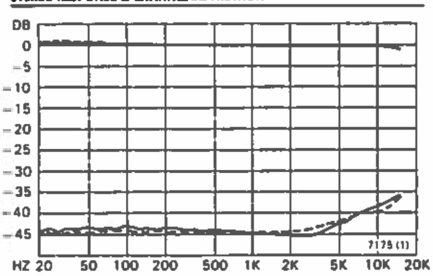
HIGH FIDELITY

AUDIO • VIDEO • TEST REPORTS • MUSIC

Test Report: NAD 7175PE Receiver

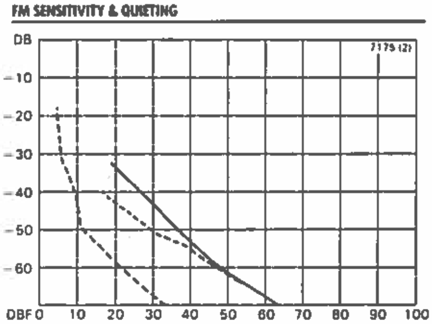
FM TUNER SECTION

STEREO RESPONSE & CHANNEL SEPARATION



Frequency response	
—— left channel	+ 1/2, −1 dB, 20 Hz to 15 kHz
- - - - - right channel	+ 1, − 3/4 dB, 20 Hz to 15 kHz
Channel separation	
	≥ 43 dB, 20 Hz to 3.8 kHz
	≥ 34 1/2 dB, 20 Hz to 15 kHz

FM SENSITIVITY & QUIETING



—— stereo quieting (noise), FM noise reduction off
- - - - - mono quieting (noise)
— — — stereo quieting (noise), FM noise reduction on

DIMENSIONS: $16\frac{1}{2}$ BY 4 INCHES (FRONT PANEL), $13\frac{1}{4}$ INCHES DEEP PLUS CLEARANCE FOR CONTROLS AND CONNECTIONS. AC CONVENIENCE OUTLETS: ONE SWITCHED, ONE UNSWITCHED (250 WATTS MAX. EACH). PRICE: $800. WARRANTY: "LIMITED," TWO YEARS PARTS AND LABOR. MANUFACTURER: MADE IN JAPAN FOR NAD (USA), INC., 675 CANTON ST., NORWOOD, MASS. 02062.

THE NAD MODEL 7175 RECEIVER IS ALSO known as the 7175PE (for Power Envelope). This concept (shared by the similar but lower-power 7150) seeks to match the instantaneous output capabilities of a power amplifier to the characteristics of real music, making clean transients available at higher levels than would be the case with an amplifier of conventional design. We'll have more to say about that later. In the meantime, the 7175 has other features that claim more immediate attention.

The tuner section typifies the NAD approach, which might be summarized as sophisticated ergonomic simplicity. Basic controls are an up or down tuning rocker and, below it, a step/seek switch—significantly more straightforward and therefore more useful, in our view, than the current fad for a mono/stereo button that also controls step/seek mode. A tap on the rocker changes tuning by quarter-channel (50-kHz) steps on the FM band, full-channel (10-kHz) on AM; firm pressure zips the tuning smartly across the band. The receiver "remembers" the last-tuned frequency even when it's turned off. There are five memory buttons, each of which will store one AM and one FM station.

There are two tuning aids just below the frequency readout: a signal-strength "meter" that registers on both bands and center-tuning aids for FM only. Discrete-element displays can only approximate the usefulness, for users with rotatable antennas, of a true needle-and-scale analog meter, which shows some movement for virtually any significant change of signal strength within its working range. The NAD's five-element display offers a closer approximation than most. Its thresholds cover an unusually wide range of antenna input level (from $4\frac{3}{4}$ to $63\frac{1}{4}$ dBf in Diversified Science Laboratories' tests), but that means that there are relatively wide gaps between them.

The channel-center display consists of arrowheads that appear at the right of the signal-strength display to indicate the direction of tuning necessary to center on a not-quite-tuned carrier. When tuning is spot-on, a rectangle between the two arrows illuminates instead. A similar rectangle just to the right of the display window lights when a stereo pilot is detected and not suppressed by the mono switch. There is no FM muting switch—nor is one needed. During seek, muting is automatic; in manual tuning, it's usually unwanted.

If these features were the only ones on the tuner, we'd call it an excellent job of boiling down functions and capabilities to simple, easily used groupings—and typical of NAD. Proprietary to NAD is what it calls FM Noise Reduction, which is a kind of dynamic blend option. Its operation is fairly complex, depending on both RF (radio frequency) signal strength and modulation level on the carrier, since low levels in either can allow audibility of hiss in weak stations. That hiss is canceled by the degree of blend that the feature introduces, and it therefore doesn't work in mono, of course.

At first glance, the data would appear to indicate a major improvement in effective sensitivity and quieting with the feature on. That's certainly true, but the side effect is a severe restriction of separation, at least under those reception conditions that benefit most from the noise reduction (NR) system. For instance, using NR improves stereo sensitivity from a respectable 36½ dBf to an outstanding 29½ dBf, but it also reduces midband separation from an outstanding 45¾ dB to a very poor 5 dB—so poor that it can hardly be called stereo. (The separation figure is determined by the standard test conditions and naturally would vary from moment to moment with a real station.) At the stereo threshold, separation measures 31 dB without noise reduction, only 3½ dB with it.

Stereo threshold behavior itself is very nearly the same either with or without NR and includes a better-than-usual ability to lock into the stereo mode so that it doesn't flicker in and out if signal strength wanders back and forth across the nominal threshold. So on weak stations, the compromise introduced by the NR feature is minimal—at most, a big improvement in signal-to-noise ratio at the expense of stereo imaging, with both factors progressively returning to normal as signal strength increases. By the time the signal-to-noise rating point has been reached, at 65 dBf, the NR feature has turned itself off.

For this reason, NAD marks the NR switch so that its normal position is on. Some combinations of signal strength and fluctuating program content can induce audible "pumping" of reception noise—therefore making it desirable to turn the NR off—but NAD has designed the feature so well that during our listening tests we could find no really obvious examples of such poor reception conditions. So we agree that most listeners will want to leave the NR on most of the time.

Overall, then, we consider the tuner section exceptional for a receiver costing $800. The alternate-channel selectivity is not quite as impressive as most of the other data—including the adjacent-channel figure—but no parameter presents a significant shortcoming for most users, and the combined performance and control approach make it unusually easy to get unusually good reception. On the back panel, there's even a 75-ohm F connector for direct coaxial input from a cable or FM antenna downlead and an attached AM bar antenna, as well as the usual spring-loaded clip connections for other antenna options.

The preamp section incorporates a fillip of its own: a bass-EQ switch that can be used to introduce a peak of 8½ dB at about 45 Hz, together with a sharp rolloff at lower frequencies. Its purpose is to add electronically the energy that might otherwise be supplied by a subwoofer, thereby increasing the overall bass extension of the system. How well it will work depends to a large extent on the response of the speakers with which it is used, but the nature of the program and the level at which it is reproduced enter into the equation as well. With a fairly powerful receiver such as this, the extra boost shouldn't actually cause an overload at anything short of Richter-scale levels.

The LOUDNESS introduces equalization that, over the range of DSL's bench tests, varies little with volume setting. Bass below 100 Hz or so is up about 10 dB relative to the midrange band between 1 and 3 kHz, while the very top of the treble is boosted by about half that much. These specifics can be modified to some extent with the tone controls, but more in degree than in kind. The bass control shelves at about ±12 dB below 100 Hz; the treble does so at about ±8 dB above 10 kHz. Should you want to separate the operation of the preamp/tuner sections from the power amp section (to insert a speaker equalizer or sound processor), there are back-panel pre-out/main-in jacks.

The overall response of the receiver—against which all other response information must be measured—is not quite flat in our test sample, whose bass detent may not be precisely centered on its null. A slight rise appearing consistently throughout the bass amounts to no more than +½ dB or so to below 40 Hz and increases to about +1 dB at 20 Hz, even with the infrasonic filter engaged. There's also a droop of about ½ dB at 15 kHz and 1 dB at 20 kHz at the top end. Only the bass rise can be expected to make any audible difference—and then only very subtly and only with certain music.

The phono section displays a very slight additional rise (less than ¼ dB) through much of the treble. The response with the back-panel phono-mode switch in the "MM" position (for fixed-coil and high-output moving-coil cartridges) turns up slightly—that is, even above the aforementioned bass rise—at the extreme bottom. The "MC" option adds a hair of additional boost over a broader bass range and droops very slightly more at the top end. None of these specifics is cause for serious complaint, however. Both phono inputs offer some inherent attenuation of infrasonic warp output; the infrasonic filter kicks in only very low (it's down 3 dB at 9.4 Hz) but is unusually steep (about 24 dB per octave), for good net effect in the 5-Hz range.

There are two completely separate but otherwise identical input selectors, one for monitoring and one for recording. The recording output passes through a buffer stage to isolate it from the main signal path, so no "recording off" switch is needed. Each selector has positions for phono, tuner, two tape decks (thus making it possible to dub between decks in either direction via the recording selector) and two high-level inputs marked for CD and "video" (meaning

Stereo sensitivity (for 50-dB noise suppression), FM NR off		
	36 1/2 dBf at 98 MHz, with 0.33% THD+N (36 1/2 dBf at 90 MHz; 36 1/4 dBf at 106 MHz)	
Stereo sensitivity (for 50-dB noise suppression), FM NR on		
	29 1/2 dBf at 98 MHz, with 0.31% THD+N (see text)	
Mono sensitivity (for 50-dB noise suppression)		
	11 1/2 dBf at 98 MHz	
Scan threshold (mono)		29 1/2 dBf
Stereo threshold		19 dBf*
Stereo S/N ratio (at 65 dBf)		70 1/2 dB
Mono S/N ratio (at 65 dBf)		77 1/4 dB
CAPTURE RATIO		1 1/2 dB
SELECTIVITY		
alternate-channel		59 3/4 dB
adjacent-channel		7 1/4 dB
HARMONIC DISTORTION (THD+N)		
	stereo	mono
at 100 Hz	0.17%	0.04%
at 1 kHz	0.06%	0.05%
at 6 kHz	0.14%	0.11%
STEREO PILOT INTERMODULATION		0.05%
INTERMODULATION DISTORTION (mono)		0.03%
AM SUPPRESSION		63 1/2 dB
PILOT (19 kHz) SUPPRESSION		82 1/2 dB
SUBCARRIER (38 kHz) SUPPRESSION		89 1/2 dB

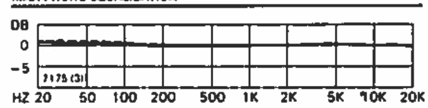
*See text.

AMPLIFIER SECTION

All measurements shown were made with soft-clipping feature off and, except as noted, impedance switch set for 8-ohm load.

RATED POWER	18.8 dBW (75 watts)/channel	
OUTPUT AT CLIPPING (at 1 kHz; both channels driven)		
8-ohm load	20.0 dBW (100 watts)/channel	
4-ohm load	21.2 dBW (130 watts)/channel	
4-ohm load, 4-ohm setting	20.0 dBW (100 watts)/channel	
DYNAMIC POWER (at 1 kHz)	**8-ohm setting**	**4-ohm setting**
8-ohm load	25.0 dBW	
4-ohm load	26.6 dBW	26.5 dBW
2-ohm load	27.5 dBW	27.7 dBW
DYNAMIC HEADROOM (re rated power; 8-ohm load)		+6.2 dB
HARMONIC DISTORTION (THD; 20 Hz to 20 kHz)		
at 18.8 dBW (75 watts)		≤0.024%
at 0 dBW (1 watt)		<0.01%
FREQUENCY RESPONSE		
	±1 dB, 19 Hz to 22.6 kHz	
	+1 1/2, −3 dB, <10 Hz to 37.9 kHz	

RIAA PHONO EQUALIZATION



——— fixed-coil	+1 1/4, −1/4 dB, 20 Hz to 20 kHz; −9 dB at 5 Hz	
- - - - - moving-coil	+1 1/4, −1/2 dB, 20 Hz to 20 kHz; −15 1/2 dB at 5 Hz	
SENSITIVITY & NOISE (re 0 dBW; A-weighting)		
	sensitivity	S/N ratio
aux input	23.5 mV	82 dB
fixed-coil phono	0.34 mV	75 dB
moving-coil phono	34 μV	77 dB
PHONO OVERLOAD (1-kHz clipping)		
fixed-coil phono		200 mV
moving-coil phono		20 mV
INPUT IMPEDANCE		
aux input	12k ohms	
fixed-coil phono	48k ohms; 115 pF	
moving-coil phono	48k ohms	
OUTPUT IMPEDANCE (to tape)		
from aux input		1,000 ohms
from tuner section		1,000 ohms
from phono inputs		1,000 ohms
DAMPING FACTOR (at 50 Hz; re 8 ohms)		85
CHANNEL SEPARATION (at 1 kHz)		66 dB
INFRASONIC FILTER	−3 dB at 9.4 Hz; ≈24 dB/octave	

only the audio from a video source).

The amplifier, which has independently switchable output connections for two speaker pairs (plus OFF, for using only the headphone jack), incorporates two options we've encountered in previous NAD products: SOFT CLIPPING and an impedance-matching switch. Both are on the back panel, near sturdy binding posts designed to accept bared speaker leads. The soft clipping, in essence, alters the waveform as signal amplitude approaches the clipping point, substituting a minor infraction (slightly increased distortion at high output levels) for the major one (audible hard clipping) that would otherwise result. In DSL's data, it doesn't increase distortion to any significant extent, despite the waveform alteration, though it does reduce available output slightly—in almost all tests, by less than 1 dB. (Our data column shows only the figures with the feature turned off.)

The impedance-matching option used to be a way of making the most of low-impedance speakers, if you had them. Here, because of the Power Envelope design, NAD seems to have changed its approach a bit. The "4-ohm" (low-impedance) switch position is marked "normal," the company tells us, because many users won't really know what their speakers' impedance curves look like, and the 4-ohm option offers the greatest protection against excessive current drain. When the speakers are known to present no very low impedance dips, however, the 8-ohm position can be used for the most unfettered output.

Finally, the Power Envelope design focuses on the fact that, in the words of the cliché, "music is composed of transients." The Federal Trade Commission chose to ignore this in stipulating that the continuous rating (into 8 ohms) must be the primary advertised power spec of any amplifier. The IHF (Institute of High Fidelity, now absorbed into the Electronics Industries Association) testing standard that is the basis of our measurements seeks a return to the real world by adding an admittedly arbitrary 20-millisecond tone burst signal in addition to the continuous sine wave of the FTC spec and our clipping test. NAD wants to design for all musical characteristics—in particular, the most typical transients, which can be much longer than 20 milliseconds—and has developed an elaborate model describing the range of peak levels and durations that music may require.

NAD claims that by designing for real musical transients, it can make several hundred watts available for almost half a second (500 milliseconds) from the 7175's "75 watt" amplifier and thus reproduce music cleanly at levels unsuggested by the FTC rating or even the IHF test. Although we can't test the many music/speaker combinations that would be necessary to reasonably substantiate all NAD's implied claims, we're satisfied on the basis of DSL's data that the claims are reasonable.

DSL measured the amp in the 8-ohm setting with 8-ohm, 4-ohm, and (for the dynamic tests) 2-ohm loads, and it repeated the tests (except for the 8-ohm load) in the 4-ohm setting. Even in the 8-ohm position, the 2-ohm load seemed to give the amplifier no complaint with the 20-millisecond burst as it delivered a whopping 27.5 dBW (that is, the equivalent of 560 watts) per channel. And set for 4 ohms, the amp delivered another 0.2 dB—for the equivalent of 590 watts per channel. These figures surpass the claims implied in NAD's literature. With the 8-ohm setting and load, the dynamic power measurement gives a headroom figure of 6.2 dB—huge, by normal standards. Unequivocally, the 7175 will deliver more clean power with music signals than its FTC rating suggests.

In every model we've tested, NAD's reputation for sensible, user-oriented design and excellent value has proved justified. And we don't think any model has justified it more dramatically than the 7175. It's not cheap, but it is exceptional and, we think, worth every penny. ■