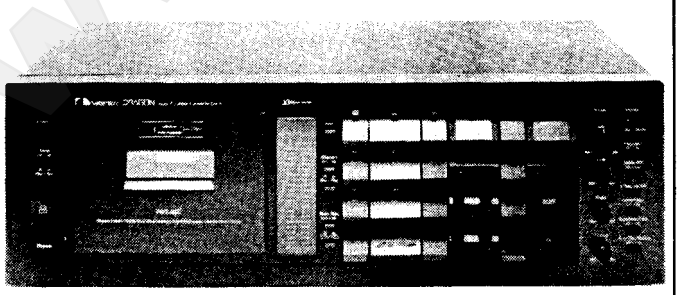
Nakamichi Dragon

Nakamichi have been responsible for many innovations over the years: half speed, high quality auto alignment, Dolby-C black boxes, auto record azimuth, etc, etc. Their latest wonder, the Dragon, automatically adjusts azimuth on replay, the record azimuth being fixed, which is truly remarkable. The deck can operate in either direction, track selection being easy to understand, and working most efficiently. Dolby-B and -C are included, together with an array of buttons and user potentiometers which will delight the inveterate fiddler. Separate L/R controls are provided for bias and record-gain and for each of the main tape types – IEC I, II and IV. The deck has three heads of course, record and replay being separate. Unfortunately, it will only record in a forward direction, but on playback auto track change is provided at the end of the tape, a selector determining auto stop at the end of one track, two, or allowing continuous cycling to and fro. The machine does not have music search, but excellent cueing is provided, a separate control complementing the wind forward/reverse buttons. Memory/counter functions provide access to a predetermined point represented by zero on the counter, the display itself being a 4-digit electronic type which is not in real-time. The level meter is an LED bargraph type but, unusually for Nakamichi, it is not too good: whilst 64ms tonebursts read accurately enough, short transients at 8ms under-read by some 15dB. There are no microphone inputs, but on the back panel there are the usual Nakamichi sockets for interconnecting various black boxes, including an excellent stereo microphone amplifier and, of course, remote control.

The record-level controls include separate L/R pots, a ganged master rotary, and up and down fade buttons which cannot be stopped halfway (the idea being to set the nominal record level and balance with the master and channel gain controls, and then use the buttons for smooth in and out fades). Three buttons select MPX filter, subsonic filter and auto-record pause. Calibration tones can be switched in for bias and level adjustment, the meter sensitivity then increasing by 20dB. Two separate switches select timer on/off and timer record/play. Pushbuttons select tape/source, 120/70µs equalisation, Dolby on/off, Dolby/-B/-C and the three previously described. In use, we made the odd error due to the somewhat crowded labelling of the buttons. The photograph shows that the layout of the controls does indeed resemble a dragon's scales! The cassette compartment has a very chunky door, with a transparent centre window. Built into this are two lights: red to indicate record on track one, and green for playback on both tracks. A ¼in. stereo jack provides adequate volume into low and high impedence headphones, level being adjustable via the replay gain control. Phono sockets on the back panel are fitted for line input and output, and the mains lead is a captive two-core of around 2m length. The machine is encased in a durable metal cabinet, and the styling is very striking and unusual; some would regard it as ugly, others as extremely handsome.

The input sensitivity for Dolby level was higher than average, allowing considerable flexibility, and no clipping problems were encountered up to 6V. Distortion from the input amplifier right through to the monitor output was also very low, and never more than 0.02% RMS. We checked the input noise and again it was at a very low level, and not significantly affected by the volume control settings. We have seen slightly lower noise on one or two decks recently, though. The input noise, however, only had a marginal affect on the overall noise with Dolby-C with a very quiet background tape, so this is not a significant problem.



The maximum output potential for Dolby level is just over 1V, so a fully modulated metal tape could give an output peaking at around 3V. Replay azimuth automatically sets itself to the tape being played back, the replay head actually having four tracks. Special circuitry detects the amount of HF on playback by comparing the outputs from each twin vertical gap, the azimuth being adjusted until the optimum HF response is achieved. This system worked stunningly well in general, although the odd, badly done, prerecorded cassette did cause the setting to change every now and then as we tried to cope with the inconsistent recorded azimuth! This machine is certainly the top choice for obtaining the best possible results from prerecorded cassettes, showing some of them to be quite reasonable even if they are not azimuthed correctly in manufacture. When we replayed our standard 3kHz phase/azimuth test tape, however, it did give a slight phase error of 10 degrees. This is certainly close enough, and no doubt the absence of higher frequencies made it difficult for the electronics to provide greater accuracy.

Head penetration and guide heights were also satisfactory, but the former were slightly out, although we did not note any crosstalk problems. The replay amplifier had an amazing clipping margin, and distortion was minimal. Replay hiss levels, with or without noise reduction, measured very well, although we have seen results on other decks which were marginally better without Dolby; but then these did not have the extended replay response of the Nakamichi. Replay hum levels, whilst being very good, could have been better, some 150Hz being apparent on the left track, although it measured at −68.5dB ref Dolby levels. This would be no problem at 50Hz, but it is not quite good enough at 150Hz for a top-flight deck, since hum at this frequency is more audible. Replay responses were extremely flat on both 120 and 70µs up to 10kHz, but we noted a 3dB lift at 18kHz.

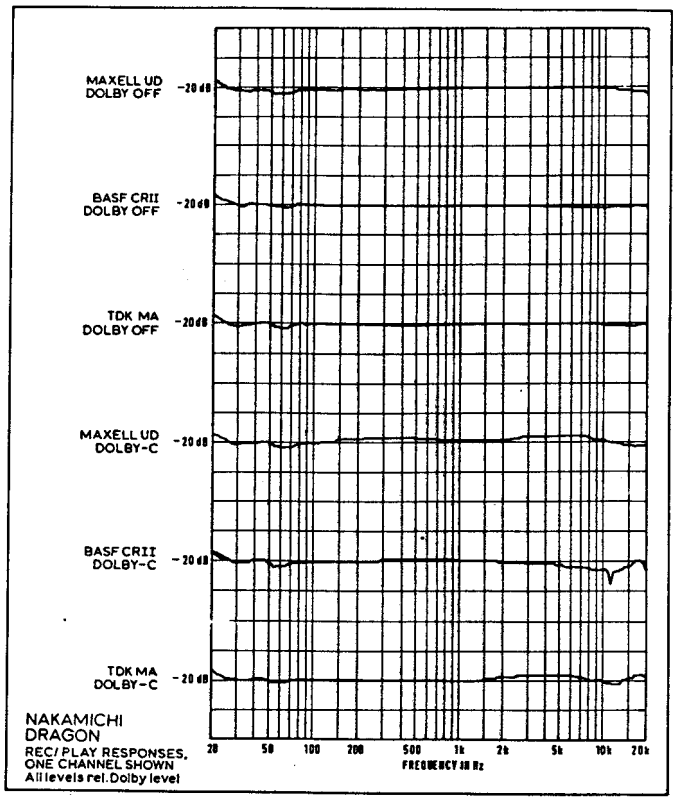
One problem occurred when the machine was being fed in parallel with other machines. When the Dragon was switched off, some positions of the input gain controls included a component which caused some diode-type action, distortion being very audible indeed on the outputs of the other decks. Turning the Nakamichi on, or turning all its pots to minimum, removed the problem. Note that Revox reel-to-reel recorders and the B710 Mk II exhibit the same syndrome.

[This is a not uncommon problem, and is the reason we suggest that tape machines be left switched on when connected to preamps which do not have buffers on their tape outputs – *eg*, Hafler DH-101/110. **Dep Ed**]

Maxell UD C90 was again used for the ferric position, and the 315Hz/10kHz optimisation was much better than on the other decks reviewed, the high frequency end being particularly fine for a medium price tape. The 3.15kHz performance was also better than usual. Overall noise measured well, and noise reduction was of almost textbook performance. Tape modulation noise was at a very low level, and virtually the same as with the Aiwa. The responses were well-nigh perfect without noise reduction, extending to 20kHz. Even with Dolby-C they were very good indeed. This aspect was not criticised at all in the listening tests, and distortion was clearly much better than usual, often being very highly rated despite the tape not being the best ferric (the choice here being intentional). We mildly criticised a slight compression on a bass drum track, but this was certainly due to the tape, not the deck. It is possible that with absolutely perfect alignment of the record and replay heads, the overall distortion measurements could have been slightly better still, but this would indeed be gilding the lily. The overall sound was always very clean and the test tones mostly sounded purer than usual, with less 'hash' in the background.

Results on BASF Chrome II were also far better than usual, although the 315Hz MOL was below that which can be achieved on our own, very carefully set up, Nakamichi 582s (which are used for testing tapes). The 3.15kHz distortion was good for the tape type, although not as impressive as that of a pseudochrome, but HF saturation was only average, which is normal. Background noise was at a very low level, but with Dolby-C we achieved 19dB instead of 20dB noise reduction due to the slight noise contribution of the input circuits; this should not really be noticed in practice. Tones again reproduced with a minimum of modulation noise.

Using the machine's own test tones for bias/response alignment, the response at 15kHz was extremely flat ref 315Hz, but this alignment method did create a very small dip between 5 and 10kHz, and this was picked up subjectively as a very slight dullness on the program; it was not much criticised, though, as the sound was so ▶



smooth. This dip became more noticeable with Dolby-B and -C, so we would prefer the equalisation to be flat at around 12 rather than 15kHz. This is only a small niggle, but it is a point Nakamichi should consider.

Distortion was only mildly criticised when we recorded at a normal level, which shows that this particular tape can do surprisingly well on a good deck. The distortion cleared up virtually completely when we lowered the level slightly of course, and the background noise was still considered very low – the equal of a pseudochrome. With Dolby-C the available dynamic range was stunning. We tried listening to and measuring a very good pseudochrome, and distortion then was audibly slightly better, especially at 3.15kHz, but the noise was also higher, so nothing is really gained as responses were similar.

TDK MA metal – also a C90 – gave very good MOLs at 315Hz and 3.15kHz but, curiously, the HF saturation performance fell slightly short of what we would expect of a Nakamichi; this partly due, perhaps, to the odd response dip at 10kHz which results from Nakamichi's user alignment procedure. With Dolby off, the responses were very flat indeed, although with Dolby-C in it was coasting slightly. Audibly the responses were excellent and sometimes singled out, while the overall quality was considered superb and very open.

When we first received this deck for review, the wow really was not too good, but on cleaning the capstans it improved remarkably, none then being heard on our test program. The measurements showed figures among the best we have ever measured. Why the capstans needed cleaning we can't be sure, but perhaps the deck has been previously tried with a cassette whose oxide coating was shedding badly. Wow measurements in both directions thus were excellent, and torque was just about ideal, with only marginal juddering noted – which in our experience is harmless. Speed accuracy was within the tolerances of our special measurement cassette. Spooling speed was remarkably fast, which is useful if you are as impatient as me!

I enjoyed using this machine as much as any other cassette deck that I have had for some time, the auto replay azimuth and track change facilities being particularly convenient. The Nakamichi 100D ZXL should still be regarded as the number one model though, but the thought of a new version of that deck with automatic replay azimuth and track reversal truly whets the appetite! The Dragon made such fine-sounding recordings, and had such superb facilities, that I can recommend it very strongly indeed, and particularly so if you want it for playing back prerecorded cassettes. If you want to do a lot of off-air recording though, you should consider a digital/video tape system, which nowadays does not cost that much more. It is a shame that it has to be so expensive. However, a little bird told me the other day that one European cassette deck manufacturer may be introducing automatic replay azimuth next year; we will have to wait and see. Nevertheless, this deck should remain a winner in the top price stakes.

Parameter	NAKAMICHI DRAGON
315Hz MOL Maxell UD L/R	+6.1/+6.2
3.15kHz MOL Maxell UD L/R	+4.0/+3.8
10kHz sat Maxell UD L/R	−3.0/−3.0
Noise NR out Maxell UD	−50.5
Noise Dolby-B Maxell UD	−60.8
Noise Dolby-C Maxell UD	−70.3
Noise dbx Maxell UD	
Mod noise Maxell UD	−37.5 dB
315Hz MOL BASF CRII L/R	+5.7/+5.4
3.15kHz MOL BASF CRII L/R	−0.1/−0.4
10kHz SAT BASF CRII L/R	−5.6/−5.7
Noise NR out BASF CRII	−55.5
Noise Dolby-B BASF CRII	−65.7
Noise Dolby-C BASF CRII	−74.7
Noise dbx BASF CRII	
315Hz MOL TDK MA L/R	+8.6/+8.6
3.15kHz MOL TDK MA L/R	+5.3/+5.1
10kHz SAT TDK MA L/R	−2.1/−1.4
Noise NR out TDK MA	−52.6
Noise Dolby-B TDK MA	−62.8
Noise Dolby-C TDK MA	−72.0
Noise dbx TDK MA	
All level in dB Noise measurements	
Max Line O/P for DL	1.16 V
Line input Sensitivity	66 mV
Line-in noise-gain min	−78.5 dB
Line-in noise-160mV=DL	−77.4 dB
120µs replay noise (NR OUT)	−57.4 dB
70µs replay noise (NR OUT)	−62.0 dB
Replay hum (50Hz)	−68.5 dB
Replay hum (100Hz)	−74.5 dB
Replay hum (150Hz)	−68.5 dB
Replay amp clipping	+16.5 dB
600 ohm phones level	1.2 V
8 ohm phones level	0.6 V
Wow & Flutter (DIN peak)	0.038%
Torque (play)	22 g
Speed error	0.0%
Azimuth error (deg) Phase @ 3kHz	+10
C90 spooling time	1:12
Meters under-read (8ms)	−15 dB
All levels ref replay Dolby Level (DL) All noise measurements are CCIR/ARM weighted	