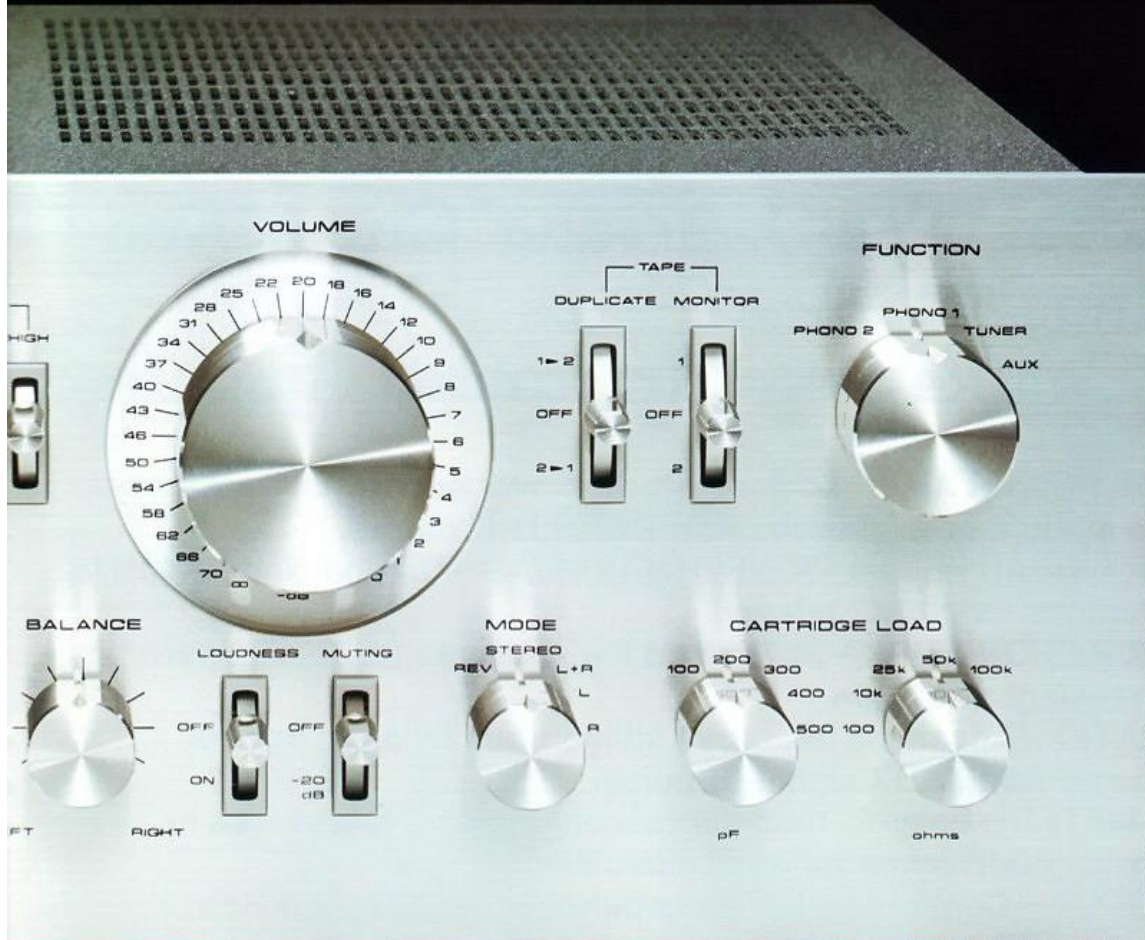


UNPRECEDENTED PERFO



PERFORMANCE IMPROVEMENTS



PIONEER SA-8800

Super-Linear RETs and Pioneer "Non-Switching" Circuit End Switching Distortion in This Deluxe Stereo Integrated Amplifier.

- **MAGNI-WIDE POWER AMP** — Lower distortion over superwide frequency/ power range in Pioneer-exclusive "Non-Switching" output.
- **NEW SUPER-LINEAR RETs & PIONEER VARI-BIAS** — Original and exclusive technical triumphs for higher fidelity.
- **DC CONFIGURATION AMPS** — Power and flat amps are DC to eliminate phase and transient distortion.
- **HIGH S/N RATIO** — Advanced circuitry and high-quality parts ensure 90dB Phono and 110dB AUX signal-to-noise.
- **NEW PEAK METER** — Easy-to-read fluorescent meter displays instant peaks over wide 60dB range for each channel.
- **POWER OUTPUT** — Continuous 80 Watts per channel, 10 to 20kHz at 8 ohms, 0.005% THD or less.

ENGINEERED FOR EXCELLENCE

Achieving realistic musical performance in a solid-state amplifier means providing maximum efficiency and minimum distortion in the power section, ridding the preamplifier and power output of all phase delays and noise, and making all circuitry serve, not fight, the goal of full dynamic range. Pioneer has achieved this in the SA-8800, but without compromising

the practicality of this stereo integrated amplifier one bit. User-oriented design features include our new fluorescent Peak Meter, a pair of selectors for Phono Cartridge Load, a 5-position Mode Switch, separate switches for TAPE DUPLICATE and MONITOR and many other functions.

Backing up our Magni-Wide amplifier policy, aimed at wider dynamic range, lower distortion and an expanded frequency range,

is the innovative, Pioneer-exclusive circuitry in the DC flat amp and especially the "non-switching" power amplifier. The latter features our new Super-Linear RETs or Ring-Emitter Transistors, and the amazing Pioneer Vari-Bias Circuit that ends switching distortion and provides "cool amp" efficiency. The more you learn of the exciting details, the more you will appreciate the excellent engineering of the SA-8800.

POWER AMPLIFIER IS "NON-SWITCHING"

Increasing Efficiency to End Distortion

A power amp that runs "hot" is an inefficient amp. Often, however, a "hot" amp may have less distortion. Engineers are faced with a choice—use the Class-A type amp configuration and waste up to 75% of its power supply in the form of heat, or use the Class-B type, whose transistors are ON only when a signal is present, and cut down on heat waste at the expense of switching distortion (also called "notching distortion") which is particularly damaging to ultra-high frequencies.

Class-A amps, the "hot" ones, are normally employed only in the *preamp* circuits in audio, or in hybrid "Class-AB" power amps as explained below. Increasing the *efficiency* of Class-A has been the dream of electronics engineers for some time. It would allow them to use Class-A for high power output. In the SA-8800, we've found a way to do just that. You'll hardly believe the improvements it achieves in actual musical performance.

Solving the "Either/Or" Paradox

One way to offer increased efficiency and lower distortion is in the use of the so-called "Class-AB" configuration which is now popular among some audiophiles. When the listener requires an output of more than three watts or so, he selects the Class-B function by means of a switch (more sophisticated versions provide automatic A/B selection). The amp is then put

into a mode where no bias current is supplied to the power transistors. This permits off/on operation for cooler performance, but adds the aforementioned switching distortion. It is a very discouraging "either/or" problem when achieving true musical fidelity at high power output is the goal.

We've tried the Class-AB approach. It works. But now we've gone it one big step better: the power output amp in the SA-8800 is "non-switching" all the way.

New Pioneer Vari-Bias Circuit

How have we achieved "Non-Switching"? Our engineers explain:

"We developed a very simple circuit to allow very fast response of the *bias control* (which prevents the power transistors from switching off). It effectively prevents the amplifier from generating high frequency switching distortion without affecting other performance parameters. Thermal loss is low, no more than conventional Class-B types and very small when compared with that of Class-A amps. Our new PVB (Pioneer Vari-Bias) circuit enables high power output with low distortion over wide frequency ranges to exceed the performance objectives outlined in our Magni-Wide amplifier policy."

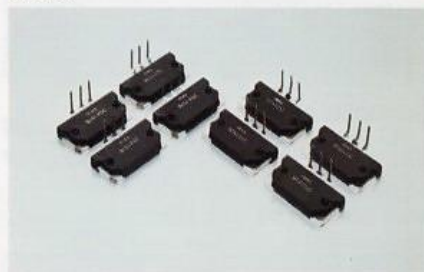
There is the crux of the matter: the transistors *do not switch off*, thus there is no switching distortion. Brilliant. And it is particularly noticeable in the high frequencies, since even the supersonics now retain faithful waveforms from input to output. New Super-Linear RETs, too, serve the cause of high fidelity, as detailed below.

RETs—Ring Emitter Transistors

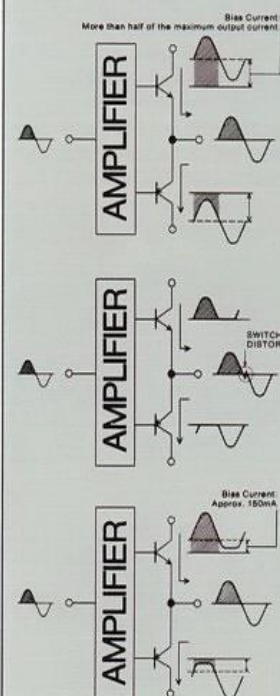
Pioneer introduced these futuristic solid-state devices, with great success not long ago. In the improved Super-Linear versions they are employed (four per channel) in the power amplifier of the SA-8800 with the following results:

- (1) Very high f_T (amplitude limiting frequency).
- (2) Higher resistance to breakdown, even handling high power outputs over long periods of time.
- (3) High linearity to ensure faithful waveform amplification.

The name "Ring Emitter Transistor" comes from their construction: inside each are hundreds of low-power transistors, connected in parallel. The emitter electrode of each sub-transistor is connected with the others in the form of a ring. Many of their characteristics are far superior to those of conventional bi-polar types, as much as ten times better, in fact.



Modes of Amplification



CLASS-A OPERATION

Paired transistors are always turned on, amplifying its assigned waveform within the range above and below its quiescent operating point. Therefore, no switching distortion can occur. But, that bias current is always at the center point and thermal loss is considerable.

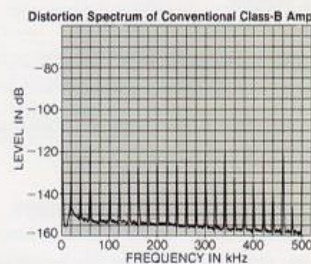
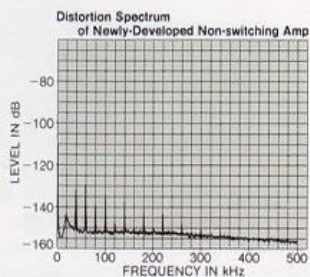
CLASS-B OPERATION

Paired transistors alternately turn on and off, amplifying the positive half-cycles and negative half-cycles. This lets amplifiers run cooler with high efficiency. But, as the power transistors are driven below its idle current into cutoff, switching distortion (also called "notching distortion") occur.

"NON-SWITCHING" AMP OPERATION

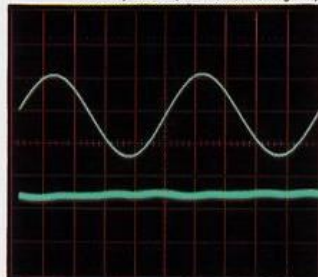
Paired transistors are always turned on; they do not switch on and off. Since the bias is controlled by our new Pioneer Vari-Bias circuit to prevent either output transistor from being driven below its idle current into cutoff, no switching distortion is generated and the thermal loss is low.

Distortion Spectra

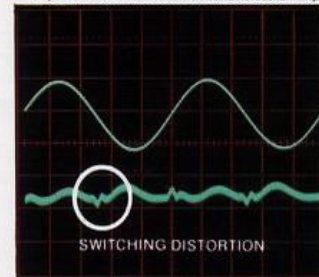


Frequency: 20kHz
Fundamental frequency removed

Output Waveforms of Newly-Developed Non-switching Amp



Output Waveforms of Conventional Class-B Amp



Frequency: 20kHz
Upper trace: Output voltage
Lower trace: Distortion

Pioneer's MAGNI-WIDE Policy Defined

There are no fewer than 12 separate points covered in our Magni-Wide policy, adding up to the elimination of all that stands in the way of truly excellent fidelity in actual musical reproduction. These aim at the:

- (1) Expansion of dynamic range,
- (2) Increase of power output,
- (3) Removal of switching distortion,
- (4) Lowering of noise and harmonic distortion,
- (5) Ending of intermodulation distortion,
- (6) Widening of power bandwidth,
- (7) Expansion of frequency range,
- (8) Improvement of phase,
- (9) Flattening of frequency response,
- (10) Reduction of dynamic envelope distortion,
- (11) Reduction of transient intermodulation distortion, and,
- (12) Improvement of overall dynamic characteristics.

With the new PVB Circuit described above, and Pioneer's very advanced Super-Linear RETs, these objectives have been achieved in the SA-8800's "non-switching" power amp.

Formidable Power Output

Far more of the total power output of the SA-8800 is *usable* over a wider frequency range with lower distortion, making it a match for amps with twice the rated power. For purposes of examining the low THD or total harmonic distortion performance of the amplifier, our specifications read: **80 watts*per channel, continuous, over the 10 to 20,000Hz at 8 or 4 ohms, with only 0.005% THD.** When a wide-range measurement is used, the specification reads: **80 watts*per channel, continuous, over the 10 to 50,000Hz range at 8 ohms, with no more than 0.01% THD (at 4 ohms it is 100 watts; 0.02%).** By any definition, this is a formidable power output with extremely low distortion, thanks to Pioneer.

IMPROVED PREAMPLIFIER

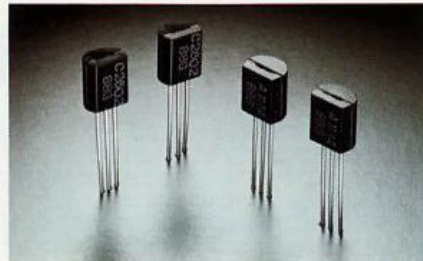
DC Flat Amp Avoids Phase Delays

In amplifier sections where phase linearity is particularly important—namely the power amp and flat amp—the SA-8800 features the direct-coupled design. Amp stages are linked *without* the use of phase-delaying capacitors, so no parts of the signal are "slowed down" to create problems in stereo-image definition and frequency response. As in all Pioneer DC amps, high quality parts add still other advantages, even in the phono equalizer and tone control sections of the SA-8800.

Specifically, the flat amp in DC configuration uses super-low-noise components throughout. One is a new dual FET used in the differential input stage. By employing the dual differential configuration, the impedance is lowered to one-tenth that of conventional types. Signal-to-noise ratio is a high 110dB (AUX) thanks to that dual FET and the NFB or Negative Feedback design of the amp.

Super-Low Noise Parts in Phono EQ

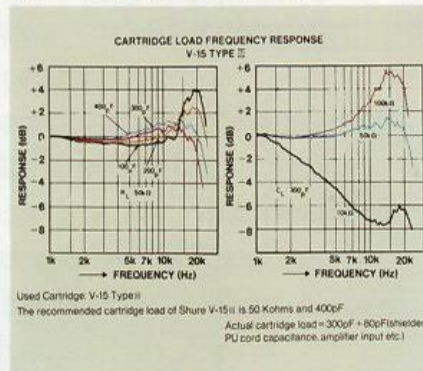
The same approach was taken in reducing noise in the phono equalizer. The special three-stage, direct-coupled all-stage Class-A symmetrical amplifier has four super-low-noise transistors per channel in the first stage. They work with a low-impedance designed NFB circuit to achieve an impressive 90dB signal-to-noise ratio. RIAA is $\pm 0.2\text{dB}$ (20Hz to 20kHz), overload is 250mV with never more than 0.002% THD at 1kHz.



Super-Low-Noise Transistors

Two Cartridge Load Selectors

A pair of front-panel rotary selectors is provided on the SA-8800 to let you get the most of any phono cartridge. The one on the left has five positions: 100, 200, 300, 400 and 500pF for capacitance; on the right is the five-position resistance selector: 100, 10k, 25k, 50k and 100k ohms. Both selectors operate for the MM (Moving Magnet) cartridges you connect to either Phono-1 or Phono-2 inputs.

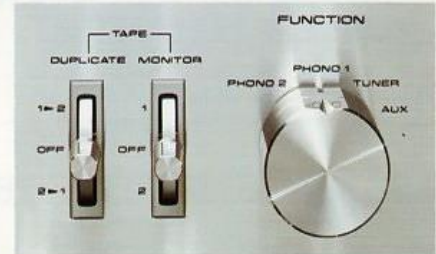


NFB Tone Controls

Conventional Baxandall type tone control circuits do not offer the low-noise/low-distortion performance of our NFB type. The BASS and TREBLE controls operate from two NFB circuits attached to the flat amp. Click-stopping either control to its "0" position will short (BASS) or open (TREBLE) the circuit to achieve an ideally flat response with improved noise characteristics. There is also a TONE switch which instantly defeats control settings for that same flat, noise-free response.

Command-Center Convenience

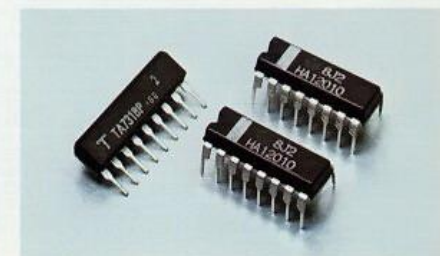
Many high-end amplifiers these days make a point of *removing* the basic conveniences in the name of better performance. Thanks to our Magni-Wide design we can offer even higher levels of performance without sacrificing a thing. The SA-8800 has Loudness, Audio Muting (-20dB), a Balancer, High (8kHz, 6dB/oct.) and Subsonic (15Hz, 6dB/oct.) Filters, SPEAKERS (OFF, A, B, A+B) selector and more. Of particular interest are the separate TAPE switches for DUPLICATE (dubbing from either deck to the other) and MONITOR, the rarely-found 5-POSITION MODE (REV, STEREO, L+R, L, R) selector and the oversized, attenuator-type Master Volume Control with 32 clicks.



New Peak Meter — Six Ways Better

Measured against other types (analogue, LEDs, liquid crystal, etc.) the fluorescent type display in our power output meter is as good or better in six important ways: Durability, reliability, response speed, resistance to shock, resistance to changes in temperature, and clear readability. The back-up circuitry includes three new ICs, one for logarithmical compression and peak hold, the others to drive the display tube, illuminated in an attractive Pioneer blue. The meter covers the power output range from 0.3W to 80W in 5dB steps, with 12 calibrations in all for each channel, *without* requiring sensitivity switching.

Note that the Peak Hold period is very short to make visual indication compatible with perceived sound level. Combined in the display panel are lettered indicators for FUNCTION (TAPE, PHONO, TUNER and AUX). If you are monitoring a tape, the TAPE and one of the source indicators both light to indicate which source is being fed to the REC OUT terminals.



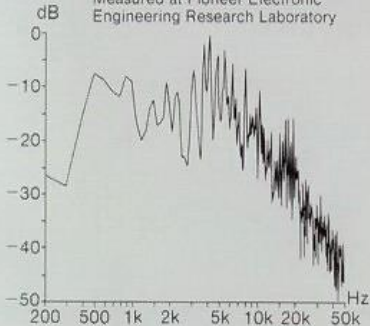
HIGH-FIDELITY SAFEGUARDS

Design Concept Stresses Low Impedance

The elimination of switching distortion in our unique "non-switching" power amp and its Super-Linear RETs and new PVB or Pioneer Vari-Bias Circuit has greatly improved the musical performance of the SA-8800. It would be a shame to cancel out this great advantage by permitting high impedance and shoddy construction to cause noise and instability. This is why we've ensured the delivery of Magni-Wide performance with positive safeguards like our Dual-Ch Power Supply system, "T-Skived" heat sinks, gold-plated protection relays and more. Ultra-high-frequency distortion, hum, "power dry-up," and high impedance are avoided entirely, making the SA-8800 capable of reproducing the wider dynamic range and beyond-audibility frequencies now available from such sources as direct-to-disc recordings and the latest wide-range tapes.

Frequency Spectrum of High-Hat Cymbal 0.35 Seconds after Being Hit

Sampled by A/D 35Kwd 12 bit 10 μ s
Measured at Pioneer Electronic
Engineering Research Laboratory



Pioneer's "Dual-Ch. Power Supply" System

We call the power supply in the SA-8800 Pioneer's "Dual-Ch Power Supply" because it features two independent constant-voltage power supply printed circuit boards (PCBs) to supply power *separately* to the low-level signal circuits—phono EQ, flat amp, etc.—and to the power amp. It also makes use of a large power

transformer and four gigantic electrolytic capacitors, each 12,000 μ F.

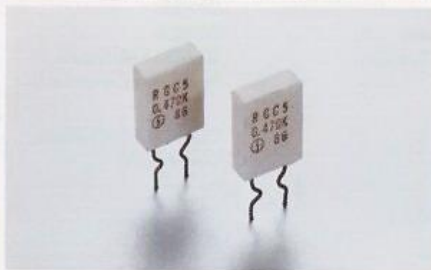
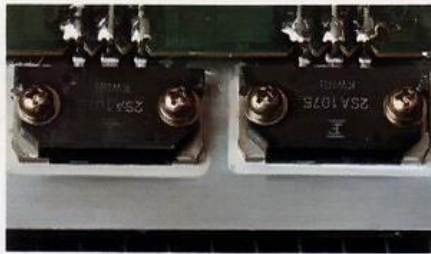
By preventing the mutual interference between amp units, sound quality is greatly improved. Clarity in the midrange frequencies, better attacks and sharper sound-image place in the stereo sound field are among the hearable advantages.

Gold-Plated Relays in Protection Circuit

Dual-contact power relays in the protection circuit offer quicker response and unflinching dependability in the case of power-related mishaps. The contacts are gold plated to resist corrosion so that signals passing through them are never delayed or altered.

The Handcrafted Touch

Our assembly specialists have been trained to take particular care in wiring the SA-8800—to the extent that many parts are installed and wired by hand. Connections are soldered smoothly, neatly. Signal-path and power leads are arranged so that mutual interference cannot occur. And grounding points are chosen and secured with regard for tonal quality. All power RETs and emitter resistors are given pure copper leads to prevent the generation of induced electromotive force, so high frequencies are never compromised. Pure copper is also used in the transistor mount frames, themselves

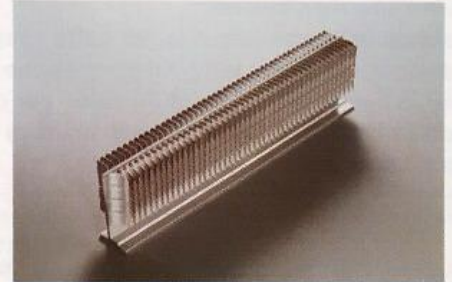


Emitter Resistors with Pure Copper Leads

designed for better accessibility. Phono hum, in the input signal path, and high-frequency instability, in the output signal path, are both avoided with the use of "Twist-Wire" leads.

Heat Sink is Curved-Fin "T-Skived"

Using the "skived" (thin-sliced) design in the heat sinks increases power amp efficiency still further. The curved fins are mounted in a "T" to help reinforce the sink and the entire chassis. Heat dissipation is as much as 50% higher than in conventional types, and weight is significantly less.



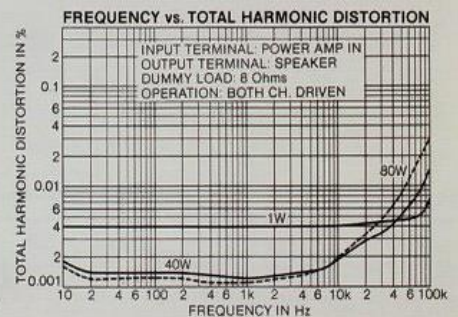
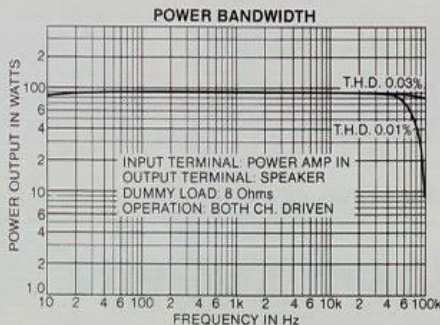
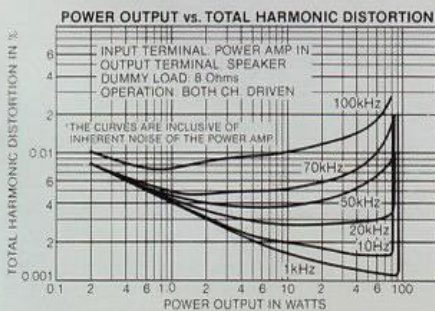
Pioneer Extras

■ **PHONO INTERFERENCE FILTER**—A rear-panel switch for the Phono-1/2 inputs permits you to shut out radio and other sources of interference.



■ **PRE/MAIN TERMINALS**—Separate terminals are provided for PREAMP OUT and POWER AMP IN.

■ **METAL CABINET**—The cabinet is in attractive black-finished metal to match other fine audio equipment from Pioneer.



SA-8800 SPECIFICATIONS

POWER AMPLIFIER SECTION

Continuous power output is 80 watts per channel, min. at 8 ohms from 10 hertz to 20,000 hertz with no more than 0.005% total harmonic distortion, or 80 watts per channel at 4 ohms from 10 hertz to 20,000 hertz with no more than 0.005% total harmonic distortion.

Continuous Power Output 10Hz to 50,000Hz:	80W+80W (T.H.D. 0.01%, 8 ohms) 100W+100W (T.H.D. 0.02%, 4 ohms)
Total Harmonic Distortion: (10 to 20,000Hz)	No more than 0.005% (continuous rated power output) No more than 0.004% (40 watts per channel power output, 8 ohms) No more than 0.004% (1 watt per channel power output, 8 ohms)
Intermodulation Distortion: (50Hz: 7,000Hz=4:1)	No more than 0.002% (continuous rated power output) No more than 0.002% (40 watts per channel power output, 8 ohms) No more than 0.002% (1 watt per channel power output, 8 ohms)
Frequency Response:	5 to 200,000Hz +0dB, -2.0dB
Input Sensitivity/Impedance: Output	1V/50k ohms
Speaker:	A, B, A+B
Headphones:	Low impedance
Damping Factor:	55 (20 to 20,000Hz, 8 ohms)
Hum and Noise:	118dB (short-circuited A network)

PREAMPLIFIER SECTION

Input Sensitivity/Impedance	
PHONO 1:	2.5mV/50k ohms
PHONO 2:	2.5mV/50k ohms
CARTRIDGE LOAD:	Both Phono 1 and 2 100, 10k, 25k, 50k, 100k ohms 100, 200, 300, 400, 500pF
TUNER:	150mV/50k ohms
AUX:	150mV/50k ohms
TAPE PLAY 1:	150mV/50k ohms

TAPE PLAY 2:	150mV/50k ohms
PHONO Overload Level (T.H.D.):	0.002%, 1kHz
PHONO 1:	250mV
PHONO 2:	250mV
Output Level/Impedance	
TAPE REC 1:	150mV
TAPE REC 2:	150mV
PRE OUT:	1V/600 ohms 3V/600 ohms (MAX)
Total Harmonic Distortion:	No more than 0.006% (10 to 50,000Hz, 1V output)
Frequency Response	
PHONO (RIAA Equalization):	20 to 20,000Hz ±0.2dB
TUNER, AUX, TAPE PLAY:	5 to 100,000Hz +0dB, -1.0dB
Tone Control	
BASS:	±10dB (100Hz)
TREBLE:	±10dB (10kHz)
Filter	
SUBSONIC:	15Hz (6dB/oct.)
HIGH:	8kHz (6dB/oct.)
Hum and Noise (short-circuited A network)	
PHONO:	90dB (MM)
TUNER, AUX, TAPE PLAY:	110dB
Muting:	-20dB

SEMICONDUCTORS

FETs:	6
ICs:	3
Transistors:	73
Diodes:	49
Others:	2

MISCELLANEOUS

Power Requirements:	110/120/220/240V (switchable) 50-60Hz 220 watts
Power Consumption:	220 watts
Dimensions:	Without package: 16-9/16(W) x 5-7/8(H) x 16-3/4(D) inches 420(W) x 150(H) x 425(D)mm
Weight:	Without package: 33 lb. 1 oz./15.0kg

NOTE: Specifications and design subject to possible modification without notice.



PIONEER ELECTRONIC CORPORATION /4-1, Meguro 1-chome, Meguro-ku, Tokyo 153, Japan
 U.S. PIONEER ELECTRONICS CORP. /85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.
 PIONEER ELECTRONIC (EUROPE) N.V. /Luithagen-Haven 9, 2030 Antwerp, Belgium
 PIONEER MARKETING SERVICES PTY. LTD. /P.O. Box 317, Mordialloc, Victoria 3195, Australia