

about 8 ohms over most of the audio range with a maximum of almost 30 ohms at the bass-resonance frequency of 53 Hz. The speaker sensitivity was 88 dB at 1 meter with an input of 2.83 volts of random noise in an octave band centered at 1,000 Hz. The tone-burst response was excellent at all frequencies, and it was virtually unaffected by changes in the microphone position relative to the speaker.

● **Comment.** We would have been surprised if a speaker that measured as good as the Avid 110 were to sound less than good in any respect. There were no such surprises. The Avid 110 delivered some of the flattest, least colored sound we have heard from a small bookshelf speaker. In fact, very few of the more sophisticated and expensive speakers we have tested could match, let alone surpass, the Avid 110 in

smooth response and lack of coloration.

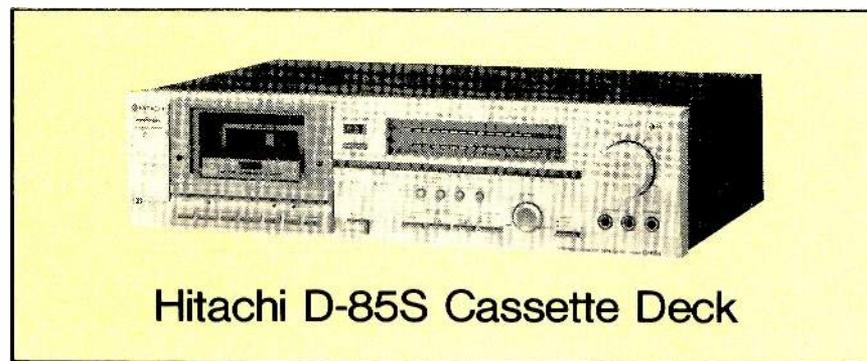
This was most evident in its mid-bass sound. The low-frequency response of the 110 has only a slight peak of about 3 dB in the 60- to 70-Hz range, and above that it is essentially flat. Thus, male voices do not acquire a boomy or tubby quality, which is one of the most common low-frequency aberrations of speakers.

Avid strongly implies that the lack of "boxiness" (another way of describing what we heard from the 110) is a direct result of its minimum-diffraction design. Although we cannot be certain which aspect of the speaker's design deserves the credit (probably there is more than one), it seems obvious to us that a speaker with uniform energy output over most of the audio range, almost constant impedance, good dispersion, clean tone-burst response at almost any distance and angle relative to the drivers, plus a lack

of "boxiness" must be doing its job properly. To paraphrase the late C. J. LeBel (one of the founders of the Audio Engineering Society), "If something measures good and sounds good, it is good."

The Avid 110 does not sound either small or inexpensive. Its bass performance is all that can be expected of an 8-inch driver in a small box, and we found it to be quite adequate and in balance with the excellent high-end output of the speaker. The 110 can be driven hard with a 200-watt amplifier without damage either to its components or to a listener's sensibilities. Even without having compared the Avid 110 directly with any competitively priced speakers, we would not hesitate to rank it among the top of that group. It is a superior speaker that does just what is claimed for it.

Circle 140 on reader service card



Hitachi D-85S Cassette Deck

THE Hitachi D-85S is a two-motor, two-head cassette deck with a solenoid-controlled transport and a rewind feature based on a microprocessor-assisted memory. An electronically regulated d.c. motor drives the single capstan, and a second d.c. motor is used to turn the reel hubs. Cassettes are inserted, tape openings downward, into slides on the rear of a front-opening cassette-well door. Rear illumination shows how much tape there is remaining on a side, and the clear plastic door affords full label visibility. The door panel itself can easily be removed for either routine head cleaning or demagnetizing.

The solenoid-controlling RECORD, PAUSE, and PLAY pushbuttons have LED status indicators; the last of these flashes on and off during record and play modes at a rate determined by the amount of tape on the take-up hub. To insert a 4-second space between recorded selections (more if the button is held down continuously), a RECORD MUTE pushbutton is provided that causes the PAUSE LED to flash and automatically halts the machine in the pause mode after inserting the blank space.

Two rows of sixteen peak-reading LEDs, (green at 0 dB and below, red above) form the record-level indicators, which are calibrated from -30 to +10 dB. No specific marking for Dolby level is provided; in our tests it registered at +1 dB. For signal levels of 0 dB and above the appropriate LED

remains on for about 1 second after the musical peak has passed, making it easier to set record levels during passages of rapidly changing signal levels.

Although the customary three-digit mechanical tape counter is provided, the D-85S does not use it for memory-rewind (and rewind-play) functions. Instead, a microprocessor in the unit memorizes the tape location when the PLAY button is pressed (during either the play or record mode), and it is to this point that the deck will return (and either stop or replay from) when the appropriate memory function is engaged. If the tape is permitted to run to the very end, where the auto-stop mechanism is triggered, the memory functions ignore the point where PLAY had been last pushed and completely rewind the tape.

Three pushbuttons set the bias and equalization of the D-85S for either metal, CrO₂-equivalent, or ferric-oxide tape formulations, and similar pushbuttons turn the Dolby system on or off and select either a microphone or a line-level source; LED indicators show when metal tape and Dolby have been selected. When the Dolby system is used, an FM multiplex filter is automatically inserted into the circuit to prevent improper operation of the Dolby circuitry during off-the-air recording. Additional front-panel switches and controls are provided for timer activation (in record or playback mode) and level setting.

The customary line-level input and output jacks are located on the rear panel, together with a DIN-type connector for attaching a remote-control accessory. The Hitachi D-85S measures approximately 17 1/8 x 4 3/8 x 10 5/8 inches (width, height, depth). Retail price: \$300.

● **Laboratory Measurements.** Test data supplied with our sample of the D-85S indicated that its factory adjustments had been made with Maxell tapes—UD XL-I (ferric), UD XL-II (CrO₂-type), and MX (metal)—so we used these in our evaluation. Other premium-grade formulations would yield very similar results, as a spot check with different brands indicated.

Playback frequency response was tested using Teac 216 (120-microsecond) and 316 (70-microsecond) test tapes. As shown in the accompanying graph, differences in equalization accuracy were negligible, and response was extremely flat (± 1 dB) from the highest tone on the test tapes (14,000 Hz) down to the lowest (31.5 Hz), where the response was down by 2 dB.

Overall record-playback frequency-response curves were no less impressive, particularly for a deck in the rather modest price class of the D-85S. Low-end response held up down to 40 Hz and showed a near-complete absence of the usual bass irregularities ("head bumps"). With the ferric UD XL-I, treble response was down by 3 dB at a little over 17 kHz; UD XL-II (CrO₂ equivalent) pushed this point slightly above 18 kHz. The metal formulation (Maxell MX) showed a slightly rising high-end response (+2.5 dB at 16 kHz), but even discounting this the -3-dB point would have fallen at approximately 19 kHz, which is extraordinarily good for any two-head deck. As we have come to expect, metal tape showed its greatest advantage in considerably extending high-frequency response at a high input level (0 dB).

Switching in the Dolby noise-reduction system with its attendant 19-kHz FM-multiplex filter restricted the upper frequency-response limit for all tapes to about 15 kHz.

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