

 **PIONEER**<sup>®</sup>

**SPEC-4**



## Stereo Power Amplifier in "DC" Configuration with Independent Left/Right Dual Power Supplies & Circuitry

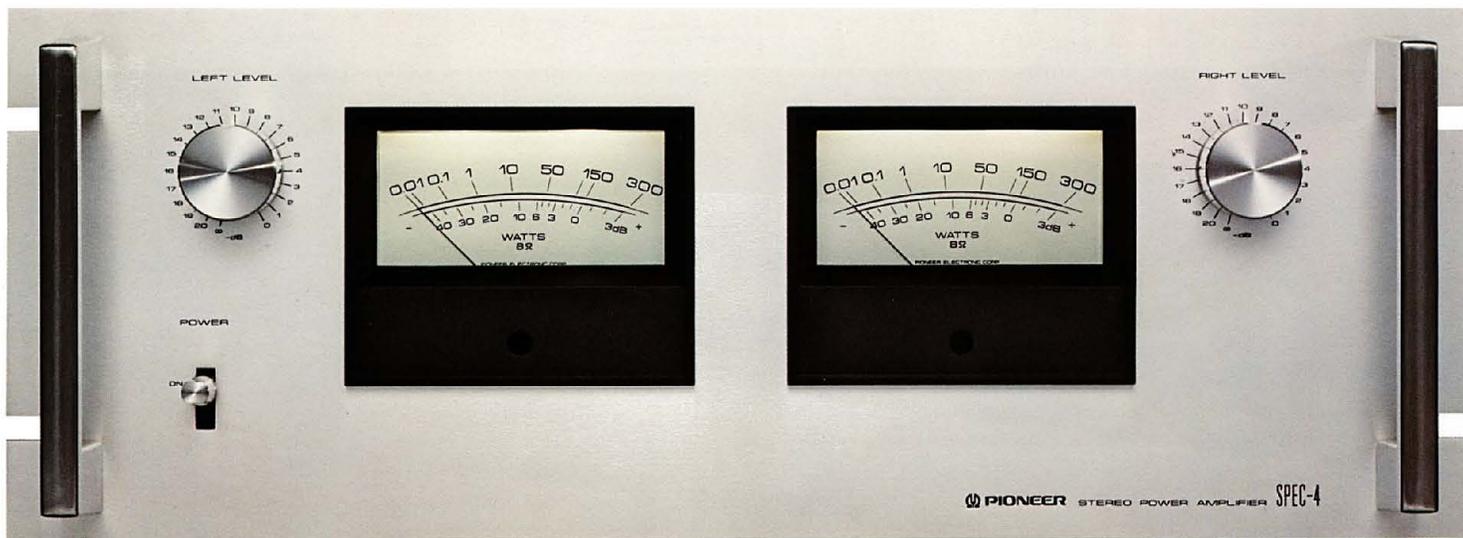
Think of the Pioneer SPEC-4 Power Amplifier as two independent mono amps in one chassis. Our stay-ahead reputation in hi-fi technology is upped another big step here by achieving real independence for the essential circuits in both the left and right channels. Physically separated signal paths and dual power transformers, four big capacitors (two

per channel) to prevent power dry-up, separate left-right relays — everything to prevent crosstalk and distortion that erode stereo clarity and tonal quality. Because the SPEC-4 is of Pioneer's new generation of "DC" configuration power amps, its performance is never compromised by capacitors in the negative feedback loop. The results: a contin-

uous power output of 150 watts\* per channel, min. RMS, at 8 ohms from 20 to 20,000Hz with no more than 0.01% total harmonic distortion. Check out the details of the SPEC-4 in the following pages, and see how Pioneer earns its stay-ahead reputation in quality high fidelity.

\*Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifiers.

# SPEC-4



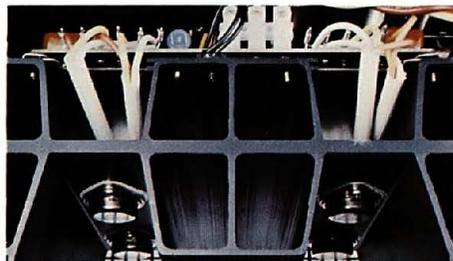
## DYNAMIC POWER WITH ULTRA-LOW DISTORTION

Why go for a separate component for power amplification? Pioneer's SPEC-4 clears up that question, and your music, with indisputable proof that separate power amplification is really worth it. It delivers a **continuous power output of 150 watts\* per channel, min. RMS, at 8 ohms from 20 to 20,000Hz with no more than 0.01% total harmonic distortion.** Massive power reserve is available throughout the spectrum, including the super-low and ultra-high ends. Pulsive signals — i.e. musical signals — are reproduced with transparency and clarity at all levels, at all times. This high quality is achieved with Pioneer's stay-ahead technology, as explained below.

## STAY-AHEAD AUDIO CIRCUITRY

The Pioneer SPEC-4 uses the latest circuitry for power amplification, as follows: The input is formed by a dual-PNP transistor differential amplifier, loaded by a current mirror circuit. This is followed by a constant-current-loaded predriver and a 3-stage Darlington connected driver. The final output is in the parallel SEPP (Single Ended Push Pull) configuration. Here are the advantages, one by one:

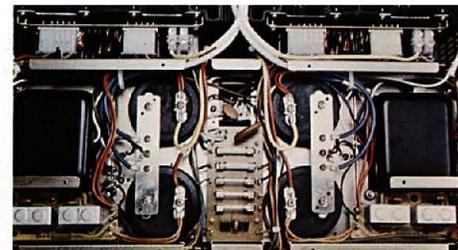
- (1) Dual-PNP Differential — Zero DC voltage is constantly maintained at the input.
- (2) Current-Mirror Loading — Reduces the load to the differential input to achieve a high gain which, in turn, permits the application of sufficient negative feedback for the effective reduction of distortion. DC stability is also improved.
- (3) 3-Stage Driver — Again loads are reduced so that the transistors in the circuit are called on to operate only at their most linear operating curve. Distortion is reduced and gain is high.
- (4) Parallel SEPP — This output configuration reduces by half the amount of current flowing through the output (power) transistors, again allowing the utilization of only the most linear parts of their operational curves, reducing distortion without sacrificing output.



## DUAL POWER SUPPLIES FOR LEFT AND RIGHT CHANNELS

Better 2-channel performance all

around. That's the result of physically separating the left-channel and right-channel power supplies and signal paths. Paired power transformers are employed, one for each channel. The advantages show up in steady-state as well as dynamic conditions. We've even separated the power relays for the two channels. No matter how complex the signal handled by one channel, the other is always ready to perform independently for more musical clarity. Think of the SPEC-4 as two independent mono amplifiers housed in one stereo unit, both as perfect as we can make them.



## MASSIVE POWER RESERVE

Power dry-up? It takes an acute ear to detect it from most amps when they are playing ordinary music. But it shows up easily during dynamic stereo passages in rock, classics and other music unless definite measures are taken to prevent it. The Pioneer SPEC-4 takes those measures. Because

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it operates on a "DC" basis, with no capacitors whatsoever in the negative feedback loop, and because it features a truly dependable power supply formed of two huge power transformers and four 22,000 $\mu$ F filter capacitors, power dry-up is entirely avoided. Your music is reproduced with vivid, full-power lows and natural transients for high resolution.

### LOW-IMPEDANCE DESIGN THROUGHOUT

Impedance plays a very important role in amplifier design and behavior. High impedance in the grounding and hot lines can result in significant losses of power and increases in distortion. The SPEC-4 avoids this in the following ways:

(1) Pure Copper Grounding—Low impedance prevents the generation of distortion and safeguards power loss. We've achieved it with the use of pure copper plates, 20mm wide by 2mm thick, in the ground path of the dielectric capacitors.

(2) 14-Gauge Cables—Again, low-impedance performance is assured with the use of very thick (2.03mm or 14 gauge) stranded cables in connecting the power output assembly to the output terminals and throughout significant large current circuits. Reproduction never suffers, even with large current flows are suddenly introduced. These "coat-hanger" cables also permit the dielectric capacitors to charge quickly and efficiently.

(3) Copper-Foil Circuit Boards—Conventional printed circuit boards use thin layers of copper foil. Ours use layers twice as thick—70 $\mu$ —to further reduce circuit impedance even when large current flows are required.

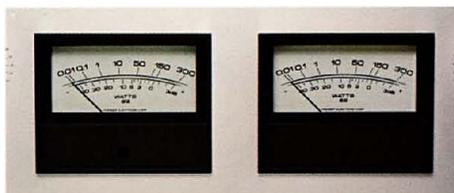
Pure-copper grounding plate

Super-low-impedance, extra-thick cable is used for high-current lines.



### PEAK-READING POWER METERS

The logarithmically compressed scales of the twin power-output meters on the front panel of the Pioneer SPEC-4 make it easy to read peak power output in both channels accurately. No sensitivity changing is necessary when large or small output levels are chosen. The large, outer-magnet type meters indicate the full output peaks within 70 milliseconds, aided by an advanced detection circuit for instant-by-instant accuracy. Their direct-readout scales indicate from 0.01 watt to 300 watts.



### INDEPENDENT LEVEL CONTROLS

Also on the front panel are independent level controls for each channel's input. Optimum input level sensitivity is thus easy to achieve regardless of the output of the connected preamplifier. Each control is an attenuator with 22 stops, calibrated precisely in 1dB increments from 0 to -20dB. Gang error and indication error are minimum so that you may adjust inputs delicately and accurately.

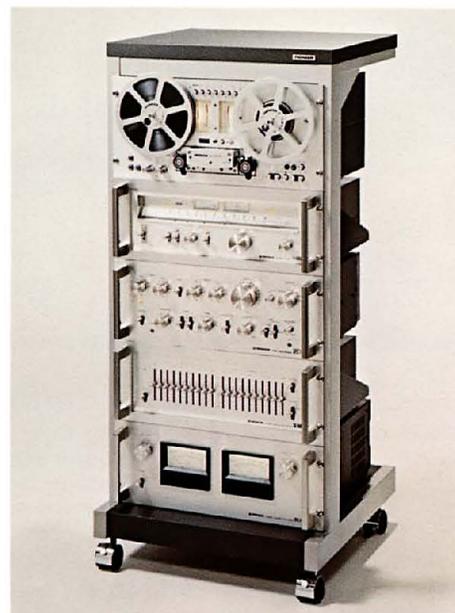
### POWER PROTECTION

The SPEC-4 circuit for speaker and power transistor protection is formed of a quick-response power relay and a dependable electronic detection stage. Detection of DC components and overload currents is instant, triggering the relay and electrically disconnecting the amplifier from your speakers and its own output stage. The protection circuit also serves as a muting circuit which eliminates click noise otherwise heard when you switch the power on or off. We've taken extra steps to protect stereo separation with the use of two independent relays, one for each channel, with twin contacts in parallel. Surge current, introduced as you switch the power on, never reaches the large power trans-

former/capacitor block thanks to this extra protection.

### OTHER FIRST-CLASS FEATURES

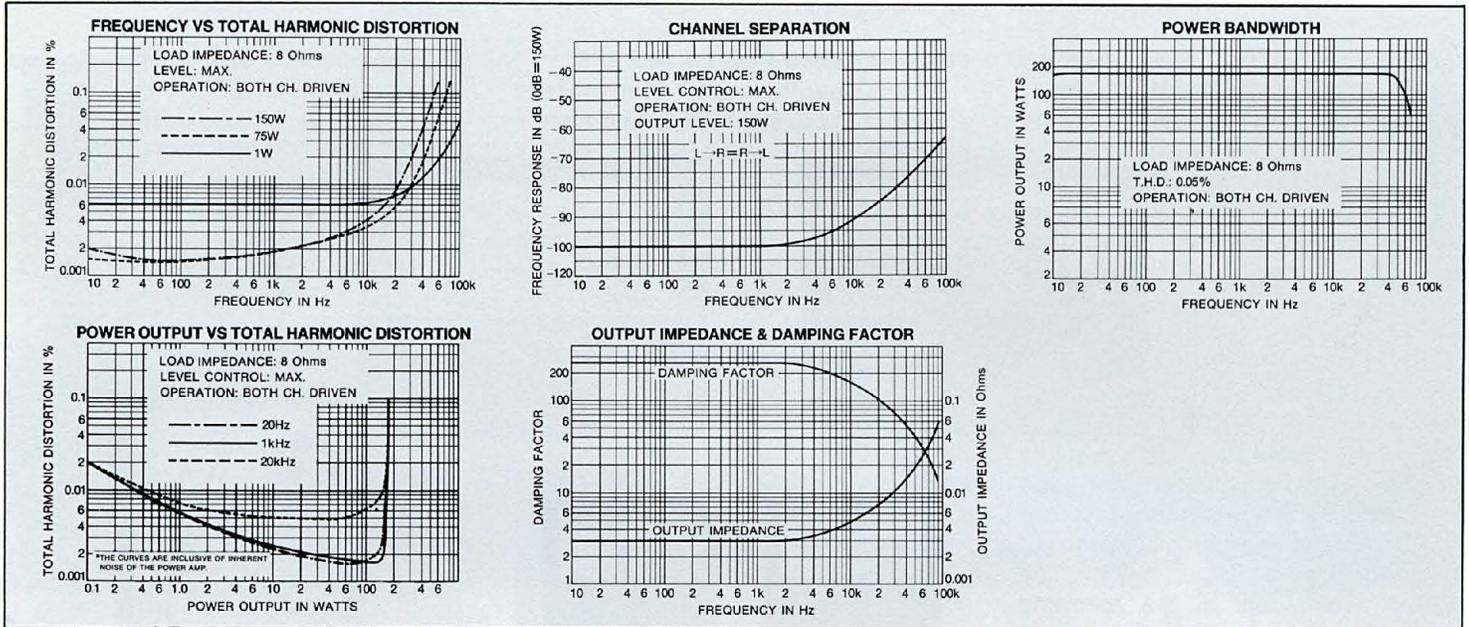
(1) REAR PANEL TERMINAL PROTECTION—Rear terminals are protected from damages with a terminal protector. (2) RACK-MOUNTING READY—All dimensions/specifications suitable for use in standard EIA equipment racks.



The above PIONEER EIA audio rack (JA-R2S) is optional.

The TX-9500II and SG-9500 shown are rack mounted with the use of an adaptor, Model JA-R101, available at option for mounting audio equipment not sized on EIA standards.

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## SPEC-4 SPECIFICATIONS

### POWER AMPLIFIER SECTION

Circuitry:

Current mirror loaded differential amplifier, 3-stage darlington parallel push-pull direct-coupled OCL ("DC" configuration power amp.)

**Continuous Power Output is 150 watts\* per channel, min. RMS, at 8 ohms from 20 to 20,000 hertz with no more than 0.01% total harmonic distortion, or 180 watts\* per channel at 4 ohms from 20 to 20,000 hertz with no more than 0.03% total harmonic distortion.**

Total Harmonic Distortion: No more than 0.01% (continuous rated power output)  
 No more than 0.01% (75 watts per channel power output)  
 No more than 0.01% (1 watt per channel power output)

Intermodulation Distortion: No more than 0.01% (continuous rated power output)  
 No more than 0.005% (75 watts per channel power output)  
 No more than 0.005% (1 watt per channel power output)

Frequency Response: 5 to 100,000Hz  
 +0dB, -1dB

Input Sensitivity/Impedance: 1V/50 Kohms

Output: Speaker  
 4 to 16 ohms

Damping Factor: 100 (20 to 20,000Hz, 8 ohms)

Hum and Noise: 115dB (IHF, short-circuited A network)

**SEMICONDUCTORS**  
 ICs: 2  
 Transistors: 61  
 Diodes: 62

**MISCELLANEOUS**  
 Power Requirements: For U.S.A. and Canada: 120V 60Hz only,  
 For other countries: 110V/120V/220V/240V (switchable)  
 50-60Hz

Power Consumption: 760 watts/950VA

Dimensions: Without package: 18-29/32(W) x 7-3/8(H) x 17-17/32(D) inches  
 480(W) x 187(H) x 445(D) mm

Weight: Without package: 54 lb./24.5kg

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

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