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AN INTELLIGENT SPEAKER: MERIDIAN D600



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The '200' series of Meridian electronics has enjoyed notable success, its best known model being the 207-PRO CD player, whose versatility and features illustrate the extraordinarily comprehensive system design behind the 200 series. Specifically, it encompasses a multi-room, multi-system concept, and most particularly the new 600 loudspeaker itself. Such is this speaker's versatility that it may be readily used with non-Meridian equipment – analogue or digital – and yet it brings large elements of Meridian's remote control facilities into play.

What is a digital loudspeaker? In absolute terms, it is one which accepts digitally coded audio and transforms it *directly*, eg by electromechanical mechanisms, into clean sound energy. Such systems are quite impractical at present, and in the case of the 600, whose full title is 'Digital Active', the design simply includes low-level electronic digital decoders within the loudspeakers themselves. Meridian showed an experimental digital speaker some years ago, where certain aspects (such as volume) could be controlled remotely via a small micro-computer. Subsequent intensive research has now resulted in the D600, a slim, elegant, floor-standing system of unparalleled versatility.

There is no doubt that you get a lot for your money, since the system includes all of the following: a pair of modern '2½-way' speakers (bass/bass-mid/tweeter),

active-drive power amplifiers, electronic crossovers including some comprehensive programming for tonal balance, to counteract environmental and boundary effects, and two left-right assignable digital receiver decoders – optical and coaxial. There is also a pre-amp section, including precision volume and balance controls and input switching from both digital and analogue sources, a dedicated remote control handset (the 609, derived from the 209 master handset), and finally a comprehensive remote control facility and communications interface. All costing £2500.

Upon assigning one of the speakers a 'master' status, which is generally done on delivery, the 609 handset can direct and control operations for an entire Meridian set-up via the speaker's own remote control facility. A second and largely independent audio system may be added to the first, while the scope of the overall design is such that four- and six-channel surround capabilities are provided; for example, with full remote control of front-rear volume balance. Sounds and sources in other rooms may also be controlled via the D600, facilitating the design of luxurious and versatile whole-house music installations.

In addition to the above sections, the delivered speakers include full system cabling. This embraces the 'comms' link needed between the two speakers for tracking stereo commands, and also the link back to the Meridian 200 electronics. A digital audio coaxial link is included in this cable set, allowing immediate and full interfacing with the 207 PRO CD player pre-amplifier. No additional remote controls are necessary. For example, link in the 204 tuner and the 609 speaker handset can tell the tuner to switch stations.

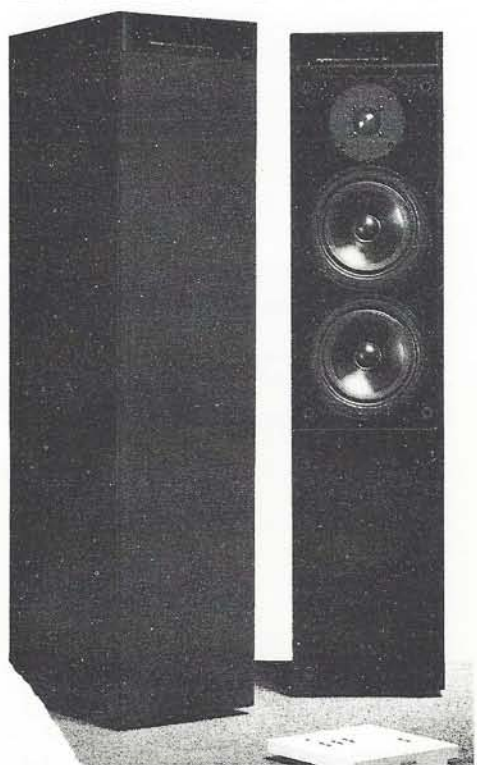
Where B&O sends amplifier power around the multi-room system, Meridian has arguably chosen the higher fidelity (and certainly more costly) approach in providing line-level analogue and digital audio links to remote power amplifiers and active speakers of high quality. Yet the D600 operational flexibility extends beyond the Meridian electronics system. When under remote control the speaker can accept up to three digital sources, including one optical, and additionally two analogue sources, thus acting as a pre-amplifier with inbuilt volume and tone controls. These latter include a 'tilt' similar to that available on Quad pre-amps.

Thus all you need for a basic system is one or more sources – at the most elementary level just a digital-output CD player – and the system will operate. Likewise, if you run cables (admittedly long) from a vinyl disc player via an existing accessory pre-amp, the speaker will play when switched to the appropriate analogue input. If a 207 PRO is used as the matching CD player, this can offer more analogue inputs including tape and LP (m-c and m-m), and if a 201 pre-amp is added, still further sources can be used. In its purest form, the D600 may be operated free of any mutual grounding by driving it solely via the optical link from a double-output digital signal source, with no other signal connections whatsoever except for the comms link between the speakers.

Standing 0.9m high on its spiked (or capped) feet, the D600 is finished in veneer, coming in a choice of black ash, teak, rosewood and walnut. It may be positioned in free-space, and has compensating adjustments if it has to be used against the wall or even built into a flush scheme. It uses three drivers per enclosure, including a metal-dome tweeter, and is driven by the equivalent of three stereo 75W-per-channel power amps operating in Meridian's 'Class-AA' mode, with direct coupling to the drive motor-coils. The system includes electronic low-level crossovers, and all facilities are logic controlled. A standby mode will shut down the mains power while leaving a low-power 'ear' open for later commands and keeping the DACs warmed up.

The top section of the speaker panel carries a glass-fronted display panel which provides read-out of command state, source, volume level, system status, and many other related aspects. A number of these are shown as mnemonics which take some getting used to. The one which tripped me at first was 'mute' on the 609 handset, which also disables the rest of the keyboard with the exception of 'standby', and confusingly appears as 'ATT' (Attenuate) on the D600 display. Meridian is planning to attend to this relatively minor ergonomic weakspot in the very near future.

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Listening tests

First impressions were most encouraging, with the D600 immediately sounding familiar both in terms of its stereo acoustic and the matching reverberant room sound. Nothing was out of place – the frequency response sounded smooth and extended, the whole effect tidy and coherent, without the significant subjective impairment often noticed with floor-placed designs. It was clear that this design is Meridian's most neutral to date, with no significant idiosyncracies of dispersion or tonal balance to draw critical comment.

One of the objects of a digitally interfaced speaker is to avoid the quality losses inherent in the usual line and speaker connecting cables. Greater sonic clarity and consistency should thus result when using digital sources. In addition, an actively driven speaker such as this should provide additional gains by improving the amplifier/speaker interface. The D600 was able to demonstrate these theoretical advantages. Using the latest series 207 PRO CD player, the superior, fixed analogue output was compared with the digital mode, the latter coaxially linked direct to the speakers, with the analogue feed executed via first-rate cable. The differences were clearly heard, namely greater dynamics, punchier bass, purer treble, bigger soundstages and more depth.

On overall merit the D600 speakers scored well and, give or take minor

matters of taste and presentation, they definitely belong in the upper group represented by models such as the Spondor S100, Acoustic Energy AE-1, KEF R104II Quad 63, and the like. With all controls set 'flat' the speaker presented a healthy, 'full' tonal balance, a touch sweet in the treble, probably tailored for the best effect with digital sources. The bass extends to quite low frequencies, and will give a suitably weighty representation of orchestral bass-drum, although it does not extend to sub-woofer frequencies. Any hint of heaviness or overhang at the bass resonance corner may be corrected by setting the bass 'Q' control to 'cut', imparting a gentle slope from 100Hz down to -4dB at 40Hz.

Occasionally a touch 'nasal', the bass was dynamic and articulate and played tunes well. It merged smoothly with the mid-range, which was of superior quality but whose minor flaws included some 'cone' sound on more difficult piano sections as well as a trace of enclosure woodenness. Another smooth transition was seen in the treble, which, driven with clean digital sources, revealed a quite exceptional purity and lucidity, coming close to audiophile ribbon tweeter standards.

An aspect which consistently ran through this speaker's performance was its exceptional clarity. Subtle musical detail was consistently present, indeed much information was heard as if new when certain programme material was

revisited – another feature reminiscent of top-grade audiophile systems. Stereo images were wide and deep, very well focused and with a marginally distant perspective.

The speaker proved consistently interesting and revealing, smooth and unforced, never seeming to betray its electronically 'active' origins. In terms of rhythm and dynamics it leans a little closer to classical than rock programme, but it nonetheless served both very well. The tri-amping technique can provide generous tidy, peak volume levels, and the D600 can certainly play loud and yet remain clean, providing 108dBa from a stereo pair. No distortion was obvious until full amplifier clipping was reached, at which point the sound became obviously brittle and fractured. The D600 levels were considerable, and would suffice for bigger rooms up to 100m³ volume.

System interaction & sound quality

In this section, four system effects are noted and may be of interest to those wishing to exploit the D600 to its ultimate. (i) On carpeted wood floors, neglect the spikes at your peril! Properly set and spiked after determining the optimum room position, the improvement in treble purity, stereo focus, dynamics, and bass speed was substantial. (ii) If left 'off' the D600 does not perform really well until 20-30 minutes after powering up, but if in 'standby' ten minutes wait is rewarding. (iii) If you can take the trouble, a separate supply spur from the electrical consumer-unit to each loudspeaker lifts the sound quality by at least as much as proper spiking. Optical connection sounds significantly better than digital coax (one opto-link directly to each speaker) if, and *only if*, other analogue and digital connections including 'comms' are deleted from the system, and in addition the optical source is known to be of sufficient quality. (Comms *between* the two speakers can remain.) If these conditions are not met, the optical link can sound the worst of all the modes, including the direct analogue one!

Design & technology

The tall slim enclosure carries a full-height aluminium alloy backplate securely screwed down and fitted into its own electrically screened rear compartment. This metal panel carries all the electronic sub-assemblies from the toroidal power transformer (in a lower sub-section) to the three complementary bi-polar power amplifiers, the active electronic crossover and response equalizer, the analogue preamp section, tone controls and, higher up, the digital equalization section plus digital-to-analogue converter. The 'noisier' digital sections are fitted in a second screened compartment. Regulated power supplies are used extensively to ensure isolation between stages.

Like the 207 PRO, the DA system is by Philips, with the new 'B' grade 4-times

resampling filter and selected 'A' grade dual 16-bit DAC. The analogue pre-amp section is modelled on the 207 and 201 series electronics, with their FET-controlled logic-switching and passive resistor, precision volume control. Selected ICs are used for buffering and amplification. Provision is made for balanced and unbalanced working via the analogue signal inputs, where the balanced connection may well improve grounding of this complex system, perhaps reducing the mild interactions noted between different source modes, digital and analogue. Good quality components are used throughout, with the board work to a professional standard and all the input phono gold-plated.

Built from 18mm top-quality plywood, the double-veneered enclosure panels are bitumen-loaded to control panel resonances, while the carcass is braced by three lateral cross-members. The driver baffle is of 18mm MDF machined to allow flush-fitting of the three drive-units. These comprise a pair of 160mm diecast frame 120mm polypropylene cone drivers and a 25mm aluminium dome tweeter. One 160mm unit serves bass only, the other bass and mid-range. Internal treatment of the modest 26 litre enclosure includes an acoustically absorbent foam lining. Bass-reflex loading is effected by a rear-mounted port, 6.5cm dia. by 20cm deep.

The drivers are made by SEAS, with the tweeter comprising a high-power rear-chamber design, with ferrofluid in the gap for cooling and resonance damping. The active crossover design includes an acoustic 6th-order alignment in the bass, with adjustable system 'Q' factor, while the acoustic slopes approximate to 4th-order between mid and treble. Equalization is applied to all crossover sections.

Test results

Axial responses obtained were quite decent, if indicative of a down-tilted frequency balance. The $\frac{1}{3}$ -octave plot (Graph 1) is a composite of nearfield LF (bass normal and 'cut') and the axial output. The effect of 'cut' is a rounding of the bass rolloff, reducing the effective 'Q'. There are good indications of a flat response from 55Hz to 20kHz, within ± 2.5 dB limits. The off-axis set (Graph 2) was measured in the narrow-band analyser mode from 200Hz to 20kHz, and indicates a tidy forward response trend. In-room (Graph 3) some floor boundary interaction is present, with a bass rise of 6.5dB at 50Hz (partly a room mode); but good output was achieved down to 30Hz, while the mid-treble trend and overall balance are nicely uniform.

Responses measured at the three driver terminals showed the two bass units were fed equally below 200Hz, above which the lower unit sloped away (-6 dB at 800Hz). The upper unit continued the mid-range, crossing over to the tweeter at 2.6kHz. Boost equalization was noted both in the low bass ($+5$ dB at 45Hz) and the upper treble ($+4$ dB by 18kHz). Other electronic tests included D/A converter linearity as expressed at the mid-range driver terminals. Plotted in Graph 4, the linearity was excellent to -90 dB and very good to 100dB, when mild system noise imposes a measurement base-line at -105 dB.

Total intermodulation distortion (covering digital system, crossover and power amps) was measured at better than -86 dB, while mid-band total harmonic distortion bettered 0.1% at the driver terminals. Both mechanical and electrical noise levels were satisfactorily low throughout, and also when heard via the

speaker itself. These standard lab measurement checks provided good reassurance that the D600 includes a decent working set of electronics.

Conclusions

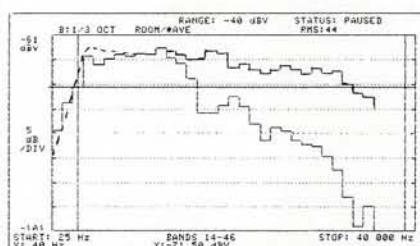
Beneath its restrained exterior, the D600 contains a wealth of ideas.

Beginning with the active loudspeaker, we have Meridian's best and most accurate design to date, one which meets or exceeds established standards for high-quality monitor grades. It can play loud, can satisfy both rock and classical tastes, sounds clear, informative and dynamic, and also has quite good bass extension. Stereo soundstages are wide, deep, and well focused, with orchestral perspectives well portrayed.

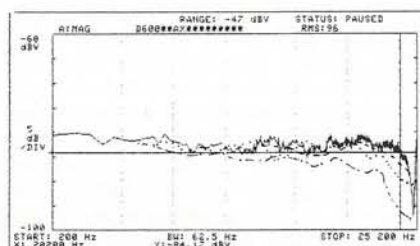
Add in the acoustic adjustability, tonal balance shaping, and the transparency provided by the active design, and you can begin to see the benefits of the concept. Now consider the built-in remotely controlled pre-amp compete with a system-remote handset, and a pre-amplifier section which will accept a range of audio signals, both digitally coded and line-level analogue, and which communicates intelligently with the other loudspeaker in the pair – as well as any other Meridian 200 series electronics to which it may also be connected. Next, examine the facility for pure isolated optical connection for a near state-of-the-art system, still with full remote speaker control, and don't forget the other versatile operating modes.

The D600 writes its own verdict. Offering a high performance, versatility, value, accuracy and convenience, it is clearly an outstanding design capable of winning any number of awards, including my own firm recommendation. ∇

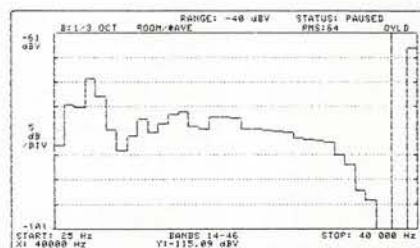
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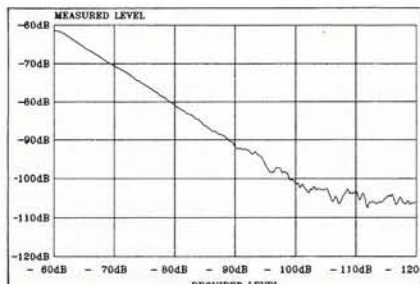
Graph 1. Meridian D600: Stepped $\frac{1}{3}$ -octave response, comprising nearfield LF in 'bass cut' mode (dashed line='normal') with axial output added above 250Hz, both curves terminating at 400kHz



Graph 2. Meridian D600: Narrow-band forward response above 200Hz, plain line axial, dotted 15° above, dashed 30° lateral, dash/dotted 45° lateral



Graph 3. Meridian D600: Room-averaged response (RAR)



Graph 4. Meridian D600: Linearity plot below -60 dB, taken at output of mid-range amplifier

Test results

Size (hwd)	90x21x29.5cm
Recommend amp power	Inbuilt tri-amp, 3x75W
Recommended placement	Free-space on floor wall also possible)
Frequency response ± 3 dB (2m)	55Hz-20kHz
LF rolloff (-6 dB) at 1m	40Hz
Bass frequency extension (typical in-room)	30Hz
Input sensitivity (line/digital)	770mV, IEC
Approx max sound level (pair at 2m)	108dBA
Forward response uniformity	Very good

Supplier:

Meridian Audio, Eccleston Road, Tovil, Maidstone, Kent. Tel (0622) 672269

Meridian America Inc.
14120-K Sullyfield Circle,
Chantilly, Virginia 22021.
Tel (703) 818 3028
Fax (703) 830 7625