

## EQUIPMENT PROFILE

# 1

### SONY CDP-620ES COMPACT DISC PLAYER

#### Manufacturer's Specifications

**Frequency Response:** 2 Hz to 20 kHz,  $\pm 0.3$  dB.

**Harmonic Distortion:** Less than 0.0025% at 1 kHz.

**Dynamic Range:** Greater than 96 dB.

**Channel Separation:** Greater than 95 dB.

**Number of Programmable Selections:** 20.

**Output Levels:** 2.0 V, fixed; up to 2.0 V maximum, variable.

**Power Requirements:** 120 V, 60 Hz, 16 watts.

**Dimensions:** 17 in. W  $\times$  3 $\frac{1}{4}$  in. H  $\times$  14 $\frac{5}{8}$  in. D (43 cm  $\times$  8 cm  $\times$  36.5 cm).

**Weight:** 19 lbs., 14 oz. (9 kg).

**Price:** \$950.

**Company Address:** Sony Drive,  
Park Ridge, N.J. 07656.  
For literature, circle No. 90



It's been only a short time since I tested and wrote about Sony's top-of-the-line Model CDP-650ESD Compact Disc player (see *Audio*, July 1985). While other CD-player prices were plummeting, Sony maintained that there would always be a market for a state-of-the-art unit that employed the very latest technology and offered all the features a serious user could possibly ever want. My review of the CDP-650ESD was nothing short of ecstatic. I still regard that player as the definitive model, one that can serve as a reference for judging other CD players both in terms of sound quality and in terms of features. That unit, however, has a suggested price of \$1,300—rather steep in view of the fact that perfectly adequate (if basic) CD players can be had for around \$300 or even a bit less, even from the very same Sony Corporation.

Sony must have realized that these days a \$1,300 player is not something throngs of people will wait in line to purchase. Accordingly, they have now come up with the CDP-620ES—a very slightly downgraded version of the CDP-650ESD that incorporates pretty much all of the new tech-

nology found in the more expensive player, but which sells for a full \$350 less. What has Sony omitted in order to accomplish this cost savings? According to them, the main visible difference between the 650 and the 620 is the omission of the 650's unique digital-code output port on the rear panel of the lower cost unit. I'm not referring to the special accessory connector that will be needed for attaching a video-graphics interface box when those become available; both the 650 and the 620 have that connector. I'm talking about the additional connector that gives the user access to the audio bit stream itself and therefore allows digital-to-digital audio data transfer. Also, the CDP-650ESD's chassis is of anodized copper (which probably contributes substantially to the price difference, and which Sony says has better resonant and thermal properties). In addition, the more expensive model has more massive feet.

I found a couple of other differences—minor ones—between the two players, that the people at Sony didn't mention. The first of these has to do with the grid-like track-number display on the front panel. The CDP-650ESD's grid shows a total of 20 numbers, while the 620 displays only 18, though 20 programmable playing steps can still be memorized by the lower-priced unit. The final difference I discovered between the two units is a feature found on the 620 that is actually not present on the higher priced 650. That's the headphone output jack. According to the people at Sony, introducing a headphone amplifier in the circuitry of a "pure" CD player such as the 650 can actually affect sound quality a trifle, so it was not done. The lower priced 620, I guess, is not regarded as a CD player in which total perfection is the goal, so its designers compromised enough to incorporate a headphone amplifier and its associated output jack with level control.

As for myself, I welcome the addition of the jack on the lower cost unit; and if it introduced any sound degradation, I confess that I failed to hear it!

### Control Layout

The front panel of the CDP-620ES is almost identical to that of the CDP-650ESD. The disc-loading drawer remains pretty much as it has been on earlier Sony home players: It is opened by touching an "Open/Close" button to its right, and is closed by touching the drawer front, the "Open/Close" key again, or the "Play" button. Numbered keys from 0 to 20, plus a key labelled "+10," are found near panel center and are used to call up desired tracks for play or to perform random-access programming. The "+10" button speeds up the process if you want to call up a track number above 20. Track 44, for example (if one existed on the disc you've inserted), would be called up by touching the "+10" button four times, and then touching the "4" button. "Play," "Pause," "AMS" (automatic track advance and track retard) and "Play Mode" keys ("Continue," "Single" and "Program") are found to the right of the numeric keyboard; "Check" and "Clear" keys used for verifying programmed instructions or for clearing them from memory are located below the numeric keys. A "Stop" key and two manual search keys are near the front panel's lower right corner. The search keys are used for fast access, in either direction, to a given point on a disc while you are listening to it.



I welcome the addition of a headphone jack to the new Sony player. If it degrades the sound, I confess that I failed to hear it.

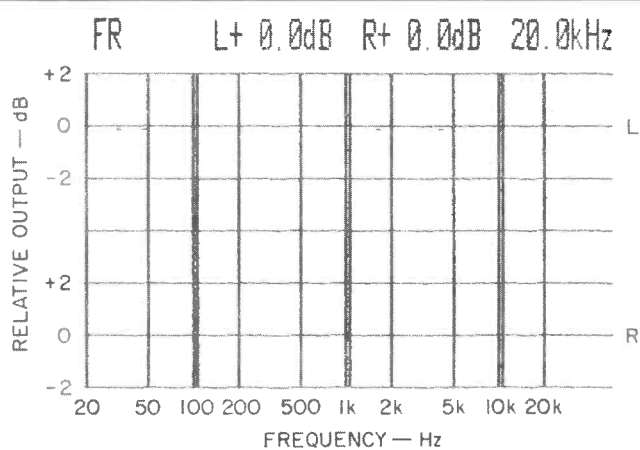


Fig. 1—Frequency response, left (top) and right channels.

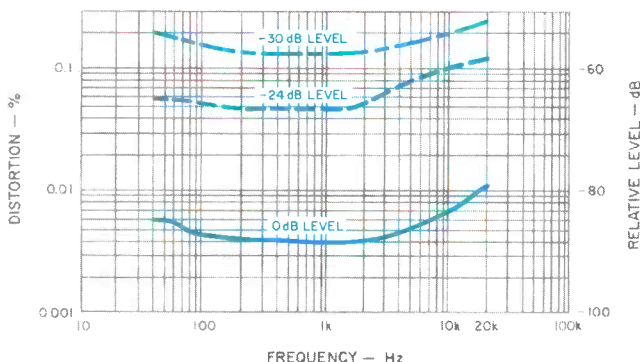


Fig. 2—THD vs. frequency at three signal levels.

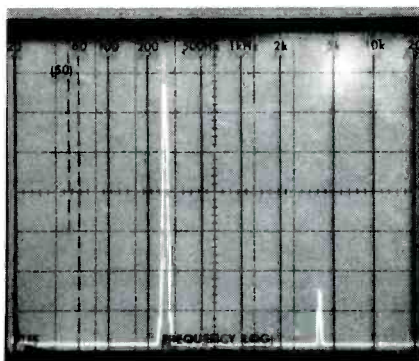


Fig. 3—Spectrum analysis of 20-kHz test signal (large spike) shows inaudible component at 40 kHz, more than 60 dB below reference level. Horizontal scale: Linear, from 0 Hz to 50 kHz.

At the lower left corner of the panel are switches which turn the player on and off manually or by an optional external timer. Additional buttons beneath the display area are labelled "Repeat" (for playing, over and over again, a single track, the entire disc, or a segment of a disc between two preselected points), "A ↔ B" (for setting those start and end points), "Time" (for toggling between an elapsed-time and a remaining-time display), "Auto Delay," and "Shuffle Play." When the "Auto Delay" button is pressed, two seconds of silence are inserted before the first selection begins. This function is toggled off by pressing the same button a second time. The "Shuffle Play" feature is an interesting one. When this button is pressed, all of a disc's selections are "shuffled" and played in random order. When all of the selections on the disc have been played once, the shuffle-play function is automatically cancelled. There would seem to be no end to what you can do with a Compact Disc player once a microprocessor is incorporated in it!

The front panel's display section presents a wide variety of useful data. When a disc has been inserted in the drawer, a "Disc" indicator illuminates. Next, a "Track" indicator briefly displays the total number of tracks on the disc, after which the actual track number being played is shown. Another display indicates elapsed time of track play after first indicating total time on the disc. (Remaining time can be toggled alternately with elapsed time, as described above). A "PGM" (ProGraM) indicator lights up when the player is in standby mode for programmed play, and an "Index" indicator shows the index number of the selection being played. (If the disc is not divided into index segments, "Index" will illuminate with the numeral "1" at all times.) The previously described numeric grid shows how many selections are programmed and which one is currently being played. If you program more than 18 selections, the word "Over" lights up.

A headphone jack at the lower left and a variable output level control at the lower right complete the CDP-620ES's front-panel layout.

A full-function wireless "Remote Commander" control module duplicates just about every function on the front panel, including random-access programming, all the repeat-play features, shuffle play, and even remote adjustment of output level for the variable-output jacks. Interestingly, when you perform the latter adjustment remotely, you can see the control knob on the panel revolve in response to your commands!

The player's rear panel has both fixed- and variable-level output jacks, plus the multiple-pin connector intended for future link-up to that video-graphics interface module referred to earlier. The rear panel also has an initializing switch which allows you to choose which play mode (continuous, single-selection or programmed) the unit will be in when first turned on.

#### Measurements

Sony claims that the circuitry of the CDP-620ES is virtually identical to that found in the more expensive CDP-650ESD. My own measurements suggest that if that is indeed the case, then some variations of measured performance occur even when "uniform" sophisticated LSI chips are used to do

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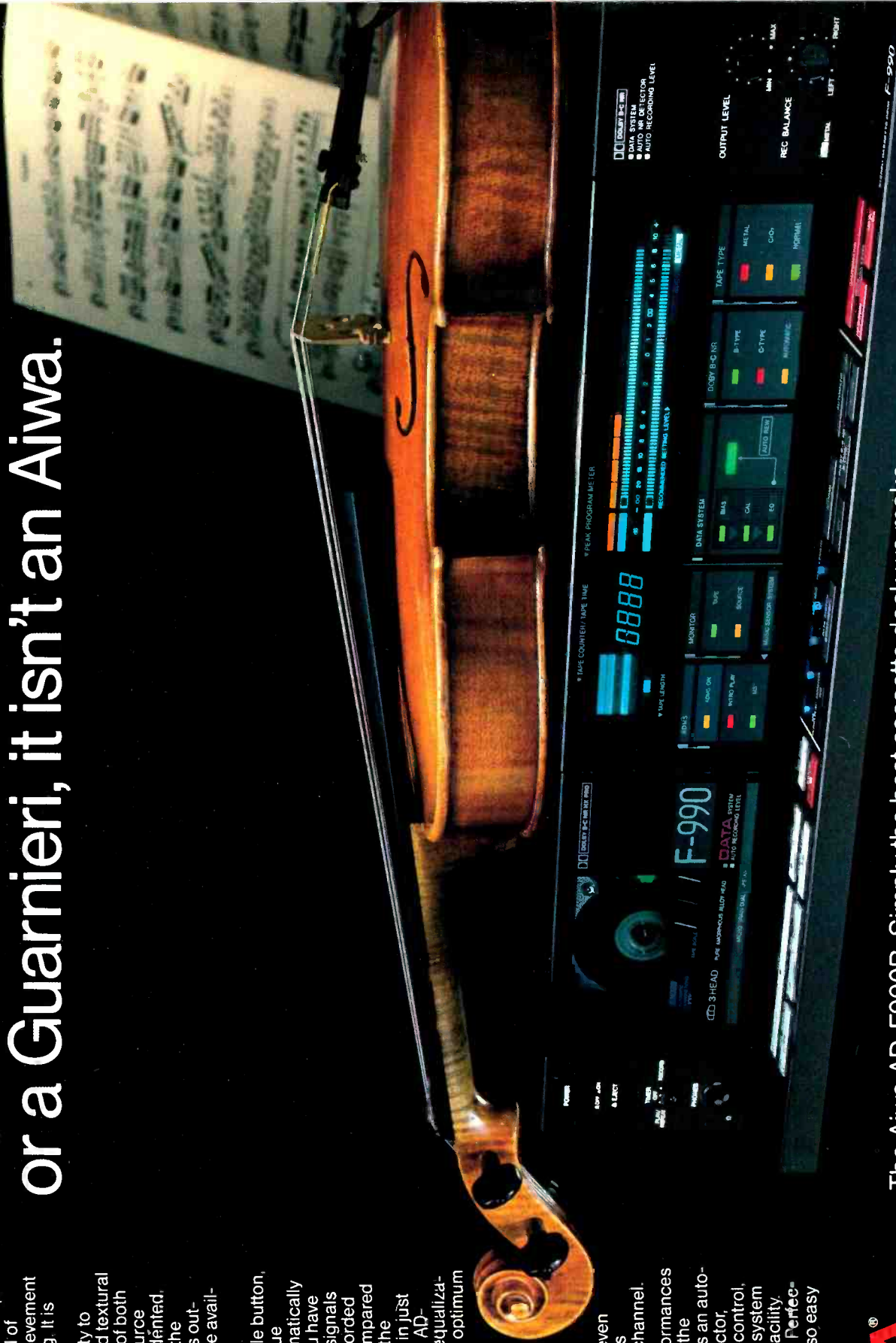
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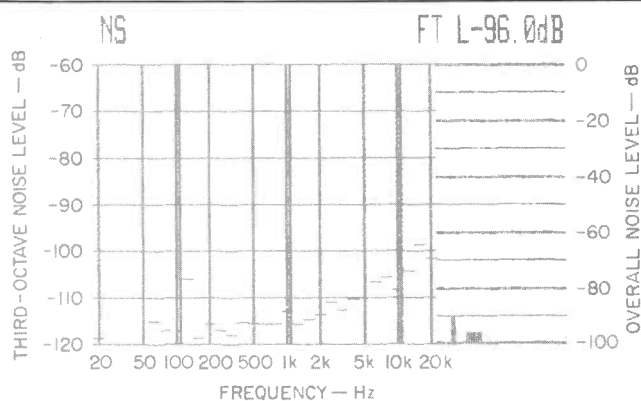
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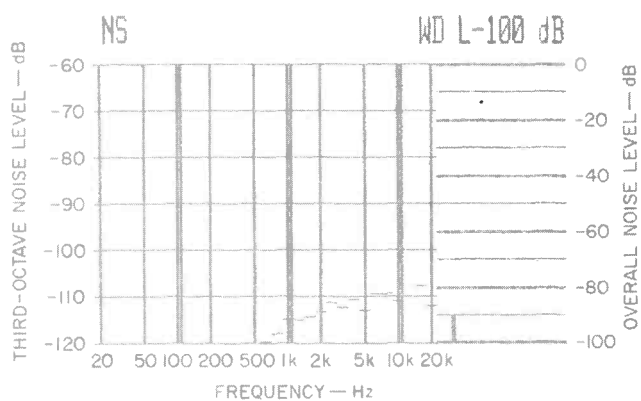
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Time after time, the unit found and began to play requested tracks almost before I could look up from the remote control I was using to instruct it.



A



B

Fig. 4—S/N analysis, unweighted (A) and A-weighted (B).

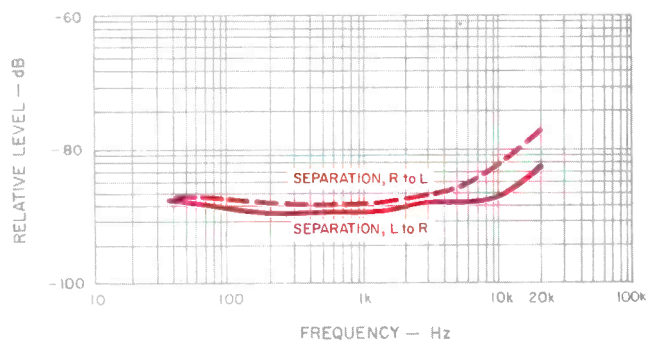


Fig. 5—Separation vs. frequency.

most of the signal processing and amplification. While the CDP-620ES's frequency response was every bit as flat as that of the more expensive Sony model (see Fig. 1), and in fact varied by no more than  $\pm 0.1$  dB over the entire range of measurement from 20 Hz to 20 kHz, total harmonic distortion was ever so slightly greater. At 0 dB it measured 0.0038% at mid-frequencies. I'd say that's nothing to get upset about, but it is, nevertheless, higher than the 0.003% I measured for the CDP-650ESD. Total harmonic distortion at mid-frequencies and other frequencies, at three playback levels, is shown in Fig. 2.

I noted no out-of-band "beats" at around 24 kHz when I used a spectrum analyzer to sweep from 0 Hz to 50 kHz (linearly) while a 20-kHz signal was being reproduced by the player. This is due in part to Sony's new digital filter and oversampling approach, introduced in several of their third-generation players, and also in part to their use of a single master digital clock (the timing circuit that synchronizes everything to the 44.1-kHz sampling rate of the standard Compact Disc).

What did show up, however, was a second-order distortion component way out at 40 kHz; such a component was not visible or detectable when I measured the CDP-650ESD. Of course, since this component is at 40 kHz and its amplitude is down more than 60 dB compared with the fundamental (see Fig. 3), I couldn't get too upset about it. I only mention it—and show it—to point out that the performance of this CD player, though very close indeed to that of the higher priced 650, is not identical to it.

Unweighted signal-to-noise ratio measured exactly 96 dB, as claimed, while A-weighting increased the S/N reading to exactly 100 dB (see Figs. 4A and 4B). SMPTE-IM distortion measured 0.0044% at full output level, increasing to 0.025% at a -20 dB recorded level. Twin-tone IM (using 19-kHz and 20-kHz test tones of equal level, supplied from one of my digitally produced CD test discs) measured no more than 0.003%, both at maximum recorded level and at a level of -10 dB.

Stereo separation, plotted as a function of frequency in Fig. 5, ranged from about 88 dB at mid-frequencies to around 83 dB for the left channel and 77 dB for the right channel at high frequencies. The minor difference between left-to-right and right-to-left separation is undoubtedly due to wiring layout in the chassis and differences in capacitive coupling at high frequencies.

A 1-kHz square wave reproduced by this new CD player is shown in Fig. 6. As far as I could tell, the waveshape was identical to that obtained from the CDP-650ESD. Specifically, the shape was indicative of digital filtering and two-times oversampling, which are the methods used by a majority of late-model CD players. Reproduction of the unit-pulse signal, shown in the photo of Fig. 7, was also identical to that obtained from the Sony CDP-650ESD and other late-model CD players.

In Fig. 8, the usual display of a 200-Hz signal from the left-channel output and a 2-kHz signal from the opposite channel output shows no detectable phase shift: As you can see, the low-frequency and higher frequency sine waves cross the zero axis in a positive-going direction at the same time, as they should.

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Except for access to the digital audio code, the CDP-620ES offers the same quality sound and almost all the features of its higher priced sister.

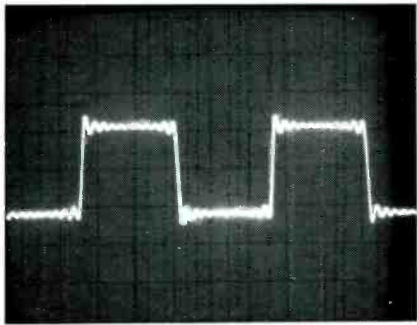


Fig. 6— Square-wave reproduction, 1 kHz.

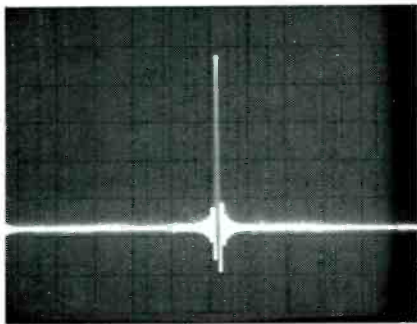


Fig. 7— Single-pulse test.

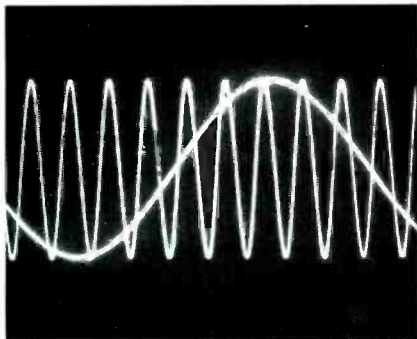


Fig. 8— Two-tone phase-test signal (200 Hz and 20 kHz).

### Use and Listening Tests

I was just as amazed by this player's speed of access as I had been by that of the CDP-650ESD. When Sony tells you that these machines can access any given point on a CD within 1 S, that is no exaggeration. Time after time, using test discs that have many more tracks than are likely to be found on musical CDs, I called upon the machine to search for double-digit-numbered tracks; almost before I could look up from the hand-held remote control I had used to enter those instructions, music of the requested track began to play. The lower mass pickup and the linear-motor pickup drive designed for the third-generation Sony CD players have been used in this latest model too, with superb results: not only in terms of search speed but in terms of tracking stability and lack of susceptibility to external shock and vibration. It almost goes without saying that the "defects" disc I use to evaluate error correction and tracking ability posed no real challenge for the CDP-620ES.

Of course, the really important thing about this or any other CD player is the sound quality that it delivers. I have maintained that the best sound I ever heard from any CD player came from the CDP-650ESD. I can't say that the sound of the CDP-620ES surpasses that of the CDP-650ESD, but I can tell you that after many hours of listening and comparing I could not, in all honesty, detect any difference in sound quality between the two. Since I tested the CDP-650ESD a while ago, my library of CDs has grown some more and I now have additional CDs that I think are able to separate the "very good" players from those that are plainly "superb." The CDP-620ES clearly belongs in the second category, but in so classifying it I wonder whether Sony has inadvertently outsmarted itself. Unless you have a really good reason for wanting the digital audio code available from the CDP-650ESD's external port, why on earth would you want to spend an extra \$350 for the top-of-the-line model when you can get the same high-quality sound and just about all of the convenience features (not to mention that headphone output jack) in the newly introduced CDP-620ES?

*Leonard Feldman*

