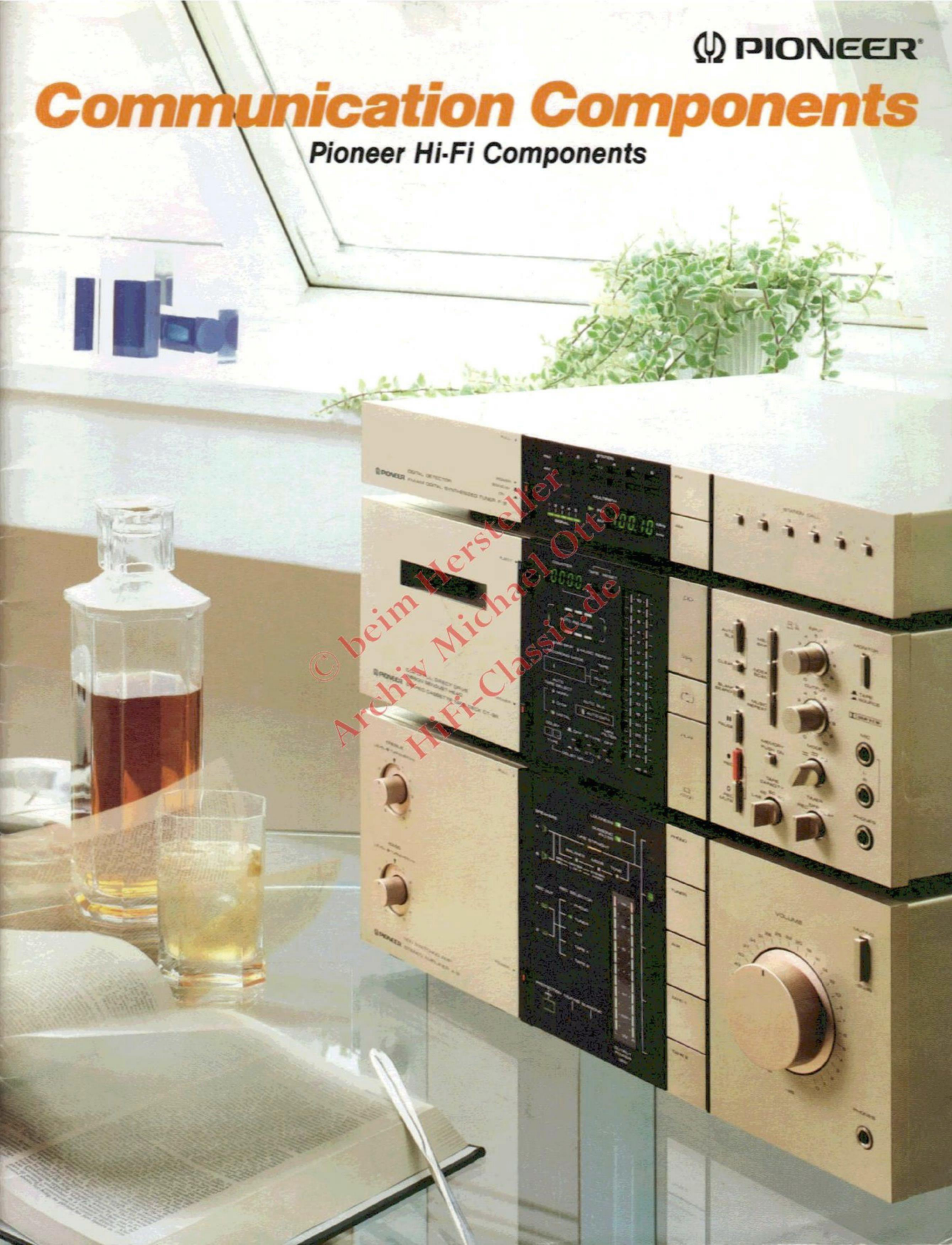


 PIONEER®

Communication Components

Pioneer Hi-Fi Components



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Quality and Styling by Pioneer

What the Scandinavians did for furniture, Pioneer has done for hi-fi. All of the matched models in our new hi-fi lineup give you functional, human engineering and stylish, eye-catching looks. That's why we call them Communication Components.

Behind our logically laid out faceplates, you'll find the newest ideas from Pioneer's audio laboratories — innovations to make listening easier and more care free, and innovations to make your music sound better than ever.

When you shop for hi-fi equipment, remember the name that has become synonymous with quality hi-fi — Pioneer.

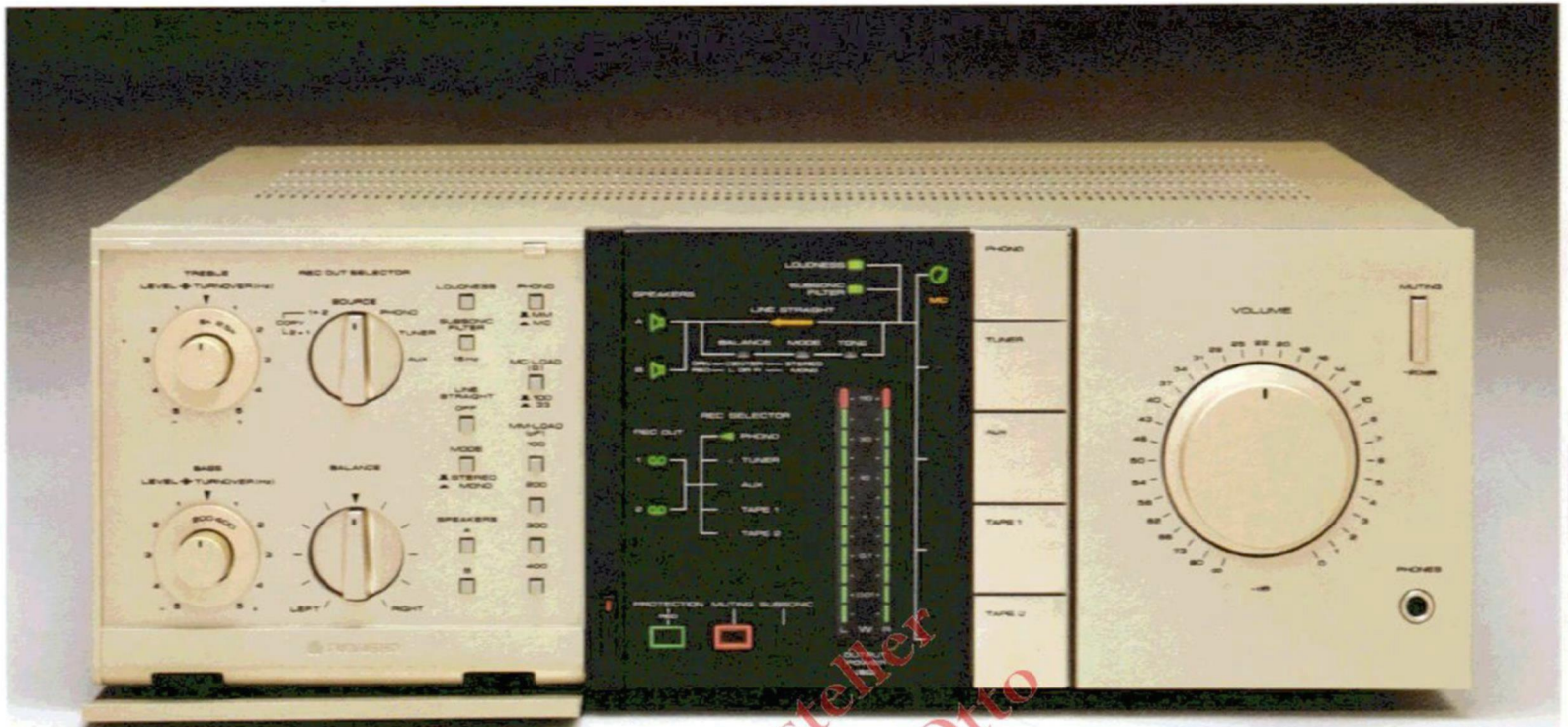


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AMPLIFIERS



NON SWITCHING AMP™

A-9 NON-SWITCHING STEREO AMPLIFIER

The Trend-Setting Amplifier from Pioneer

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 musical accuracy. Foremost among its features for better sound is the Pioneer-exclusive Non-Switching* power amplifier design.

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

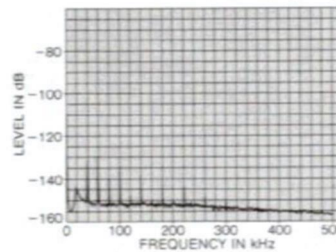
Non-Switching amp achieves low distortion and high efficiency

- The engineers' dilemma: class-A for better sound, or class-B for higher efficiency

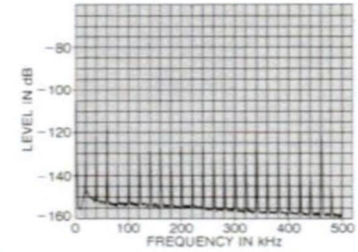
When an audio engineer must decide what basic amplification circuit to utilize, the choice most often boils down to class-A or class-B. In class-B (or AB) amps, efficiency is relatively high because output transistors switch on only when needed, thus preventing heat build-up and wasteful energy loss. This efficiency is the reason why most amps on the market, particularly those with high-output capabilities, are of the class-B design. The major drawback of class-B is that the

Distortion Spectra

Distortion Spectrum of Non-Switching Amp

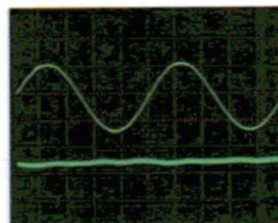


Distortion Spectrum of Conventional Class-B Amp



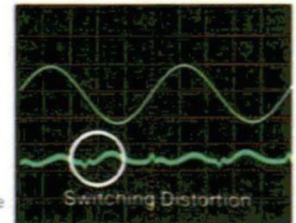
Frequency: 20kHz
Fundamental frequency removed

Output Waveform of Non-Switching Amp



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

Output Waveform of Conventional Class-B Amp



switching of transistors on and off creates significant amounts of distortion.

The most common alternative is class-A, in which a constant amount of bias (idle current) is applied to the transistors to keep them from switching off, even when no signal is present for them to amplify. In this manner, distortion caused by switching cannot occur, but as much as 75% of the energy consumed is given off in the form of heat rather than sound. This inefficiency means more than just high electricity bills; heat sinks must be very large to dissipate the large amount of generated heat. It's no wonder that heavy, costly class-A amps are popular only with a handful of money-no-object audiophiles.

● **Pioneer Non-Switching: A power amp design that has made high efficiency and ultra-low distortion compatible**

Pioneer's answer to the class struggle (A vs. B) is the revolutionary "Non-Switching" amplifier design. It is based on a circuit called a "Vari-Bias*," which continuously monitors the amplitude of incoming signals and automatically raises or lowers the amount of bias current fed to the transistors via a high-speed servo. They get only a nominal 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 loss in the form of heat, and, since the transistors never switch off, there's no switching distortion. The Non-Switching design is very nearly as efficient as a class-B amplifier, so power consumption remains low.

The Non-Switching amp in the A-9 uses Pioneer-developed high- f_t RETs (Ring Emitter Transistors). They offer a very high- f_t or transition frequency — fully ten times higher than conventional bipolar types. Linearity remains high even for high-amplitude inputs, so transfer error remains negligible.

Further, our Non-Switching amp is a DC-servo design built around an op-amp. This allows it to operate in the DC mode. Phase response remains accurate over a wide frequency range, yet the most inimical of DC disadvantages — the danger that infrasonics will upset the DC voltage and lead to distortion, or even to speaker damage — is neatly avoided. The result is tight reproduction with good transient response.

The A-9 delivers 110 watts per channel, both channels driven, at 8 ohms, from 20 to 20,000Hz with 0.003% total harmonic distortion (140W + 140W at 8 ohms, DIN).

(*Vari-Bias is a trademark of Pioneer.)

Versatile phono section — DC-Servo phono circuit and separate pre-preamp

The phono equalizer of the A-9 is built around a DC-servo circuit using a low-noise op-amp. Just like the power amp's op-amp, it completely shuts out infrasonics — such as caused by warped records — so that reproduction remains pure and true. For playback of low-output moving-coil (MC) cartridges, the A-9 has a separate pre-preamp (head amp) that is unusually quiet (a high signal-to-noise ratio).

For versatility, the A-9 is equipped with two sets of cartridge selectors — one set provides a choice of two resistance values for moving-coil cartridges, and the other set provides a choice of four capacitance values for moving-magnet cartridges.

Pictographic and other displays

Adorning the functionally divided front panel are pictographic and other displays that help make operation easier and more meaningful.

Pictographs for Source Indication: All inputs are button selectable. Beside each button is a pictograph which illuminates when that input is selected. Just a glance tells you all you need to know.

Signal Flow Indicators: You can easily observe the signal flow inside the amp from input to output. When you use the "Line Straight" selector to bypass the tone controls, the balance pot and the mode switch, the "Line Straight" arrow lights on the display panel, showing you that the signal

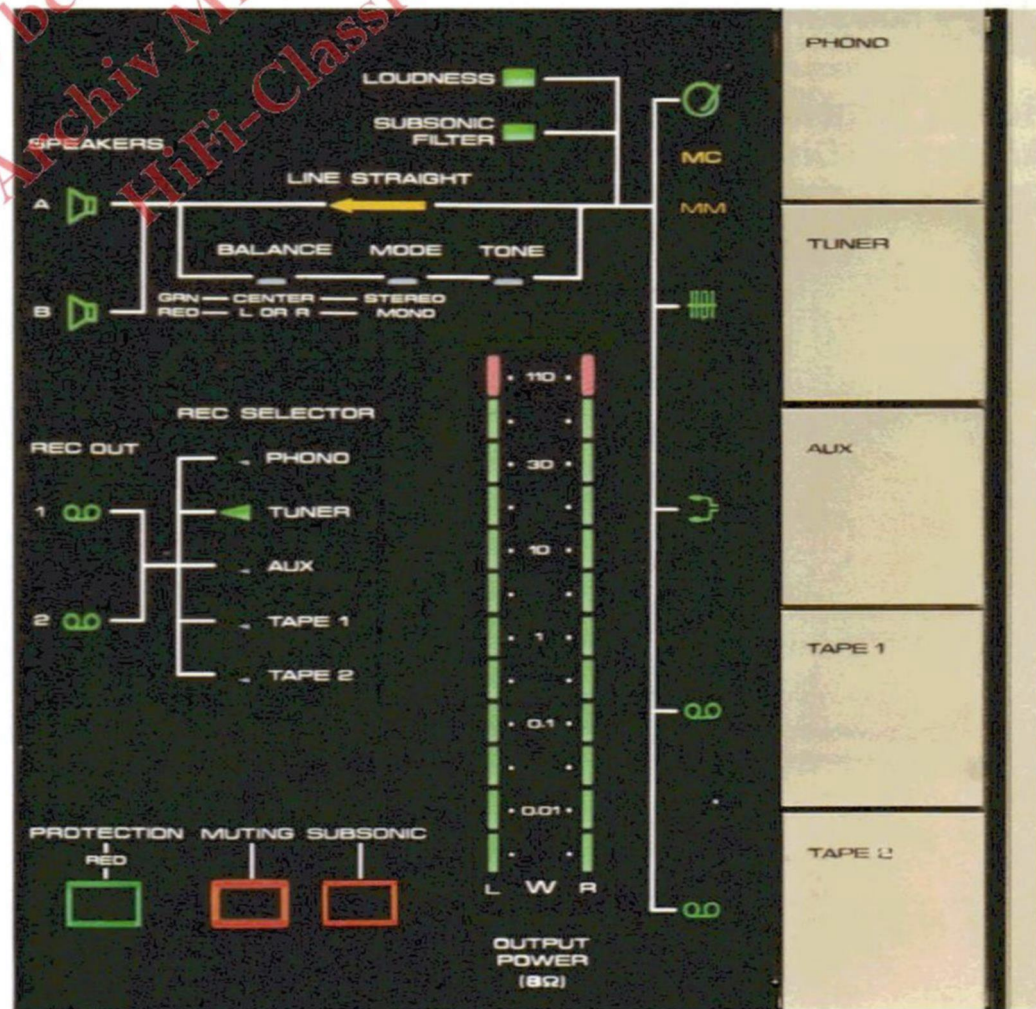
is taking the shortest possible route for absolutely flawless musical purity.

Protection Indicator: When the power switch is turned on, the indicator first glows red, indicating that the built-in protection circuitry is working. A few seconds later it turns green, letting you know that all circuits are fully stabilized and all systems are "go." 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, protecting them and letting you know there's a problem.

LED Peak Power Meters: The moment-to-moment power the amp is delivering to the connected speaker systems is displayed with electronic accuracy by a string of LEDs (separate displays for each channel). Output is shown over a wide range from the rated maximum power down to about one-hundredth of a watt (at 8-ohm impedance).

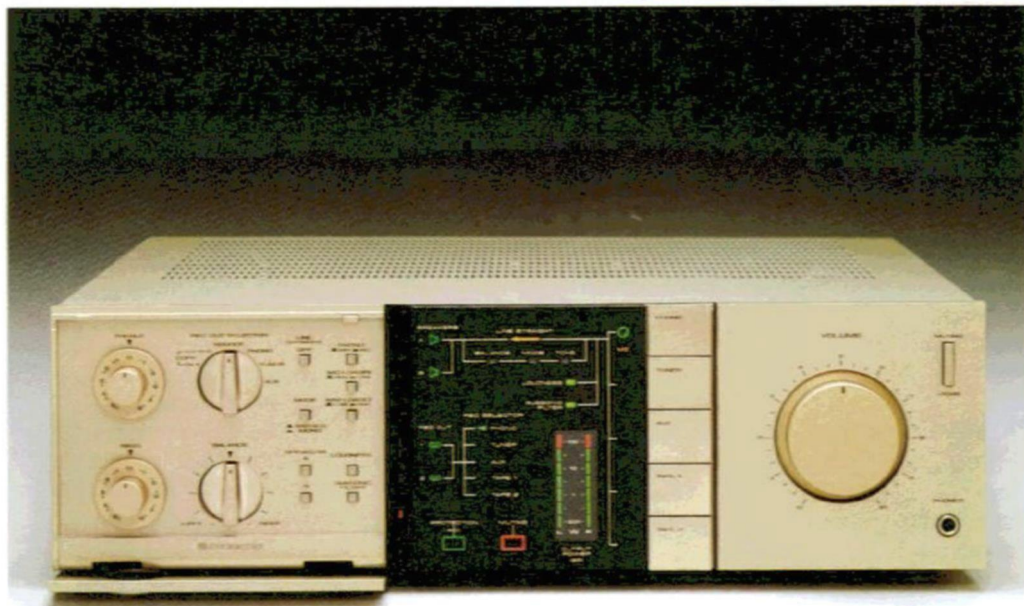
Subsonic Indicator: When an input signal contains excessive infrasonics due to record warps and eccentricities, this indicator glows a red warning to you, letting you know that you should switch in the Subsonic Filter. This assures better quality sound, free of intermodulation distortion, and lessens the chance of speaker damage caused by excessive woofer excursion.

Record Selector Indicators: A sound source to be recorded may be selected independently from the one you plan to listen to. And, the pictographs tell you at a glance what source is being recorded into either or both of two connected decks.



A-8 NON-SWITCHING STEREO AMPLIFIER

Conceived to Deliver Prodigious Amounts of Low-Distortion Power and Utmost Operating Ease



NON SWITCHING AMP™

A-7 NON-SWITCHING STEREO AMPLIFIER

Boasts Pioneer's Unique Control and Display Layout and Ample Low-Distortion Power for All Your Needs



NON SWITCHING AMP™

- **Power output 90 watts per channel**, both channels driven, at 8 ohms, from 20 to 20,000Hz with 0.005% total harmonic distortion (100W + 100W at 8 ohms, DIN).

- **"Non-Switching" DC-servo Power Amplifier:** Eliminates switching distortion and drastically reduces all other types of distortion while maintaining high efficiency. DC-Servo further reduces distortion.

- **High-gain phono equalizer for moving-magnet and moving-coil cartridges:** Allows the use of both popular types of cartridges at no additional cost.

- **Cartridge load selectors:** High/low capacitance values for moving-magnets, high/low resistance values for moving-coils.

- **"Line Straight" switch:** Provides purest possible sound quality by bypassing tone controls, the balance pot and the mode switch.

- **Informative displays:** Include sources (pictographs), record sources, signal flow, protection, power output (LED peak meters), subsonic filter, muting and loudness.

- **Other features:** Subsonic filter, tape dubbing, independent record out selection, muting, mode selection, A/B speaker drive, loudness.

- **Power output 70 watts per channel**, both channels driven, at 8 ohms, from 20 to 20,000Hz with 0.007% total harmonic distortion (85W + 85W at 8 ohms, DIN).

- **"Non-Switching" DC-servo Power Amplifier:** Eliminates switching distortion and drastically reduces all other types of distortion while retaining high efficiency. DC-Servo further reduces distortion.

- **Ring Emitter Transistors (RETs):** High transition frequency means high linearity for low distortion.

- **High-gain phono equalizer for moving-magnet and moving-coil cartridges:** Allows the use of either popular cartridge type at no additional cost.

- **"Line Straight" switch:** Provides purest possible sound quality by bypassing tone controls, the balance pot and the mode switch.

- **Informative displays:** Include sources (pictographs), record sources, signal flow, protection, power output (LED peak meters), subsonic filter, muting and loudness.

- **Other features:** Subsonic filter, tape dubbing, independent record out selection, muting, mode selection, A/B speaker drive, loudness.

A-6 NON-SWITCHING STEREO AMPLIFIER

Exhibits the Best of Pioneer's Technology: Non-Switching Amp, DC-Servo and Versatile Control Functions



- **Power output 60 watts per channel**, both channels driven, at 8 ohms, from 20 to 20,000Hz with 0.008% total harmonic distortion (75W + 75W at 8 ohms, DIN).
- **"Non-Switching" DC-servo Power Amplifier:** Eliminates switching distortion and drastically reduces all other types of distortion while retaining high efficiency. DC-Servo further reduces distortion.
- **Ring Emitter Transistors (RETs):** High transition frequency means high linearity for low distortion.
- **High-gain phono equalizer for moving-magnet and moving-coil cartridges:** Allows the use of either popular cartridge type at no additional cost.
- **Informative displays:** Include sources (pictographs), tape copy, signal flow, power output (LED peak meters), subsonic filter, muting and loudness.
- **Other features:** Subsonic filter, tape dubbing (Copy 1 to 2), independent record out selection, muting, tone defeat, A/B speaker drive, loudness.

NON SWITCHING AMP™

A-5 NON-SWITCHING STEREO AMPLIFIER

A Fine Sampling of State-of-the-Art Pioneer Amplifier Technology at an Attractive Price



- **Power output 35 watts per channel**, both channels driven, at 8 ohms, from 20 to 20,000Hz with 0.009% total harmonic distortion (45W + 45W at 8 ohms, DIN).
- **"Non-Switching" Power Amplifier:** Eliminates switching distortion and drastically reduces all other types of distortion while retaining high efficiency.
- **Ring Emitter Transistors (RETs):** High transition frequency means high linearity for low distortion.
- **Nested Feedback Loops in power amp:** Reduces distortion by the use of nested differentiating feedback in multiple form from the output stage. It's a technology initiated by Associate Professor Edward M. Cherry of Monash University, Australia.
- **Informative displays:** Include sources (pictographs), tape copy, signal flow, muting, loudness.
- **Other features:** Tape dubbing (Copy 1 to 2), muting, independent record out selection, tone defeat, A/B speaker drive, loudness.

NON SWITCHING AMP™

CASSETTE TAPE DECKS

S Ribbon
Sensust head



*Remote control unit JT-216 is optional.

CT-9R AUTO-REVERSE, 3-MOTOR CASSETTE DECK

Pioneer's Top Cassette Deck Provides Performance and Convenience Unequaled by Any Other

If you're looking for a cassette deck in a class by itself, consider the CT-9R, Pioneer's top model. Feature for feature and specification for specification, it out-competitions the competition by a large margin.

A sophisticated tape transport mechanism designed around three motors: the ultimate in speed accuracy

The new tape transport used in the CT-9R, we believe, is the most sophisticated and accurate on the market. By utilizing three direct-drive motors — one for capstan drive, one for supply-reel drive, and one for take-up-reel drive, moving parts are kept to a minimum, assuring speed accuracy and stability and transport reliability that are all far superior to conventional designs.

Each of these three motors is a brushless Hall type developed by Pioneer. The capstan drive motor uses a Periphery Integration system (like the one used in our turntables) to accurately monitor the

moment-to-moment speed. For even more accuracy, the motor is controlled by a Quartz-PLL speed control system.

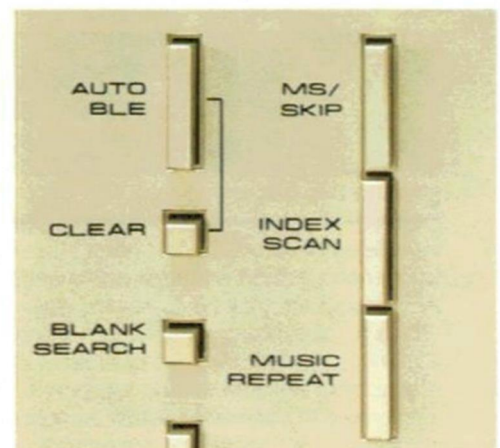
Auto-reverse playback with Blank Skip: An ultra convenient feature

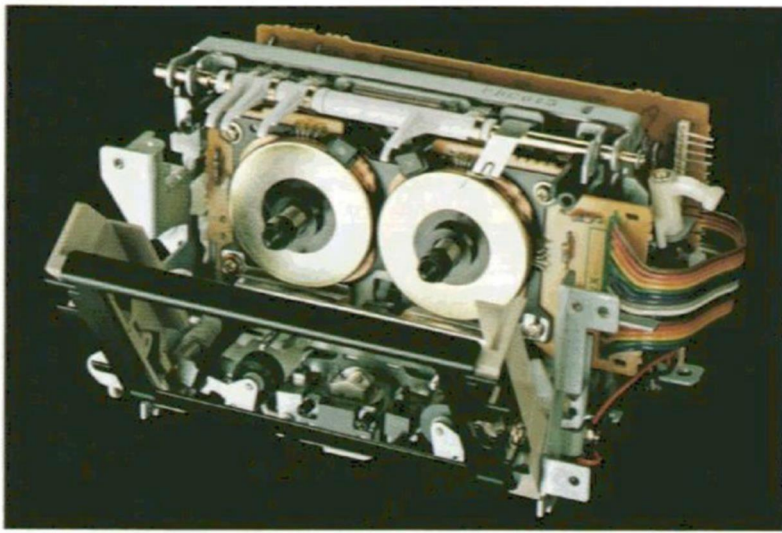
The CT-9R features a special convenience called "Blank Skip & Reverse" that lets you now forgo the long "silence" you previously had to put up with after the last song on the first side, and before play began again on the second side. As soon as the end of recorded material is detected — an unrecorded portion lasting more than 8 seconds — the deck enters the fast mode, reverses at the tape end and quickly locates the beginning of the first song on the second side. Additionally, thanks to an optoelectrical leader-tape detection system built into the erase head, direction change occurs the second the translucent leader tape is detected. The interruption in music is barely perceptible.

Pioneer's C.A.C. — Computer-Aided Convenience

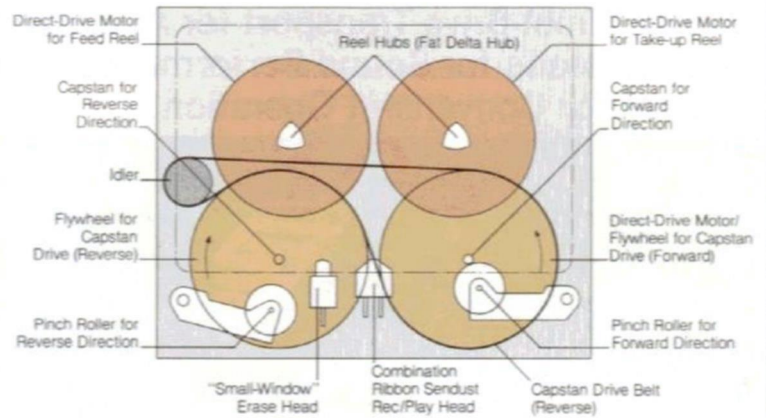
Pioneer has given the CT-9R four computer-aided automatic conveniences (C.A.C.), each available at the touch of a button:

Blank Search — You can easily dovetail the end of a previous programme with the





3-Direct-Drive-Motor Tape Transport



beginning of a new one. Blanks between programmes are automatically set at four seconds.

Index Scan — It lets you automatically sample and play the first seven seconds or so of each selection on the tape, one right after another.

Music Search/Skip — This lets you return to the beginning of the selection you're listening to or advance to the beginning of the next selection.

Music Repeat — This convenient feature allows you to repeat one selection over and over again, from its exact beginning to its exact end.

Automatic BLE Tuning System for tape-by-tape fine adjustment of bias, level and equalization

BLE stands for bias, level and equalization — the three most important electromagnetic properties of a recording tape. The Automatic BLE Tuning System in the CT-9R automatically adjusts each of these parameters so that the full potential of each and every tape may be realized. At the touch of a button, the built-in microprocessor quickly analyzes the properties of each tape and finely adjusts the deck electronics for a perfect match. The entire tuning process requires but eight seconds!

Bias, when optimized, means wider frequency response and minimum distortion. Optimized recording levels assure better Dolby tracking during recording and playback; noise reduction is achieved without any audible alteration in frequency response. Optimized recording equalization secures flat high-frequency response.

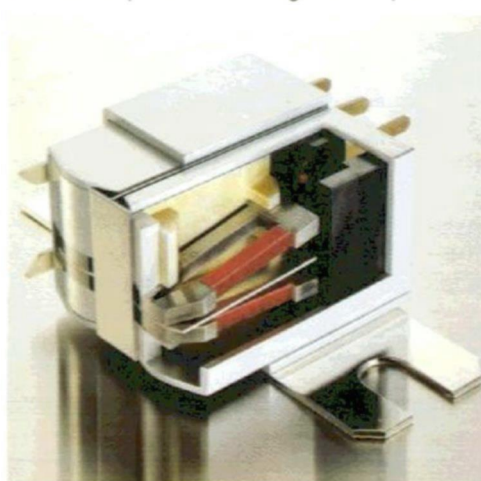
Unitized Ribbon Sendust Recording and Playback Heads provide off-tape monitoring

Metal tape has proved that the cassette tape is a true hi-fi format. With its high coercivity, recording music with exceptionally wide dynamic range is now possible, but the recording and play heads must be up to the task.

Of all the various head materials, sendust seems ideal since it provides high sensitivity and excellent wear characteristics. Yet its response characteristics are poor due to a phenomenon called core loss, caused by eddy currents.

We have overcome this one fault by developing a new manufacturing process called the "fast cooling method" that makes it possible for us to fashion fine "ribbons" of hard, brittle sendust. When laminated to form our Ribbon Sendust Head, they greatly reduce eddy currents. All in all, our Ribbon Sendust Heads offer superior recording response, especially at high frequencies, higher linearity, higher MOL (Maximum Output Level), high playback sensitivity, and high bias efficiency.

In the CT-9R two independent Ribbon Sendust Heads are used, one for recording and one for playback. They not only allow monitoring of a recording a split second after it has been recorded, but also, by being separate, they allow us to provide optimum gap widths for each, giving you low distortion and flat response to the highest frequencies.



Dolby* C-type noise reduction — for less noise and more music

"Hiss" — high-frequency noise — is particularly noticeable with cassette recordings because of the format's narrow dynamic range. Dolby C-type noise reduction, an updated version of the popular B type system, gives you, essentially, hiss-free recordings. Dynamic range has been expanded to unheard-of levels, fully comparable with the best audiophile recordings.

Dolby-C noise reduction provides twice as much noise reduction as standard Dolby-B noise reduction. Whereas B-type NR improves the signal-to-noise ratio by 10dB at 5kHz, the new C-type NR improves it by about 19dB at the same frequency.

Only mid and high frequencies are compressed (compressed and expanded), so breathing noise and noise modulation are unnoticeable unlike some other "linear" compander systems. Moreover, two special circuits — anti-saturation and spectral skewing circuits — prevent saturation-induced clipping and increase the MOL (Maximum Output Level) at high frequencies, thereby increasing high-frequency headroom.

All this means you can record just about any sounds you care to record, without worrying about dynamic range. It also means more natural transient attacks and clearer reproduction quality.

*'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Other features

Electronic 4-digit counter (tape/real-time), auto tape selector, LED bargraph display, one-touch recording, recording mute, timer-assisted record/play, wired remote control, MPX filter.

CT-8R AUTO-REVERSE, 3-MOTOR CASSETTE DECK

3-Motor Direct-Drive Transport for Accuracy, Ribbon Sendust Heads for Sound Performance, and a Host of Features for Convenient Operation



*Remote control unit JT-216 is optional.

CT-7R AUTO-REVERSE, 3-MOTOR CASSETTE DECK

Pioneer's Amazing Deck that Gives You Auto-Reverse Playback and Auto-Reverse Recording



*Remote control unit JT-216 is optional.

● Three-motor auto-reverse tape transport:

By utilizing three direct-drive motors, accuracy, high reliability and quick reverse action are yours. Blank Skip & Reverse is an extra bonus.

● **Auto BLE Tuning System:** Strikes an optimum balance between wide frequency response, low distortion, and flat response while recording on any tape.

● **Three-head design using Ribbon Sendust Heads:** A perfect match for metal tapes; off-the-tape monitor is possible.

● **Computer-Aided Convenience:** Included are Blank Search, Index Scan, Music Search/Skip and Music Repeat.

● **Dolby C-type noise reduction system:** Reduces noise by 19dB at critical high frequencies.

● **IC full-logic tape transport:** For comfortable touch operation and direct change of modes.

● **Other features:** Auto tape selector, LED bargraph display, one-touch recording, recording mute, timer-assisted record/play, wired remote control, MPX filter.

● Three-motor auto-reverse tape transport:

By utilizing three direct-drive motors, accuracy, high reliability and quick reverse action are yours. Blank Skip & Reverse is an extra bonus.

● **Two-head design — two erase heads and a Ribbon Sendust Record/Play head:** A perfect match for metal tapes.

● **Computer-Aided Convenience:** Included are Blank Search, Index Scan, Music Search/Skip and Music Repeat.

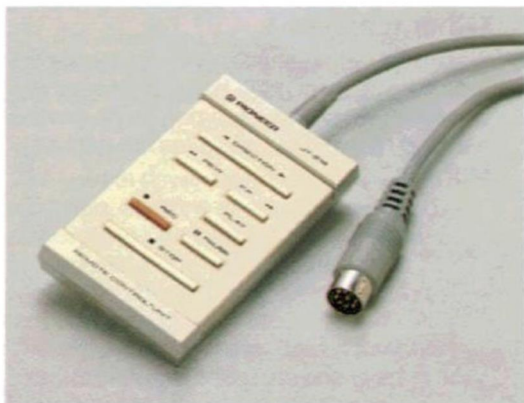
● **Dolby C-type noise reduction system:** Reduces noise by 19dB at critical high frequencies.

● **IC full-logic tape transport:** For comfortable touch operation and direct change of modes.

● **Other features:** Auto tape selector, LED bargraph display, one-touch recording, recording mute, timer-assisted record/play, wired remote control, MPX filter.

JT-216 REMOTE CONTROL UNIT

Operate any of Pioneer's auto-reverse cassette decks — CT-9R, CT-8R, CT-7R and CT-6R — from 5m away across the room. All tape control functions are duplicated.



CT-6R AUTO-REVERSE, 3-MOTOR CASSETTE DECK

A Full Auto-Reverse Cassette Deck That Gives You a 3-Motor Direct-Drive Transport and Pioneer's C.A.C. Conveniences



*Remote control unit JT-216 is optional.

- **Three-motor auto-reverse tape transport:**

By utilizing three direct-drive motors, accuracy, high reliability and quick reverse action are yours. Blank Skip & Reverse is an extra bonus.

- **Ribbon Sendust Head for record/play:** A perfect match for metal tapes.

- **Computer-Aided Convenience:** Included are Index Scan and Music Search/Skip.

- **Dolby C-type noise reduction system:** Reduces noise by 19dB at critical high frequencies.

- **IC full-logic tape transport:** For comfortable touch operation and direct change of modes.

- **Other features:** Auto tape selector, LED bargraph display, one-touch recording, recording mute, timer-assisted record/play, wired remote control, MPX filter.

CT-5 STEREO CASSETTE DECK

An Easy to Use Deck with Fine Performance and Sound



- **IC full-logic tape transport:**

For comfortable touch operation and direct change of modes.

- **Dolby C-type noise reduction system:** Reduces noise by 19dB at critical high frequencies.

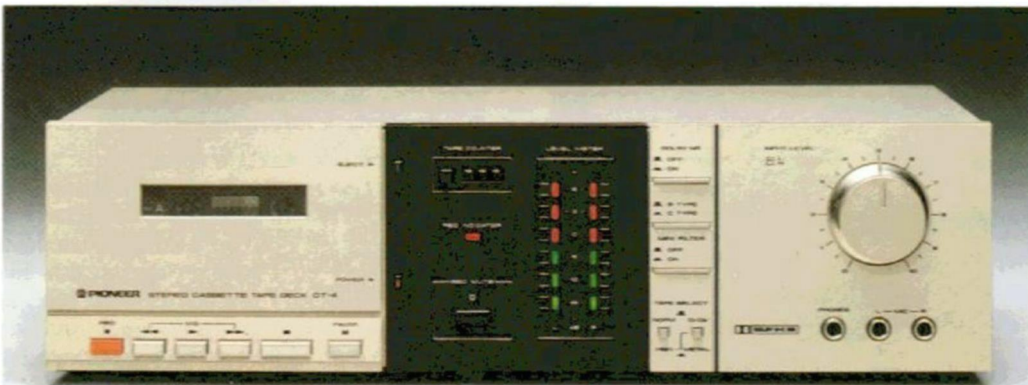
- **Music Search:** Lets you automatically go back to the beginning of the song currently playing, or jump ahead to the beginning of the next song.

- **One-touch recording:** Just a touch of the RECORD button is all that is necessary to start recording — a true convenience.

- **Other features:** Metal tape capability, 6-LED bargraph display, auto tape selector, recording mute, timer-assisted record/play, ALC automatic level control (defeatable), MPX filter.

CT-4 STEREO CASSETTE DECK

An Inexpensive Deck with Features Found Normally Only on Luxury Models



- **Soft-touch tape control:** Comfortable touch operation with positive feel.

- **Dolby C-type noise reduction system:** Reduces noise by 19dB at critical high frequencies.

- **Music Search:** Lets you automatically go back to the beginning of the song currently playing, or jump ahead to the beginning of the next song.

- **One-touch recording:** Just a touch of the RECORD button is all that is necessary to start recording — a true convenience.

- **Other features:** Metal tape capability, 6-LED bargraph display, recording mute, timer-assisted record/play, MPX filter.

TUNERS



F-9 QUARTZ-PLL DIGITAL SYNTHESIZER TUNER

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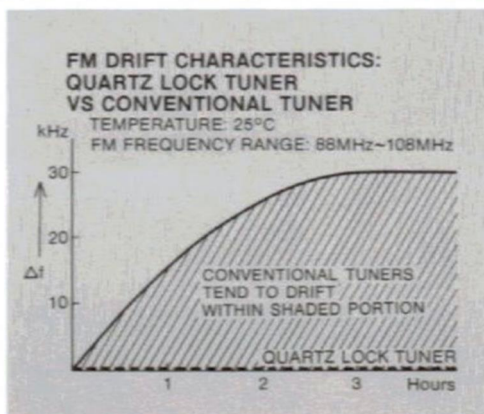
Pioneer Tuner Technology Reaches New Heights

High technology shouldn't be overly confusing — and Pioneer's F-9 FM/AM tuner featuring advanced, yet easy-to-use, technology is the proof. Controls and indicators include FM/AM IF bandwidth selectors, 6 FM/6 AM preset buttons, an auto/manual search selector, a multipath indicator, a digital frequency readout, and much more. Here are the details.

Quartz-PLL digital synthesizer tuning: Pinpoint accuracy and presets for 6 FM/6 AM stations

The FM/AM front end of the F-9 features an important technology — Quartz-PLL digital synthesizer tuning. It's Pioneer's answer to the problem of mistuning or "drift" that may occur due to a variety of reasons including varying temperature and humidity.

However, our Quartz-PLL tuning system offers even more than accuracy: preset tuning of up to six FM and six AM stations. Once you preset your favourite stations, you can recall each instantly at the touch of a button. Also possible is pushbutton electronic scan-tuning up and down the tuning band.



ID MOS FET front end: Interference-free reception and wide dynamic range

Often RF (Radio Frequency) intermodulation distortion is created in the front end and mixes with the sound you hear from the station you are listening to, limiting audible dynamic range and causing poor high-frequency response. The FM front end of the F-9 is essentially free of distortion, because it is push-pull configured using two Pioneer-exclusive ID (Ion-implantation Double-Diffusion) MOS FETs.

Direct-Through multiplex with Auto Pilot Canceller for higher fidelity

These are two technologies which, together, account for the high signal-to-noise ratio, low distortion and wide frequency range, reaching 15kHz, of the F-9.

F-7 QUARTZ-PLL DIGITAL SYNTHESIZER TUNER

The Slim Tuner That Puts All Your Favourite Stations Just a Touch Away



- **Quartz-PLL synthesizer tuning:** Drift-free reception for hours of hi-fi listening.
- **Presets for 6 FM and 6 AM stations:** Your favourite stations are only a touch away. Stations are always perfectly tuned each time they are recalled.
- **Single ended FM front end featuring ID MOS FET:** Interference-free reception assures truly hi-fi sound quality with wide dynamic range and extended highs.
- **Direct-Through multiplex demodulator:** Direct conversion of demodulated signals into audio means a higher signal-to-noise ratio and lower distortion.
- **Auto Pilot Canceller:** Extends high-frequency response to 15kHz.
- **Tuning conveniences:** Station/Manual Search for quick tuning-band scanning. 6 FM/6 AM Preset Buttons for instant tuning. Digital Frequency Readout in five digits. Record Level Check for accurate level calibration of your tape deck to assure low-distortion recordings. Station Frequency/Call Letter Indicators for easy station identification with user-changeable sheet.
- **Human-engineered front panel:** Logical layout assures error-free operation.

F-5L STEREO FM/MW/LW TUNER

A Low-Cost Digital Tuner with Unrivalled Performance



- **Advanced FM front end:** 3-gang variable capacitor, cascode-junction FET amp and high- f_t transistor together offer effective rejection of interference and assure clear reception.
- **Servo-Lock tuning:** A station's frequency locks onto the oscillator frequency for rock-steady reception hour after hour. This is a touch-sensitive automatic system, linked with the tuning knob.
- **2 ceramic filters in FM IF stage:** Improve selectivity and reduce phase distortion for higher fidelity.
- **PLL multiplex demodulator in IC:** Widens channel separation and reduces distortion. Peak performance is guaranteed independent of passage of time.
- **Digital frequency readout:** Shows you the frequency of a tuned station in five unambiguous digits.
- **3-LED signal strength indicator:** Shows when the FM or AM station is optimally tuned for lowest distortion.
- **Muting circuit:** Spells the end to irritating interstation noise.

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TURNTABLES



PL-L800 TANGENTIAL TRACKING TURNTABLE

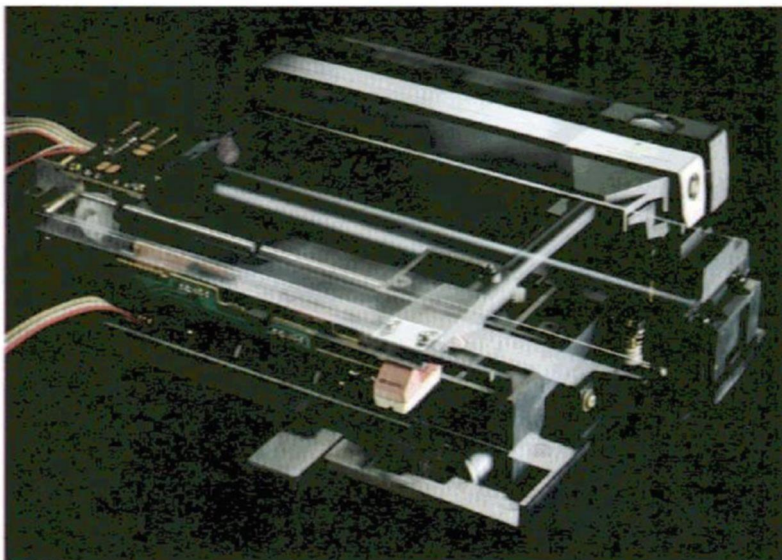
The Second-Generation Tangential Tracking Turntable with Fully Automatic Convenience

The PL-L800 is Pioneer's answer to the newest turntable format — the tangential tracking design. Unlike outwardly similar designs from other manufacturers, the PL-L800 uses a linear motor for horizontal arm movement, the reason why it boasts an ultra-high signal-to-noise ratio.

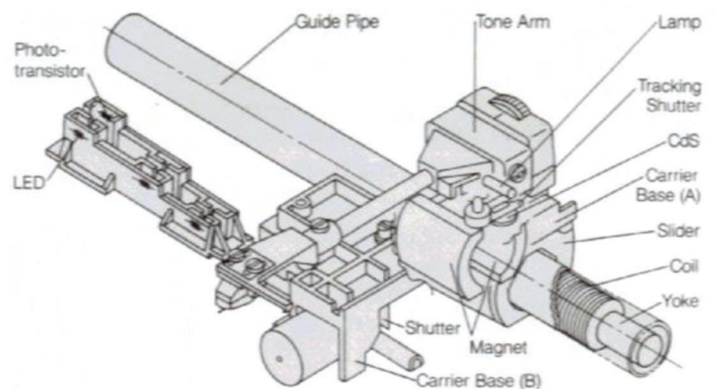
Tangential tracking reduces tracking error to practically zero

When a disc is cut on a master lathe the cutting head moves across the virgin lacquer in a straight line from the edge to the centre. It's evident then that the most

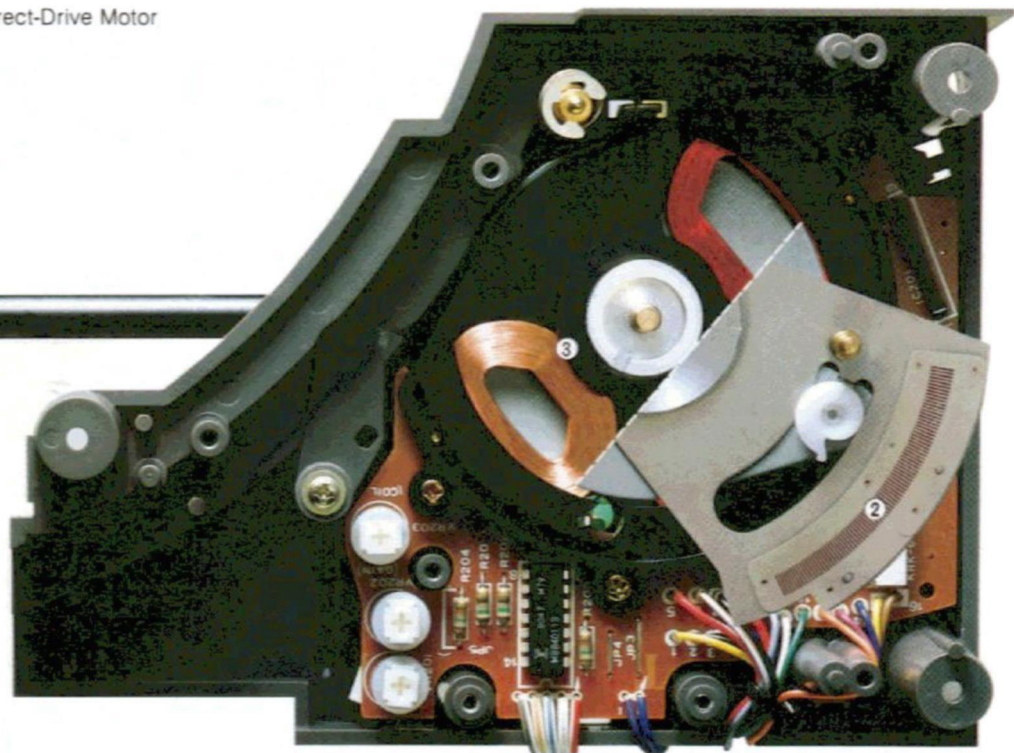
accurate way of recovering the information inscribed on the disc in this manner is with a stylus that tracks in a straight line — that is, one mounted on a tangential tracking arm. It reduces tracking error — common to all pivoted tone arms, however elaborate — to practically zero. And low tracking error



Structure of Direct-Induction Linear Motor



① Double Eye Sensor ② Address Sensor ③ Horizontal Direct-Drive Motor



Smooth, speedy automatic operation thanks to the direct-drive arm motor

Horizontal movement of the tone arm is quick and smooth thanks to two motors working in relay. As the arm comes forward over the record from its rest to begin playback, it is first driven at high speed by a DC motor up to the centre of the record, at which point a direct-drive arm motor takes over, bringing the tone arm further outward to the standby position above the record periphery.

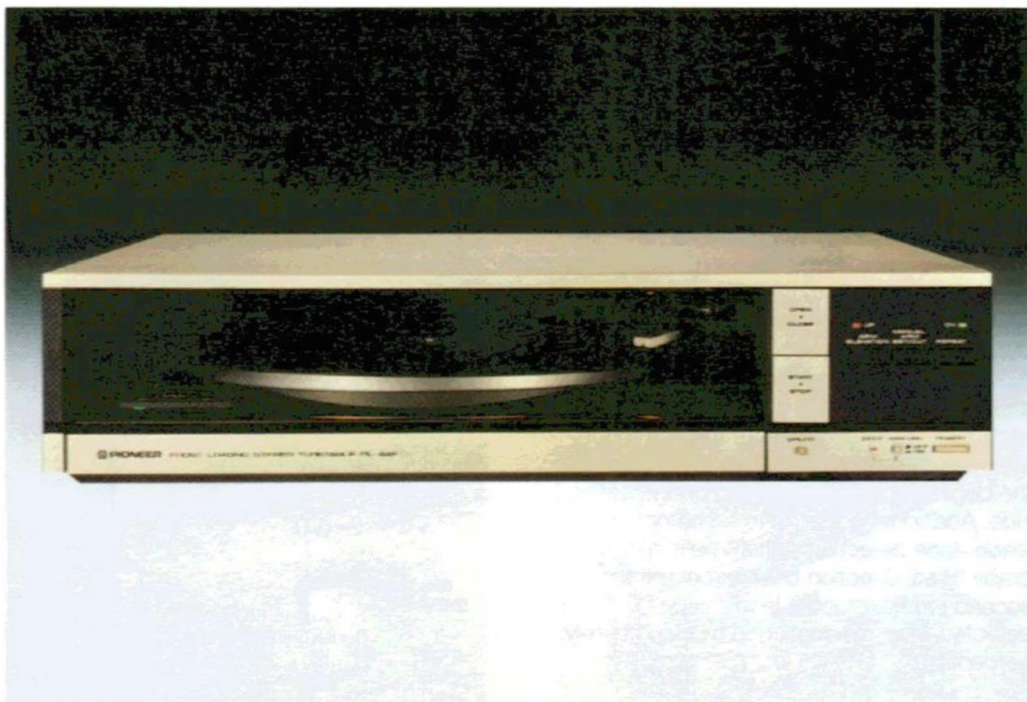
Coreless motor for high speed precision, Stable Hanging Rotor for higher platter stability

The motor used in the PL-88F is a coreless and slotless type in order to prevent wow and flutter due to "cogging." Platter rotation is always smooth. It also has a

responsive Quartz-PLL servo system that ensures high speed stability, even in the face of constantly changing loads applied to the platter (and the motor). The Stable Hanging Rotor improves stability even more, the reason the PL-88F exhibits wow and flutter as low as 0.012% (WRMS, directly measured from the FG output).

PL-44F FRONT-LOADING TURNTABLE

The Front-Loading Turntable that Thinks It's a Cassette Deck



The PL-44F is a turntable that is as easy to operate as a cassette deck: You can squeeze it into an audio rack between other components and operate it from the front. It's robustly built to sustain loads up to 40kg (88 lbs.). When you build a hi-fi system around it, you'll have a system that looks neat and well organized.

Operation is fully automatic and thoroughly dependable, while all touch-sensitive controls and the record loading slot are up front. REPEAT and DECK SYNCHRO, discussed in the PL-88F, are both available. Record size is automatically determined by a sensing mechanism for accurate cueing, protecting the stylus from damage. The end-of-play mechanism uses an advanced optical velocity detector.

In addition to hands-off automatic operation, the PL-44F features an advanced-technology precision platter drive system and a feedback-free cabinet design. The motor is our belt-drive DC-servo motor with Stable Hanging Rotor, providing low wow and flutter of 0.045% (WRMS). And every PL-44F comes with a high-output moving-coil cartridge with user replaceable stylus.

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SPEAKER SYSTEMS

PG
POLYMER GRAPHITE



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HPM-1100 BASS-REFLEX FLOOR STANDING 4-WAY SPEAKER SYSTEM WITH 40cm WOOFER

New PCM Digital Recordings Have Met Their Match

Today we are on the threshold of one of the most exciting advances in audio history — the digital revolution. PCM (Pulse-Code Modulation) digital recordings and audiophile direct-to-disc recordings are already on the market, each providing vastly improved fidelity with wide dynamic range and low distortion. They have met their match in the form of the PG (Polymer Graphite)* diaphragms used in our top-of-the-line HPM-1100.

(*Polymer Graphite and PG are trademarks of Pioneer.)

Polymer Graphite for the PCM age

Polymer Graphite ("PG" for short) is a new substance that Pioneer engineers discovered in their search for a superior material to utilize in the construction of speaker cone diaphragms. PG is a chemical compound consisting of microscopic crystal-line graphite particles, produced through a chemical vapour deposition process and bonded by a special polymer agent. Graphite is nearly as hard as diamond, the reason why it has been used in rocket nozzles and satellite radiation shields by NASA. But

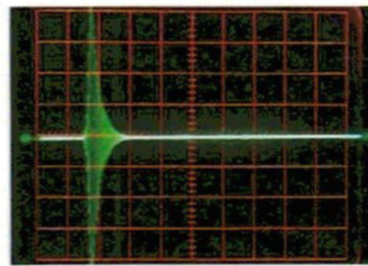
Pioneer was the first to discover that its amazing physical properties make it also an ideal material for speaker diaphragms.

● **Polymer Graphite has ideal properties for a diaphragm material — low density, high Young's modulus, high internal loss.**

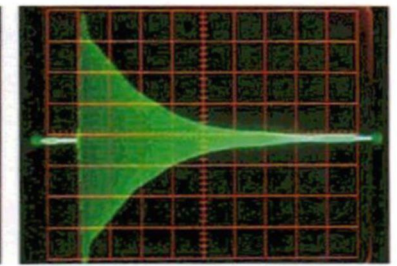
Polymer Graphite is low in density, high in Young's modulus and high in internal loss. Let us take a look at what these properties mean to your music.

Low density — It means high efficiency and better transient response for linear

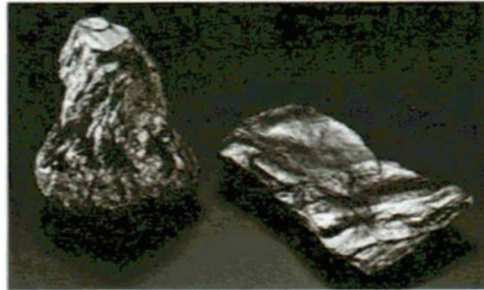
Material	Young's Modulus (E) N/m ²	Density (ρ) kg/m ³	Sonic Speed ($\sqrt{E/\rho}$) m/sec.	Internal Loss tand
Polymer Graphite	7.0×10^{10}	1.8×10^3	6.2×10^3	0.05
Aluminium	7.0×10^{10}	2.7×10^3	5.1×10^3	0.002
Titanium	11.0×10^{10}	4.5×10^3	4.9×10^3	0.002
Paper	0.2×10^{10}	0.5×10^3	2.0×10^3	0.05



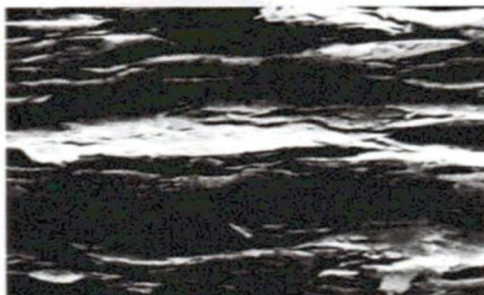
Transient Response of Polymer Graphite



Transient Response of Aluminium



Graphite Block



Microscopic View of Polymer Graphite

reproduction over a wide amplitude range.

High Young's modulus — It means the material is firm and rigid. Since PG has low density too, sonic speed is fast; in other words, high-frequency response is improved and harmonic distortion is reduced.

High internal loss — This means the material is less subject to "doubling" (split vibrations). The result is flatter frequency response with fewer dips and peaks. Coloration is kept to a minimum.

In summary, as a diaphragm material, PG is much better than common paper, aluminium, titanium, beryllium or boron. For instance, its sonic speed is 1.2 times that of aluminium or titanium, and 3.1 times that of paper (this means better high-frequency response and less harmonic distortion). Moreover, it can be easily pressed into nearly any shape, size or thickness — any diaphragm from a giant woofer to a small tweeter is possible. PG also withstands high humidity and temperature remarkably well, retaining its original dimensions and mechanical strength over long periods of use.

● Proof of PG's superiority

Let us look at actual proof of the superiority of PG. Data is based on a test of our 40cm (15-3/4-inch) PG woofer.

Low distortion at high output. Distortion is typically less than 0.03% at 90dB sound pressure level.

Wide dynamic range. A high sound pressure level of an ear-piercing 115dB is achieved at a total harmonic distortion level of 0.3%. This characteristic makes PG an ideal mate for PCM recordings.

Superb transient response. As can be seen from the accompanying oscilloscope

photos, PG demonstrates excellent transient response.

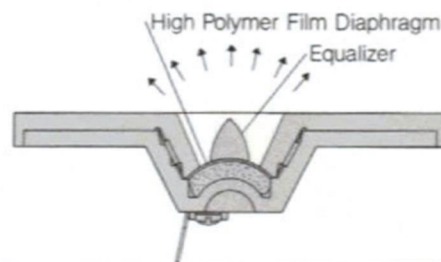
Helping us further improve every aspect of PG performance are the latest optical measuring systems like the laser holographic technique and the laser Doppler vibrometer.

Woofer, midrange and tweeter all use PG diaphragms in the HPM-1100

All diaphragms except the supertweeter in the HPM-1100 are made of PG diaphragms. In the 40cm (15-3/4-inch) woofer, superb transient response and flat, smooth overall response are coupled with high efficiency and high input power capacity. By itself, the woofer is able to handle an extra-high input of 250 watts at low distortion. This gives it the ability to generate bone-shaking bass for exceptional realism.



Cross Section of Newly-Designed High Polymer Supertweeter



The midrange uses a 12cm (4-3/4-inch) PG cone. One consideration in designing the unit was the accurate reproduction of vocals, free of all traces of nasality. Finally, the tweeter uses a 4.5cm (1-3/4-inch) PG diaphragm. Frequencies up to 50,000Hz are reproduced flat and accurately.

High Polymer supertweeter extends frequency response beyond the audible limit

The super high frequencies beyond the top of the audible range are reproduced with minimal distortion by Pioneer's HP (High Polymer) film supertweeter. You may argue that you can't hear frequencies above 20,000Hz, but the reason for extending the frequency response far above the limits of human hearing is to assure ruler-flat response and lower distortion within the *audible* range. The HPM supertweeter offers the following advantages.

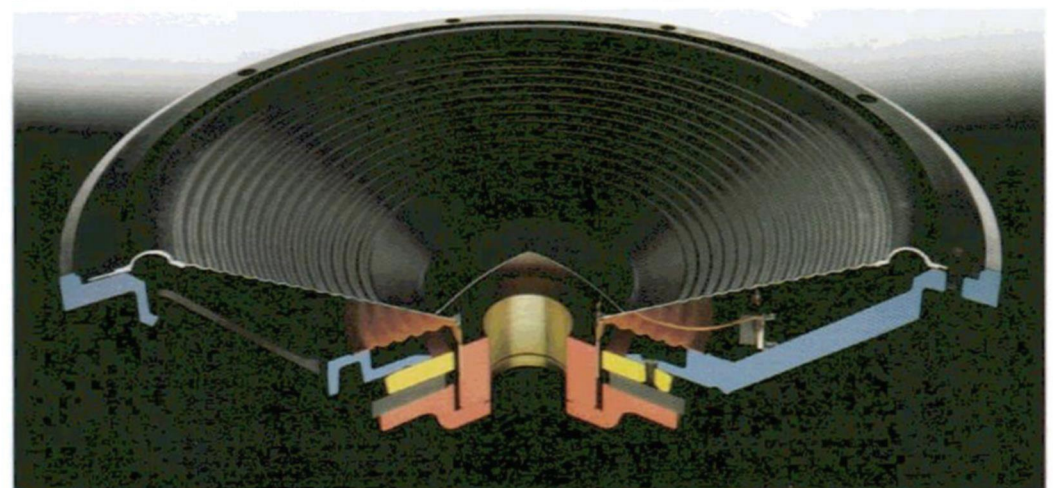
1) Its semicylindrical form provides wide 180-degree sound distribution coverage; eliminated is beaming, a phenomenon common to all conventional high-frequency drivers, be they cone, dome or horn.

2) Its ultra-thin film diaphragm vibrates in a "breathing motion" over its entire surface for uniform phase response.

3) Because it's light and firm, transient response is admirable, and harmonic distortion is extremely low. Sound is crisp and clean.

4) It has a high input power handling capability.

As a final touch, the unit is coupled with a horn for efficient radiation of generated sound waves, and fitted with an acoustic equalizer to prevent phase disturbances and assure clean sonic images. In the HPM-1100, two HPM supertweeters are connected in parallel to further increase power handling capacity and improve dispersion characteristics.





HPM-900

BASS-REFLEX 4-WAY BOOKSHELF SPEAKER SYSTEM WITH 30cm WOOFER

Pioneer's Best Bookshelf Speaker System

- **Pioneer's newly-developed PG cone diaphragms:**

30cm (12-inch) PG cone woofer provides rich bass with fast transient response, and flat, smooth output over a wide power range.

10cm (4-inch) PG midrange gives natural presence, free of any trace of nasality. Low distortion and superb transient response are combined.

4.5cm (1-3/4-inch) PG tweeter with improved transient response and low distortion.

- **Horn-loaded HP supertweeter:** Adds one more octave to your music for greater high frequency realism.

- **Compact bookshelf design:** Easy to mount, easy to move.

- **Level controls for mids and lows:** Let you match speaker response with the acoustics of your room.

- **Attractive simulated walnut-grain finish:** Lets the system blend with any room decor.

- **Wide frequency response, 30Hz to 50,000Hz;** high power capability, 200 watts maximum.

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HPM-700

BASS-REFLEX 4-WAY BOOKSHELF SPEAKER SYSTEM WITH 25cm WOOFER

Wide-Range Compact Bookshelf Speaker System

- **Pioneer's newly-developed PG cone diaphragms:**

25cm (10-inch) PG cone woofer provides rich bass with fast transient response, and flat, smooth output over a wide power range.

10cm (4-inch) PG midrange gives natural presence, free of any trace of nasality. Low distortion and superb transient response are combined.

4.5cm (1-3/4-inch) PG tweeter with improved transient response and low distortion.

- **Horn-loaded HP supertweeter:** Adds one more octave to your music for greater high frequency realism.

- **Compact bookshelf design:** Easy to mount, easy to move.

- **Attractive simulated walnut-grain finish:** Lets the system blend with any room decor.

- **Wide frequency response, 35Hz to 50,000Hz;** high power capability, 120 watts maximum.

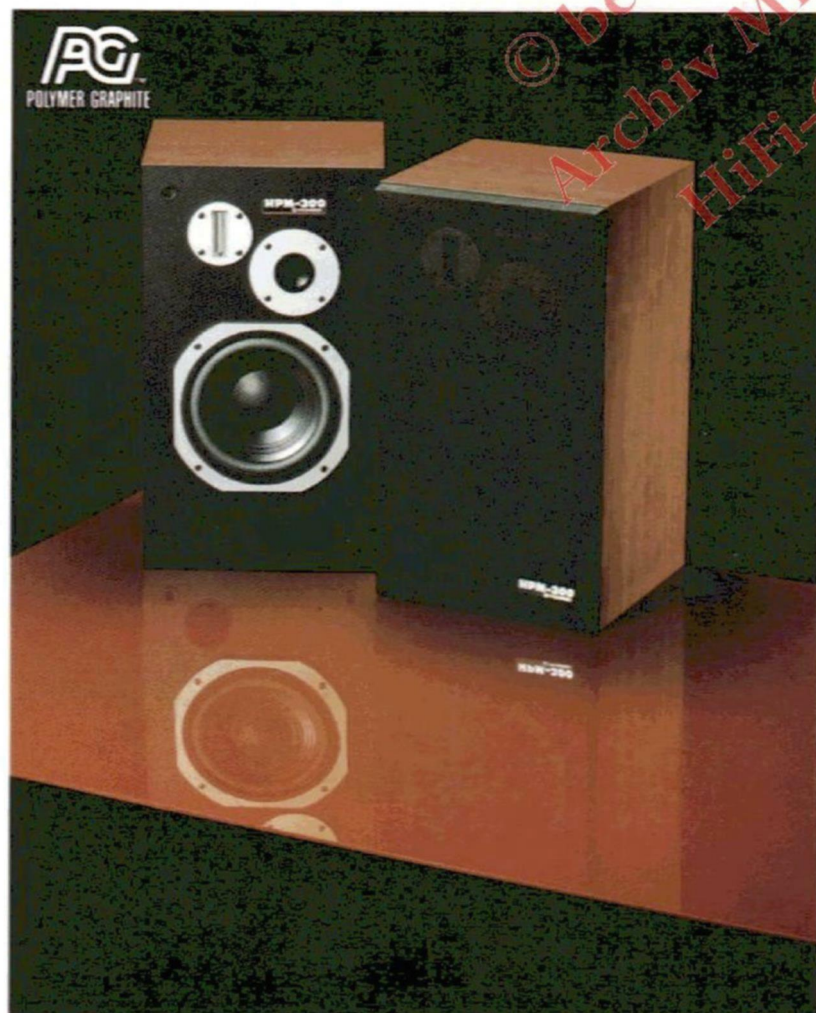


HPM-500

BASS-REFLEX 3-WAY BOOKSHELF SPEAKER SYSTEM WITH 25cm WOOFER

The Technology of PG Cones in a Compact Bookshelf System

- **Pioneer's newly-developed PG cone diaphragms:**
 25cm (10-inch) PG cone woofer provides rich bass with fast transient response, and flat, smooth output over a wide power range.
 4.5cm (1-3/4-inch) PG tweeter with improved transient response and low distortion. A wide-range unit, it covers the important midrange for natural presence.
- **Horn-loaded HP supertweeter:** Adds one more octave to your music for greater high frequency realism.
- **Compact bookshelf design:** Easy to mount, easy to move.
- **Attractive simulated walnut-grain finish:** Lets the system blend with any room decor.
- **Wide frequency response, 35Hz to 50,000Hz;** comfortable power capability, 80 watts maximum.



HPM-300

BASS-REFLEX 3-WAY BOOKSHELF SPEAKER SYSTEM WITH 20cm WOOFER

The Lowest-Priced PG Cone Speaker System from Pioneer

- **Pioneer's newly-developed PG cone diaphragms:**
 20cm (8-inch) PG cone woofer provides rich bass with fast transient response, and flat, smooth output over a wide power range.
 4.5cm (1-3/4-inch) PG tweeter with improved transient response and low distortion. A wide-range unit, it covers the important midrange for natural presence.
- **Horn-loaded HP supertweeter:** Adds one more octave to your music for greater high frequency realism.
- **Compact bookshelf design:** Easy to mount, easy to move.
- **Attractive simulated walnut-grain finish:** Lets the system blend with any room decor.
- **Wide frequency response, 40Hz to 50,000Hz;** comfortable power capability, 60 watts maximum.

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ADD-ON EQUIPMENT

Add-on Components — There's More to Satisfying Sound Than You Think

Your stereo system may do a very good job of reproducing the music you put into it. But that's not all there is to accurate, satisfying sound. The dimensions and furnishing of your listening room can do unpredictable things to sound quality. Also, the dynamic range of most of the music you listen to has been narrowed to accommodate the various music-carrying media — records, tapes and radio.

Pioneer attacks these problems with a series of extremely versatile add-on components. The SG-9 graphic equalizer compensates for any idiosyncrasies in the listening room and acts as highly selective filters to eliminate annoying tape hiss and record rumble. The RG-9 dynamic processor restores the original dynamic range of music from any source by emphasizing loud passages and lowering soft passages. The SR-9 reverberation amp restores another quality missing from most recorded music — the "spaciousness" of live music played in a concert hall. By themselves, or in combination, these components give you more versatility and realism than you ever thought possible for both playback and recording.



RG-9
SR-9
SG-9

SG-9

TWELVE-BAND GRAPHIC EQUALIZER

"The Frequency Flattener"
Lets You Achieve Flat Response
— in any Listening Room

- **One-octave equalizer:** Twelve controls per channel — covering a range from 16Hz to 32kHz — gives you complete tonal versatility. Levels may be adjusted up to ± 10 dB, with click-stops every 2dB.
- **LED-lit slide controls:** Graphically show the overall "shape" of the equalization curve.
- **Equalizer recording:** Equalized sound can be recorded on a connected tape deck.
- **Two input attenuator switches:** Avoid overloading circuits by reducing input sensitivity when the level is too high.
- **Tape monitor switch:** Lets you connect and hear a tape deck.
- **Low-noise, low-distortion circuitry:** You can add an SG-9 to your hi-fi system with assurance that it improves, not degrades, overall sound quality.

SR-9

REVERBERATION AMPLIFIER

"The Ambience Restorer" Puts Life Back Into Your Music

- **Reverberation time control:** Gives you reverb time variable from 0 to 3 seconds.
Echo (Effect 1) — Pushing the control provides an echo effect, turning your listening room into a large concert hall.
Duet (Effect 2) — Pulling the control gives a duet effect, making a solo singer sound like a duet.
- **Depth control:** Adjusts the depth of reverberation. At the minimum position, you hear only the original sound.
- **Bucket Brigade IC:** Makes the unit immune to acoustic feedback, a problem that plagues mechanically-operated reverb amps.
- **Time/depth display:** Displays the amount of reverb as a pleasing visual effect.
- **Reverb recording:** Allows you to record music with reverb added.

RG-9

DYNAMIC PROCESSOR

"The Compression Fighter"
Adds Depth to Your Music

- **Dynamic expansion control:** Enables you to expand the dynamic range in 3dB steps over a 4 to 16dB range, restoring the dynamic peaks and valleys of the original performance.
- **Precision level indicator:** Monitors the effect of dynamic expansion with superb precision and responsiveness.
- **Noise reduction:** Loud passages are made louder, soft passages are made softer. Unlike a "two-way" noise reduction system like Dolby NR, the RG-9 is a one-way design, capable of reducing noise in any programme material.
- **Top-notch specifications:** You can patch the unit in the tape loop of your amp or receiver, with full assurance that it improves, not degrades, overall sound.

SPECIFICATIONS

Amplifiers

	A-9	A-8	A-7	A-6
POWER AMPLIFIER SECTION				
Continuous Power Output 20Hz to 20,000Hz:	110W + 110W (T.H.D. 0.003%, 8 ohms)	90W + 90W (T.H.D. 0.005%, 8 ohms)	70W + 70W (T.H.D. 0.007%, 8 ohms)	60W + 60W (T.H.D. 0.008%, 8 ohms)
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)
1,000Hz (DIN):	140W + 140W (8 ohms)	100W + 100W (8 ohms)	85W + 85W (8 ohms)	75W + 75W (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: Headphones:	A, B, A + B (4—16 ohms) Low impedance	A, B, A + B (6—16 ohms) Low impedance	A, B, A + B (6—16 ohms) Low impedance	A, B, A + B (6—16 ohms) 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
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: TAPE REC 2:	150mV/2.2k ohms 150mV/2.2k ohms	150mV/2.7k ohms 150mV/2.7k ohms	150mV/2.7k ohms 150mV/2.7k ohms	150mV/2.7k ohms 150mV/2.7k ohms
Frequency Response PHONO (RIAA Equalization): TUNER, AUX, TAPE:	20 to 20,000Hz ±0.2dB (MM) 5 to 200,000Hz 0dB, -3dB	20 to 20,000Hz ±0.2dB (MM) 5 to 200,000Hz 0dB, -3dB	20 to 20,000Hz ±0.3dB (MM) 5 to 200,000Hz 0dB, -3dB	20 to 20,000Hz ±0.2dB (MM) 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: -40dB position)	+6dB (100Hz), +3dB (10kHz)	+9dB (100Hz), +3dB (10kHz)	+9dB (100Hz), +3dB (10kHz)	+6dB (100Hz), +3dB (10kHz)
Hum and Noise (IHF, A-network) PHONO: TUNER, AUX, TAPE:	90dB (MM), 74dB (MC) 110dB	90dB (MM), 72dB (MC) 110dB	88dB (MM), 70dB (MC) 110dB	86dB (MM), 70dB (MC) 100dB
Hum and Noise (DIN; continuous rated power output/50mW) PHONO: TUNER, AUX, TAPE:	80dB/68dB (MM), 75dB/70dB (MC) 95dB/70dB	80dB/66dB (MM), 71dB/65dB (MC) 95dB/69dB	80dB/66dB (MM), 70dB/65dB (MC) 95dB/69dB	80dB/66dB (MM), 70dB/65dB (MC) 95dB/69dB
Muting:	-20dB	-20dB	-20dB	-20dB
MISCELLANEOUS				
Power Requirements:	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz
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 (W × H × D): (without package)	420 × 150 × 443 mm 16-9/16 × 5-7/8 × 17-7/16 inches	420 × 132 × 423 mm 16-9/16 × 5-3/16 × 16-5/8 inches	420 × 132 × 423 mm 16-9/16 × 5-3/16 × 16-5/8 inches	420 × 98 × 367 mm 16-9/16 × 3-7/8 × 14-7/16 inches
Weight (without package):	16kg/35 lbs. 4 oz.	13.8kg/30 lbs. 7 oz.	12.2kg/26 lbs. 14 oz.	7.0kg/15 lbs. 7 oz.

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Tuners

A-5	F-9	F-7	F-5L
FM SECTION (87.5 — 108MHz)			
35W + 35W (T.H.D. 0.009%, 8 ohms) 40W + 40W (T.H.D. 0.005%, 8 ohms) 45W + 45W (8 ohms)	Usable Sensitivity (Mono): 10.8dBf (0.95µV, 75 ohms)	10.8dBf (0.95µV, 75 ohms)	10.8dBf (0.95µV, 75 ohms)
No more than 0.009% (continuous rated power output) No more than 0.007% (17.5 watts per channel power output)	50dB Quieting Sensitivity Mono: 15.0dBf (1.55µV, 75 ohms) Stereo: 37.0dBf (19.5µV, 75 ohms)	16.0dBf (1.7µV, 75 ohms) 37.2dBf (19.9µV, 75 ohms)	17.3dBf (2.0µV, 75 ohms) 39.2dBf (25µV, 75 ohms)
No more than 0.007% (continuous rated power output) No more than 0.005% (17.5 watts per channel power output)	Sensitivity (DIN) Mono (26dB S/N, 75 ohms): 0.75µV (Wide), 0.55µV (Narrow) Stereo (46dB S/N, 75 ohms): 19.3µV	0.75µV 19.9µV	0.75µV 19.9µV
A, B, A + B (6—16 ohms) Low impedance	Signal-to-Noise Ratio Mono/Stereo (IHF; at 85dBf): 90dB/85dB Mono/Stereo (DIN; at 85dBf): 77dB/71dB	85dB/80dB 75dB/67dB	75dB/70dB 74dB/66dB
50	Distortion (at 85dBf, Wide) 100Hz (Mono/Stereo): 0.03%/0.05% 1kHz (Mono/Stereo): 0.03%/0.05% 10kHz (Mono/Stereo): 0.03%/0.1%	0.06%/0.08% 0.06%/0.08% 0.1%/0.25%	0.1%/0.2% 0.1%/0.2% 0.2%/0.5%
2.5mV/50k ohms	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
— 150mV/50k ohms 150mV/50k ohms 150mV/50k ohms 150mV/50k ohms	Capture Ratio: 1.0dB (Wide), 2.5dB (Narrow)	1.0dB	1.0dB
140mV (T.H.D. 0.004%, 1kHz)	Alternate Channel Selectivity 400kHz: 40dB (Wide), 85dB (Narrow) 300kHz: 60dB (Narrow)	60dB —	60dB —
150mV/2.7k ohms 150mV/2.7k ohms	Spurious Response Ratio: 80dB	70dB	70dB
20 to 20,000Hz ±0.5dB 5 to 200,000Hz 0dB, -3dB	Image Response Ratio: 70dB	55dB	50dB
±8dB (100Hz)	IF Response Ratio: 100dB	90dB	80dB
±8dB (10kHz)	AM Suppression Ratio: 65dB	60dB	50dB
— +6dB (100Hz), +3dB (10kHz)	Muting Threshold: 25.2dBf (5µV)	25.2dBf (5µV)	19.2dBf (2.5µV)
70dB 100dB	Stereo Separation 1kHz: 55dB/40dB (Wide/Narrow) 50Hz to 10kHz: 48dB (Wide)	50dB 40dB	40dB 30dB
72dB/64dB	Subcarrier Product Ratio: 70dB	55dB	55dB
95dB/69dB	Aerial Input: 300 ohms balanced, 15 ohms unbalanced	300 ohms balanced, 75 ohms unbalanced	300 ohms balanced, 75 ohms unbalanced
-20dB	AM SECTION		
220/240V (switchable) 50Hz	MW (Medium Wave) Section (525 — 1,605kHz)		
180 watts (UL), 260 watts (max.)	Sensitivity IHF, ferrite aerial: 300µV/m IHF, external aerial: 15µV	300µV/m 15µV	300µV/m 15µV
420 × 98 × 367 mm 16-9/16 × 3-7/8 × 14-15/16 inches	Selectivity: 10dB/50dB (Wide/Narrow)	30dB	30dB
6.5kg/14 lbs. 5 oz.	Signal-to-Noise Ratio: 50dB	50dB	50dB
	Image Response Ratio: 60dB	30dB	30dB
	IF Response Ratio: 80dB	65dB	65dB
	Aerial: Ferrite loopstick aerial	Ferrite loopstick aerial	Ferrite loopstick aerial (MW & LW)
	LW (Long Wave) Section (150 — 350kHz)		
	Sensitivity IHF, ferrite aerial: — IHF, external aerial: —	— —	450µV/m 40µV
	Selectivity: —	—	30dB
	Signal-to-Noise Ratio: —	—	50dB
	Image Response Ratio: —	—	30dB
	IF Response Ratio: —	—	65dB
	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 Requirements: 220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz
	Power Consumption: 17 watts	15 watts	10 watts
	Dimensions (W × H × D): (without package) 420 × 60 × 380 mm 16-9/16 × 2-3/8 × 14-15/16 inches	420 × 60 × 380 mm 16-9/16 × 2-3/8 × 14-15/16 inches	420 × 60 × 380 mm 16-9/16 × 2-3/8 × 14-15/16 inches
	Weight (without package): 4.5kg/9 lbs. 15 oz.	4.5kg/9 lbs. 15 oz.	4.5kg/9 lbs. 15 oz.

Cassette Tape Decks

	CT-9R	CT-8R	CT-7R
Type:	4-track, 2-channel recording and auto-reverse playback stereo cassette tape deck	4-track, 2-channel recording and auto-reverse playback stereo cassette tape deck	4-track, 2-channel auto-reverse recording and playback stereo cassette tape deck
Motors:	Quartz-PLL direct-drive motor for capstan drive, Two direct-drive brushless DC Hall-motors for each reel drive (play, fast forward and rewind)	Direct-drive brushless DC Hall-motor for capstan drive, Two direct-drive brushless DC Hall-motors for each reel drive (play, fast forward and rewind)	Direct-drive brushless DC Hall-motor for capstan drive, Two direct-drive brushless DC Hall-motors for each reel drive (play, fast forward and rewind)
Heads:	"Ribbon Sendust" recording/playback combination head (swivels to allow tape playback in both directions), "Small-Window" erasing head x 1	"Ribbon Sendust" recording/playback combination head (swivels to allow tape playback in both directions), "Small-Window" erasing head x 1	"Ribbon Sendust" recording/playback head x 1 (swivels to allow tape recording and playback in both directions), "Small-Window" erasing head x 2
Fast Winding Time (C-60 tape):	Within 90 seconds	Within 90 seconds	Within 90 seconds
Wow and Flutter (WRMS): (DIN):	No more than 0.04% Within $\pm 0.16\%$	No more than 0.045% Within $\pm 0.16\%$	No more than 0.045% Within $\pm 0.16\%$
Frequency Response			
Normal tape (-20dB):	20 to 18,000Hz (25 to 15,000Hz ± 3 dB)	20 to 18,000Hz (25 to 15,000Hz ± 3 dB)	20 to 15,000Hz (30 to 13,000Hz ± 3 dB)
Chrome tape (-20dB):	20 to 19,000Hz (25 to 17,000Hz ± 3 dB)	20 to 19,000Hz (25 to 17,000Hz ± 3 dB)	20 to 18,000Hz (30 to 16,000Hz ± 3 dB)
(0dB):	25 to 10,000Hz (Dolby C on)	25 to 10,000Hz (Dolby C on)	25 to 9,000Hz (Dolby C on)
Metal tape (-20dB):	20 to 19,000Hz (25 to 18,000Hz ± 3 dB)	20 to 19,000Hz (25 to 18,000Hz ± 3 dB)	20 to 18,000Hz (25 to 17,000Hz ± 3 dB)
(0dB):	25 to 15,000Hz (Dolby C on)	25 to 15,000Hz (Dolby C on)	25 to 14,000Hz (Dolby C on)
Signal-to-Noise Ratio (Dolby Off):	More than 58dB*	More than 58dB*	More than 58dB*
Harmonic Distortion (0dB):	No more than 1.0%	No more than 1.0%	No more than 1.2%
Inputs (Sensitivity/Maximum allowable input/Impedance)			
MIC (6mm jacks x 2): (Reference MIC impedance):	0.3mV/50mV/10k ohms (250 ohms to 10k ohms)	0.3mV/50mV/10k ohms (250 ohms to 10k ohms)	0.3mV/30mV/12k ohms (250 ohms to 10k ohms)
LINE (pin jacks x 2):	65mV/25V/120k ohms	65mV/25V/120k ohms	50mV/25V/100k ohms
Outputs			
LINE (pin jacks x 2): (Reference level/Load impedance): (Maximum level/Load impedance):	500mV/50k ohms	500mV/50k ohms	450mV/50k ohms
HEADPHONES (6mm stereo jack x 1):	60mV/8 ohms	60mV/8 ohms	60mV/8 ohms
Power Requirements:	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz
Power Consumption:	45 watts	45 watts	45 watts
Dimensions (W x H x D) (without package):	420 x 130 x 320 mm 16-9/16 x 5-1/8 x 12-5/8 inches	420 x 130 x 320 mm 16-9/16 x 5-1/8 x 12-5/8 inches	420 x 99.5 x 270 mm 16-9/16 x 3-15/16 x 10-5/8 inches
Weight (without package):	6.5kg/14 lbs. 5 oz.	6.5kg/14 lbs. 5 oz.	5.3kg/11 lbs. 11 oz.
Features:	<ul style="list-style-type: none"> • Auto BLE (Bias, Level & EQ.) tuning system • Dolby B/C (switchable) NR system with LED indicators • Computer-Aided Convenience (Music Search/Blank Skip and Reverse/Index Scan/Music Repeat/Blank Search) • Quick Auto-Reverse playback mechanism • Electronic 4-digit tape counter (Tape counter/Real time remaining tape counter) • Remote control capability • LED display peak meters (-30dB to +10dB) • Timer aided recording/playback device • One-touch recording device • Auto-Tape Selector (METAL/CrO₂/NORM) • REC Mute with LED indicator • Rear illumination for checking amount of tape • Output level control 	<ul style="list-style-type: none"> • Auto BLE (Bias, Level & EQ.) tuning system • Dolby B/C (switchable) NR system with LED indicators • Computer-Aided Convenience (Music Search/Blank Skip and Reverse/Index Scan/Music Repeat/Blank Search) • Quick Auto-Reverse playback mechanism • Remote control capability • LED display peak meters (-20dB to +8dB) • Timer aided recording/playback device • One-touch recording device • Auto-Tape Selector (METAL/CrO₂/NORM) • REC Mute with LED indicator • Rear illumination for checking amount of tape • Output level control 	<ul style="list-style-type: none"> • Dolby B/C (switchable) NR system with LED indicators • Computer-Aided Convenience (Music Search/Blank Skip and Reverse/Index Scan/Music Repeat/Blank Search) • Quick Auto-Reverse recording/playback mechanism • Remote control capability • LED display peak meters (-20dB to +6dB) • Timer aided recording/playback device • One-touch recording device • Auto-Tape Selector (METAL/CrO₂/NORM) • REC Mute with LED indicator • Rear illumination for checking amount of tape

*S/N is improved by 10dB with Dolby B, and by 19dB with Dolby C (except CT-3), both at 5kHz.

Speaker Systems

	HPM-1100	HPM-900	HPM-700
Enclosure:	Bass-reflex floor type	Bass-reflex bookshelf type	Bass-reflex bookshelf type
Speakers			
Woofer:	40cm (15-3/4-inch) PG cone type	30cm (12-inch) PG cone type	25cm (10-inch) PG cone type
Midrange:	12cm (4-3/4-inch) PG cone type	10cm (4-inch) PG cone type	10cm (4-inch) PG cone type
Tweeter:	4.5cm (1-3/4-inch) PG cone type	4.5cm (1-3/4-inch) PG cone type	4.5cm (1-3/4-inch) PG cone type
Supertweeter:	Horn-loaded double-drive High Polymer Film type	Horn-loaded High Polymer Film type	Horn-loaded High Polymer Film type
Impedance:	6.3 ohms	8 ohms	8 ohms
Frequency Range:	25 to 50,000Hz	30 to 50,000Hz	35 to 50,000Hz
Sensitivity (at 1m distance):	92.5dB/W	92.5dB/W	92.5dB/W
Operation Power to get 96dB SPL at 1m distance (DIN):	2.1 watts	2.1 watts	2.1 watts
Maximum Input Power:	250 watts	200 watts	120 watts
Nominal Input Power:	125 watts	100 watts	60 watts
Amplifier Power Range* (recommended):	50 to 300 watts	50 to 270 watts	30 to 150 watts
Crossover Frequencies:	850Hz (Low-Mid) 2,000Hz (Mid-High) 16,000Hz (High-Superhigh)	2,500Hz (Low-Mid) 5,500Hz (Mid-High) 16,000Hz (High-Superhigh)	1,700Hz (Low-Mid) 3,000Hz (Mid-High) 16,000Hz (High-Superhigh)
Dimensions (W x H x D): (without package):	500 x 910 x 358 mm 19-11/16 x 35-13/16 x 14-1/8 inches	390 x 670 x 393 mm 15-3/8 x 26-3/8 x 15-1/2 inches	350 x 610 x 321 mm 13-3/4 x 24 x 12-5/8 inches
Weight (without package):	31.8kg/70 lbs. 1 oz.	23.4kg/51 lbs. 9 oz.	14.7kg/32 lbs. 7 oz.

CT-6R	CT-5	CT-4	CT-3
4-track, 2-channel recording and auto-reverse playback stereo cassette tape deck	4-track, 2-channel recording and playback stereo cassette tape deck	4-track, 2-channel recording and playback stereo cassette tape deck	4-track, 2-channel recording and playback stereo cassette tape deck
Direct-drive brushless DC Hall-motor for capstan drive, Two direct-drive brushless DC Hall-motors for each reel drive (play, fast forward and rewind)	Electronically-controlled DC-servo motor	Electronically-controlled DC-servo motor	Electronically-controlled DC-servo motor
"Ribbon Sendust" recording/playback head x 1 (swivels to allow tape playback in both directions), "Small-Window" erasing head x 1	"Hard Permalloy" recording/playback head x 1, Ferrite erasing head x 1	"Hard Permalloy" recording/playback head x 1, Ferrite erasing head x 1	"Hard Permalloy" recording/playback head x 1, Ferrite erasing head x 1
Within 90 seconds	Within 100 seconds	Within 110 seconds	Within 110 seconds
No more than 0.045% Within $\pm 0.16\%$	No more than 0.05% Within $\pm 0.17\%$	No more than 0.05% Within $\pm 0.18\%$	No more than 0.05% Within $\pm 0.18\%$
20 to 15,000Hz (30 to 13,000Hz $\pm 3\text{dB}$) 20 to 18,000Hz (30 to 16,000Hz $\pm 3\text{dB}$) 25 to 9,000Hz (Dolby C on) 20 to 18,000Hz (25 to 17,000Hz $\pm 3\text{dB}$) 25 to 14,000Hz (Dolby C on)	25 to 15,000Hz (35 to 14,000Hz $\pm 3\text{dB}$) 25 to 17,000Hz (35 to 16,000Hz $\pm 3\text{dB}$) 30 to 8,000Hz (Dolby C on) 25 to 18,000Hz (35 to 17,000Hz $\pm 3\text{dB}$) 30 to 13,000Hz (Dolby C on)	25 to 14,000Hz (35 to 12,000Hz $\pm 3\text{dB}$) 25 to 16,000Hz (35 to 15,000Hz $\pm 3\text{dB}$) 35 to 8,000Hz (Dolby C on) 25 to 16,000Hz (35 to 15,000Hz $\pm 3\text{dB}$) 35 to 13,000Hz (Dolby C on)	25 to 14,000Hz (35 to 12,000Hz $\pm 3\text{dB}$) 25 to 16,000Hz (35 to 15,000Hz $\pm 3\text{dB}$) 25 to 16,000Hz (35 to 15,000Hz $\pm 3\text{dB}$)
More than 58dB*	More than 57dB*	More than 57dB*	More than 57dB*
No more than 1.2%	No more than 1.2%	No more than 1.2%	No more than 1.2%
0.3mV/30mV/12k ohms (250 ohms to 10k ohms) 50mV/25V/100k ohms	0.3mV/57mV/10k ohms (250 ohms to 10k ohms) 50mV/22V/100k ohms	0.3mV/57mV/10k ohms (250 ohms to 10k ohms) 50mV/25V/75k ohms	0.3mV/57mV/10k ohms (250 ohms to 10k ohms) 50mV/25V/75k ohms
450mV/50k ohms	450mV/50k ohms	450mV/50k ohms	450mV/50k ohms
60mV/8 ohms	65mV/8 ohms	65mV/8 ohms	65mV/8 ohms
220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz	220/240V (switchable) 50Hz
45 watts	23 watts	16 watts	16 watts
420 x 99.5 x 270 mm 16-9/16 x 3-15/16 x 10-5/8 inches	420 x 99.5 x 243.5 mm 16-9/16 x 3-15/16 x 9-9/16 inches	420 x 120 x 245 mm 16-9/16 x 4-3/4 x 9-5/8 inches	420 x 120 x 245 mm 16-9/16 x 4-3/4 x 9-5/8 inches
5.3kg/11 lbs. 11 oz.	4.4kg/9 lbs. 11 oz.	4.4kg/9 lbs. 11 oz.	4.4kg/9 lbs. 11 oz.
<ul style="list-style-type: none"> • Dolby B/C (switchable) NR system with LED indicators • Computer-Aided Convenience (Music Search/Blank Skip and Reverse/Index Scan) • Auto-Reverse playback mechanism • Remote control capability • LED display peak meters (-20dB to +6dB) • Timer aided recording/playback device • One-touch recording device • Auto-Tape Selector (METAL/CrO₂/NORM) • REC Mute with LED indicator • Rear illumination for checking amount of tape 	<ul style="list-style-type: none"> • Dolby B/C (switchable) NR system with LED indicators • Music Search device • Automatic REC level setting • IC Full-logic control • Timer aided recording/playback device • One-touch recording device • Auto-Tape Selector (METAL/CrO₂/NORM) • REC Mute with LED indicator • LED display peak meters 	<ul style="list-style-type: none"> • Dolby B/C (switchable) NR system • Music Search device • One-touch recording device • Tape Selector (METAL/CrO₂/NORM) • Timer aided recording/playback device • REC Mute device • LED display peak meters • Soft-touch operation keys 	<ul style="list-style-type: none"> • Dolby B NR system • Music Search device • One-touch recording device • Tape Selector (METAL/CrO₂/NORM) • Timer aided recording/playback device • REC Mute device • LED display peak meters • Soft-touch operation keys

HPM-500	HPM-300
Bass-reflex bookshelf type	Bass-reflex bookshelf type
25cm (10-inch) PG cone type	20cm (8-inch) PG cone type
4.5cm (1-3/4-inch) PG cone type Horn-loaded High Polymer Film type	4.5cm (1-3/4-inch) PG cone type Horn-loaded High Polymer Film type
8 ohms	8 ohms
35 to 50,000Hz	40 to 50,000Hz
91dB/W	89dB/W
3.2 watts	5 watts
80 watts	60 watts
40 watts	30 watts
20 to 100 watts	20 to 80 watts
2,500Hz (Low-High) 8,000Hz (High-Superhigh)	1,500Hz (Low-High) 8,000Hz (High-Superhigh)
325 x 570 x 317 mm 12-13/16 x 22-7/16 x 12-1/2 inches	300 x 530 x 296 mm 11-13/16 x 20-7/8 x 11-5/8 inches
12.2kg/26 lbs. 14 oz.	11kg/24 lbs. 4 oz.

***IMPORTANT:** Nominal Input Power means the power which has been passed with test application of continuous musical input of momentary peaks of higher wattage. To ensure optimum transient reproduction, the output of the connected amplifier should be within the range given. The amplifier should not be overdriven to its clipping level if the amplifier's continuous power is higher than each system's Nominal Input Power rating.

Turntables

	PL-L800	PL-L1000	PL-8	PL-7
MOTOR AND TURNTABLE				
Drive System:	Quartz-PLL direct-drive	Quartz-PLL direct-drive	Quartz-PLL direct-drive	Quartz-PLL direct-drive
Motors				
Platter Drive:	Quartz-PLL Coreless DC-servo Stable Hanging Rotor™ Hall-motor	Quartz-PLL DC-servo Stable Hanging Rotor™ Hall-motor	Quartz-PLL Coreless DC-servo Stable Hanging Rotor™ Hall-motor	Quartz-PLL Coreless DC-servo Stable Hanging Rotor™ Hall-motor
Tone Arm Drive:	Direct-induction linear motor	Direct-induction linear motor		
Speeds:	33-1/3 and 45 rpm	33-1/3 and 45 rpm	33-1/3 and 45 rpm	33-1/3 and 45 rpm
Wow and Flutter (WRMS):	0.025%, 0.012% (measured directly from FG output)	0.025%, 0.012% (measured directly from FG output)	0.025%, 0.012% (measured directly from FG output)	0.025%, 0.012% (measured directly from FG output)
(DIN):	Within ±0.035%	Within ±0.035%	Within ±0.035%	Within ±0.035%
Signal-to-Noise Ratio (DIN-B):	78dB	78dB	78dB	78dB
TONE ARM				
Type:	Statically balanced, linear motor driven, tangential tracking, low mass straight Polymer Graphite™ pipe arm	Statically balanced, linear motor driven, tangential tracking straight pipe arm	Statically balanced, low mass straight Polymer Graphite™ pipe arm	Statically balanced, low mass straight Polymer Graphite™ pipe arm
Effective Arm Length:	162mm (6-3/8 inches)	190mm (7-1/2 inches)	221mm (8-11/16 inches)	221mm (8-11/16 inches)
Overhang:	0mm	0mm	15.5mm (5/8 inch)	15.5mm (5/8 inch)
Usable Cartridge Weight:	3g (min.) to 8g (max.)	4g (min.) to 23g (max., with auxiliary weight)	3g (min.) to 8g (max.)	3g (min.) to 8g (max.)
CARTRIDGE				
Type:	Moving-Coil type (PC-4MC)	—	Moving-Coil type (PC-3MC)	Moving-Coil type (PC-3MC)
Frequency Response:	10 to 35,000Hz	—	10 to 32,000Hz	10 to 32,000Hz
Output Voltage:	1.5mV	—	2.5mV	2.5mV
Load Impedance:	30k—100k ohms	—	30k—100k ohms	30k—100k ohms
Stylus:	0.3 × 0.7 mil diamond (PN-4MC)	—	0.5 mil diamond (PN-3MC)	0.5 mil diamond (PN-3MC)
Tracking Force:	2g ±0.3g	—	2g ±0.3g	2g ±0.3g
MISCELLANEOUS				
Power Requirements:	220/240V (switchable) 50-60Hz	220/240V (switchable) 50-60Hz	220-240V 50-60Hz	220-240V 50-60Hz
Power Consumption:	22 watts	35 watts	15 watts	12 watts
Dimensions (W × H × D): (without package)	420 × 120 × 427 mm 16-9/16 × 4-3/4 × 16-13/16 inches	494 × 154 × 456 mm 19-3/16 × 6-1/16 × 17-15/16 inches	420 × 114 × 395 mm 16-9/16 × 4-1/2 × 15-9/16 inches	420 × 108 × 367 mm 16-9/16 × 4-1/4 × 14-7/16 inches
Weight (without package):	8.3kg/18 lbs. 15 oz.	12kg/26 lbs. 8 oz.	6.2kg/13 lbs. 11 oz.	5.9kg/13 lbs.
FEATURES				
	<ul style="list-style-type: none"> Fully Automatic Lead-In/Cut/Return/Quick Repeat/Play/Off Direct-readout counter weight Quick-Start/Stop system Electronic cueing device Free-hinged acrylic cover 	<ul style="list-style-type: none"> High Inertial Mass (330kg·cm², including rubber mat) Fully Automatic Lead-In/Cut/Return/Quick Repeat/Play/Off Direct-readout counter weight Quick-Start/Stop system Arm height adjusting device (±3mm) Electronic cueing device Free-hinged acrylic cover Arm damper, Spirit level 	<ul style="list-style-type: none"> Fully Automatic Lead-In/Cut/Return/Repeat/Quick-Play/Off Direct-readout counter weight Quick-Start/Stop system Anti-skating device Oil-damping cueing device Free-hinged acrylic cover 	<ul style="list-style-type: none"> Fully Automatic Lead-In/Cut/Return/Repeat/Quick-Play/Off Direct-readout counter weight Quick-Start/Stop system Anti-skating device Oil-damping cueing device Free-hinged acrylic cover

Open-Reel Tape Deck

RT-707		Inputs: (Sensitivity/Maximum allowable level/input impedance)	MIC × 2: 0.25mV/125mV/27k ohms, 6mmø jacks LINE × 2: 50mV/25V/100k ohms, pin jacks, DIN: 16mV/8V/1.3k ohms, DIN standard
Drive System:	3-motor drive system	Outputs: (Reference level/Maximum level/Load impedance)	LINE × 2: 450mV/700mV/50k ohms, pin jacks, DIN: 450mV/700mV/50k ohms, DIN standard, HEADPHONES × 1: 70mV/8 ohms, 6mmø stereo jack
Operation:	Solenoid drive, direct switchable function buttons and pre-set function buttons for timer recording and playback	Semiconductors:	ICs: 5 Transistors: 67 (including 4 FETs) Diodes: 47 (including 1 Thyristor, 2 Varistors, 4 Zener Diodes and 2 LEDs)
Motors:	FG Servo AC direct drive motor × 1 (capstan drive), 6-pole inner-rotor induction motor × 2 (reel drive)	Features:	(1) Pitch control (variable ±6%, only playback) (2) Automatic (with sensing tape) and Manual reverse playback (3) Automatic repeat play (connected with tape counter) (4) Independent right/left recording mode selectors (5) Tape selectors: Bias × 2 (STD/LH) EQ × 2 (STD/LH) (6) LINE/MIC mixing (7) Output level controls (rear panel) (8) Pause indicator lamp
Tape Heads:	4-track, 2-channel erasing head × 1, 4-track, 2-channel recording head × 1, 4-track, 2-channel playback head × 1, 4-track, 2-channel reverse playback head × 1	Power Requirements:	120/220/240V (switchable) 50-60Hz
Maximum Reel Size:	7-inch reel	Power Consumption:	120 watts
Tape Speeds:	19cm/sec. (7-1/2 ips), 9.5cm/sec. (3-3/4 ips) ±0.5%	Dimensions (W × H × D): (without package)	480 × 230 × 356 mm 18-7/8 × 9-1/16 × 14 inches
Fast Winding Time:	Approximately within 100 seconds (7-inch reel, 370m)	Weight (without package):	20.0kg/44 lbs. 1 oz.
Wow & Flutter:	No more than 0.05% (WRMS) (at 19cm/sec., 7-1/2 ips) No more than 0.08% (WRMS) (at 9.5cm/sec., 3-3/4 ips)		
Signal-to-Noise Ratio:	More than 58dB		
Harmonic Distortion:	No more than 1% (at 19cm/sec., 7-1/2 ips)		
Frequency Response:	19cm/sec. (7-1/2 ips): 20 to 28,000Hz (30 to 24,000Hz ±3dB), 9.5cm/sec. (3-3/4 ips): 20 to 20,000Hz (30 to 16,000Hz ±3dB)		
Crosstalk:	More than 50dB		
Stereo Channel Separation:	More than 50dB		
Erasing Coefficient:	More than 70dB		
Bias Frequency:	125kHz		
Equalizer:	NAB curve (19cm/sec., 7-1/2 ips, 9.5cm/sec., 3-3/4 ips)		

PL-6	PL-4	PL-2	PL-88F	PL-44F
Quartz-PLL direct-drive	Direct-drive	Belt-drive	Quartz-PLL direct-drive	Belt-drive
Quartz-PLL Coreless DC-servo Stable Hanging Rotor™ Hall-motor	Coreless DC-servo Stable Hanging Rotor™ Hall-motor	DC-servo motor	Quartz-PLL Coreless DC-servo Stable Hanging Rotor™ Hall-motor DC motor and direct-drive motor	DC-servo motor
33-1/3 and 45 rpm	33-1/3 and 45 rpm	33-1/3 and 45 rpm	33-1/3 and 45 rpm	33-1/3 and 45 rpm
0.025%, 0.012% (measured directly from FG output) Within ±0.035%	0.025%, 0.014% (measured directly from FG output) Within ±0.035%	0.05% Within ±0.07%	0.025%, 0.012% (measured directly from FG output) Within ±0.035%	0.045% Within ±0.065%
78dB	78dB	68dB	78dB	70dB
Statically balanced, low mass straight Polymer Graphite™ pipe arm	Statically balanced, low mass straight Polymer Graphite™ pipe arm	Statically balanced, low mass straight Polymer Graphite™ pipe arm	Statically balanced, low mass straight pipe arm	Statically balanced, low mass straight pipe arm
221mm (8-11/16 inches)	221mm (8-11/16 inches)	221mm (8-11/16 inches)	208mm (8-1/4 inches)	208mm (8-1/4 inches)
15.5mm (5/8 inch)	15.5mm (5/8 inch)	15.5mm (5/8 inch)	20.2mm (3/4 inch)	20mm (3/4 inch)
3g (min.) to 8g (max.)	3g (min.) to 8g (max.)	3g (min.) to 8g (max.)	—	—
Moving-Coil type (PC-3MC)	Moving-Coil type (PC-3MC)	Moving-Magnet type (PC-220)	Moving-Coil type (PC-41MC)	Moving-Coil type (PC-3MC)
10 to 32,000Hz	10 to 32,000Hz	10 to 30,000Hz	10 to 35,000Hz	10 to 32,000Hz
2.5mV	2.5mV	2.5mV	1.5mV	2.5mV
30k—100k ohms	30k—100k ohms	30k—100k ohms	30k—100k ohms	30k—100k ohms
0.5 mil diamond (PN-3MC)	0.5 mil diamond (PN-3MC)	0.5 mil diamond (PN-220)	0.3 × 0.7 mil diamond (PN-41MC)	0.5 mil diamond (PN-3MC)
2g ±0.3g	2g ±0.3g	2g ±0.3g	2g ±0.3g	2g ±0.3g
220-240V 50-60Hz	220-240V 50-60Hz	220-240V 50-60Hz	220/240V (switchable) 50-60Hz	220/240V (switchable) 50-60Hz
12 watts	12 watts	3 watts	21 watts	13 watts
420 × 108 × 367 mm 16-9/16 × 4-1/4 × 14-7/16 inches	420 × 108 × 367 mm 16-9/16 × 4-1/4 × 14-7/16 inches	420 × 108 × 367 mm 16-9/16 × 4-1/4 × 14-7/16 inches	420 × 98 × 335 mm 16-1/2 × 3-7/8 × 13-1/4 inches	420 × 98 × 335 mm 16-1/2 × 3-7/8 × 13-1/4 inches
5.8kg/12 lbs. 13 oz.	5.8kg/12 lbs. 13 oz.	5.1kg/11 lbs. 4 oz.	10.3kg/22 lbs. 11 oz.	9kg/19 lbs. 13 oz.
<ul style="list-style-type: none"> •Auto-Return, Auto-shut off •Quick-Play/Stop system •Direct-readout counter weight •Anti-skating device •Oil-damping cueing device •Free-hinged acrylic cover 	<ul style="list-style-type: none"> •Auto-Return, Auto-shut off •Quick-Play/Stop system •Direct-readout counter weight •Anti-skating device •Oil-damping cueing device •Free-hinged acrylic cover 	<ul style="list-style-type: none"> •Auto-Return, Auto-shut off •Quick-Play/Stop system •Direct-readout counter weight •Anti-skating device •Oil-damping device •Free-hinged acrylic cover 	<ul style="list-style-type: none"> •Fully Automatic Lead-In/Cut/Return/Repeat/Play/Off •Programmable Music Search, Index Scan, Skip, Repeat/Manual Operation •Deck Synchro •Automatic Disc Size Selector •Built-in Anti-skating device 	<ul style="list-style-type: none"> •Fully Automatic Lead-In/Cut/Return/Repeat/Play/Off •Deck Synchro •Automatic Disc Size Selector •Built-in Anti-skating device

PC-70MC

Transducing System: Left/right separate, 6-pole, 4-magnet, air-core, bobbinless, twin coil system **Output Voltage:** 0.2mV (1kHz, maximum velocity amplitude 50mm/sec, horizontal) **Output Balance:** less than 0.75dB **Channel Separation:** more than 35dB (1kHz), more than 30dB (100Hz — 10kHz) **Frequency Response:** 10Hz — 80,000Hz **Compliance:** 16 × 10⁻⁴cm/dyne (100Hz), 30 × 10⁻⁴cm/dyne (static) **Internal Impedance:** 38 ohms (10Hz — 80,000Hz) **Load Resistance:** 40 — 100 ohms **Tracking Force:** 1.2g ±0.3g **Stylus:** 0.2 × 0.8mil elliptical **Stylus Tip Mass:** 0.23mg **Weight:** 4g **Cantilever:** Tapered beryllium tube

PC-50MC

Transducing System: Left/right separate, 6-pole, 4-magnet, air-core, bobbinless, twin coil system **Output Voltage:** 0.2mV (1kHz, maximum velocity amplitude 50mm/sec, horizontal) **Output Balance:** less than 1.0dB **Channel Separation:** more than 30dB (1kHz), more than 25dB (100Hz — 10kHz) **Frequency Response:** 10Hz — 60,000Hz **Compliance:** 12 × 10⁻⁴cm/dyne (100Hz), 25 × 10⁻⁴cm/dyne (static) **Internal Impedance:** 38 ohms (10Hz — 80,000Hz) **Load Resistance:** 40 — 100 ohms **Tracking Force:** 1.5g ±0.3g **Stylus:** 0.3 × 0.7mil elliptical **Stylus Tip Mass:** 0.3mg **Weight:** 4g **Cantilever:** Tapered aluminium tube

Add-On Equipment

SG-9

Equalizer Range: ±10dB
Centre Frequencies: 16Hz, 32Hz, 64Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz, 32kHz

Total Harmonic Distortion
20Hz to 20kHz, All Controls Flat, output 1V: 0.006%
10Hz to 30kHz, All Controls Flat, output 1V: 0.02%
1kHz, All Controls Max., output 3V: 0.01%
1kHz, All Controls Flat, output 2V: 0.005%
1kHz, All Controls Min., output 1V: 0.02%

Gain: 0dB (Controls Flat)

Maximum Output Voltage (1kHz, T.H.D.: 0.02% R_L: 47k ohms): 7.5V

Frequency Response: 5Hz to 100kHz 0dB, -3dB

Signal-to-Noise Ratio (Short-circuited A network, 1V output): 92dB

Input Impedance: 50k ohms
Output Impedance: No more than 600 ohms

Power Requirements: 220/240V (switchable) 50-60Hz 25 watts

Power Consumption: 25 watts
Dimensions (W × H × D): 420 × 150 × 355 mm (without package)
Weight (Without package): 16-9/16 × 5-7/8 × 14 inches 7.1kg/15 lbs. 8 oz.

RG-9

Maximum Output Voltage: 6.5V (1kHz, T.H.D. 0.5%, R_L: 47k ohms, Dynamic Expansion 16dB)

Total Harmonic Distortion: 0.05% (Output 1V, 1kHz, Dynamic Expansion 16dB)

Dynamic Expansion: 4, 7, 10, 13, 16dB

Gain Position: 4dB 7dB 10dB 13dB 16dB

Upward Gain: +2dB +4dB +6dB +8dB +10dB

Downward Gain: -2dB -3dB -4dB -5dB -6dB

Impulse Response
Attack Time: 0.3m sec.
Release Time: 120m sec.

Input Impedance: 50k ohms (20Hz—20kHz)

Output Impedance: 300 ohms (1kHz)

Residual Noise: 10µV (Dynamic Expansion 16dB)

Signal-to-Noise Ratio (A short circuit, Dynamic Expansion 16dB): 100dB (at 1V), 116dB (at 6.5V)

Power Requirements: 110/120/220/240V (switchable) 50-60Hz 10 watts

Power Consumption: 10 watts
Dimensions (W × H × D): 420 × 99 × 336 mm (Without package)
Weight (Without package): 16-9/16 × 3-7/8 × 13-1/4 inches 4.4kg/9 lbs. 11 oz.

SR-9

Output (Level/Impedance): 150mV/1k ohms (at 1kHz, DEPTH volume control Min.)

Input (Sensitivity/Impedance): 150mV/50k ohms (at 1kHz, DEPTH volume control Min.)

Total Harmonic Distortion: No more than 0.05% (at 1kHz, DEPTH volume control Min., output 1V)

Frequency Response: 5Hz to 70kHz ±1dB (at DEPTH volume control Min.)

Signal-to-Noise Ratio: 90dB (at DEPTH volume control Min., output level 1V)

Reverberation Time: 0 to 3.0 sec. (at Effect 1, 400Hz), 25m sec. to 100m sec. (at Effect 2, 400Hz)

Maximum Input Level: 2V (at DEPTH volume control Min., output level 1V)

Power Requirements: 110/120/220/240V (switchable) 50-60Hz 13 watts

Power Consumption: 13 watts
Dimensions (W × H × D): 420 × 99 × 336 mm (Without package)
Weight (Without package): 16-9/16 × 3-7/8 × 13-1/4 inches 4.3kg/9 lbs. 8 oz.



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