

## 2

## TECHNICS SL-P8 COMPACT DISC PLAYER

### Manufacturer's Specifications

**Frequency Response:** 4 Hz to 20 kHz,  $\pm 0.5$  dB.

**S/N Ratio:** Greater than 96 dB.

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

**Channel Separation:** Greater than 90 dB.

**Harmonic Distortion:** Less than 0.003% at 1 kHz, 0 dB.

**Output Level:** 2.0 V for 0 dB.

**Number of Programmable Selections:** 32.

**Power Consumption:** 35 watts.

**Dimensions:** 16-9/16 in. (43 cm) W x 3 1/2 in. (8.8 cm) H x 12-13/16 in. (32.5 cm) D.

**Weight:** 13.4 lbs. (6.1 kg).

**Price:** \$700.00.

**Company Address:** One Panasonic Way, Secaucus, N.J. 07094.

For literature, circle No. 90



The new Technics SL-P8 is, without a doubt, the most feature-laden Compact Disc player I have tested to date. It is also one of the best in terms of error-correction capabilities, control layout, and styling. Though Technics continues to offer its "first-generation" model SL-P10 for a suggested retail price that is \$300 higher than the SL-P8's, I frankly cannot see any reason to select the costlier unit, since the SL-P8 offers superior performance and a great many more operating features, not the least of which is a full-function wireless remote control. Technics also introduced an even less expensive (\$600) CD player, the SL-P7, at the same time that they announced availability of the SL-P8. I have

had an opportunity to check out both models, and, although the lower priced unit's basic performance is essentially equal to that of the SL-P8, it lacks many of the latter's features (see accompanying sidebar).

Even a quick summary of the SL-P8's outstanding features is enough to impress the most seasoned user of other late-model CD players. It offers a search function at two speeds, with audible cueing (you hear samplings of audio content even at the faster search speed). You can program up to 32 different selections by track or index point within a track, and play them in any order you choose. You can skip (advance) to the next track or to the next index point pro-



grammed, or, if no program is in memory, to the next sequential track or index. You can program the system to begin play at any point on a CD, either by track, by index, or by time (minutes and seconds). You can program the end-point of play in the same ways. There's even a "Music Scan" feature that will send the laser pickup to the beginning of each track, at which point it plays the first few seconds of that track. If you do nothing, it proceeds to the next track and plays its opening few seconds. If you like what you hear at any given point, pressing the "Play" button stops the scanning function and allows you to continue playing the track just auditioned.

Many of these features have been found in other CD players, but I can't remember a single unit that incorporated all of them at a price this low. There are also at least two features in the Technics SL-P8 that I have not seen on any CD player before. The first of these is a pitch control. Yes, you can actually change the pitch of music contained on any CD by as much as  $\pm 6\%$ —much as you would on conventional turntables equipped with this feature. How is it possible to change the pitch of a digital recording which, after all, consists of sampled "number values" taken at a fixed rate of 44.1 kHz? Well, if you think about it, it's really not that difficult in principle. The samples read by the laser pickup are first stored in solid-state memory before being fed out at a uniform rate (controlled by a quartz clock) to the D/A converter. If you change the clock rate to something other than the standard 44.1-kHz sampling rate, you change the musical pitch of the recovered analog audio signals. In order to insure perfect pitch when the feature is not wanted, Technics tied the pitch control slider to an on/off pushbutton. When you want perfect pitch, this button is released and the slider control is completely bypassed.

The second unique feature is "Synchro Record," which synchronizes certain Technics tape decks to start recording when the SL-P8 starts to play, a feature I'd previously only seen on automatic turntables.

### Control Layout

A power on/off pushbutton is at the extreme upper left of the control panel. Just below it are a stereo headphone jack and a headphone output-level control. Disc loading is via a slide-out drawer, to the right of the power switch. Further to the right is an "Open/Close" touch button to operate the drawer motor. A large display area to the right of this control button offers a variety of visual indications. These include a ruler-like scale, calibrated from 1 to 20, showing the total number of tracks on a disc after it has been inserted in the drawer. During play, a flashing fluorescent bar along the length of this scale shows which track is being played, and, in addition, other bars show which programmed tracks remain to be played. To the right are LED numeric displays which show total playing time (when the disc is first inserted), elapsed track time, track playing time, remaining playing time, track number or index number. Controls to the right of the display area include a "Pause/Stop" button (touch it for "Pause," hold it down for a couple of seconds for "Stop"), a "Play" button, forward and reverse search touch bars, and forward and reverse "Skip" buttons for advancing to the beginning or next track or programmed selection.

All of the remaining front-panel controls are found logically arranged below the large display area. They include the "Music Scan" button, 10 numeric buttons for entering desired track and index numbers for programming, the pitch-change on/off button, the slider control for altering pitch, a "Memory" button (for entering programming data), and "Index," "Time," "Clear" and "Repeat" buttons. All of these controls are also found on the wireless remote control, so the user can program the player from across a room in addition to simply starting, stopping and pausing the machine's turntable and pickup system. A three-position switch on the main panel selects the "Auto Pause" feature (which

I can't remember a single CD player incorporating so many features at so low a price—including two features I haven't seen on any CD player before.

stops play at the end of each track, resuming when you press "Play"), as well as "Timer Play" (if the player is powered through an optional clock-timer).

The rear panel of the SL-P8 is equipped with the usual left and right output jacks, the "Synchro Record" terminal, and an accessory terminal for easy connection to external components that Technics plans to make available some time in the future.

### Measurements

Figure 1 shows a plot of frequency response for both left and right channels of this CD player. As in previous reports, the vertical scale has been expanded to 2 dB per division, and the plot is from 20 Hz to 20 kHz. At 18.5 kHz, response was up by 0.1 dB for the left channel and down by 0.1 dB for the right. You could hardly ask for flatter response from any audio component.

Harmonic distortion at mid-frequencies, for maximum recorded level, measured only 0.003%, rising to 0.0065% at 16 kHz. Above that frequency, I did note what appeared to be a rapid rise in THD—reaching nearly 0.1% at 20 kHz. While such a level of distortion is clearly not an audible problem, I was curious about the sudden rise in the reading. A spectral analysis of the situation disclosed that the supposed "harmonic distortion" was not harmonic, but rather a "beat" frequency at 24.1 kHz, outside the range of human hearing. In Fig. 2, a linear sweep from 0 Hz to 50 kHz was used (5 kHz per division). The tall spike is the desired 20-kHz output signal; just to its right, about 4 kHz higher in frequency, is the spurious beat component which was responsible for the higher distortion reading.

Figure 3 presents plots of distortion versus frequency for 0-dB record level as well as for a -24 dB level, and the expected relationship (higher distortion at the lower output level) holds true here, as in previously tested CD players.

Output linearity was accurate to within  $\pm 0.2$  dB from 0-dB output down to -60 dB, and within 0.4 dB from -60 to -80

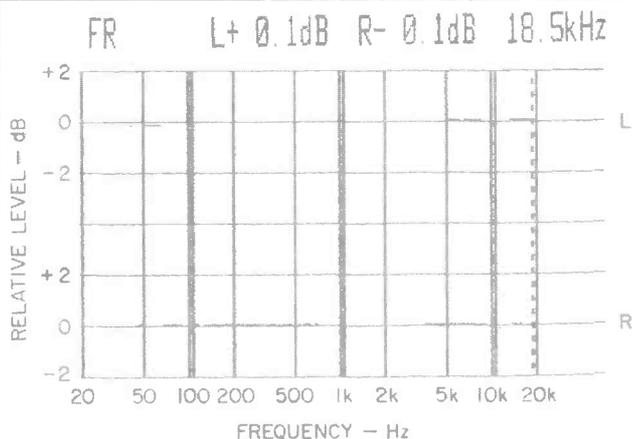
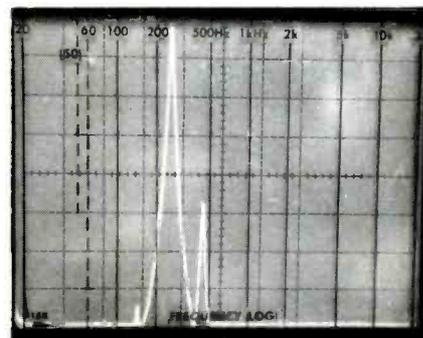


Fig. 1—Frequency response, left (top) and right channels, at 0-dB level.

Fig. 2—Spectrum analysis of reproduced 20-kHz test signal revealed presence of beat tone at inaudible frequency of 24.1 kHz (small spike at right of the desired, tall spike).



### WHAT THE TECHNICS SL-P7 OMITS

Laboratory measurements made on a sample of Technics' SL-P7 CD player revealed that its basic performance was virtually identical to that of the more expensive SL-P8. If you don't require any of the refined programming features and the wireless remote control offered by the SL-P8, you may very well want to consider this more basic player.

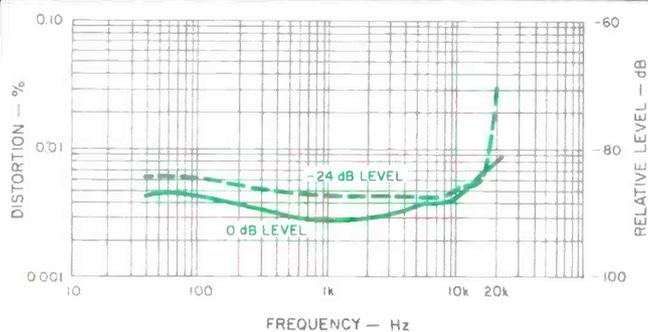
The SL-P7 measures nearly 4½ inches less in width and weighs nearly 3½ pounds less than its more expensive "big brother." The smaller unit's display area has been compressed so that it displays track, index and time. Like the SL-P8, however, it does display total time and total number of tracks when a disc is first inserted into the disc drawer and that drawer is closed. The major controls, such as "Pause/Stop," "Play," forward and backward "Search/Index" and forward and backward "Skip" buttons all perform the same functions as they do on the SL-P8. Although all controls and buttons relating to programming (such as the number keys, the "Memo-

ry" key, and "Index," "Time" and "Clear" keys) found on the SL-P8 have been omitted on the SL-P7, it does offer repeat-play capabilities of either the track in progress or the entire disc. The pitch control is omitted, as are the auto-pause feature and the headphone jack. The synchro-record terminal and the accessory connection socket are, however, retained on the SL-P7.

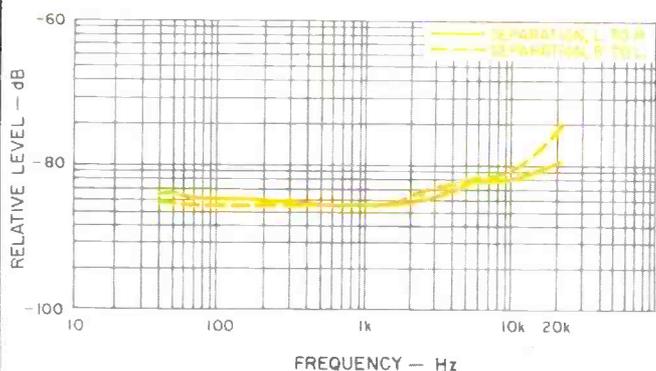
### Equal Basic Performance

What differences I noted in the measured performance characteristics of the SL-P7 compared with those of the SL-P8 are, more than likely, the minor differences that one might find between any two samples employing the same circuitry. Specifically, the SL-P7 had mid-frequency harmonic distortion readings of 0.004% and exhibited the same sort of super-audible "beat" phenomenon that I observed in the SL-P8. Signal-to-noise ratios on the SL-P7 were actually a shade better than the SL-P8's: 95.3 dB unweighted and an even 100 dB, A-weighted. Linear-

At 18.5 kHz, response was up by 0.1 dB for the left channel and down by 0.1 dB for the right one. You could hardly ask for flatter response than that.



**Fig. 3—THD vs. frequency, at levels of -24 (top) and 0 dB.**



**Fig. 4—Separation vs. frequency.**

dB. Stereo channel separation is plotted for left and right channels in the graph of Fig. 4. I measured separations of approximately 85 dB at mid-frequencies and between 75 and 78 dB at the high end of the spectrum. Left-to-right separation at the treble end was somewhat better than right-to-left separation.

SMPTE-IM distortion measured 0.0037% at 0-dB recording level, increasing to 0.036% at a -20 dB signal level. Signal-to-noise analysis was conducted with and without an A-weighting network. Unweighted S/N measured 93.6 dB (as displayed in Fig. 5A), while weighted S/N was 99.1 dB (as shown in Fig. 5B).

Reproduction of a 1-kHz, digitally generated square-wave test signal, shown in Fig. 6, was typical of that encountered with CD players which utilize multi-pole, steep-analog post-D/A filters. The same held true for reproduction of the digitally generated unit-pulse test signal, shown in the 'scope photo of Fig. 7. The usual slight phase displacement between a left-channel, 2-kHz test signal and a right-channel, 20-kHz test signal is evident in the 'scope photo of Fig. 8. Had phase linearity been perfect, positive crossing of the zero axis would occur at the same time for both signal frequencies. Though phase displacement at 20 kHz looks to be 25° or 30°, actual displacement might be higher by a multiple of 360°. (See Sears review, this issue.)

I repeated the usual tracking and error-correction tests using the specially prepared Philips test disc, which contains a wedge of opaque material, several black dots of specified diameters and a semi-transparent, simulated fingerprint smudge. The Technics SL-P8 is one of a very few CD players I have tested that successfully completed this "obstacle course" without missing a beat of music encoded beneath the deliberate defects. In other words, the laser tracking system, in combination with the built-in error-correction circuitry, was able to overlook disc "scratches" having a linear thickness of 900 microns, "dust" particles of 800-micron diameter, and a rather nasty "smudge" that

ity, stereo separation, and IM distortion readings were identical for both units and, best of all, the SL-P7 performed very nearly as well as the more expensive model in tracking my test "defects" disc. It almost played through the 900-micron-width wedge without any audible problems. I heard just one tiny pop, towards the end of the band, which wouldn't even qualify as a real mute, although the player did exhibit one or two moments of muting when playing through the test disc's 800-micron simulated dust speck. As for square-wave and unit-pulse reproduction, these appeared to be identical, when viewed on a 'scope, with the results obtained for the Technics SL-P8.

While the SL-P7 has no multiple-selection programming capability, I should stress the fact that access to any point on the disc (including index points, if they are present on any CD) is as rapid as in the SL-P8. Only access by *time* has been omitted.

To summarize, if you are the type of listener who needs

the programming versatility and the remote-control facilities of the SL-P8, by all means audition this model, and, if you're as pleased with it as I was, select it. If, on the other hand, you are looking for superior basic playback performance in an up-to-date CD player design and are willing to expend a little more effort in accessing desired programs on a disc, the SL-P7 could well be what you're looking for—and it will save you enough money for at least five or six extra Compact Discs. L.F.

#### Technics SL-P7 CD player



With players this good, I'll need a "defects" disc that makes even greater demands on their tracking and error-correction systems.

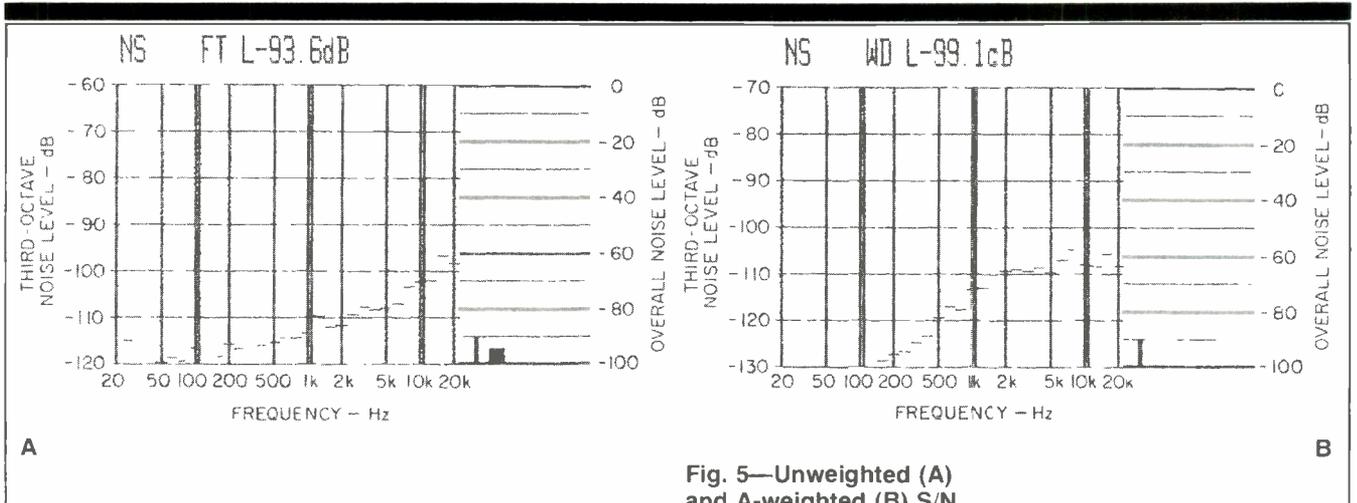


Fig. 5—Unweighted (A) and A-weighted (B) S/N.

occupies nearly an inch of linear distance near the outer diameter of the test disc. I can't tell you what it would take to make the SL-P8 mute or fail in its tracking ability, simply because these were the worst defects available on my test disc. With players such as this, I'm going to need a test disc that makes even greater demands upon a unit's tracking and error-correction system.

As for mechanical stability and shock resistance, I was half tempted to mount the SL-P8 in an automobile, so resistant was it to the thumps and whacks that I gave its top surface and side while playing CDs. It really took a rather violent pounding on the surface to cause mistracking, and that, to me, is an important characteristic of any machine.

#### Use and Listening Tests

The Technics SL-P8 is, quite simply, a pleasure to use. I have maintained right along that the biggest differences between CD players are not so much the quality of sound they produce (though, in recent tests, I have heard some differences) but in the features they offer and in their ease of use. It is in this latter area that the Technics SL-P8 truly excels.

As for sound quality, I now have some excellent Telarc discs which confirm what I've been saying: There's nothing wrong with the standardized CD system itself; we've simply got to learn how to make discs that take best advantage of the system. Telarc seems to have mastered the technique well ahead of others, though in all fairness, I must say that I own several other CDs that are beyond reproach musically and technically. In any case, playing the Telarc version of the Berlioz *Symphonie Fantastique* or their recording of Rudolf Serkin as soloist in the Beethoven Third Piano Concerto, or their recording of Stravinsky's *Firebird Suite*, one begins to appreciate the true potential of the CD format. These and other discs were played during my evaluation of the Technics SL-P8, and while I did not compare sounds heard with the same material played on other CD players, I can tell you that I truly liked the sounds delivered via the Technics unit. I hope Technics is nearly out of stock of the older SL-P10; if they aren't, they're likely to have a hard time selling it when it's compared with this newer, finer and less expensive player.

Leonard Feldman

Fig. 6—Response to 1-kHz square wave.

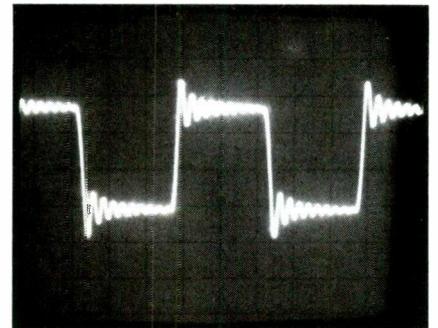


Fig. 7—Single-pulse reproduction.

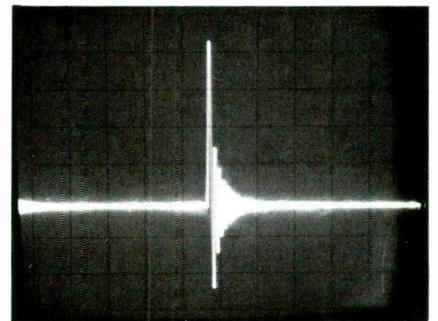


Fig. 8—Two-tone phase check (2 kHz left-channel, 20 kHz right-channel).

