

NAD

THE 7175PE and 7250PE STEREO RECEIVERS with POWER ENVELOPE design



Introduction:

NAD is internationally recognized as the value leader in hi-fi, and these receivers set a new world standard for musically useful dynamic power. Indeed, they redefine the very idea of dynamic power. They have nearly the same size, heat dissipation—and nearly the same cost—as conventional “medium-power” receivers. But thanks to POWER ENVELOPE design, these new NAD receivers produce hundreds of watts of clean, solid power for flawless reproduction of the dynamic bursts in music.

Unlike many receivers which perform at their best only with loudspeakers that electrically resemble a simple 8-ohm resistor, NAD receivers feature a Speaker Impedance selector and a high-current output stage that delivers full power to speakers of any impedance—high or low, simple or complex.

The phono preamplifier circuit has unusually low noise and high headroom for peaks. The overload-proof inputs for digital Compact Disc and video-related audio can accommodate a dynamic range greater than 103 dB. The combination of Bass EQ with infrasonic filtering provides bass that is powerful without the muddiness of intermodulation distortion.

A special FM noise-reduction circuit trades away stereo separation in weak signals to obtain a welcome quieting of noise and distortion. At every signal level, the quieting is 5 to 10 dB better than in most other receivers—even than in most separate tuners.

When you choose an NAD receiver, you are investing in quality *behind* the front panel—in advanced engineering design, selected parts, oversize high-current transistors, exacting quality control, and solid construction for consistent performance and long-term reliability.

NAD manufactures an entire line of home electronics, including stereo and video components, loudspeakers and accessories. The 7175PE is shown above with the 6155 Cassette Deck and 5355 Compact Disc Player.

Circuit Features—Amplifier Section

POWER ENVELOPE circuitry. In the NAD 7175PE and 7250PE receivers, the available tone-burst power for music is **four to six times greater** than the rated continuous power for test tones. The “50-watt” 7250PE produces over 200 watts per channel of tone-burst power, while the “75-watt” 7175PE can produce bursts of 300 watts into 8 ohms and 400 watts per channel into a 4-ohm impedance.

Digital-ready design. The line-level inputs of these receivers will not be overloaded by high-level signal peaks from a Compact Disc player or digital tape recorder. The signal-to-noise ratio, over 100 dB, exceeds that of any analog or digital program source. The low-impedance, low-noise design of the volume and tone control circuits guarantees that the transparent clarity of the finest analog and digital recordings will be preserved.

Low-noise phono preamplifier. As long as LPs remain a principal music source for many listeners, there must be no compromise in the quality of the phono preamp circuit. NAD's phono preamp circuits feature accurate RIAA equalization, correct interfacing with the complex impedance of the phono cartridge, very low noise, and plenty of headroom to accommodate the highest-level peaks without distortion. The total dynamic range of the phono preamp is greater than 105 dB, ample for all direct-to-disc and digitally-mastered LP recordings.

High-current output stage. Electrical power is the product of voltage and current. In some receivers the output current is deliberately constricted by current limiters (protection circuits), in order to allow the use of smaller, cheaper output transistors. But NAD engineers have always known, and other manufacturers have lately begun to realize, that to provide precise electromagnetic control of the speaker voice-coil's motion, the amplifier must be able to supply high peak currents upon demand. The NAD 7250PE can produce peak currents greater than 30 amperes per channel, and the 7175PE can deliver in excess of 40-ampere peaks.



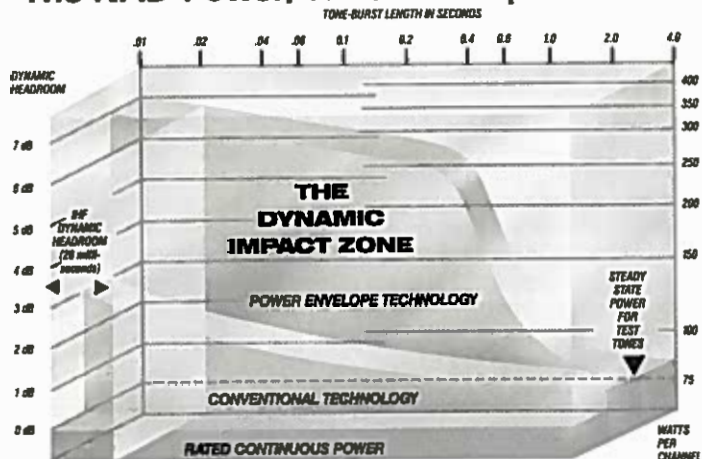
Loudspeaker impedance matching. Standard lab tests of amplifiers use 8-ohm resistors in place of loudspeakers. But most loudspeakers have a lower and more complex impedance that increases the required amplifier output current. (And if you connect two pairs of loudspeakers, the effective impedance of the pair is halved.) For this reason all NAD amplifiers and receivers are designed to deliver maximum power into low impedances of 4 or even 2 ohms. But the exclusive NAD impedance selector allows you to re-optimize the circuit to deliver greater output voltage for maximum effective power delivery to loudspeakers whose true impedance is 8 ohms or higher.

Close-Tracking Soft Clipping. NAD's trademarked Soft Clipping circuit gently limits the waveform when the amplifier is driven beyond its maximum power rating. By preventing the output transistors from being driven fully into saturation, the Soft Clipping reduces the harshness that is normally heard when an amplifier is overdriven. The newly improved "close-tracking" circuit accurately tracks the available peak power, regardless of speaker impedance, ensuring that the receiver's sound will remain subjectively clean and transparent right up to the maximum output level.

Bass EQ. A special equalization circuit provides 6 dB of boost at 32 Hz in order to strengthen and extend the deep-bass response of closed-box loudspeaker systems. A typical bookshelf speaker that rolls off below 50 Hz will have strong output to 30 Hz when used with an NAD receiver, providing the sort of authentic bass "feel" that might otherwise require a costly separate subwoofer system.

Infrasonic filter. Precise infrasonic filtering is included to eliminate signal contamination from turntable rumble, record warps, tonearm/stylus resonances, vibration and acoustic feedback. This guarantees the cleanest possible handling of signals within the audible range and eliminates the excessive woofer-cone excursions that can cause intermodulation distortion and muddy bass in systems without filtering.

The NAD Power/Time Envelope.



Unlike conventional amplifier designs NAD POWER ENVELOPE CIRCUITRY provides dynamic power for musical transients lasting much longer than the 0.02 second IHF dynamic headroom test. This will greatly increase the DYNAMIC IMPACT of loud music.



NAD's critically acclaimed receiver line now includes the advanced POWER ENVELOPE

- POWER ENVELOPE design yields extraordinary reserves of tone-burst power for music—four to six times higher than the rated continuous power.
- Dynamic power exceeds 200 watts/channel in the NAD 7250PE, 300 watts/channel in the NAD 7175PE.
- High-current output circuits can deliver peak currents above 30 amperes, for precise control of voice-coil motion with speaker impedances as low as 2 ohms.
- Exclusive NAD impedance selector delivers maximum power into any speaker impedance.
- Bass EQ circuit augments the deep-bass response of speakers, while a steep infrasonic filter preserves maximum power for music.

Designed to incorporate POWER ENVELOPE design.

- FM NR (FM Noise Reduction) provides a dramatic 9 dB reduction of noise and distortion in weak stereo signals. Automatically selects the optimum combination of stereo separation and effective quieting at any signal level.
- Nearly twice as sensitive in FM stereo as other receivers. The 50 dB stereo quieting sensitivity is less than $20\mu\text{V}$, and maximum quieting in stereo exceeds 80 dB.
- High AM rejection and low capture ratio minimize multipath interference in both strong and weak signals.



Circuit Features—Tuner Section



Design for real-world conditions. Tuner specifications are measured with a medium-strong signal (65 dBf, i.e. 1000 μ V into 300 ohms), but in the real world a tuner must perform well with signals of widely varying strength and quality. For example, an FM tuner's resistance to multipath interference depends on its ability to "capture" the desired signal and reject weaker reflected signals; the lower the capture ratio, the more efficiently the tuner rejects the interference and captures clean stereo. These NAD receivers are consistently low in capture ratio, not only at the medium signal strengths where other tuners perform well, but also over the 100-to-1 range in signal level from 25 to 65 dBf, allowing many more stereo broadcasts to be received without distortion.

Sharp selectivity and clean stereo. The MOSFET input circuit can accept a full volt (a million microvolts) of signal; strong-signal overload is no longer a problem in urban areas. The I.F. circuit contains three linear-phase ceramic filters selected for the optimum combination of sharp selectivity (to get clean separation of closely-spaced stations) and low phase-shift delay (for minimum distortion and crosstalk in stereo). The balanced linear quadrature detector ensures consistently low distortion, even with over-modulated broadcasts. The composite stereo signal is phase-compensated to ensure that the PLL multiplex decoder delivers wide separation at all frequencies, not just in the midrange.

Refinements. The 75-ohm coaxial input bypasses the internal 300/75-ohm balun transformer and goes directly to the r.f. amplifier for best sensitivity. A dual-notch low-pass filter completely suppresses the 19 & 38 kHz stereo subcarrier signals and also provides extra filtering of SCA interference, in addition to the SCA rejection that is built into the PLL MPX decoder chip. This is especially important now that FM stations use SCA subcarriers to transmit computer data. A special low-leakage capacitor maintains programmed station frequencies in memory for over 3 weeks when the tuner is off or unplugged.

FM Noise Reduction. 90 percent of the noise and distortion that arise in less-than-ideal FM reception is in the L-minus-R stereo subcarrier. Whenever the signal strength is low enough to cause noisy reception in stereo, NAD's FM NR (noise reduction) automatically reduces the level of the noisy L-R signal, restoring good quieting while narrowing the width of the stereo image. This system dramatically improves the listenability of weak FM signals.

Optimum gains and losses. In the I.F. section of any tuner the signal is attenuated by high-selectivity filters and re-amplified, by high-gain ICs. By optimizing the filter design to reduce losses, NAD's designers were able to simplify the circuit, eliminating an entire stage, while still delivering the optimum signal level to the PLL MPX decoder—obtaining an 80 dB stereo S/N ratio at 75 dBf!

Superior stereo sensitivity and quieting. In most tuners and receivers the 50 dB stereo quieting sensitivity is about 37 dBf (39 μ V across 300 ohms). NAD's design refinements and the action of the FM NR circuit jointly improve this figure to about 28 dBf (15 μ V). *In effect the NAD receivers are more than twice as sensitive as a conventional FM tuner.*

Quiet AM tuning. The AM section is surprisingly sensitive, and its exceptional freedom from noise and static makes it unusually pleasant to listen to. This is because it is based on an IC that was especially developed for use in quality digital tuners.

Extra Features In The 7175PE:

The 7175PE has an extra margin of power for very large listening rooms, for very inefficient speakers, or for particularly demanding listeners. In addition, the 7175PE has several refinements of its own:

Five-gang tuning. An extra stage of filtering provides greater immunity to interference in difficult reception areas (near airports, for example).

MC phono mode. A rear-panel switch converts the phono preamp to a high-gain mode with extra-low noise, for use with moving-coil cartridges.

Separate input selectors for listening and recording. This flexible design makes it easy to listen to phono or CD while recording from the FM tuner, or to copy a recording from one tape deck onto another while listening to the source deck, the copying recorder, or any other input.

AM whistle filter. The AM tuner in the 7175PE contains a sharp filter (at 10kHz in the U.S., 9kHz in European versions) to eliminate adjacent-station interference.

Exceptional Performance And Value.

The 7250PE and 7175PE receivers represent the kind of value that has made NAD world-famous. With their POWER ENVELOPE design, they are among the most powerful stereo receivers available. But since they also have outstanding FM sensitivity and quieting, logically designed and musically useful controls, very low noise and wide dynamic range, a high-current output stage with speaker-impedance matching, and superbly musical sound quality, these NAD receivers would represent exceptional value even if they didn't also have one of the greatest ratios of useful power to price of any receiver on the market today.



Specifications

NAD 7175PE and 7250PE Stereo Receivers

Note: Measurements referenced to 8 ohms are taken with the Speaker Impedance selector set to "8Ω (High)." Measurements for 4 and 2 ohms are taken with the impedance selector at "4Ω (Normal)." Specifications are measured in accordance with EIA Standard RS-490 (IHF A-202) for amplifiers and ANSI-IEEE Standard 185(1975) (IHF T-200) for tuners. Tuner sensitivity is measured via 75-ohm coaxial input and converted to equivalent 300-ohm values.

Power Amplifier Section

	NAD 7175PE	NAD 7250PE
CONTINUOUS AVERAGE POWER OUTPUT INTO 8 OHMS (min. RMS power per channel into 8 ohms, 20 Hz–20 kHz, both channels driven, with no more than the rated distortion)	75 W (18.7 dBW)	50 W (17 dBW)
Rated distortion (THD), 20 Hz–20 kHz		0.03%
Clipping power at 8 ohms (maximum continuous power per channel)	80 W	55 W
IHF dynamic headroom at 8 ohms		+6 dB
IHF dynamic power		
8 ohms (maximum short-term power per channel)	300 W	200 W
4 ohms	400 W	250 W
2 ohms	500 W	300 W
Peak output current (amperes)	>40 A	>30 A
Slew factor		>50
Slew rate		30 V/μsec
Damping factor (ref. 8Ω, at 50 Hz)		>50
Input impedance		30 kΩ
Input sensitivity for rated power		1 V
Input sensitivity for 1 watt out	120 mV	140 mV
Power amplifier gain	28 dB (25 ×)	26 dB (20 ×)
THD (Total Harmonic Distortion, 20 Hz–20 kHz, from 250 mW to rated output)		<0.03%
SMPTE I.M. (Intermodulation Distortion, 60 Hz + 7 kHz, 4:1, from 250 mW to rated output)		<0.03%
IHF I.M. (CCIF IM Distortion, 19 + 20 kHz at rated output)		<0.03%

Preamp Section

Phono Input

Input impedance (MM or MC)		47 kΩ + 100 pF
Input sensitivity ref. 1 watt	MM: 0.4 mV MC: 0.03 mV	0.4 mV N/A
Input overload at 20 Hz/1 kHz/20 kHz	MM: 18 mV/170 mV/ 1.5 V	18 mV/170 mV/ 1.5 V
	MC: 15 mV/13 mV/ 110 mV	N/A

THD (20Hz–20kHz) and IM Dist. at +30 dB level <0.04%

RIAA response accuracy = 0.5 dB

S/N ratio, IHF A-weighted, with cartridge connected	MM: 76 dB re 5 mV MC: 76 dB re 0.5 mV	76 dB re 5 mV N/A
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Line Level Inputs (CD, Video, Tape)

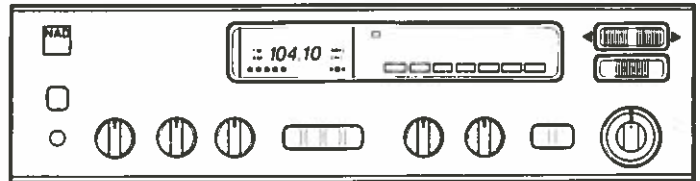
Input impedance	10 kΩ + 220 pF
Input sensitivity ref. 1 watt	25 mV
Maximum input signal	>10 V
Signal to noise ratio, A-weighted	85 dB re 1 watt >100 dB ref. rated power
Frequency response, 20 Hz–20 kHz	= 0.5 dB

Outputs

Preamp output impedance	800 ohms
Maximum output level	10 V
Tape output impedance	1000 ohms (buffered)
Tape output infrasonic filter	-3 dB at 15 Hz, 12 dB/octave

Controls

Treble	±7 dB at 10 kHz
Bass	±7 dB at 100 Hz
Bass EQ	+3 dB at 70 Hz, +6 dB at 32 Hz
Infrasonic filter (switchable)	-3 dB at 15 Hz, 12 dB/octave
Audio muting (low level)	-20 dB



FM Tuner Section

	NAD 7175PE	NAD 7250PE
Input sensitivity		
Mono, -30 dB THD + N		10.3 dBf (1.8 μV/300Ω, or 0.9 μV into 75Ω)
Mono, 50 dB S/N		14.2 dBf (2.8 μV)
Stereo, 50 dB S/N		29 dBf (15 μV), FM NR on
Stereo 60 dB S/N		36 dBf (35 μV), FM NR off
		40 dBf (55 μV), FM NR on
		46 dBf (110 μV), FM NR off
Capture ratio (at 45 and 65 dBf)		<1.5 dB
AM rejection (at 65 and 85 dBf)		>65 dB
Selectivity		
Alternate channel		70 dB
Adjacent channel		8 dB
Image rejection		85 dB
R.F. intermodulation		70 dB
I.F. rejection		100 dB
SCA rejection		70 dB
Subcarrier suppression (19 & 38 kHz)		6 dB
THD at 100% modulation		
Mono, 1 kHz		0.08%
100 Hz–6 kHz		0.2%
Stereo, 1 kHz		0.08%
100 Hz–6 kHz		0.3%
Signal-to-noise ratio		
A weighted, 65 dBf		
Mono		82 dB
Stereo		76 dB
		(typ. 80 dB at 75 dBf)
Frequency response, 30 Hz–15 kHz		= 0.5 dB
Stereo separation		
1 kHz (FM NR off)		50 dB
30 Hz–10 kHz		40 dB

AM Tuner Section

Usable sensitivity	300 μV/meter
THD	0.5%
Selectivity	35 dB
Image rejection	50 dB
I.F. rejection	50 dB
S/N ratio (30% mod., 50 mV input)	45 dB

Physical Specifications

Dimensions			
Width	42 cm. (16.5 in.)	42 cm. (16.5 in.)	
Height	10.8 cm. (4.25 in.)	10.8 cm. (4.25 in.)	
Depth	38 cm. (15 in.)	38 cm. (15 in.)	
Net weight	9.18 kg. (20 lb. 4 oz.)	9.2 kg. (20 lb. 6 oz.)	
Shipping weight	10.6 kg. (23 lb. 6 oz.)	10.6 kg. (23 lb. 6 oz.)	
Power consumption (50/60 Hz at 110, 120, 220, or 240 VAC)	340 W	290 W	

Specifications are those in effect at the time of printing. NAD reserves the right to change specifications or designs at any time without notice.

Industrial Design: REINHOLD WEISS DESIGN/CHICAGO

About NAD:

NAD is the world's leading manufacturer of affordable high-quality stereo equipment. Since 1978, NAD stereo components have won universal praise for their sophisticated engineering, excellent sound, ease of use and superior price performance value. NAD products are sold by a carefully selected network of dealers in twenty-nine countries around the world. If you haven't seen the name before, it is because NAD invests most of its money in engineering rather than advertising—relying on enthusiastic word-of-mouth publicity and an unbroken string of rave reviews in magazines to spread the news of the superiority of NAD's designs. In keeping with its dedication to high value engineering and innovative product design, NAD is proud to introduce the Models 7175PE and 7250PE Receivers.

NAD ELECTRONICS

BOSTON/LONDON