

# DENON CD TEST DISC

Louis Challis

This test disc is one of the best bargains of 1984. If you're not planning to buy it then you're obviously not seriously involved with high fidelity as it contains so much invaluable testing information. It gives you the equivalent of more than \$10 000 of test equipment for less than \$20.

## TEST RESULTS

To test a disc like the Denon Audio Technical CD test disc is 'a little hairy'. Our approach was to inter-compare measurements of what are nominally the same signals from four different test discs on two CD players, the Yamaha CD-X1 and the Sony CDP-101. The results of these tests provided measurable and significant differences in performance. Thus, by way of example, the harmonic distortion with the 1 kHz signal on the Sony Type 3 disc provided the following results:

### Measured Distortion Performance of Denon Test Disc c.f. Sony Test Disc

AT MAXIMUM OUTPUT LEVEL = 0 dB

	Sony	Denon	Sony	Denon	
	1000kHz	1001 Hz	100 Hz	100 Hz	
2ND	- 111.4	- 111.5	- 106.2	- 103.0	dB
3RD	- 115.1	- 115.2	- 88.5	- 88.7	dB
4TH	- 107.4	- 107.0	- 107.3	- 106.7	dB
5TH	- 105.9	- 119.0	- 105.2	- 115.6	dB

Louis A. Challis

TWO YEARS AGO when the first production of Sony CDP-101 players arrived in Australia, I faced a dilemma. Without software you can't test the equipment. Sony produced some magnificent demonstration discs for the initial release of their players, but at that time there was not a single test disc in this country.

We reviewed a CDP-101 a few months later with just two demonstration discs, but we still managed to produce some rather exciting test results in the absence of a definitive test disc.

At that time, Sony in Japan and Philips in Eindhoven made some fairly momentous decisions concerning standards for CD players and for test disc material. Sony produced one disc and Philips a set of three.

The Sony Test Disc Type 3 retails for more than \$70 and the Philips disc No. 3 retails for about \$100. These discs, like the seven or eight other commercial test discs now available, contain information whose accuracy and precision is far greater than that provided by the average laboratory with test equipment costing tens of thousands of dollars.

If you own a good CD player then, by purchasing the appropriate CD test discs, you will be able to convert that CD player into a precision piece of laboratory test equipment. You can test not only your CD player but most of your hi-fi equipment, including your tape recorder, amplifier, loudspeakers and even the room in which you do your listening.

This could be, and I venture should be, one of the most exciting pieces of information that you have heard in years. If you are at all serious about your home hi-fi system, then the chances are that you have already spent copious sums of money on ancillary items of test equipment, probably including test tapes and records. These do not begin to compare with the Denon Audio Technical CD test disc.

I have watched with interest or excitement (depending on the quality of the record) as each new conventional microgroove test record has been released. However, I have been far more interested and concerned with both the availability and content of each new CD test disc, for this medium is not only more demanding, but the availability of appropriate test software is far more important. The reason for this is that no single test disc has contained all the software that I require. Consequently, I have been forced to use six or more laboratory test discs to provide the aggregate information required by a single review (see Yamaha's CD-X1 review).

While my requirements are possibly more demanding than yours, it is equally clear that the average (or above average) hi-fi enthusiast has special requirements in assessing amplifiers, tape recorder, cassette player, speakers and listening room.

In order to perform such testing, it is

## DENON AUDIO TECHNICAL CD TEST DISC

Disc No: 38C39-7145 (Produced May, 1984).

Price: Rrp \$19.95.

Manufacturer: Nippon Columbia and Waseda

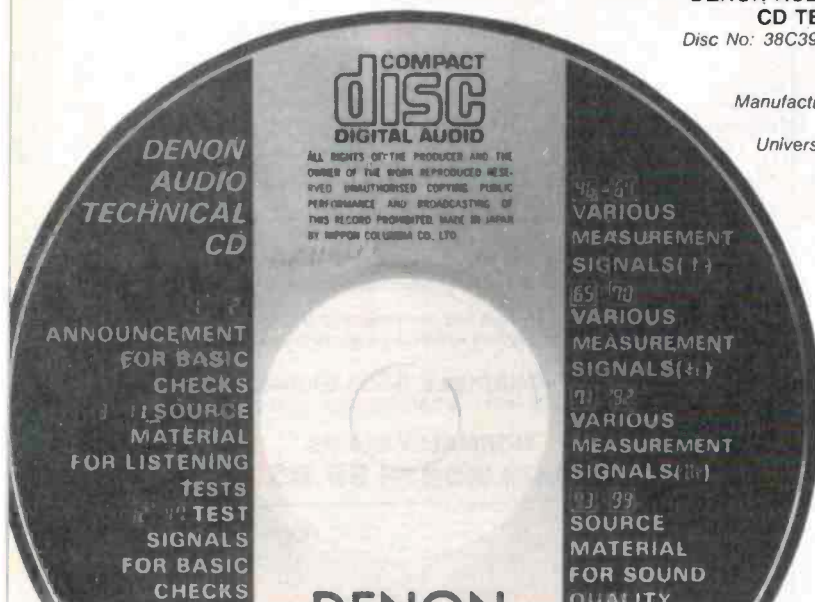
University for Denon in Japan.

Distributor: TEAC,

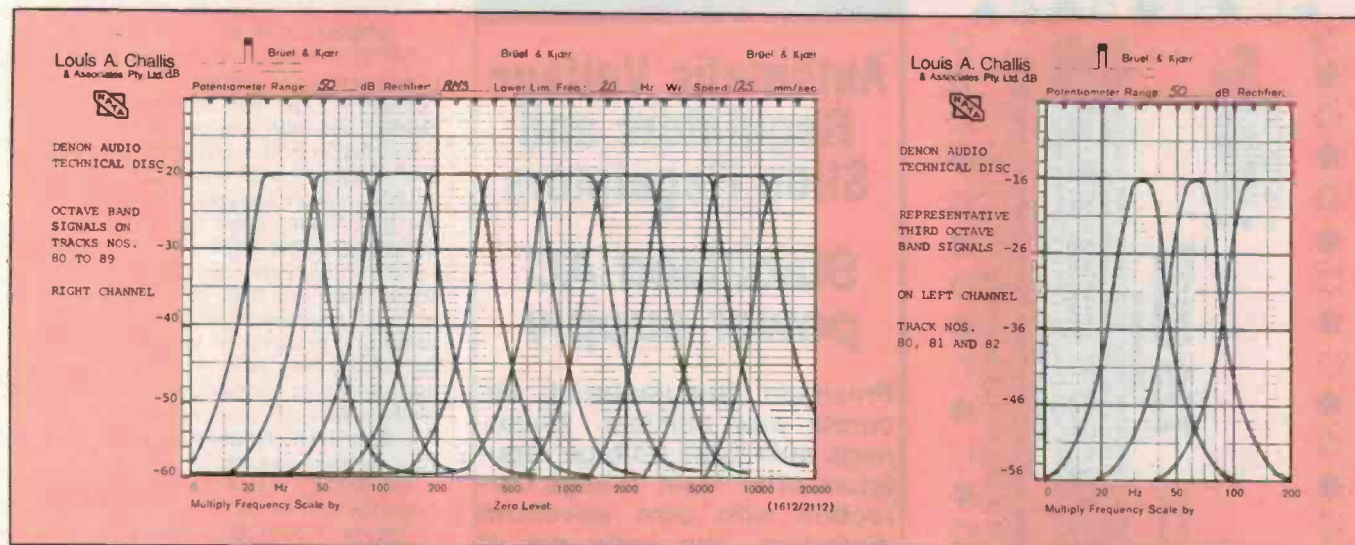
115 Whiteman St,

St Melbourne Vic.

(03)699-6000.







clear the test software should be suitable for use by people both with and without supplementary test equipment. The Denon Audio Technical CD test disc provides precisely those facilities *and a whole lot more.*

### Features

This particular disc contains almost all the test material that you are likely to require and provides you with the equivalent of more than \$10 000 of test equipment for less than \$20. Need I say more!!

The Denon test disc contains 99 tracks with a wide range of carefully collected software. Track 1 provides a commentary in English on how to use tracks 1 and 2. This immediately tells you whether your loudspeakers are correctly phased. Just that information alone would be worth the \$20 or more that some of my acquaintances have paid servicemen for correctly phasing their speakers, removing 'muddy' sound from their new stereo systems. Tracks 1 and 2 contain in-phase, out-of-phase and channel balancing information, which is particularly well presented.

Tracks 3 to 9 contain a series of orchestral, concerto, chamber music, piano, organ, jazz and rock demonstration material. Tracks 10 and 11 contain announcements in English and Japanese; I was intrigued that this took 108 seconds in English and only 43 seconds in Japanese. Could it be that the Japanese language is twice as efficient as the English language or that we use too many redundant (or long) words? I listened carefully to the Japanese again and discovered that they actually left out some of the text — Shame!!

Tracks 12 to 35 contain test tones at precise frequencies and levels ranging between 0 and -60 dB, as well as 'zero' signals with which the basic background noise of your equipment, or your hearing

acuity, may be evaluated. The zero signal level, which the disc describes as 'infinity zero', is an extremely important test which your amplifier and loudspeakers may not necessarily duplicate. It is also interesting to note that the 1 kHz frequency on the test disc is not actually 1 kHz, but 1001 Hz.

The reason for this unusual choice of frequency, like many of the other test frequencies selected on the disc, is that 1001 Hz is a precise sub-multiple of the 44.1 kHz sampling frequency used by CD players. Consequently, it can be digitally derived without the need for separate analogue test equipment. The digital purity of this signal is then absolute, and unwanted inaccuracies are avoided.

Tracks 36 to 39 each contain a 1 kHz reference signal followed by a logarithmically-swept band of test signals covering the range 20 Hz to 20 kHz. Tracks 40 to 45 provide a wide range of intermodulation tests complying with both the International Electro-Technical Commission (IEC) and the SMPTE standards.

Tracks 46 to 64 contain a variety of sine wave test signals at 0, -20, -40 and -60 VU including test tones of 40, 100, 315, 1001, 3149, 6301, 9999, 15 999, 17 999 and 19 999 Hz. These are particularly suitable for testing your cassette recorder, tape recorder or loudspeakers, particularly if you can use your VU meters on playback.

Track 65 provides a further logarithmic swept signal covering the range 5 Hz to 22.5 kHz. Tracks 66 to 68 provide three test tones at 100 Hz, 1001 Hz and 9999 Hz which glide from -60 dB to 0 dB per second, to evaluate linearity distortion in your CD player, amplifier, loudspeakers, tape recorder or whatever you may choose to connect to the output of your CD player.

At this point I should stress again a word of warning which the literature gen-

tly presents and which I will re-inforce. The test signals that this CD test disc produce cover such a wide dynamic range that the chance of blowing up your amplifier or loudspeakers are particularly good (or bad). It doesn't take much power to destroy a small loudspeaker, particularly when it does not incorporate any internal protection system. Amplifiers are generally a little more difficult to destroy, but they too fail fairly rapidly, particularly if the loudspeaker has already failed. They have to dissipate not only their own power losses, but also the energy that should have been dissipated in the loud speakers.

**BE WARNED** — CD test discs, as well as being very useful or convenient, are also very much like a loaded gun. If mis-handled, or employed in the wrong hands, they can be very dangerous.

Tracks 69 and 70 provide a 401 Hz test signal with the signal phase being rotated through 360° at 12° per second. Tracks 71 to 75 provide excellent square waves and tone bursts at three different frequencies to evaluate your loudspeakers, amplifiers, tape recorder and cassette recorder. These have precise zero crossings to avoid the disturbing effects that many early pieces of test equipment could not properly provide.

Tracks 76 to 78 contain impulse test signals which are extremely useful for testing both the CD player, your loudspeakers and a wide range of high fidelity and professional equipment — but be careful, these signals can wipe out your tweeters if you aren't careful with the volume control settings!

Track 79 is a band of 120 seconds of 'white' noise with a genuine 20 kHz bandwidth, derived digitally with what is described as an 'M-sequence dither'. This signal is absolutely perfect for conducting A-B tests between pairs of loudspeakers, *and just by itself would justify the purchase of this disc.*



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## SOUND REVIEW

Tracks 80 to 89 are most probably the 'pièce de résistance' of the disc. They contain a series of 1/3-octave bands of signal between 25 Hz and 16 kHz on the left channel and matching octave bands of signal centred on 31.5 Hz through to 16 kHz on the right channel (see Figure 1).

These signals are arranged so that while the left channel steps through three contiguous 1/3-octave bands, the right channel provides the corresponding octave band signal. You are thus able to generate at will the 1/3-octave band or single octave bands for listening to your loudspeakers, for testing your tape recorder, for assessing your room characteristics, and if your loudspeakers are good enough, for assessing your own hearing acuity or that of your relatives and friends.

This facility is undoubtedly worth many times the cost of the disc. I will be using it in future loudspeaker subjective assessments as it will save me the trouble of bringing home the 50 kg or so of test equipment that I have had to carry in the past!

Track 90 contains a band of 'pink' noise which is also invaluable for loudspeaker testing. Track 91 provides a superb 3150 Hz test sine wave for 'wow and flutter' measurements (but this requires access to a wow and flutter meter).

Track 92 contains a test signal which is FFFF/0000 at 22.05 kHz for testing CD player out-of-band ('anti-aliasing') filters and consequently is inaudible to mere mortals.

Tracks 93 to 96 contain a series of orchestral and piano music at normal stereo level, -20 VU, -40 VU and -60 VU. This is extremely useful for evaluating both your CD player and the loudness contours and noise generation characteristics of your amplifier/speaker system. If nothing else, it will tell you how good or bad the background listening levels are in your room. If you live in a noisy location you may be tempted to move as a result!

Tracks 97 to 99 contain three classical samples of music, each repeated four times for A-B testing of amplifiers and loudspeakers, which once again prove to be an excellent set of test material.

### Conclusions

If by now you are not 'chaffing at the bit' to buy this disc, then it's clear that you are not seriously involved with hi-fi. I classify this particular CD test disc as one of the best bargains of 1984. I believe that almost every recording studio, radio station, television station and serious hi-fi enthusiast will want to buy this particular disc because it provides so much invaluable testing information.

The information has been produced with a degree of precision which has never before been matched by any other means for so little cost. Having checked the main parameters, I can now attest to its precision, accuracy and usefulness. (I kept the disc.) ●