

Starting
right now,
forget
everything
you know
about high
fidelity.

Getting the Most Out of Digital Audio —the Sony ES Series

With a series of impressive technological breakthroughs, Sony has virtually re-invented high fidelity—we've redefined its potential and eliminated many of its previously-accepted limitations. Based on three entirely new audio media (all invented or co-invented by Sony), our new series of components can now create the elusive sense of reality that's been hotly pursued (but only partially attained) by audio engineers since the industry's infancy. With the Compact Disc digital audio player, the PCM digital processor, and the Beta Hi-Fi videocassette recorder, Sony's ES Series forever changes the way people think about recorded music.

A Little History

The first stirrings of the coming technological revolution began back in the early 1970s. That was when Sony first developed a PCM digital recorder for professional use.

But Sony has a reputation built on the excellence of our innovative *consumer* products. So we sought to make our professional digital technology available to the serious (but nonetheless amateur) audiophile. That required a major reduction in size and price, with no corresponding cutback in quality and performance. A difficult task indeed.

Difficult, but far from impossible. In 1977, Sony offered the first digital processor for consumers, the PCM-1. It was designed to create a digital signal from an analog input, which would then be recorded onto a conventional video cassette tape with any VCR.

The world's first portable PCM processor was the PCM-F1, introduced by Sony in 1981. The PCM-F1 was an unprecedented success—musical engineers in recording studios throughout the world applauded its transparent clarity and staggering accuracy. After years of research and development, Sony had at last made digital audio a reality. But that was just the beginning.

Advanced Technology in an Exciting New Format

On October 1, 1982, Sony marketed a product which experts predict will have a profound and permanent effect on the hifi industry—the Compact Disc player. The Sony CDP-101 Compact Disc player was greeted by rave reviews from consumers and professionals alike. And it featured some highly innovative engineering.

By combining digital technology with a futuristic laser light "stylus," the Compact Disc duplicates the incredible performance of the

PCM processors. Yet the disc itself is easy to handle and nearly indestructible. The result of our efforts is an exciting new medium that integrates superior sonic performance, compact size, potentially unlimited durability, easy handling, and convenient indexing and search capabilities.

A Unique Marriage of Audio and Video

The ES Series also features an advanced Beta Hi-Fi videocassette recorder, which offers the finest sound quality available with analog technology. In terms of sonic excellence, it easily outperforms all conventional audio recorders. And it also provides superior video performance. Beta Hi-Fi is truly an incredible new entertainment experience—never before could you enjoy the best of analog sound and state-of-the-art video from one source. Beta Hi-Fi makes this dream an entrancing reality.

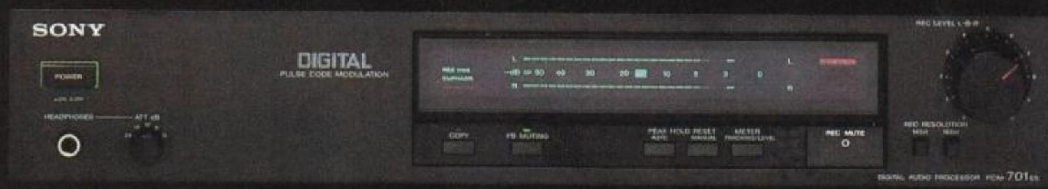
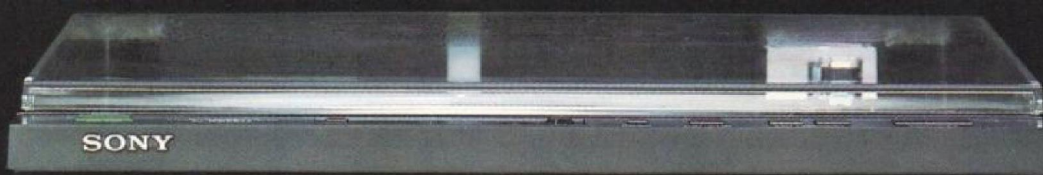
So Why a System?

The ES Series amp and speakers have been designed with the special capabilities of these three new media in mind. For example, wide dynamic range is one of the new technology's most important accomplishments. But it places rather stringent demands upon the amp for high power when it's needed, low crosstalk, and outstanding performance at all output levels. And the speakers must be able to handle prodigious quantities of power without overloading, while maintaining excellent linearity to reproduce the wide differential between loud and soft sounds accurately. There are other unique requirements—and the Sony ES Series reflects these considerations with an intelligent design dedicated to proper reproduction with the new technologies.

What About Your Current Music Collection?

No innovation, no matter how remarkable, will convince you to discard all your current records and tapes—nor should it try. Sony is convinced that you'll soon become a committed digital listener. But in the meantime, you'll want the finest sounding analog equipment. Both Sony's Biotracer-equipped turntable and Independent Suspension three-head cassette deck are recent innovations that make significant, and audible, improvements in the quality of analog sound. Therefore, they are included in the ES Series to let you enjoy your existing sources.

The ES Series is Sony's boldest leap into the future of home entertainment. We invite you to preview tomorrow with us. We're sure you'll agree—it's an exhilarating experience.



CDP-701ES — The CD Player for Dedicated Audiophiles



It's a simple, unassailable fact—Sony can truthfully claim more extensive experience and expertise in the design and construction of Compact Disc players than any other manufacturer. After all, we co-invented the CD concept in the first place. While much of our competition struggles to complete their first Compact Disc player, the CDP-701ES represents our *third* such endeavor. We've made and sold more Compact Disc players than anyone—our CDP-101 is the world's most popular CD unit. Sony also makes the \$7000 CDP-5000; it is used in CD mastering applications throughout the world.

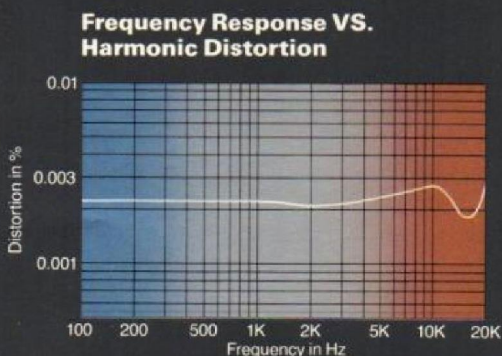
How the Past Improves the Present

These statistics are more than simple self-congratulation—they can mean a great deal to you. Much of the same innovative design and construction that make the CDP-5000 so superb have also been included in the CDP-701ES. That makes the CDP-701ES the Compact Disc player of choice for audiophiles seeking the unit with sonic performance against which all others must be measured. If you are that dedicated audiophile, the CDP-701ES features the construction and materials required to achieve the virtual sonic perfection promised by the Compact Disc technology.

Dual-Monaural Circuitry for Better Stereo Separation

For example, the CDP-701ES features dual monaural construction. So each channel has its own separate post-laser signal path. Everything from the digital/analog converter to the integrator to the audio line amplifier to the buffer amplifier to the low pass filters . . . it's all duplicated. Result? Stereo separation—especially at the high frequencies—that's unsurpassed by any CD player.

The low pass filters are another example of the care in construction and quality of materials evident throughout the CDP-701ES. They've been specially designed to provide the ideal combination of extended high frequency response and complete attenuation of ultrasonic noise.



The Sony CDP-701ES exhibits phenomenally low harmonic distortion across the entire spectrum of audible frequencies.



There's more. The CDP-701ES incorporates mica capacitors in the de-emphasis circuit for impressive accuracy. And metal film resistors reduce thermal noise. A special low-inductance polystyrene condenser ensures greater high frequency linearity, while glass epoxy circuit boards, a copper shielded chassis, and oxygen-free copper wiring all contribute to the superior dynamic range and low distortion exhibited by the CDP-701ES. In addition, the audio output amplifier boasts superior regulation and a high slew rate to make sure you hear all these refinements.

Advanced Mechanism with Unique Consumer Protection

Even the mechanical design of the CDP-701ES is unique. Some compact disc players are designed to "track" over badly damaged discs. Others are designed for immunity to external shock. The CDP-701ES excels at both. A specially de-coupled sub-chassis protects from shock and vibration, while an advanced servo system maintains tracking.

We believe that all these improvements mean you'll derive many years of pleasure from what we think is the world's most impressive CD player. And, unlike our competition, we back up our claims—the CDP-701ES is the only CD player you can buy that's covered by a full 3 year parts and labor warranty. But it's more than just a technological masterpiece. It also provides the most flexible operating features ever offered in a Sony consumer audio product.

Sony's Most Extensive Playback Features

You can program the CDP-701ES to play any 8 selections in any order you choose. Within a given selection, you can advance to specially sub-coded index numbers for finding a particular part of a classical music performance. You can access music using real-time locations—for example, begin playback 1 minute, 32 seconds into track #5. The Music Scan feature lets you sample the first ten seconds of each track. With the Automatic Music Sensor, it's easy to locate the beginning of any selection. And you can use both the Forward and Reverse Scan Modes at either of two speeds to scan through the disc while listening at normal pitch. Repeat functions let you replay any track, any phrase, or the entire disc automatically.

To keep you aware of the player's status, a multi-function display indicates track number, index number, track time, elapsed time, time remaining, laser position, and the total number of tracks on the disc.

The CDP-701ES also comes with an eleven-function wireless remote control at no additional cost. Now you can enjoy virtually every feature of the CDP-701ES while remaining in your easy chair.

The CDP-701ES—it's the CD player for purists. For design, for construction, for features, and especially for sound, the CDP-701ES is the reference standard in Compact Disc performance.

PCM-701ES— For Recordings that Don't Sound Like Recordings



The PCM-701ES is a PCM (Pulse Code Modulation) digital processor—it is designed to translate an analog signal into digital form for recording on an external videocassette recorder. Once processed, the signal may be recorded with any NTSC-standard VCR. So if you currently own a VCR, you can save the extra expense of purchasing another one—there's never a problem with compatibility.

As with the Compact Disc player, Sony's expertise with PCM processors is unequalled. To begin with, Sony invented PCM processing. And no other manufacturer can match Sony in terms of PCM experience—the PCM-701ES is our fourth consumer digital processor. Sony's PCM technology has been proven and refined since Sony introduced the world's first PCM processor six years ago.

The major benefit of PCM processors is impressive sound. Recording on a videocassette tape using a PCM processor like the PCM-701ES yields performance dramatically and noticeably superior to even the best professional analog recorders. And although all PCM digital processors, regardless of manufacturer, boast excellent performance (especially when compared to analog recorders), they are certainly not all the same. The undeniable truth is that there are certain benefits that only Sony can offer.

Why Sony PCM Technology is Better

For example, the EIAJ has recognized the 14-bit processing mode as the standard format for PCM processors. There's nothing wrong with that. Sony applauds the wisdom of having a standard—in fact, it's based on an earlier Sony design. And 14-bit processing yields some excellent results: dynamic range is over 86 dB; frequency response is within ± 0.5 dB, all the way from 10 Hz to 20 kHz; stereo separation exceeds 80 dB; harmonic distortion is 0.007% or less; and wow and flutter is, quite simply, immeasurable with today's test instruments.

But 14-bit processing is most emphatically not the finest technology available today—that exalted plateau is reserved for 16-bit processing. And 16-bit processing is available only with Sony PCM processors, like the PCM-701ES.

The Advantages of Sony's 16-bit Processing

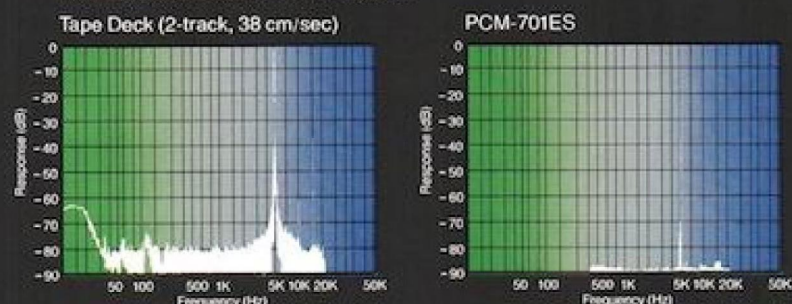
In the 16-bit mode, you achieve even wider dynamic range (90 dB), and even lower total harmonic distortion (0.005%). But you don't end up with an incompatible tape—when using a 14-bit machine for playback, a tape made on the PCM-701ES is automatically processed in the 14-bit mode. It's part of an ingenious system that yields the perfect combination of benefits—you get both an industry-standard-compatible tape, and absolutely the finest digital recording on the market.

Sony's Advanced Error Correction

Sony also developed the 3-way error correction system (CRCC, word interleaving, linear interpolation) that is today the industry-standard for PCM processors. Without this error correction technology, PCM processing would not be possible. The inherent characteristics of magnetic tape would result in uncontrollably destructive dropouts. But Sony engineers overcame these problems, paving the way for the digital explosion to come.

Other key features include multi-function peak program meters, which help you make a perfect, undistorted recording every time; a video monitor output connector; a versatile and informative fluorescent display, which even lets you monitor and adjust the tracking of your video recorder; a digital copy out switch, which results in perfect, non-deteriorated reproductions of an original recording no matter how many times you re-record; and playback and record muting controls.

Harmonic Distortion At 5 kHz



The harmonic distortion of an analog open-reel tape deck compared to that of the PCM-701ES. The digital audio processor's lack of noise and distortion is only one aspect of its sonic potential.

SL-2700B —

Sony's Finest Analog Recorder . . . Complete with Pictures



When developing the first videocassette recorders (VCRs), electronic engineers faced a formidable problem. How could a great deal of very high frequency information be squeezed onto a small tape surface? The answer was an ingenious system using helical-scan recording heads rotating at an impressive 1800 rpm. These heads record the full bandwidth of video signals.

Why the Audio Portion of a Video Signal Needed Improvement

Rotating heads record the video portion of a television broadcast on a conventional VCR. But what about the audio? It was still recorded in the traditional way—with a separate stationary head recording on a narrow track along the edge of the tape. This method is used by both Beta decks and VHS machines.

Unfortunately, this arrangement yields audio performance that's less than satisfying. That's primarily because the tape crawls along at less than one inch per second. Consequently, audio performance is unimpressive—S/N ratio rarely exceeds 40 dB, distortion is 3%, frequency response is limited to 10 kHz, and wow and flutter is typically quite audible.

The Beta Hi-Fi system is Sony's response to this situation. Stated simply, no analog recorder of any kind can match its sonic capabilities.

Finding A Place for the Audio Signal

How did we accomplish this feat? By borrowing from our own video technology. The SL-2700B utilizes rotating video heads to record the audio signals. That increases the effective tape-to-head speed from less than one inch to nearly 23 feet per second! The secret is a system called Audio Frequency Modulation (AFM) which lays down two separate frequency-modulated subcarriers between the two sections of the video signal (color and brightness) on the main portion of the tape. (At the same time, a mono signal is recorded in the traditional way for compatibility with conventional Beta decks.)

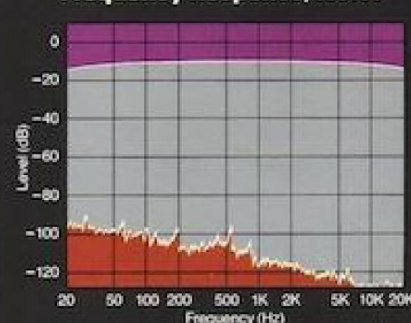
The resulting audio performance is unprecedented. Dynamic range exceeds 80 dB, frequency response is within +1 dB, -3 dB between 20 and 20,000 Hz, distortion is below 0.3% at 400 Hz, and (perhaps most impressive, considering the "competition") wow and flutter is less than 0.005% (WRMS). This performance is superior to virtually every audio recorder (let alone video recorder) on the market today.

Sony's Most Extensive Video Features

As befits our finest Beta deck, the SL-2700B is fully equipped with exciting video features. For example, it includes Sony's finest tuner, with our ten-key frequency synthesis system. The SL-2700B is cable-ready, with 107 channel capability and auxiliary antenna input, and includes a 14 day/4 event programmable clock/timer. It also offers BetaScan, and Swing Search for a crystal clear image with forward, reverse, and freeze frame special effects. Plus, 2X fast play with sound permits fully intelligible time-compressed viewing. A Linear Counter indicates hours, minutes, and seconds of elapsed time. The SL-2700B even comes complete with Sony's most comprehensive Betamax wireless remote control.

Finally, when combined with the PCM-701ES, the SL-2700B offers another remarkable experience. If you record two channels of PCM audio on the video tracks, and two channels of Beta Hi-Fi (AFM) audio through the regular audio inputs, you'll create a 4-track system that outperforms an analog recording system costing thousands of dollars!

Frequency Response, Noise



Response extends across the full audible spectrum, from 20 Hz to 20,000 Hz. Background noise is impressively low.

TA-F555ES — The Integrated Amp for the Technology of the Future

SONY

ATTENUATOR

AUDIO CURRENT TRANSFER

A current-drive amplifier system that has electrically separated the four amplifier sections for total elimination of mutual interference. Designed to offer optimum performance.



POWER

ON OFF

HEADPHONES

SPEAKERS

A1R OFF B

TOPE BASS BOOST

ON DIRECT ON OFF

BASS

TREBLE

BALANCE

SUBSONIC

ON OFF

RED OUT SELECTOR

CD TUNER PHONO

OUTSIDE LOAD

16Ω 8Ω 4Ω

INTEGRATED STEREO AMPLIFIER

F555ES

Consider the key performance improvements inherent in the new ES Series technologies—extended dynamic range, unprecedented stereo separation, staggeringly low noise and distortion. Now consider the typical amplifier on the market today—chances are it lacks the particular attributes needed to take advantage of digital's impressive audible improvements. The unfortunate result is that much of the most desirable performance offered by the latest audio technologies is wasted.

Which is precisely why Sony has designed and built the TA-F555ES. Quite simply, the Sony TA-F555ES is one of a small handful of amplifiers whose performance is geared to bring you all the remarkable sonic wonders that Sony's advanced new audio media (digital recording, Compact Discs, and Beta Hi-Fi) can provide with the appropriate equipment.

Plenty of Power . . . and a Great Deal More

The TA-F555ES offers 100 watts per channel into either 8 or 4 ohm loads (minimum RMS, 20-20,000 Hz, both channels driven, with no more than 0.004% THD into 8 ohms, no more than 0.01% THD into 4 ohms). And it backs that up with a remarkable supply of dynamic headroom. Which means that you'll always have the power when you need it, without paying extra for it when you don't.

But let's be candid—plenty of amplifiers produce high power. However, very few—if any—other amps give you the quiet, crystal-clear performance of the TA-F555ES. This monumental accomplishment required all Sony's years of experience with innovative, creative engineering.

How do you reduce distortion and increase stereo separation in an amplifier? One way—Sony's way—is to attack the distortion caused by the interaction between the power amp and the preamp in a traditional amplifier. Rather than using the typical voltage transmission within the amplifier (which almost invariably leads to an audible signal degradation), the TA-F555ES uses a novel approach called Audio Current Transfer (ACT). ACT uses current amplification to transfer signals from preamp to power amp stage. And it results in some major sonic improvements.

The Audible Results of ACT

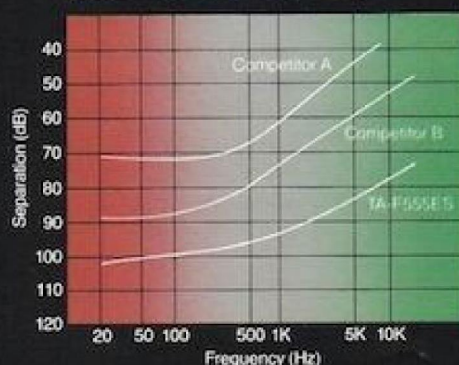
In particular, distortion, separation, noise, and dynamic range performance specifications for the TA-F555ES either match or exceed those of the digital sources. To consider an impressive example—the TA-F555ES can achieve 120 dB of dynamic range with tuner, Compact Disc, and tape inputs. Separation is also outstanding—100 dB or more. These figures are, simply, unprecedented among today's amplifiers.

Consistent Performance Under All Conditions

The TA-F555ES has been designed to deliver high performance into with all kinds of speakers, all kinds of sources, and even at all settings of the volume control. The amplifier incorporates a Linear Gain volume control that maintains its remarkable performance at all listening levels. Just as important, the amplifier is designed to deliver ample current into difficult low impedance loads. High slew rate, fast rise time, and a design free of switching distortion further assure outstanding audio characteristics.

Naturally, the TA-F555ES also features all the controls a critical listener might demand. These include a built-in moving coil cartridge preamp with switchable impedance for MC inputs and a choice of phono capacitance settings for MM models. Two tape monitor circuits with tape copy are also incorporated, while a record output selector lets you select one source for listening and a different one for recording at the same time. There's also a switchable subsonic filter and a tone control bypass feature.

Separation VS. Frequency



With Sony's innovative Audio Current Transfer, the TA-F555ES maintains stereo separation far better than these two highly-regarded competitive integrated amps.

ST-S555ES Tuner — Audibly Superior FM Performance

SONY

DIRECT COMPARATOR



AUDIO CURRENT TRANSFER FM STEREO TUNER ST-S555ES
WOOD/CHESTER LINDEN/AN KUBO/DAVE © 1982

It was in 1971 that Sony introduced the world's first quartz frequency synthesis tuner, the ST-5555. To a world accustomed to painstaking tuning with capacitors prone to drift, the drift-free precision tuning inherent in a quartz frequency synthesis design offered a level of convenience never before available.

But audiophiles weren't satisfied. Quartz synthesis tuners were inherently more noisy than the best analog models. So, Sony produced one of the most highly acclaimed tuner circuits ever invented. The Direct Comparator.

The Direct Comparator improves audible reception because it functions above the audible frequency range. By making the required PLL comparison directly at a higher frequency, the Direct Comparator in tuners like the ST-S555ES cuts through the blanket of noise so prominent in FM reception. Result? A spectacular S/N ratio of 92 dB in mono and 86 dB in stereo.

The Next Breakthrough in Tuner Technology from Sony

Now Sony has advanced tuner design one more significant step forward. The ST-S555ES includes a novel circuit design called Audio Current Transfer (ACT). This feature further reduces noise by transferring the audio signal to the amplifier in the form of current, instead of the more common voltage transmission. Can you hear this difference? Most definitely—the new ST-S555ES provides a cleaner, more open sound than any conventional quartz synthesis tuner you can buy.

Outstanding Performance Wherever You Live

The basic performance of the ST-S555ES is so impressive that it became especially important to preserve it under all conditions. Consequently, the ST-S555ES includes several very unusual features to assure you'll hear the results of its innovative design. One such feature is the dual antenna inputs. One should be used for normal reception. The other includes a switchable 20 dB attenuator which you can engage to receive

nearby and powerful stations without overload. An FM bandwidth selector further ensures outstanding performance under all conditions. The "narrow" setting provides better reception when stations are spaced very closely on the dial; the "wide" setting improves separation and reduces distortion.

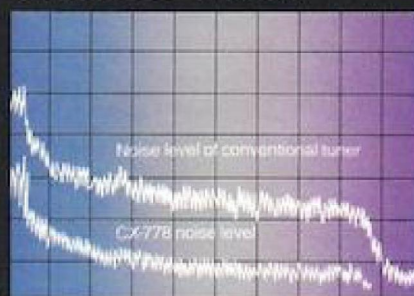
Innovative Features Make Operation a Pleasure

And the ST-S555ES is a joy to use. Among the selectable tuning modes, you can use up to 8 random station presets. These are not simple presets, however—the ST-S555ES memorizes and recalls every vital setting for optimum reception of each preset. The memory sets the following information when the preset is engaged: station frequency; antenna input selection; IF bandwidth selection; high blend and muting condition; and mono or stereo reception. Result? The ST-S555ES provides ideal listening conditions and reception every time.

You can also automatically scan the presets for your favorite station. Or you can use the "manual" mode, which still provides perfect tuning automatically. There's even a feature which allows you to pre-program the tuner for automatic reception of up to four stations, using an optional program timer.

Audibly superior performance and unequalled convenience. What more could you possibly want from a tuner? We could think of only one thing. So we made the ST-S555ES a bargain as well. For the price of an average tuner a few years ago, you can now own one of the all-time greats—the Sony ST-S555ES.

Response VS. Frequency



Sony's Direct Comparator integrated circuit, the CX-778, provides a remarkable decrease in tuner background noise.

PS-X555ES Turntable — The Turntable With a Mind of Its Own



The linear tracking tonearm is a major technological achievement in turntable design that has recently become both highly successful and quite popular. The reason for its nearly universal appeal is simple—it plays records exactly as they were originally cut, thereby eliminating tracking error, and improving both stereo separation and overall sonic fidelity. Unfortunately, despite its benefits, the linear tracking tonearm also produces an unwanted (and often audible) side effect—resonance. The Sony PS-X555ES uses microcomputer technology to control resonance.

The Problem of Low Frequency Resonance

A conventional tonearm pivots at a stable, reinforced point. By contrast, the linear tracking tonearm moves along the groove towards the center of the disc as it plays. This means that it lacks a rock-solid foundation. Since this is the key to fighting the low-frequency resonance that's fairly common during disc playback, linear tracking tonearms are prone to this type of distortion.

Resonance can actually be quite disturbing in a listening situation—its manifestations include distortion, rumble, howl, and an overall dulling of the music's impact. It's a serious problem with all linear tracking turntables—except those equipped with Sony's unique Biotracer tonearm. The Sony Biotracer is the first—and to date, the only—linear tracking tonearm that effectively combats the effects of low-frequency resonance.

Biotracer Technology for Improved Performance

How does the PS-X555ES control resonance? It thinks. The Biotracer tonearm of the PS-X555ES is a dynamic device that is constantly driven by two microcomputer-controlled motors. When the microcomputer senses any variation from the correct tonearm position, it instantly alerts the motors (one for horizontal motion, one for vertical), and instructs them to adjust the tonearm's motion. Not only does this ingenious system relieve resonance problems associated with the linear tracking design, it also helps combat distortion caused by warps and eccentricities in the disc itself. And previously annoying imperfections such as tonearm skating and improper stylus force adjustments are automatically corrected as well.

The Biotracer Supports Freedom of Choice

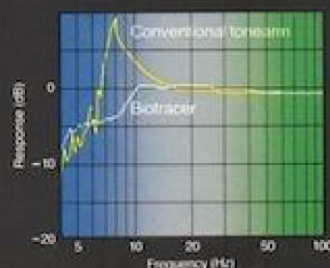
And the Biotracer does still more. With most turntables, your choice of cartridges is greatly limited—the tonearm accepts only a narrow range of cartridge mass and compliance. But that's not the case with the Biotracer. Because it is so effective in overcoming low-frequency resonance, the Biotracer permits you to install just about any cartridge you like. With most turntables, the choice of cartridge must be based on the equipment—with the PS-X555ES, you can select your cartridge according to its sonic characteristics.

Incorporates Many Other Design Innovations

Furthermore, all the special technology that's made Sony turntables so popular is also found on the PS-X555ES. That includes our Brushless Slotless (BSL) motor, recognized for its accuracy and reliability. Plus, Sony's quartz lock direct drive with Magnedisc servo control ensures rotational precision. And height-adjustable gel-filled feet, combined with Sony's non-resonant SBMC base, resist acoustic feedback.

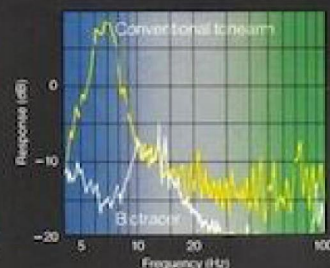
Naturally, all the convenience and performance features that have made the linear tracking design so popular are included in the PS-X555ES. For example, you can control the movement of the tonearm without ever raising the dust cover, and without risking damage to the record or the stylus—cueing and indexing are accomplished with front-panel feather-touch controls.

Low-Frequency Resonance Characteristics



Low-frequency response characteristics showing the resonant peak without Biotracer and the damping of that resonance with Biotracer.

Crosstalk Characteristics



Crosstalk between channels showing the high crosstalk without Biotracer and the improved crosstalk with Biotracer.

TC-K555ES Deck— The Culmination of Sony's Cassette Expertise



Quite simply, Sony wanted to build a deck good enough to be a part of the ES system. So we addressed each of the three essential issues concerning cassette deck design—the heads, the transport, and the noise reduction system. Each was designed and constructed incorporating the most advanced technology available today.

A Third Head for Better Performance

Let's begin with the heads—the TC-K555ES employs a unique Independent Suspension three-head design. The record head has been designed with the wide head gap that is essential for wide dynamic range recordings, while the playback head retains the narrow gap required for accurate high frequency response. This is in sharp contrast to the glaring compromises of a two-head deck, in which a single head gap must adequately accommodate both requirements—an impossible task.

Superior Sound without the Struggle

Three-head design has been the cornerstone of superior cassette performance. Unfortunately, in the past, three-head decks have required critical and nearly constant azimuth adjustment to be effective. But Sony's inventive three-head design places the record and playback heads in close proximity to one another, eliminating the need for cumbersome azimuth adjustments. Yet the heads still remain physically distinct (for optimized performance) and magnetically shielded from one another (for minimal crossfeed). And Sony's exclusive Independent Suspension design improves tape contact and azimuth accuracy, while reducing flux leakage. Result? Outstanding (and adjustment-free) performance.

The heads also combine an amorphous core material (whose irregular molecular structure provides superior magnetic performance) with modern laser construction technology to assemble the heads with exceptional precision. These LaserAmorphous (LA) heads assure you superior sound and long life.

More Innovative Transport Technology

Another problem often associated with cassette decks is the distortion caused by inaccurate tape transport. A common

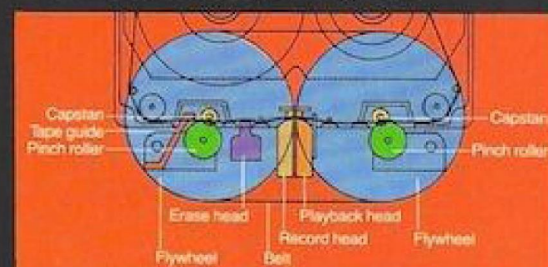
manifestation of transport imperfection is called modulation noise. Sony's closed-loop dual capstan transport combats this problem. We've placed a capstan on either side of the tape path to isolate the tape passing across the heads from external influences (such as the spooling motor). And, as a bonus, head-to-tape contact is also improved and performance remains consistent from one end of the tape to the other.

The Beautiful Sound of Silence

Perhaps the most heralded recent achievement in cassette deck technology is in the field of noise reduction—specifically, the development of Dolby C. And it's an impressive accomplishment, to be sure. With no more effort than simply flipping a switch, you can reduce the tape hiss in its most annoying frequencies by nearly 20 dB! The TC-K555ES lets you experience the wonder of Dolby C, while still providing compatibility with your tapes recorded with Dolby B—the older noise reduction system is included as well. And an anti-saturation circuit improves treble headroom by up to 4 dB, which makes proper recording utterly simple.

The TC-K555ES also includes a variety of convenience features, such as auto play; memory play; feather-touch full-logic controls; a fluorescent Concentrated Display; variable bias for tape types I, II, and III; and a Linear Counter that accurately reveals elapsed tape time in all transport modes (including rewind and fast forward). But it is most impressive for its unsurpassed basic performance and remarkable sonic capabilities. The TC-K555ES is a proud and worthy addition to the ES system.

Closed Loop Dual Capstan System



With one capstan to the left of the heads and another to the right, the Sony TC-K555ES achieves improved tape-to-head contact and reduced modulation noise.

APM-33W —

Translating Advanced Technology into Beautiful Music



With all the impressive technology built into the ES Series, it would be a shame to spoil the final enjoyment of the music by using a loudspeaker incapable of matching the system's sonic performance. Yet, that's exactly what would happen with many of the most popular speakers on the market today. Very few of them are designed to handle the extremely wide dynamic range that's an important part of PCM, Compact Disc, and Beta Hi-Fi sound. And almost none can reproduce the full spectrum of the audio frequencies without severe inaccuracies and distortion. Even something as fundamental as clean, uncolored bass response is beyond the capabilities of most speakers.

That's why Sony includes the APM-33W Accurate Pistonic Motion (APM) loudspeakers as an integral part of the ES series system. They are uniquely qualified to deliver all the exciting sonic benefits that are a part of Sony's advanced technologies.

Reproducing the Particular Attributes of Digital-quality Audio

The APM-33W speakers combine remarkable efficiency and impressive power handling capacity (up to 160 watts) with extended bass response and linear, transparent frequency characteristics. The result is the ability to match the dynamic range of the PCM digital recorder, the Compact Disc player, and Beta Hi-Fi videocassette deck without distortion or overload.

And the low frequency output of the APM-33W is smooth and powerful. This characteristic is especially surprising when you consider the dimensions and appearance of the speaker enclosures—they're small and attractive enough for almost any installation in almost any room.

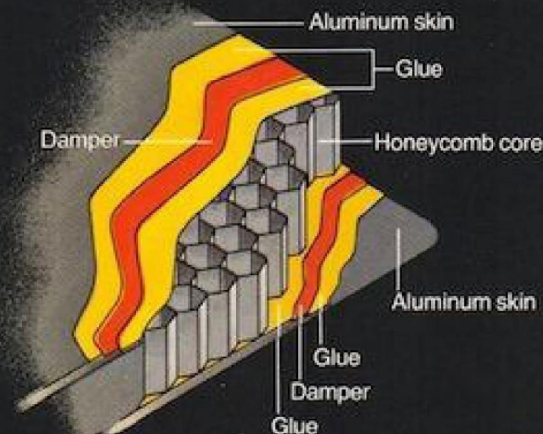
How Sony's APM Technology Works

What are the major design features of Sony's Accurate Pistonic Motion speakers? One key characteristic is the use of flat drivers. Flat diaphragms have a major advantage over traditional cone-shaped drivers. In cone-shaped drivers, the outputs from opposing surfaces of the speaker cone interfere with each other, causing inaccurate frequency response. This is known as the "cavity effect," and it's an inherent abnormality of the cone shape design. Because flat diaphragms like the APM drivers are not prone to this type of distortion, you hear a speaker with more linear frequency response.

Honeycomb Construction with Four-point Drive

To ensure that these compact drivers won't lose their shape when presented with powerful sonic modulations, Sony APM drivers feature an innovative aluminum honeycomb construction. The increased rigidity inherent in the honeycomb design permits the APM drivers to resist bending—a major cause of distortion in typical paper drivers. Yet the aluminum honeycomb is light in weight for superb transient response.

For these reasons, several speaker manufacturers use aluminum honeycomb construction. However, only Sony uses square diaphragms and four-point drive to further eliminate potential nodes of vibration. In this way, distortion is reduced to the vanishing point.



The aluminum honeycomb construction of Sony's unique APM drivers.

The Final Analysis

What do these advanced APM speakers sound like? Their response is clean, distortion-free, and highly accurate. Their frequency range is also impressive—it extends from 39 to 20,000 Hz, +4, -8 dB. Just as important, the APM-33W speakers can easily handle the most demanding input from a digital source and reproduce it with all its striking clarity. In short, the APM speakers perfectly match our design criteria—they're clean, uncolored, and highly musical.

MDR-CD7 Headphones — The ES Philosophy in a Personal Format

Building full-sized equipment capable of properly reproducing Sony's new media is difficult enough. Add the constraints inherent in headphone design, and you'll understand the design challenge of the MDR-CD7 headphones. To be effective with the ES Series' digital-quality sound sources, they had to combine wide, linear response, deep bass output, and full dynamic range. On top of all that, they had to be lightweight and comfortable to wear.

Only the Size and Weight Are Small

The solution? An innovative transducer design. The MDR-CD7 uses a small but very strong Samarium Cobalt magnet for startlingly wide frequency response. And a high compliance 24K gold ion plated diaphragm exhibits extraordinary amplitude, resulting in an impressive dynamic range of 135 dB!

For comfort, the slightly off-center mounting position of the urethane earpads guarantees proper side pressure distribution and good balance for all wearers. The pads themselves are specially designed to conform to the ear, further increasing comfort, providing 30 dB of isolation from ambient sound and extending bass response.

Paying Careful Attention to Detail

The cord is made of nearly pure copper. More copper means less oxygen content—since oxygen interferes with the transmission of the sound-carrying electrons, that means the MDR-CD7's wire provides clear, open sound.

With a conventional system, all this careful construction and expensive material might seem like overkill. But with Sony's new digital-quality media, even little things make a big difference. That's why the MDR-CD7 headphones sound so sensational.



MX-1000ES — Professional Control Over Live Recordings



The best way to take advantage of the incredible performance capabilities exhibited by the PCM-701ES is to make live recordings. Capturing the full breadth of an actual performance is surely the most demanding challenge faced by any recordist and his equipment. To fulfill the input requirements for a live recording, Sony offers the MX-1000ES mixer to augment the PCM-701ES and the TC-K555ES.

State-of-the-art Construction

The MX-1000ES features exceptional electronics throughout. From its dual-gate FET input amplifiers to its direct coupled design, the MX-1000ES combines extended frequency response with exceptionally low noise.

To ensure proper flexibility, the MX-1000ES can accept up to four microphone or four line inputs in any combination. The

mic inputs are conveniently placed on the front panel, with the line inputs out of the way in back. Convenient front-panel switches select the input source.

Make Your Own Kind of Music

Each input includes a pan-pot which lets you control the proportion of the input signal going to the left and right channels. You can also attenuate a high-output mic's signal level, using a front-panel selector. In addition, there's also a two-step low-cut filter, which makes it much easier to control wind noise and mic "proximity effect." And the MX-1000ES features a large, prominently-located master input level control to adjust all inputs without changing the relative relationships you've probably set quite painstakingly.

Specifications

CDP-701ES Compact Disc Player

CD System	
Format	Compact Disc Digital Audio System
Signal readout	Non-contact semi-conductor laser (780 nm wavelength)
Playing speed	1.2-1.4 m/sec (constant linear velocity)
Playing rotation	500-200 rpm; counter-clockwise (viewed from readout side)
Digital system	Pulse Code Modulation (PCM) with Eight-to-Fourteen Modulation (EFM) coding
Sampling frequency	44.1 kHz
Quantization	16-bit linear
Error correction	Sony Super Strategy/Cross Interleave Reed Solomon Code
Disc diameter	12 cm (4 3/4 inches)
Disc thickness	1.2 mm (1/20 inch)
Disc track pitch	1.6 μm (1/16,000 inch)
Disc playing time	Up to 60 minutes on one side

Player

Channels	Two channels
Frequency response	5-20,000 Hz, ±0.5 dB
Harmonic distortion	Less than 0.003% at 1 kHz
Dynamic range	More than 95 dB
Stereo separation	More than 90 dB
Wow and flutter	Beneath the limits of measurement
Line output	2 V rms; load impedance over 10 kilohms
Headphone output	28 mW at 32 ohms
Power requirements	120 V, 60 Hz; RM-101 Remote Commander; two "AA" batteries
Power consumption	30 W
Dimensions	430 mm (W) x 105 mm (H) x 385 mm (D); 17 x 4 1/4 x 15 1/4 inches
Weight	11.5 kg (25 lb. 6 oz.)
Supplied accessories	RM-101 Remote Commander; Two "AA" batteries; Disc Cleaning Cloth; RK-112 Connecting Cord
Warranty	"Limited" three years, parts and labor



The wireless Remote Commander for the CDP-701ES duplicates the major front-panel controls for armchair convenience.

PCM-701ES Digital Audio Processor

System	PCM Encoder and Decoder
Number of channels	Two PCM channels
Modulation system	PCM system using NTSC standard TV signals
Coding format	EIAJ standard (14-bit) and 16-bit format
Sampling frequency	44.056kHz
Quantization	14-bit linear quantization or 16-bit linear quantization
Code	128 bits/1 TVH
Muting condition	More than 96 TVH of dropout
Emphasis	Time constant 50μsec. 15μsec.
Frequency response	10-20,000Hz ± 0.5dB
Dynamic range	More than 86dB (14-bit) More than 90dB (16-bit)
Harmonic distortion	Less than 0.007% (14-bit) Less than 0.005% (16-bit)
Channel separation	More than 80dB
Wow and flutter	Beneath measurable limits
Inputs	LINE x 2 (Phono jack) -10dB, 40k ohms VIDEO (Phono jack) 1Vp-p, 75 ohms
Outputs	LINE x 2 (Phono jack) -10dB, load impedance over 10k ohms Headphones (Stereo standard) -24~ -48dB, 5 steps, low impedance VIDEO (Phono jack) 1Vp-p, 75 ohms COPY (Phono jack) 1Vp-p, 75 ohms
Power consumption	17W
Power requirements	AC120V, 60Hz
Dimensions	430 mm (W) x 80 mm (H) x 375 mm (D) 17" x 3 1/4" x 14 7/8"
Weight	8.3 kg (18 lb. 5 oz.)
Warranty	"Limited" three years, parts labor



The SL-2700B is supplied with Sony's most extensive Betamax remote control.

SL-2700B Beta Hi-Fi Betamax

Beta Hi-Fi	
System	Audio Frequency Modulation (AFM)
Dynamic range	More than 80 dB
Frequency response	20-20,000 Hz, +1, -3 dB
Wow and flutter	Less than 0.005% (WRMS)
Harmonic distortion	Less than 0.3% at 400 Hz
Channel separation	More than 60 dB

Conventional Audio

Signal-to-noise ratio	Better than 40 dB (Beta Hi-Fi off)
Frequency response Beta-II	50-10,000 Hz (Beta Hi-Fi off)
Beta-III	50-7,000 Hz (Beta Hi-Fi off)

Video

Format	Beta
Channel coverage	NORMAL Position: VHF: 2-13 UHF: 14-83 CATV Position: VHF: 2-13 Midband: A-1, A-2, A through I Superband: J-W (107 channels in all)
Video recording system	Rotary helical scanning, two heads, Double Azimuth head
Video signal	EIA Standards, NTSC color
Recording speeds	Beta-II & III
Playback speeds	Beta-I, II, & III
Video signal-to-noise ratio	Better than 45 dB

Inputs and Outputs

Antenna terminals	
VHF input	75-ohm F-type
CATV/Aux input	75-ohm F-type
VHF output	75-ohm F-type
Decoder output	75-ohm F-type
UHF input	300-ohm ribbon type
UHF output	300-ohm ribbon type
Video input	RCA Phono jack
Video output	RCA Phono jack
Camera input	Sony 14-pin camera connector
Audio line inputs	RCA Phono jack x2
Audio line outputs	RCA Phono jack x 2; 260 mV
Multiplex output	RCA Phono jack
Microphone inputs	Minijack x2; for low-impedance mics
Headphone output	Stereo minijack

General

Power requirements	120 V AC, 60 Hz
Power consumption	38 Watts (58 Watts with AG-500)
Weight	11.2 kg (24 lbs, 11 oz)
Dimensions	430 mm (W) x 105 mm (H) x 355 mm (D) 17" x 4 1/8" x 14"
Wireless remote commander	RMT-317
Warranty	"Limited" 1 year parts, 90 days labor

TA-F555ES Integrated Amplifier

Continuous power output (RMS)	100 Watts per channel, both channels driven into 8 Ohms from 20 th to 20 kHz, at no more than rated total harmonic distortion
Total harmonic distortion	100 Watts per channel, both channels driven into 4 Ohms from 20 Hz to 20 kHz, at no more than rated total harmonic distortion
Intermodulation distortion	0.004% (60 Hz: 7 kHz::4:1) at rated output, 8 Ohms 0.01% (60 Hz: 7 kHz::4:1) at rated output, 4 Ohms
Power bandwidth (IHF)	5 Hz-100 kHz (50 Watts, 8 Ohms, 0.02% THD) 5 Hz-80 kHz (50 Watts, 4 Ohms, 0.02% THD)
Slew rate	100 Volts/μsec (250 Volts/μsec, IHF)
Damping factor	125 at 1 kHz, 8 Ohms
Residual noise	28 μV (A-weighted, 8 Ohms)
Dynamic headroom	1.8 dB (4 or 8 Ohms, IHF-1978)
Dynamic range (Tuner, Tape, Aux, CD)	120 dB
Frequency response	Phono RIAA standard ±0.2 dB Tuner, Tape, Aux, CD 2 Hz-200 kHz, -0.3 dB
Channel separation	Phono, MM 85 dB Phono, MC 90 dB Tuner, Tape, Aux, CD 90 dB
Input sensitivity/impedance/capacitance	Phono, MM 2.5 mV; 50 kOhms; 100 pF or 330 pF Phono, MC 130 μV; 100 Ohms at 40-Ohm setting 130 μV; 30 Ohms at 3-Ohm setting Tuner, Tape, Aux, CD 150 mV; 50 Ohms
Signal-to-noise ratio	Phono, MM @ 2.5 mV 83 dB (IHF-A); 87 dB (New IHF) Phono, MC @ 0.125 mV 73 dB (IHF-A); 70 dB (New IHF) Tuner, Tape, Aux, CD 102 dB (IHF-A); 97 dB (New IHF)
Maximum input capability	Phono, MM 150 mV Phono, MC 8.5 mV
Tone controls	Bass ±8 dB at 60 Hz Treble ±8 dB at 25 kHz
Bass boost switch	+4 dB at 50 Hz
Subsonic filter	6 dB/octave below 15 Hz
Speaker impedance	4-16 Ohms
Power requirements	AC-120 Volts; 60 Hz
Power consumption	240 Watts
Power outlets	Switched (2) 100 Watts, max. each Unswitched (2) 100 Watts, max. each
Dimensions	430 mm (W) x 130 mm (H) x 365 mm (D) 17" x 5 1/8" x 14 1/4"
Weight	13.1 kg (28 lb. 12 oz.)
Warranty	"Limited" three years, parts and labor

ST-S555ES FM Tuner

Usable sensitivity (Mono)	10.3 dBf; 0.9 μ V
30 dB Quieting sensitivity (Mono)	16.8 dBf; 1.8 μ V
30 dB Quieting sensitivity (Stereo)	37.9 dBf; 22.5 μ V
Signal-to-noise ratio	92 dB mono; 86 dB stereo
Total harmonic distortion	
Wide IF bandwidth	
100 Hz	0.03% mono; 0.05% stereo
1 kHz	0.03% mono; 0.04% stereo
10 kHz	0.03% mono; 0.12% stereo
Narrow IF bandwidth	
100 Hz	0.05% mono; 0.07% stereo
1 kHz	0.05% mono; 0.06% stereo
10 kHz	0.05% mono; 0.15% stereo
Intermodulation distortion	
Wide IF bandwidth	0.03% mono; 0.04% stereo
Narrow IF bandwidth	0.05% mono; 0.06% stereo
Frequency response	30 Hz-15 kHz, +0.2, -0.5 dB
Stereo separation	
Wide IF bandwidth	
@ 100 Hz	55 dB
@ 1 kHz	60 dB
@ 10 kHz	45 dB
Alternate channel selectivity, 1 kHz	60 dB Wide IF bandwidth; 90 dB Narrow IF bandwidth
Adjacent channel selectivity, 200 kHz	10 dB Wide IF bandwidth; 21 dB Narrow IF bandwidth
Capture ratio	1.0 dB
AM suppression	65 dB
Image rejection	120 dB
Spurious response	120 dB
IF response	120 dB
RF intermodulation	88 dB, IHF; 105 dB, 2.4 MHz
Sub-carrier product ratio	78 dB
Muting/auto tuning threshold	25 dBf (5.0 μ V)
Calibration tone	400 Hz (50% modulation)
Antenna terminal	75 Ohms
Output level and impedance	750 mV; 620 Ohms (through supplied ACT cable)
Power requirements	AC-120 Volts; 60 Hz
Power consumption	23 Watts
Dimensions	430 mm(W) x 80 mm(H) x 340 mm(D) 17" x 3 1/8" x 13 3/8"
Weight	4.8 kg (10 lb. 10 oz.)
Warranty	"Limited" three years, parts and labor

PS-X555ES Turntable

Tonearm Section	
Tonearm type	Tangential Biotracer
Effective length	130 mm (5 1/8")
Overall arm length	213 mm (8 3/8")
Tracking error	\pm 0.07°
Tracking force range	0.5-2.5 grams
Cable capacitance	60pf/meter; 87.5 pf total
Usable cartridge weight (including headshell)	10-19.5 grams
Supplied headshell	7.2 grams
Turntable Section	
Motor	Linear BSL
Drive system	Direct Drive
Wow and flutter	
WRMS	0.025%
DIN-45507	\pm 0.03%
FG direct measurement	0.015%
Signal-to-noise ratio	78 dB (DIN-B)
Speed accuracy	Better than 0.0003%
Start-up time at 33 1/3 rpm	1/2 rotation
Platter diameter	32 cm (12 5/8 inches)
Platter weight (with rubber mat)	1.2 kg
Speeds	33 1/3 & 45 rpm
Electromagnetic breaking	Yes
Power requirements	AC-120 Volts, 60 Hz
Power consumption	23 Watts
Dimensions:	430 mm(W) x 100 mm(H) x 425 mm(D) 17" x 4" x 16 3/4"
Weight	7.4 kg (16 lb. 5 oz.)
Warranty	"Limited" three years, parts and labor

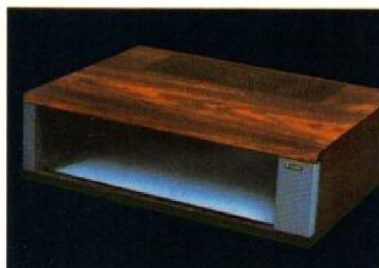


The floor-standing Sony SU-777 rack provides ample space to house all the ES Series electronics. The rack features walnut finish sides and top, glass front door, and casters. Dimensions are 50 inches high x 21 1/2 inches wide x 17 7/8 inches deep.

TC-K555ES Cassette Deck

Wow & flutter	
WRMS	0.04%
DIN-45507	\pm 0.12%
Fast-forward/rewind time	80 seconds, C-60
Frequency response (\pm 3 dB, re -20 dB)	
Type IV (Metal)	25 Hz-18 kHz
Type III (FeCr)	25 Hz-18 kHz
Type II (UCX)	25 Hz-17 kHz
Type I (AHF)	25 Hz-17 kHz
(\pm 3 dB, re 0 dB)	
Type IV (Metal)	25 Hz-14 kHz
Signal-to-noise ratio (re 3% THD, Peak Wtd.)	
Dolby NR OFF	
Type IV (Metal)	60 dB
Type III (FeCr)	62 dB
Type II (UCX)	59 dB
Type I (AHF)	56 dB
Dolby B NR ON	
Type IV (Metal)	67 dB
Type III (FeCr)	69 dB
Type II (UCX)	66 dB
Type I (AHF)	63 dB
Dolby C NR ON	
Type IV (Metal)	73 dB
Type III (FeCr)	75 dB
Type II (UCX)	72 dB
Type I (AHF)	69 dB
Total harmonic distortion (@ 1 kHz, re: 0 dB record level)	0.8% (Type IV & Type II)
Crosstalk (@ 1 kHz)	60 dB, between tracks
Separation (@ 1 kHz)	35 dB, between channels
Input sensitivity	LINE x2 (50 kOhms), -20 dB; 77.5 mV
Output level	LINE x2 (10 kOhms), -5 dB; 435 mV
Headphone level (8 Ohms)	-20 dB--50 dB
Power requirements	AC-120 Volts; 60 Hz
Power consumption	26 Watts
Dimensions	430 mm(W) x 105 mm(H) x 285 mm(D) 17" x 4 1/4" x 11 1/4"
Weight	6.1 kg (13 lb. 8 oz.)
Warranty	"Limited" three years, parts and labor

Note: Noise reduction improvement with Dolby B NR: up to 5 dB at 1 kHz, 10 dB at 5 kHz or above. With Dolby C NR: up to 12 dB at 500 Hz, 20 dB at 2 kHz or above.



The TAC-101 cabinet is an elegant rosewood veneer housing for the CDP-101, Sony's first Compact Disc Player. The TAC-101 enables you to stack the CDP-101 with your ES Series components. A special compartment stores the RM-101 Remote Commander.

APM-33W Loudspeakers

Drivers	50 square inches APM-type woofer; 1 square inch APM-type tweeter
Crossover frequency	2.2 kHz
Enclosure type	Bass Reflex
Frequency response	39 Hz—20 kHz, +4, -8 dB
Sensitivity	91 dB SPL, 1 Watt, at 1 meter
Power handling capacity	80 Watts nominal; 160 Watts maximum
Nominal impedance	6 Ohms
Dimensions	315 mm(W) x 540 mm(H) x 320 mm(D) 12 1/2" x 21 1/4" x 12 5/8"
Weight	14.4 kg (31 lb. 10 oz.)
Warranty	"Limited" 5-year driver exchange

MDR-CD7 Headphones

Headphone type	Closed, dynamic
Driver type	30 mm diameter; Dome driver; (24K gold ion plated)
Sensitivity	110 dB SPL at 1 mW
Frequency response	2 Hz—24,000 Hz
Impedance	45 Ohms
Rated power	10 mW
Power handling capacity	50 mW
Cord	Oxygen-free copper Litz wire, 3.0 meters (10 feet)
Plug	Sony Uni-Match design with both stereo miniplug and 1/4" phone plug
Weight (without cord)	80 grams (3 ounces)
Warranty	"Limited" One year, parts and labor

MX-1000ES Microphone Mixer

Frequency response	10—150,000 Hz, +0, -3 dB
Harmonic distortion	0.005%
Equivalent input noise level	-130 dBV (MIC input, A-Wtd.)
Signal-to-noise ratio	
MIC	68 dB (A-Wtd.)
LINE	73 dB (A-Wtd.)
Low cut filter	6 dB per octave below 50 or 150 Hz
Input sensitivity and impedance	
MIC	-70 dB (0.245 mV); 6 kOhms
Line output	0.245 mV (-10 dB) into 10 kOhms or higher
Power requirements	AC-120 Volts; 60 Hz
Dimensions	430 mm(W) x 55 mm(H) x 340 mm(D) 17" x 2 1/4" x 13 1/2"
Weight	3.2 kg (7 lb. 1 oz.)
Warranty	"Limited" three years, parts and labor

SONY
The Leader in Digital Audio

Sony Consumer Products Company, Sony Drive, Park Ridge, New Jersey 07656
All specifications are subject to change without notice.
Sony is a registered trademark of Sony Corporation.

H-3804
Printed in USA 10/83