pointed out that the end user is rendered impotent when something goes amiss. It makes even something we take for granted as a simple action, like adding a new source component or moving the listening seat, a task which must involve the retailer. To put it another way, I'd hate to own an 861 which suffered a software malfunction on New Year's Eve.

Because set-up is taken out of the hands of the owner, all that's left for him or her to do is operate the 861, either via one of the company's remotes, or using the few buttons on the front panel. Source selection and volume are the obvious commands to access, the former also dealing with a number of pre-programmed functions. The intense, involved set-up doesn't just allow for speaker size, number of channels or the distance of the listener from the speakers. It also accounts for which default effects are applied to a source, automation then taking over when you access multi-channel sources. Hence, the review set-up featured Pro-Logic for TV and VCR sound, the Theta Data III laserdisc player was set up to trigger either THX DTS and THX Dolby-

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Digital as required, and the Meridian 586.2 DVD player triggered Dolby Digital THX. But given that there are shades and colours in between, you can also use the front-panel DSP button to scroll through surround settings for music-only programme, unprocessed stereo, and others, including Meridian's Trifield mode.

What I didn't get to sample is the 861's ability to go beyond 5.1 channel surround, simply because I don't have a 7.1 or even 9.9 set-up. Additionally, I had no material which would trigger MPEG. But within the confines of five channels, I was able to try conventional stereo CDs, DTS 5.1 channel CDs, 96kHz/24-bit audio DVDs defaulting to 48kHz/20-bit, laserdiscs of both the Dolby Digital and DTS persuasions and video and NICAM broadcasts in Pro-Logic, as well as playing with the various 'alternative' modes. And while the latter are interesting, they are very much matters of personal taste, so I concentrated on the standard formats.

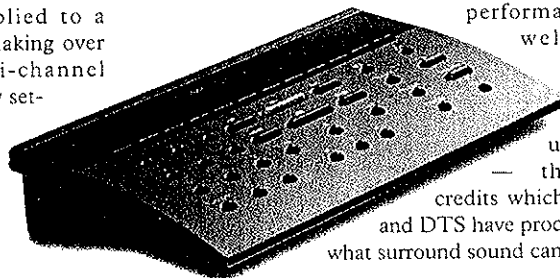
ALL ENVELOPING

Auditioned through a mix of Apogee and Sonus Faber speakers, with amplification courtesy of Marantz and Acurus, the 861 immediately staked its claim as one of the most cohesive, enveloping surround-sound machines I've ever used.

That initial response was an immediate result of being able to compare it with its less expensive sibling and directly to the Lexicon DC-1, but had to rely on memory *vis à vis* the Casablanca. Given that the Casablanca and the 861 (plus the Krell KAV-S, the Proceed and a few others) are rivals, I wouldn't expect anyone shopping in the high end surround sector to buy one without an intense session with each of the others.

Quite clearly, the 861 excels at filling in the gaps between speakers with a facility exclusive to processors above a certain price point — that price point being the £4000-£5000 you'd pay for a Lexicon or the 500-series Meridian alternative. If anything betrays budget processors, it's the way they fail to form a hole-free 360° envelope. Naturally, certain scenes better reveal this capability, especially rainfall, live music performances with a well-recorded hall and audience, and — unsurprisingly — the opening credits which both Dolby and DTS have produced to show what surround sound can offer. One of

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MERIDIAN 861

the best sources for this is Delos's excellent Surround Spectacular on DVD, and the 861 handled this selection of short clips precisely as Dolby would like: impressively.

And 'impressive' rather than 'realistic' is the adjective which comes to mind most often, mainly because the precision with which the Meridian places specific sounds is so cut-glass and so exact that it dazzles as much as it convinces. Once the novelty of such exactitude wears off, and you allow yourself to forget hardware, competing formats, prejudices and the like, and you simply wallow in the wash of sound, it gets better. But there's an inescapable edge to the proceedings, the characteristic which distinguishes digital from analogue and transistor from tube, one which will delight some while antagonising others. It's here that the warmer Theta sablanca veers away from the Meridian, and where personal preferences become the final arbiters.

Quite clearly, the 861 is an example of intellect over emotion. The lab-grade/mil-spec pure science of it all can be found in the less-expensive Meridian package, while the Lexicon occupies a space between the Meridian and the almost purely audiophilic Theta. And as such, each will appeal (price notwithstanding) to a different sort of listener. The Meridian is ever-cool, ever-correct, and it shines best with modern recordings, gosh-wow effects and the kind of transients which leave most components dragging their heels. Moreover, its Dolby Digital implementation is the best and most convincing I've ever heard, while the Lexicon betters it in exploiting the full worth of DTS.

But this isn't a matter of choosing between, say, a dozen reviewers' faves: 50W integrated amplifiers with prices differing by £10 or the Top 10 £500 two-way speakers; the choice isn't that wide. However multi-channelled our future, the contenders for the circa 1998 title in the cost-no-limit processor stakes are few in number. And, fortunately, there are no real stinkers. What the 861 adds to the competition is a non-American contender. And it's one which is so commandingly superior in so many areas that it should scare the shit out of every American company producing a surround-sound processor pre-amp at this elevated price level. Indeed, the 861 is so blindingly clever and so masterful that I'm almost willing to forgive Meridian its inexcusable behaviour.

Almost, but not quite. ←

LAB REPORT

As an exercise in the flexibility of DSP for the modern home entertainment system, Meridian's 861 processor is a unique proposition. In this instance, advanced DSP techniques are implemented for 'de-jittering' and optimising the wordlength of incoming data, to decode Dolby Digital, DTS and/or MPEG audio formats and to process the audio into a variety of user-configurable multi-channel outputs.

Meridian's proprietary digital volume control provides a succinct example of the 861's crafty code. Sure enough, peak level (0dBFS) inputs [Fig 4] will prompt output clipping at volume settings beyond 94 (equivalent to 3.45V RMS). Otherwise, the control is precisely calibrated in 98 1dB steps (displayed from 1-99), the first 24dB of which is accomplished as a sequence of 1-bit attenuation followed by 6dB of analogue range-switching. Below 75dB on Meridian's scale (1), the attenuation is purely digital, achieving a theoretical dynamic range of 140dB (or very close to 23 bits) at 55dB (2) after which quantisation errors tend to limit its range to a 'mere' 130-135dB!

This

should not be confused with its working signal-to-noise ratio, which clocks-in at 111dB (A-wtd) and which, with the disappointingly high +12dB of noise modulation, might suggest a practical range no greater than 16-17 bits. The minimal +0/-0.4dB errors in low-level resolution over a full 100dB range, however, prove otherwise.

A Motorola DSP56004 processor controls Meridian's proprietary FIFO as part of its jitter reduction scheme and, as claimed, delivers a record-breaking performance for what is, to all intents and purposes, a 'two-box' solution [see Fig 1]. With Theta's Data Basic II as host CD transport, the bulk of the 155ps total is accumulated by substrate-level data-induced patterns (3), though it's interesting to note the characteristic (if inaudible) low-rate broadening (4) seen before with the 500i566 and 506 players [HFNIRR Jan '97, Feb '98]. Typically, the very best two-box digital combinations yield a minimum jitter of around 200 picoseconds — only the best integrated players achieve 150ps or less.

In common with the latest 506 CD player, the 861 processor utilises Crystal's new '24-bit' CS4390 bitstream converter, with an equivalent 20-bit CS5335 ADC to handle its analogue inputs. The spurious ultrasonic output of the 861 [see Fig 2] bears very close comparison with that recorded for the acclaimed 506/20-

bit CD player [HFNIRR, Feb 98, p30]. Note, in particular, the residual stopband images (5) and very high-order sampling patterns (6) that crest this wave of 'shaped' re-quantisation noise.

The <power> of this ultrasonic output is not insubstantial, however, and will possibly result in a hard and generally less sympathetic sound when partnered with amplifiers that, through intermodulation, are susceptible to such ultra-high frequency noise. Nevertheless, the audioband (7) is clear of sampling patterns and, at -30dB, distortion which bests the performance of the 505/20-bit at just 0.0025% (midband). At 0dBFS this falls to 0.0006%.

In Fig 3, the classical Pro-Logic/Dolby Digital 'THX curves' are represented on a high-precision 20,000-point response plot (normalised at 1kHz and extending over 4 decades). This clearly demonstrates the LF filtering of its centre channel 'small speaker' option (8), the HF filtering invoked by 'THX Re-equalisation' (9) and the double-notches of THX's proprietary 'Timbre-Matching' (10) for the rear surround channels. Necessarily, this short treatise can only reflect some semblance of the 861's technical potential. Nevertheless, however brief our exploration, the 861 is clearly a mould-breaking product, deserving of every success.

Paul Miller

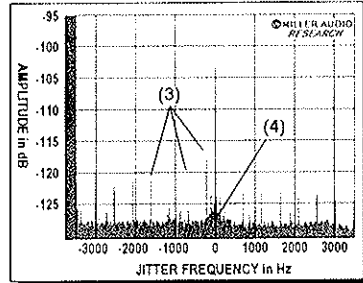


Fig 1. Meridian 861: total jitter spectrum

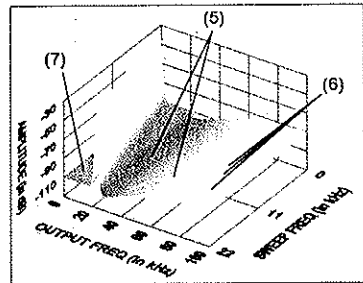


Fig 2. Meridian 861: spurious output resulting from 0-22kHz sweep at -30dB

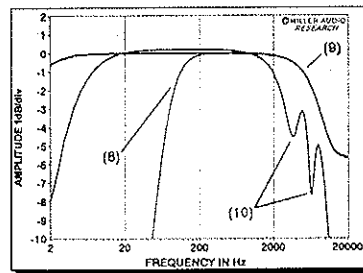


Fig 3. Meridian 861: THX responses, front (black trace), centre (red) and surround (blue)

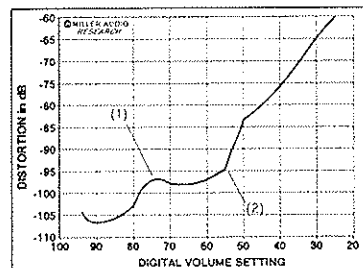


Fig 4. Meridian 861: digital volume control, distortion versus volume setting for 0dB input

Test results	Meridian 861		
	20Hz	1kHz	20kHz
Channel balance (dB)	0.1	0.1	0.1
Channel separation (dB)	125	88	72
Frequency response (dB)	0.1	0	0
Distortion (THD vs level, dB):			
At 0dB	-108	-105	-81
At -30dB	-96	-92	-68
At -60dB	-62	-59	-15
At -80dB	-35	-41	-10
At -90dB (dithered)	-20	-30	+5
At -100dB (dithered)	-	-21	-
At -110dB (dithered)	-	-12	-
Resolution (linearly error, dB):			
Error at -60dB	-	0	0
Error at -80dB	-	0	0
Error at -90dB	-	0	-0.4
Error at -100dB	-	-0.4	-0.2
Peak output level L/R	3.442/3.473V		
Relative output level ref 2V (dB)	+4.76		
Output impedance L/R	47ohms		
Intermodulation, CCIR, 0dB (dB)	-104		
Stopband image suppression (dB)	96.5		
1Hz noise modulation (dB)	+12.1		
Signal-to-noise (A-wtd, dB):			
With emphasis, OLSB	114.5		
Without emphasis, OLSB/1LSB	110.6/111		
Total correlated jitter	155 picoseconds		
Digital outputs	S/PDIF and AES/EBU		
Crystal clock accuracy	-0.2ppm		
Track access time (to track 99)	3 seconds		
Typical price (inc VAT)	from £545		

