Technics
The science of sound

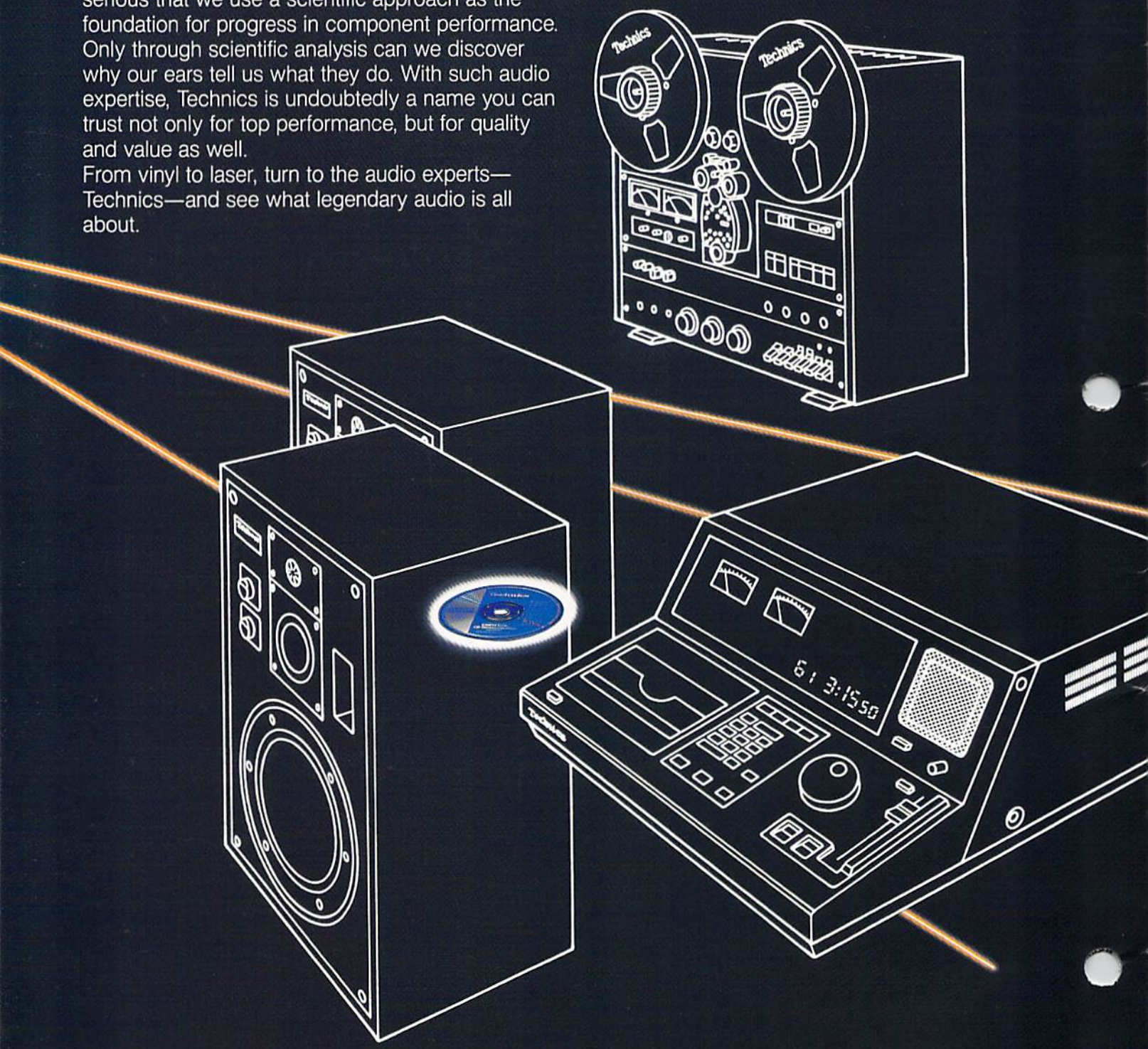
PROFESSIONAL SERIES

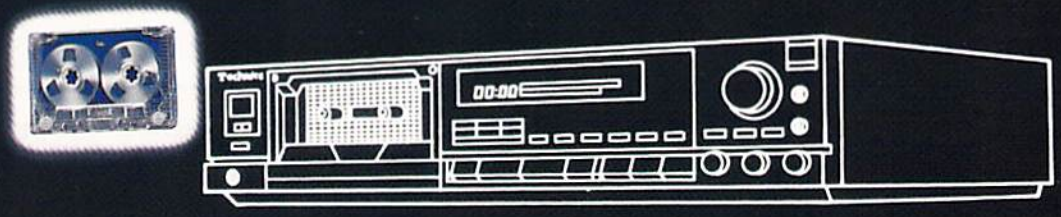
Professional Audio Designed by Professionals

85%. That's the percentage of broadcasting stations in America that use Technics turntables.

Why? Because Technics is serious about audio. So serious that we use a scientific approach as the foundation for progress in component performance. Only through scientific analysis can we discover why our ears tell us what they do. With such audio expertise, Technics is undoubtedly a name you can trust not only for top performance, but for quality and value as well.

From vinyl to laser, turn to the audio experts—Technics—and see what legendary audio is all about.

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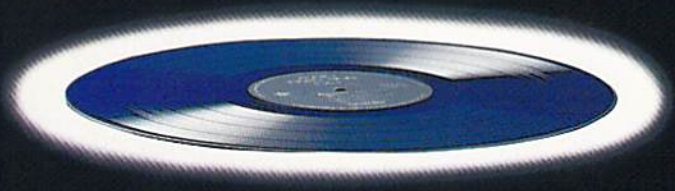

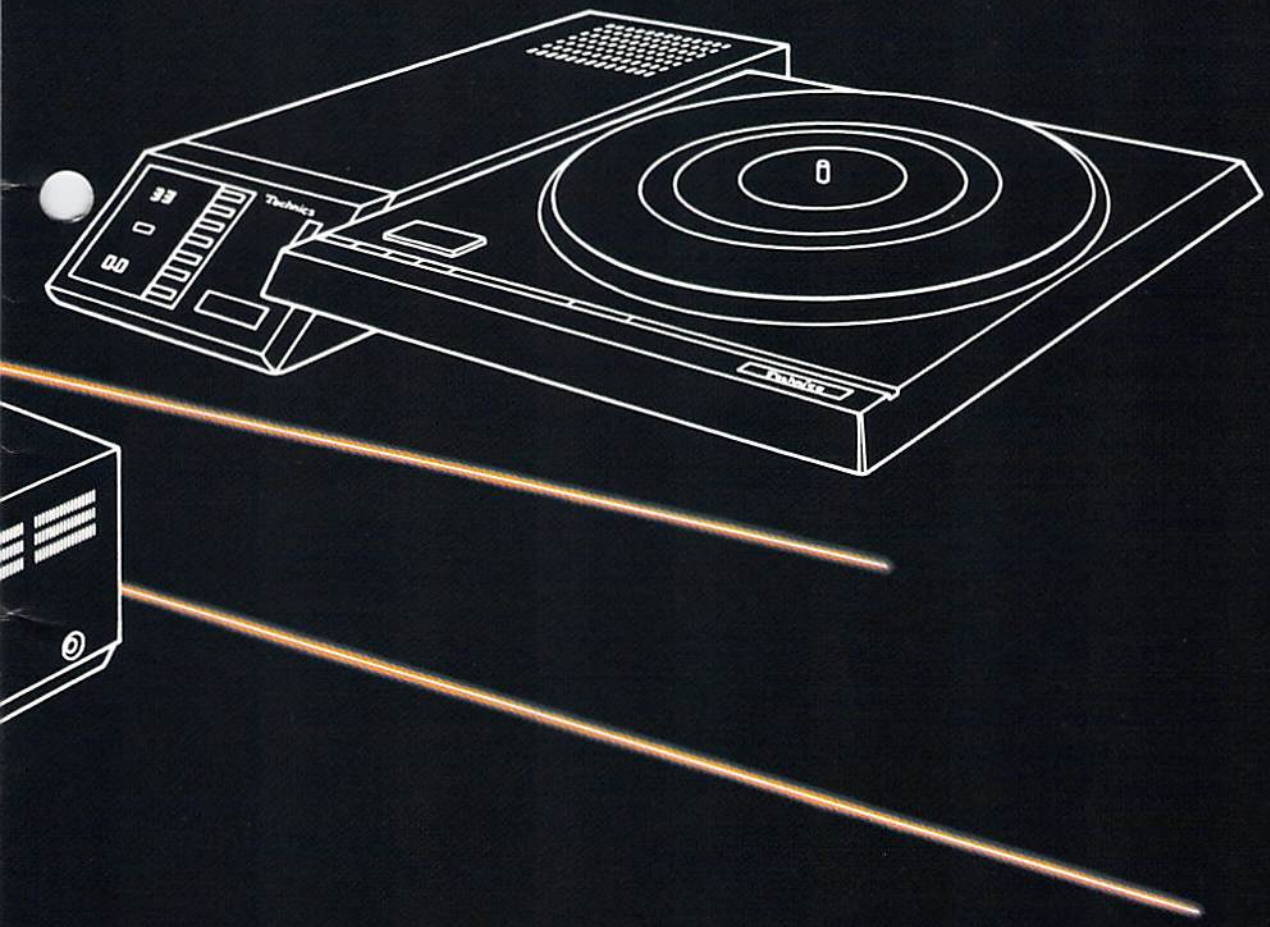
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SP-15 Quartz Synthesizer Direct Drive Turntable

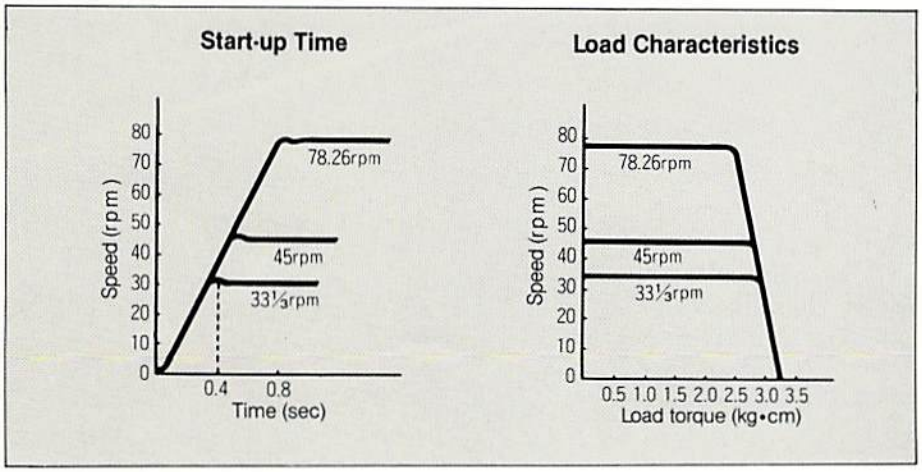
Setting the Standards for Professional Performance and Flexibility

When you're looking for the best turntable your money can buy, it makes sense to see what professionals choose. In many cases, the choice is a turntable from Technics—the originator of direct drive and quartz synthesizer pitch control systems. The SP-10MKII, and other models, are used by broadcasters (including Britain's BBC) in over 25 countries. The SP-15 offers high professional performance as well, in combination with the flexibility and convenience needed for home use. Impressive features include quartz synthesizer pitch control (as in the original SL-1300MK2 series), full cycle detection FG, high torque for fast starts and load stability, heavy duty construction, highly effective damping, a pulsed power supply, and a special lock mechanism that prevents accidental misoperation.

Quartz Synthesizer Pitch Control in 0.1% Steps up to ±9.9% at All Three Standard Speeds — with Digital Display

Many quartz-controlled turntables do not maintain their usual level of rotational speed accuracy when the pitch control is used because the reference frequency in the servo loop is fixed. But in Technics quartz synthesizer system, the reference frequency itself can be changed, or synthesized, so that rotational speed is always as precise as at standard speeds. This quartz phase-locked pitch control system is an important feature of the SP-15 because it gives precise variation in 0.1% increments above or below any of the three standard speeds (33, 45, 78 rpm) up to a maximum of ±9.9%.

With this precision system you can match the pitch of a record to that of a musical instrument, or expand and compress playing times to fit a given broadcasting time slot. The amount of pitch variation selected is clearly shown by a bright digital display above the pitch control buttons.



Instant Starts and Stops—Thanks to High Torque and Advanced Circuitry

Fast starting times and stopping times are a real advantage in broadcasting and other professional applications. The SP-15 comes up to full rotational speed within a mere 0.4 seconds after pressing the start button. This virtually instantaneous starting time is achieved by the very high torque (3 kg•cm) of Technics' heteropole, direct drive motor, backed up by the advanced circuitry of the servo system.

The 33.9 cm diameter 2.7 kg platter has a very high moment of inertia of 380 kg•cm² to help maintain speed accuracy, regardless of load fluctuations. In fact, load torque is so high and the servo control circuit so responsive that speed deviation is 0 % for tracking forces up to 500 g. This means that turntable speed would not be affected even with 250 tonearms, each tracking at 2 grams.

An ingenious combination of mechanical and electronic braking systems provides an extra measure of convenience and precision control. The turntable is brought to a smooth and complete stop within only 0.4 seconds of pressing the stop button.

Large Turntable Platter with Threefold Damping

To help eliminate resonances and damp external vibrations, the SP-15's large 33.9 cm aluminum diecast turntable platter is damped at three points. Specially fabricated rubber matting is placed in the underside, rim, and top of the turntable. As a result, acoustic feedback is suppressed even at high sound pressure levels.

Precision Diecast Aluminum Base and TNRC Base

Like the platter, the base is made of diecast aluminum. The underside of the base features TNRC (Technics Non-Resonant Compound)—a unique acoustic material specially developed by Technics and used with great success in a number of other Technics turntables. Thanks to the TNRC base and other anti-resonance measures incorporated in the SP-15, this turntable exhibits excellent resistance to acoustic feedback.

Advanced IC's Attribute to Compact Size and Precision

Thanks to a number of large scale integrated circuits, the SP-15 delivers superb performance without the need for excessive space for electronics. Four specially developed IC's perform the functions of about 3,000 discrete components.

Pulsed Power Supply Prevents Hum Induction

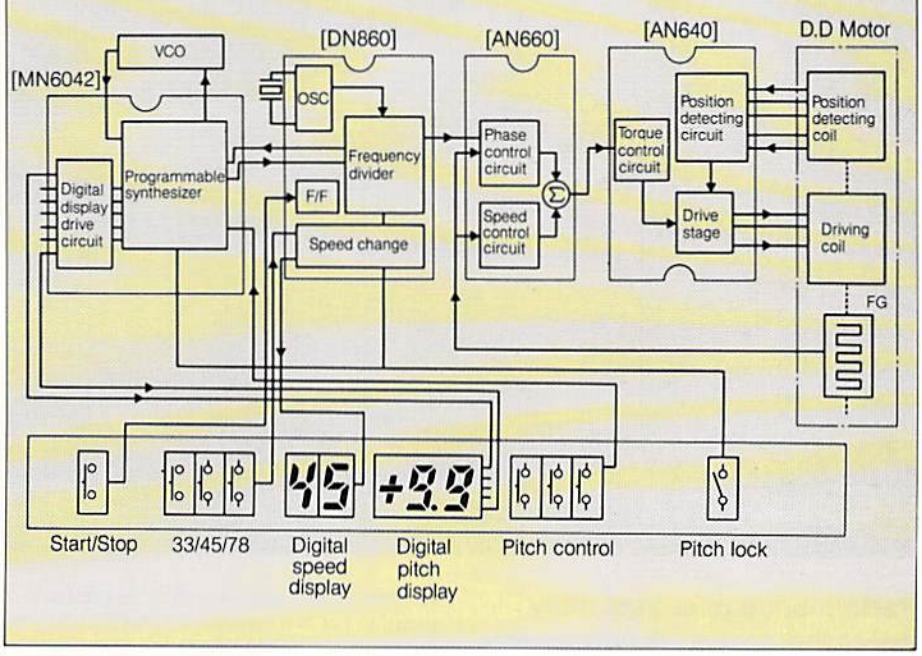
Technics pulsed power supply for the SP-15's direct drive motor is not only more efficient than conventional operating systems, but also serves to prevent AC frequency hum induction.

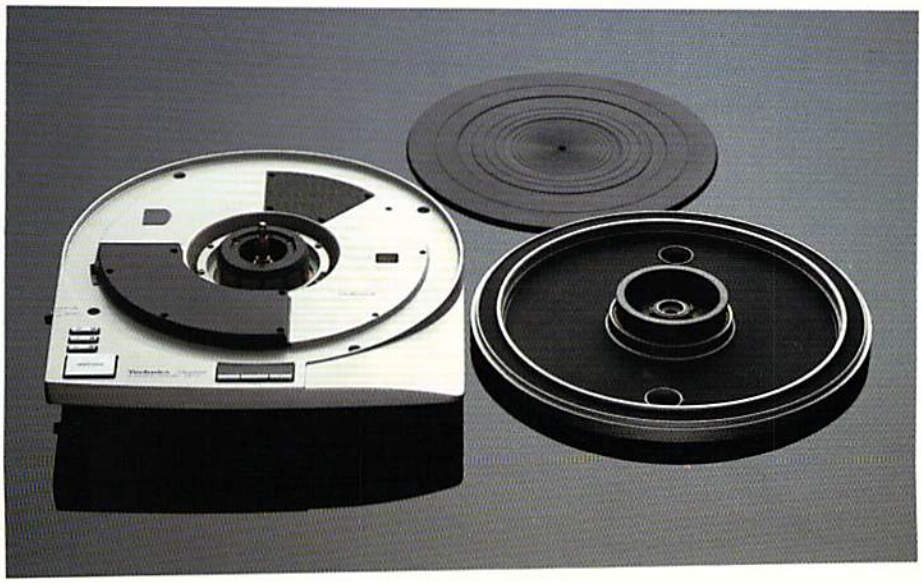
By raising the frequency and changing the waveform of the transformer input, the transformer operates at a higher level of efficiency. The result is that the usual 50 or 60 cycle AC frequency will not affect other circuitry. This contributes to the turntable's high S/N ratio.

Other Features

- Technics integral rotor-platter motor construction.
- Full cycle detection frequency generator helps to maintain accurate rotational speed characteristics: Wow & flutter 0.025% WRMS.
- Pitch lock mechanism locks speed selector and pitch controls during play so as to prevent accidental misoperation.
- Heavy duty construction for extended professional and home use.
- Three precision speeds, 33-1/3, 45, and 78.26 rpm for versatile phono reproduction applications.

Block Diagram of the SP-15





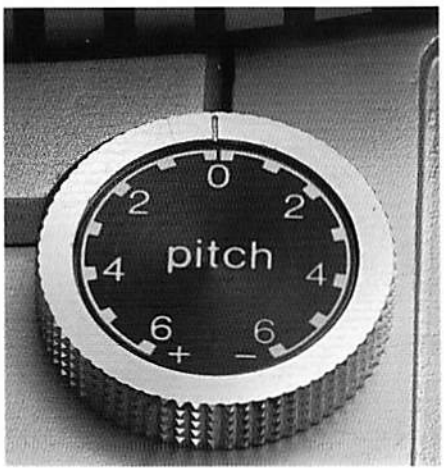
SP-25 Quartz Synthesizer Direct Drive Turntable

Performance plus Versatility

Technics SP-25 combines professional excellence with the kind of flexibility and convenience crucial to home use. State-of-the-art features include total quartz-locked pitch control within a ±6% range from rated speeds, full cycle detection FG, and high torque for fast starts and load stability. The list continues with an electronic braking system, integral rotor/platter motor construction, a large turntable platter with an extra-high moment of inertia, and highly effective damping. Precisely the needs required for precision professional use and features desired for home enjoyment.

Total Quartz-Locked Continuous Pitch Adjustment

Quartz-locked control means virtually perfect speed accuracy. But in most quartz-controlled turntables, this accurate speed control circuit must be defeated when pitch changes are required.
With the SP-25, however, you can vary the pitch continuously by up to ±6% under total quartz-locked control. Simply turn the rotary knob and use the precision scale as references.
With this system, you can match the pitch of a record to that of a musical instrument, or expand and compress playing time to fit a given broadcasting time slot.
Single-row platter markings and a quartz oscillated strobe illuminator indicate exact 33-1/3 or 45 rpm rated speed.



High Torque for Fast Starts

The integral rotor/platter motor delivers 1.3 lb•in (1.5 kg•cm) of starting torque. This high torque enables the platter to reach 33-1/3 rpm within 0.7 seconds, or a quarter of a turn. This is a big advantage in the professional arena especially when fast cueing is necessary.

Excellent Load Characteristics for Steady Speed

Speed fluctuation, due to load torque caused by tonearm or record cleaner drag, is virtually eliminated thanks to the elaborate electronic circuits. It is 0% within 0.87 lb•in (1.0 kg•cm). If you place 100 tonearms tracking 2 grams each on this turntable, the platter would still rotate at precisely the chosen speed.

Specially Constructed Turntable Damps Resonances

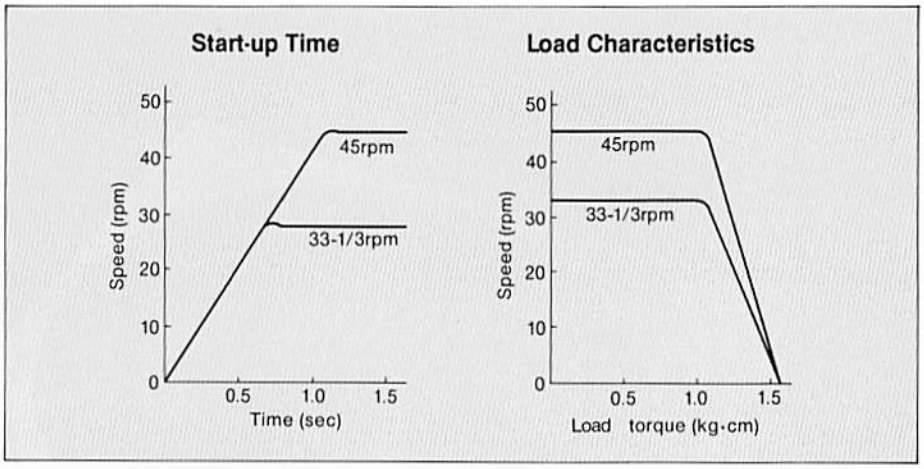
To isolate the turntable and damp external vibrations, the SP-25's large 33.9 cm aluminum diecast turntable platter is damped on three surfaces. Specially fabricated rubber matting is placed in the underside and rim of the platter. A thick rubber matting covers the top of the platter. As a result, acoustic isolation is maintained even at high sound pressure levels.

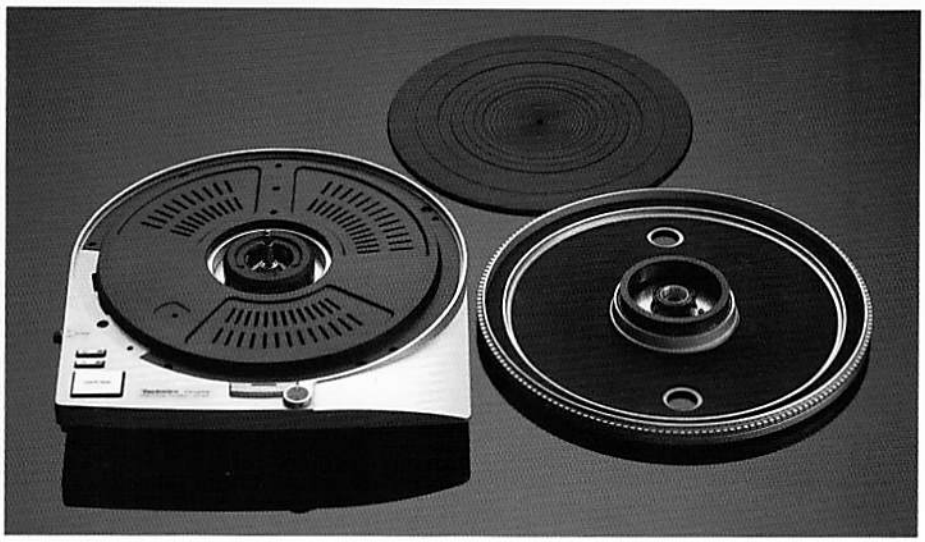
Precision Aluminum Diecast Base

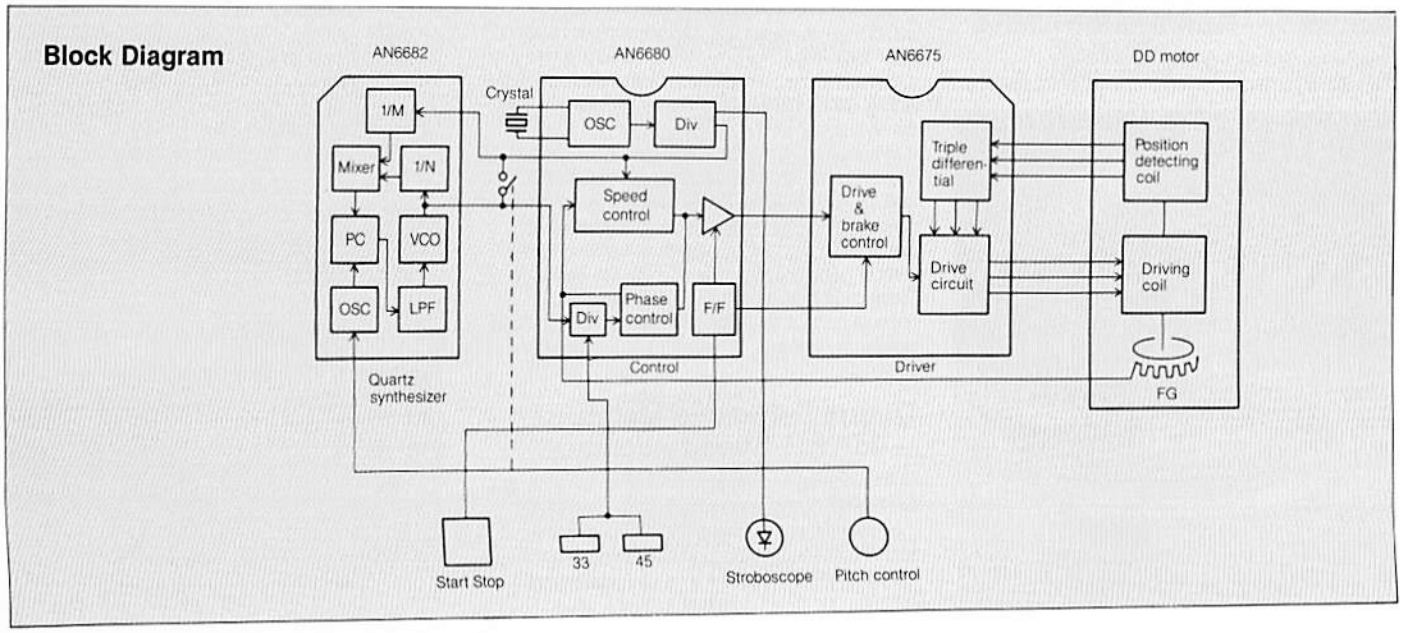
Like the platter, the base is constructed of precision-made diecast aluminum. Thanks to the turntable base and other anti-resonance measures incorporated in the SP-25, this turntable exhibits excellent resistance to acoustic feedback.

Other Features

- Fully electronic braking system for quick stops.
- Soft-touch start, stop and power on/off switches allow precision control without the danger of accidental operation.
- Technics famous integral rotor/platter motor construction with full cycle detection FG.







SP-10MKII Quartz-Controlled Direct Drive Turntable

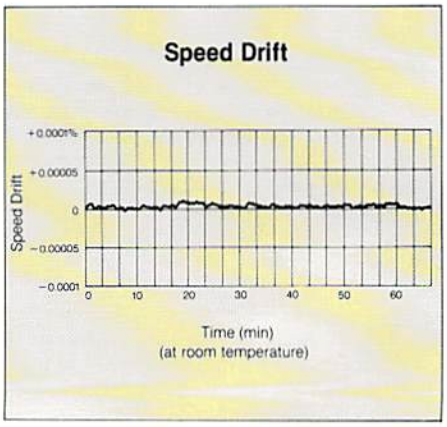
The New Standard of Accuracy—Technics SP-10MKII

Ever since Technics first introduced the SP-10MKII, other turntable manufacturers have been trying to catch up. The standards set by the SP-10MKII are legendary. Speed accuracy is ±0.002% or within ±0.036 seconds for each LP side. Torque is 5 kg•cm, strong enough to be undisturbed by even 500 tonearms each tracking at 2 g. Start-up time from 0 to 33-1/3 rpm in only 1/4 of a second.

Full speed (33-1/3) to a complete stop in only 3/10 of a second. Rapid switching between 33-1/3, 45, and 78 rpm. Indeed, these features in combination with the quartz referenced servo system and heavy duty construction gave professionals the kind of performance they had always dreamed of. Today, it is a level of performance that audio experts cannot do without because when a solid, precision turntable is needed, professionals turn to Technics.

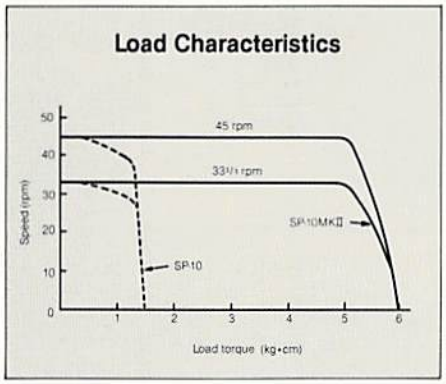
Quartz Reference Maintains ±0.002% Speed Accuracy

In the 30-minute program time of an LP side, the SP-10MKII errs by no more than thirty-six one-thousandths of a second. This means that its speed accuracy remains within ±0.002%—much too small to be detected by a stopwatch and certainly not by an ear. This extreme speed accuracy is achieved through the use of the most advanced speed control method ever used in a turntable: reference to an oscillating quartz crystal. Elaborate servo electronics, employing the phase-locked-loop and circumference integral-type push-pull FG for delay-free servo action, keep the turntable speed independent from fluctuations in AC line frequency, drag load, temperature and humidity.



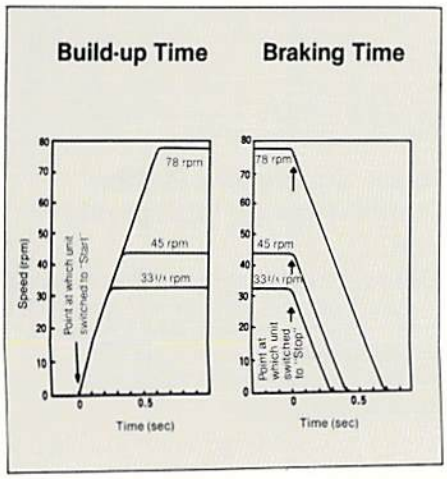
High Torque to Overcome Changes in Drag Load

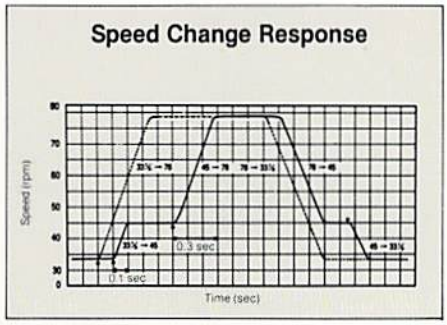
The drag load on a turntable is by no means constant. It varies as the stylus tracks highly modulated grooves and increases substantially when arm cleaning devices or hand-held brushes are used. Changes in load can cause momentary speed changes. These changes can create an unsteady, vacillating, "muddied" sound quality. The SP-10MKII's motor delivers an enormous amount of corrective torque (6 kg•cm). A speed fluctuation will not occur with up to 5 kg•cm of drag load. The result is that even 500 tonearms, each tracking at 2 grams, could not slow the platter down.



Virtually-Instantaneous Start-Up and Stop Times

Thanks to the tremendous 6 kg•cm starting torque, the platter reaches the rated 33-1/3 rpm speed within 0.25 seconds from start. In other words, the platter reaches 33-1/3 rpm after only one quarter of a turn. This is important in professional situations where split-second cueing is required. As for braking, the SP-10MKII utilizes an electromechanical dual braking system. The turntable comes to a full stop in only 0.3 of a second. The graph below indicates how rapidly the SP-10MKII reaches any of its three rated speeds from a standstill and how quickly it brakes to a stop.





Single-row, Quartz-Controlled Stroboscope

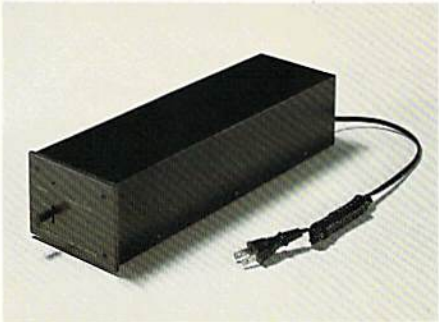
The single row stroboscope is controlled by the extremely stable quartz oscillator, rather than the potentially unstable AC line frequency. This enables the stroboscope to give an exact indication of the platter's proper rotational speed.

Remote Control for Start and Stop

Start or stop the turntable via the included cable-connected remote control.

Separately Housed Power Supply

The power transformer cannot interfere (through magnetic leak) with the electronic "brain" in the turntable because it is contained in a separate unit. Separate installation helped Technics designers give the SP-10MKII a slim and elegant appearance.



All Circuits on Three Pin-Connected Modules

Modular circuit construction improves reliability and makes for easier servicing.

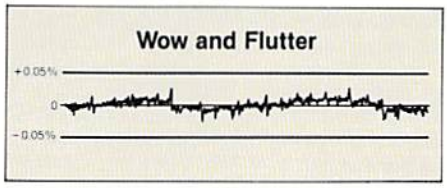
Positive Vibration Damping

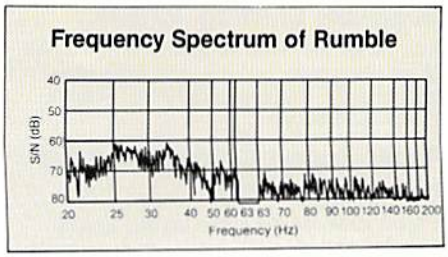
A second rubber sheet on the underside of the platter provides an extra measure of vibration damping.

What Kind of Performance Can You Expect?

Wow and Flutter:
0.025% (JIS C5521) WRMS
±0.035% (DIN 45 507) weighted, zero to peak
Rumble:
−50 dB (DIN 45 539A)
−73 dB (DIN 45 539B)

These figures speak for themselves. Suffice it to say that the turntable actually surpasses the standards of record-cutting equipment. Further details on this drive system and its quartz phase-locked servo loop can be found in the SP-10MKII product information sheet.





SP-10MK3 Quartz Synthesizer Direct Drive Turntable

Precision at Any Speed

With the help of quartz synthesized circuitry, the SP-10MK3 has the ability to maintain high rotational precision at any speed setting, up to ±9.9% of standard rpms. The result is that you don't have to sacrifice performance for pitch adjustment or when a musical program must fit into a particular time slot. The SP-10MK3 exciting features continue with a 16 kg•cm starting torque that enables the record to reach the rated speed in only 0.25 seconds. The moment of inertia is an astounding 1.1 ton•cm². Wow and flutter is only 0.015% WRMS, and rumble is −92dB (DIN B). Technics SP-10MK3. The professional turntable for the audio expert.

16 kg•cm Starting Torque

Even though the platter weighs 10 kilos, the high torque of the motor brings it up to rated speed in a split second — 0.25 seconds, or 30° of a full rotation at 33-1/3 rpm.

Rapid Speed Change and 0.3 seconds Braking

A mechanical reverse torque braking system stops the platter in just 0.3 seconds (from 33-1/3 rpm). Speed changes between 33-1/3, 45, and 78 rpm also occur quickly. For precise cueing, the platter is partially braked when stopped.

1.1 ton•cm² Moment of Inertia

The 10kg platter is constructed of diecast aluminum with a 15 mm copper alloy surface layer. Even with a fixed load of up to 10 kg•cm, there is no change in rotational speed. This means that you can clean or accidentally touch the turntable without causing speed fluctuations.

Wow & Flutter: 0.015% WRMS; Speed Accuracy: ±0.001%

As these specifications verify, the SP-10MK3 employs an unusually precise drive system. Besides the huge moment of inertia of the heavy platter itself, a full cycle detection FG supplies a reliable signal for phase comparison with the quartz crystal reference. As a result, deviations are beyond the detection threshold of many test instruments.

−92dB Rumble

Besides helping to reduce wow & flutter, the heavy platter also serves to improve rumble. The diecast zinc and aluminum, TNRC (Technics Non-Resonant Compound) base construction also contributes to reduced noise.

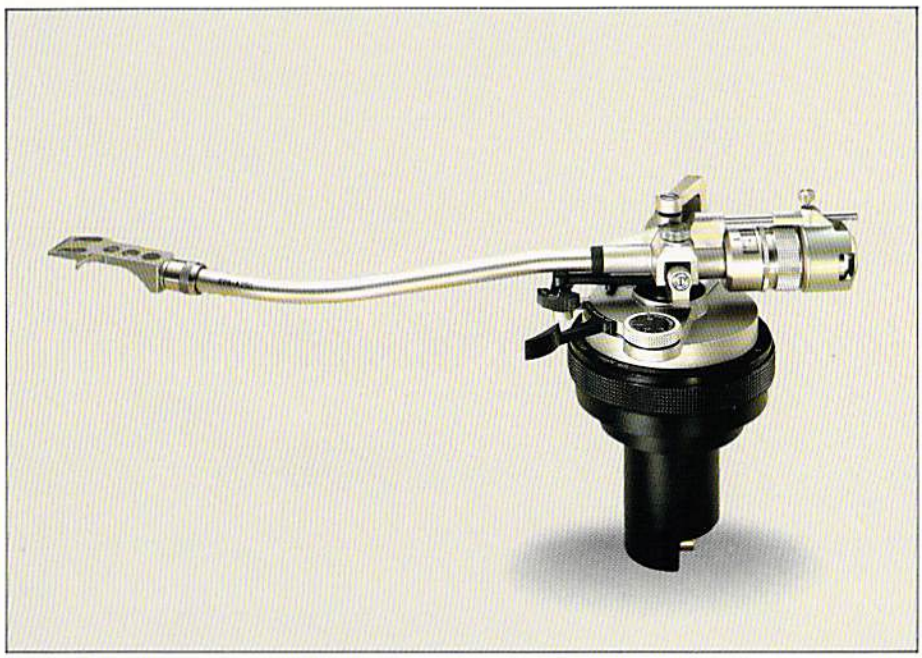
Quartz Synthesizer Pitch Control

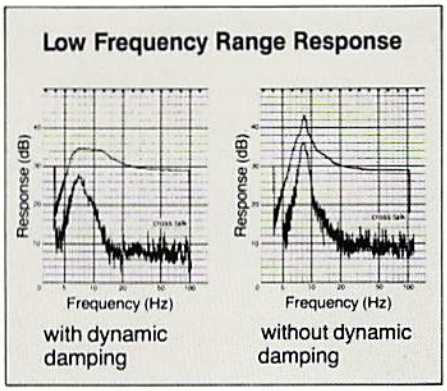
The remote control unit contains buttons that raise or lower the rotational speed in 0.1% steps up to ±9.9%, of any of the three standard speeds. The servo system is referenced to a quartz synthesizer circuit to maintain the same speed accuracy at any setting. Operation is enhanced by a pitch lock button, a pitch display, and a 2-color strobe.

Power Supply and Remote Control Housed in Separate Unit

The separate control unit not only provides remote control, but also houses the power supply and all circuitry except for the motor itself. This helps to increase reliability and reduce noise. The start/stop and speed selector switches are duplicated on the turntable.

EPA-250 Tonearm System





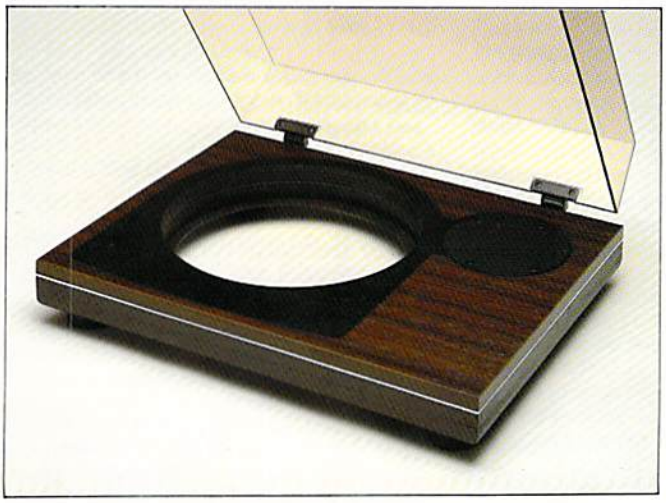
The Sophisticated Hi-Fi Tonearm System

The EPA-250 Tonearm System includes the EPA-B500 arm base and the EPA-A250 universal arm unit. The arm unit is firmly secured by a slide-in connector. A dynamic damping device is built into the arm unit's counterweight for the low-frequency resonance peak. Unlike oil damping systems, this succeeds without causing an increase in low-range mechanical impedance. Tracking force can be read directly from the adjustable counterweight.

The EPA-A250 offers the convenience of interchangeable cartridges and headshells. For further optimization, you can remove the EPA-A250 universal arm unit and replace it with one of five optional units. Each has a different effective mass so that compliance with virtually any cartridge can be met with little difficulty. After mounting the arm unit in the slide-in connector, it moves with little friction, thanks to the 4-point gimbal suspension system. The system uses ball bearings specially manufactured for a strict tolerance to roundness. Bearing friction is 7 mg, or less in both directions.

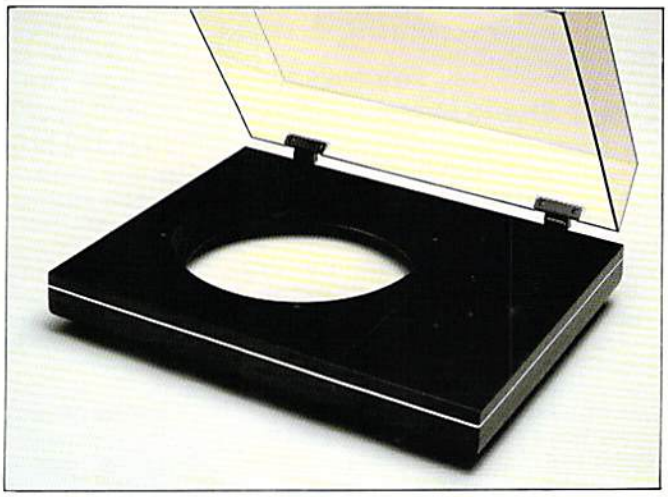
A refined helicoid control on the arm base allows for easy and precise arm height adjustment. This is very helpful for deterring vertical tracking error. The EPA-250 Tonearm System is an ideal match for the SP-10MK3 or SP-10MKII turntable. It can be mounted on the SH-15B2 or SH-15B3 turntable base to form a complete reference phono system.

SH-15B2 Turntable Base



The acoustically solid base enhances the excellent anti-resonant characteristics of the turntable. Features heavy rubber construction with spring-loaded feet. Finished in attractive simulated rosewood veneer.

SH-15B3 Turntable Base



The essential difference between the SH-15B2 and SH-15B3 is appearance. The SH-15B3 is black and does not contain trim.

RS-1520 Quartz-Locked Isolated Loop Three-Motor Direct-Drive Open-Reel Tape Deck

2-Track Studio Model

The RS-1520 offers the precision of the RS-1500US as well as exciting new features. The result is a tape deck designed especially for professional recordists. An "isolated loop" tape transport system helps assure excellent performance. This, in combination with a 3-motor direct-drive system, a quartz phase-locked control for the capstan motor, and a tape tension control for the reel motors, allows for remarkable precision and accuracy. With full IC logic control, feather-touch solenoid switches, and an efficient amplifier boasting a high S/N ratio, the RS-1520 is undoubtedly a serious tape deck for those serious about music.

Built-in Test-Tone Oscillator (1 kHz/10 kHz)

The three position oscillator (off, 1 kHz, 10 kHz), is a great advantage for making test-tones during bias and equalization adjustments.

- Adjust the recording level of the test-tone through the use of front panel line input level controls (left/right).
  The "5" position shows a recording level of about −10 VU.
  The "10" position shows a level of about 0 VU, or higher.
  (The meter sensitivity selector is set to the "normal" position.)
- Because the test-tone signal can be taken out from the line output terminals on the rear panel, the oscillator can also be used as a test-tone oscillator for checking other equipment. The output level can be changed by using the line output level controls (left/right).
- Distortion of the test-tone is held to less than 3%.

Meter Sensitivity Selector

The selector allows for precise adjustments because it increases the sensitivity of the meters by 10 VU. This is especially helpful when using the built-in test-tone oscillator for fine adjustment of the bias and recording equalization.

- The recording level of the test-tone is −10 VU for fine adjustment of the bias or recording equalization. Because the calibrations of the meters are approximate in the −10 VU vicinity, this selector can be used to increase the sensitivity by 10 VU for an even more precise adjustment in the 0 VU vicinity.

- So as to prevent incorrect level settings for ordinary recordings, sensitivity selection is possible only when the test-tone oscillator switch is set to the "1 kHz" or "10 kHz" position. If it is set to the "off" position, meter indication would be the same as for ordinary use even if the selector is set to the "+10 dB" position.

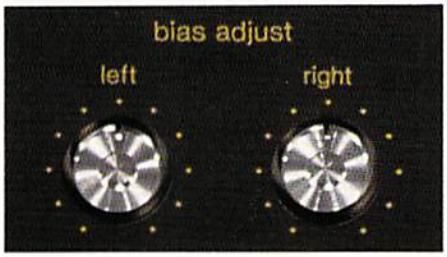
Playback Equalization Selector (NAB/IEC)

Select playback equalization characteristics for the 15 ips tape speed to meet either NAB or IEC standards. The NAB and IEC use the same playback equalization characteristics for 7-1/2 ips and 3-3/4 ips.

- **NAB Position**
  The RS-1520's recording equalization is pre-adjusted to conform to NAB standards. The selector can be set to this position for ordinary recording and playback.
- **IEC Position**
  Set the RS-1520 to this position only when playing a tape recorded with IEC recording characteristics.

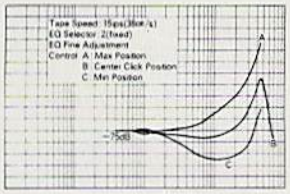
Bias Fine-Adjustment Control (−50% ~ +20%)

With the RS-1520's 3-position bias selector, it's possible to increase and decrease the bias current value in 10% increments. In addition, because fine-adjustments can be made within a range of −50% to +20%, left/right adjustments are possible for each reference value of almost any tape type currently available. With the center "click" position of the control knobs, it is always possible to return precisely to the reference value.



Equalization Fine-Adjustment Control

Recording Equalization Fine-Adjustment Characteristics



This control features 3-position settings as well as independent left and right fine adjustments. With the equalization fine-adjustment control, the RS-1520 obtains the optimum equalization parameters for most any tape.

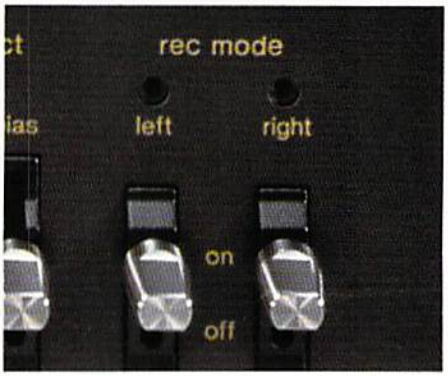
Cue/Edit Switch

The RS-1520 includes an edit dial and tape position marker to make tape editing extremely easy. Editing is practical as well, because the edit switch is operable when the cue lever is pushed all the way to the left and locked.

- To edit efficiently, set the Cue/Edit switch to "on". The tape transport will stop. During play, push the playback button, or set the switch to the "on" position. Either way, the capstan and pinch roller will continue to move the tape without interruption. Because the take-up reel remains stationary, the part of the tape not used is not wound onto the reel.
- After the unused part of the tape has been taken out, push the stop button to activate the tension roller switches. The tape transport mechanism is now set to the Auto-Shut-Off mode. Even if other operation buttons are pushed, the tape will not be damaged.
- If tape is taken out in this way and the fast-forward, rewind or any other button is accidentally pushed, the IC logic control circuitry automatically sets the unit to "stop" so as to protect the tape.

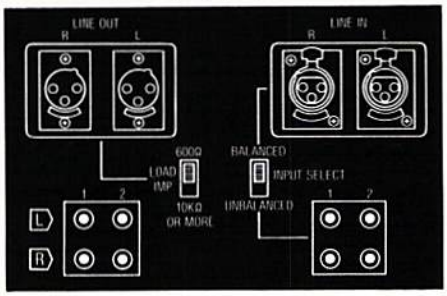
Recording Mode Indicators

When the recording mode switches are set to the "on" position, the L and R lamps illuminate. This is especially convenient for assuring that the recording mode switches have not accidentally been left in the "off" position when the RS-1520 is to be used to make a timer-activated recording.



Balanced Connectors

The RS-1520 has 3 sets of terminals for line input and line output. One set is equipped with balanced connectors that help assure a firm connection. They are also widely used on broadcasting and measuring equipment. The remaining two sets contain the ordinary unbalanced phono (pin) type jacks.



Load Impedance Selector (600 Ω/10 kΩ or more)

This selector can be used to select either 600 Ω or more than 10 kΩ impedance, according to the impedance of the equipment connected to the Cannon-type output terminals.

VU Meters

The VU meters of the RS-1520 feature precise indication accuracy, conforming to ASA standard for "attack" time, frequency response and scale precision.

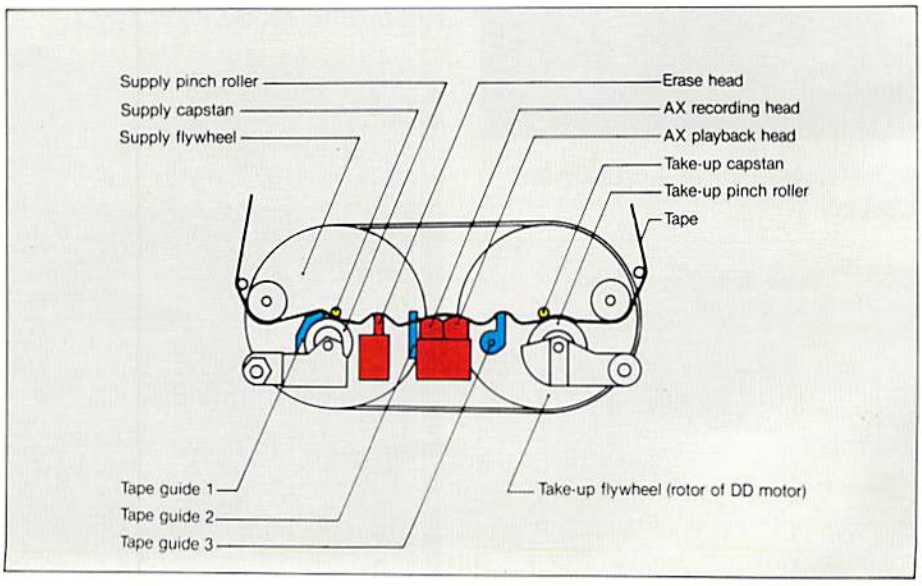
RS-B100 dbx, Quartz DD, 3-Head Stereo Cassette Deck

Quartz DD Closed-Loop Double Capstan

This advanced tape transport system is designed to maximize speed accuracy and decouple the tape from outside influences during the period when it is in contact with the heads. There are two capstans, one on either side of the head block.

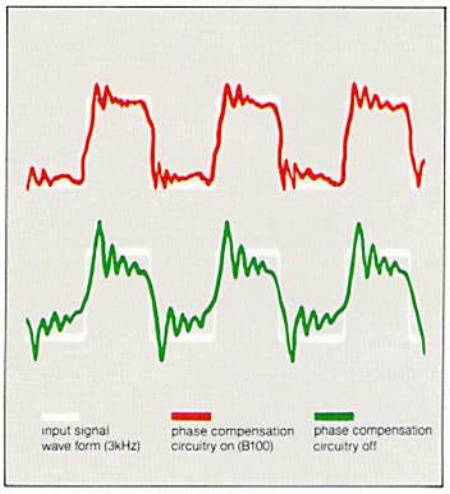
The take-up capstan is an extension of the planar opposed direct drive motor spindle which prevents mechanical play in the direction of capstan thrust. The direct drive motor has an internal FG (Frequency Generator) that produces 260 pulses per full rotation (about double the usual, thereby contributing to higher rotational precision).

The servo circuit compares this pulse frequency with the unwavering reference signal derived from a quartz crystal oscillator. Motor speed is instantly corrected if any deviation is detected. The supply side capstan is linked by a precision belt to the direct drive motor forming a closed-loop around the head contact area. To avoid the possibility of sympathetic resonance between the two capstans they are given slightly different diameters. Further enhancing tape transport stability is a new triple tape guide configuration. These features work together to minimize modulation noise and achieve extremely low wow & flutter of only 0.022% WRMS (±0.038% DIN).



Phase Compensation Circuitry

Because of the recording and playback equalization circuitry employed in analog tape recording, filter group delay characteristics inevitably cause phase deviation in the reproduced waveform (see graph). Technics has now developed a way to overcome this problem. Employed for the first time in the RS-B100 this innovative Phase Compensation circuitry rectifies high range phase linearity so you enjoy a dramatic improvement in sound quality. This is all the more noticeable when tapes are copied since cumulative phase distortion is drastically reduced.



Linear Feedback Circuitry

Linear Feedback (LFB) is a Technics developed optimization of negative feedback (NFB) theory. By using an additional, positive, selective feedback loop, the playback amp circuitry is given infinite gain, enabling virtually complete cancellation of harmonic distortion components. LFB is particularly effective for cleaning up the low range portion of the signal and improving attack characteristics.

Direct Coupled Dual FET Construction

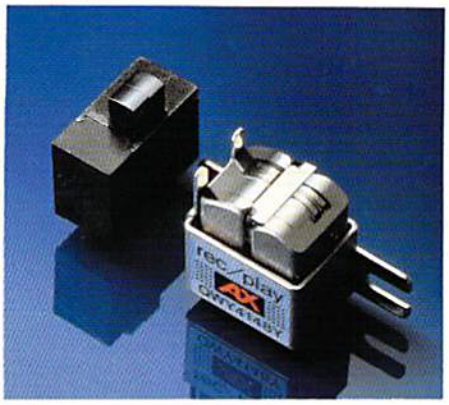
Playback amplifier performance is supplemented by direct coupled construction using dual FETs. Since there are no coupling capacitors in the signal path, you obtain the full benefits of the Phase Compensation circuitry. The high gain characteristics of the FET devices help reduce noise by about 5 dB.

3NR-dbx plus Dolby B-C NR

The RS-B100 has all three of the world's major noise reduction systems. Equally important, they are all in double circuits so you can enjoy 3-head real-time monitoring with correct NR decoding. dbx* provides up to 110 dB dynamic range while virtually eliminating noise throughout the audio spectrum. This means that you can make successful recordings from any source including Compact Disc players, studio mixing consoles, PCM and open reel analog master tape recorders, and so on. A pleasant extra is the built-in dbx disc decoder. Dolby** C and B noise reduction circuits are included to assure the most complete compatibility with other decks and prerecorded cassettes. The MPX filter can be switched in as necessary to avoid NR mistracking due to pilot signal leakage when recording FM broadcasts.

AX (amorphous) Combination 3-Head System

Amorphous alloys offer discernible dividends in electromagnetic transducer applications. Technics research has now optimized the characteristics of this non-crystalline alloy in the RS-B100's AX 3-head system. The noble metal ruthenium (Ru) and a carefully balanced selection of admixtures provide high saturation flux density in the recording head and great permeability in the playback head. Of course, the wide 2.5 micron recording gap width also contributes to high MOL while the narrow 0.8 micron playback head gap extends high frequency response. Laminated construction also assists high range performance by reducing eddy current loss. The Technics combination head design avoids azimuth adjustment problems since the recording and playback head gap angles are precisely aligned in the computer controlled manufacturing process. Vickers hardness of 1050 rounds out the striking performance of this new AX head, giving it more than seven times the abrasion resistance of permalloy. Frequency response is rated at 15 Hz ~ 25,000 Hz (metal). An extra convenience is the automatic tape/source selector which switches to "source" for recording and "tape" for playback. For real time monitoring you can switch back and forth manually to instantly compare the input source signal with your recorded result. A double-gap sendust head is used for high efficiency erasure.



Microprocessor Feather-Touch Control with 2-Plus-1 Motor Mechanism

Besides the DD capstan motor, the RS-B100 uses a second high torque DC motor for reel drive and one additional motor to move the head block. A microprocessor coordinates all operations to assure smooth, trouble-free performance. A light touch on the control buttons provides quick, positive activation.

Bias Adjustment and Rec Level Calibration

Automatic bias, level and equalization adjustment systems may be able to give you flat response with most cassette formulations. However, the RS-B100 lets you take advantage of the strong points of particular tapes for specific applications. For example, you can raise midrange MOL for classical music recording or extend high range headroom to handle electronic music. Left and right channel recording calibration is independent and bias can be adjusted for normal and CrO_2 (high position) tapes.

3-Way Digital Tape Counter

Can be switched to show remaining tape time so you can avoid running out of tape before the end of a piece of music. Also shows elapsed rec mute time and works as a highly accurate 3-digit tape counter.

Remaining time display

3-Digit tape counter

Rec mute time

Other Features

- Wide-range 3-color FL meters with peak-hold.
- Auto tape select/ Auto rec memory/ Auto rec mute/ Music select.
- Large master input level control and balance control.
- Output level control.
- Timer record/playback capability.
- Remote control (RP-9645) optionally available.
- Illuminated cassette compartment.
- Black and silver input level knobs included.

* dbx is a registered trademark of dbx Inc.
** "Dolby" is a registered trademark of Dolby Laboratories Licensing Corporation.

SL-P50P Professional Compact Disc Player

Thoroughly Professional from Performance to Engineering

Technics. It's a name trusted by professional broadcasters and audio engineers worldwide. Our legendary turntables, for example, have been shipped to over 120 countries. With such impressive qualifications, it's no wonder that Technics has become a leader in digital technology as well as analog. Our digital Compact Disc expertise includes advanced technology such as original IC's, LSI's, and laser systems, not to mention our own Compact Disc manufacturing facility. Although the first generations of CD players were meant chiefly for home use, broadcasting stations and other professional users soon realized the potentials of this exciting medium and sought players fully equipped for professional applications.

Technics answered their request by sending engineers to visit broadcasting stations all over the world to find out the professional's exact CD player needs. Only then did we go back to the drawing board to create the SL-P50P.

The SL-P50P is truly an achievement in the eyes of professionals and Technics engineers alike. As the flagship of our CD players, it represents the sum total of Technics expertise and proficiency in electronics, mechanical engineering and ergonomic design. We think of the SL-P50P as a precedent-setting piece of professional audio equipment ready to set standards just like our SP-10 turntable did over a decade ago.

Performance Excellence Made Possible by Technics Technology

All parts and subsystems installed in the SL-P50P are Technics-developed. The "optical deck," (the laser pickup system that serves as the "eye" of a CD player, reading the information encoded in microscopic pits) deserves special mention. Although such systems can now be purchased from outside suppliers, Technics utilized its own resources in the science of solid state lasers and related fields to create our own exclusive design. In the same manner, our technology in direct drive motors helped us design an ultra-compact DD motor to drive the disc. All systems are mounted on a precision-machined, aluminum diecast chassis for high rigidity and reliability. The laser beam is kept in focus by a mechanical system of extreme precision, while two specially developed

SL-P50P on Console Stand SH-S50P (optional)

IC's perform powerful functions in the focus and tracking servo systems. Combined with the 3-beam astigmatic pickup design, these features help assure the excellent long-term stability and performance that the professional user rightly demands.

One of the most critical factors determining a compact disc player's sonic quality is the D/A converter. Here, too, Technics uses originally developed 16-bit converters, one in each stereo channel, for optimum performance not only in stereo programs, but also in mono (AM) broadcasts. High performance 11th order low pass filters are used to remove those high frequencies from the audio signal that are an unwanted remainder of the digital process. The resulting specs are truly impressive: 20 Hz ~ 20 kHz within ±0.5 dB. Dynamic range and S/N ratio over 96 dB. Over 90 dB of channel separation.

Expert Functions for Professional Needs

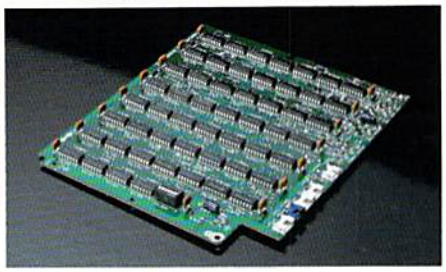
With a full complement of convenience features, the SL-P50P is undoubtedly a professional. For example, cueing is quick and easy in any of three ways.

(1) Use the numeric keypad to type in the time in minutes, seconds, and frame numbers.
(2) "Dial it up" with the search dial, almost as if you were cueing on an analog turntable.
3) Use the automatic search functions to get you to the first recorded note. Either way, timing accuracy is an amazing 13.3 ms.

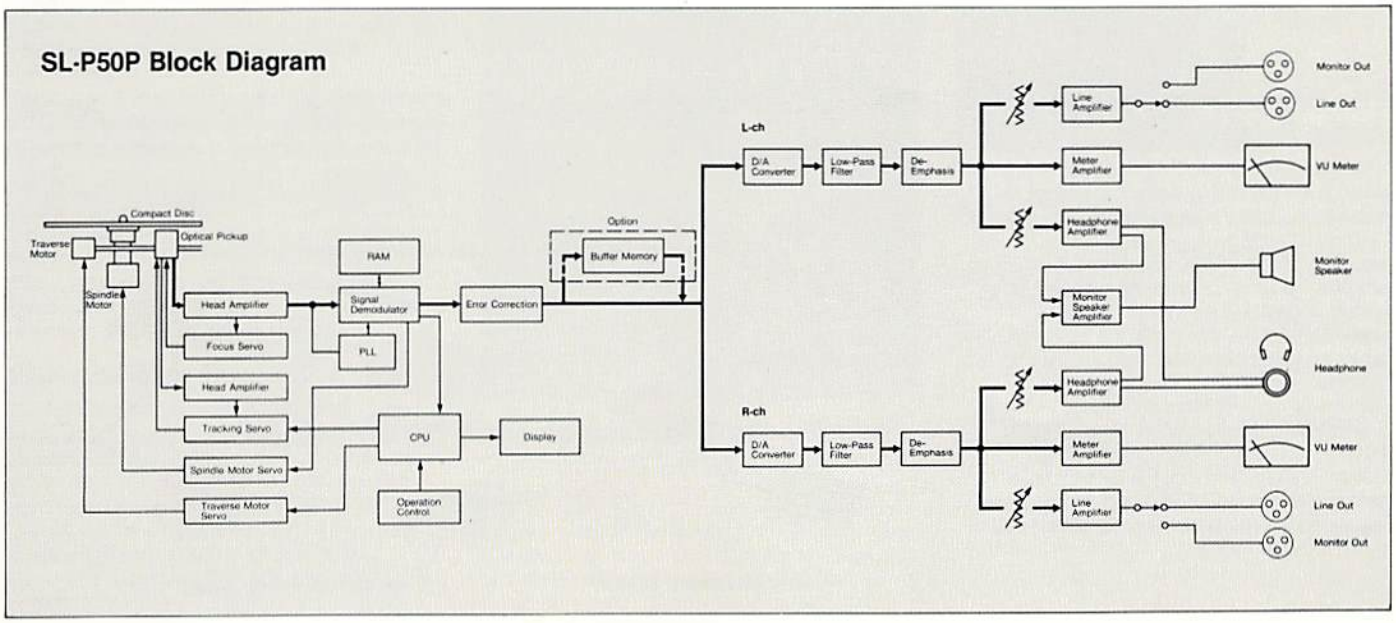
An LED digital display shows track and index numbers, elapsed time in minutes and seconds, and frame number. An FL bar graph display gives an entire disc overview. The VU meters, independent from the fader control, show actual disc signal level. With all this information, the professional can react quickly and accurately to most any need. Operation also appeals to professional habits and preferences, as seen in the large search dial for "cueing" as on an analog turntable. When on the air, all controls (except one) are inoperative so as to avoid errors and mishaps. Only 16-15/16" wide (43 cm) including it's own power supply, the SL-P50P can be placed on a table or mounted in a standard rack. An optional stand that converts it into a console unit is available.

Other Convenient Features

- **Fader Start On/Off Key**
  When this key is in the ON position, play begins as soon as the fader is moved up from its "–oo" position. This allows for smooth fade-ins.
- **Fader Control**
  Controls output level. When the VU meters indicate 0 VU and the fader is set at 0 dB, rated output level is supplied.
- **On-Line Stop Key**
  Stops play. In the on-line play mode, only this key remains operative. No other controls can be used so as to avoid accidents and mishaps.
- **On-Line Play Key**
  Play begins from the specified start location (as seen on the indicator). If the unit is in standby mode, play begins within 0.3 seconds. With the optional "Zero Start Board," the waiting time can be shortened almost to zero. Start-up time can be set from 0 seconds to 0.7 seconds in 0.1 second steps.
- **Monitor Play Key**
  Starts monitoring from a specified location. Line out remains off, but all other functions are performed as in the normal way.
- **Standby Key**
  The pickup system moves to the specified start location and remains in "ready" mode.
- **Search Speed Key**
  Switches the search dial's search speed to slow (1 sec per turn) or fast (about 30 sec per turn).
- **Remaining Time Switch**
  A toggle that switches the "remaining time" display from "this track" to "total disc."
- **Cue Indicator**
  A lamp that gives the operator visual clues (for instance, starting and stopping). Can also be wired to an external cue switch in an adjoining control room.
- **Error Indicator**
  Lights up under the following conditions: Compact Disc inserted wrong side up; disc heavily contaminated; disc heavily scratched or distorted. Also flashes on and off (in conjunction with the start location indicator) when an erroneous entry has been made on the 10-key pad.
- **Built-in Monitor Speaker**
  For easy confirmation of disc programs without an external monitor system. Adjustable monitor volume. Speaker can be switched off.
- **Headphone Jack**
  Operative in all play modes. Volume is controlled by the monitor level control.
- **"Zero Time Lag" Starts (optional)**
  With the installation of an optional board, the SL-P50P will start playing immediately from any point on the disc with the simple touch of the play button. Delayed starts are easily possible, too.



SL-P50P Block Diagram



SE-A3MK2 Stereo DC Power Amplifier

Computer Drive new class A

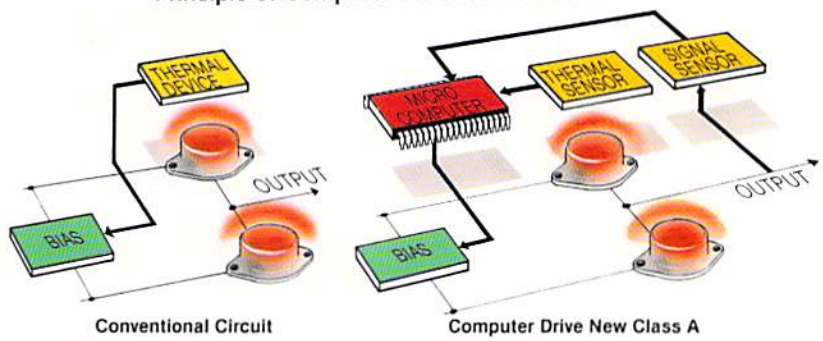
The Power Amp for Digital Audio Reproduction

With the advent of the Compact Disc, digital sources are presenting a major challenge to conventional audio equipment. Since digital audio has such a wide dynamic range, flat frequency response, and low noise and distortion, flaws in amplifier performance become apparent rather quickly. Technics is prepared to meet the challenge of digital audio with the SE-A3MK2. This power amp has more than enough output to reproduce digital's wide dynamic range: 300 W+300 W, minimum continuous RMS into 8 ohms, both channels driven from 20 Hz to 20 KHz with no more than 0.002% THD. Computer Drive New Class A circuitry helps prevent the transient crossover distortion that usually occurs when handling signals with wide dynamic range variation.

Computer Drive New Class A Circuitry

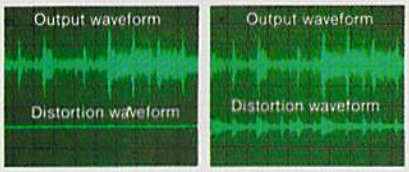
Transistor bias current (ICQ, also known as idling or quiescent current) is an essential element of modern amplifier design. In a class B amp, bias current is supposed to prevent distortion by controlling the operating characteristics of the two transistors so that the upper and lower halves of the waveform match each other. Although this

Principle of Computer Drive New Class A Circuit



Conventional Circuit | Computer Drive New Class A

Waveform of Musical Instrument Tone



Transient crossover distortion is not generated.

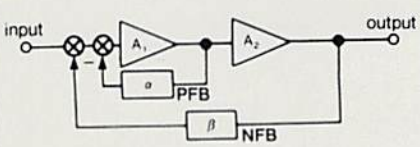
Transient crossover distortion is worst where signal level changes the most.

works in theory and during amplification of ordinary sine wave test signals, transistor temperature changes during amplification of actual musical waveforms. Any large transient can quickly raise transistor temperature, thereby affecting the bias current. The result is transient crossover distortion — a mismatching of the upper and lower halves of the waveform during amplification of wide dynamic range signals (like those from digital sources). To compensate, many amps use thermal devices to vary the bias. But, as illustrated in the oscilloscope trace above, the thermal device cannot respond fast enough to prevent distortion with a transient waveform (in this case a musical instrument tone signal). Technics offers a solution to the problem with Computer Drive New Class A — the first amp circuit to use a microprocessor to improve wave form fidelity. Ultra-sensitive thermal and signal level sensors provide the microprocessor with real-time data. Based on these computations, the microprocessor instantaneously adjusts the bias voltage to maintain optimum bias current in the output transistors. This helps to prevent transient crossover distortion and provides excellent amplification for digital and other wide dynamic range sources.

Linear Feedback Circuitry

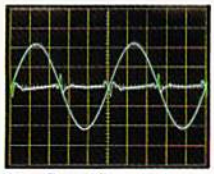
For infinite gain, LFB has an extra, positive feedback loop within the usual negative feedback loop. The negative feedback loop reduces distortion dramatically. As a valuable side benefit, LFB also helps to minimize output impedance so as to improve the damping factor for tight speaker control.

LFB Amplification

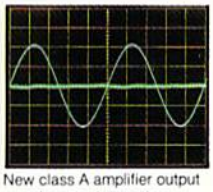


New Class A Synchro-Bias

Combines the fidelity of class A with the high power and efficiency of class B. The high-speed diode, which synchronizes bias with the waveform, helps to eliminate transistor switching distortion and static crossover distortion.



Class B amplifier output waveform and distortion waveform (at 20 kHz)



New class A amplifier output waveform and distortion waveform (at 20 kHz)

Concentrated Power Block Reduces Electromagnetic Distortion

High current circuitry can easily induce distortion in the sections of the amp that handle smaller signals. The Concentrated Power Block helps prevent this electromagnetically induced distortion by grouping all large current circuitry in a block with connections as short as practically possible. This design avoids the use of "nonmagnetic chassis construction" which would make the amp susceptible to external interference.

Extra Large Transformers and Capacitors for Stable Power Supply

Twin mono power supplies use a huge independent 400 VA transformer and a pair of 105 V, 22,000 μF capacitors for each channel so as to help prevent crosstalk. The transformers themselves are designed for low noise performance. Buffered circuitry contributes to the amp's high signal-to-noise ratio and provides stable power supply to each amplifier stage.

4-Stage Darlington Output Construction

The SE-A3MK2 has a great deal of dynamic headroom, thanks to 4-stage Darlington circuitry. The transistors are capable of very high signal levels, providing a total instantaneous power handling capacity of up to 1.6 kW per channel.

Auto-Load Impedance Detector

When the amp is turned on and the speaker selectors switched, connected speaker impedance is automatically detected. This determines selection of high or low voltage transformer taps so that the amp maintains rated 300 W+ 300 W output whether speaker impedance is 8 ohms or 4 ohms.

Computer Protection Circuitry

The Computer Drive New Class A microprocessor also provides reliable protection against DC leakage, speaker lead short circuits, and dangerously high temperatures.

Large, Fast Peak Power Meters

With an attack time of only 50 μs, these meters are capable of responding to a single cycle of a 20 kHz sine wave. Indication is continuous from 0.0001 W to 1 kW.

Other Features

- Computer Drive display shows warm-up, etc.
- Extra 2 Hz low-cut input terminals.
- Main, remote, main and remote, off pushbutton speaker selectors on front panel.
- Thick aluminum cabinet construction.

SU-A4MK2 Stereo DC Control Amplifier

State-Of-The-Art Construction for State-Of-The-Art Performance

Although digital audio has been tagged the "sound of the future," analog audio is still a major presence. That's why the SU-A4MK2 is especially designed to give you exceptional performance from both digital and analog sources. For remarkable analog disc reproduction, this preamp is equipped with a full matching phono equalizer and a built-in amorphous step-up transformer. Other features include all class A and ICL construction, shelving tone controls, and extremely low output impedance.

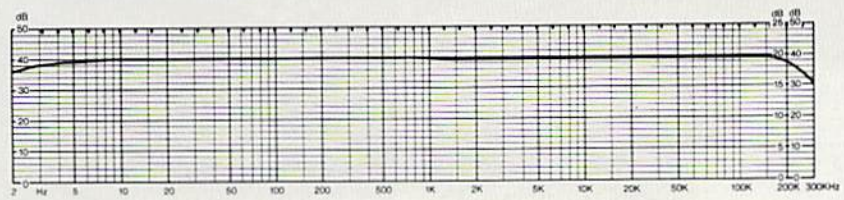
Built-in Amorphous Step-up Transformer for Extended Linear Response

Extremely flat frequency response from 3 Hz to 300 kHz (15 Hz ~ 100 kHz, ±0.2 dB).
Believe it or not, this spec of the transformer itself is for a moving coil cartridge input. This incredible performance is achieved by incorporating an amorphous core toroidal step-up transformer in the amp itself — another first from Technics.
The transformer's laminated core is made of wafer thin sheets of an amorphous (i.e., non-crystalline) alloy composed of cobalt with admixtures of iron, manganese, chromium, boron, and silicon.

AMORPHOUS
MC transformer

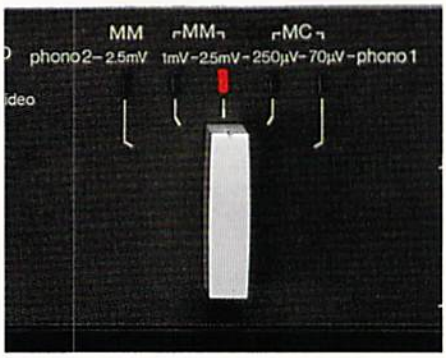
Magnetic permeability is high, thereby improving bass response. The amorphous structure and toroidal shape also improve high range response, since distortion and magnetic loss are dramatically reduced. Step-up transformers have inherently lower noise than pre-preamps (head amps) and S/N ratio is further improved by five-fold shielding: two layers of permalloy enclosing the core, plus two additional silicon steel inner cases and a steel outer case. Since the transformer is built-in, it is also that much less susceptible to externally induced hum. The extreme hardness of the amorphous alloy helps assure high reliability and resistance to accidental damage.

Frequency Response of the Built-in Amorphous Step-up Transformer



Matching Phono Equalizer for All Types of Cartridges

In many cases, a cartridge that sounds great with one preamp will not sound as good with another. One reason is the mismatching between cartridge output (and/or impedance) and preamp phono input sensitivity. The SU-A4MK2 is designed to eliminate this problem, so you can enjoy optimum performance from both MM and MC cartridges. The phono selector offers a choice of four settings: 2.5 mV for high output MM, 1 mV for low output MM, 250 μV for high output MC, and 70 μV for low output MC cartridges. In addition, there is an extra position (2.5 mV) for selecting a phono source connected to the phono 2 (MM only) input jacks.

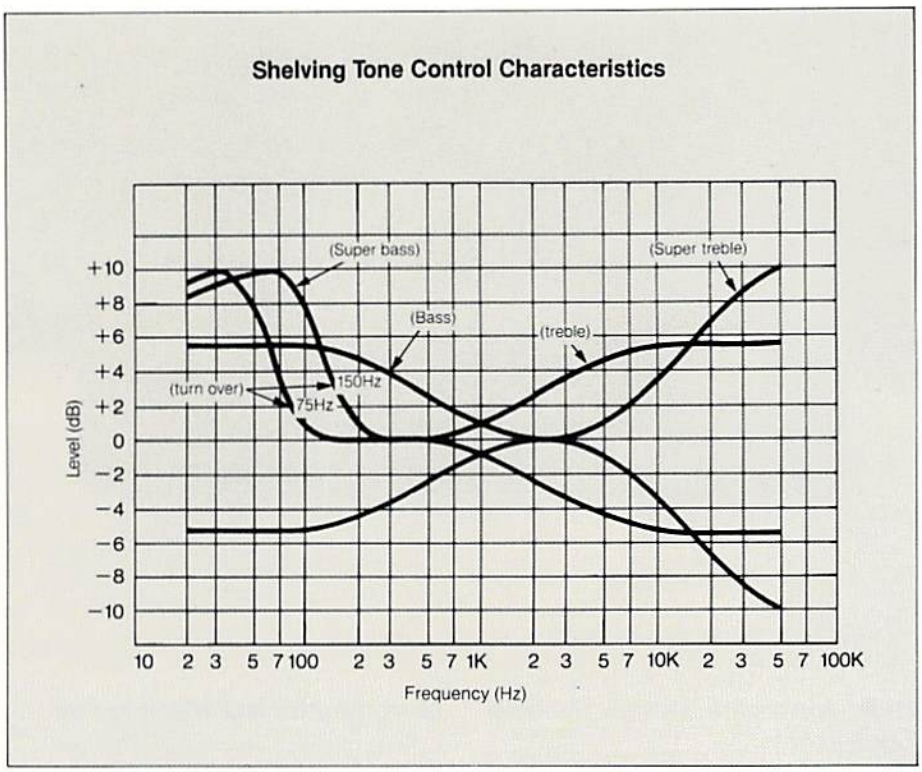


All Class A with ICL Ultra-Low Noise FET Input

Class A amplification completely eliminates switching and crossover distortion. Circuit features include an amorphous MC step-up transformer, an ICL (input capacitorless) FET differential input phono equalizer/preamp, and buffered DC flat amp. The current mirror loaded FET differential flat amp/buffered amp with SEPP output means that you can enjoy pure DC amplification without any coupling capacitors when using high level inputs (Compact Disc, tape, tuner, etc.).
Even with phono inputs, there is only one coupling capacitor in the entire signal path from input to output. Furthermore, the phono stage's ultra low noise dual FET differential EQ/amp helps assure a remarkably high signal-to-noise ratio—92 dB for MM inputs (2.5 mV).

Low Output Impedance Allows Remote Power Amp Placement

You can obtain greater speaker control by placing the power amp close to the speaker system instead of a distant location. The reason is if the power amp is too far away, high preamp output impedance may cause degraded frequency response and other problems. However, with the SU-A4MK2, you can obtain the full benefits most anywhere it's placed. How? The SU-A4MK2's output stage reduces output impedance to a very low 2 ohms so you can enjoy tighter speaker control without suffering a loss in overall system performance.



Shelving Tone Controls for Equalization

Besides the usual bass and treble tone controls, the SU-A4MK2 includes two more shelving type controls for the very high and low portions of the audio spectrum. The Super Bass control has a steep 12 dB pre-octave slope. With its 10 dB boost, you can use it to extend speaker system bass response by as much as one octave. The 75 Hz and 150 Hz turnover frequencies let you match individual speaker system characteristics so as to avoid unnatural boominess. The Super Treble control begins operation at 8 kHz and has up to a 10 dB boost or attenuation. This makes it helpful for dealing with cartridge anomalies, especially when used in conjunction with the regular tone control.

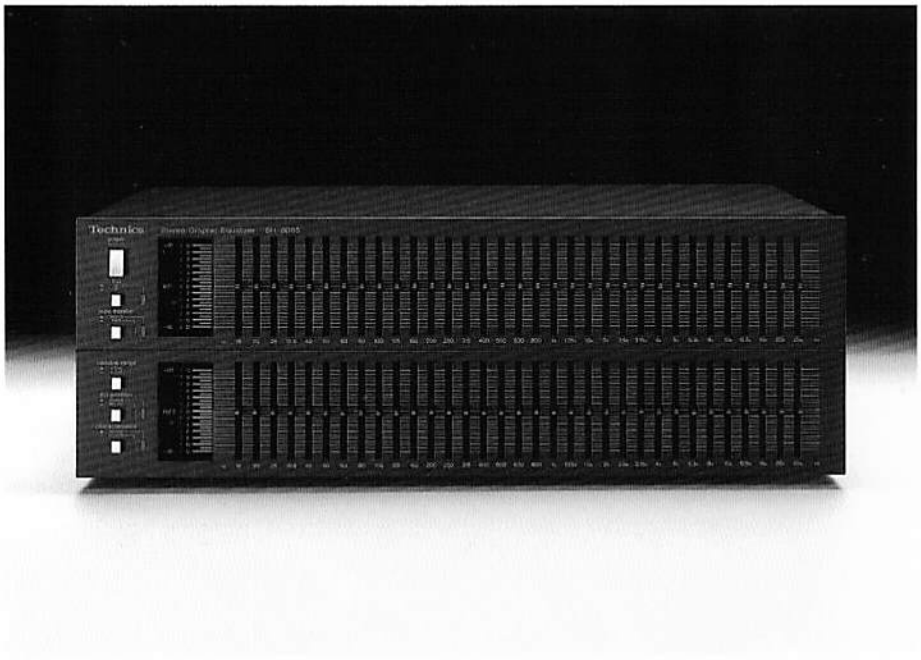
Presettable CD/aux/video Input Selector

Extra connection and selection facilities make it easy to expand your entertainment system to include a Compact Disc player, digital tape recorder, and video equipment. Both the input selector and rec selector have a CD/aux/video position that provides three times the flexibility of an ordinary aux input. You can connect up to three inputs and preset any one of them using the buttons in the lower control panel behind the glass door.

Other Features

- 4-ganged master volume control helps improve S/N ratio.
- Subsonic and high filter switches.
- Loudness switch.
- Separate rec selector with 2-way dubbing.
- Two tape monitors.

SH-8065 Stereo Graphic Equalizer



Hi-Performance Stereo 33-Band Equalizer

Technics brings professional equalizer technology to the home with the SH-8065 stereo 33-band equalizer. This state-of-the-art audio component divides the audio spectrum into bands one-third of an octave wide. With such fine division, you can boost or attenuate any one-third octave portion of the audio spectrum from 16 Hz to 25 kHz so that you can, for example, reach low 16 Hz organ frequencies. To feed less distortion to the power amp, the SH-8065's 25 kHz slide switch tempers high frequencies and cuts supersonic distortion. And with 33-band per channel versatility in stereo, you can tailor your music for most any room condition or personal preference.

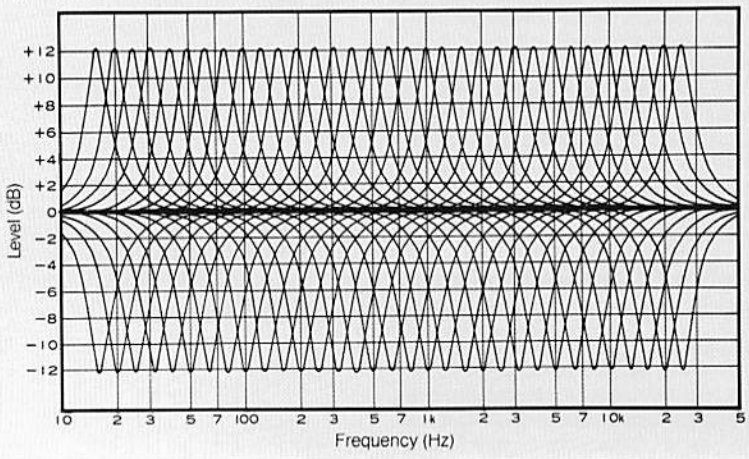
More Music, Not More Noise

Instead of distortion causing inductance coils found in many other equalization circuits, the SH-8065 employs highly sophisticated bandpass filter circuitry. A semiconductor inductor circuit contributes to the equalizer's high signal-to-noise ratio (no less than 110 dB, IHF A) and a minute THD figure (no more than 0.0025%). In addition, the SH-8065 does not have gain or insertion loss.

Variable Control Range

Flexibility, control and freedom of choice are the benefits of a good equalizer. However, some equalizers deliver these benefits to a greater extent than others. On the SH-8065, a dual range selector provides excellent flexibility. This selector has range choices of ±12 dB or ±3 dB. When a high degree of boost or cut is called for (for example, in compensating for bass roll-off in a pair of speakers, or removing a stray hum which has crept into the sound) set the variable range switch to ±12 dB. But when precise, delicate control of small increments of boost or cut is required (such as making subtle changes in tonal balance by adding brightness or presence to a dull recording) set the range selector to ±3 dB. And each channel also has illuminated range display to aid in calibrating boost or cut in decibels or fractions of decibels.

Frequency Response Curves (±12 dB range)



Equalizer Position Switch

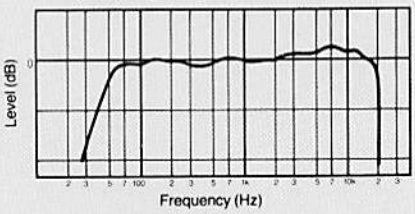
When the SH-8065 is connected between the control amplifier's tape loop and a tape deck, equalization can be instantly inserted in the path of the source signal or the playback signal.

Reversible Curve

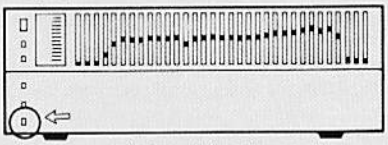
The "characteristics" switch reverses the effect of the equalization curve. So peaks become dips and vice versa. This can be used for customized equalization during tape recording and playback. To compensate for cartridge or speaker response, you can set the curve to match actual response, then instantly reverse it.

Characteristics Switch Application Example

Speaker system response curve

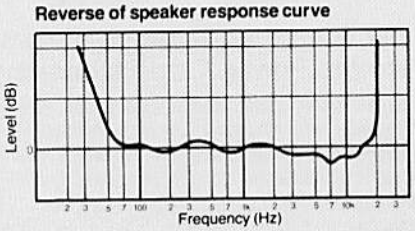


1) Set slide pots to match speaker response curve.



2) Set characteristics switch to "reverse" position.

Reverse of speaker response curve



3) Results in flat response from speaker system.

Other Features

- Equalizer on/off switch.
- Tape monitor switch.

SH-8000 Audio Frequency Analyzer

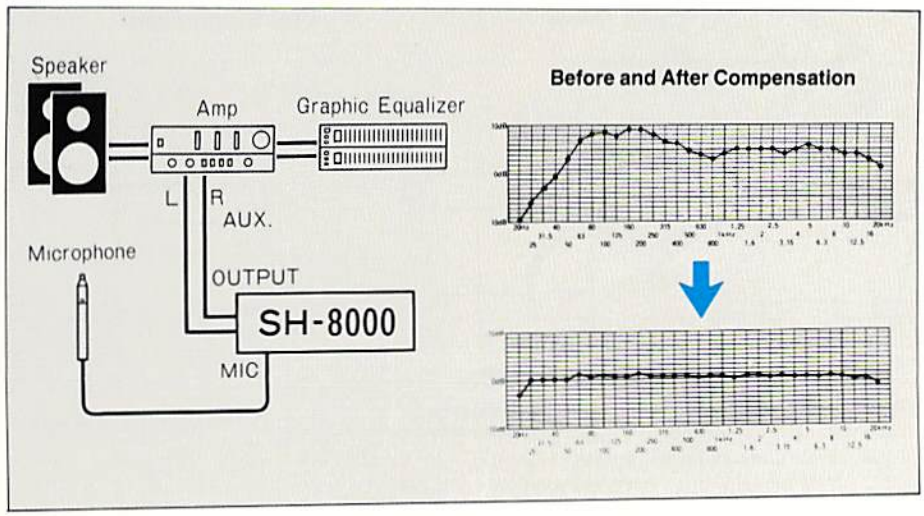
The Serious Component for the Serious Audiophile

Technics SH-8000 frequency analyzer is used in conjunction with your graphic equalizer to measure and compensate for individual speaker response and listening room characteristics.

Evaluate and Compensate

Although a speaker may show flat response when tested in a manufacturer's anechoic listening room, that data loses much of its significance when those speakers are moved to another, less ideal environment. The size, shape, construction, and furnishings of your listening room greatly affect the sound your speakers will produce. Of course, the sonic properties of the speakers themselves influence the final product. For optimum performance from your system, it is necessary to analyze your speaker's response and listening room acoustic and make adjustments for the inevitable peaks and dips in frequency response. Enter the SH-8000 audio frequency analyzer.

The SH-8000 includes a 1/3-octave step, a 31-point warble tone generator and sound level meter, and an ultra-sensitive back-electret condenser microphone that boasts linear response across the spectrum. Teamed with a graphic equalizer, the SH-8000 gives you a visual measure of frequency response on up to 31 bands per channel and the ability to adjust this response to suit the unique characteristics of your listening environment. Once you have the response you want from every band, you have an unwavering reference for further equalization adjustments.



How to Use the SH-8000

Plug the SH-8000 into your amp's AUX input jacks and position the mike in front of one speaker. Set the SH-8000's frequency bands and adjust each band until the SH-8000 meter needle moves to zero. You now have flat frequency response across the audio spectrum.

1/3-Octave, 31-Point Warble Tone Generator

Instead of pink noise, the SH-8000 uses a warble tone generator to produce test signals that are more like real music signals so as to avoid the problem of standing waves. The rotary frequency selector switch and frequency range buttons produce warble tones at 31 one-third octave intervals from 20 Hz to 20 kHz.

Tweeter Protector Switch for High Range Signals

The SH-8000 is equipped with a special protection switch to minimize accidental tweeter damage from high audio test signals that might exceed a tweeter's power-handling capacity. Warble tones of 10 kHz and above will be muted unless you press the protector switch.

5-Setting Precision Sound Level Meter

The ±15 dB precision level meter combines with an adjustable sound level control with 5 settings — 50 dB, 60 dB, 70 dB, 80 dB, and 90 dB — for accurate indication of any volume level from 35 dB to 105 dB. Such versatility enables you to check performance at different volume levels and monitor the influence of ambient sound.

Ultra-Sensitive Condenser Microphone

The omnidirectional measuring microphone with ultra-sensitive back-electret condenser boasts extremely flat response from 20 Hz to 20 kHz. Every microphone is matched and its overall response is factory adjusted to ensure frequency response accuracy across the audio spectrum. The mike's cord is over 13 feet long for use at different points in the listening room.

Other Features

- Switchable (fast/slow) meter response speed for indication of transient or average peaks.
- Battery check switch and meter indicator.
- Carrying case for portability.

Technics Honeycomb Disc Revolutionizes Speaker Design

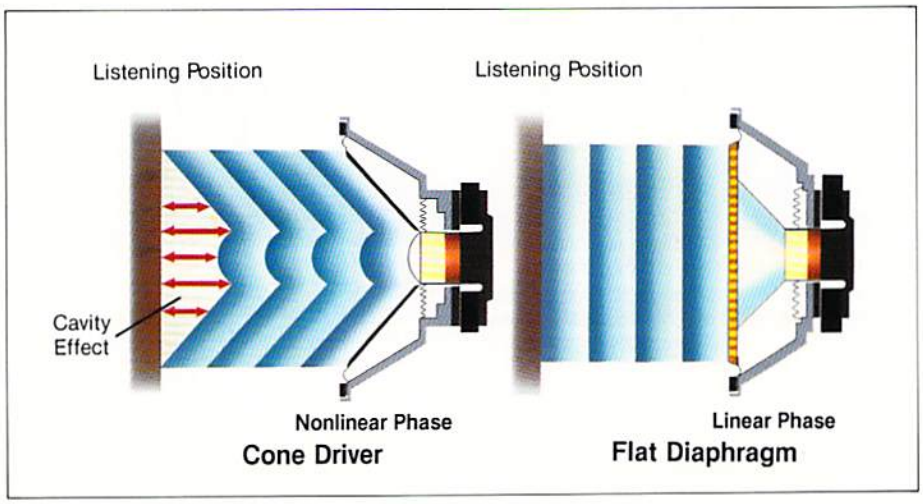
Flat frequency response, extended frequency range, and wide dynamic range. Three essential characteristics needed for exceptional speaker performance. Utilizing the highly rigid Honeycomb Disc, Technics Honeycomb Disc speakers offer all that and more. The flat diaphragm helps prevent the "cavity effect" of conventional units. The nodal drive system aids in preventing resonances and extends the range of pistonic motion. The axial symmetric structure resists bending, thereby reducing distortion. And with Linear Phase Response, Technics Honeycomb Disc speakers offer amazing clarity, accuracy, and musicality.

Technics Flat Diaphragm for Flat Frequency Response and Linear Phase Response

No Cavity Effect

Due to the cone-shape of conventional speaker drivers, sound waves from different points on the diaphragm are out of phase so the sound reaches your ears at different times. Known as the "cavity effect," this problem causes peaks and dips in frequency response. The result is poor sound quality. Since the cavity effect is an inherent cone design problem, it cannot be overcome as long as the speaker system uses cone-shaped drivers. To compensate, many speaker systems compromise design for flat response.

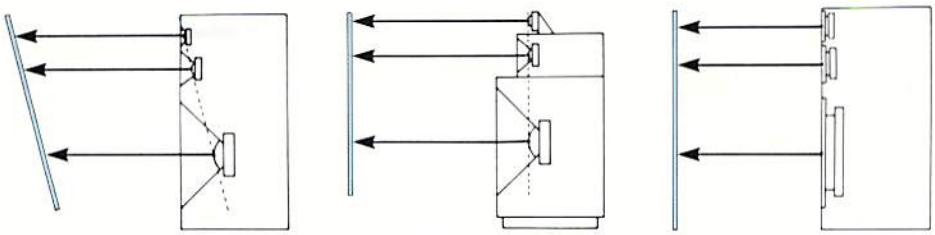
The only way to avoid the cavity effect is to eliminate the cone-shaped driver and replace it with a flat diaphragm — like the Technics Honeycomb Disc. With the Honeycomb Disc, the entire surface faces forward, so sound waves radiate in unison and reach your ears at the same instant. The driver has linear phase response as well for dynamic and lifelike sound.



More on Linear Phase Response

Cone-shaped drivers cause another problem in phase response. Because a speaker system's drivers are not the same size, sound waves from each individual driver do not travel in unison so the waves do not reach your ears at the same time. Until now, the most effective means to combat the problem has been to stagger the drivers so that their centers align vertically.

But, Technics Honeycomb drivers are flat so they can be aligned vertically. This helps to avoid the cluttered appearance of conventional designs. Sound waves from all drivers radiate together. The result is phase linearity and lifelike sound in combination with an attractive speaker design.



Conventional Speaker System | Conventional Linear Phase Speaker System | Honeycomb Disc Speaker System

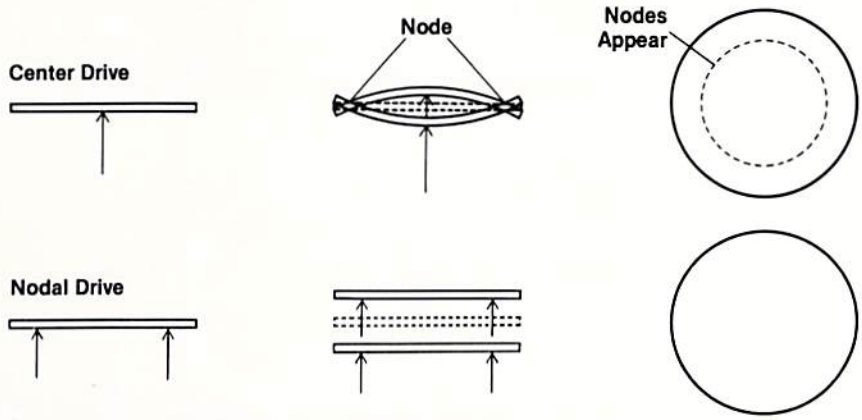
Frequency Response and Technics Nodal Drive

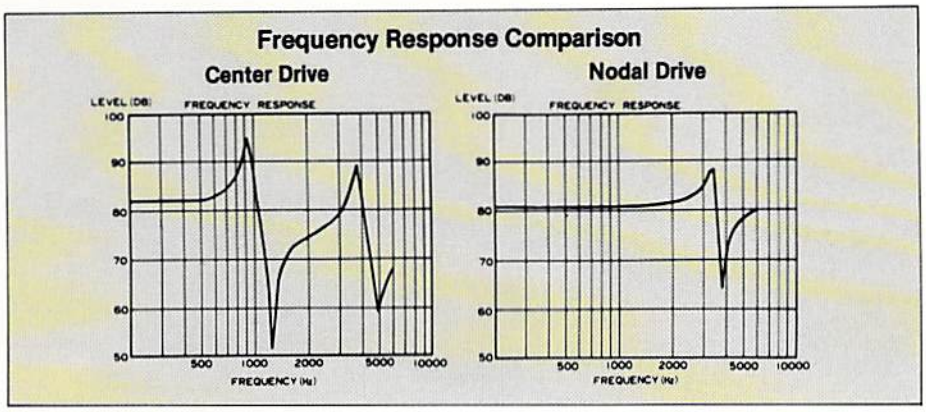
Modes and Nodes

A speaker diaphragm tends to vibrate in a constant, unchanging pattern called a "mode." Every such mode has some points that fail to vibrate and seem to stand still. These points are called "nodes." Nodes, are undesirable in a speaker diaphragm because they color the music signal and limit frequency response.

Technics Nodal Drive

The usual method of driving the diaphragm at its center provides an ideal situation for nodes to appear. As the graph illustrates, the limited range of pistonic motion that is caused by nodes results in big peaks and dips in frequency response.
But, if the diaphragm is driven at the points where nodes naturally appear, there would be no point where the diaphragm does not vibrate. The nodes disappear along with their undesirable effects. Technics calls this method "nodal drive." Practically speaking, nodal drive means that the voice coil is designed to intersect the nodes.
The result is that Technics Honeycomb Disc speaker systems exhibit wide frequency response and maintain pistonic motion throughout an incredibly wide range of frequencies (as shown in the graph).





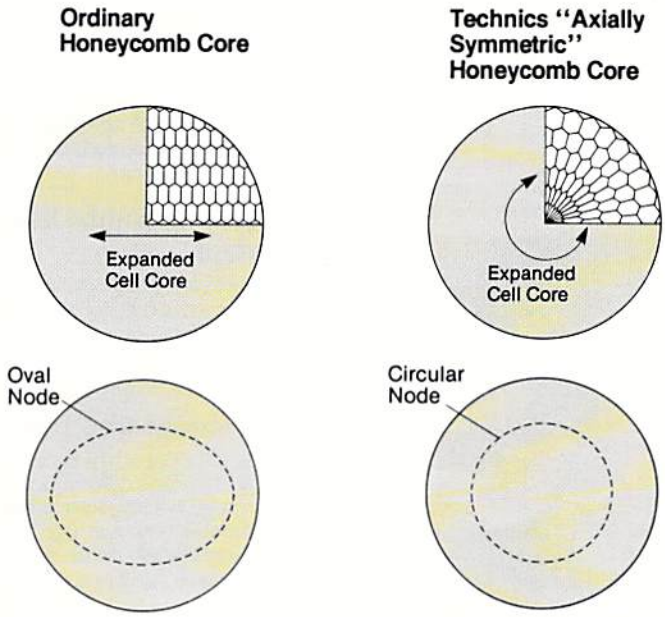
Low Distortion with Axial Symmetry

Rigid Honeycomb Core

The idea of a flat diaphragm is not new. Engineers have been experimenting with design ideas for years. What is new, though, is a flat diaphragm that effectively overcomes the problems of rigidity. Cone-shape designs inherently increase the rigidity of the diaphragm, but unfortunately suffer from partial vibrations and cone break up. To increase the rigidity of the flat diaphragm, Technics uses axial symmetry. For improved performance, the honeycomb core is sandwiched between two fine skins of an aluminum alloy.

The Benefits of Axial Symmetry

Axial symmetry provides equal rigidity in all directions and produces a round nodal pattern that helps to reduce distortion. Without axial symmetry, the honeycomb concept is not practical. This is why many other flat diaphragm speakers can not match the performance of Technics.



SB-M3 Honeycomb Disc Speaker System

13″ Honeycomb Disc Woofer

For accurate digital source reproduction, the Honeycomb Disc woofer design offers several advantages. Linked with an innovative linear damper and a symmetrical four-way gather, it becomes flexible. Yet it helps to prevent rolling for more linear power output. A 1.5 kg magnet and 4-layer voice coil aid in increasing both power handling capacity and efficiency.

Linear Damper

3-1/8″ Honeycomb Disc Midrange

Efficient crossover occurs at 3.5 kHz. Pistonic motion reaches a much higher 10 kHz. The 1-31/32″ (4.5 cm) diameter voice coil uses a GFRP bobbin and copper clad aluminum wire to raise the power handling capacity (950 g magnet).

1-1/8″ Honeycomb Disc Tweeter

Laminated mica diaphragm construction provides frequency response extension up to 38 kHz (−16 dB). A square magnet is used to allow mounting closer to the midrange, offering better vertical dispersion and stereo imaging. Magnetic fluid raises power handling and linearity (18,000 gauss magnet).

Low Noise Network

High impedance wire connections. Combined electrolytic and film capacitors. Low distortion choke coils. An 18 dB/oct mid-to-high crossover is delivered quietly.

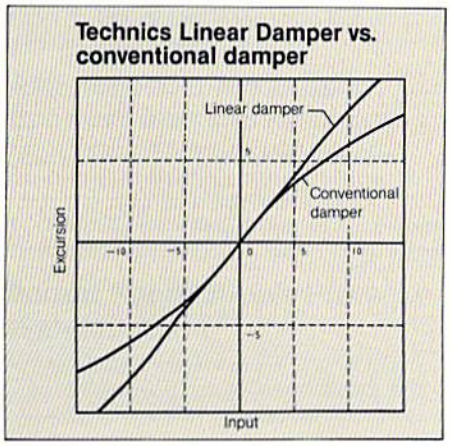
Other Features

- Handsome, rugged enclosure uses special joints to prevent resonances. Made of real wood.
- Terminals designed to permit use of large gauge speaker cords.
- Large attenuators for both midrange and tweeter.
- Thermal relay protects tweeter from accidental damage.
- R/L symmetrical cabinet design.
- Saran net complements room interior.

SB-M5 Honeycomb Disc Speaker System

10″ Honeycomb Disc Woofer

A diamond-shaped linear damper, a 4.5 cm diameter voice coil, and polyimide bobbin and bonding all help to contribute to high power linearity, excellent handling capacity, and ultra-low distortion.



3-1/8″ Honeycomb Disc Midrange

The Honeycomb Disc, a 15,000 gauss magnet, a narrow magnetic circuit gap, and special edge construction allow midrange frequency reproduction that is effortless and remarkably natural.

1-1/8″ Honeycomb Disc Tweeter

The honeycomb configuration is ideal for high frequency reproduction. Imagine, crystal clear treble notes up to 35 kHz (−16 dB). A square magnet permits closer mounting with the midrange unit. The close proximity of the magnet helps to improve stereo image.

Low Distortion Network

A precision crossover network. Ferrite core choke coils and specially selected capacitors provide high fidelity and low distortion.

Other Features

- Handsome, walnut grain finished enclosure. Uses special joints to prevent resonances.
- Special square bass-reflex port prevents escape of standing wave resonances.
- Terminals designed to permit use of large gauge speaker cords.
- Large attenuators for both tweeter and midrange.
- Thermal relay protects tweeter from accidental damage. LED verifies operation.
- R/L symmetrical cabinet design.
- Saran net complements room interior.

Technical Specifications

Turntables

	SP-15	SP-25	SP-10MKII	SP-10MK3
TURNTABLE SECTION				
Type	Quartz synthesizer direct drive turntable	Quartz synthesizer direct drive turntable	Quartz-phase-locked control direct drive turntable	Quartz-phase-locked control direct drive turntable
Motor	Ultra-low-noise, brushless, heteropole DC motor	Ultra-low-speed, brushless, DC motor	Ultra-low-speed, brushless, DC motor	Quartz-phase-locked control, ultra-low-speed brushless DC motor
Turntable platter	Aluminum diecast	Aluminum diecast	Aluminum diecast	Copper alloy + aluminum diecast
Diameter	13 11/32" (33.9cm)	13 11/32" (33.9cm)	12 19/32" (32cm)	12 19/32" (32cm)
Weight	5.9 lb (2.7kg) (including rubber matting)	4.4 lb (2kg) (including rubber matting)	6.4 lb (2.9kg)	22.0 lb (10.0kg)
Moment of inertia	130 lb•in² (380kg•cm²)		130 lb•in² (380kg•cm²)	1100kg•cm²
Turntable Speeds	33 1/3, 45, 78.26 rpm	33 1/3, 45 rpm	33 1/3, 45, 78.26 rpm	33 1/3, 45, 78.26 rpm
Speed adjustment range	±9.9% in 0.1% steps (digital read-out)			
Pitch controls		All quartz-locked control within ±6%		Quartz locked pitch control by up to ±9.9% in 0.1% steps, at all three rated speeds
Starting torque	2.61 lb•in (3.0kg•cm)	1.3 lb•in (1.5kg•cm)	5.2 lb•in (6.0kg•cm)	16.0kg•cm
Start-up time	0.4 sec. (to 33 1/3 rpm from standstill)	0.7 sec. (to 33 1/3 rpm from standstill)	0.25 sec. (= 25° rotation) to 33 1/3 rpm	0.25 sec. (to 33 1/3 rpm)
Braking time	0.4 sec. (at 33 1/3 rpm)		0.3 sec. (= 30° rotation) (from 33 1/3 rpm to standstill)	0.3 sec. (to 33 1/3 rpm)
Braking system	Combination of electronic and mechanical brakes	Electronic brake		
Speed fluctuation due to load torque	0% within 2.2 lb•in (2.5kg•cm) load torque (up to 500g tracking force)	0% within 0.87 lb•in (1.0kg•cm)	0% within 4.3 lb•in (5.0kg•cm)	0% within (10.0kg•cm)
Speed drift	0.008% WRMS*	0.01% WRMS*	Within ±0.002%	Within ±0.001%
Wow and flutter	0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A weighted)	0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A weighted)	0.025% WRMS (JIS C5521) ±0.035% weighted, zero to peak (DIN 45 507)	0.015% WRMS (JIS C5521) ±0.021% weighted zero to peak (DIN 45 507), (IEC 98A weighted)
Rumble	−56dB DIN A (IEC 98A unweighted) −78dB DIN B (IEC 98A weighted)	−56dB DIN A (IEC 98A unweighted) −78dB DIN B (IEC 98A weighted)	−60dB (IEC 179B) −50dB (DIN 45 539A) −70dB (DIN 45 539B)	−60dB DIN A (IEC 98A unweighted) −92dB DIN B (IEC 98A weighted)
GENERAL				
Power supply	AC 110 ~ 120/220 ~ 240V, 50/60Hz	AC 110 ~ 120/220 ~ 240V, 50/60Hz	AC 120V, 50/60Hz	AC 120V 50/60Hz
Power consumption	11W	11W	26W	35.5W
Dimensions (W x H x D)	13 3/4" x 3 11/32" x 14 41/64" (349 x 93 x 372 mm)	13 3/4" x 3 5/32" x 14 41/64" (349 x 85 x 372 mm)	14 31/64" x 4 1/64" x 14 31/64" (368.5 x 102.5 x 368.5 mm) (Turntable only)	14 17/32" x 4 7/16" x 14 17/32" (369 x 113 x 369 mm) (Turntable only) 6 17/32" x 3 25/32" x 16 5/32" (166 x 96 x 410 mm) (Control unit)
Weight	13.7 lb (6.2kg)	10.6 lb (4.8kg)	20.9 lb (9.5kg) (Turntable only)	40 lb (18kg) (Turntable only) 13.2 lb (6kg) (Control unit)

*This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter.
Measured by obtaining signal from built-in frequency generator of motor assembly.

Tonearm System

	EPA-250
Type	Interchangeable arm unit with dynamic damping device
Suspension	Gimbal suspension
Effective length	250mm
Rear stub length	max. 93mm (from point of suspension)
Range of height adjustment	42 ~ 62mm (from mounting surface to arm tube center) (20mm at helicoid part)
Overhang	15mm
Lateral tracking error angle	+1°6' at the inner groove +2°6' at the outer groove
Friction	7mg or less (lateral, vertical)
Effective arm mass	14g (without cartridge)
Adjustable tracking force	0 ~ 2g (direct-reading)
Headshell weight	7.5g
Suitable cartridge weight	6 ~ 8g 3 ~ 6g (with supplied headshell sub-weight) 10.5 ~ 12.5g (with supplied stub sub-weight)
DC resistance of phono cable	39.5 milliohms/m
Capacitance of phono cable	41.5pF/m
Resonance (Q)	Below 8dB
Pitch of mounting screws	Standard 1/2" (12.7mm)
Headshell pins	1.2mm diameter, 4-pins
Diameter of arm mounting hole	φ62mm

Tape Decks

	RS-1520
Tape width	1/4" (6.3mm), 0.069" (1.75mm) track width (2-track) 0.039" (1.00mm) track width (4-track)
Channel and track	2-channel, 2-track rec/PB and 4-track playback (2-channel, 4-track rec/PB and 2-track playback head assembly RP-2422 optionally available)
Tape speeds	3 speeds; 15, 7 1/2 and 3 1/4 ips (38.1, 19.05 and 9.53cm/s) max. deviation ±0.1% and fluctuation 0.05% at 15 ips (38cm/s) Pitch Control: ±6% (record and playback)
Reel size	5 to 10 1/2" (13 to 26.7cm) EIA or NAB, plastic or metal
Wow and flutter (overall)	(JIS weighted RMS) (DIN weighted peak) (NAB unweighted RMS)
15 ips (38cm/s)	0.018% ±0.035% 0.045%
7 1/2 ips (19cm/s)	0.03% ±0.06% 0.07%
3 1/4 ips (9.5cm/s)	0.06% ±0.12% 0.15%
Fast winding time	less than 150 sec. for 2500 feet (762m) tape
Capstan drive	Quartz-phase-locked control DC brushless servo direct-drive motor
Reel drive	2 tape tension controlled DC brushless direct-drive motors
Remote control	Functions; Rec/Play/Pause/FF/Rew Remote control box RP-9690 optionally available
Frequency response (overall)	rec. level
15 ips (38cm/s)	−10dB 30 ~ 30,000Hz (40 ~ 22,000Hz ±2dB) 0VU 30 ~ 20,000Hz (40 ~ 20,000Hz ±2dB)
7 1/2 ips (19cm/s)	−20dB 20 ~ 25,000Hz −10dB 20 ~ 20,000Hz (30 ~ 20,000Hz ±2dB)
3 1/4 ips (9.5cm/s)	−20dB 20 ~ 15,000Hz ±3dB
Signal-to-noise ratio (overall)	A-weighted at 1kHz (650nWb/m) (370nWb/m)
15 ips (38cm/s)	68dB 63dB
7 1/2 ips (19cm/s)	68dB 63dB
3 1/4 ips (9.5cm/s)	66dB 61dB
	650nWb/m = 11dB above a 0VU of 185nWb/m, 1kHz THD is less than 3% 370nWb/m = 6dB above a 0VU of 185nWb/m measured with bulk erased 3M type 207 tape
Distortion (overall)	Total Harmonic Distortion (THD) at 400Hz, all speeds less than 0.8% at 185nWb/m (0VU) less than 2% at 370nWb/m (+6dB)
Channel separation	better than 50dB at 1kHz
Recording bias	120kHz
GENERAL	
Power supply	AC 120V, 50/60Hz
Power consumption	120W
Dimensions (WxHxD)	18" x 19 1/4" x 10 1/8" (456 x 502 x 257 mm)
Weight	61.7 lb (28kg)
Rack mounting	with Shelf Brackets (RP-9130) optionally available for a standard 19" rack

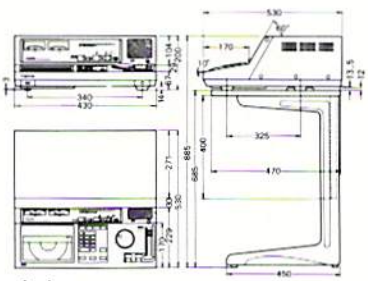
Specifications based on use of 3M type 207 type.

	RS-B100
Track system	4-track 2-channel stereo recording and playback
Tape speed	4.8cm/s
Wow and flutter	0.022% (WRMS)
Frequency response	
Metal tape	15 ~ 25,000Hz 20 ~ 23,000Hz (±3dB)
CrO_2 tape	15 ~ 23,000Hz 20 ~ 21,000Hz (±3dB)
Normal tape	15 ~ 21,000Hz 20 ~ 19,000Hz (±3dB)
Dynamic range	110dB (at 1kHz) with dbx in
Max. input level improvement	10dB or more with dbx in (at 1kHz)
Signal-to-noise ratio	
dbx in	92dB (A weighted)
Dolby C NR in	78dB (CCIR)
Dolby B NR in	70dB (CCIR)
NR out	60dB (A weighted) (signal level = max. input level, CrO_2 type tape)
Fast forward and rewind time	Approx. 90 sec. (C-60 tape)
Input sensitivity and impedance	
Line	60mV/more than 47 kilohms
Output level and impedance	
Line	700mV/820 ohms or less
Headphones	125mV (at 8 ohms), applicable headphone impedance 8 ohms ~ 600 ohms
Bias frequency	105kHz
Motors	2-motor system Quartz-locked DD motor (x1), DC motor (x1) (plus one DC motor for mechanism drive)
Heads	3-head system AX (amorphous) combination head (record x 1, playback x 1) Double-gap sendust head for erasure (x1)
Power supply	AC 120V, 50/60Hz
Power consumption	35W
Dimensions (W x H x D)	16 7/8" x 3 7/8" x 10 1/4" (430 x 98 x 273 mm)
Weight	12.3 lb (5.6kg)

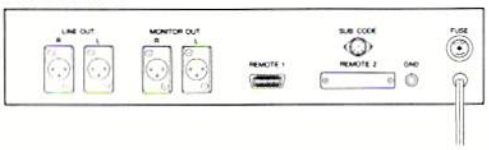
CD Player

	SL-P50P
AUDIO	
Number of channels	2 (stereo)
Fequency response	20 ~ 20,000Hz, ±0.5dB
Dynamic range	More than 96dB
S/N ratio	More than 96dB
Total harmonic distortion	Less than 0.005%
Channel separation	More than 90dB
Wow & flutter	Unmeasurable
Output level	+4dBm/−20dBm (at 0VU, selectable)
SIGNAL FORMAT	
Sampling frequency	44.1kHz
Decoding	16-bit linear
Error correction	Technics Super Decoding Algorithm
PICKUP	
Type	Astigmatic 3-beam
Beam source	Semiconductor laser
Wavelength	780nm
ACCESS	
Audio start-up time	Within 0.3 seconds (0.1 second with optional circuit board)
Access time	
a) For track number and time	Within 4 seconds
b) For index number	Within 8 seconds
c) Auto search	Within 5 seconds (Automatic location of beginnings of the music)
Access accuracy	13.3msec. (1 frame)
CONTINUOUS OPERATION	All performance levels listed in the specifications are maintained after the player has been operated in a normal manner continuously for more than 10 hours.
INSULATION RESISTANCE	More than 50 Megaohm measured with a 500V resistance meter between the AC power supply input terminal and the cabinet.
STABILITY	
Power supply voltage	All specifications are maintained if voltage is within ±5% of the rated value.
Ambient temperature	All functions operate normally within the range of 5° and 40°C.
GENERAL	
Ambient temperature	5 ~ 40°C
Power supply	AC 120V, 60Hz
Power consumption	85W
Dimensions (W x H x D)	
Tabletop type	16 15/16" x 7 7/8" x 20 7/8" (430 x 200 x 530 mm)
Console type (with optinal stand)	16 15/16" x 34 3/4" x 20 7/8" (430 x 883 x 530 mm)
Weight	
Tabletop type	39.7 lb (18kg)
Console type	67.2 lb (30.5kg)
TERMINALS	
Line out	
Type	XLR-3-32 or equivalent (Cannon)
Impedance	600 ohm balanced
Monitor out	
Type	XLR-3-32 or equivalent (Cannon)
Impedance	600 ohm balanced
Remote 1	
Type	14-pin
Remote 2	
Type	RS-232-C 25-pin
Headphones	Stereo phone jack

Note: The terminal specification may differ from those of other machines, as they are specified by the customer.



Rear Terminals

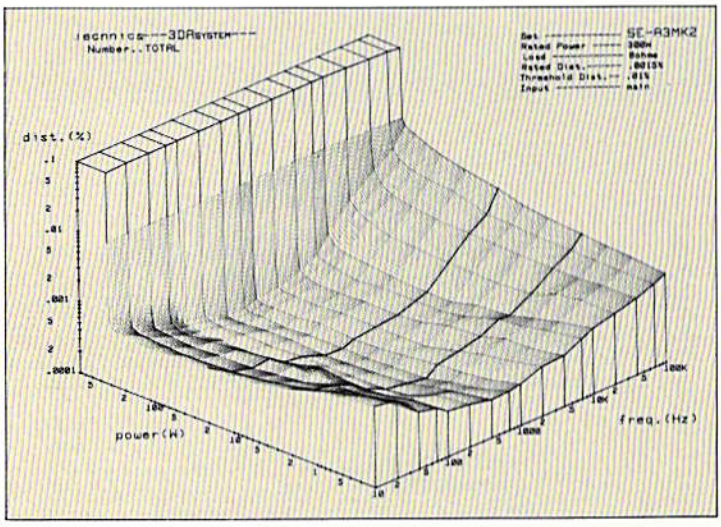


Technical Specifications

Amplifiers (IHF '78)

	SE-A3MK2
AMPLIFIER SECTION	
Rated minimum sine wave RMS power output	
20Hz ~ 20kHz both channels driven 0.002% total harmonic distortion	300W per channel (8 ohms)
20Hz ~ 20kHz both channels driven 0.003% total harmonic distortion	300W per channel (4 ohms)
1kHz continuous power output both channels driven	
0.001% total harmonic distortion	320W per channel (8 ohms)
0.003% total harmonic distortion	320W per channel (4 ohms)
Dynamic headroom	1.0dB (8 ohms) 2.0dB (4 ohms)
Total harmonic distortion	
rated power at 20Hz ~ 20kHz	0.002% (8 ohms)
half power at 1kHz	0.0003% (8 ohms)
SMPTE intermodulation distortion	0.002% (8 ohms)
Frequency response	DC ~ 200kHz, −3dB 20Hz ~ 20kHz, +0dB, −0.1dB
Input sensitivity	55mV (1V, IHF '66)
S/N (IHF A)	100dB (125dB, IHF '66)
Input impedance	47 kilohms
TIM (Transient intermodulation distortion)	unmeasurably small
Low frequency damping factor	200 (8 ohms) 100 (4 ohms)
Load impedance	
MAIN or REMOTE	4 ~ 16 ohms
MAIN and REMOTE	8 ~ 16 ohms
METER	
Reading range	0.0001W ~ 1kW (8 ohms) −60dB ~ +5dB
Frequency response (reading accuracy)	10Hz ~ 20kHz, ±1dB (more than −40dB) 10Hz ~ 10kHz, ±1dB (less than −40dB)
Attack time	50μsec
Recovery time	750 msec (0dB → −20dB)
GENERAL	
Power consumption	1200W, 1400 VA
Power supply	AC 120V, 60Hz
Dimensions (W x H x D)	16 15/16" x 8 1/16" x 19 11/12" (430 x 208 x 507 mm)
Weight	86 lb (39kg)

Note: Total harmonic distortion is measured by the digital spectrum analyzer (HP 3045 system).



	SU-A4MK2
PRE AMPLIFIER SECTION	
Frequency response	
PHONO MM	20Hz ~ 20kHz (RIAA ±0.15dB) 20Hz ~ 100kHz (RIAA ±0.2dB)
TUNER, CD, AUX, VIDEO, TAPE 1, 2	DC ~ 100kHz, +0dB, −3dB
Input sensitivity	
PHONO 1 MM	0.26/0.64mV (1/2.5mV IHF '66)
MC	20/65μV (70/250μV IHF '66)
PHONO 2 MM	0.64mV (2.5mV IHF '66)
TUNER, CD, AUX, VIDEO, TAPE 1, 2	38mV (150mV IHF '66)
S/N	
PHONO MM	77dB (92dB IHF '66)
PHONO MC	76dB (82dB IHF '66)
TUNER, CD, AUX, VIDEO, TAPE 1, 2	100dB (106dB IHF '66)
Total harmonic distortion (20Hz ~ 20kHz)	
PHONO MM	
(2.5mV)	0.006%
(2V output at vol. max.)	0.001%
PHONO MC	
(250μV)	0.01%
(2V output at vol. max.)	0.001%
TUNER, CD, AUX, VIDEO, TAPE 1, 2	0.006%
(2V output at vol. max.)	0.001%
Maximum input voltage	
PHONO MM	150mV (160mV, 1kHz)
MC	15mV (16mV, 1kHz)
Input impedance	
PHONO 1 MM	47 kilohms
MC	30/470 ohms
PHONO 2 MM	47 kilohms
TUNER, CD, AUX, VIDEO, TAPE 1, 2	47 kilohms
Shelving tone	
SUPER TREBLE (50kHz)	−10dB ~ +10dB
TREBLE (20kHz)	−5dB ~ +5dB
BASS (50Hz)	−5dB ~ +5dB
SUPER BASS (20Hz)	0dB ~ +10dB
Turnover frequency	
SUPER TREBLE	8kHz
TREBLE	2kHz
BASS	500Hz
SUPER BASS (+12dB/oct.)	75Hz, 150Hz
Filter	
HIGH	7kHz, −6dB/oct.
SUBSONIC	20Hz, −12dB/oct.
Loudness control (vol. at −30dB)	50Hz, +7dB
Muting	−20dB
Output voltage	
TAPE 1, 2 REC OUT	150mV
PRE OUT	2V (rated)
Output impedance	
TAPE 1, 2 REC OUT	600 ohms
PRE OUT	2 ohms
GENERAL	
Power consumption	15W
Power supply	AC 120V, 60Hz
Dimensions (W x H x D)	16 15/16" x 3 13/16" x 14 3/16" (430 x 97 x 330 mm)
Weight	17.6 lb (8kg)

Note: Total harmonic distortion is measured by the digital spectrum analyzer (HP 3045 system).

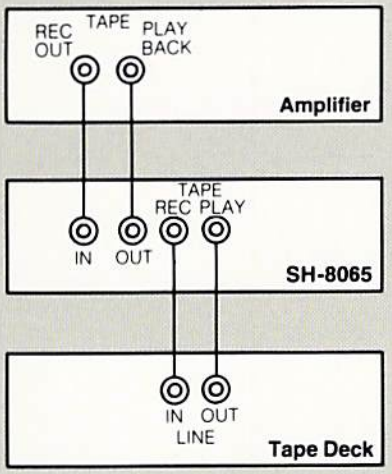
Graphic Equalizer (IHF '78)

	SH-8065
Frequency response	5Hz ~ 100kHz, −1dB
Maximum output voltage	8V (1kHz, THD 0.01%)
Total harmonic distortion	0.0025% (20Hz – 20kHz)
S/N	110dB (IHF A)
Rated output voltage	1V
Input sensitivity	1V
Maximum input voltage	8V (1kHz)
Input impedance	47 kilohms
Output impedance	600 ohms
Gain	0 ± 1dB
Line level voltage switch	150mV/1V
Band level controls	+3dB ~ −3dB, +12dB ~ −12dB (33 elements continuously variable)
Center frequencies	16Hz, 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz, 20kHz, 25kHz
GENERAL	
Power consumption	28W
Power supply	AC 120V, 60Hz
Dimensions (W x H x D)	16 15/16" x 6 1/32" x 13" (430 x 153 x 330 mm)
Weight	14.6 lb (6.6kg)

Audio Frequency Analyzer

	SH-8000
Overall frequency response	20Hz ~ 20kHz, ±2dB
MAIN UNIT	
OSCILLATION SECTION	
Oscillation signal	Warble tone (Modulation frequency: 8Hz)
Oscillation frequencies	20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, 100Hz, 125Hz, 160Hz, 200Hz, 250Hz, 315Hz, 400Hz, 500Hz, 630Hz, 800Hz, 1kHz, 1.25kHz, 1.6kHz, 2kHz, 2.5kHz, 3.15kHz, 4kHz, 5kHz, 6.3kHz, 8kHz, 10kHz, 12.5kHz, 16kHz, 20kHz (Measurement points: 31)
Frequency precision	±6% or better
Rated output level and output impedance	70mV/1 kilohm
METER SECTION	
Sound-pressure level measurement range	35dB ~ 105dB SPL (0dB = 2x10 ^{4}μbar) (50 ~ 90dB; 10dB steps, switchable in 5 ranges)
Meter response time	FAST: 350 msec. (attack time), 400 msec. (recovery time) SLOW: 550 msec. (attack time), 2 sec. (recovery time)
GENERAL	
Power source	DC 9V (Panasonic 006P or equivalent)
Battery life	10 hours (continuous operation, using Panasonic 006P battery)
Dimensions (W x H x D)	8 15/32" x 2 7/16" x 4 13/16" (215 x 62 x 122 mm)
Weight	2.2 lb (1kg)
MICROPHONE	
Type	Back-electret-condenser type
Directional characteristic	Non-directional
Sensitivity (front)	−72dBV/μbar (1kHz)
Frequency response	20Hz ~ 20kHz
Maximum input level	110dB SPL (0dB = 2 x 10 ^{4}μbar)
Output impedance	600 ohms (1kHz) unbalanced
Power source	DC 1.5V (1 "AA" size battery)
Battery life	1500 hours (continuous operation, using "Heavy Duty" battery)
Cord length	13.2 feet (4m)

System Interconnections



Speakers

	SB-M3	SB-M5
Configuration	3-way, 3-speaker, bass-reflex	3-way, 3-speaker, bass-reflex
Speaker units		
Woofer	13" (33cm) Honeycomb Disc	10" (25cm) Honeycomb Disc
Midrange	3 1/8" (φ80) Honeycomb Disc	3 1/8" (φ80) Honeycomb Disc
Tweeter	1 1/8" (φ28) Honeycomb Disc	1 1/8" (φ28) Honeycomb Disc
Impedance	6 ohms	6 ohms
Input power	200W (music), 100W (DIN)	160W (music), 80W (DIN)
Output level	90dB/W (1.0m)	92dB/W (1.0m)
Frequency range	28Hz ~ 38kHz (at 16dB below average level), 38Hz ~ 35kHz (at 10dB below average level)	33Hz ~ 35kHz (at 16dB below average level), 43Hz ~ 33kHz (at 10dB below average level)
Crossover frequencies	450Hz, 3.5kHz	900Hz, 3kHz
Dimensions (W x H x D)	15 3/4" x 26 3/8" x 13 1/8" (400 x 670 x 333 mm)	13 25/32" x 23 27/32" x 12 19/32" (350 x 606 x 320 mm)
Weight	68.3 lb (31kg)	36.4 lb (16.5kg)

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