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MERIDIAN 206 CD PLAYER

John Atkinson

Solid-state CD player with remote control, optical and coaxial digital outputs, 4x-oversampling digital filter, and dual 16-bit DACs. Frequency response: 20Hz–20kHz ± 0.2 dB. Distortion: less than 0.004% (no frequency or level specified). S/N ratio: greater than 90dB (no weighting curve specified). Precision: 15.7 bits. Measured output impedance: 11 ohms. Measured maximum output level at 1kHz: 2.301V (left), 2.283V (right). Dimensions: 12.8" (325mm) W by 3.9" (100mm) H by 12.6" (320mm) D. Weight: 14 lbs (6.4kg). Price: \$1650. Approximate number of dealers: 40. Manufacturer: Boothroyd/Stuart Ltd., Huntingdon, Cambridgeshire, England. Distributor: Meridian America Inc., 14120-K Sullyfield Circle, Chantilly, VA 22021. Tel: (703) 818-3028.



Meridian 206 CD player

"I suspect that [the Meridian Pro-MCD] will be the first CD player to be regarded as a 'classic!'" I wrote back in early 1986 after living with that modified 14-bit Philips machine for six weeks or so.¹ Well, my use of the word "classic" may have been too strong, considering that the generations of CD players seem to be succeed-

ing each other with increasing rapidity. But when I recently listened to a Pro-MCD, I was astonished at how good it sounded, despite its being the CD-player equivalent of a Studebaker Hawk. Classic or not, the Pro-MCD was undoubtedly a seminal product in that it showed what can be done when a designer of talent, in this case Bob Stuart, turns his attention to getting the best out of a stock Philips player. In

a sense, Bob virtually created a small industry of modifiers and tweekers.

These days, Bob Stuart's and Allen Boothroyd's Meridian company is part of the English AGI group, along with KEF, and they are no longer in the business of modifying another company's product. Their model 207 player,² released in 1986, was innovative, not only in that it incorporated a full-function remote-control preamplifier but also that it represented a from-scratch original CD player design, with particular attention paid to getting the best performance from the transport section. It also looked stunning, though, of course, reviewers for *Stereophile* are not supposed to be affected by such surface values. The subject of this review, the 206 CD player, was launched about a year ago, and it is to my shame that it has taken me rather longer than intended to rush into print with an evaluation.

Revealing its descent from the two-box 207 player/preamplifier, the 206's construction consists of two distinct chassis, each formed from two U-shaped aluminum extrusions and joined together by a common backplate and a bar across the base. One chassis contains the transport and power supply (apart from the transformer, the circuitry actually mounted on the backplate), the other, electrically connected to the first by two ribbon cables, housing the digital outputs, digital filter, the twin-DAC chip, the microprocessor controlling all the transport and display functions, and the analog circuitry.

The transport is based on Philips's CDM-4 mechanism, this mounted via a compliant suspension on a glass-fronted tray that slides completely into the chassis, where it benefits from a degree of isolation from airborne vibration. Unlike the 207, the glass front is now carried in a satin-black molding. All the signal processing, analog circuitry, and gold-plated output sockets are carried on one neatly laid-out, double-sided printed circuit board which occupies most of the depth of the second chassis. Though a rear-panel switch above the IEC mains socket acts as a master on/off switch, in

¹ *Hi-Fi News & Record Review*, February 1986.

² The original 14-bit version of the 207 was reviewed by Martin Colloms in *Stereophile* Vol.10 No.3 (April/May 1987), the 16-bit 207 Pro by Thomas J. Norton in Vol.11 No.11 (November 1988).

normal use this is left on, a front-panel button labeled Standby turning off the display but leaving the active circuitry fully powered up. A 5-pin DIN socket allows the 206 transport functions to be controlled by the model 609 remote control for the D600 active loudspeakers via that system's communications cable. When used on its own, the 206 can be operated via the supplied standard Philips handset. It can also be operated by the CD function buttons on the Meridian 209 handset supplied with the 207 and 208 preamp/players and the 201 preamplifier.

One comment regarding the 206's function control is of relevance here. Unlike some other players where you can quickly press at least two command buttons in quick succession, the 206 ignores all but the first command until that has been carried out. When you press Stop, for example, the machine will not respond to another command until the disc has come to a stop. In addition, some of the commands seem counterintuitive (at least to me). Both Next Track and Previous Track, as well as calling out a track by its number, have to be followed by Play to advance the laser pickup to the chosen track, though pressing Play alone starts the next track playing. Used to machines that act on a single button press, this idiosyncrasy kept catching me unawares. In addition, indices can only be accessed via the front-panel buttons, not by the supplied remote (though they can be called with the 209 remote). This, however, is more of a pain for a reviewer than a typical audiophile, and on the plus side, the 206's green display does give a degree of user feedback—press Stop and it says "STOP," for example—and the 206 is unusual in that it can be programmed to exclude tracks from play, as well as the normal manner.

Build quality appears to be excellent, with careful board layout, individual heatsinking on critical integrated circuits, good parts quality—the DAC is the S1 Crown version of the Philips two-channel TDA1541A; capacitors are polystyrene and other good-quality plastic-film types—and close placement of voltage regulators to the circuits they supply. Digital filtering and 4x-oversampling are performed by the Philips SAA7220B chip, current-to-voltage conversion by a discrete transistor circuit, while the direct-coupled output circuit is based on a Signetics NE5532 dual-op-amp IC, a low-noise chip I first saw used in the replacement phono module for the Meridian 101 preamplifier in 1980, and which has since become ubiquitous. Op-amp technology has marched on since the 5532 was designed, but in a carefully implemented circuit with limited gain requirements it can still deliver the sonic goods. It is also supposed to be able to better cope with capacitive loads than some of the more fancy op-amp chips. (The single op-amp version, the NE5534, was used in the 1985 Meridian Pro-MCD.) FETs are used to mute the outputs and switch in the de-emphasis network when appropriate. (Both de-emphasis and analog filter networks are passive, the latter featuring a single inductor per channel.)

Compared with the older 207 and newer Bitstream 208 (\$2990), the 206 lacks some convenience functions that some might find important. It lacks, for example, both the other models' provision for inverting the signal polarity or absolute phase, and their LEDs indicating

the presence of corrected errors and the presence of a pre-emphasized disc. The presence of both optical and coaxial digital outputs, however, makes it eminently suitable for eventual upgrading by use of a separate D/A processor. I achieved excellent results using the 206 to drive the Proceed and Stax processors, while Meridian itself introduced a promising stand-alone Bitstream processor to sell for around \$1000 at the *Stereophile* High End Show in April.

Listening

The basic system in which the 206 was used consisted of Celestion SL700 loudspeakers sitting on their spiked, lead-shot- and sand-filled stands, driven by two Mark Levinson No.20.5 power amplifiers. Control unit was a Mark Levinson No.26, though I also used a Mod Squad Line Drive Deluxe passive control unit (Penny & Giles version) some of the time, and all cables were AudioQuest: the latest Lapis interconnects, used unbalanced in 1m lengths between the CD player and the preamp, and in 5m balanced runs between preamp and power amps; and 5' bi-wired sets of AudioQuest Clear speaker cable. An Audio Research Classic 60 (review forthcoming) was used for a significant proportion of the time, and I also spent considerable time using the 206 to drive Meridian's active D600 loudspeakers, which themselves incorporate almost identical 16-bit, 4x-oversampling D/A circuitry. The 206 was also the CD source of choice for many of my recent equipment reports.

I had access to three other players or processors, all excellent-sounding, while carrying out this review: the Kinergetics KCD-40 that I reviewed last January, the Proceed PDP D/A processor that Robert Harley reviewed in June, and the Stax DAC-XL1 processor, which Robert will review in either the August or September issues of the magazine. For comparisons, both processors were driven by the 206's coaxial data output, identical AudioQuest Lapis 1m interconnects were used for all four players/processors, and levels were matched at 1kHz using a test tone and a Fluke true-RMS AC meter. The Meridian's polarity inversion compared with the other units was compensated for using the No.26's polarity switch.

Right from the start, I was impressed with the musical quality of the sound being produced from the system when driven by the 206. The soundstage was wide, deep, and well-defined, while there was a refreshing absence of "CD treble," that slightly sizzly, amusical grain that too often accompanies silver-disc sound. Even with rather upfront rock mixes, such as Little Feat's new *Representing the Mambo* (Warner Bros. 9 26163-2), the treble remained clean, the sound not degenerating as it does with inexpensive players into a giant high-frequency buzz. By comparison, the Proceed sounded a little wispy in the top octave, while the Kinergetics was rather dark in tonality. The Proceed tended to overemphasize the lispy edge of Sting's closely miked voice on "Someone to Watch Over Me" from the 1988 3" *Englishman in New York* CD (A&M CSIG 000048); while the KCD-40 didn't emphasize the lisp (why on earth did the engineer use such a peaky microphone?), it sounded a little too laid-back.

The 206's midrange was also distinguished

by a grain-free quality, lacking congestion at climaxes. The big orchestral chords following the trumpet introduction to the live Bernstein recording of the Mahler Symphony 5 (DG 423 608-2), for example, again remained clean, failing to degenerate into the messy roar reminiscent of a giant harmonica that is often heard with this disc. Also consistently noticeable in the midband was a greater sense of "body," of palpability, to instrumental and vocal tonalities, even when compared with such an excellent-sounding component as the Proceed processor. On the Little Feat album's title track, a nylon-strung guitar is used to point the texture of the mix. Via the Proceed, though quite believable as a close-miked acoustic guitar, this was reproduced with a little too much pick/finger noise and not enough body tone. Via both the Meridian and the Kinergetics, the sound was usefully more fleshed out, so that while the guitar's role in the mix was not diminished, it was also more identifiable as a unique rather than a generic instrument.

Elsewhere in this issue, in "As We See It," Robert Harley examines a question put to me recently by Stanley Lipshitz: "What does 'better' mean?" How do I *know* when a component sounds "better"? As in this instance, "better" is when the sound more closely resembles that perceived in real life. And in real life, individual sounds retain their character even when in ensemble with other sounds, and can be focused on individually. Thus the Meridian and the Kinergetics are "better" than the Proceed in this respect. But to put things into perspective, the difference between the Proceed processor and the other two players was of the same order of that to be heard between the latest version of AudioQuest Lapis interconnect using six-nines copper and the version sold until the end of '89, which used OFC. Using the newer cable on the Proceed and the older on the 206 reduced the subjective difference in this area by a factor of about 50%.

Martin Colloms reported in the November '89 issue of *HFN/RR* that shorting the 206's coaxial digital output gave a small improvement in sound quality. Trying this, I did feel that this tweak subtly softened the 206's sound in the treble, as well as adding a degree of air and space (though some might regard the effect as slightly diminishing the sound's high-frequency definition). Hey, I'm talking a small difference here, but isn't every small improvement with CD sound worth the effort?

The 206's low-frequency performance was excellent. Possessing even more subjective extension than the Proceed, which is itself no slouch in this area, it made the Kinergetics sound slightly overwarm, a little lacking in—here comes a word I shudder to use, but I can't think of another—"slam." Some might find the 206's lows to be a little lean in the midbass compared with the Proceed processor's. However, in combination with the SL700's slight propensity for upper-bass warmth or the warm-balanced D600s, the result was pretty damn satisfying. It was hard to hear how either of these systems reproducing Terry Bozzio's thunderclap'n'backbeat drumming on *Jeff Beck's Guitar Shop* (Epic EK 44313) could be beat (except when it comes to ultimate blow-your-ear-lobes-back, stadium-level loudness, of course).

The area where the Meridian excelled over-

all, however, was in its presentation of the soundstage. In general it had a rather more distant perspective than the Proceed processor, being more like the Kinergetics in this regard. On my piano recording on the *Stereophile* Test CD,³ made with the Calrec Soundfield microphone set to a single-point Blumlein stereo pattern, the Steinway could be heard to be positioned well behind the loudspeakers, yet its image remained well-defined in space, the reflections of the piano sound from the walls of the hall providing a sense of deep ambient space. And on rock recordings where the producer and engineer had contrived a well-managed soundstage presentation, there was also space aplenty. On the track "Where Were You?" from the aforementioned Jeff Beck album, Mr. Beck's Stratocaster could be heard to sing into a convincingly vast, if undoubtedly artificial, acoustic.⁴

Continued listening to a number of discs revealed that my impression of a distant soundstage perspective was not actually true. Rather, the Meridian seemed to respond to differences in recorded depth so that, depending on your own desires, you would regard them as being either exaggerated or more accurate. In other words, images that were far away tended to sound farther away; images that were close moved a little closer. The in-the-instrument piano sound featured on the Sting track mentioned earlier⁵ via the Meridian sounded even closer than it did via the rather close-sounding Proceed processor. Yet at the same time the 206 presented the distinctive Sting voice as being further back in space than via even the Kinergetics player (which does have a generally distant presentation of soundstage depth). Spatial exaggeration or accuracy? I plump for accuracy on the grounds that it is more likely for component deficiencies to homogenize than diversify the sound.

Were there drawbacks to the Meridian's sound? Of course, though nothing that jumped out at me. However, my assessment of the 206's performance has to be regarded as relative in that my referents have all been CD-based. In comparison with the obscenely expensive Stax processor (where the manufacturer cost of the Ultra Analog DACs alone is \$800, half the 206's retail price), the Meridian sounds like excellent CD whereas the Stax more closely approaches good LP sound. And in my humble opinion, good LP sound, groove noise apart, more closely approaches the analog master tape; and a good analog master tape more closely approaches the real thing.

Amén.

Measurements

The maximum output level of the Meridian 206 was a hair more than 0.2dB higher than the standard 2V at 2.301V (left) and 2.283V (right). This will just be audible in an A/B test, thus should be compensated for before carrying out any comparisons. The output impedance was

very low at 11 ohms, and the 206 should therefore not be fazed by long or highly capacitive leads or the use of a passive control unit. Despite the use of a direct-coupled output circuit that doesn't appear to use a servo to eliminate DC, offset voltage on the 206's outputs was negligible at -4mV (left and right), measured while the player was playing a "digital-zero" track. The 206's frequency response is shown in fig.1, the right channel being dotted and fractionally lower in level, as implied earlier. Flat throughout all but the top audio octave, the responses droop by 0.3dB at 20kHz with slight, subjectively inconsequential ripples due to the digital filter just noticeable. In the bass, the response is just 0.2dB down at 7Hz. Things didn't look so good when I looked at the 206's de-emphasis error (fig.2). Though the left channel was OK, the right channel introduced 0.5dB or so of positive error above 3kHz, which will make pre-emphasized CDs sound a little pulled to the right in the treble.

Separation between channels was also lower than I had expected, as shown in fig.3. Martin Colloms had found the 206 to have much greater separation in his *HFN/RR* review, so I repeated the measurement using a different test disc, taking pains to ensure that I hadn't inadvertently introduced a hum loop of some kind which would affect the readings. The results, however, were the same, within the limits of experimental error. In fact, carrying out a final check using dual-mono preamp and power amplifiers revealed the crosstalk signal to be surprisingly audible in the undriven channel's output at high playback levels. However, at still better than 60dB down across the audio band in both directions, it's hard to see how this crosstalk could have an audible effect; as noted earlier, the 206's soundstage was both wide and well-defined.

Turning from the frequency to the time domain, the impulse shape in fig.4 reveals the 206's output to be polarity-inverting, again something to be allowed for in A/B comparisons with other players. As is to be expected from this linear-phase impulse response, a 1kHz squarewave at a 0dB level reproduces with symmetrical ringing (fig.5).⁶ Note how, in comparison with players and processors using Japanese digital filter chips, the peaks are not clipped (see Vol.13 No.1, p.185).

As is to be expected from a player using the S1 Crown grade of Philips TDA1541A DAC chip, the departure from linearity at low levels was

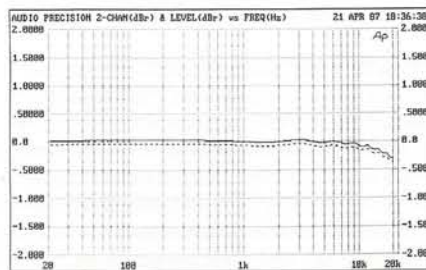


Fig.1 Meridian 206, frequency response (right channel dotted)

5 In a recent review (of the Celestion 3000 loudspeaker, May 1990, p.141), I reported my suspicion that the swishing noise to be heard very quietly accompanying the voice and piano on this recording was perhaps leakage of a since-deleted brushed drum track from the singer's monitoring headphones. Returning to my reference SL700s with the Meridian player, I have to say that I was mistaken. Instead, with the superior soundstage-depth resolution offered by this combination, I can now hear that it is faint piano pedal noise localized within the piano image, not with the sound of the voice.

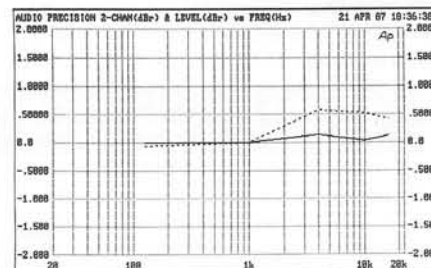


Fig.2 Meridian 206, de-emphasis error (right channel dotted)

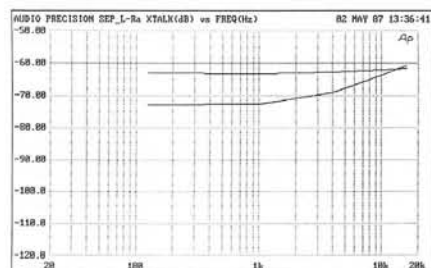


Fig.3 Meridian 206, separation (L-R below, R-L above)

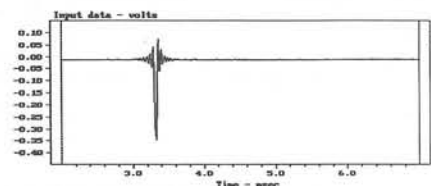


Fig.4 Meridian 206, impulse response

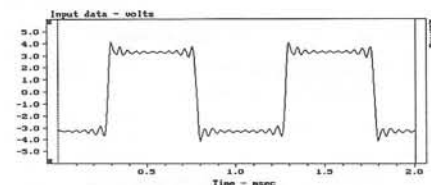


Fig.5 Meridian 206, 1kHz squarewave at 0dB

excellent, with a -90.31dB 1kHz tone reproducing only slightly too low in level (fig.6), this confirmed by the monotonic waveform in fig.7. (Note that the jump in level from zero to the first toneburst is less than that from the first to the second, revealing the slight downward expansion at this level.)

Examining an undithered -90.31dB 1kHz tone in detail with a 20kHz measurement bandwidth (fig.8) reveals quite a good stepped-square waveshape, overlaid with audio-band noise. A dithered -90.31dB tone should reproduce as a pure if noisy sinewave; looking at the noise and spurious spectrum while the 206 was playing this tone (fig.9) shows that only a trace of third-harmonic distortion mars the purity of the tone. Note, however, the 60Hz hum present, the right channel being about 12dB worse than the left in this respect (although it must be remembered that these components are still 100dB or so down). Repeating the spectral anal-

6 Strictly speaking, "ringing" is inaccurate. The symmetrical ripples that disfigure what should be flat tops to the squarewave are due to accurate reproduction within the limited bandwidth of the CD system. A squarewave can be considered to be synthesized from a fundamental sinewave at the same frequency to which are added the appropriate amounts of the odd-numbered harmonics of that fundamental—3rd, 5th, 7th, etc.—each with its correct phase/time relationship. Except that in the case of CD replay, a 1kHz squarewave can only be synthesized from odd-numbered harmonics below half the sampling frequency, 22kHz; i.e., up to the 21st. It is the time-correct nature of the reproduction of the harmonics up to the 21st, coupled with the absence of any harmonics above the 21st, that gives this CD squarewave its peculiar shape.

3 Available for \$8.95 including shipping and handling from *Stereophile*, Records Department, P.O. Box 364, Mount Morris, IL 61054.

4 Anyone at all involved in the guitar should get this album, a *tour de force* essay in modern rock-guitar wizardry. It's no coincidence that the two instruments to dominate jazz and rock music are the saxophone and electric guitar, respectively. Unlike most classical instruments, the sound of each can reflect the musical personality of the player to an astonishing degree only exceeded by the human voice itself: the instrument can thus truly be said to sing.

ysis with the DRA Labs MLSSA system again reveals the third and sixth harmonics to be the main distortion components present, the level of the third relative to the fundamental being shown by the cursor readout as -17.5dB, which is excellent.⁷ Listening to the dithered fade-to-noise track on the CBS Test CD with the pre-amp gain all the way up revealed this third harmonic (easily identifiable as a tone an octave and a fifth above the 500Hz fundamental) to become audible at about -80dB and disappear again at around -100dB, the tone then remaining pure-sounding into inaudibility. In this respect, the 206 is one of the best Philips-system players I've heard, better even than the expensive Philips LHH1000 I reviewed in June 1989.

Looking at the waveform of a dithered 1kHz tone at -100dB (fig.11) seems to reveal nothing but noise. Carrying out an FFT analysis on this waveform, however, reveals that there is still a 1kHz tone present, shown by the cursor position in fig.12. Better evidence is hard to come by that properly dithering a tone that is ostensibly below the floor of a digital system enables the DAC still to reproduce that tone.

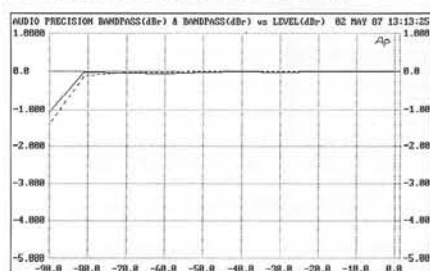


Fig.6 Meridian 206, departure from linearity (right channel dotted)

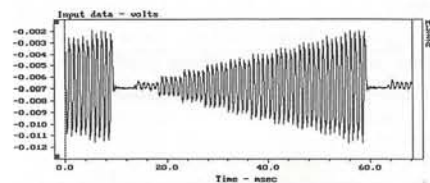


Fig.7 Meridian 206, monotonicity waveform

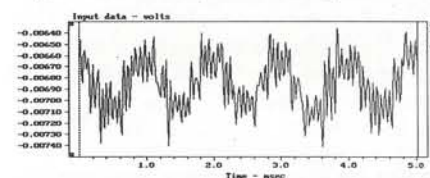


Fig.8 Meridian 206, undithered 1kHz tone at -90.31dB (20kHz measurement bandwidth)

The 206's generally excellent technical performance led me to conduct one further test, to examine the high-level distortion, to see if this would throw up any correlations with its sound. Fig.13 shows the player's output spectrum when reproducing a 1:1 mix of 19kHz and 20kHz sinewaves recorded at 0dB peak. The image of the 20kHz signal at 24kHz can be seen to lie at -41.4dB referred to the level of the fundamentals: only slightly better rejection than that featured by my inexpensive Magnavox

⁷ The difference in the shape of the high-frequency noise floors in figs.9 and 10 is due to the first being taken with an analyzer that features a constant, 1/2-octave bandwidth. With noise that is white in nature—has constant energy per hertz or unit frequency—this appears to give a rising level of noise with frequency due to the fact that 1/2-octaves that are high in frequency simply include more frequencies. With an analyzer such as the FFT type used to derive fig.10, these have a constant analysis width in hertz regardless of frequency, which means that white noise reproduces as being flat.

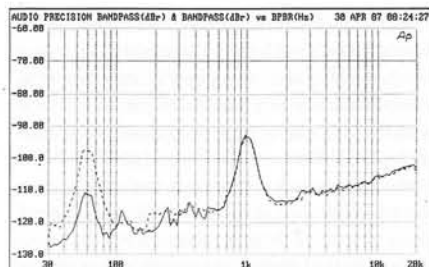


Fig.9 Meridian 206, dithered 1kHz tone at -90.31dB with noise and spurious (1/2-octave analysis)

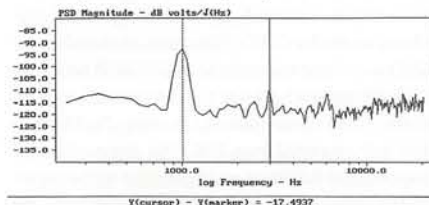


Fig.10 Meridian 206, dithered 1kHz tone at -90.31dB with noise and spurious (FFT analysis)

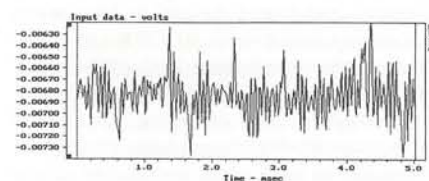


Fig.11 Meridian 206, dithered 1kHz tone at -100dB (20kHz measurement bandwidth)

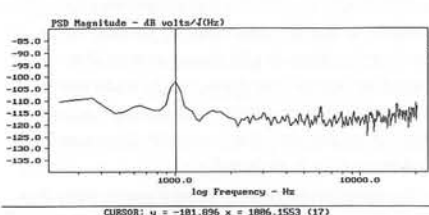


Fig.12 Meridian 206, dithered 1kHz tone at 100dB with noise and spurious (FFT analysis)

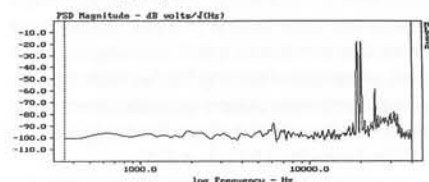


Fig.13 Meridian 206, HF intermodulation spectrum (300Hz-40kHz) 19+20kHz at 0dB (30kHz measurement bandwidth)

CDB472, which uses a less-well-specified version of the same digital filter chip. Looking at the same signal when reproduced by two of the other machines with which I compared the 206's sound, the Proceed PDP and Kinergetics KCD-40 (which use NPC and Sony digital filters respectively), the Proceed rejects the 24kHz tone by 55dB and the Kinergetics by 70dB! Apart from residual sidebands at 18kHz and 21kHz and a component at 6125Hz, all other intermodulation products from the Meridian player are buried in the noise, even the 1kHz difference tone lying at -87dB—almost 0.003%! The Proceed is not quite as good, its 1kHz product appearing at -81dB, while the Kinergetics 1kHz product lies at -65dB, which is, of course, still just 0.05% of the fundamental

level. It would be foolhardy, therefore, to draw any serious conclusions from these distortion measurements.

Finally, I had noticed the Meridian to have the occasional problem coping with "difficult" discs, in terms of very occasional muting at instances where the Kinergetics, for example, had sailed through. I therefore checked the 206's error-correction capabilities with the Pierre Verany test CD and found that the player had some problems once the gap in the data exceeded 1.5mm. It gave bursts of mutes and clicks with a single 2mm gap or two 1.5mm gaps, and refused to play tracks with data gaps longer than these. This is still good performance, well exceeding the demands of the CD Standard, but the Kinergetics KCD-40, for example, was only upset by a gap in the data path 4mm long.

Conclusion

The Meridian 206's polarity-inverting nature and slightly high output level will mean that extra care will have to be taken into account when comparing its sound with that of other players. I was also perturbed by the de-emphasis error featured by the right channel and a little bothered by the 206's rather clunky response to commands compared with a typical Japanese player. Is it really so difficult to engineer at least a two- or three-command buffer into the system controller's software?

However, when it comes to things that are of real importance, the Meridian 206, beautifully engineered and beautiful-looking, is the best player I have heard to use the 16-bit Philips chip set. It offers clean high frequencies and a natural midband tonality, though its unexaggerated midbass balance might sound slightly lean with the wrong loudspeaker/amplifier combination. The palpability and depth of its soundstage presentation, however, took me by surprise. This is something I just didn't expect from a relatively inexpensive, solid-state English player. (Don't ask me what I *did* expect.) Meridian may now be exploring the sonic joys of Bitstream PDM D/A technology, with their \$3000 208 player/preamplifier and their new 203 processor, but I can still confidently recommend the 206 as being one of the finest conventional-DAC CD players I have heard, equaling the achievement of the American Kinergetics KCD-40 in offering more than a hint of high-end CD sound without its purchaser having to hock the Mercedes.

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