

AUDIO/HI-FI

TC-K88B

A remarkable cassette deck from the acknowledged leader in tape technology



Sony TC-K88B

Sendust and Ferrite Head

Tape deck performance begins with the record/play head. While most manufacturers buy their heads from outside suppliers, Sony is one of the handful that have the metallurgical and manufacturing skill to produce their own. Sony has long been a leader in magnetic head technology. In 1968, Sony was first in developing an advanced head lamination construction that led to the introduction of the famous Ferrite-and-Ferrite (F & F) design. The F & F head, in which ferrite is used for both the magnetic pole pieces and the surface of the head face, set a new standard for longevity and performance. As a magnetic substance, ferrite exhibits superior flux density, specific resistance, and permeability at high frequencies. Because ferrite is extremely hard, the Ferrite-and-Ferrite head provides service life up to 200 times longer than conventional permalloy heads.

The Ferrite-and-Ferrite head has contributed to the success of the many Sony open-reel and cassette decks into which it has been incorporated. Yet as good as the F & F head is, Sony has found a way to make certain improvements. The result is the new Sendust and Ferrite (S & F) head.

The Sendust and Ferrite head was created to meet a primary requirement of the newest tape formulations: increased flux density. The outstanding characteristic of sendust is its maximum flux density, the highest of any head material. Yet sendust has drawbacks that disqualify it from use throughout the head. Specific resistance and permeability are much lower than ferrite. And permeability is lower still when metal alloys are added to offset sendust's tendency to rust.

Sony has produced a corrosionresistant sendust formulation without sacrificing permeability. And Sony has applied sendust only where specific resistance and permeability are less important, and maximum flux density is most important: at the tip of the head, surrounding the gap. The magnetic core remains mostly ferrite. Thus the Sendust and Ferrite head has the advantages of both ferrite and sendust, without the disadvantages of either.



Most manufacturers assume that the proper choice of head materials is itself sufficient for good performance. But Sony total-system technology demands more. For example, the mechanical stress on the head core during fabrication can degrade audio performance. Many organic bonding agents used in conventional heads cause slippage over the years, allowing the head gaps to spread or 'scatter'. Left and right channels can be subject to signal phase shift. Also the core of the head can twist and the gap filler can buckle, deforming the critical point of tape-tohead contact.

Sony overcomes these problems through careful head design and fabrication. Inorganic bonding materials are used throughout, for their superior strength. Quartz gap filler—applied by vapor deposition—provides both hardness and stability. And special lowstress manufacturing techniques are used to form and polish the magnetic materials. The result is a head that delivers the full performance of Sendust and Ferrite, and will continue to deliver this performance over many years of service.

The superior frequency response, lower distortion, and longer life of the Sendust and Ferrite head will benefit your recordings, regardless of tape formulation or brand. But the S & F head's improved flux capabilities make it especially well-suited to recording and playing back the new metal particle tapes.

Four-Gap Erase Head

In addition to the S & F record/play head, the TC-K88B boasts a newly-designed erase head. A four-gap

design disperses a strong erasing field over and through the tape. The result is more complete erasure than the conventional, single-gap erase head, even with the new metal particle tape.

Metal Tape Capability

Metal tape offers distinct sonic advantages over even the finest conventional tape formulations. Metal tape can accept very strong signals before saturating, especially at high frequencies, where the headroom limitations of other tapes often dull or muffle musical transients. Recording with metal tape on the TC-K88B, you can expect wider dynamic range and cleaner, more sparkling high frequency transients. The difference is particularly audible on demanding program material, such as direct-cut discs and live recording.

Not only does the K88B accept metal tape, but it also provides independent bias and equalization selection for all four types of tape: normal, chrome and chrome equivalents, ferrichrome, and metal.

Low-Distortion Electronics

Sony's attention to detail extends to the electronic design, as well. The critical head/playback amplifier, for example, uses a unique, patented, directcoupled design, which improves phase-response time and lowers distortion.

The K88B also incorporates the Dolby noise reduction system. Using a newly-developed Sony Dolby IC, the CX-174, the system provides signal-tonoise ratio improvement of up to 10dB at 5kHz and above. Made with Sony's unique 'Process V' wafering technique, the CX-174 exhibits exceptionally pure



chemical composition. This helps the Sony Dolby IC realize lower distortion, higher saturation, and better tracking linearity. To further maintain this tracking line-

Superlative performance and unprecedented sophistication

arity, the K88B features a switchable 19kHz filter for recording FM stereo broadcasts.

Direct Drive Design with Three BSL Motors

The vast majority of cassette decks use a single motor for all transport functions: tape travel, fast forward, and rewind. Accomplishing all this with a single motor requires an array of belts, cams, gears, levers, and clutches. A cleaner, more expensive design approach is to use two motors. Here, one motor specializes in smooth tape drive, while a second motor effects spooling, fast forward, and rewind. Even though gears and cams are still required, overall mechanical complexity is reduced. And performance and reliability are improved.

Of course, an even higher degree of sophistication is possible: a threemotor direct-drive design. In the TC-K88B's three-motor transport, one



Sony's unique BSL motor eliminates the cogging of conventional drive systems.

motor drives the tape, one drives the take-up hub, while a third drives the supply hub. Each motor performs its specialized function with maximum efficiency. The transport becomes simpler, more reliable, and substantially more accurate with the elimination of belts, gears, and cams, and the adoption of direct drive.

All three motors of the K88B incorporate Sony's famous brushless and slot less design, for uncommonly even delivery of torque. As a conventional tape deck motor turns, the torque increases and decreases as a result of the spaces—'slots'—between the electromagnets. This wavering-force effect is called 'cogging'. Sony has eliminated cogging with the remarkable BSL motor. There are no brushes, no slots, and the magnetic force is constant. Wow and flutter are greatly reduced.

Magnedisc Servo Control

The capstan motor controls the motion of the tape over the heads; hence it is critical to sonic quality. For this reason, capstan motors are generally DC servocontrolled for accurate speed. Conventional servo systems use an optical frequency generator, with a slotted disc, to monitor speed and feed that information back to the control circuits. Sony has markedly increased the accuracy of speed sensing with its Magnedisc system. Magnedisc uses a magnetically imprinted band along the outer rim of the motor. As the motor turns, a multigap pickup head reads the signal on this band, producing a frequency proportional to the motor's speed. This signal is fed back to the servo control electronics which govern the motor's drive voltage. In this way, Magnedisc servo control corrects minute speed variations before they can affect the music. And because the system produces a higher frequency than conventional frequency generators, Magnedisc affords more accurate servo control.

Quartz Lock

The Magnedisc signal is relayed to the X-tal (quartz) lock electronics, which compare the readings with a totally stable reference: a quartz crystal oscillating at a precise frequency. The servo system is locked into this quartz signal. This prevents even slight speed variations that might be caused by temperature, drift in the servo loop, changes in voltage, or even load fluctuations placed on the hubs by the tape cassette itself.

The unique combination of directdrive design with the efficiency of three Sony BSL motors, plus the accuracy of quartz lock and Magnedisc servo control, assures the audible result of the TC-K88B's clear, unwavering sound, and a measured wow and flutter of only 0.03% (WRMS).

Power Loading Module

Because the three-motor direct-drive system eliminates so many mechanical parts, and places the torque exactly where it is needed, the transport of the K88B is unprecedented in its compactness: about the size of a small paperbound book. Sony's industrial designers have used this compactness to create a new cassette loading format: the Power Loading Module. With power loading, you place the cassette into a retractable drawer. Touch the 'open/ close' button, and the drawer retracts silently back into the chassis of the K88B. The deck is fully operational with the drawer out or in. In fact, the module is so immune to external vibration that the transport will continue to operate, unaffected, even while being opened or closed.

Microprocessor Transport Control

To coordinate the operation of the three motors, the TC-K88B incorporates a logic microprocessor. This logic control also facilitates the use of feather-touch transport pushbuttons, which provide convenient, foolproof mode selection. You can go quickly from fast-forward, for example, to rewind without going through stop. The logic circuit also enables you to 'punch-in' recordings of new material onto a previously recorded track. The optional RM-50 fullfunction remote control unit operates through the microprocessor IC as well.



Transport logic control provides sensitive and precise tape handling and facilitates remote control with the optional RM-50.

Automatic Music Sensor

The TC-K88B incorporates Sony's Automatic Music Sensor (AMS), a system that automatically indexes individual selections of music. Working in conjunction with the transport microprocessor, the AMS quickly finds and plays the selection of your choice. Simply make your selection, using the 'program' button. The AMS numeral display glows to indicate your choice. Then touch the 'play' and 'fast forward' (or 'rewind') buttons to locate the beginning of your selection and play it, automatically.



AMS also provides the ability to 'skip' back to the beginning of a work, or 'skip' forward to the beginning of the next selection.

Additional Transport Features

To provide absolute silence between recorded selections, the TC-K88B incorporates a unique Auto-Space/REC mute control. The control can be used to automatically attain a timed four-second space between selections. And you can replace unwanted program material, such as FM commercials, with four seconds of silence, or insert longer or shorter gaps, as desired.

With the CUE feature of the K88B, you can hear the high-pitched sounds as the tape passes over the heads in fast forward and rewind. Program material and the pauses between recorded pieces can be identified.

Another convenience is Auto Play. This allows you to preset the deck to go from rewind into play at the beginning of the tape. Used in conjunction with the memory cue feature, you can rewind to '000' on the tape counter and automatically go into stop or play mode.

Finally, at the end of the tape, in any mode or function, an Auto-Stop system

quickly disengages the heads, pinch roller, and drive capstan. This prevents any unnecessary friction and wear.

Liquid Crystal Peak Program Meters

Recording levels on the K88B are monitored on the extremely bright, high-resolution LCD Peak Program Meters. LCDs are used in preference to conventional needle-and-armature VU meters because, having no mechanical inertia to overcome, they are better able to follow transient peaks. Response time and element accuracy of the LCD display exceed those of the fluorescent meters used on conventional high-quality tape decks. Sophisticated circuitry, including a log amplifier, analog-to-digital converter, and the Sony CX-765 LSI driver, processes and analyzes the audio input signal to establish the unique accuracy of the LCD digital displays.

Calibrated in 33 steps across a broad range from -40dB to +8dB, the meters feature an expanded scale in the critical range around 0dB. Below 0dB, the LCD segments are cerulean blue. Above 0dB, the segments are red, to indicate the onset of tape overload. With their fast response and clear format, the Peak Program Meters make it easy to avoid tape saturation and its consequent distortion.

There are additional benefits: because the meters are arranged in parallel lines, you can evaluate left/right channel balance at a glance. With the exclusive Sony Double Indication System (DIS), the drive circuits can display two types of peak hold. In the 'auto' mode, the highest indication of a peak stays lit for 1.7 seconds, or until a higher peak is established. In 'manual' mode, the peak indication remains lit as lon'g as desired. This highest-peak indication can be particularly useful when setting record levels.

The same logic microprocessor that controls the transport also monitors the rotational speeds of the hub motors. These speeds translate into an accurate indication of the tape remaining, which can then be displayed on the Peak Program Meters (the meter faces include percentage scales for this purpose). At your command, tape remaining can be displayed simultaneously with musical peaks. In the absence of musical material, the tape remaining indication takes the form of one illuminated display segment on each meter. In the presence of musical material, it appears as a 'blank' segment on each meter. And this indication remains active and accurate in fast forward and rewind.

- dB \approx 40 30 20 10 5 3 0 3 5 8 + da - dB \approx 40 30 20 10 5 5 3 0 3 5 8 + da - dB \approx 40 30 20 10 5 5 3 0 3 5 8 + da - dB \approx 40 30 20 10 5 5 3 0 3 5 8 + da - dB \approx 40 30 20 10 5 5 3 0 3 5 8 + da - dB \approx 40 30 20 10 5 5 3 0 3 5 8 + da

The LCD Peak Program Meters (A) glow red above 0dB to clearly indicate high record levels. The parallel-bar arrangement(B) shows channel balance at a glance. Double-Indication peak-hold (C) retains the highestpeak indication for 1.7 seconds, or until manually reset. Blank segments show tape remaining (D).

Front-Panel Function Indicators

The four-digit tape counter and AMS system indicator are white electro-fluorescent digital readouts for easy reading. In addition, status indicators for Dolby NR, MPX filter, and all main transport functions use bright, reliable LEDs in order to ensure high visibility.

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Sony leadership in every aspect of audio and video reproduction is legendary. That leadership is no accident, nor is it recent. It arises from three sources. First, the vast Sony research and engineering facilities, among the most sophisticated in the world. Second, the application of 'total-system technology' in the design of all our products. And third, a commitment to translating this approach into instruments for the home that combine advanced technology with lasting value. The TC-K88B Stereo Cassette Deck is an outstanding expression of this commitment.

As heir to Sony's 30 years of excellence in tape recording, the K88B offers new breakthroughs in magnetic, mechanical, and electronic technology. The result is superlative convenience, solid reliability, and near-perfect reproduction of musical sound.

Features

Specifications

- Sony Sendust and Ferrite (S & F) head
- Four-gap erase head
- Metal particle tape capability
- 4-position bias and equalization controls
- Patented direct-coupled head/playback amplifier
- Exclusive Sony Dolby IC noise reduction with switchable MPX filter
- Direct-drive design
- Three-motor drive system with Sony BSL . motors
- Magnedisc servo control
- X-tal lock
- Dynamically balanced oversize flywheels
- Power Loading Cassette Module with safety-load mechanism
- Microprocessor-IC solenoid-logic
- 'Punch-in' record
- Automatic Music Sensor (AMS)
- Auto-Space/REC Mute
- 'Auto-Play' repeat control
- Separate Memory/CUE controls
- All-Mode Auto-Stop
- 33-segment LCD Peak Program Meters with Double-Indication System (DIS)
- Tape-remaining guide
- Front-panel function indicators
- Dual concentric record controls
- Optional RM-50 full-function remote control

Tape Format	Compact Cassette 4-track, 2 channel stereo record/playback	
Drive System	3 motor, direct-drive system	C
Tape Speed	1% ips(4.75cm/Sec)	Separ
Fast Forward/ Rewind Time	60 seconds (C-60)	
Speed Accuracy	±0.2%	
Wow & Flutter	0.03% WRMS 0.085% DIN 45507	Me
Frequency Response (re: -20dB record level)	30-17,000Hz ±3dB (Metallic) 30-17,000Hz ±3dB (FeCr) 30-16,000Hz ±3dB (EHF) 30-15,000Hz ±3dB	251(
(re: 0dB record level)	30-13,000Hz ±3dB (Metallic)	
Signal-to-Noise Ratio (Dolby off, re: 3% THD)	60dBPeak IHF-A WTD (Metallic) 60dB Peak IHF-A WTD (FeCr) 58dB Peak IHF-A WTD (EHF) 54dB Peak IHF-A WTD (SHF)	Pow Po
(Dolby on)	improved up to 5dB @ 1kHz, 10dB @ 5kHz or above	

Total Harmonic less than 0.9% (Metallic @ 1kHz) Distortion (re: OdB record less than 0.9% (FeCr@1kHz) level) Crosstalk (tracks) 60dB @ 1kHz paration (channels) 35dB @ 1kHz 65dB @ 400Hz Erasure (inc. Metallic) Bias Frequency 105kHz Meter Type & Range 33-segment LCD peak, -40 to +8dB, with DIS peak hold and taperemaining guide Input Sensitivity & Impedance Line 77.5mV, 50k Ohms Mic 0.25mV, low **Output Level &** Impedance Line fixed: 0.435V, 50k Ohms nominal, 10k Ohms minimum Headphone 38.8mV, 8 Ohms nominal ower Requirements AC 120V, 60Hz Power Consumption 35 watts maximum Dimensions 31/8"H x 187/8"W x 151/4"D 80 x 480 x 385mm

Weight 22 lbs, 1 oz; 10kg

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2578 Shattuck Berkeley, CA 94704 415-548-8733



Sony Industries 9 West 57th Street, New York, N.Y. 10019