

YAMAHA K-2000/K-1000

Natural Sound Stereo Cassette Decks

Yamaha Linear EM Transduction System

ORBiT (Optimum Record Bias Tuning) System

3-Head 2-Motor Direct Drive Transport

*Double dbx** and Double Dolby* B Noise Reduction (K-2000)*

dbx and Dolby B Noise Reduction (K-1000)

Auto/Memory Functions

4-Digit Linear Real-Time Counter with Minus Display



NEW TECHNOLOGY FOR UNMATCHED

LINEAR EM TRANSDUCTION

The most basic function of a cassette deck is to record an electronic music signal as accurately as possible onto a length of magnetic tape. This process of converting an electronic signal into a magnetic signal which can be "imprinted" on the tape is known as "electromagnetic transduction."

In conventional cassette decks, the record current is delivered to the record head via a "bias trap"—a filter circuit using coils and capacitors—and directly mixed with the bias signal from an LC (inductive/capacitive) bias oscillator at the input to the record head. All this inductive and capacitive circuitry directly affecting the signal path means distorted or "non-linear" head current, and therefore distorted magnetic flux output from the record head. This creates audible intermodulation distortion—even in the finest conventional cassette decks.

The new Yamaha Linear EMT (Electro-Magnetic Transduction) system offers the first significant breakthrough in this basic but vital function by providing linear magnetic flux output from the record head through application of linear current to the head windings. This has been accomplished by eliminating the bias trap as well as isolating the bias oscillator's inductive/capacitive circuitry from the signal path. Simply stated, the Linear EMT system means that a pure, undistorted signal is recorded on the tape for correspondingly pure, undistorted music reproduction.

The K-2000 goes one step further by using an exceptionally high bias frequency of 200,000 Hz to absolutely minimize the possibility of intermodulation effects. In addition,

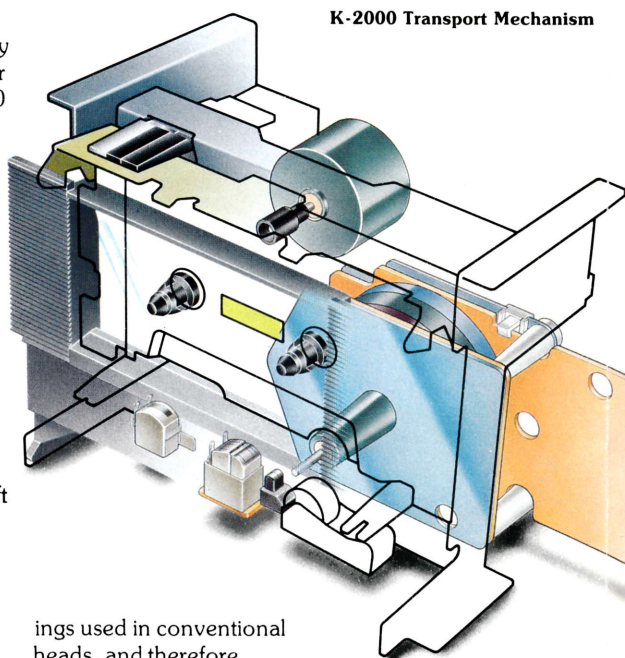
the K-2000 incorporates a dual differential FET-input direct-coupled record amp, directly coupled to the record head, for even greater linearity and reproduction purity. The K-1000 incorporates a differential FET-input record amp, also directly coupled to the record head, for similarly high reproduction quality and precision.

2-MOTOR DIRECT DRIVE TRANSPORT

A virtually flawless transport system is an essential element in supporting the unprecedented performance of the Linear EM Transduction system. Naturally, the K-2000 and K-1000 incorporate such a transport. The capstan is directly driven by a brushless DC servo motor that has been specifically designed for this application. The motor shaft is ground to micron tolerances for ideal stability—stability that is attested to by an impressive 0.02% wow and flutter figure. An independent high-quality DC motor powers the supply and take-up reels so rotational irregularities at the reels cannot possibly affect the stability of the tape passing the heads. This type of super-precision engineering is carried on throughout the transport, ensuring exceptionally smooth, stable operation.

TOP-QUALITY HEADS IN A FULL THREE-HEAD SYSTEM

Another feature that fully supports the Linear EM Transduction system is a full complement of three top-performance heads. The K-2000 and K-1000 record and playback heads are formed of high-purity Sendust for ideal magnetic characteristics. For enhanced overall reproduction performance the K-1000 heads are a dual-lamination design, while the K-2000 heads are constructed with three-laminations for even greater music reproduction purity. Further, the head coils have approximately half the number of wind-



K-2000 Transport Mechanism

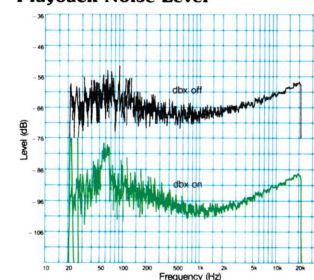
ings used in conventional heads, and therefore approximately half the usual impedance. This minimizes inductive effects that can limit transient response and cause increased crosstalk. In general, the unquestionably superior magnetic characteristics of these heads achieve performance that permits the full potential of the Linear EM Transduction system to be realized—for a new experience in cassette reproduction reality.

dbx AND DOLBY B NOISE REDUCTION

Although still a relatively rare feature on many of even the most expensive cassette decks available, dbx noise reduction is widely used in professional recording studios throughout the world to reduce noise and maximize the dynamic range on the critical master tapes from which phonograph records are made.

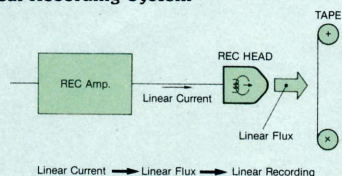
dbx works by compressing the music signal before recording so that the maximum and minimum music levels are brought well within the tape's inherent saturation and noise levels. Then, when the tape is played back, the signal is expanded to its original dynamic range—with all peak music

Playback Noise Level

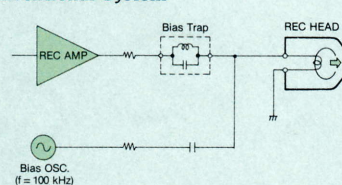


Linear Electromagnetic Transduction

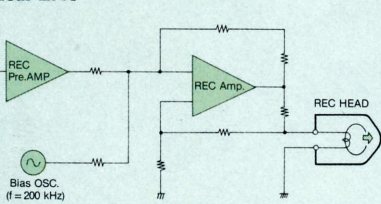
Ideal Recording System



Conventional System

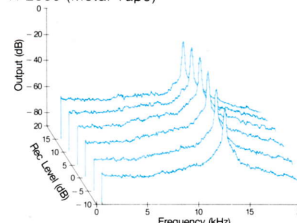


Linear EMT

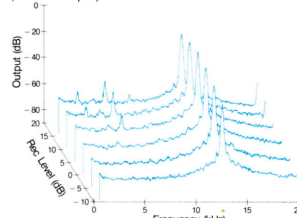


Comparison of IM Distortion in Linear EMT and Conventional Recording Systems

K-2000 (Metal Tape)

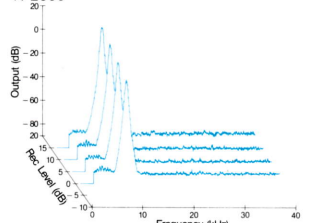


Conventional Recording System (Metal Tape)

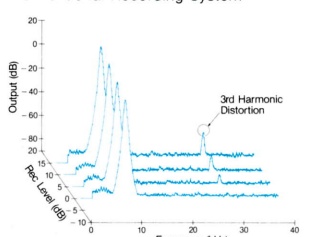


Comparison of Head Current Distortion in Linear EMT and Conventional Recording Systems

K-2000



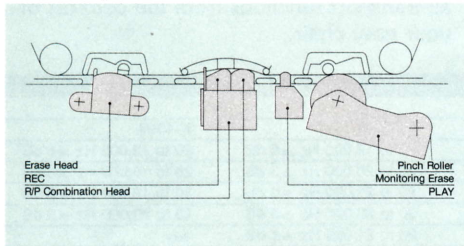
Conventional Recording System



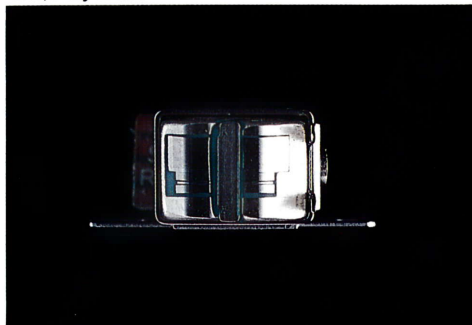
D SOUND COMPUTER AUTOMATIC

levels and low level music passages intact. This means that the average 60 dB or so of dynamic range available with standard cassette tape is expanded to more than 100 dB. The maximum level of even the most dynamic orchestral performance is just a little over 100 dB! Obviously this makes a dramatic difference in musical impact. Dolby B noise reduction has been around in cassette decks for quite some time now, and many audiophiles prefer Dolby NR to other systems (not to mention the large Dolby-encoded cassette library that most serious cassette fans have acquired). Both the K-2000 and K-1000 therefore also incorporate a high-performance Dolby B NR system. Both the dbx and Dolby B noise reduction systems in the K-2000 feature double processors so you can monitor NR-decoded as you record.

K-2000 Tape Path



K-2000 3-Laminate Core, Low-Impedance Sendust Rec/Play Head



α -ORBiT (K-2000) AND ORBiT (K-1000) — OPTIMUM RECORD BIAS TUNING

It's a fact that tapes of the same formulation (i.e. normal, chrome or metal) actually differ enough from manufacturer to manufacturer that the record bias current should be individually adjusted for each tape to achieve optimum reproduction performance. In fact, tapes of the same type from the same manufacturer can vary enough in their characteristics to warrant critical bias adjustment. ORBiT is a sophisticated automatic bias tuning system that allows you to precisely calibrate bias current for ideal matching with the characteristics of any individual cassette tape, guaranteeing the finest possible reproduction quality with every recording.

The K-2000's α -ORBiT System

The α -ORBiT system in the K-2000 carries out the calibration process automatically every time you load a cassette and press the REC PAUSE button. The calibration process takes a mere 2 seconds, and when it is over there is no calibration tone left on the tape to give you an unpleasant surprise when the tape is played back.

The K-1000's ORBiT System

Calibration is only slightly less automated in the K-1000. Load a tape, press the TEST button and enter the record mode—this begins the calibration process. All you do then is adjust the bias fine tuning control until a special bias tuning display indicates that the bias is set precisely for the tape you have loaded. Then either press STOP or disengage the TEST button and the tape is automatically rewound to the point where calibration began and the deck is set to the REC PAUSE mode, ready to record.

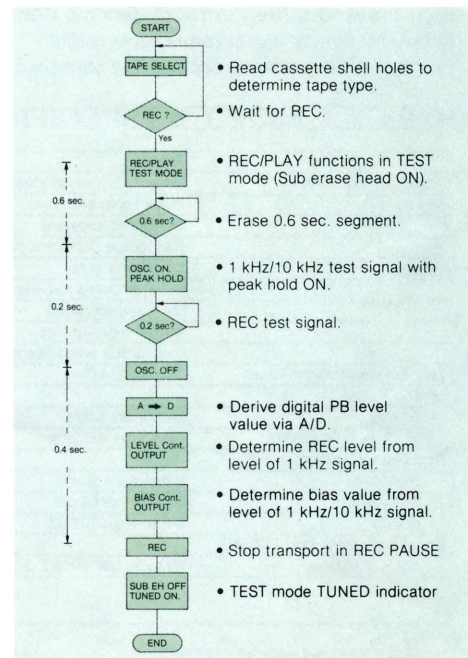
4-DIGIT LINEAR COUNTER

Conventional tape counters provide only an extremely rough indication of tape position. Moreover the numbers assigned to tape posi-

tion are completely arbitrary and the amount of tape that passes the heads between counter numbers varies considerably from one end of a cassette to the other.

In the K-2000 and K-1000 you get a digital readout in minutes and seconds, indicating precisely how long the tape has been running. If you rewind beyond "00:00" the counter starts reading off "minus" times—e.g. —12:30—so you always have an accurate reference to the zero point. What's more, this system makes use of the built-in micro-computer to keep track of the rotational speed of the supply reel. That way the micro-computer can compensate for the variations in reel speed that "fool" conventional counters into non-linear operation. The Yamaha Linear Counter is extremely accurate, providing a genuinely useful

Basic Flowchart



FUNCTION ENHANCES SOUND AND CONTROL

elapsed-time display that aids in recording, editing and tape search operations. Over the length of a C-60 cassette, the display will be accurate to within seconds—that's far greater precision than conventional elapsed-time counters can offer. And there's comparatively little error even with other tape lengths.

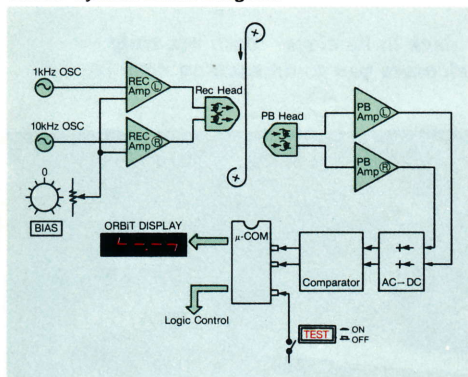
AUTO/MEMORY FUNCTIONS

In addition to the vastly expanded capabilities of the linear counter, both the K-2000 and K-1000 have a few automatic functions that make transport operation easier than ever.

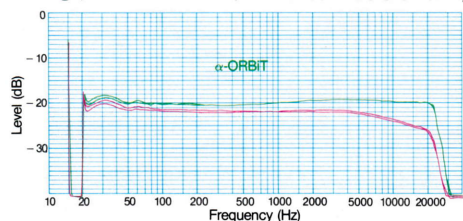
Auto Rec Return

Pressing the REWIND section of the centralized control panel while in the Record mode will immediately rewind the tape to the exact point where you began recording for easy, instant retakes. It's also extremely useful in

ORBiT System Block Diagram



Frequency Response Before and After ORBiT Tuning (K2000 α -ORBiT) — Tuned — Before Tuning



critical recording applications where proper level setting and timing might require two or three tries before the actual recording is made.

Auto 0 Stop

With this function, the tape automatically stops when counter "0000" is reached during rewind. For example, you can set the counter to "0000" at the beginning of a selection and then return to that point automatically later on, simply by pressing the rewind button.

0-M Repeat

This function lets you set up a continuous repeat playback loop between the "0000" counter position and any another preset memory location on the tape. You could set the counter to "0000" at the beginning of a selection and then press the Memory button at the end. The 0-M function would then play that selection back over and over until you stop it. A number of selections or even a section of a selection can be automatically repeated in this way.

Full Repeat

Full Repeat offers automatic repeat playback of an entire side of a cassette. This is great for parties or any other situation where you want continuous background music without having to continually flip and change tapes.

EXTRA WIDE RANGE LED PEAK METERS WITH PEAK HOLD

Conventional peak meters are usually acceptable for making average recordings, but the K-2000 and K-1000 meters are perfect for making outstanding recordings. They are extremely fast in response, high in resolution with a 16-segment display, and two-color coding makes for easy interpretation. Their "peak hold" function displays the highest peaks encountered, making it simple to determine the optimum record levels. Further, they feature an extended high-level readout so you can take full advantage of the vast dynamic range reproduction capabilities provided by the built-in dbx noise reduction system.

EXTRA K-2000 FEATURES

MONITORING ERASE FUNCTION

This is a highly original Yamaha feature that you won't find on any other cassette deck. While most modern cassette decks let you insert silences in a program being recorded by pressing a REC MUTE button (both the K-2000 and K-1000 also have a REC MUTE button), the K-2000 actually lets you selectively erase portions of a program while monitoring in the playback mode. This not only gives you much greater editing flexibility than provided by the REC MUTE function alone, but it allows you to record a program

in its entirety and then edit later at your leisure—a particularly useful feature for editing timer-activated recordings made when you are away or asleep.

WIDE RANGE ($\pm 15\%$) PITCH CONTROL

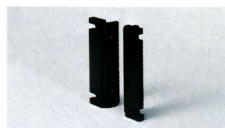
The pitch control on the K-2000 varies playback tape speed over a much wider range than conventional pitch controls. This means you have greater control when matching the pitch of a cassette recording to that of a live instrument.

OTHER FEATURES FOUND ON THE K-2000 AND K-1000

- Full logic, lighttouch transport control
- Rec Mute function
- Timer rec/play capability
- Remote control compatibility (RS-10 unit, optional)

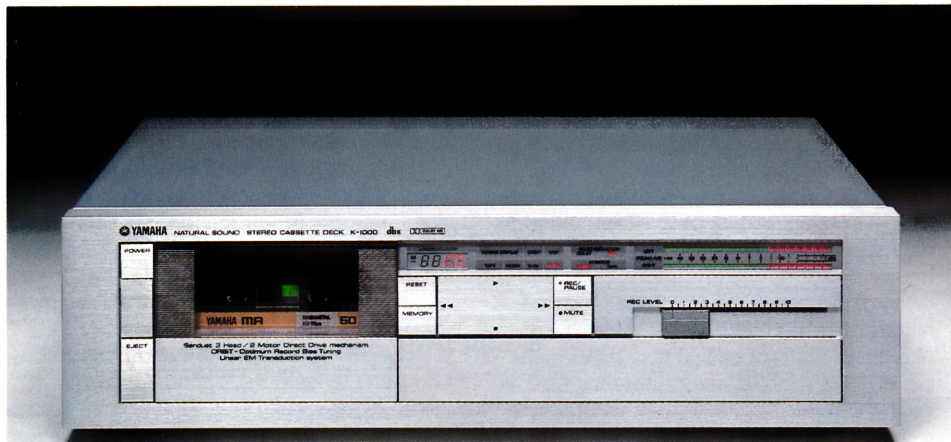
- EIA rack mount adaptors for black model (option)

EIA Standard Rack Mount Adaptors



K-2000/K-1000

Natural Sound Stereo Cassette Decks



RS-10 Remote Control Unit (Option)

K-1000 SILVER MODEL

If your sound system or room decor is dominated by lighter visual tones, you might prefer a silver cassette deck to the standard

black models. The K-1000 is available in a silver model to add an elegant touch to your audio setup.

K-2000/K-1000 SPECIFICATIONS

	K-2000	K-1000
Track Configuration	4-track, 2-channel stereo	←
Motors	Pulse servo brushless	←
	DD motor (capstan):	
	Fiat torque DC motor (reel)	
Heads	3-laminate core, low impedance Sendust rec/playback head; double-gap Sendust main & sub erase heads	2-laminate core, low impedance Sendust rec/playback head; double-gap Sendust erase head
Fast Forward/Rewind Times	75 sec. (C-60)	←
Wow & Flutter		
WRMS	Less than 0.02%	←
W. Peak (DIN 45507)	Less than ±0.08%	←
Signal-to-Noise Ratio		
THROUGH	Better than 59 dB	←
Dolby B on	Better than 68 dB	←
dbx on	Better than 108 dB	Better than 105 dB
Frequency Response (±20 dB)		
Normal Tape	20 to 18,000 Hz ±3 dB	25 to 17,000 Hz ±3 dB

	K-2000	K-1000
	20 to 19,000 Hz ±6 dB	20 to 18,000 Hz ±6 dB
CrO ₂ Tape	20 to 20,000 Hz ±3 dB	25 to 18,000 Hz ±3 dB
	20 to 21,000 Hz ±6 dB	20 to 19,000 Hz ±6 dB
Metal Tape	20 to 20,000 Hz ±3 dB	25 to 20,000 Hz ±3 dB
	20 to 21,000 Hz ±6 dB	←
Maximum Recording Level		
Normal/CrO ₂ /Metal Tape	+8 dB	←
Overall Distortion	Less than 0.8%	←
Input Sensitivity/Maximum allowable		
Input/Impedance (Line)	50 mV/6 V/50 k-ohms	50 mV/6 V/30 k-ohms
Output Level/Impedance		
Line	500 mV/30 k-ohms	←
Phones	170 mV/8 ohms	←
Power Supply	Matched to supply voltage and frequency of each area	←
Power Consumption	40 W	35 W
Dimensions (W x H x D)	435 x 122.5 x 346 mm	←
	17-1/8" x 4-13/16" x 13-5/8"	←
Weight	9.0 kg (19 lbs. 13 oz.)	8.0 kg (17 lbs. 10 oz.)

Specifications subject to change without notice. *TM Dolby Laboratories Licensing Corp. ***dbx is a trademark of dbx incorporated.

NATURAL SOUND CASSETTE TAPE

Music Tape for Music Lovers

Yamaha offers five kinds of cassette tape for every type of music recording application, each available in 60 and 90 minute lengths. Each provides highly accurate reproduction of all types of music, with low distortion and wide dynamic range.

A Perfect Tape for Every Need

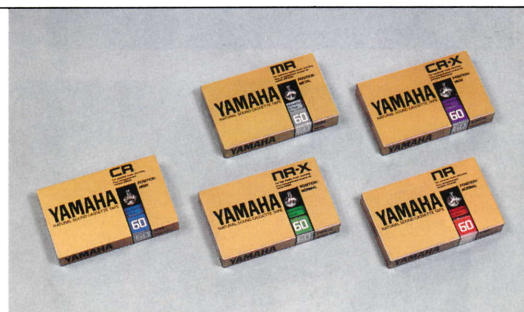
MR 60/90 min., Bias: Metal, EQ: 70 µs
For Reference Quality Music Recording

CR-X 60/90 min., Bias: High (CrO₂), EQ: 70 µs
For Top-Priority Music Recording

CR 60/90 min., Bias: High (CrO₂), EQ: 70 µs
For Selected Music Recording

NR-X 60/90 min., Bias: Normal, EQ: 120 µs
For High-Fidelity Music Recording

NR 60/90 min., Bias: Normal, EQ: 120 µs
For Universal Music Recording



For details please contact:

SINCE 1887



YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

Behind the Superior Yamaha Sound

the company began as a producer of reed organs, it has expanded steadily until today, Yamaha music instruments, sound reinforcement gear, music education and popularization programs, motor products, sports equipment, and of course, audio products, are renowned worldwide for their highly refined performance. Naturally, the many years spent in intensive research and development in all these fields has

Yamaha's foundation as a manufacturer spans more than a hundred years in a number of specialized fields. Since

resulted in a vast and varied store of technology. Moreover, the finely balanced interrelationship between the many Yamaha in-house technologies, production facilities and product groups creates a highly efficient network that makes it possible to achieve optimum quality and performance in every product. Yamaha audio know-how, however, does not stop at technology. Each and every new audio product must face the most demanding challenge imaginable: the critical ears of Yamaha music instrument designers. Unless the reproduced sound is exactly like the real thing, the product is not considered finished. Yamaha gives you vast technology tamed by musical sensitivity—a claim no other audio manufacturer can honestly make.

UNMATCHED CASSETTE REPRODUCTION PURITY — AT ANY PRICE

The K-2000 and K-1000 Natural Sound Stereo Cassette Decks from Yamaha are unquestionably destined to become the cassette reproduction standard for quite some time. That's because they are thoroughly equipped with uncompromising technology. A combination of "spare-no-cost" engineering and innovative Yamaha design has resulted in literally amazing performance. Moreover, both these decks are highly automated—thanks to built-in microcomputers—providing an extensive range of features that are simple to use. Unlike many decks that compare in price with the K-2000 and K-1000, however, the features provided are all practical and highly desirable.

Briefly, the K-2000 and K-1000 incorporate a specially designed two-motor, direct drive transport mechanism for smooth, silent precision, and a three-head reproduction system. Both decks also employ a new Yamaha breakthrough—Linear Electromagnetic Transduction. This new system extends high signal transmission linearity to the actual point where the signal is transferred from the head to the tape—a previously uncontrollable area in the recording chain. Then there are double dbx and Dolby B noise reduction systems in the K-2000 and single dbx and Dolby B NR in the K-1000, ORBiT (Optimum Record Bias Tuning) for automatic, precise bias level setting, a 4-digit linear real-time counter, expanded-range LED level metering with peak hold, a number of auto/memory functions, and more. The K-2000 additionally features a unique "monitoring erase" function and a broad-range pitch control.

The K-2000 is truly a professional cassette deck and the K-1000 outperforms any other deck in its class—both are truly outstanding accomplishments in the field of audio reproduction. With them, Yamaha welcomes you to an exciting new experience in natural sound.

