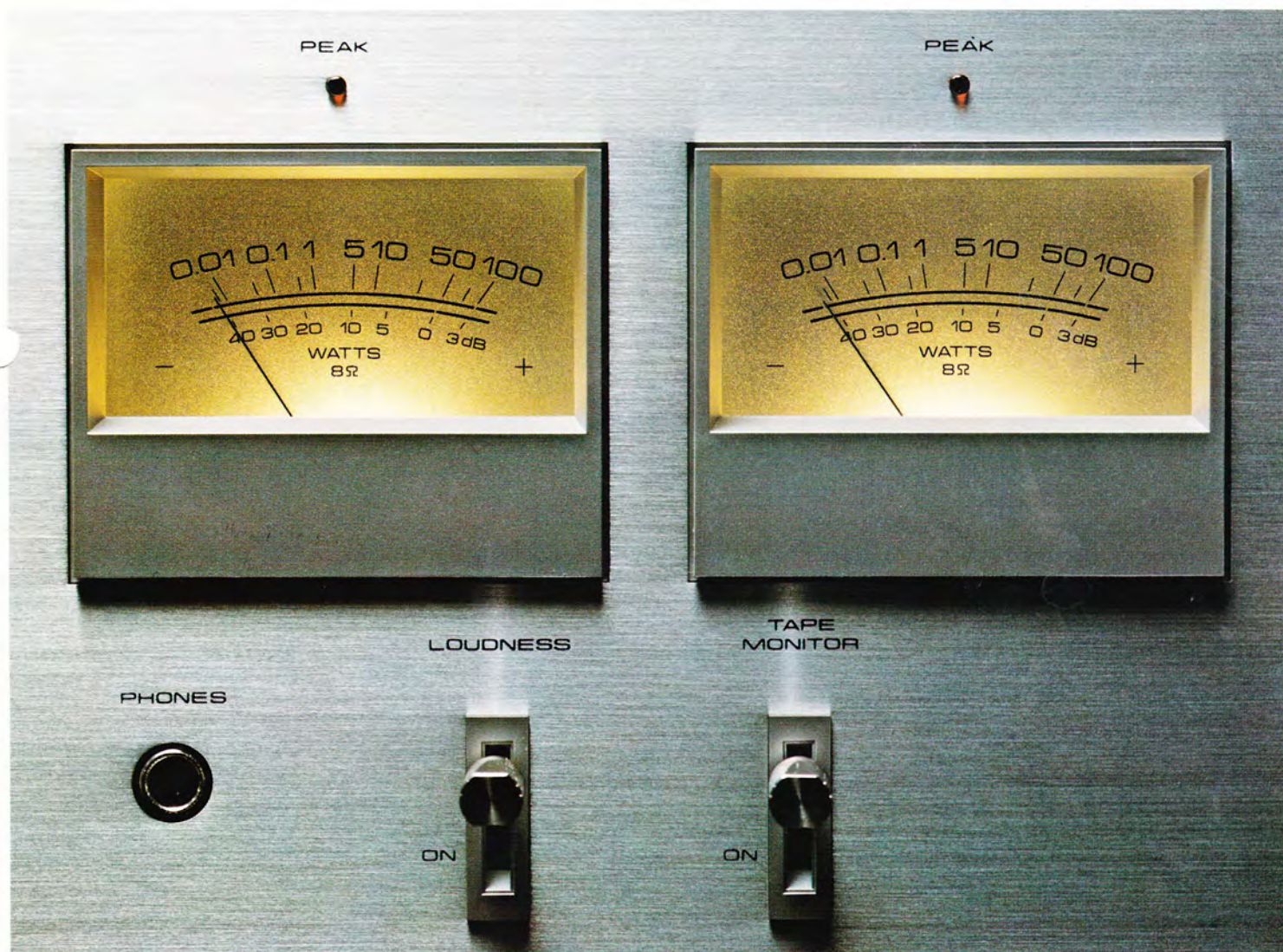


PIONEER SA-6700

STEREO INTEGRATED AMPLIFIER WITH POWER METERS



PIONEER SA-6700

Superior Cost/Performance Ratio

- LED Peak Indicators & Power Meters for Each Channel
- Discrete Power Supplies for Class-A/Class-B Amps
- IC Phono Equalizer with Outstanding Signal-to-Noise Ratio



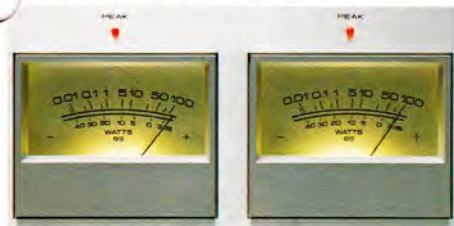
*Walnut veneered top and side panels are used in the construction of this cabinet.

Why Pay For What You Don't Need?

There are battles raging in hi-fi circles on the question of "frills." Some audiophiles claim that only the basics should be provided on stereo amps, that elaborate tone controls, multi-deck, multi-phono inputs and outputs, *super-dooper* filters and all the rest only stand in the way of good, clean high fidelity reproduction. Such purists do not necessarily base their arguments on considerations of cost. But if they are right—if you really don't need all the fancy extras—why, we ask, should you have to pay for them? The answer is that you shouldn't, and don't, in the Pioneer SA-6700, a modestly-priced *basic performance* stereo integrated amplifier with, we modestly say, the very finest tonal quality, most reliable circuitry and simplest operation of any of its competitors. Here are the basic details:

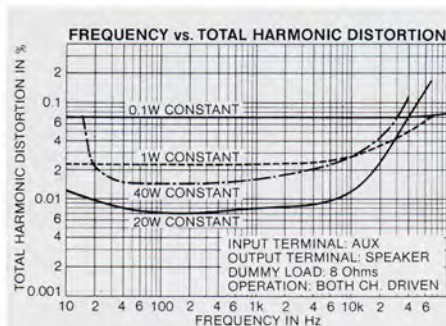
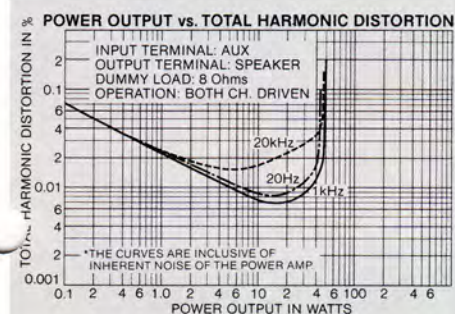
Left/Right-Channel LED Peak Indicators & Power Meters

There are many features in this well-built stereo integrated amplifier you can't get in any other, and to start with the most obvious, consider the useful LED peak indicators provided for each channel. They work from a voltage-detection type circuit to inform you when power output in either channel reaches the amplifier's clipping level, and they respond *instantly*. The individual left/right-channel power meters are also useful, but in a different way. They indicate on their logarithmically compressed scales a *direct* readout from 0.01W to 100W the exact amount of power being fed to connected speaker systems so that you may adjust output for best performance of your entire system.



High 40W-Per-Channel Power Output with Low Distortion

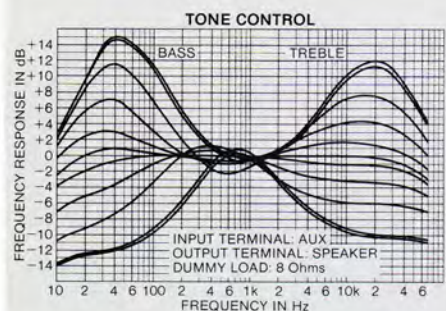
The power output of the SA-6700 is a comfortable **40 watts* per channel, both channels driven at 8 ohms from 20Hz to 20,000Hz, with no more than 0.05% total harmonic distortion.** This is delivered from Pioneer's own current-mirror-loaded differential amplifier, constant-current-loaded, Darlington-connected all-stage direct-coupled OCL circuit. Improved frequency response,



particularly in the highs, results from the application of ample negative feedback stably over a broader-than-usual frequency bandwidth—a special advantage of this circuitry.

Power NFB Circuit for CR-Type Tone Control

Our CR-type tone control amplifier is circuited through the power amplifier in a negative feedback loop (Power NFB) using AC feedback to control distortion. This design not only saves costly circuitry, it also provides more reliable tone control performance to help you obtain a flat response in your listening room.



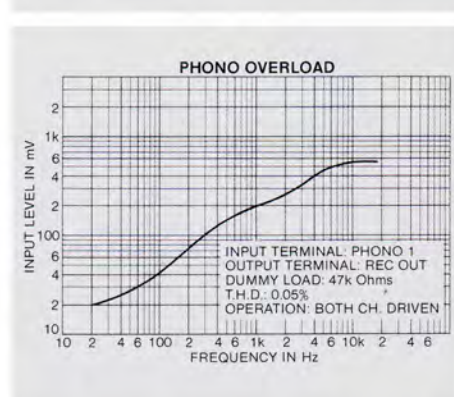
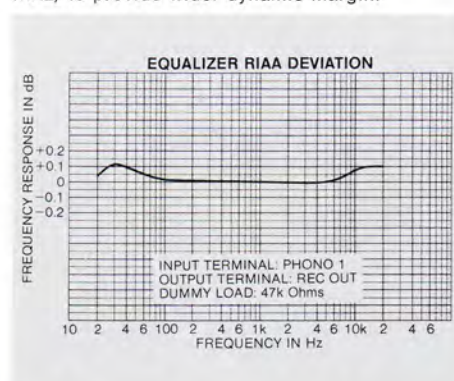
Discrete Twin Power Supplies for Class-A/B Circuits

Many so-called "budget-priced" amplifiers suffer instability and other faults when reproducing heavily modulated musical signals at high level (volume). This is because they feed their power amplifiers and their preamplifier blocks from the same source. In the SA-6700, Pioneer has taken special care to prevent these "dim-outs." We use discrete and separate transformers, and two large 8,000 μ F electrolytic capacitors, in our Twin Power Supplies. The Class-B amps (power output) and Class-A amps (equalizer, etc.) receive their energy needs from *separate* sources.



IC Phono Equalizer with Outstandingly High 78dB Signal-to-Noise Ratio

Now that our engineers and our customers alike have come to place top confidence in the relatively new concept of using ICs or integrated circuits in high fidelity equipment, we are happy to reveal that the extraordinary phono equalizer in the SA-6700 is, you guessed it, ICized. The new IC (TA-7136PI) used here not only lowers cost dramatically, its high input voltage resistance contributes to better and more reliable performance. With it we've used low-error metal-coated resistors ($\pm 1\%$ error) and capacitors ($\pm 2\%$ error) to offer an RIAA curve deviation of no more than ± 0.3 dB over the wide 20 to 20,000Hz range. This circuitry also achieves the amazingly high signal-to-noise ratio of 78dB (IHF-A). A high voltage (approx. ± 40 V) plus-minus split power supply helps boost the phono overload level to 180mV (0.05% THD, 1kHz) to provide wider dynamic margin.



Speakers and Power Amp Fully Protected

In the SA-6700, Pioneer uses a TRIAC (bi-directional triode thyristor) and other devices to provide fail-safe power protection. Connected speaker systems and the amplifier's own output circuitry are never threatened by power irregularities.

Other Basic-Performance Features

- Green LED Power-On Display
- Volume Control with Click Stops
- Bass/Treble Tone Controls & Loudness Switch
- Tape Monitor (Stereo) Switch
- Speakers Switch—Stereo systems A or B or A+B or Off.
- Wooden Cabinet in Attractive Walnut Veneer

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

SA-6700 SPECIFICATIONS

AMPLIFIER SECTION

Continuous Power Output is 40 watts* per channel, min. at 8 ohms from 20 hertz to 20,000 hertz with no more than 0.05% total harmonic distortion.

Total Harmonic Distortion:	No more than 0.05% (20Hz to 20,000Hz, from AUX) (continuous rated power output)
	No more than 0.03% (20 watts per channel power output, 8 ohms)
	No more than 0.03% (1 watt per channel power output, 8 ohms)
Intermodulation Distortion:	No more than 0.05% (50Hz: 7,000Hz=4:1, from AUX) (continuous rated power output)
	No more than 0.02% (20 watts per channel power output, 8 ohms)
	No more than 0.02% (1 watt per channel power output, 8 ohms)
Output Speaker:	A, B, A+B
Damping Factor:	30 (20 to 20,000Hz, 8 ohms)
Input Sensitivity/Impedance:	
PHONO:	2.5mV/50k ohms
TUNER:	150mV/50k ohms
AUX:	150mV/50k ohms
TAPE PLAY 1:	150mV/50k ohms
PHONO Overload Level (1kHz, T.H.D. 0.05%)	
PHONO:	180mV
Output Level/Impedance	
TAPE REC 1:	150mV

Frequency Response

PHONO (RIAA Equalization):	20 to 20,000Hz ± 0.3 dB
TUNER, AUX, TAPE PLAY:	20 to 40,000Hz ± 2 dB

Tone Control

BASS:	+12dB, -10dB (100Hz)
TREBLE:	+10dB, -10dB (10kHz)
Loudness Contour:	+6dB (100Hz), +3dB (10kHz)

(Volume control set at -40dB position)

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

PHONO:	78dB
TUNER, AUX, TAPE PLAY:	95dB

SEMICONDUCTORS

ICs:	2
Transistors:	25
Diodes:	27

MISCELLANEOUS

Power Requirement:	120V 60Hz only
Power Consumption:	150W (UL)
Dimensions:	Without package: 17-23/32(W) x 5-13/16(H) x 10-11/32(D) inches 450(W) x 148(H) x 263(D)mm
Weight:	Without package: 23 lb. 2 oz./10.5kg

OMNI MUSIC SYSTEMS
R.R. # 3
Rochester, MN 55901

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



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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. / 178-184 Boundary Road, Braeside, Victoria 3195, Australia

BOSE

**Model 901[®] Series IV
Direct/Reflecting[®]
Loudspeaker System**



In contemplating an investment in a music system, many people do not realize that the most expensive part of their hi-fi system will probably be their records. And the quality of the music reproduced from these records is determined most of all by the speakers. The additional cost to own the best speakers may well be overshadowed by the cost of your records and by the value that the best speakers add to your entire record collection. A question often asked is, "Can I afford to invest in the best speakers?" But serious consideration should be given to the question, "Can I afford to make the larger investment in records and the other system components without owning the best speakers?"



We provide the technology, you provide the ultimate judgement.

Today it is probably undisputed that the Bose® 901® Direct/Reflecting® speaker has more research behind it than any speaker ever produced. The research began at M.I.T. in 1956, under the direction of Dr. Amar Bose. We produced the first 901 system, based upon this research, in 1968. Each year our research has intensified, resulting in more than three hundred changes and improvements from the first 901 speaker, to the present 901-IV speaker. All our work is directed toward the one goal of maintaining the 901 speaker as the best speaker regardless of size or price.

But when it comes to evaluating the success of our efforts, we put away all the science and technology and let you, the listener, be the judge. For there are no measurements capable of defining one's sensation of the accuracy of music reproduction. Through your own listening test we would like you to experience why the Bose 901 speaker has become internationally the most highly reviewed speaker regardless of size or price.

Here are a few points that you may wish to listen for in your evaluation:

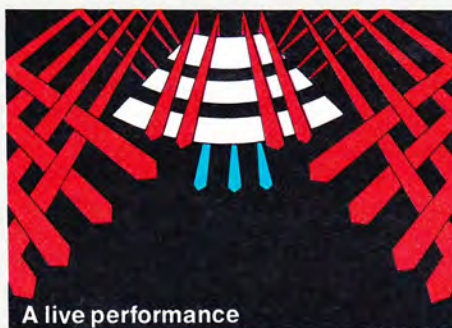
Stereo From Almost Any Position in the Room.

Conventional speakers give you an equal balance of sound from each speaker only when you sit at a position that is equidistant from both speakers. Indeed, such positions are seldom encountered in normal living rooms. Usually people sit closer to one speaker than to the other, and, with conventional speakers, all the sound then appears to come from the closest speaker. The result is that we all purchase stereo systems, but few of us actually experience much more than single channel (monaural) sound!

The Bose 901-IV Direct/Reflecting® speaker is designed to solve this problem. As you move closer to one speaker you actually receive more energy from the other more distant speaker thus helping to maintain the stereo balance and image in almost any listening position. We think that stereo represents a large improvement over monaural and if you invest in it you deserve to enjoy it.

Open Spacious Sound.

Sound reaches your ears in a live performance after thousands of reflections



from all the walls and surfaces of the hall. Conventional speakers direct their sound to the listener from a small area on the front of the speaker and do not



create the spatial sensation found in live performances. The Bose 901 speaker is designed to make use of the wall behind it in the way that musical instruments make use of the stage wall to reflect sound into the room. This provides the warm spatial sense of music. To appreciate the importance of this spatial parameter, play a heavily orchestrated music selection and switch back and forth between the Bose 901 speaker and any other speaker.

Separation of Musical Instruments.

In live performances we have the ability to separate and follow the sound of a single instrument in the presence of many other types of instruments playing simultaneously. This property of live music is one of the most difficult to reproduce. Almost any imperfections in loudspeaker design cause this property to rapidly fade away. We invite you to select a good recording with complex orchestration and make this listening test with the 901 speaker in comparison to any other speaker.

Accuracy of Musical Timbre Without Shrillness.

Ensembles of instruments playing sustained notes in the higher musical registers have a sweet and mellow sound in live performances. But hi-fi systems have long had the reputation for reproducing these sounds with shrillness rather than mellowness. This in fact was the observation that launched the original research into sound reproduction at M.I.T. in 1956. It was found that the ratio of reflected to direct sound was an important key to this problem.

To see if the Direct/Reflecting® Bose 901 system is the answer to this problem, select a recording with, for example, an ensemble of violins playing in the upper registers and compare the reproduction through the 901 system to that through any other speaker.

Clarity and Definition of Bass.

The Bose 901-IV speaker replaces the conventional hollow speaker boxes containing fiberglass insulation with a sophisticated fourteen element Acoustic Matrix™ enclosure. In this enclosure air moves at speeds up to 100 KM/hr (60 MPH) to produce bass notes with a clarity and definition that we were unable to achieve with conventional technology. For an experience that you will long remember we suggest that you place a pair of 901-IV speakers on top of the largest speakers you can find and make an A-B comparison on a bass drum and on an organ pedal note.

Advanced technology and precision construction make this quality of sound possible.

Correct Balance of Reflected and Direct Sound.

The Bose 901-IV Direct/Reflecting® speaker reflects 89% of the sound from the wall behind it at precisely selected angles and it sends 11% directly into the listening area. This combination of reflected and direct sound enables the Bose 901-IV system to reproduce, in a relatively small space of a living room, much of the open spacious sound that you hear in the larger environments of live performances.

Nine Full Range Precision Speakers.

Conventional speakers use large woofers to produce low frequencies,

small tweeters to produce high frequencies. A "crossover network" divides the audio signal and directs the low frequencies to the woofer and the high frequencies to the tweeter. The age-old problem of "crossover coloration" is totally eliminated by the 901-IV speaker design because the crossover itself is eliminated. Nine precision matched speakers in each enclosure individually cover the full range of audible frequencies. This is a more expensive approach but we think that the performance advantages justify it.

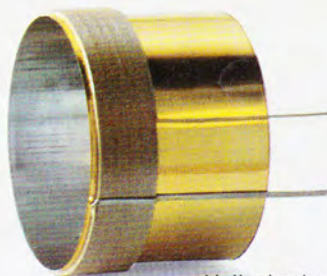
The Acoustic Matrix™ Enclosure.

For the past thirty years conventional

speaker enclosures have usually consisted of hollow wooden boxes that are either sealed or have a hole through which a tube (port) is placed. The 901-IV system replaces this older technology with the highly engineered Acoustic Matrix™ enclosure. It is a complex injection-molded structure which has fourteen principal acoustical regions that act as acoustical elements. In this Acoustic Matrix™ enclosure air moves at speeds up to 100 KM/hr to produce bass notes with a clarity and definition that we were unable to achieve with conventional technology.



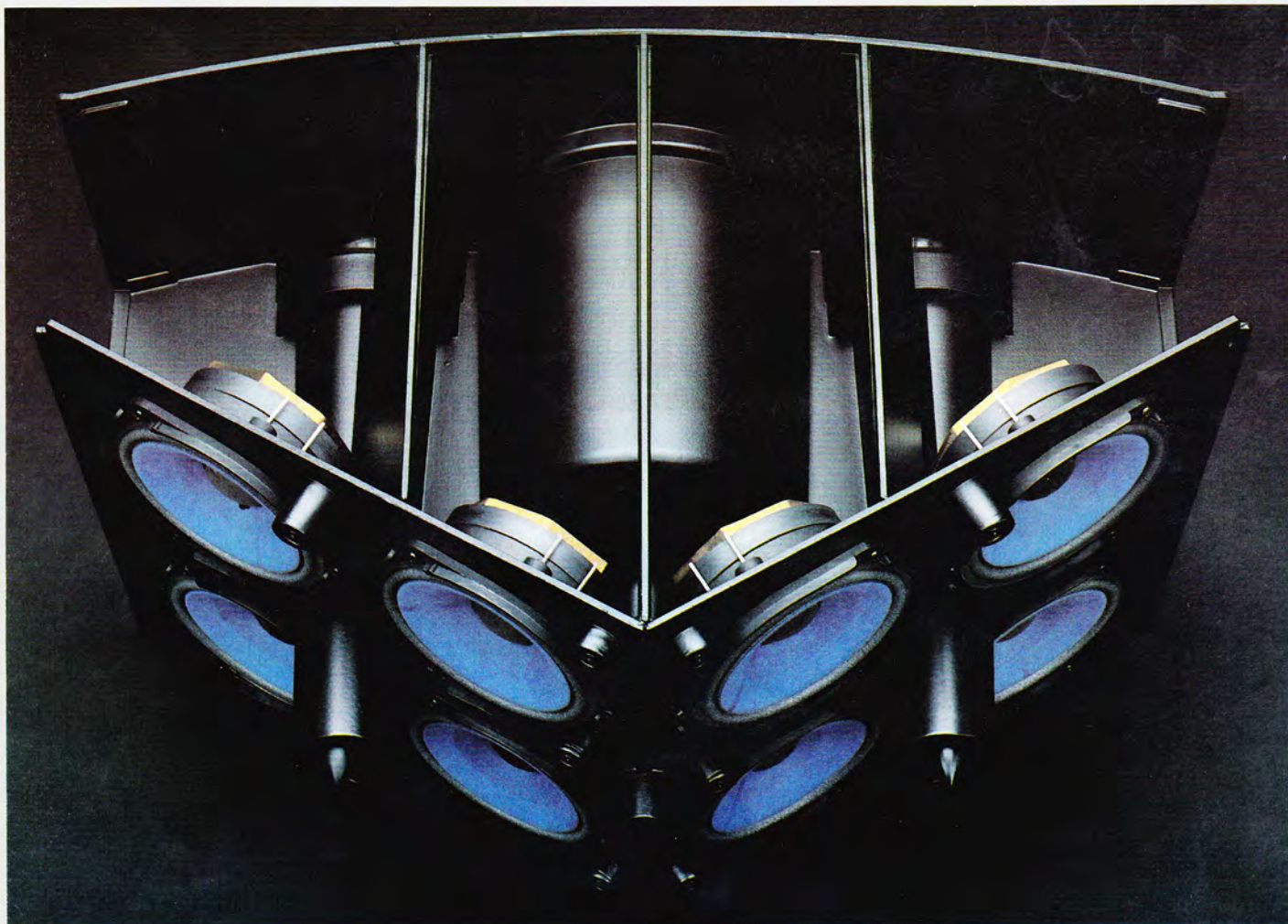
Full-range drivers.



Helical voice coil.



Portion of Acoustic Matrix™ Enclosure.



The New High-Performance Driver.

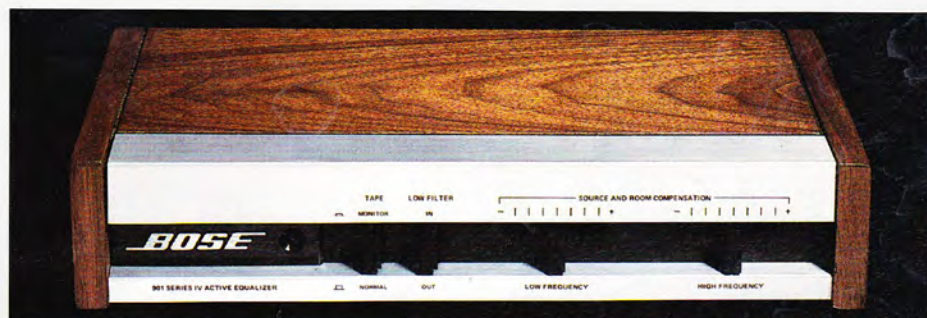
The driver in a speaker system is like the engine in a car. It must have precision engineering and assembly. The 901-IV driver is unique in its technology and construction. A combination of advances make possible the outstanding performance of the 901 Series IV driver:

- An aluminum helical voice coil wound with rectangular wire for better utilization of magnetic energy.
- A high-strength, injection-molded plastic frame for elimination of distortion of the magnetic field caused by steel frames and for added precision in assembly.
- A new cone and suspension for smoother, more controlled frequency response and lower distortion.
- A highly efficient magnetic structure with all parts assembled to precise tolerances to provide maximum magnetic field energy.
- Precision automated assembly to reduce otherwise wasted "clearance" spaces.

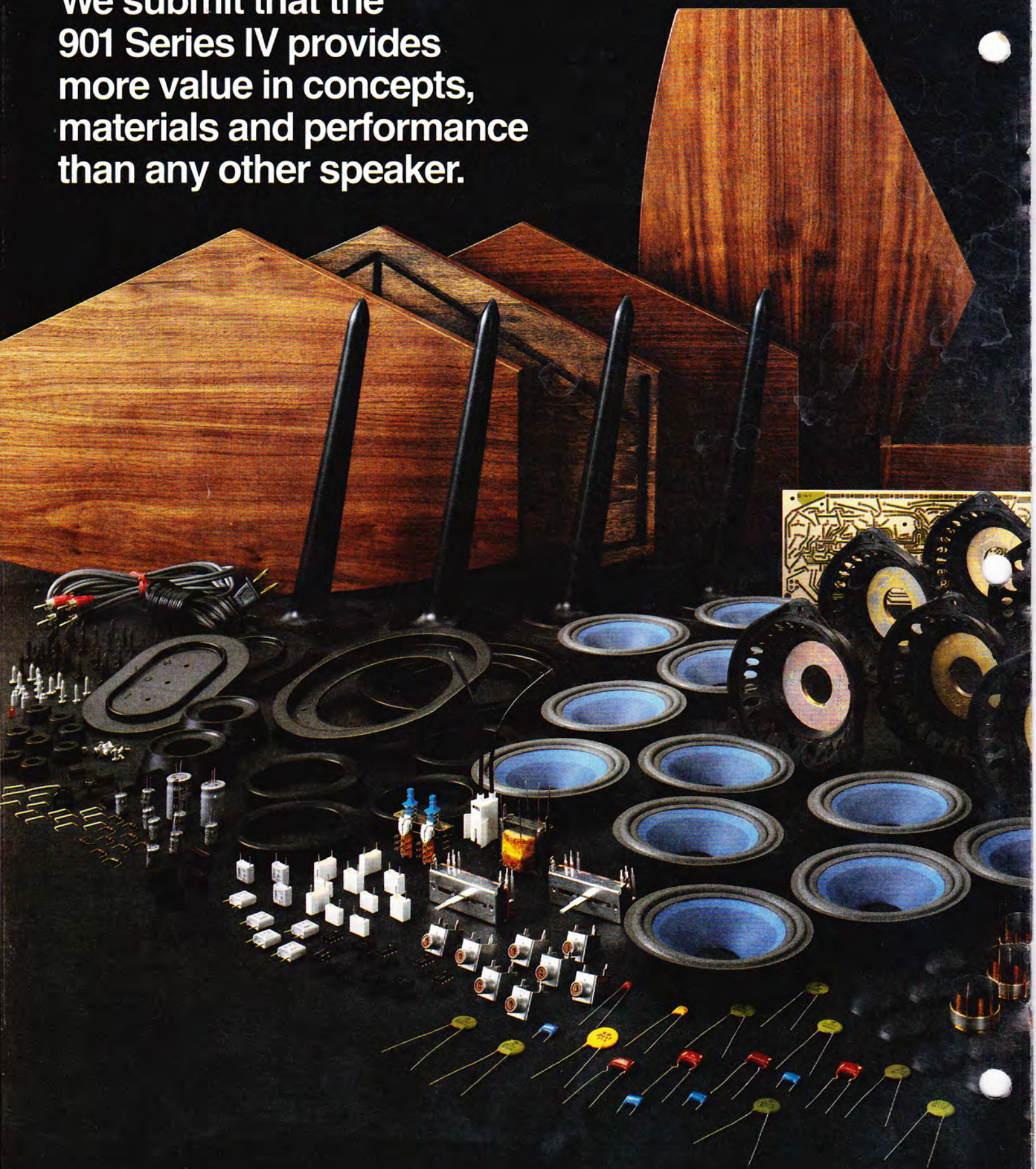
Active Equalizer.

Speakers are almost required to perform miracles! They are supposed to mechanically vibrate with precision over a frequency range of almost 1000 to 1! It's not surprising that all speakers fall short of this goal. But the 901-IV system does not stop at this shortfall. It comes with an active equalizer whose electronic circuits are more sophisticated than those found in complete pre-amplifiers. The equalizer electronics are precisely matched to the 901-IV speaker so that the combination provides a smooth uniform acoustic power response over the audible spectrum.

New in the Bose 901 Series IV equalizer are two controls that enable you to adjust the 901 speakers to the acoustics of your room. Different rooms have different acoustic behavior. The same musical instrument played in different rooms sounds different. In some rooms its sound is good; in others its sound is poor. The same is true for all hi-fi speakers. Bose research into room acoustics has resulted in two sliding controls on the front of the Series IV equalizer. These controls go a long way toward assuring that you will enjoy in your home the same high level of performance for which the 901 system is renowned.



**We submit that the
901 Series IV provides
more value in concepts,
materials and performance
than any other speaker.**



System specifications

Speaker (each enclosure)

Spatial characteristics

One speaker directed into the listening area; eight speakers reflecting sound at 30° angles from the wall behind the speaker to provide the optimum range of ratios of reflected to direct sound and the proper angles of the reflected sound incident upon the listener.

Speaker complement

Nine matched full-range speakers utilizing aluminum helically wound voice coils. Linear, high excursion suspension. Low impedance (0.9 ohm) voice coils connected in series.

Speaker connections

Three screw terminals: Third terminal for use only with special dual amplifier outputs of Bose® Spatial Control™ Receiver. Spatial slider control on receiver permits adjustment of spatial image of sound to suit individual recordings.

Magnets

5.3 pounds in each enclosure. As in all Bose speakers, only ceramic magnets are used to avoid the demagnetization effects associated with alnico magnets.

Enclosure

Acoustic Matrix™ multi-cell chamber.

Amplifier power

Minimum: 10 watts. Maximum: No limit in noncommercial applications. (For amplifiers over 100 watts follow fusing instructions in Owner's Manual.) For most home music systems 20 to 100 watts is the recommended range of amplifier power. Note that more powerful amplifiers provide higher volume levels with no change in sound quality.

Cabinet construction

Injection molded core with particle board external panels and walnut veneer finish.

Impedance

8 ohms.

Dimensions

12 $\frac{3}{8}$ " high, 21" wide, 13" deep.

Shipping weight

Part I—45 $\frac{1}{2}$ lbs; Part II—43 $\frac{1}{2}$ lbs.

Active Equalizer (both channels)

Controls

High frequency compensation: Continuously adjustable slider. Shelving-type control affecting frequencies above 2 kHz. Range: ± 8 dB @ 15 kHz.

Low frequency compensation: Continuously adjustable slider. Band of adjustment (3 dB points) 55 to 400 Hz. Range: ± 7 dB @ 150 Hz.

Low filter: 4 dB decrease at 40 Hz.

Tape monitor switch: Replaces tape monitor switch on receiver or amplifier when equalizer is connected in tape monitor circuit.

Noise

(A-weighted) 92 dB below 1 volt.

Harmonic distortion

Less than 0.1% at 1-volt output.

Cabinet construction

Walnut veneer on particle board.

Installation

Conveniently connected to any preamplifier, amplifier, or receiver using cables supplied.

Dimensions

2 $\frac{1}{2}$ " high, 11" wide, 5" deep.

Input impedance

80 k ohms.

Minimum load impedance

2 k ohms.

It's now time to stop talking about research and technology and to consider the objective toward which all of the efforts have been focused—your enjoyment. In the end, all the technology is only of academic interest if the product does not bring you closer to the total involvement and excitement that is the experience of live music. Over the centuries music has evolved, constantly striving in its compositions and performances to touch the deepest roots of human emotion. When the music reproduction is right, you will have the experience, know it, and remember it. It won't matter whether you are a musical connoisseur or a novice, an audiophile or an engineer. At such time, the thought of hi-fi and loudspeakers will be furthest from your mind.

If we can produce a loudspeaker that can give you this experience, that indeed is our ultimate pride. And we rest our reputation on it with the best we have to offer—

The Bose 901 Series IV Direct/Reflecting® loudspeaker.

BOSE®

Better sound through research.
The Mountain Road, Framingham, MA 01701

[illegible]

When you decide to upgrade your stereo system – whether you add the latest cartridge, buy separates, or trade in the whole system – you do it for one reason only. To get closer to the realism of a live performance.

dbx has been designing audio products since 1971 that let you do just that.

We started in the professional recording studios, where the major obstacle to realistic sound reproduction was tape noise. While Dolby* systems were helping in this area, they didn't solve the problem. So dbx developed a new process called *linear decibel companding* that's many times more effective than Dolby in reducing tape noise.

Today, dbx tape noise reduction systems are used in professional recording studios around the world.

From that beginning, dbx has carried its technology into home systems with a whole family of audio components.

They are not ordinary components. We let other companies build receivers, amplifiers, preamplifiers, turntables and tape recorders. At dbx, we develop high technology products for the person who appreciates how live music sounds, and how far short of that sound conventional equipment falls.

WHY DOES LIVE MUSIC SOUND LIVE?

A live performance *sounds* live because of three basic characteristics of music: *tonal balance*, *spatial perspective*, and *dynamic range*.

Correct tonal balance, or flat frequency response, requires uniform reproduction of sound across the audible frequency range.

Spatial perspective is the dimensional quality of music that allows you to recognize that instruments and voices are reaching your ears at different times and from different locations.

The third, dynamic range, is the difference in volume, measured in decibels, between the loudest and quietest passages of a musical selection. From the 120 dB thundering transients of an orchestra or rock group, to the 30 dB subtle nuances of a triangle or flute.

In order for your stereo system to sound more like a live performance, it has to accurately reproduce all three of these basic characteristics of live music.

When dbx entered the high fidelity scene, audio manufacturers had already made a lot of progress in tonal balance and spatial perspective. So dbx began by addressing the problem everyone else was ignoring: *dynamic range*.

THE MISSING ELEMENT.

The problem is that conventional records have always been severely limited in dynamic range. Instead of the 90 dB of a live performance, they provide only 50 dB, or 60 dB from the best audiophile discs. Any attempt to record music with greater dynamic range on a vinyl record results in groove excursions simply too extreme for the phonograph stylus to track.

A similar problem exists with tape. Too wide a dynamic range can saturate the tape, causing distortion of the music.

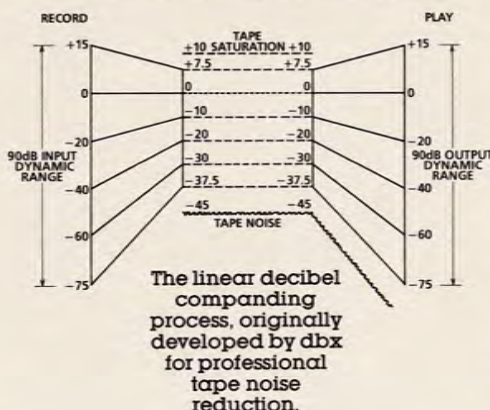
So, audio engineers have been forced to compress dynamic range during recording. They actually squeeze the music, so the louds don't sound as loud as they should, and the softs don't sound as soft. Add to that the problems of record surface noise and tape hiss – which interfere with quiet musical passages – and you can appreciate how dynamic range has suffered in the music recording and reproduction process.

In fact, even with the finest hi-fi equipment and the best conventional records and tapes, you still lose about 1/3 of the dynamic range that was present in the original performances.

THE DBX BREAKTHROUGH.

The breakthrough came when dbx applied the linear decibel companding process to home audio equipment. Because the process not only reduces noise. It also allows the full dynamic range of the source material to be reproduced.

Our first products were tape noise reduction systems used for taping live music without losing dynamic range.



Then we adapted this process to develop a new family of products which you can use to greatly improve the dynamic range of music from conventional records and tapes as well as radio broadcasts. This new family of products is called *dynamic range expanders*.

But the major goal still remained: to hear the *full* dynamic range of a live performance from records in your own home.

DBX DISCS: THE STATE-OF-THE-ART IN DYNAMIC RANGE.

Again, linear decibel companding was the answer.

Very simply, dbx went to the source of the problem: the actual cutting of the master disc from which records are eventually made. Instead of arbitrarily compressing or limiting dynamic range as the music signal is transferred from master tape to master disc, dbx precisely compresses the music by a 2 to 1 ratio. The resulting *encoded* signal fits comfortably within the

dynamic range limitations of vinyl records. Then, when the record is played back through a dbx Disc Decoder, the music signal is expanded in an exact mirror image fashion by a 1 to 2 ratio. This restores the full signal of the music as captured on the master tape.

Now, with dbx Discs, you can hear music with dynamic range equal to that of studio master tapes.

And recently, dbx introduced Digital dbx Discs, produced from tapes made by the new digital recording process. The result is the full 90 dB dynamic range of a live performance.

In addition, dbx Discs and Digital dbx Discs virtually eliminate the ticks, pops and surface noise of conventional records. So for the first time, you can listen to the music instead of the record – a major breakthrough in music reproduction.

PERFECTING TONAL BALANCE AND SPATIAL PERSPECTIVE.

Now dbx is attacking the remaining problems in reproducing sound that approaches the realism of a live performance.

Our Subharmonic Synthesizer can enhance the bass response of your stereo system to include the natural subharmonics of live music – the kind of bass you actually *feel*.

And our Computerized Equalizer/Analyzer can provide an accuracy of tonal balance in a listening area never before possible.

Take a look at the family of dbx audio components and what they can do for your music. Then ask your authorized dbx retailer for a demonstration.

It could be the most important step you ever take toward sonic realism.

*Dolby is a registered trademark of Dolby Laboratories, Inc.

RECORDING TECHNOLOGY SERIES MODEL 224.

For home recording, the 224 gives you performance incredibly close to digital recording.

Without the 224, you can only hope for about a 50 dB usable dynamic range with an open reel deck, and just 45 dB with a cassette deck.

But the 224's linear decibel companding process gives you an unprecedented 85 dB on open reel, and 80 dB on cassette. That's very close to the dynamic range of a live performance.

The 224 also gives you far better tape noise reduction than the Dolby* B system that is built into most tape recorders. Dolby reduces noise by less than 10 dB, and only in the high frequency range. But the 224 reduces noise by more than 30 dB across the entire audio frequency range, and adds 10 dB more recording headroom. That's a difference you can easily hear.

So just by adding the 224 to your

present tape recorder, you'll enjoy the maximum performance it is capable of delivering. In fact, you'll be able to record sound that is virtually indistinguishable from the original.

The 224's simultaneous encode/decode process provides full monitoring capability for three-head recorders, and is also compatible with all two-head recorders.

In addition, the 224 includes a built-in dbx Disc Decoder for playing the new dbx Discs and Digital dbx Discs.

MODEL 222

The Model 222 is the newest member of the Recording Technology Series. It gives you all the performance of dbx Type II Tape Noise Reduction at an economical price.

Designed for optimum use with two-head recorders, the Model 222 has separate encode (record) and decode (play) functions but no monitoring capability. However, it provides the same 30 dB of noise reduction as the Model 224, and includes the dbx Disc Decoder for playing the new dbx Discs and Digital dbx Discs.

SPECIFICATIONS

EFFECTIVE NOISE REDUCTION: 30 dB plus 10 dB of headroom

DYNAMIC RANGE (peak signal to weighted background noise): 110 dB

INPUT IMPEDANCE: 100 k Ω (designed to be driven from a source impedance of less than 10 k Ω)

INPUT LEVEL (nominal): 300 mV

INPUT
OUTPUT

5 k Ω

OUTPUT

20 k Ω

FREQUENCY

to 20 kHz

(typical)

SLEW RATE

EQUIVALENT

20 kHz

-85 dB

TOTAL HARMONIC

< 0.5%

20 kHz

I.M.D.

POWER

50 to 60 W

Line Voltage

POWER SUPPLY

DIMENSIONS

4.4 cm

Standard 15" Rack Mounts are supplied with unit

SHIPPING WEIGHT: 6 lbs. / 2.7 kg

Wood sides are available as an option.

U.S. suggested retail prices for dbx Consumer Products**

dbx Discs and Digital dbx Discs	\$9 to \$ 18.	3BX Dynamic Range Expander	\$759.
Model 21 Disc Decoder	\$109.	2BX Dynamic Range Expander	\$499.
Recording Technology Series Model 224	\$299.	1BX Dynamic Range Expander	\$279.
128 Dynamic Range Enhancer/Tape Noise Reduction System	\$499.	3BXR Remote Control	\$169.
		118 Dynamic Range Enhancer	\$239.
		110 Subharmonic Synthesizer	\$249.

ACCESSORIES

3BX-RC	3BX-R Extension Cable — 25 Ft.	\$ 20.
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RACK MOUNT KITS

RM-19-X	To rack mount one 3BX or one 2BX	\$ 40.
RM-19-2	To rack mount one 118 or 110 with a 122*, 124*, 128, or 1BX	\$ 40.
RM-120-1	To rack mount any single 122*, 124*, 128, or 1BX	\$ 40.
RM-18-3	To rack mount a Recording Technology Series 224	\$ 40.

**Prices subject to change without notice.

*Models 122 and 124 have been replaced by the new Recording Technology Series Model 224.



PIONEER PL-518

DC-SERVO DIRECT-DRIVE AUTO-RETURN/QUICK-START TURNTABLE



 PIONEER®

PIONEER PL-518

DC-Servo Direct-Drive Turntable with Auto-Return Convenience and Quick-Start Operation

Today's superior long-play and 45 rpm records offer vastly improved dynamic range, wider frequency response, virtually no noise. Are you staying ahead of these significant improvements in hi-fi software by up-dating your amps, speakers and other hi-fi system hardware? Pioneer's PL-518 has all the up-to-the-minute advances you need to get your music's worth, at a price that guarantees your money's worth. Particular attention has been paid to making the PL-518 super accurate when it comes to platter speed — it has a DC servomotor to

deliver rated speed performance all the time, with extremely low wow/flutter. And we've made the PL-518 super resistant to howling and unwanted resonance of all forms — it has a 40mm-thick solid particleboard base and SPC steel bottom plate to stop sound pressure howling, and other special devices to shut out floor howling. All this plus Auto-Return convenience for the sensitive tone arm, and Quick-Start convenience for the high-inertia platter. Here are the details that add up to superb tonal quality as judged by today's — and tomorrow's hi-fi mu



AUTO-RETURN/QUICK-START

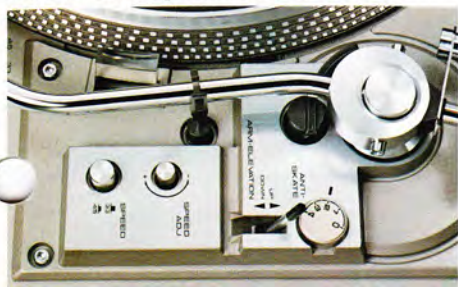
Time-Tested Auto-Return Mechanism

Although the PL-518 is technically a manual, single-play turntable—the kind traditionally preferred by audiophiles and professionals alike—it offers two welcome conveniences. One is the Quick-Start function, explained below. The other is the Auto-Return function, which works like this: When the stylus enters the lead-out groove of your record, a special Pioneer-developed device detects the increased lateral speed of the tone arm and triggers the auto-return mechanism. This lifts the tone arm gently, returns it to its rest, and shuts off all power to the turntable. The mechanism is one that Pioneer has tested successfully for over 100,000 continuous operations, and one guaranteed to perform with minimum noise and maximum reliability.



Quick-Start Convenience

The PL-518's platter does not begin to rotate until you lift the tone arm and move it toward the outer edge of the platter. This convenience is appreciated all the more when you use it in combination with the oil-damped Cue Lever which lets you lower the stylus to the record surface (at the point of your choice) without risk of dropping the arm or nicking the record.



Right-Side Control Grouping/Strobe

All controls on the Pioneer PL-518 are grouped on the righthand side of the platter to make handling easier still. In addition to the adjustment controls for the tone arm there is the Cue Lever, the Speed Select Button, and the Fine Pitch Control. Also on the right is the built-in strobe with an attractively illuminated light/calibration arrangement so that you may keep a visual check on the platter's accurate speed.

DC SERVOMOTOR

Twice the Strength and Double the Accuracy in Direct Drive

Pioneer has developed a 16-pole, 24-slot DC servomotor for the PL-518, one that provides exactly the same high signal-to-noise ratio and low wow/flutter as that used in the more expensive PL-520 model. This motor's magnetic circuit is *twice* as strong as conventional direct-drive types, a fact which contributes greatly to its improved resistance to torque ripple caused by uneven magnetic force. Its switching frequency is also doubled—to 13.3Hz. Together these mean improved load characteristics, more accurate platter speeds *at all times* and, ultimately, better tonal quality results from your records.



Proof of Performance: 73dB S/N and 0.03% Wow/Flutter

You will find that few if any turntables in this price range offer such outstanding performance specifications: the signal-to-noise ratio achieved by the super-silent DC servo direct-drive motor is a high 73dB (DIN-B) or less. The overshoot problem has been solved by the high inertia of the platter so that settle time is an excellent 1.8

seconds or less. Finally, in the specifications which reveals the most about a motor's accuracy, we are proud to say that the wow/flutter is an excellent 0.03% (WRMS) or less—and will stay that good over long years of use.

Pitch Control — Plus/Minus 2% Adjustment Range

Adjacent to the Speed Selector in the control grouping on the PL-518 is a rotary knob which lets you fine-adjust or "tune" the speed of the platter for *either* speed (33-1/3 or 45 rpm) within a range of $\pm 2\%$. The fact that it operates the built-in DC servo system for both speeds is an additional convenience.

Die-Cast Aluminum Platter — High Inertial Mass on Rim

Contributing to the overall low-error speed constancy of the PL-518 is its special heavy aluminum die-cast platter.



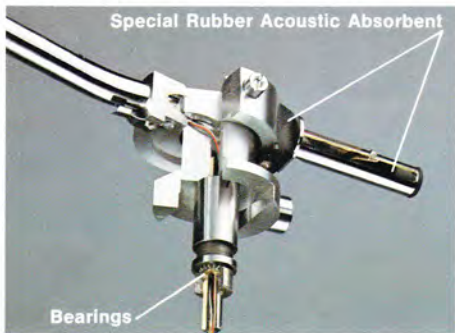
While other platters may be heavier, this one has its mass concentrated at the rim or periphery so that the resulting inertial characteristics are excellent: 200kg/cm². The platter is 12-5/8 inch (320mm) in diameter, a full 2 centimeters larger than the normal long-playing record.

TONE ARM/CABINET

High-Sensitivity Tone Arm on Precision-ground Carbon-Chromium Bearing

The gentle S-curve shape of the tone arm on the PL-518 contributes to better record-groove tracing. Even more important is the arm's support, which uses a precision-ground super-hard carbon-chromium steel bearing in the vertical plane. The arm pipe and its

weight are de-coupled with a special rubber acoustic absorbent to lower resonance.



Resin/Glass Fiber Head Shell and Thick Arm Base

There are two additional design points which contribute to cleaner tonal quality in the PL-518 tone arm. One is the thick, die-cast aluminum arm base — particularly effective in reducing low-frequency resonance. The next is the silver-colored head shell of special resin mixed with glass fiber; the shell's high internal loss effectively prevents unwanted resonance from reaching the stylus.



“Sunrise Silver” Surface, SPC Bottom on Thick, Hard Base

The slab-type base of the PL-518 contribute to the overall high anti-howling qualities while providing especially good looks in a “Sunrise Silver” color. The bottom sheet is of SPC steel with high-speed vibration propagation, lowering the likelihood of howling, particularly caused by sound pressure

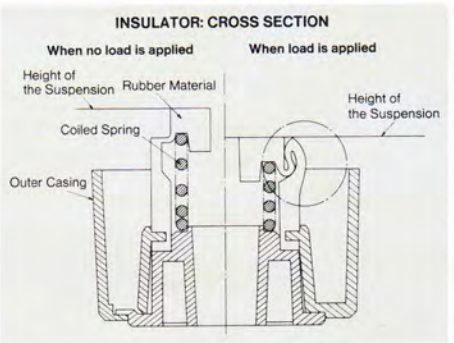
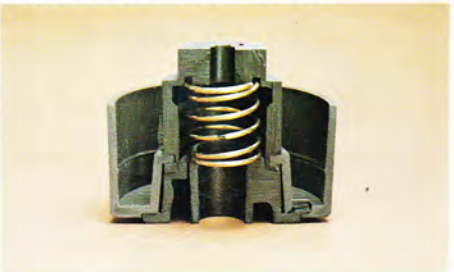


The anti-howling margin of the PL-518 is guaranteed by our repeated test.

from speakers. The base itself, of 40mm-thick hard particleboard, is in the form of single, solid slab to reduce the chance of resonance. Cavities are expertly cut into this to house the direct-drive DC motor and associated parts.

Large Insulators of Rubber/Steel Spring Design

As a final touch — and ultimate protection against howling, particularly “floor howling” transmitted through the shelf or countertop on which the PL-518 is mounted — we’ve added four large, newly-designed insulators. Inside each is a coiled steel spring exhibiting excellent linearity; a gum rubber type material is used to add high internal loss characteristics.



Additional Features

- Anti-Skate and Lateral Balancer Devices for Tone Arm
- Oil-Damped Cue Mechanism
- 45 rpm Adaptor

*Metal-like vinyl cabinet.



SUPERB TONAL QUALITY

- Direct-Drive DC Servomotor for Low Wow/Flutter
- Excellent Signal-to-Noise/Anti-Howling Characteristics
- Time-Tested Auto-Return and Quick-Start Convenience

PL-518 SPECIFICATIONS

MOTOR AND TURNTABLE

Drive System: Direct-drive System
Motor: DC servo motor
Speeds: 33-1/3 and 45 rpm
Speed Control Range: Within $\pm 2\%$
Wow and Flutter: No more than 0.03% (WRMS)
Signal-to-Noise Ratio: More than 73dB (DIN B)

TONE ARM

Type: Static-balanced S-shaped pipe arm
Effective Arm Length: 8-11/16-inch (221mm)
Overhang: 5/8-inch (15.5mm)
Usable Cartridge Weight: 4g (min.) to 10g (max.)

OTHER FEATURES

Auto-return, Auto-shut-off tone arm system,
Anti-skating,
Oil-damped cueing device,
Strobe illumination light

MISCELLANEOUS

Power Requirement: 120V 50/60Hz only
Power Consumption: 7 watts
Dimensions: 17-3/8(W) x 5-5/8(H) x 14-3/8(D) inches
440(W) x 145(H) x 365(D)mm
Weight: 20 lb. 15 oz./9.5kg

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



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OMNI MUSIC SYSTEMS
R.R. # 3
Rochester, MN 55901

PIONEER PL-400

FULL AUTOMATIC QUARTZ-PLL DC DIRECT-DRIVE TURNTABLE



PIONEER

PIONEER PL-400

The All-Around Best-Buy Full-Automatic

Innovation in hi-fi is contagious. Like a catchy tune (or a cold in the nose) some audiophiles can't get it out of their heads that every new component must have a gimmick. Take turntables, and the question of "howling."

Not long ago, thick and heavy cabinets were considered *la mode de la mode*. Veined marble bases and gilt fittings included, some looked like commodes. Others were filled with cement, as if ready for a long walk on a short pier. They shared one advantage: thieves would weigh the chances before hastening them off along with your amp.

Lately there's an emphasis on slimmer, trimmer cabinets on the theory (correct) that it's not the *mass* but the *acoustic profile* of a turntable which helps it resist howling. Shapes which offer less surface area to the sonic bombardment

from your speakers naturally suffer less acoustic resonance. Records sound less muddy, more transient.

But you can go only so far in slimming down a turntable cabinet without first slimming the motor. So Pioneer has perfected our new "Stable Hanging Rotor" design, creating the *world's thinnest direct-drive turntable motor*. Then we built our howl-proof cabinet around it, putting the full automatic controls up front where you can use them even with the super-slim cover closed.

Learn all the details of these and other features of the Pioneer PL-400. You'll see that innovation at Pioneer has reached epic if not epidemic proportions when it comes to making more progress in hi-fi for you.

PIONEER'S SUPER-THIN QUARTZ-PLL DC MOTOR

The motorshaft does not rotate!

This is the feature which is most apparent when you examine the construction of the new Pioneer "Stable Hanging Rotor" DC motor. Unlike most other motors, this one is designed around a fixed motorshaft, *atop* which is the pivot for the spindle and platter assembly. That pivot is located *at the center of gravity for the entire rotating structure*. This is a vital point if you are to understand the real beauty of this Pioneer design: our platter itself serves a gyrostatic function in stabilizing its own rotation axis and therefore eliminating all platter wobble that might endanger speed accuracy. Compare this with old-fashioned systems which place the pivot point at the bottom of the rotating shaft/motor/platter assembly. You can easily imagine that a tiny tipping in the attitude of the axis of such a design is magnified by the time it reaches the platter to result in what aircraft (and spacecraft) pilots call "yaw." This, in turn, contributes to serious stylus mistracking, not to mention increased wow/flutter and other speed deviations.

Center of Gravity, Fulcrum & Stability—How they're Dynamically Related in Stable Hanging Rotor Construction

Pioneer's New Stable Hanging Rotor System



Conventional Motor Construction



U.F.O. (Unusually Faithful Operation)

The Stable Hanging Rotor design also eliminates many of the bulky, space-wasting motor elements used in conventional types. Overall mass is lowered, thickness is reduced by as much as 50% and a slimmer, more practical profile is created. This, in turn, has permitted us to design the super-thin cabinet for the PL-400—reducing the cabinet's overall surface area and greatly increasing the "howling margin," avoiding acoustic resonance even when your speakers are pumping out high-amplitude sound. In addition to the improved tonal quality (less "mud and thud" in record reproduction thanks to lowered resonance throughout) this design also offers unusually faithful and long-life operation since it has fewer moving parts and suffers less friction and stress.

Quartz-PLL servosystem ensures very high accuracy.

One drawback of the direct-drive system, even when DC motors are used, is drift, caused by temperature changes within and without. All so-called "servocontrol" systems aim at reducing drift, with varying degrees of success. Our improved Quartz-PLL servo, using Hall elements for speed detection and a Periphery Integration technique, is the most successful of all. This is why:

Hall detection elements are integrally mounted with the stator coil. There are a stationary printed coil of low impedance design which offers 200 pulses, and a magnet with 200 poles, built on the rim of the Stable Hanging Rotor in the motor. As the latter rotates above the former, 200 pulses are generated in the circuit. In our unique Periphery Integration technique, the signal thus obtained is proportionate to the actual speed of the motor at all times. This signal is then sent to the PLL (Phase-Lock Loop) circuit where it is compared for phase differences with a very stable frequency obtained from an energized crystal of quartz (the same type of "time-base" reference used in quartz timepieces).

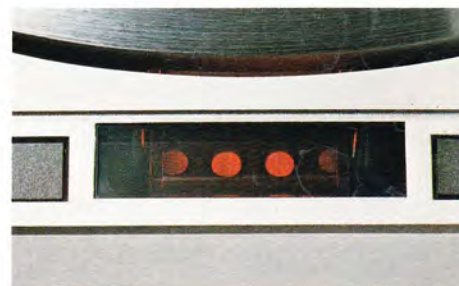
Differences (if any) are then converted into control voltages which in turn "tell" the motor to speed up or slow down to achieve

absolutely accurate rotational speed (33- $\frac{1}{3}$ to 45rpm) at any given moment. The advantages of this Pioneer system are (1) that no detection error can occur even in the face of slight intolerances of the magnetic pole placement, and (2) that because the impedance of the circuit is extremely low, it neither causes nor is affected by radio interference, extraneous noise or power-line hum. Evidence of the high accuracy in this motor is the very low wow/flutter specification: 0.025% (WRMS) or less!

Quartz-timed strobe has only one stripe.

The first generation of direct-drive turntables, you may remember, has complicated-looking multiple rows of strobe calibration dots around the platter edge. To use them you had to first determine the speed (33- $\frac{1}{3}$ or 45 rpm) and then the power line frequency (50Hz or 60Hz) you were using, then locate the proper dotted stripe, then squint at it long enough to determine if the dots were "creeping" to indicate speed inaccuracy. The reason for this clumsy design was, of course, that such strobes were timed by the alternating current frequency. We've ended all this confusion with a simple-to-use, easy-to-see *one-stripe* strobe on the PL-400. It glows in a soft cherry red to indicate

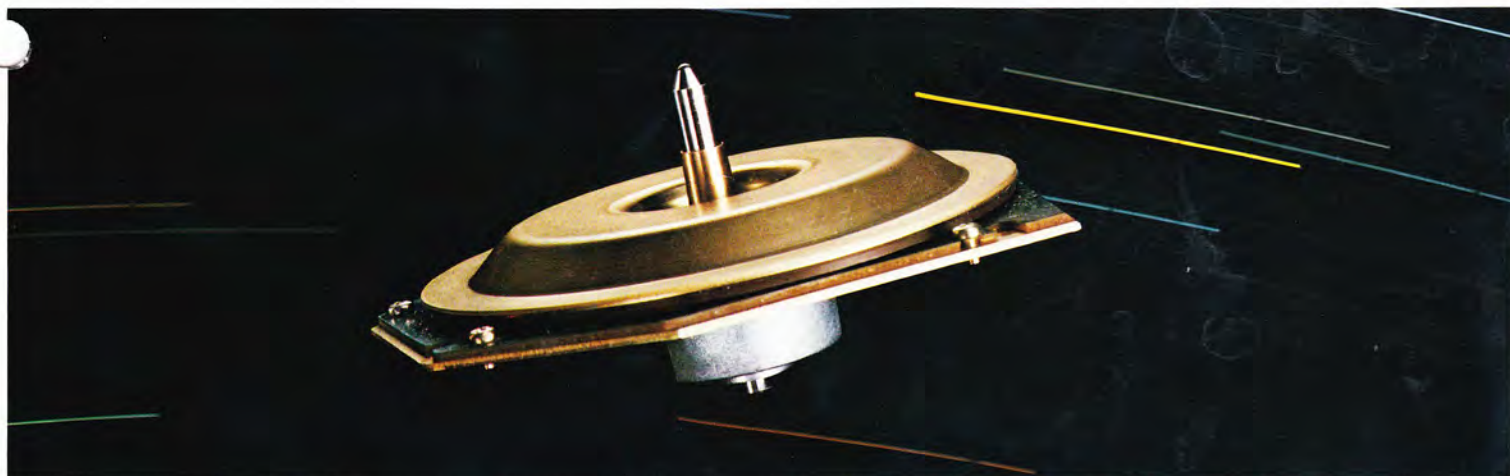
power-on status and confirm platter speed accuracy. The timing pulse is derived directly from the quartz crystal—simple, clean and precise.



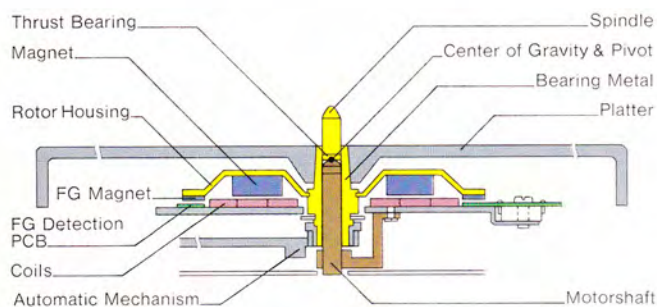
FULL AUTOMATIC PLAY, RETURN, STOP, REPEAT

The convenience of FULL AUTOMATIC operation.

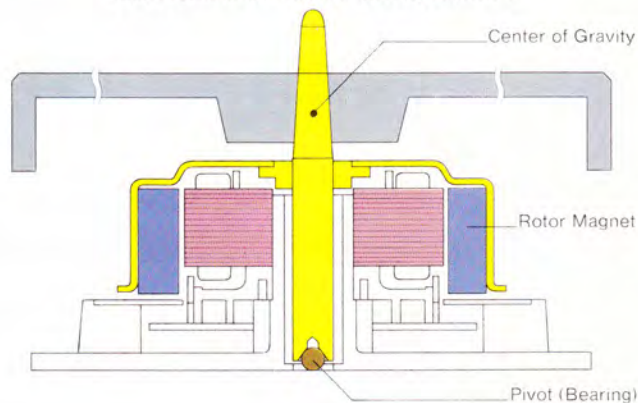
There was a time when "fully automatic" was almost synonymous with unstable performance when it came to record players. This was because the automatic mechanisms were linked mechanically to the tone arms

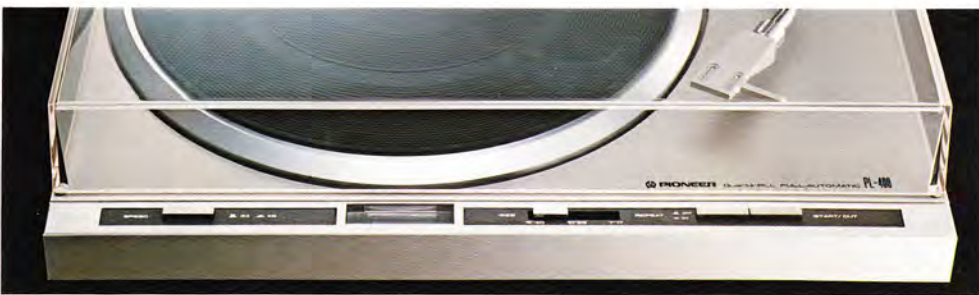


Pioneer Perfects World's Thinnest Turntable Motor



Conventional Motor Construction





even during play, causing drag, resonance and lowered sensitivity. In the Pioneer PL-400 we've taken care to reduce these threats to high fidelity performance by designing a sophisticated precision mechanism which greatly reduces the complexity of arm-to-control linkage. Noiseless plastic parts are fitted by hand into diecast metal holders in the chassis itself in an "outsert" technique which affords greater alignment precision and much lower vibration.

Just touch the START button...

After you have selected record size and speed, just touch the START button once and:

1. **AUTOMATIC LEAD-IN**—The tone arm is lifted gently, moved without jerking to a point over the lead-in groove of your record, then lowered to the record surface to begin play.
2. **AUTOMATIC CUE**—If you set the ARM LIFTER lever at the base of the arm to the  position, then touch the START button, the arm will be moved to a point over the lead-in groove and stop to await your CUE to begin play. Then you simply move the lever to the  position and play begins. Use this convenience when you want to interrupt play momentarily, or when you use the tone arm manually, to avoid record/stylus damage.
3. **AUTOMATIC LEAD-OUT/RETURN**—When the stylus enters the lead-out groove of your record, a special detection system triggers the automatic mechanism to again lift the arm gently, then return it to its rest; power is then shut off automatically unless you have also pushed the REPEAT button.
4. **AUTOMATIC REPEAT**—This defeats the automatic shutoff operation and provides infinite repeat cycling of the automatic lead-in/lead-out/return function. Use the CUT control at any time to override the automatic functions (including REPEAT) and return the arm and shut off power.



Pioneer's unique QUICK-START feature

Simply lift and move the tone arm manually (or use the START button) as usual and wait for the platter to start revolving. The difference is that the moment the tone arm begins to move toward the platter, revolution begins. Operation is much faster (and rated platter speed is obtained far more quickly) than in conventional systems, thanks to Pioneer's QUICK-START.

TONE ARM, PLATTER & ANTI-HOWL CABINET

Mass Concentrated Tone Arm is Pioneer exclusive.

Newton said it best: "...bodies at rest tend to stay at rest." Likewise, as he observed, bodies in motion *will not stop of their own accord*. What these elementary laws of motion mean to tone arm design is that inertia must be strictly controlled if the side-to-side and up-down motions of your stylus are to reflect the undulations in the record groove and not the tiny vibrations of the tone arm and turntable themselves. We've outfoxed inertia by using what we call a **MASS CONCENTRATED** design. By shortening the distance between the support and the counterweight on the tone arm of the PL-400, and reducing the mass at the stylus tip, we have reduced crossmodulation distortion, improved tracking accuracy and prevented the reinforcement of all forms of extraneous vibrations and resonance. Dramatic improvements in clarity and channel separation in the reproduced sound field are among the benefits.

More stable from base to headshell.

Special Pioneer designs throughout the tone arm on the PL-400 help increase stability and defeat resonance. The tone arm base, for instance, is solidly mounted in such a way that is physically "decoupled" from the cabinet. Even the arm support and its pivots are streamlined and stabilized, while at the extreme end of the arm we have installed a special headshell formed of a new shock-proof polyester-based resins and glass fiber.

Slim, trim cabinet is 20% lower in profile.

The overall height of the Pioneer PL-400 including the cover, is only 96mm (about 3-³/₄ inches)! Even measured up against our closest competition, this is a full 20% thinner and, therefore, 20% less likely to suffer "howling" caused by sonic bombardment. The depth (cover open) of the PL-400 is only 380mm (about 15 inches) or approximately 10% less than the average. This allows you to position the turntable much closer to a wall or the back of a cabinet for still more savings in space.

Our COAXIAL SUSPENSION smooths out the shocks.

Unless your listening room is buried inside a mountain or fully cushioned in rubber, structure-borne vibrations ("floor howling") is always a danger to clean record reproduction. That's why we've used a very special suspension design on our best turntables, dubbed the Pioneer Coaxial Suspension System. Large springs and insulators, mounted on the bottom panel and on the external cabinet shell respectively, together discourage the propagation of all vibrations from within and without. Disbursal of shocks is handled laterally thanks to the common-axis design. (See illustration on back page.)

Other Useful Features

- **FRONT-PANEL DESIGN**—We have mentioned the convenience of having all the controls for SPEED (33/45), SIZE (12"/30 cm; 10"/25cm; 7"/17cm), REPEAT (OFF/ON) and START/CUT up front. But here we must add that this design also reduces the chance that your operation of the controls will cause shocks and possible damage to the turntable while it is in operation.
- **DUST COVER**—It is visually transparent but sonically opaque to further extend the howling margin of the PL-400. Hinges are free-stop type, and cover is removable. Operation is possible with cover closed.
- **COUNTERWEIGHT/TRACKING FORCE DIAL**—Designed for quick and easy setting; weight is "decoupled" from arm shaft to lower mutual resonance.
- **ANTI-SKATE DIAL**—Also easy to set to match the tracking force you have chosen and prevent "skating" of the arm toward the spindle.



This Slim & Trim Turntable Has The World's Thinnest Motor!

- Ultra-Thin "Stable Hanging Rotor" Quartz-PLL DC Motor
- Front-Panel Access to All Full Automatic Controls
- Mass Concentrated Arm, Slim-Line Cabinet, Coaxial Suspension

PL-400 SPECIFICATIONS

MOTOR AND TURNTABLE

Drive System: Quartz-PLL direct-drive System
 Motor: Quartz-PLL Stable Hanging Rotor hall-motor
 Speeds: 33-1/3 and 45 rpm
 Wow and Flutter: No more than 0.025% (WRMS)
 Signal-to-Noise Ratio: More than 75dB (DIN B)

TONE ARM

Type: Static-balanced S-shaped pipe arm
 Effective Arm Length: 8-11/16-inch (221mm)
 Overhang: 5/8-inch (15.5mm)
 Usable Cartridge Weight: 4g (min.) to 9g (max.)

OTHER FEATURES

Full Automatic Lead/Cut/Return/Off, Quick-Start system, Built-in strobe illumination light, Oil-damping cueing device, Anti-skating, Free-hinged acrylic cover

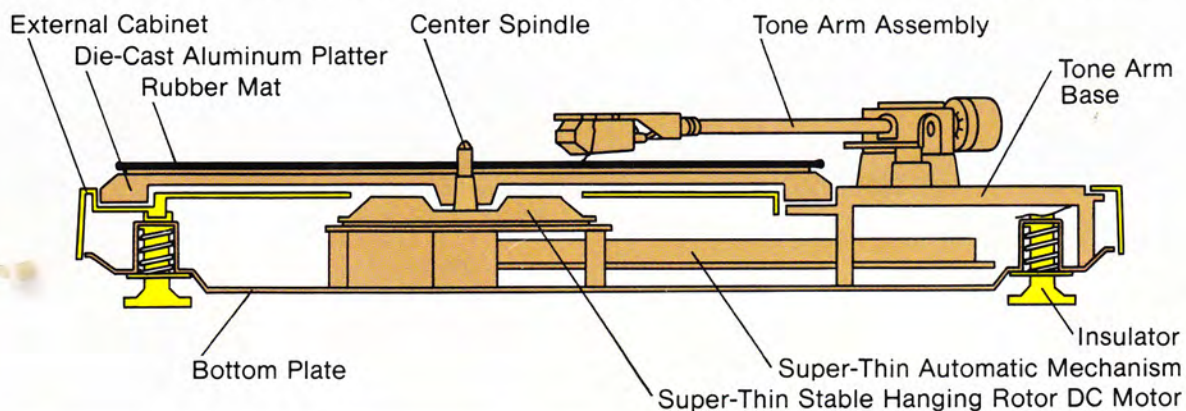
MISCELLANEOUS

Power Requirement: 120V 60Hz only
 Power Consumption: 8 watts
 Dimensions: without package
 16-9/16(W)×3-3/4(H)×14-3/16(D) inches
 420(W)×96(H)×360(D)mm
 without package
 14 lb. 5 oz./6.5kg

Weight:

OMNI MUSIC SYSTEMS
 R.R. # 3
 Rochester, MN 55901

Cross Section of Coaxial Suspension System



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

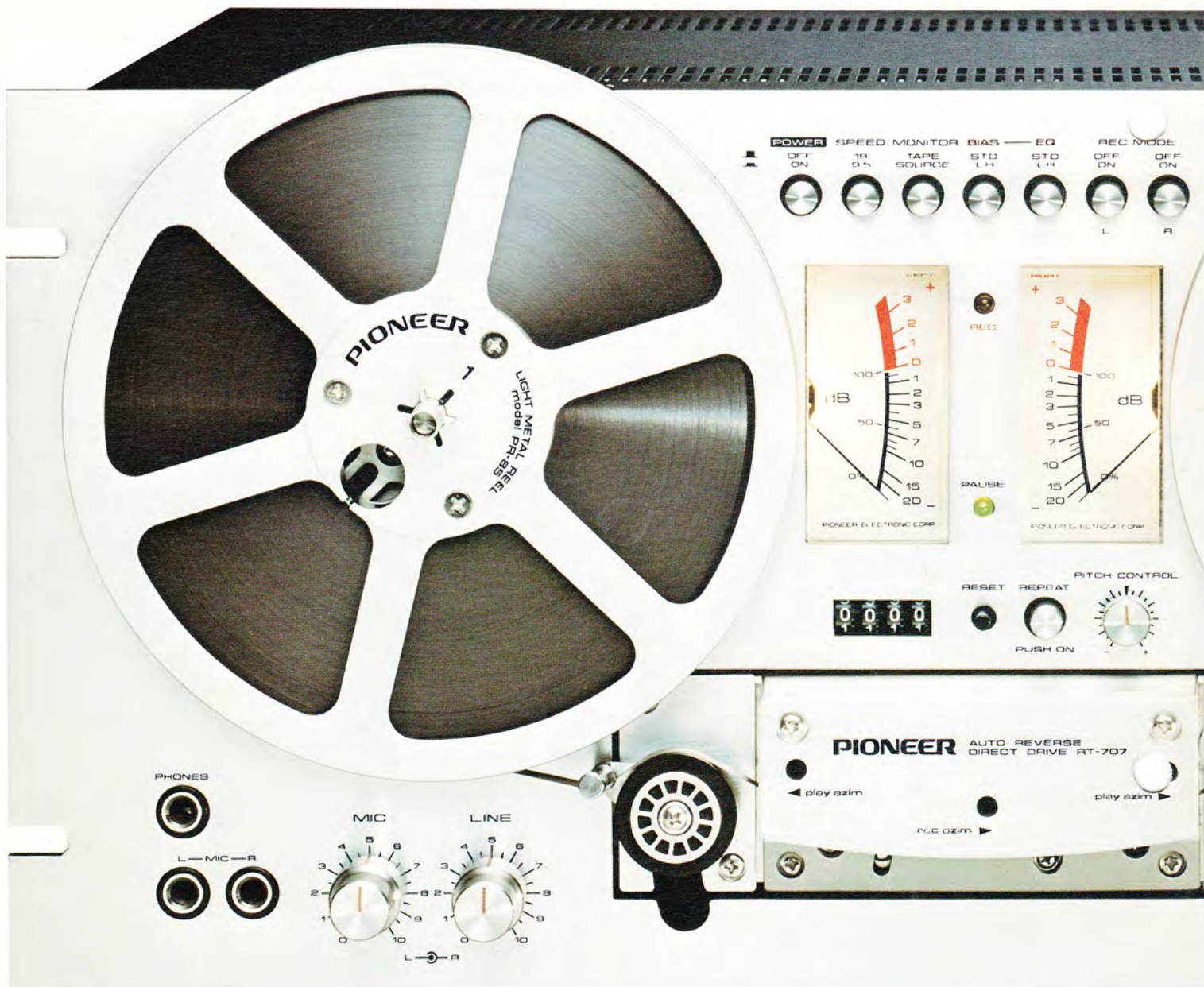


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 PIONEER MARKETING SERVICES PTY. LTD. / P.O. Box 317, Mordialloc, Victoria 3195, Australia

RT-707

OPEN REEL 4-HEAD AUTO-REVERSE PLAYBACK 3-MOTOR AC SERVO
DIRECT-DRIVE STEREO TAPE DECK

 **PIONEER[®]**

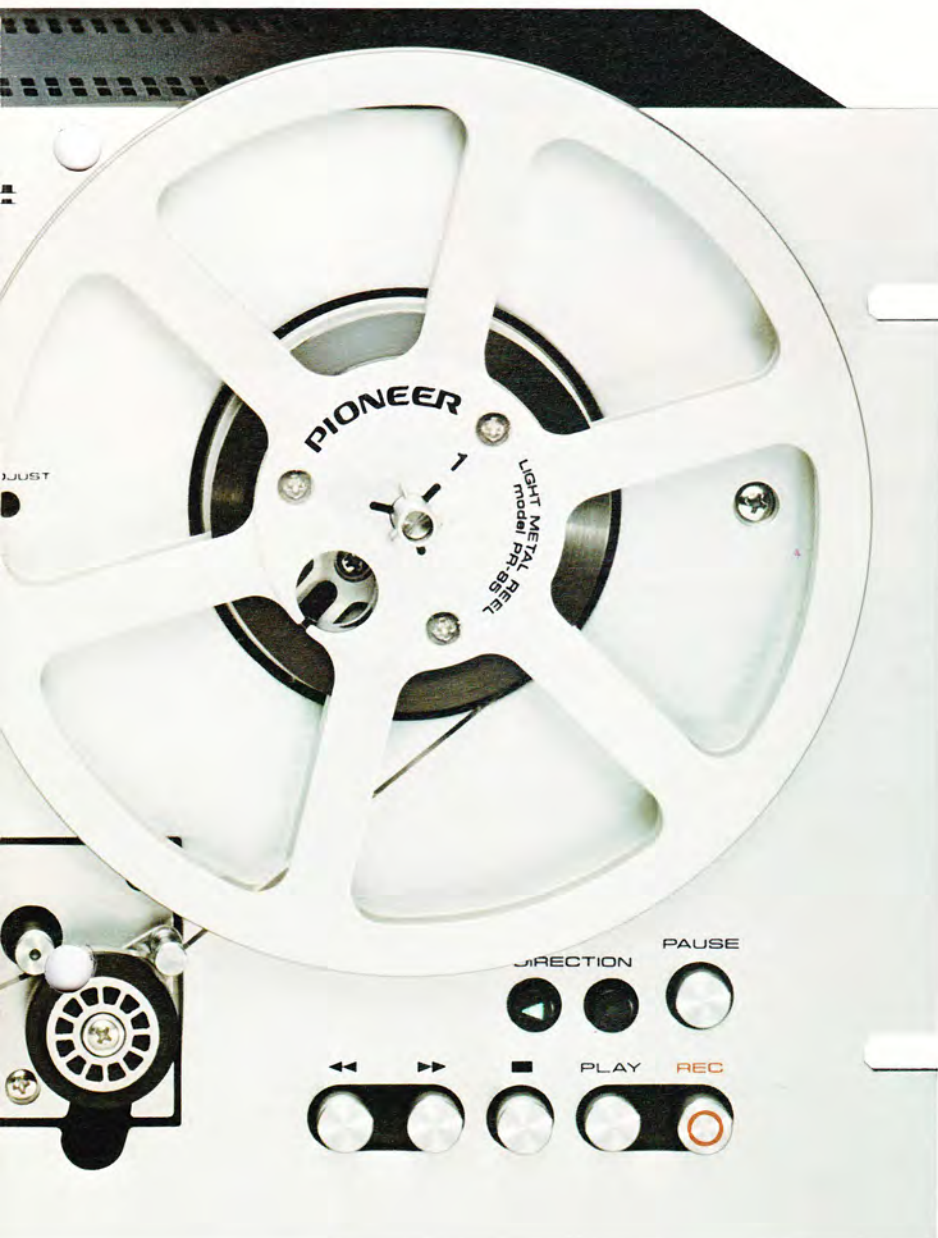


Rich "Old-Fashioned" Open Reel Musical Performance in A New Generation Auto-Reverse Playback/AC Servo 3-Motor, 4-Head Deck from Pioneer

Magnificent musical performance, compact and efficient size, unfailing electronics, stress-free mechanics. The RT-707 reflects Pioneer's stay-ahead success in hi-fi by offering all the things you know you need in an open reel deck, and then some.

Design is 4-head, 3-motor, 2-speed (19/9.5 cm/sec), auto-reverse (playback only), continuous play with pitch-controllable AC Servo Direct-Drive capstan. Format is quarter-inch, 4-track, 2-channel stereo. Performance is 0.05% WRMS wow/flutter, 58dB signal-to-noise ratio, 20 to 28,000Hz frequency response. And

the extra are 2-step Bias, 2-step EQ, $\pm 6\%$ Pitch Control, Hard Permalloy heads, independent mic/line with mixing, wide-throw VUs, auto-reverse/infinite play and auto-reversing index, electronic switching (logic circuit), Pause, REC ON/OFF switching for each channel, and lots more. This new Pioneer SERIES 700 open reel deck sounds as good as it looks—the rich and dependable sound of the best old-fashioned decks, plus the technical advantages and conveniences of the new generation of hi-fi tape machines. Stay ahead in hi-fi with Pioneer.



A NEW APPROACH TO AUTO-REVERSE CONVENIENCE

Non-stop, no-hassle music. Open reel decks with auto-reverse features have promised this in the past. But now new advances in deck engineering at Pioneer live up to this promise of convenience without compromising high fidelity playback standards. With the RT-707 you enjoy the same high quality musical reproduction from open reel tapes in both forward and reverse directions, allowing you to hear both sides of your tape without the need to flip the reel or punch a button. Simply attach a strip of standard sensing foil on the tail



end of the tape (i.e. the end of side one) — or at any other point on the tape — and you're all set. With an ordinary 7" reel at 19cm/sec you get the whole hour and a half of music automatically.

AUTO-REPEAT PLAY, TOO



With a strip of sensing foil attached at the end of the tape, and with the Repeat button locked IN, the Pioneer RT-707 will perform endless forward and reverse play automatically on a tape between the point where the sensing foil is attached and the point where the four digit tape index counter is set for 0000, until you disengage the button or set the mode to STOP.

RACK YOUR ROCK 'N' ROLL

Youngsters taught the automobile industry that "customized" cars offered streamlined performance and good looks as well. Young hi-fi fans have taught the component designers at Pioneer that the "total system" look in home high fidelity systems offers streamlined performance plus the clean and compact efficiency of professional sound studio equipment. Our Pioneer matched component systems have enjoyed tremendous popularity among young buyers in Europe, Japan and America for that very reason. The RT-707 is designed for rack mounting according to the EIA (Electronic Industries Association) standard dimensions/mounting holes — neat, solid and a far cry from the monster decks of the past.



The above PIONEER EIA audio rack (JA-R2S) is optional. The TX-9500II and SG-9500 shown are rack mounted with the use of an adaptor, Model JA-R101, available at option for mounting audio equipment not sized on EIA standards.

*The audio rack, JA-RIA, for US overseas military market differs in height. Please refer to spec sheet on JA-RIA.

DIRECT-DRIVE CAPSTAN

"Direct-Drive" technique isn't only found in Pioneer turntables. It gives you much of the same advantages in the open reel RT-707 as well. A Frequency-Generation (FG) type AC Servomotor with high rotational accuracy drives the single capstan shaft directly in both forward and reverse directions and at 19cm/sec speed with a minimal wow/flutter of less than 0.05% WRMS. The high rotational accuracy of the motor, combined with the use of a precision-finished shaft and a large flywheel (7,600g-cm² inertia) with excellent dynamic balance, adds up to superb musical performance. Separate, high-speed



motors are used for Fast-Forward and Rewind.

ADVANTAGES OF DIRECT DRIVE

Decks using drive belts or pulleys to rotate the capstan shaft tend to show their age early. Belts flutter, sag and slap; pulleys stretch, twist and slip. Pioneer's direct-drive motor has none of these drawbacks.

(1) Rotational accuracy is enhanced because the transfer and control of the drive force is direct, and relies on no extra mechanisms or frills. Stability over long life.

(2) Signal-to-noise ratio is improved because the extra-low speeds of the motor generate less vibration and rotational noise.

(3) Less power consumption is a bonus advantage, along with the reduction of induction hum and heat.

(4) Pitch Control is possible—and easy—because the direct-drive motor is the servo type with a frequency generated reference.

HIGH-SPEED, HIGH-STABILITY REEL DRIVE

Separate motors are used in the 3-motor system of the RT-707 for reel take-up and high-speed Rewind/Fast-Forward. The tape path is designed with very precise tolerances and built to stay that way: the front panel is a thick 5mm sheet of tough aluminum covering the rugged die-cast frame. Precision fabricated die-cast pinch roller arm construction and tension arm stand up to more-than-normal abuse with strength. Tape tension and tape-to-head contact is kept ideal with the use of a time-tested tape tension regulation system which provides equal tape tensions by identical tension regulators both at the supply side and take-up side.



A tape tension regulation system assures perfect head-to-tape contact.

QUICK-ACTION PAUSE

"Human-engineering" concepts are employed throughout the RT-707, as in the quick-action Pause mechanism. We know how and how often you need or want to use Pause. We have figured out a way to make it work best for you. Push it and the pinch rollers move away from the tape instantly; push it again and they resume contact for smooth tape transport.

is kept narrow, and the mechanism kept hair-triggered, so that you don't drop the downbeat of the music you're recording or editing.



PLAY/RECORD MODE: The pinch roller features a high friction factor and a high driving torque for smooth tape transport.



PAUSE MODE: The pinch roller stays close to the capstan, while tape is in contact with heads. Start-up is instant.



STOP/FAST FORWARD/REWIND MODE: The pinch roller is far away from tape path, to enable easy tape loading and smooth tape transport.

HEADS AND AMPS

Hard Permalloy playback heads (2) and recording head (1) and tough ferrite erase head further improve long-life performance. Tonal quality, wear factors and noise suppression are among the considerations leading to the selection of these particular, mirror-polished units. Equal care is taken in the recording amps and playback. Pioneer-exclusive ICs boost high power resistance, lower noise and provide better S/N and still better dynamic range (30dB over the norm). The separate microphone input amp accepts mic impedance as low as 600 ohms for live recording at its realistic best.



INDEPENDENT BIAS/EQ SELECTION

Two 2-step buttons are provided, one for Bias selection, the other for Equalization selection. There is thus a total of four different Bias/EQ values to let you use all types of open reel recording tape on the market, including the ones which exhibit excellent high-spectrum characteristics and minimal distortion.



INDEPENDENT L/R RECORDING MODE

Left only, Right only, or Stereo. You select the channel(s) you want to record by pushing either or both of the buttons at the right of the array above the VUs. Switches may be used at any time during recording, as often as you like. Change the amp connections on the rear panel and you can create sound-on-sound and other effects easily.

DIRECT-CHANGE TRANSPORT BUTTONS

Move from mode to mode without going through STOP. Tape-safe mechanism allows you to go from, say, FAST-FORWARD to PLAY without fear of jamming or tape breakage by a logic circuitry. This system does permit timer-assisted recording.



PITCH CONTROL

The effective speed control range is $\pm 6\%$ (semitone), enough to change the musical pitch of a recorded instrument significantly. Say you're playing a tape made on an old and not-to-dependable deck, and it sounds sluggish or too sharp. The RT-707 brings you back to perfect pitch at a touch. A built-in protection circuit automatically cancels the pitch control adjustment in recording mode so that you don't accidentally record at an incorrect pitch.

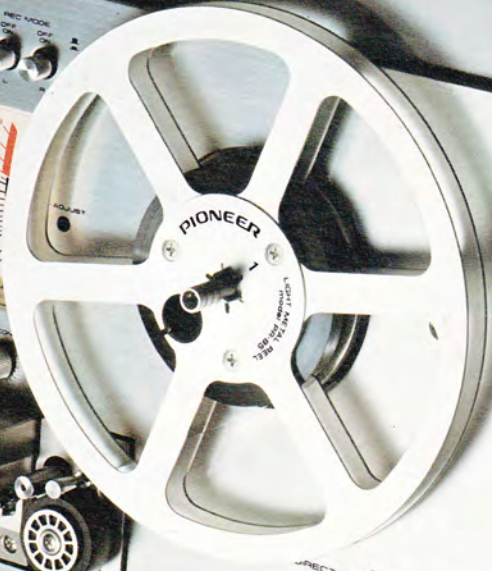
THERE'S MORE THAN MEETS THE EYE

On the back panel of the Pioneer RT-707 is a stereo output control to let you adjust—then forget—the output level of the deck. Make your volume adjustments through your amp or receiver, the way you usually do. Other conveniences include:

- (1) Independent MIC and LINE input level controls, L/R separated.
- (2) Clear, well-illuminated, long-throw VU meters.
- (3) Indicator lights for REC, PAUSE, DIRECTION.
- (4) One-touch reel clamps.
- (5) 300W AC outlet.
- (6) Designer's bonus—an empty take-up reel with each deck.

PIONEER

PIONEER



SPEED MONITOR 945 950 955 960 965 970 975 980 985 990 995 1000



PIONEER STEREO TUNER
TUNING
FM 88 90 92 94 96 98 100 102 104 106 108
AM 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

REVERSE PAUSE
PLAY REC

FM 88 90 92 94 96 98 100 102 104 106 108
AM 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690 700 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000

PIONEER STEREO TUNER TX-1

BASS 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
TREBLE 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
VOLUME 0 10 20 30 40 50 60 70 80 90 100
BALANCE
MODE STEREO MONO
ATTENUATOR
FUNCTION PHONO 2 PHONO 1

PIONEER STEREO PRE

RT-707 SPECIFICATIONS

Drive System:	3-motor drive system	(3) Automatic repeat play (connected with tape counter)
Operations:	Solenoid drive, direct switchable function buttons and pre-set function buttons for timer recording and playback	(4) Independent right/left recording mode selectors
Motors:	FG Servo AC direct drive motor x 1 (capstan drive), 6-pole inner-rotor special induction motor x 2 (reel drive)	(5) Tape selectors: Bias x 2 (STD/LH) EQ x 2 (STD/LH)
Tape Heads:	4-track, 2-channel erasing head x 1, 4-track, 2-channel recording head x 1, 4-track, 2-channel playback head x 1, 4-track, 2-channel reverse playback head x 1	(6) LINE/MIC mixing
Maximum Reel Size:	7-inch reel	(7) Output level controls (rear panel)
Tape Speeds:	7-1/2 ips (19cm/sec.), 3-3/4 ips (9.5cm/sec.) $\pm 0.5\%$	(8) Pause indicator lamp
Fast Rewinding Time:	Approximately within 100 seconds (7-inch reel, 370m)	Power Requirements:
Wow and Flutter:	No more than 0.05% WRMS within $\pm 0.14\%$ (DIN) (at 7-1/2 ips, 19cm/sec.), No more than 0.08% WRMS within $\pm 0.18\%$ (DIN) (at 3-3/4 ips, 9.5cm/sec.)	For U.S.A. and Canada: 120V 60Hz only, For other countries: 120V/220V/240V or 220V/240V (switchable) 50-60Hz
Signal-to-Noise Ratio:	More than 58dB	Power Consumption:
Distortion:	No more than 1% (at 7-1/2 ips, 19cm/sec.)	Dimensions:
Frequency Response:	7-1/2 ips (19cm/sec.): 20 to 28,000Hz (30 to 24,000Hz ± 3 dB), 3-3/4 ips (9.5cm/sec.): 20 to 20,000Hz (30 to 16,000Hz ± 3 dB)	Without package:
Crosstalk:	More than 50dB	18-7/8(W) x 9-1/16(H) x 14-1/32(D) inches
Stereo Channel Separation:	More than 50dB	480(W) x 230(H) x 356(D)mm
Erasing Coefficient:	More than 70dB	Without package:
Bias Frequency:	125kHz	44 lb. 1 oz./20.0kg.
Equalizer:	NAB curve (7-1/2 ips, 19cm/sec., 3-3/4 ips, 9.5cm/sec.)	(1) 7-inch metal reel (PR-85) x 1
Input (Sensitivity/Maximum allowable level/Input impedance):	MIC x 2: 0.25mV/125mV/27 Kohms, 6mm ϕ jack, LINE x 2: 50mV/25V/100 Kohms, pin jack, DIN: 16mV/8V/1.3 Kohms, DIN standard	(2) Connecting cable (stereo) x 2
Output (Reference level/Maximum level/Load impedance):	LINE x 2: 450mV/700mV/50 Kohms, pin jack, DIN: 450mV/700mV/50 Kohms, DIN standard, HEADPHONES: 70mV/8 ohms, 6mm ϕ stereo jack	(3) Head cleaning kit x 1
Semiconductors:	ICs; 5 Transistors; 67 (including 4 FETs) Diodes; 47 (including 1 Thyristor, 2 Varistors, 4 Zener Diodes and 2 LEDs)	(4) Splicing tape x 1
Other Features:	(1) Pitch control (variable $\pm 6\%$, only playback) (2) Automatic (with sensing tape) and Manual reverse playback	(5) Sensing tape x 1

NOTES:

- (1) Reference tape: Scotch No. 206.
- (2) Reference recording level: meter 0dB level. (NAB standard reference level)
- (3) Reference signal: 1kHz.
- (4) Wow and Flutter: JIS (3kHz, weighted RMS)
- (5) Frequency Response is measured at -20 dB level (7-1/2 ips) from reference recording level.
- (6) Signal-to-Noise ratio is measured at $+6$ dB level from reference recording level.
- (7) Total harmonic distortion is measured at the reference recording level.
- (8) Channel separation is measured at the reference recording level (JIS).
- (9) Crosstalk is measured at 0dB (JIS) from the reference recording level.
- (10) Sensitivity: Input level (mV) required for the reference recording level measured with input (recording) level control set at maximum position. With the level meter set at 0dB.
- (11) Maximum allowable input level is measured at the point where the output signal wave starts to clip while gradually increase the input level at the input terminal at the same time, turning down the input level control to keep 0dB on the meter.
- (12) Reference output level: meter 0dB level.
- (13) Maximum output (playback) level: Output level to the reference recording level, measured with an output (playback) level control set at maximum position.

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

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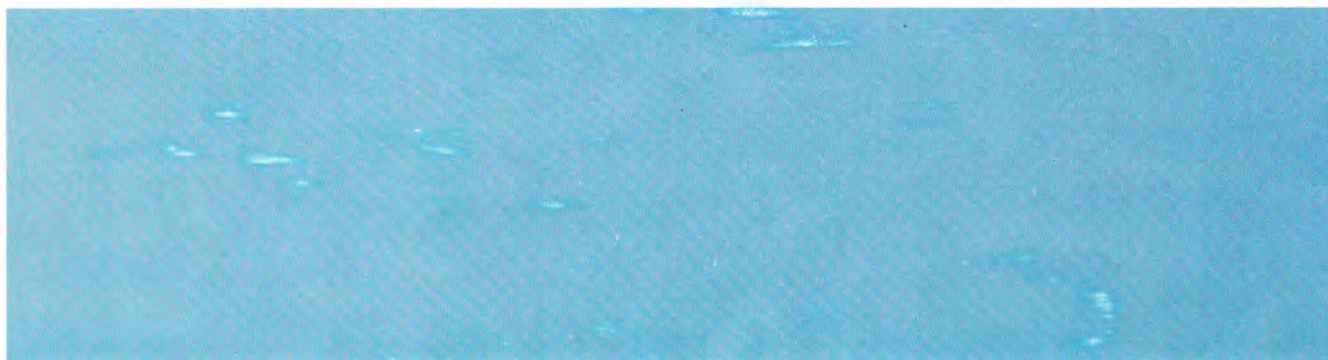
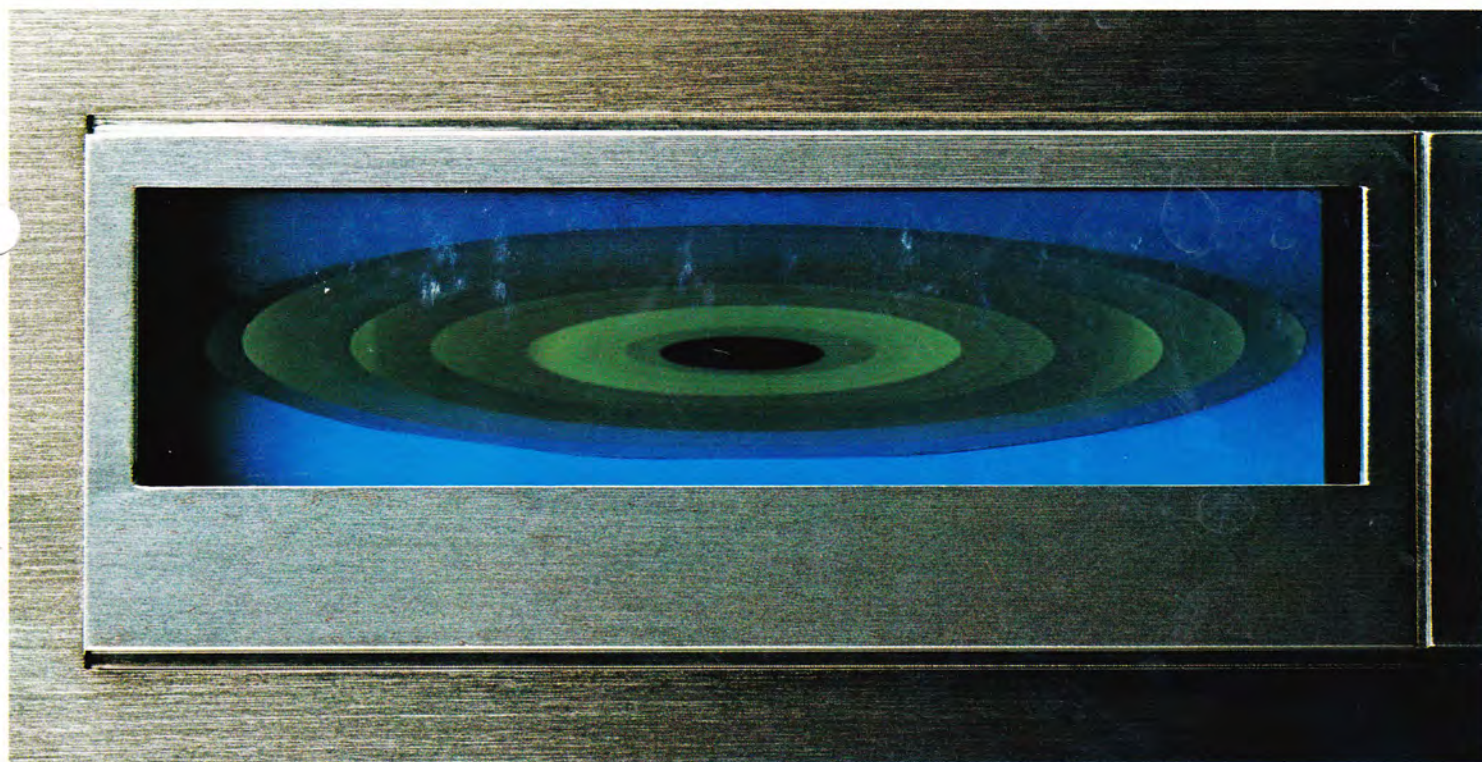
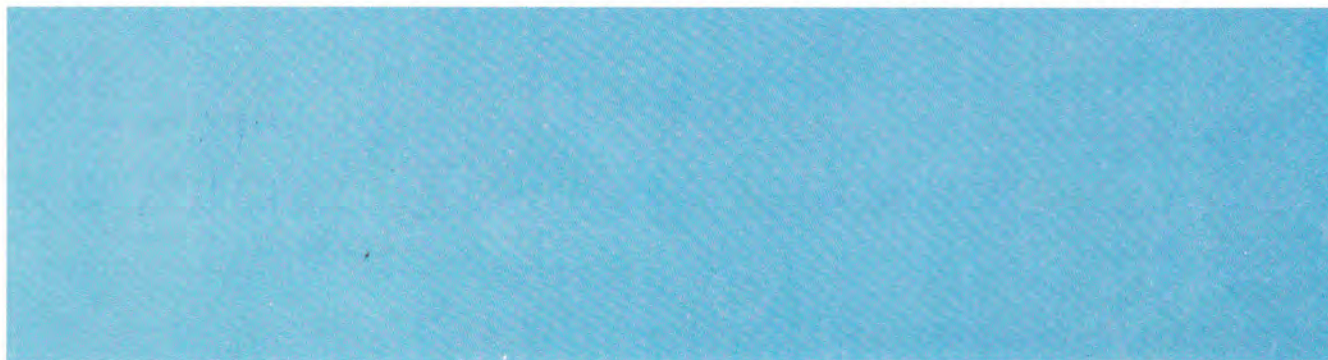


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179.87

PIONEER SR-303

REVERBERATION AMPLIFIER—TIME/DEPTH CONTROL WITH B.B.D. IC



 **PIONEER®**

PIONEER SR-303

All-Electronic Reverb & 3-Dimensional Time/Depth Display

- "Bucket-Brigade" IC electronics eliminate howling.
- Reverb. Time/Depth switches are continuously adjustable.
- Unique and colorful Reverb. Effect Indicator.
- Impressive hi-fi specifications.



An entire symphony orchestra would look strange packed into your living room. It would sound even stranger. But using valid techniques in electronics and high fidelity to "bring the musicians into your home" is possible, even desirable, when you add the Pioneer SR-303 to your existing system. For a reasonable investment, Pioneer gives you the same benefits you'd find in the world's most sophisticated "time delay" systems—the ones you've read about, costing many more times the worth of your home hi-fi rig. Time-delayed components mixed in varying proportions with the original signal have the effect of recreating a deeper, richer musical sound field. This is not merely "echo processing" but actually an outgrowth of psycho-acoustic research where the emphasis is not on "presence" but on "you are present." The SR-303 uses a newly-developed IC element called BBD (Bucket-Brigade Device) to shut out unnatural "echo howling" effects, and is built with the same thorough care as all other Pioneer high fidelity equipment to shut out noise and distortion that might tip-off the listener that he was hearing something "mechanical." Here are the details:

An external clock signal drives each element, switching it on or off at a rate you control with the REVERB TIME knob on the front panel of the SR-303. How much of the delayed signal is mixed back into the original is determined with the DEPTH knob, also a continuously-adjustable type control.



Reverberation Section

If you increase REVERB TIME, the amount of feedback sent from the output back to the input's Buffer Amp is increased. If increased over a certain amount, multiple delays are created, and can be used for an echo effect. But if that feedback is decreased to zero, the multiple delays vanish, leaving only one delayed component. By using the latter phenomenon, and controlling it with the REVERB TIME control in the EFFECT 2 mode (pulled out) you can create a "Chorus Effect". In the EFFECT 1 mode the multiple delays are mixed for ordinary "mirrored room" infinite echo effect.

Center Components Detector

The SR-303 retains a natural musicality and avoids harsh "cave-echo" sound. Moreover, the spatial sense is never distorted. Both these advantages stem from the Center Components Detector system. It permits the selection of only in-phase signals; since in-phase signals are those which appear to be "located" in the center of stereo sound field between your speakers, the *dimensional* sense is also respected. This is particularly effective on vocals.

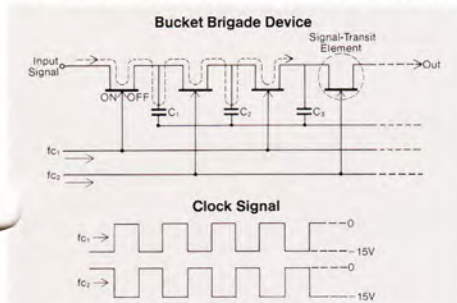
Some Useful Features

There is an input attenuator (—6dB) switch, a set of input/output terminals for LINE and a set of rec/play terminals for TAPE on the rear panel. Using the REVERB RECORDING switch on the front, you can put processed signals on tape; the TAPE MONITOR switch lets you monitor taped material if your deck permits. And when you want to bypass the active elements entirely, use the OFF switch. For your reference, the continuously-adjustable controls on the front panel offer a DELAY TIME of 25 to 100m Sec (Effect 2) and a REVERBERATION TIME of 0 to 3 seconds (Effect 1), measured at 400Hz.



The Bucket Brigade

How to slow down a sound without spoiling its immediacy? This has been a problem in hi-fi from the beginning when it came to using "echo" effects to increase a sense of spaciousness in musical reproduction. Spring devices, capacitor-filled boxes, elaborate and fussy tape-delay systems couldn't satisfy a true audiophile's ear. So Pioneer engineers refined a little-known electronic system, put it in IC form, and created the vital circuit at the heart of the SR-303, the so-called Bucket Brigade Device. The IC contains several hundred signal-transit elements; an input signal is passed from one to another on its way to the output. During the process, the signal is delayed in time but not effected in any other way. (See the illustration).



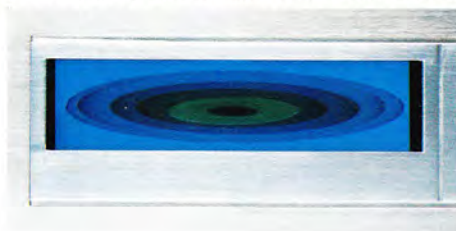
Some Impressive Specs

The danger in add-on units is always the possibility of increasing noise and distortion in the signal you are trying to enhance. We've kept the signal-to-noise ratio to 90dB or better, and the distortion factor to 0.05% or below, to prevent this.

A Unique Time/Depth Display

Indication of the reverberation effect of the Pioneer SR-303 is made in this unusual display. When signal input is zero, the oval-shaped image glows in a cool Pioneer blue. As you introduce a signal, the edge of each ring flushes in green in proportion to level. Since the display is constructed of six acrylic boards, one behind

another, the effect is perceived in "three dimensions" adding a novel time/depth visual appeal.



Rack-Mountable Design

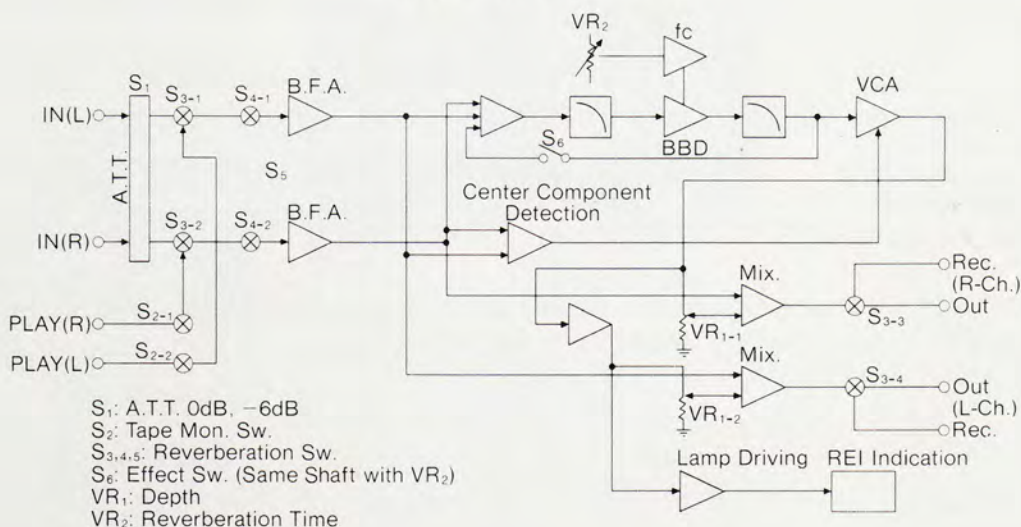
As are all new hi-fi components in the Pioneer lineup, the SR-303 is sized for mounting on

professional-type audio racks (EIA standard). Adaptors (Pioneer JR-104 2U EIA size) are optional.

*For U.S. overseas military market, the rack mounting adaptors are included in the price of SR-303.



SR-303 BLOCK DIAGRAM



SR-303 SPECIFICATIONS

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 $\pm$ 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)

SEMICONDUCTORS

ICs:	8
FET:	1
Transistors:	14
Diodes:	16

MISCELLANEOUS

Power Requirements:

Power Consumption:
Dimensions:

Weight:

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R.R. # 3

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For U.S.A. and Canada: 120V 60Hz only,
For other countries: 110/120/220/240V
(switchable) 50-60Hz, 220/240V
(switchable) 50-60Hz
13 watts
Without package:
16-1/2(W) x 3-7/8(H) x 13-1/4(D) inches
420(W) x 99(H) x 336(D) mm
Without package:
9 lb. 8 oz./4.3kg

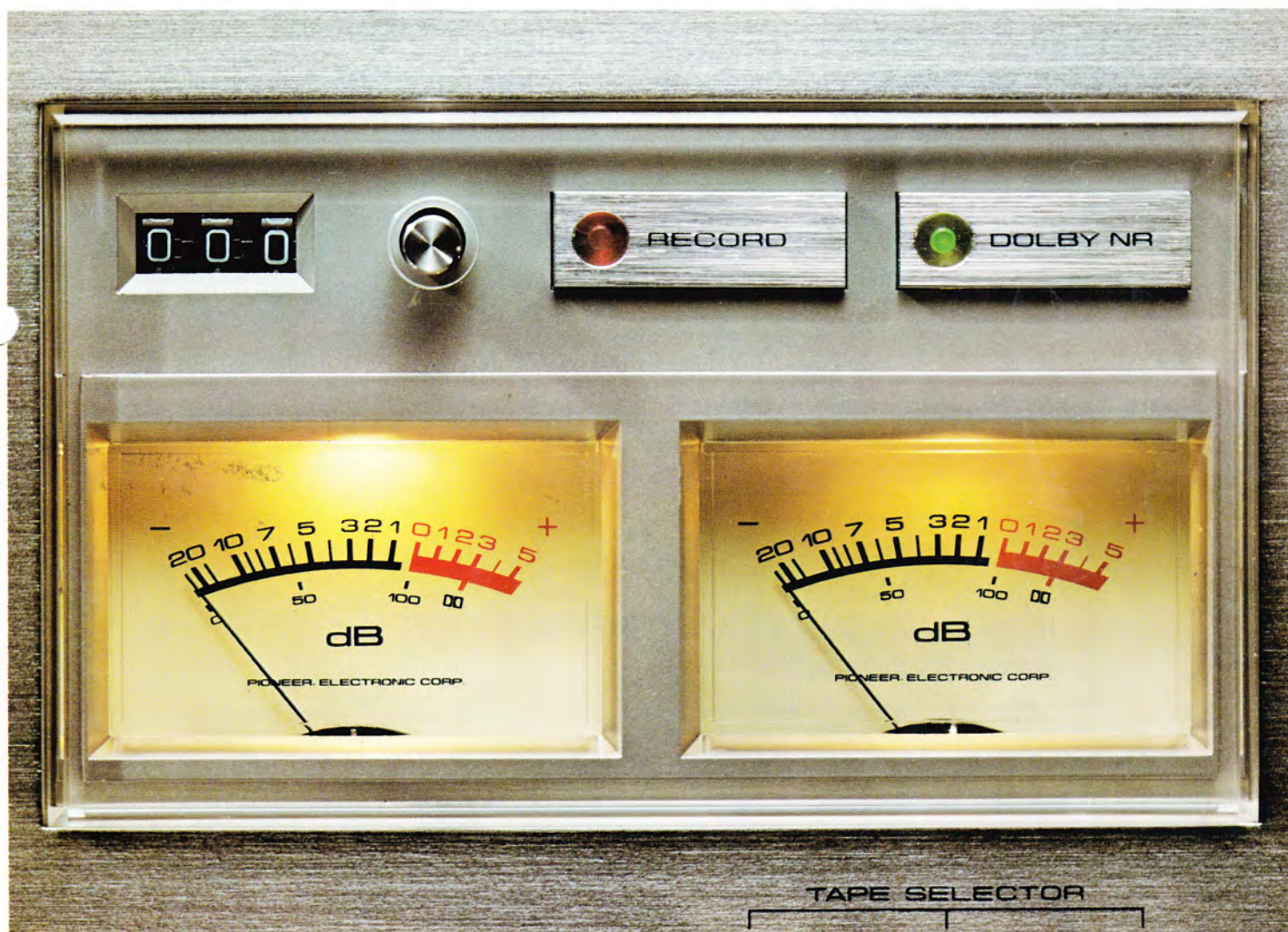
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PIONEER CT-F500

STEREO CASSETTE TAPE DECK WITH INDEPENDENT DRIVE SYSTEM

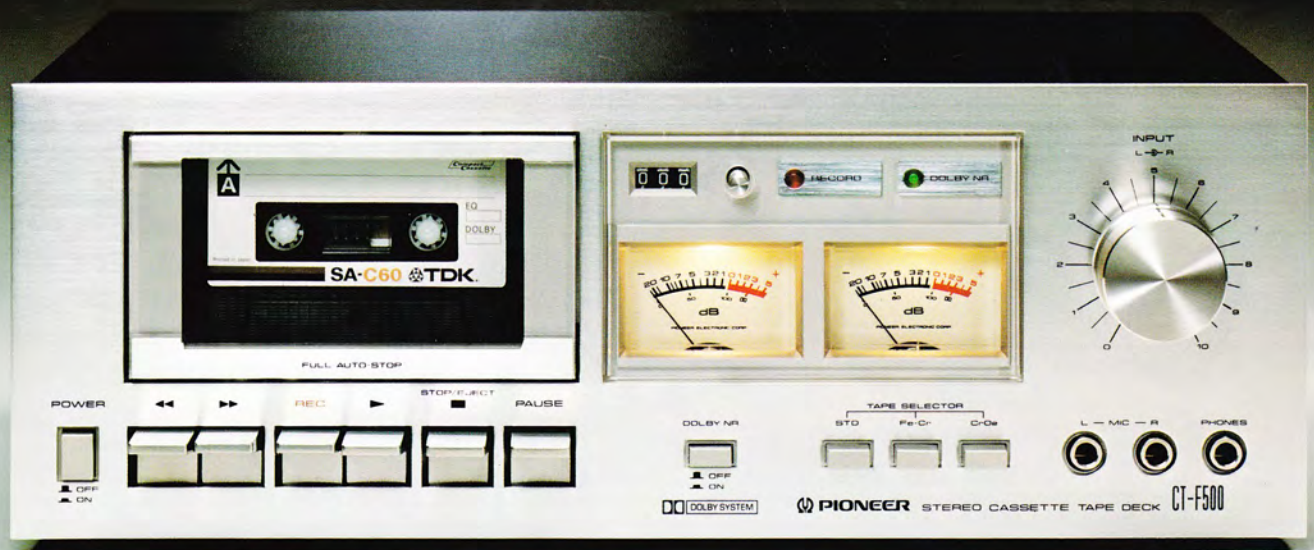


 PIONEER®

PIONEER CT-F500

Basic Hi-Fi Performance Has Never Been Better

- Independent Drive for Low 0.05% Wow/Flutter
- All-Mode Shut-Off & New DC Motor
- 3-Mode Tape Selector, Dolby, New Permalloy Head

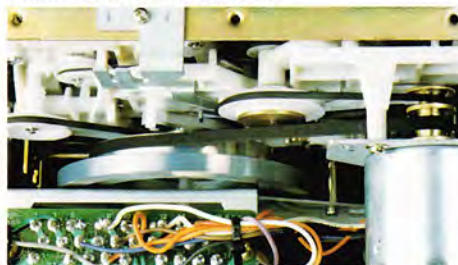


Extremely Dependable Deck

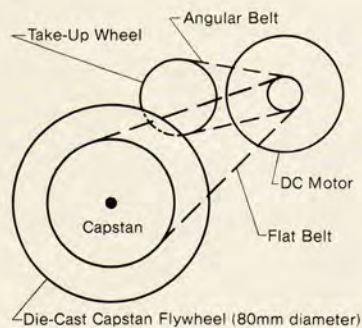
Basic hi-fi performance? That means low wow/flutter so that your music is played back with perfect pitch—over the entire length of the tape. It means the widest possible frequency response and dynamic range so that your music's here-and-now flavor doesn't become then-and-gone. It means a built-in Dolby to reduce "hiss" and other hassles relating to the critical signal-to-noise ratio. The Pioneer CT-F500 is basic, as its price might indicate. But basic has never been better.

Independent Drive for Impressive Accuracy

High stability in tape transport speeds is one of this deck's claims, and it's delivered by a newly-designed drive system. The rotation force of the DC motor (see below) is passed directly to a large, diecast flywheel via a flat belt. The flywheel, an unusually large 80mm in diameter, has excellent inertial characteristics, and because the take-up motive power is passed to the reels directly, independently of the motor/capstan flywheel system, reel drag is eliminated to prevent generation of wow/flutter. The direct system for wheel drive also eliminates belt slippage; winding is smooth and even and sound quality is improved.



PIONEER INDEPENDENT DRIVE SYSTEM



Why a DC Motor in a Cassette Deck?

You know that many of the latest direct-drive turntables on the market use a DC type motor to obtain the highest accuracy

possible. But you may wonder why we've used the same kind of motor for the CT-F500, since most decks in this price range use AC. The reason is simple: the challenge in creating a reasonably-priced deck to offer unquestionable accuracy demanded it. The wow/flutter is an impressively low 0.05% as a result.

Three-Mode Tape Bias/Equalization Switching

No complicated multi-position switches or knobs here. There are three pushbuttons only, STD, Fe-Cr and Cr-O₂, which enable you to switch the deck to get the most out of the particular tape you are using. Their back-up circuits handle equalization changeover as well as bias switching. Selecting the right combination is easy, and the extended frequency response and dynamic range the right combination offers is what high fidelity is all about when it comes to cassettes.



All-Mode Automatic Shut-Off

This one works! And you can depend on it to end tape stretching, case warping and capstan/roller damage every time. When your tape reaches its end in any mode, the pinch roller and head carriage are automatically moved away from the tape, and all operation buttons are disengaged: STOP.

Soft-Damping Cassette Holder

Our engineers have found that pneumatic damping is the most effective system to use on decks with "kangaroo pocket" tape compartments, like this one. One reason is that there's no complicated mechanical/gear mechanism to make noise, or jam. The engineers (themselves hi-fi users) know that you like to have a clear field of vision



to check tape labels, etc., and for that reason have designed the CT-F500 with a large transparent compartment cover (removable for head maintenance).

Newly-Developed Permalloy Head

Which is more important to you, low head/tape wear or better electrical performance? Until recently, deck designers had to make a choice: ferrite has the hardness and smoothness to resist abrasion, but in its pure form isn't so hot when it comes to magnetic stability; permalloy, on the other hand, has superb electrical properties which keep the high-frequency range of the tape close and faithful to the original. To make permalloy harder, we've re-mixed the formula and improved the shape in this newly-developed head. Basic performance is yours—for a long, long time.



Other Basic Features You'll Appreciate

- **DOLBY® NOISE REDUCTION**—Perhaps too little is said about Dolby these days, as it has become a more-or-less standard feature on most hi-fi quality decks. Without it, the cassette format with its narrow tape width and slow tape speed, wouldn't be as popular, for noise (especially high-frequency "hiss") would increase significantly. The CT-F500 uses the latest generation of Dolby circuits, one contained in an IC for long-life stability. The circuit is switched, with its own lighted LED indicator.
- **LEFT/RIGHT MIC JACKS**—The amps behind them are automatically switched for MIC inputs when mic plugs are inserted; high S/N and lower distortion are the benefits.
- **EXTRA LARGE LEVEL CONTROL**—Input level control is easier since this precision "pot" fits your fingers for a smooth control "feel."
- **CONTEMPORARY DESIGN**—The CT-F500 is no larger than it needs to be. Controls are arranged for maximum ease of use, and the visual appeal of the front panel reflects the latest in high fidelity equipment from Pioneer.

*Dolby is a trademark of Dolby Laboratories, Inc.

CT-F500 SPECIFICATIONS

Type: Compact cassette tape deck,
2-channel stereo/mono

Motor: Electronically-controlled DC motor

Heads: "Hard Permalloy" recording/playback head x 1.
Ferrite erasing head x 1

Fast Winding Time: Within 90 seconds (C-60 tape)

Wow and Flutter: No more than 0.05% (WRMS)

Frequency Response: Standard LH tapes: 30 to 14,000Hz
(40 to 13,000Hz ± 3 dB)
Chromium dioxide tape: 30 to 16,000Hz
(40 to 15,000Hz ± 3 dB)
Ferrichrome tape: 30 to 16,000Hz
(40 to 15,000Hz ± 3 dB)

Signal-to-Noise Ratio: Dolby Off: more than 54dB
Dolby On: more than 64dB
(over 5kHz, standard, LH tapes)
When chromium dioxide tape is used,
signal-to-noise ratio is further improved by
4.5dB over 5kHz

Harmonic Distortion: No more than 1.5% (0dB)

Inputs (Sensitivity/Maximum allowable input/impedance):
MIC x 2: 0.3mV/110mV/10k ohms, 6mm ϕ jacks
(Reference MIC impedance;
250 ohms to 10k ohms)
LINE x 2: 65mV/14V/100k ohms, pin jack

Outputs (Reference level/Load Impedance):
LINE x 2: 450mV/50k ohms, pin jack
HEADPHONES x 1: 60mV/8 ohms 6mm ϕ stereo
jack

Semiconductors:
Transistors: 20
ICs: 2
Diodes: 11

Other Features: (1) Dolby system (ON/OFF) with LED indicator
(2) Tape Selector (STD/FeCr/CrO₂)
(3) All-mode Shut-off Mechanism
(4) LED Recording indicator

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

Power Consumption: 13 watts

Dimensions: Without package:
14-15/16(W) x 5-1/2(H) x 10-1/4(D) inches
380(W) x 140(H) x 261(D)mm

Weight: Without package:
11 lb./5kg

NOTES:

- (1) Reference tape: standard, LH tape are DIN 45513.
chrome tape is DIN 45513 (CrO₂).
- (2) Reference recording level is meter 0dB level.
(160 nwb/m magnetic level = Philips' cassette reference level.)
- (3) Reference signal is 333Hz.
- (4) Wow and Flutter: at 3kHz, WRMS (JIS), at 3,150Hz weighted
PEAK (DIN 45507)
- (5) Frequency response is measured at -20dB level for reference
recording level, Dolby off.
Level deviation is ± 6 dB (where not indicated). (DIN 45500)
- (6) S/N is measured at +4dB level for reference recording level
(250 nwb/m magnetic level = reference level of DIN 45513) with
IEC A curve when weighted. (DIN 45500)
- (7) Sensitivity: Input level (mV) for reference recording level measured
with input (recording) level control set at maximum position.
- (8) Maximum allowable input level (mV) is measured at the point
where the output signal wave is clipped while gradually
turning the input level control.
- (9) Reference output level is meter 0dB level.

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AMPLIFIERS by Soundcraftsmen

CLASS "H" - VARI-PORTIONAL®

Soundcraftsmen's revolutionary new Patent Pending VARI-PORTIONAL® system uses Analog Logic Circuitry to anticipate power demands, then supplies only a proportional amount of power, as required by varying input signal voltages.

The advantages of the VARI-PORTIONAL® system are obtained through its continuous monitoring of output power and requirements for optimum efficiency. This results in direct and measurable energy savings by reducing the amount of energy dissipated as heat loss, yet with controlled full power always available, standing by, and supplied as needed. This higher powered amp can be sold at a price even lower than ordinary Class AB amplifiers through cost savings made possible by the Patent Pending VARI-PORTIONAL® circuitry. For example, no fan is needed even under most severe operating conditions.

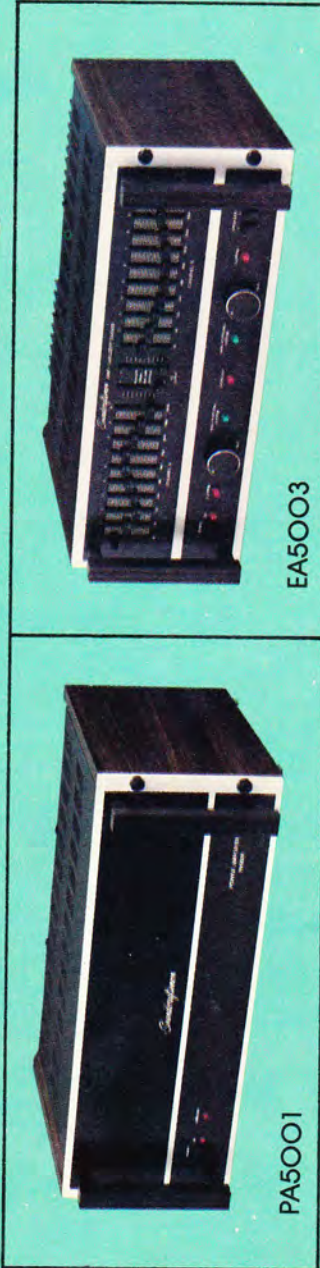
An added advantage is a substantial savings in power consumption. Class AB amplifiers of the same power rating, operating at $\frac{1}{3}$ power in accordance with FTC test requirements, will consume over 40% more energy than the Soundcraftsmen CLASS H amplifier. Thus, the CLASS H amp provides savings in heat dissipation of approximately 200 watts. Progressively greater percentages of savings may be obtained at lower power levels.

AUTO-CROWBAR® PROTECTION

This AUTO-CROWBAR® protection circuitry is unique among amplifiers. It uses no relays, no circuit breakers. It is all-solid-state, and is instantaneous-acting in triggering an SCR (silicon controlled rectifier), which discharges the amplifier's DC power supply in a few micro-seconds; simultaneously the AC power is de-coupled by a TRIAC, leaving the amp with no power applied. (An auxiliary low voltage (12VDC) power supply, used for meter lights and L.E.D.'s, remains activated. This supply turns on the overload L.E.D. and also resets the full AUTO-CROWBAR® circuit after approximately 2 or 3 seconds delay) when the overload is minor, such as over-driving or shorted speaker wiring. The AUTO-CROWBAR® circuit will automatically and continuously attempt to reset itself every second or two, until the overloaded condition is removed... This same AUTO-CROWBAR® protection circuit will also cut off the amplifier's output when an overheating condition exists. (This is extremely unlikely, because the VARI-PORTIONAL® SYSTEM enables the Soundcraftsmen amp to operate so efficiently that it is barely warm to the touch, even when operating at very loud music levels.)



MA5002



PA5001

EA5003

VARI-PORTIONAL SYSTEM® -

TECHNICAL DESCRIPTION: A brief explanation of the VARI-PORTIONAL® SYSTEM is that its computer-like ANALOG LOGIC CIRCUITRY senses and calculates the amount of voltage required in accordance with the amplifier's rising or falling output power level, and it then directs the power supply to make available precisely the amount of voltage required, with no wasted energy. The scope photo illustrates this Patent Pending system by showing a loud rock music signal penetrating the upper voltage supply, and also showing the supply VARIABLY increasing AHEAD of the signal. Because all electronics related to the energy saving/new class circuitry are out of the amplifier's feed-back loop, no change in sound can ever be detected. The second supply will only operate when it is necessary, but you will only know when you see the VARI-PORTIONAL® green L.E.D.'s turn on — your ears won't tell you.

