Digital Activity

THE COMBINATION OF ACTIVE DRIVE AND DIGITAL SIGNAL PROCESSING CAN GIVE MERIDIAN'S DSP 7200 LOUDSPEAKER SOME REMARKABLE PROPERTIES, AS MARTIN COLLOMS EVENTUALLY DISCOVERED

Meridian has, with a few historical exceptions, specialised in fully active speaker designs, which it has been making for some 30 years. This can be a lonely path, since hi-fi is one of those mix'n'match fields of consumer electronics where an enthusiast can swap cables, amplifiers, sources and speakers can relatively freely. While such flexibility is certainly laudable, it can also result in unfortunate mismatches.

Some active speakers, such as the Naim SL-2, use separate electronic line level crossovers and power amplifiers, allowing for various active and also passive versions. However, in the all-in-one active speaker, the crossovers, power supplies and amplifiers are defined by the designer: you take the lot or nothing. Where such speakers are analogue, there's a free choice of pre-amp, but this DSP7200 is all digital and you may or may not use a digital system controller to select inputs, mix formats and operate as a pre-amp. Meridian supplied its 808.2i CD player/transport as a system controller, a component which also has analogue inputs for auxiliary sources, but as this review reveals, you may not wish to use this facility. The 7200 also has an S/PDIF input for PCM signals up to 24-bit/96kHz resolution.

In one respect the buying decision is easier. Control, amplification and speaker matching are out of your hands: either you like the speaker or you don't, and that's it. You can't go back and improve some of it later. But there are also significant advantages to the integrated Meridian active approach, which potentially deliver greater performance for a given engineering budget.

Full active integration has the potential, in combination, to extend the bass, increase the dynamic range, reduce distortion, smooth the frequency response, optimise directional responses, and, not least, time align the separate drivers for a more coherent output. In addition, effective efficiency may be increased, while physical size may be reduced for a given performance envelope. Predictive analysis allows for electronic driver overload protection. With intelligent remote control, many of the facilities of a versatile tone control pre-amp may be incorporated, including sophisticated features such as acoustic axis tilt and room matched bass settings. It sounds almost too good to be true, but if the intrinsic speaker design is good enough, these benefits will be apparent.

In my room this speaker is deceptive. It's larger than it looks, with particular curved shapes and surfaces that reflect the light so it looks subtly different from different angles. Its form is somehow more organic than most. One quickly adjusts, appreciating its visual simplicity and how the demanding acoustic requirements have been satisfied. In the best possible taste, I could say that this loudspeaker has been designed and built in the B&O lifestyle idiom, though Meridian might well argue that it got there first. The £17,500/pair *DSP7200* is sleek, easy to install, simple to operate, and leaves nothing to chance; there's almost nothing to fine tune or tweak. For the dealer it's a 'fit and forget' dream product.

(Indeed B&O currently makes a large DSP four-way active *Beolab 5* loudspeaker which is also time aligned, and in addition has automatic bass alignment for the room. It features exclusive acoustic lenses from La Carruba, intended to maximise the horizontal directivity and deliberately corral the spread in the vertical plane. These speakers have 16-bit 44.1kHz inputs and a total of 2.5kW of Class D Icepower amplification.)

Meridian upsamples digital inputs to 88.2kHz, to enable its apodised, pre-echo-free digital filter to function. 24-bit/96kHz inputs are also supported, though not SACD's DSD format. We heard the remarkable, analogue like effect these new filters have on CD replay with its 808.2i player (reviewed in *HIFICRITIC Vol3 No1*).

The *7200* is a substantially upgraded version of the previous *7000*, with re-designed internal electronics, new software, and improved drive units. Balanced input Class A/B low feedback power amplifiers are used, four per speaker, each rated at 100W on load, with a large low profile external heat sink for cool running. Four 24-bit 128x oversampling D/A converters are used, along with a large FIFO memory buffer input for the lowest possible jitter from almost any source. The bass alignment is a zero overshoot, 3rd-order Bessel from 90Hz to 26Hz, this obtained by DSP processing for the intrinsic 6th-order, active bass reflex. No less than 9dB of potential bass power headroom is exchanged for the chosen 'faster' bass alignment.

Multi-way loudspeakers, active or passive, inherently require low-pass (bass) filtering, and this incurs significant group delay. The virtual source for the bass may well be 3m behind the midrange. Time aligning it to the mid and treble requires that the latter are proportionately

delayed, and while there had been debate about including it at the design stage, this speaker is time aligned after all, and consequently the textbook crossovers also work a treat. Thin, screened, modestly priced, 'lay-flat' CAT-5 'interconnect' cable is supplied, a Meridian special for its SpeakerLink, using its RJ45 (Ethernet) ports for 'Meridian Comms' system management.

This is a three-and-a-half-way design with two 8.5in (210mm) pulp cone bass drivers sharing the lower 50 litre enclosure, tuned to a low 31Hz via concealed rear ports. The bass units cross over at 140 Hz and 200Hz. In its own 15litre enclosure, the 6.5in (165mm) midrange driver's flared cone uses a special transparent co-polymer of TPX and polypropylene, and crosses over at 2.6kHz to the well known 25mm aluminium alloy dome Meridian tweeter, anti-diffraction mounted, short horn loaded, and with a silver voice coil.

The curved side wall enclosure is highly inert, achieved by a unique aluminium and birch plywood composite panel material. The exterior is fine piano gloss, black or silver, colours to order, while the integrated lightweight grilles are rather neat and did not upset the performance in any detectable way – a refreshing change. The speaker also has its own control system driven by a comprehensive remote unit. Available adjustments include absolute phase inversion, balance, frequency adjustment, input selection, axis tilt, and a high dynamic range, high resolution 100-step volume. The displays may also be set to 'auto off' following commands. Maximum output is specified at 112dB spl on axis.

The speakers proved easy to install, and after some experimentation were just fine in the normal room location: 0.8m to the rear, and 1.4m to the side walls (measured from the front panel). I initially drove them *via* the flat Meridian digital 'comms' link cable, from the *808.2i* working as a transport and analogue conditioning unit, using the on-board CD drive and auxiliary analogue sources. Inputs from a phono head amplifier or a tuner are digitised here before being sent on to these pure digital input loudspeakers. (Later on I tried the S/PDIF direct input on the back of the speaker, driven via a Marantz *CD-7* player and also an old Meridian *200* series transport.)

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Sound Quality

There is so much new technology in this design that I had no idea what to expect, and in any case it is some years since I have tried a Meridian loudspeaker. Setting up was straightforward, the comms link worked straight off, the controls were left flat and the azimuth set to '-1' to align for my seated head height. Best set-up has the speaker

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axes crossing a little ahead of the listening position. Right away certain specific characteristics were evident. It's unquestionably 'active', with the grip, near effortless dynamic range, convincing integrity and authority that is typical of the breed. The stereo image was simply excellent, in depth width and focus. There was no aural confusion here, as it sounded almost effortlessly clear, with crisp stable imaging of believable width, coupled with stable off-axis placement where obviously phase displaced content so dictates.

The bass is unusually good, as powerful at very low frequencies as the two hard working 8.5in (216mm) bass units could supply, still more powerful at somewhat higher bass frequencies, and with a gracefully controlled overload character allowing it to be driven harder than one has any right to expect. The bass clearly sounded 'different', even compared with very large and extended low frequency alternatives. Something about the *7200* got closer to the truth, with tighter control, better tune playing, and an ability to differentiate confidently between percussive and sustained bass sounds. Tracks combining both at once can tend to blur into one sound, but not so with the *7200*.

Overall it sounds essentially neutral, if marginally rich and comfortable, giving a slightly distant effect that caresses rather than assaults the ears, even when playing very loud. The treble was pretty good, though familiar treble sounds had just a hint of grit and grain and were not quite as clear and pure as with some costly alternatives.

First impressions were of a considerable achievement, as a result of the time-corrected bass, the smooth phase control, and the sweet sounding digital replay filter, but then some doubts set in. While greatly enjoying it at first, I found that it could not fully hold my attention, and I began to imagine subtle errors, colorations, and frequency imbalances, as excuses to explain my mild dissatisfaction. It somehow sounded too too polite, even soft, and while there was still much to admire, I began to feel that it also verged on a kind of musical wallpaper. My objective senses fought my emotional response, leaving me in some confusion over the sound of this speaker.

I now recognised some observed lack of dynamic expression as a significant flaw. The sound was somewhat soft and slow with a slight lack of contrast, and I was sure that this was not due to the new apodising filter which had sounded so good when using Meridian's CD player in a conventional system. While I can still recommend the *7200* loudspeaker as way above average, I missed that full degree of emotional involvement that I value in music replay.

We had decided to pack up when Chris Bryant remembered we had not tried the alternative 'lower tech' S/PDIF co-ax input on the back of the speaker. I connected my venerable Marantz *CD-7* as a transport, via a good quality screened twisted pair cable, and left the second 'comms' lead in place to link the speakers. From the very first note it was blindingly obvious that the loudspeaker had been transformed, musically speaking. The sound was now so special that any thoughts about colorations, response errors *et al* paled into insignificance. It was fascinating to hear a speaker which so well commanded one's emotional responses that any debate over objective criticisms now seemed nonsensical and irrelevant.

Now those technical strengths, modestly evident previously, were drawn powerfully together in a blaze of exceptionally dynamic and well timed sounds – upbeat, and imbued with rhythmic musical expression. The bass was simply extraordinary. Yes, it has its power limits, but within its capabilities, and across a wide selection of different tracks, it provides a level of clean tune playing, clarity, speed, and meaning at low frequencies that one emerges utterly convinced of the value of a well tuned and properly time-aligned bass. This nicely correlates with the findings in the Newell/Holland paper concerning bass decay responses and time alignment for studio monitors, which Philip Newell wrote up for us in *HIFICRITIC Vol2 No1*.

I have already discussed the *7200*'s very good image depth and detail, but for me its intrinsic quality in direct S/PDIF mode is really demonstrated by the convincing portrayal of vibrato. Here it's not only highly 'focused', but on familiar recordings one is now made fully aware of that inherent 'dynamic' quality which goes with vibrato, and which is so characteristic of live sound. Used this way this speaker sounds genuinely fast, yet remains sweet and full-bodied with truly extended bass. That a Meridian was doing this surprised me, and I daresay more than a few others. This speaker became quite compulsive, demanding track after track and hour after hour of listening, to see how it now 'correctly' interpreted recordings I thought I knew by heart. I was just beginning to find minor criticisms on certain favourite pieces when I realised that the last time I had heard them sound better was on a complete passive audio system costing upwards of £60,000, and even there the bass timing was not quite as good as the *7200* driven within its limits.

In this external 'straight' S/PDIF mode sourced from an ordinary CD drive, the *7200* rocks and rocks really well. Yet it is equally adept on classical material. It shows no favouritism. My listeners were struck dumb in their enthusiasm to experience every revealed sound nuance.

I also felt that there was also some improvement in definition and the sense of life in the treble range.

I queried this change of behaviour with source with Meridian in case there was a drive fault with our *808.2i* sample, who having tried it agreed that there was a difference in dynamic presentation between the two digital feeds, but nevertheless stated that the *808.2i* drive method in its opinion still possessed more of the company's sought after refinement. Clearly an intending purchaser will have to satisfy him or her self on this matter, but I have no doubts whatsoever. Happily the *808.2i* was cleared of possible error.

Lab Report

Testing took some thought, since measurements made *via* the *808.2i* controller's analogue input gave a different result each time. This turned out to be due to processor latency, and was resolved by using *CLIO 8* driving the speaker directly at 96kHz via the S/PDIF input.

Frequency response was exceptionally uniform on axis, +/-2.5dB 30 Hz to 23kHz and was also consistent over the forward angles, showing the powerful benefits of DSP equalisation: for intrinsic driver characteristics; for the zeroing of inter driver time delay; and for the high slope Linkwitz-Riley, low phase-error, digitally executed crossovers. As might be expected, there was some loss above axis, *eg* -10 dB at the upper crossover frequency of 2.8kHz, because the optimum axis had been set at '-1' for best integration and focus at my seated ear height. Therefore the response at 15 degrees below the geometric axis was a very good +/-2.5dB to 20kHz. Laterally off-axis the midrange unit becomes mildly directive in energy terms with an increasing trough around 1.5kHz before the tweeter kicks in. Spatially averaged in the room, the listening region was provided with a wide range and uniform response 20Hz to 7kHz +/-3dB, with the usual mild roll off at higher frequencies. Clearly the speaker/room match is as good as the acoustic integration of the sources.

The tone controls were assessed, and gentle correction is available to align for different rooms, with a hinge point at 2kHz (see representative graph). In practice we used little or no adjustment, and believe that the speaker as supplied is intrinsically accurate.

The waterfall presentation for energy decay shows the near perfect time alignment evident in the pure top line, with subsequent clear space, and unobstructed succeeding decay. The decay field is also good, even though anechoic conditions were not used. Enclosure coloration was very low, the curved composite construction proving unusually effective in controlling resonance.

It was not possible to generate representative tracking distortion measurements under room conditions, but a few spot checks were made. The system clips at different powers at different frequencies, so it can be overloaded in the bass while the mid and treble carries on as if nothing has happened, somewhat increasing the effective dynamic range.

'Power' bass reaches to a commendably low 27Hz, albeit with mild port chuffing at a maximum of about 96dB spl. By 35Hz it was thundering well at a high 99dB, while at the lower and more normal 86dB level distortion was fine, better than 1%. Up at 85Hz, 96dB sound level came in at an excellent 0.1% of second, 0.15% of third harmonic distortion. For 500Hz, 96dB we had 0.2 % second, 0.07% third. Distortion in loudspeakers can vary significantly with frequency, thus at a rather loud 96dB at 1kHz it gave 0.2% second, 0.5% of third, reducing quickly at lower powers; 96dB at 5kHz was fine, with 0.4% second, and 0.1% of third. All in all these are fine distortion results.

Power consumption was quite economical, a stereo pair using about 25W on standby, increasing to 75W when powered up – fair enough considering the DSP engines, crossovers and the eight power amplifiers involved. Played at fairly high volume they reach 90W average consumption; blast them and they might scrape 350W on short term peaks, while the medium term power draw average is still just 80W a pair.

Conclusions

This exceptional loudspeaker presented two faces to us. Inexplicably, when driven *via* the *802.2i* CD transport/control centre, the *7200* sounded elegant, controlled, powerful, very well mannered, wide in bandwidth and with exceptional detail and focus. It also sounded comparatively undynamic, downbeat and uninvolving musically. It was mental torture to try and come to terms with this contradiction, though the result still qualifies for a recommendation but with a caveat to try it first.

It was so fortunate that before repacking it we tried the 'poor man's option' of omitting the £8,000 *808.2i* altogether (even though this is a wonderful standalone CD player in its own right), and simply driving the speakers from the S/PDIF output of a spare CD player. This demonstrated that the *7200* could now rock and roll with the best of them, with superior clarity, fine timing, and real grunt and dynamic authority. Whereas it had previously hinted at potentially superior bass transient qualities, now the advantage was abundantly clear. At last we could clearly hear the balance of engineering design guided by Bob Stuart's view of important psychoacoustic weighted parameters – and it works. Used in this way

it's effectively a single input system but the sonic reward is great, and the on-board remote facilities provide all the necessary controls including that 100dBx1dB step volume control. In the *7200*/S/PDIF, we heard the unmistakable hallmarks of a truly great loudspeaker. It matches a normal room well with conventional free space placement, has low distortion, a wide dynamic range, and smooth, consistent and uniform frequency responses.

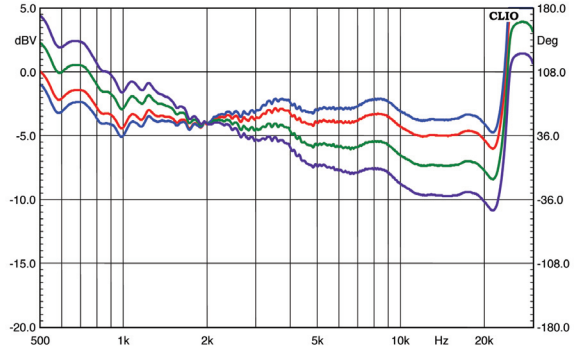
Adding the style, build, facilities and technical performance to the remarkable sound quality, this is clearly a finely crafted and most professional piece of work with quite exceptional performance in all respects, deserving enthusiastic recommendation. It is ironic that for me an ordinary CD transport provides the right music signal for it to excel.

For anyone committed to CD as a source, I cannot think of any way of obtaining better sound quality at anywhere near the price. No, forget the price: operated at its best, the *DSP7200* is simply a first rate music reproducer.

HIFICRITIC TEST RESULTS

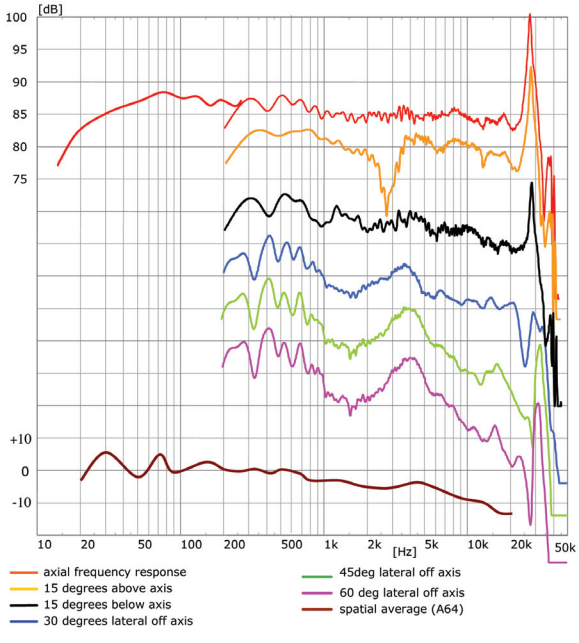
Make	Meridian Audio
Model	DSP 7200
Price	£17,500 including cables and remote control unit
Finishes	Black or silver lacquer; colours to order
Size (w x h x d)	18-35 x 107.2 x 21.7-41.5cm
Weight	55kg (each)
Type	Four driver, 3.5-way, bass reflex loaded
Sensitivity	S/PDIF wired digital input
Frequency response, axial	30Hz to 23kHz +/-2.5dB, (listener axis): excellent
Frequency Response, off axis	Very good power response
Bass extension	23Hz for -6dB
Max Loudness (in room)	107dBA for a stereo pair
Power Amplifiers	4x100W 4 ohm rated per channel
Placement	Floor standing, free space location
Contact	Meridian Audio Tel: 01480 445678 www.meridian-audio.com

Meridian DSP 7200 tone control (red is reference, 2kHz hinge point)

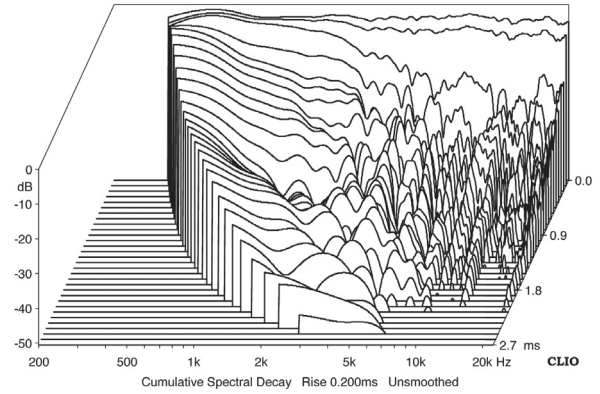


Treble Control Frequency Response: +2.5dB, 0dBB, -5dB, -10dB. Note that greater treble cut is internally supplemented by bass boost to reach -10dB.

Meridian DSP 7200 Frequency Responses

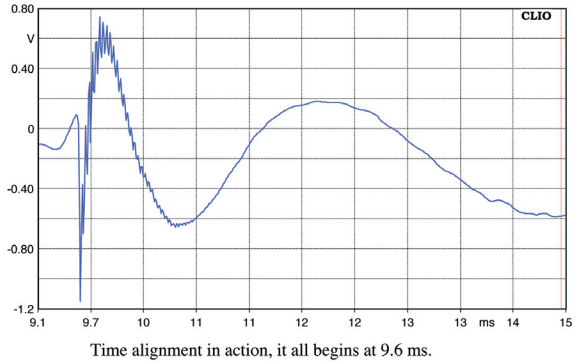


Meridian DSP 7200 Waterfall decay response



Cumulative Spectral Decay Rise 0.200ms Unsmoothed

Meridian DSP 7200 Step Response



Time alignment in action, it all begins at 9.6 ms.