

Hi-Fidelity for Humans

PIONEER STEREO AMPS & TUNERS

A-9/A-8/A-7/A-6/A-5/F-9/F-7/F-5





© vom Hersteller
Archiv Michael Otto

AMPS

STUNNERS

© beim Hersteller
Archiv Michael Otto



PIONEER INTEGRATED STEREO AMPLIFIERS

Performance in Style

It's possible to reduce harmonic distortion to ridiculously low levels and yet have an inferior sounding amplifier. The reason is that harmonic distortion in nearly all modern hi-fi amps is already at inaudible levels while other, more damaging forms of distortion may not be. That's why we at Pioneer chose to isolate *audible* types of distortion and eliminate them. Our Non-Switching* amplifier design — an innovative circuit that successfully *eliminates* a particularly harmful form of

audible distortion, switching distortion — is an example of our dedication to the reproduction of pure musicality.

Pioneer's new lineup of integrated amplifiers incorporates another interesting feature, a new faceplate design divided into three logical sections — the frequently used controls on the right, more infrequently used controls on the left and an informative display in the center. This design concept is in line with our redefinition of human

engineering, stressing the interaction of man and his music. It applies not only to our amplifiers but also to all the hi-fi components we produce: tuners, cassette decks, turntables. Each is matched in appearance and performance.

In one fell swoop, Pioneer is offering the best combination of performance, styling and ease-of-use. But then this is expected of Pioneer, the world's leader in hi-fi.

(*Non-Switching is a trademark of Pioneer.)



Non-Switching Power Amp

A: Non-Switching Design

● Class A or Class B?

Traditionally, the two most popular classes of amps have been A and B. Class-B (or AB) amps are relatively efficient because output transistors are designed to switch on and off to prevent heat build-up and wasteful energy loss. This efficiency is the reason why most amps on the market, particularly those with high-power capability, are of the class-B design. But class-B has one major drawback: transistor switching creates a significant amount of distortion.

The alternative has been class-A, which uses a constant amount of bias (idle current) to keep transistors on at all times, whether or not a signal is there for them to amplify. In this way, the distortion caused by switching cannot occur, but as much as 75% of the energy consumed is given off in the form of heat. This is wasteful and very inefficient. It's no wonder that class-A amps, which are costly, heavy and bulky brutes, are reserved for a handful of money-no-object audiophiles.

● Pioneer Non-Switching to the Rescue

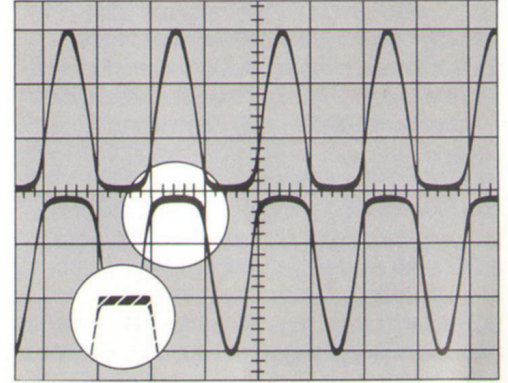
Pioneer's new "Non-Switching" amplifier concept works around a revolutionary circuit called a "Vari-Bias*" which continuously monitors the amplitude of the incoming signals and dynamically raises or lowers the amount of bias current fed to the transistors via a high-speed servo. They get only a trickle of bias current when they're resting through a non-conducting ("off") period, just enough to keep them from switching off. This means high efficiency, with much less energy consumption, and, since the transistors never switch on or off, there's no switching distortion. And since the Non-Switching design is very nearly as efficient as a class-B amplifier, the power supply remains compact. (*Vari-Bias is a trademark of Pioneer.)

● Nested Feedback Loops (NFL)

The power amp sections of our new A-8, A-7, A-6 and A-5 integrated amps adopt a technology of Nested Feedback Loops (NFL), which aims for an improvement in distortion. It involves the use of nested differentiating feedback in multiple form from the output stage. This technology was initiated by Associate Professor Edward M. Cherry of Monash University, Australia.

B: High- f_T Power Transistors

Conventional high-output power transistors can't even come close to the excellent performance of the Pioneer-developed high- f_T RETs (Ring Emitter Transistors) used in all our new amps except the A-8. Inside each RET are several hundred low-power transistors, connected in parallel, their emitter electrodes arranged in a ring, hence the name. RETs have a very high f_T or transition frequency — fully ten times higher than conventional bipolar types. Furthermore, they display very high linearity even for high-amplitude inputs, and therefore transfer error is negligible. In the A-8, two high- f_T power transistors are used for each channel. These, too, have a high transition frequency comparable to our RET's.

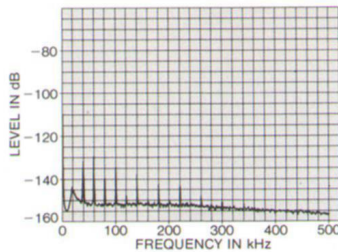


"Vari-Bias" in Pioneer's Non-Switching amps provides alternately non-conducting transistors with bias that tracks a smoother curve (solid line). In comparison with a bias circuit whose tracking is more angular (broken line in inset), Vari-Bias is more effective against switching distortion.

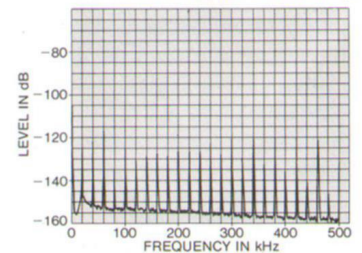
© beim Hersteller
Archiv Michael Otto

Distortion Spectra

Distortion Spectrum of Non-Switching Amp

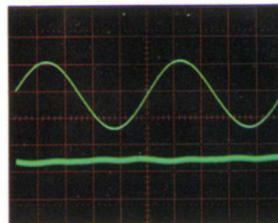


Distortion Spectrum of Conventional Class-B Amp



Frequency: 20kHz
Fundamental frequency removed

Output Waveform of Non-Switching Amp



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

Output Waveform of Conventional Class-B Amp



DC-Servo Circuit

Capacitors in the signal path of an amplifier unavoidably add coloration and distortion to the signal. A DC (Direct Current) amplifier maintains high transfer accuracy — excellent fidelity — by eliminating large-capacity capacitors from the signal path and from the NFB (negative feedback) loop. You can eliminate coupling and NFB capacitors, but unfortunately, not the input capacitors in a DC amp, normally. If the input capacitors are eliminated, there's the danger of upset DC offset voltage. By definition, a DC amp is capable of amplifying a DC voltage. So when a DC signal is applied to the input of a DC amp (no musical instrument, not even a synthesizer, produces a DC — 0Hz), it is amplified a hundred times or more and sent to the output, resulting in irreparable damage to the connected speakers. An accident of this type is not inconceivable since the DC offset voltage can "drift" or fluctuate from the reference value, according to ambient temperature. Even if there is a protection circuit — there usually is — to disconnect speakers in the face of upset DC voltage, it may not act quickly enough to prevent damage. Also, even the most insignificant upset voltage leads to distortion, however slight, in the output.

Enter Pioneer's new DC-Servo circuit. It has eliminated the input, coupling and NFB capacitors entirely, yet is capable of eliminating DC and infrasonics cleanly. The DC-Servo circuit automatically compensates for the slightest deviation (drift) in the DC offset voltage, attenuating any DC component by cutting it off sharply.

A: DC-Servo in the Power Amp

Four of our new amplifiers — A-9/A-8/A-7/A-6 — feature the DC-Servo in the Non-Switching power amp, built around an op-amp. This amp has a differential FET input and uses no input, coupling or NFB capacitors at all. Reproduction is tight with good transient response while speaker cone damping (damping factor) at low frequencies is increased thanks to the DC-Servo.

The driver sections of the A-9 and A-8 feature a cascode bootstrapping circuit that improves transistor linearity, assuring low-distortion boost of even the highest frequencies.

B: DC-Servo in the Phono Equalizer

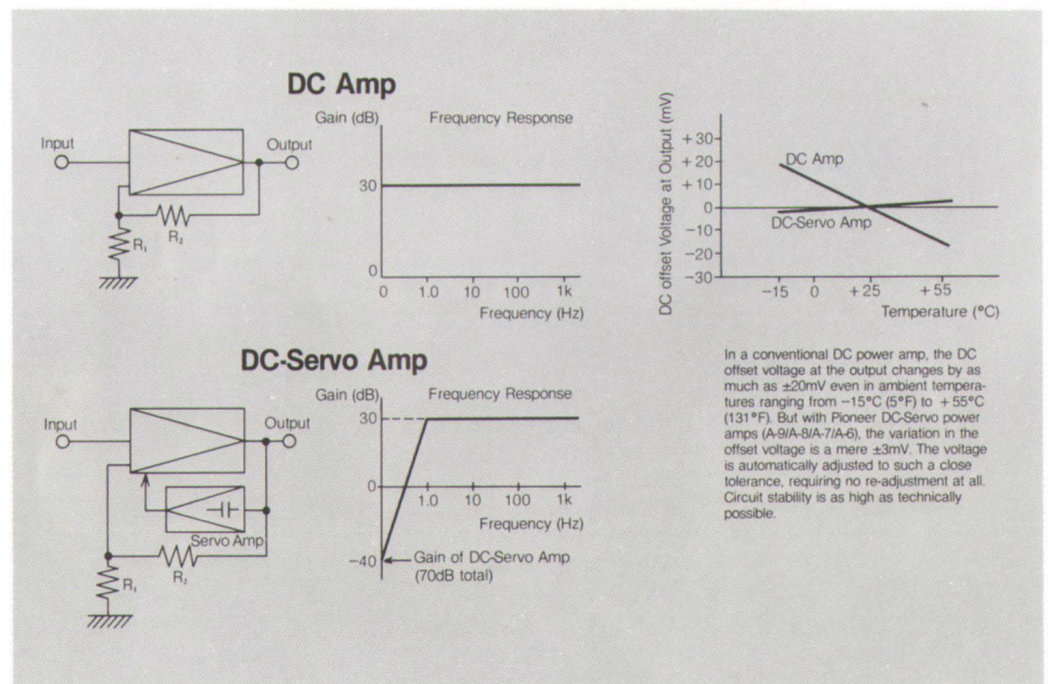
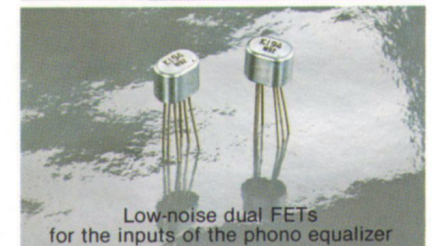
In the A-9, the phono equalizer is built around a DC-Servo circuit using a low-noise op-amp. A signal introduced to the phono equalizer from the separate MC head amp (pre-preamp) won't encounter a single capacitor as it passes into the power amp and finally out to the speaker output. Reproduction quality is kept pure and true.

In the A-8 and A-7, the phono equalizer is a high-gain ICL (Input Capacitor-Less) design, directly interfacing with the cartridge. In the A-6, the equalizer is a high-gain ICL design with the input formed of an FET differential, controlled by the DC-Servo circuit, built around an op-amp. All these equalizers provide two boost gains — one for popular moving-magnet (MM) cartridges and the other for low-output moving-coil (MC) cartridges.

Regardless of its configuration, each equalizer offers close-tolerance RIAA accuracy, high-phono overload, a high signal-to-noise ratio and low distortion thanks to the combined use of advanced designs and select capacitors and resistors in the RIAA network.

In each of these amplifiers, gain is selected by front-panel switches; there's no need to reconnect turntable cables every time you switch from MM to MC or vice versa.

Pioneer Made-To-Order Transistors



Pictographic and Other Displays

In each of our new amps, the front panel is clearly divided into three functional areas: All indicators and displays are located on the center section, including the unique pictographs. All frequently used switches and controls are located on the right-hand panel, while the less frequently used controls are grouped on the left panel.

Furthermore, in the top three models, only the most frequently used controls and switches are exposed. Other, less frequently used ones are hidden behind a hinged cover which conveniently flips down and slides under the cabinet. Once these controls are set, close the cover until they're needed again.

A: Pictographs for Source Indication

All inputs are button selectable — PHONO, TUNER, AUX, TAPE-1 and TAPE-2. Beside each button is a pictograph which

illuminates when that input is selected. You know at a glance what program you're listening to — even if the cartridge you're listening to is MM or MC.

B: Indicators for Signal Flow from Input to Output

At a glance you can observe the signal flow inside the amp from input to output, for instance, whether you're routing the signal through the tone control circuit, feeding the output to the "A" speaker systems, sending the PHONO input to the recording output, etc. In the top three models, a "Line Straight" selector bypasses the tone controls, the balance pot and the mode switch. A "Line Straight" arrow lights on the display panel to show the signal flow whenever absolutely flawless musical purity is chosen.

C: Protection Indicator (A-9/A-8/A-7)

When the power switch is turned on, the protection indicator comes on red, indicating that the built-in protection circuitry is working. After a few seconds, the indicator turns green, letting you know that all circuits are fully stabilized and all systems are "go." During this brief power-on period, there are no annoying and dangerous "pop" noises. Once in operation, should there be any speaker-lead shorts or too low speaker impedance, the indicator turns red again, and the protection circuitry shuts off the power to the speakers, letting you know there's a problem.

D: LED Peak Power Meters

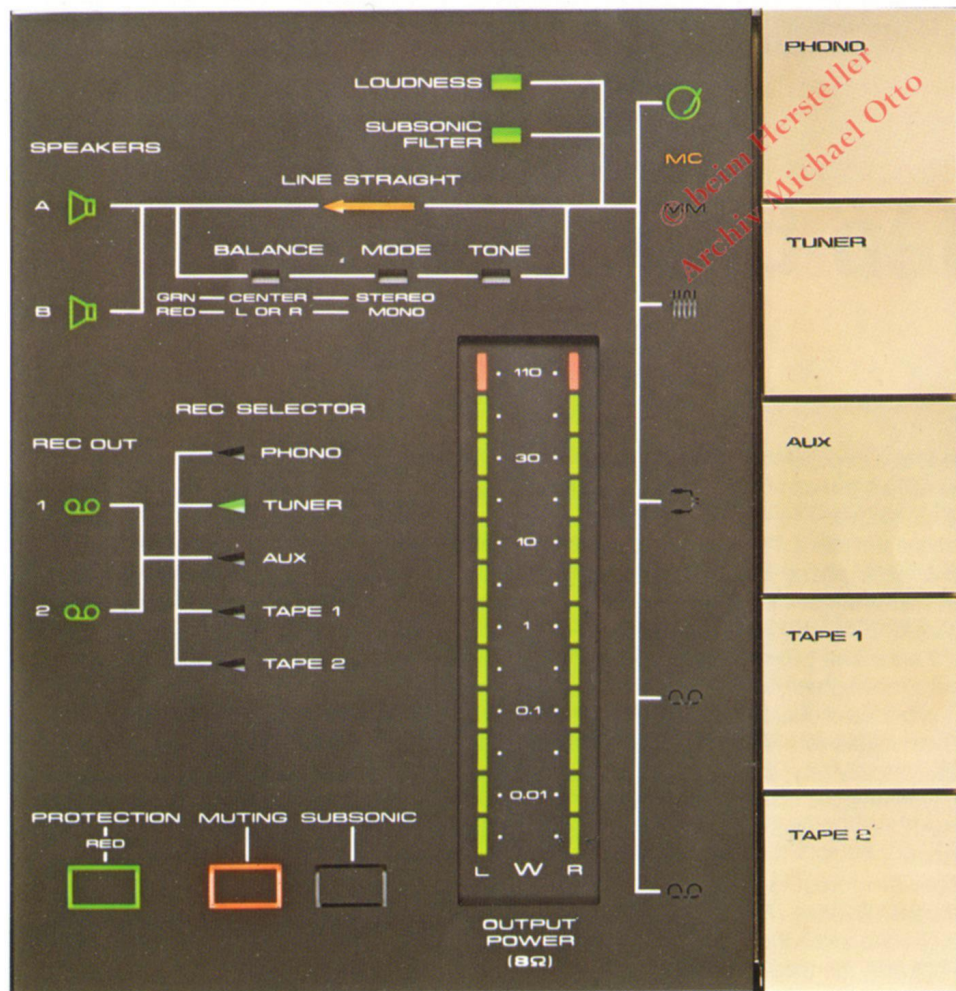
The moment-to-moment power the amp is delivering to the connected speaker systems is displayed by a string of LEDs (separate displays for each channel) with electronic accuracy. Output is shown over a wide range from the rated maximum power down to about one-hundredth of a watt (into 8-ohm impedance). Reliability is enhanced by the one-chip integrated circuit for display drive.

E: Subsonic Indicator

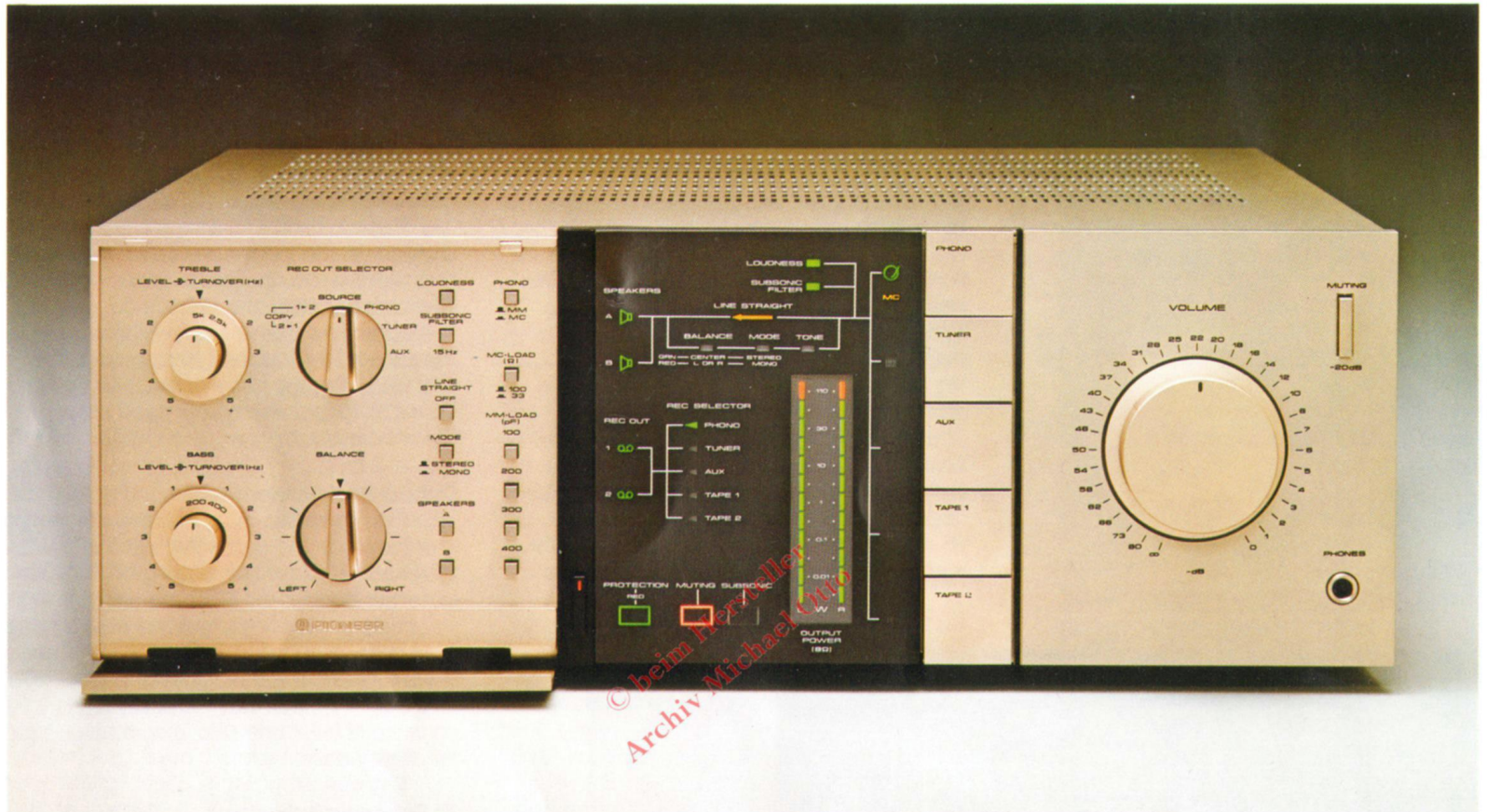
This is a useful indicator unique to the A-9. Excessive infrasonics due to record warps and eccentricities add intermodulation to reproduction. This indicator glows a red warning to you when IM is excessive, letting you know that you should turn on the Subsonic Filter for better quality reproduction and lessen the chance of speaker damage caused by excessive woofer excursion.

F: Record Selector Indicators (A9/A-8/A-7)

You can select a source to be recorded independently from the one to be heard. And, you know at a glance what source is being recorded into either or both of two connected tape decks.



A-9



The Trend Setter

WITH ITS INNOVATIVE DESIGN AND high-technology circuits, the A-9 should be the trend setter for the audio industry the world over. For you, it's a worthwhile investment in the long run.

Its power amp features the Non-Switching configuration regulated by a DC-Servo circuit. These technologically advanced circuits have eliminated switching distortion and clarified bass response. The amp's four power RETs (Ring Emitter Transistors) per channel provide high **continuous average power output of 110 watts* per channel, min. at 8 ohms, from 20 hertz to 20,000 hertz with no more than 0.003% total harmonic distortion.**

The preamp section consists of a DC-Servo phono equalizer for clean bass

response and a separate pre-preamp (head amp) that allows the use of quality moving-coil (MC) cartridges. The latter's superb specifications include a 74dB signal-to-noise ratio and a 10mV phono overload capability. For versatility, the A-9 is equipped with two sets of cartridge selectors — one set provides a choice of two resistance values for use with moving-coil cartridges, and the other set provides a choice of four capacitance values for moving-magnet cartridges. Virtually any cartridge, regardless of make, type or specifications, can be coupled with the A-9 and provide optimum performance.

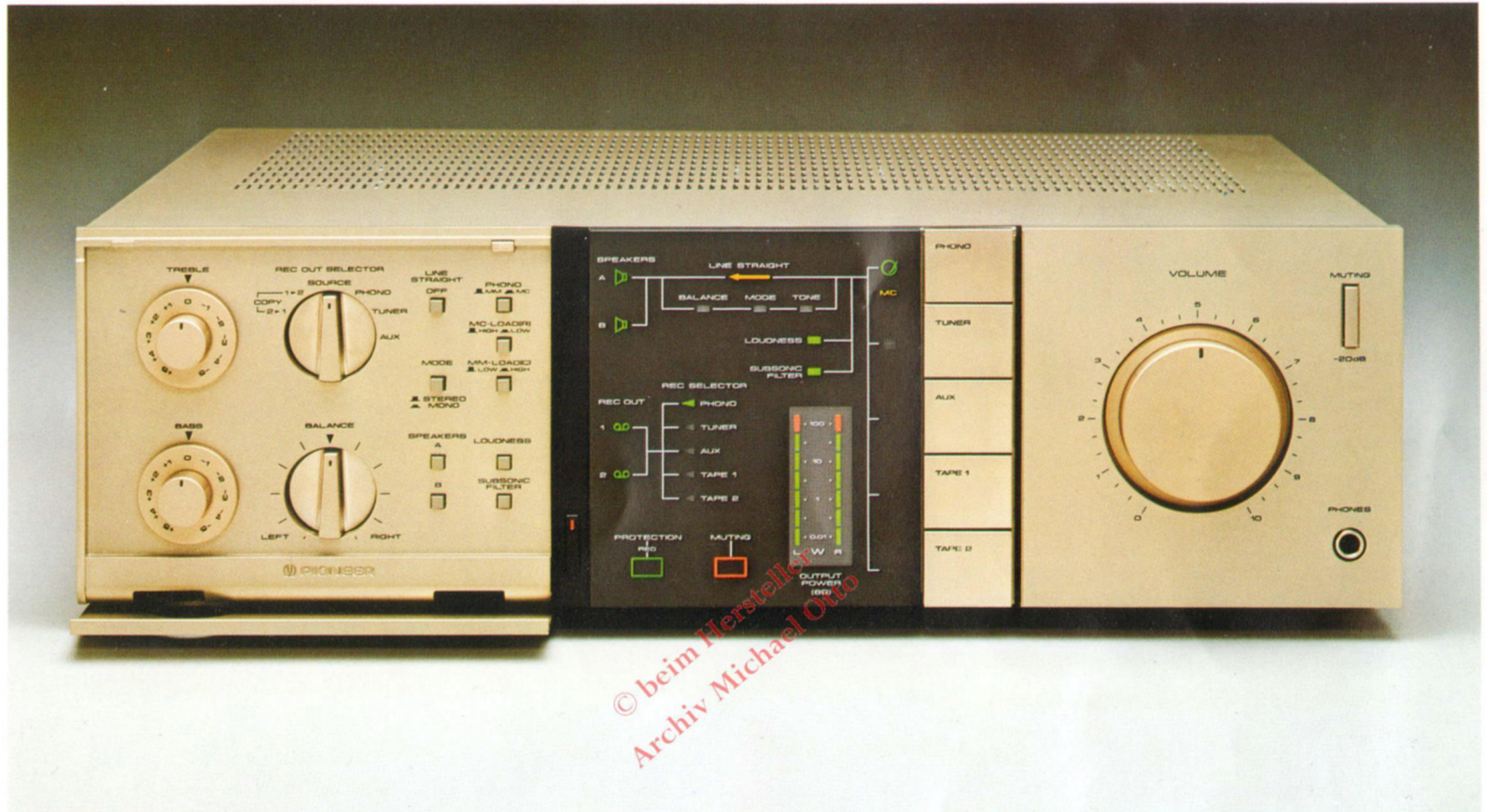
Of special interest to the "purist" is the "Line Straight" Bypass. When this feature is in use, bypassed are not only the tone controls but also the balance control and

the mode switch. Purest sound possible is assured. Pioneer recommends you use this control if your listening room is free of acoustic aberrations.

The preamp's versatile tone control system provides selectable turnovers for both the BASS and TREBLE controls. Another useful feature is the internal circuit design that allows recording of one program while listening to another. Like all Pioneer amps, the front panel of the A-9 is divided into three functional areas for easy operation. Infrequently used controls and switches are neatly hidden behind a hinged, hide-away cover. Other features include LED peak level meters, a signal flow indicator, a useful "Pictograph" display, a subsonic indicator, a protection indicator and two-way tape dubbing capability.

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

A-8



The Sweet Sound of Power

MORE SO THAN EVER, HIGH POWER is demanded of amplifiers. The latest digitally mastered and direct-to-disc recordings contain instantaneous peaks that are simply too much for low-powered amps. This is the rationale behind the A-8; its power amp delivers sufficient power at low distortion levels to maintain all the realism of these new recording technologies.

The continuous average power output of the A-8 is 90 watts* per channel, min. at 8 ohms, from 20 hertz to 20,000 hertz with no more than 0.005% total harmonic distortion; this is your assurance that every nuance of a recorded performance will be unfailingly reproduced. Its power amp is of Pioneer's Non-Switching design, regulated by a DC-Servo circuit. Sound is tight and

rich, practically devoid of switching and other types of distortion. The output stage is formed around two 200-watt-class high- f_T power transistors per channel.

Phono reproduction is handled by the high-gain ICL phono equalizer that directly mates with MM (Moving-Magnet) and MC (Moving-Coil) cartridges. Cartridge matching is no problem with the A-8 since two cartridge load selectors are provided. One offers two resistance values for MCs and the other two capacitance values for MMs. And, for cleaner reproduction, a subsonic filter attenuates warp-generated low frequencies.

"Purist" features include the "Line Straight" Bypass. Unlike common tone defeat switches, the "Line Straight" control lets you bypass the balance control and mode switch as well as the tone control

circuit. The front-panel signal flow display indicates with a lighted arrow whenever this bypass circuit is in.

Tape recording and monitor circuits are crossconnected so that it is possible to record a program while listening to another or dub between two tape decks — a definite advantage for active recordists.

While a flip-down hide-away panel hides infrequently used controls and switches to give the A-8 an uncluttered look, innovative displays make the amp more attractive and easier to use. Specifically, on the central panel are found pictographs for the sources, a signal flow display, the record selector indicator, protection and muting indicators and two rows of LEDs that read peak power.

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

A-7



The Clear Winner

IF YOU WANT TO BE ON THE winning side, you should consider the Pioneer A-7. Unlike the competition, it's designed for today's and tomorrow's music; it won't become obsolete in performance or design for years to come.

The power amp is of the Non-Switching design that has ended switching distortion to assure silky, smooth reproduction. Bass is tight and rich because we've added a DC-Servo circuit to cleanly attenuate infrasonics and DC. Circuit stability is impeccably maintained at all times. The power output devices used are two of our 120-watt-class RETs per channel. **The continuous average power output is 70 watts* per channel, min. at 8 ohms, from 20 hertz to 20,000 hertz with no more than 0.007% total harmonic distor-**

tion, sufficient to fill your room with low-distortion sound from corner to corner.

The phono equalizer of the A-7 represents the best of Pioneer audio technology. It's a high-gain ICL design that allows direct interfacing of the equalizer with either MM or MC cartridges. Top-notch specifications such as an 88dB signal-to-noise ratio (with MM cartridges) are the rule, not the exception. Of course, switching between MMs and MCs is accomplished by a front-panel switch.

Is your room acoustically perfect — neither too "live" nor too "dead"? Is left-to-right balance perfect as well? Then you might as well forgo the tone controls for purer sound. With the A-7, you can not only bypass the tone control circuit but also the balance control and mode switch. This unique "Line Straight" arrangement should

delight the "purist" immensely.

For the recording buff, we have two surprises in store. One, it's possible to record one program while listening to another program, and, two, it's possible to dub tapes between two connected tape decks in either direction.

For easy and error-free operation, we've divided the panel into three functional areas. On the left are concentrated infrequently used controls and switches (a convenient flip-down, slide-under cover hides all except the tone controls when shut). On the right are the most commonly used controls — the volume control, the muting switch and the source selectors. In the center are informative displays including pictographs for sources.

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

A-6



The Proof of Pioneer's Competitive Edge

PIONEER'S COMPETITIVE EDGE manifests itself in the A-6. No other manufacturer produces an equally priced amp with the features and performance of this model.

The power amp of the A-6 is, like more expensive models', of the Non-Switching design. We've combined Non-Switching with another advanced feature — a DC-Servo circuit built around an op-amp — for reproduction quality which is smooth and clean as well as tight and rich. This DC-Servo circuit has ended circuit instability for good. The output stage consists of two 120-watt-class RETs (per channel) for a wide safety margin. The A-6 has a **continuous average power output of 60 watts* per channel, min. at 8 ohms, from 20 hertz to 20,000 hertz with no more**

than 0.008% total harmonic distortion.

The DC-Servo circuit is repeated in the phono equalizer for better reproduction and safer operation. A high signal-to-noise ratio of 86dB (with MM cartridges) is assured thanks to the input formed of a high-gm dual FET. The equalizer is of the high-gain type, accepting either MM or MC cartridges directly. Without rerouting signal cables, you can switch between the two types of cartridges — a definite plus for those who own a mixed collection of MMs and MCs.

A unique feature of the A-6 is the record output selector that, independently from the input selector, lets you listen to one program while recording another. Interconnections also allow you to dub from Tape 1 to Tape 2.

Like all the other Pioneer amplifiers, the

A-6 is designed to communicate with you via the informative displays on the central panel. Displays include the 7-LED peak-reading power meters, pictographs for program sources, signal flow, tape dubbing and other vital information on the operating status of your system. Switches located on the center panel include speaker selection, subsonic filter, tone defeat, muting and MM/MC cartridge selection. To the left and right of the front panel you'll find the most frequently used controls — bass, treble and record selector on the left and volume, balance and loudness on the right. Our logical panel layout gives the A-6 an overall look of utility and elegance.

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

A-5



A Sampling of the State of the Art

IF YOU'RE IN THE MARKET FOR AN amplifier for the first time, it would be in your best interest to audition the A-5 from Pioneer at your dealer's showroom. You'll find the A-5 to be probably the best investment available in quality stereo sound at an economy price.

You'll be surprised to learn that even our least expensive amplifier is replete with Pioneer's exclusive Non-Switching power amp configuration. It's your guarantee that you'll enjoy low-distortion sound comparable in quality to expensive audiophile class-A amps. This new design has completely eliminated switching distortion, replacing it with smooth, clean sound without a hint of the transistor sound of other amplifiers.

The Non-Switching design is combined with a technology of Nested Feedback Loops

(NFL) in the A-5's power amp. Involving the use of nested differentiating feedback in multiple form from the output stage, this technology lessens distortion. The A-5 has a **continuous average power output of 35 watts* per channel, min. at 8 ohms, from 20 hertz to 20,000 hertz with no more than 0.009% total harmonic distortion.** Add to it the two 100-watt-class RETs per channel in the power output section, and you have a state-of-the-art amplifier par excellence.

The A-5 features a unique circuit — a record output selector. With it you can select a program to record — tuner, phono, aux — independently from the one you listen to. Thus, you can record an FM program while listening to a tape or record. At the twist of a knob you can also dub tapes from deck

1 to deck 2.

You'll particularly appreciate the logical way we have designed the front panel of the A-5. Controls and displays are so laid out that they won't confuse you. On the left panel are the bass and treble controls as well as the recording selector. On the right is the oversize volume control and concentric balance control as well as the loudness switch. Concentrated in the center are the selector switches and various other switches like speaker selectors, tone defeat and muting. But most interesting is the display that gives a pictographic look at the signal flow, as well as indicators for tape copy and muting. You'll love the logic of the A-5's design as much as its economical price.

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

PIONEER FM/AM TUNERS

Technology in its Purest Form

To receive a transmitted signal, reject all other signals both of natural and man-made origin, add no distortion, and convert this signal into full hi-fi stereo is a monumental task. All three of Pioneer's new tuners are up to the task. Each utilizes the most advanced technologies available so that what you hear is just as pure and clean as a live performance.

Externally, these tuners present clean lines with only a minimum of controls. In the F-9 and F-7, additional controls hide behind a hinged door. The center panel of each is its information center, displaying the digital frequency readout, the signal strength meter, stereo indicator and, in the F-9 and F-7, station frequency/call letter indicators. Pioneer tuners are a wonderful blend of logical design and innovative engineering.

Push-Pull Front End (F-9)

As you tune up and down the dial of a tuner, you often find stations on frequencies where they shouldn't be. This is called RF (Radio Frequency) intermodulation. When there are two (or more) powerful stations in your area, the tuner, because of nonlinearity in its amplifying transistors and FETs, produces spurious frequencies, or, as called collectively, "RF intermodulation distortion." With dozens of FM stations you can tune to, RF intermodulation distortion can play havoc with FM reception, making some stations sound less than hi-fi and other stations sound completely unlistenable.

The FM front end of the F-9 is essentially free of RF intermodulation distortion. The reason is that it features a push-pull configuration, using two Pioneer-exclusive ID (Ion-Implantation Double-Diffusion) MOS FETs (P001). While improving high-frequency response, this configuration has expanded the dynamic range to twice the norm. All this adds up to clear reception, free of interference and concomitant noise.

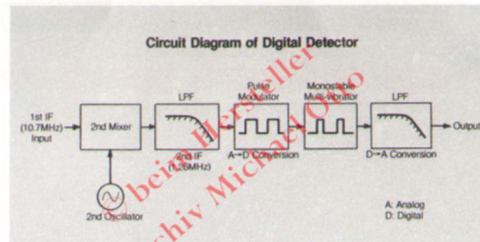
In the F-7, the front end is a single-ended type featuring a Pioneer ID MOS FET (P001). Otherwise it's similar to the F-9's.

Digital Detector (F-9)

The Digital Detector is a Pioneer technique whereby the tuned FM signal is digitally converted into an AF (Audio-Frequency) signal. This type of detector suffers no nonlinearity, therefore distortion is low across a very wide frequency range. In the F-9, we've employed the Double-Converter type Digital Detector to improve the signal-to-noise ratio. And beat noise,



common to this type of detector, poses no problem, for it's completely eliminated by our linear multiplier IC (Pioneer PA5001) in the mixer and a push-pull oscillator.



Quartz-PLL Digital Synthesized Tuning (F-9, F-7)

The front ends of both the F-9 and F-7 feature another important technology — Quartz-PLL Synthesized Tuning. Pioneer's Quartz-PLL is the answer to the problem of mistuning or "drift" that may occur due to varying temperatures and humidities. The steady frequency derived from the quartz crystal is compared with the desired station frequency via a PLL (Phase-Locked Loop) thousands of times per second. Drift is impossible. Tuning is accurate and precise.

Furthermore, in our Quartz-PLL digital synthesized tuners, a varicap has replaced the conventional mechanically-linked capacitor, controlling preset fixed voltages commanded by ICs and LSIs, at will. You can preset the frequencies of twelve of your favorite stations (6 FM/6 AM) and tune them in at the touch of a button, without scanning the entire FM or AM band.

"Direct-Through" Multiplex with Auto Pilot Canceller (F-9, F-7)

The multiplex stereo demodulator separates the composite input into left-channel and right-channel components by 38kHz switching. In conventional multiplex demodulators, switching is achieved with two transistors connected in series with the signal path. However, the signal bypasses the active transistors in our new "Direct-Through" circuit provided by the Pioneer PA4006A demodulator IC. This simple design sends the demodulated signal directly to the output. Advantages? A better signal-to-noise ratio and lower distortion.

Finally, the "Direct-Through" Demodulator features an Automatic Pilot Canceller in both the F-9 and F-7. It's not a passive filter. It is an active device, contained in the Pioneer manufactured PLL demodulator IC (PA4006A), that electronically cancels the pilot by mixing it with a 19kHz signal which is 180 degrees out of phase with the pilot. It's therefore no wonder that both the F-9 and F-7 offer a wide frequency range from 20Hz to 15kHz and suffer no pilot signal leakage.

Tuning Conveniences, Human Engineering

Like their amp cousins, these Pioneer tuners stress human-engineering — the relationship of man to machine. The more often used controls and switches are exposed on the outside panel, while less often used ones are behind the flip-down hinged panel (F-9 and F-7).

F-9



Easy-Use High Technology

HIGH TECHNOLOGY SHOULDN'T BE overly confusing — and Pioneer's new F-9 featuring ease of use *and* advanced technology is the proof.

Its front end is of the push-pull design built around two Pioneer-exclusive ID MOS FETs (P001). Since this design affords the front end with extra-high linearity, the tuner is virtually free from RF intermodulation distortion. High-frequency response and dynamic range are dramatically improved.

Another feature of the F-9's front end is the Quartz-PLL Digital Synthesized Tuning. It uses a combination of a Quartz-PLL servo and a voltage-controlled varicap (not an error-prone variable capacitor). The bonuses you get are tremendous. One, the tuner is completely immune from tuning drift. Two,

you have at your command six FM and six AM preset stations, available for instant recall at the touch of a button. Three, pushbutton electronic scan-tuning is possible up and down the tuning band.

FM IF signals are converted into audio signals through the Digital Detector. Since it does not use common coils and capacitors (as ratio and quadrature types do), the Detector does not succumb to errors caused by changes in climatic conditions, nor does it suffer nonlinearity. Distortion remains low across a very wide frequency range. Furthermore, this Detector is of the Double-Converter type using a second IF. This means an improved signal-to-noise ratio and freedom from beat noise. Two Pioneer ICs — PA5001 and PA5002 — contribute to the

good performance of the FM IF.

A "Direct-Through" Multiplex demodulator lets you enjoy FM stereo broadcasts with high signal-to-noise ratio and low distortion. Its Auto Pilot Canceller assures no pilot signal leakage. Two Pioneer ICs — PA5002 and PA4006A — form the heart of the demodulator.

On the logically laid-out front panel you'll find: the FM/AM IF Bandwidth Selectors and Auto/Manual Search Selector, Preset Buttons for 6 FM and 6 AM stations, a Multipath Indicator, the Digital Frequency Readout, a Record Level Check Switch, and more.

F-7



Tune with Pushbutton Ease

WITH THE F-7 FROM PIONEER YOU can tune with pushbutton ease. Be whisked from station to station — automatically or manually — with just a touch of a button. Or recall any of six AM or six FM stations at the touch of another series of buttons. Modern tuner technology has advanced in leaps and bounds with Pioneer leading the way.

The F-7 utilizes a single-ended front end featuring a Pioneer-developed ID MOS FET (P001). It resists RF intermodulation and assures improved high-frequency response and dynamic range. The coupled twin-type varicap has reduced noise by half and doubled the dynamic range. This advanced front end virtually ends interference as well as RF intermodulation distortion.

Drift-free tuning accuracy is guaranteed

by the Quartz-PLL Digital Tuning system that's centered around a responsive Quartz-PLL servo and a control LSI (Large-Scale Integrated Circuit). It's thanks to this tuning system that you have a total of 12 preset stations at your ready command.

The "Direct-Through" Multiplex demodulator does not suffer nonlinearity, a common problem with conventional circuit designs. By bypassing the active transistors, it lets the demodulated signals go directly to their output while separating left-channel signals from right. Advantages include a better signal-to-noise ratio (an 11dB improvement over more conventional designs) and lower distortion (one half the norm). To effectively suppress pilot signal leakage, Pioneer has equipped the F-7 with a

built-in pilot signal canceller. Two Pioneer ICs — PA5002 and PA4006A — are used for high reliability and peak performance.

The human-engineered front panel design contains all the switches and displays in logical groupings. The most commonly required switches — the preset station call buttons, and the FM and AM band selector switches are located to the right. Less commonly called-for switches and controls — such as auto search, memory, tuning mode, and record level check — are located behind a hinged drop-down panel on the left. But most interesting and useful is the display panel in the center. Here are located the digital frequency readout, the signal strength meter and the user changeable station frequency/call letter indicators.

F-5



A Truly Hi-Fi Tuner

WHAT IS DEMANDED OF A TUNER IS the same as what is demanded of an amplifier — wide dynamic range, low distortion, wide frequency response and above all, hi-fi reproduction quality. But a truly hi-fi tuner such as the F-5 is hard to come by, and so it's a miracle that the F-5 is so reasonably priced.

The FM front end of the F-5 couples a 3-gang variable capacitor, a cascode-junction FET RF amp and a high- f_t transistor in the mixer. Together they offer you effective rejection of interference and assure clear reception.

In the FM IF two ceramic filters improve selectivity and lower group-delay distortion to ensure better hi-fi. IF amplification is handled by the Pioneer PA3001A IC, which doubles as

a muting circuit to silence inter-station noise and too weak signals. The IC also contributes to improved selectivity and reduced distortion. The PLL multiplex demodulator, contained in an IC, widens channel separation and reduces distortion, helping make the F-5 a truly hi-fi tuner.

Drift, often a problem with lesser tuners, is completely banished from the tuning circuit of the F-5 by a Servo-Lock tuning system. Here's how it works: A control voltage derived from the PA3001A IC is added to the varicap of the local oscillator, thereby controlling and locking in the oscillator frequency. Tune to a desired station and release the tuning knob. Pioneer's Servo-Lock system locks the station's frequency automatically for hour upon hour

of drift-free FM listening.

The F-5 does not disappoint you with hard-to-tune controls and useless displays. The digital frequency readout shows a tuned frequency in five digits — a degree of accuracy rarely found in any tuner, regardless of price. Three LEDs (Light-Emitting Diodes) show signal strength of both FM and AM stations. The muting circuit may be defeated whenever weak-signal station listening is desired. Reception reverts to mono for lowest noise in this mode. Indicators include stereo and selected band — FM or AM. Naturally, like our matching amps, this tuner has a panel clearly and logically laid out.

Feature Comparison Chart of Pioneer Amps & Tuners

	A-9	A-8	A-7	A-6	A-5
POWER AMP					
Non-Switching Amp	○	○	○	○	○
DC-Servo	○	○	○	○	—
High- f_T Transistors	○	○	○	○	○
PREAMP					
Built-in MC Head Amp	○	—	—	—	—
DC-Servo Phono Equalizer	○	—	—	○	—
High-gain Phono Preamp (MM/MC)	—	○	○	○	—
Cartridge Load Selectors	○	○	—	—	—
MC (Resistance)	○ (2)	○ (High/Low)	—	—	—
MM (Capacitance)	○ (4)	○ (High/Low)	—	—	—
"Line Straight"	○	○	○	—	—
DISPLAYS					
Pictographs	○	○	○	○	○
Signal Flow Indicator	○	○	○	○	○
Protection Indicator	○	○	○	—	—
LED Peak Meters	○	○	○	○	—
Subsonic Indicator	○	—	—	—	—
Record Selector Indicators	○	○	○	—	—
FRONT END					
Push-Pull Front End	—	○	—	—	—
Single-Ended Front End	—	—	○	○	—
Quartz-PLL Digital Tuning	—	○	○	○	—
DIGITAL DETECTOR	—	○	—	—	—
"DIRECT-THROUGH" MULTIPLEX DETECTOR	—	○	○	○	—
PIONEER-DEVELOPED ICs					
P001 (Front End)	—	○ (2)	○ (1)	○ (1)	—
PA5001 (Second Mixer)	—	○	—	—	—
PA5002 (FM Detector)	—	○	○	○	—
PA4006A (MPX Demodulator)	—	○	○	○	—
PA3007 (FM IF)	—	○	○	○	—
PA3001A (FM IF)	—	—	—	—	○
TUNING CONVENIENCES					
FM/AM IF Bandwidth Selectors	—	○	—	—	—
Station/Manual Search	—	○	○	○	—
6 FM/6 AM Preset Buttons	—	○	○	○	—
Multipath Indicator	—	○	—	—	—
Digital Frequency Readout	—	○	○	○	○
Record Level Check	—	○	○	○	—
User-Changeable Station Frequency/Call Letter Indicators	—	○	○	○	—

SPECIFICATIONS

	A-9	A-8	A-7	A-6
POWER AMPLIFIER SECTION				
Continuous Power Output:				
	Continuous average power output is 110 watts* per channel, min., at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.003% total harmonic distortion.	Continuous average power output is 90 watts* per channel, min., at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.005% total harmonic distortion.	Continuous average power output is 70 watts* per channel, min., at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.007% total harmonic distortion.	Continuous average power output is 60 watts* per channel, min., at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.008% total harmonic distortion.
1,000Hz:	120W + 120W (T.H.D. 0.003%, 8 ohms)	98W + 98W (T.H.D. 0.005%, 8 ohms)	78W + 78W (T.H.D. 0.007%, 8 ohms)	70W + 70W (T.H.D. 0.005%, 8 ohms)
Total Harmonic Distortion: (20 to 20,000Hz, 8 ohms)	No more than 0.003% (continuous rated power output) No more than 0.003% (55 watts per channel power output)	No more than 0.005% (continuous rated power output) No more than 0.005% (45 watts per channel power output)	No more than 0.007% (continuous rated power output) No more than 0.005% (35 watts per channel power output)	No more than 0.008% (continuous rated power output) No more than 0.006% (30 watts per channel power output)
Intermodulation Distortion: (50Hz: 7,000Hz = 4:1, 8 ohms)	No more than 0.005% (continuous rated power output) No more than 0.003% (55 watts per channel power output)	No more than 0.005% (continuous rated power output) No more than 0.003% (45 watts per channel power output)	No more than 0.005% (continuous rated power output) No more than 0.003% (35 watts per channel power output)	No more than 0.006% (continuous rated power output) No more than 0.004% (30 watts per channel power output)
Output:				
Speakers:	A, B, A + B, OFF (4—16 ohms)	A, B, A + B, OFF (6—16 ohms)	A, B, A + B, OFF (6—16 ohms)	A, B, OFF (6—16 ohms)
Headphones:	Low impedance	Low impedance	Low impedance	Low impedance
Damping Factor (20 to 20,000Hz, 8 ohms):	60	60	60	60
PREAMPLIFIER SECTION				
Input Sensitivity/Impedance:				
PHONO (MM):	2.5mV/50k ohms, Load Capacitance: 100, 200, 300 400pF	2.5mV/50k ohms, Load Capacitance: 200, 400pF	2.5mV/50k ohms	2.5mV/50k ohms
(MC):	100µV/100 ohms, 33 ohms	0.25mV/100 ohms, 33 ohms	0.25mV/100 ohms	0.25mV/100 ohms
TUNER:	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms
AUX.:	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms
TAPE PLAY 1:	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms
TAPE PLAY 2:	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms	150mV/50k ohms
PHONO Overload Level:				
PHONO:	250mV (MM), 10mV (MC) (T.H.D. 0.0015%, 1kHz)	200mV (MM), 20mV (MC) (T.H.D. 0.0015%, 1kHz)	200mV (MM), 20mV (MC) (T.H.D. 0.0015%, 1kHz)	150mV (MM), 15mV (MC) (T.H.D. 0.002%, 1kHz)
Output Level/Impedance:				
TAPE REC 1:	150mV/2.2k ohms	150mV/2.7k ohms	150mV/2.7k ohms	150mV/2.7k ohms
TAPE REC 2:	150mV/2.2k ohms	150mV/2.7k ohms	150mV/2.7k ohms	150mV/2.7k ohms
Frequency Response:				
PHONO (RIAA Equalization):	20 to 20,000Hz ±0.2dB (MM)	20 to 20,000Hz ±0.2dB (MM)	20 to 20,000Hz ±0.3dB (MM)	20 to 20,000Hz ±0.2dB (MM)
TUNER, AUX, TAPE PLAY:	5 to 200,000Hz 0dB, -3dB	5 to 200,000Hz 0dB, -3dB	5 to 200,000Hz 0dB, -3dB	5 to 200,000Hz 0dB, -3dB
Tone Control:				
BASS:	±10dB (100Hz) at Turnover frequency 400Hz ±10dB (50Hz) at Turnover frequency 200Hz	±10dB (100Hz)	±10dB (100Hz)	±8dB (100Hz)
TREBLE:	±10dB (10kHz) at Turnover frequency 2.5kHz ±10dB (20kHz) at Turnover frequency 5kHz	±10dB (10kHz)	±10dB (10kHz)	±8dB (10kHz)
Filter:				
SUBSONIC:	15Hz (-12dB/oct.)	20Hz (-6dB/oct.)	20Hz (-6dB/oct.)	15Hz (-6dB/oct.)
Loudness Contour: (Volume control set at -40dB position)	+6dB (100Hz), +3dB (10kHz)	+9dB (100Hz), +3dB (10kHz)	+9dB (100Hz), +3dB (10kHz)	+6dB (100Hz), +3dB (10kHz)
Hum and Noise (short-circuited, A network, rated power)				
PHONO:	90dB (MM), 74dB (MC)	90dB (MM), 72dB (MC)	88dB (MM), 70dB (MC)	86dB (MM), 70dB (MC)
TUNER, AUX, TAPE PLAY:	110dB	110dB	110dB	100dB
Muting:	-20dB	-20dB	-20dB	-20dB
MISCELLANEOUS				
Power Requirement:	120V 60Hz	120V 60Hz	120V 60Hz	120V 60Hz
Power Consumption:	350 watts (UL), 820 watts (max.)	250 watts (UL), 470 watts (max.)	200 watts (UL), 420 watts (max.)	280 watts (UL), 400 watts (max.)
Dimensions (without package):	16-9/16 (W) × 5-7/8 (H) × 17-7/16 (D) inches 420 (W) × 150 (H) × 443 (D) mm	16-9/16 (W) × 5-3/16 (H) × 16-5/8 (D) inches 420 (W) × 132 (H) × 423 (D) mm	16-9/16 (W) × 5-3/16 (H) × 16-5/8 (D) inches 420 (W) × 132 (H) × 423 (D) mm	16-9/16 (W) × 3-7/8 (H) × 14-7/16 (D) inches 420 (W) × 98 (H) × 367 (D) mm
Weight (without package):	35 lb. 4 oz./16kg	30 lb. 7 oz./13.8kg	26 lb. 14 oz./12.2kg	15 lb. 7 oz./7.0kg

A-5

Continuous average power output is 35 watts* per channel, min., at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.009% total harmonic distortion.

40W + 40W
(T.H.D. 0.005%, 8 ohms)
No more than 0.009% (continuous rated power output)
No more than 0.007% (17.5 watts per channel power output)
No more than 0.007% (continuous rated power output)
No more than 0.005% (17.5 watts per channel power output)

A, B, OFF (6—16 ohms)
Low impedance
50

2.5mV/50k ohms

150mV/50k ohms
150mV/50k ohms
150mV/50k ohms
150mV/50k ohms

140mV
(T.H.D. 0.004%, 1kHz)

150mV/2.7k ohms
150mV/2.7k ohms

20 to 20,000Hz ±0.5dB
5 to 200,000Hz 0dB, -3dB

±8dB (100Hz)

±8dB (10kHz)

+6dB (100Hz), +3dB (10kHz)

70dB
100dB
-20dB

120V 60Hz only
180 watts (UL), 260 watts (max.)
16-9/16 (W) × 3-7/8 (H)
× 14-7/16 (D) inches
420 (W) × 98 (H) × 367 (D) mm
14 lb. 5 oz./6.5kg

F-9

F-7

F-5

FM SECTION

Usable Sensitivity (Mono):	10.8dBf (0.95µV, 75 ohms)	10.8dBf (0.95µV, 75 ohms)	10.8dBf (0.95µV, 75 ohms)
50dB Quieting Sensitivity:			
Mono:	15.0dBf (1.55µV, 75 ohms)	16dBf (1.7µV, 75 ohms)	17.3dBf (2.0µV, 75 ohms)
Stereo:	37.0dBf (19.5µV, 75 ohms)	37.2dBf (19.9µV, 75 ohms)	39.2dBf (25µV, 75 ohms)
Signal-to-Noise Ratio:			
Mono/Stereo (IHF; at 85dBf):	90dB/85dB	85dB/80dB	75dB/70dB
Distortion (at 85dBf, Wide)			
100Hz (Mono/Stereo):	0.03%/0.05%	0.06%/0.08%	0.1%/0.2%
1kHz (Mono/Stereo):	0.03%/0.05%	0.06%/0.08%	0.1%/0.2%
10kHz (Mono/Stereo):	0.03%/0.1%	0.1%/0.25%	0.2%/0.5%
Frequency Response:	20 to 15,000Hz +0.2dB, -0.5dB	20 to 15,000Hz +0.2dB, -1.0dB	30 to 15,000Hz +0.2dB, -1.5dB
Capture Ratio:	1.0dB (Wide), 2.5dB (Narrow)	1.0dB	1.0dB
Alternate Channel Selectivity:			
400kHz:	40dB (Wide), 85dB (Narrow)	60dB	60dB
300kHz:	60dB (Narrow)	—	—
Spurious Response Ratio:	80dB	70dB	70dB
Image Response Ratio:	70dB	55dB	50dB
IF Response Ratio:	100dB	90dB	80dB
AM Suppression Ratio:	65dB	60dB	50dB
Muting Threshold:	25.2dBf (5µV)	25.2dBf (5µV)	19.2dBf (2.5µV)
Stereo Separation:			
1kHz (Wide/Narrow):	55dB/40dB	50dB	40dB
50Hz to 10kHz (Wide):	48dB	40dB	30dB
Subcarrier Product Ratio:	70dB	55dB	55dB
Antenna Input:	300 ohms balanced 75 ohms unbalanced	300 ohms balanced 75 ohms unbalanced	300 ohms balanced 75 ohms unbalanced

AM SECTION

Sensitivity:			
IHF, ferrite antenna:	300µV/m	300µV/m	300µV/m
IHF, external antenna:	15µV	15µV	15µV
Selectivity (Wide/Narrow):	10dB/50dB	30dB	30dB
Signal-to-Noise Ratio:	50dB	50dB	50dB
Image Response Ratio:	60dB	30dB	30dB
IF Response Ratio:	80dB	65dB	65dB
Antenna:	Ferrite loopstick antenna	Ferrite loopstick antenna	Ferrite loopstick antenna

AUDIO SECTION

Output (Level/Impedance)			
FIXED:	650mV/1.1k ohms (FM), 200mV/1.1k ohms (AM) FM(100% MOD), AM(30% MOD)	650mV/1.1k ohms (FM), 200mV/1.1k ohms (AM) FM(100% MOD), AM(30% MOD)	650mV/3.5k ohms (FM), 200mV/3.5k ohms(AM) FM(100% MOD), AM(30% MOD)

MISCELLANEOUS

Power Requirement:	120V 60Hz	120V 60Hz	120V 60Hz
Power Consumption:	17 watts (UL)	15 watts (UL)	10 watts (UL)
Dimensions (without package):	16-9/16 (W) × 2-3/8 (H) × 14-15/16 (D) inches 420 (W) × 60 (H) × 380 (D) mm	16-9/16 (W) × 2-3/8 (H) × 14-15/16 (D) inches 420 (W) × 60 (H) × 380 (D) mm	16-9/16 (W) 2-3/8 (H) × 14-15/16 (D) inches 420 (W) × 60 (H) × 380 (D) mm
Weight (without package):	9 lb. 15 oz./4.5kg	9 lb. 15 oz./4.5kg	9 lb. 15 oz./4.5kg

*Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Output Claims for Amplifier.
Note: Specifications and design subject to possible modification without notice.

PIONEER®

U.S. PIONEER ELECTRONICS CORP.

Corporate Headquarters

85 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.

Eastern Branch

75 Oxford Drive, Moonachie, New Jersey 07074, U.S.A.

Midwest Branch

737 Fargo Avenue, Elk Grove Village, Illinois 60007, U.S.A.

Western Branch

4880 W. Rosecrans Avenue, Hawthorne, California 90250, U.S.A.

Southern Branch

1875 Walnut Hill Lane, Irving, Texas 75062, U.S.A.

