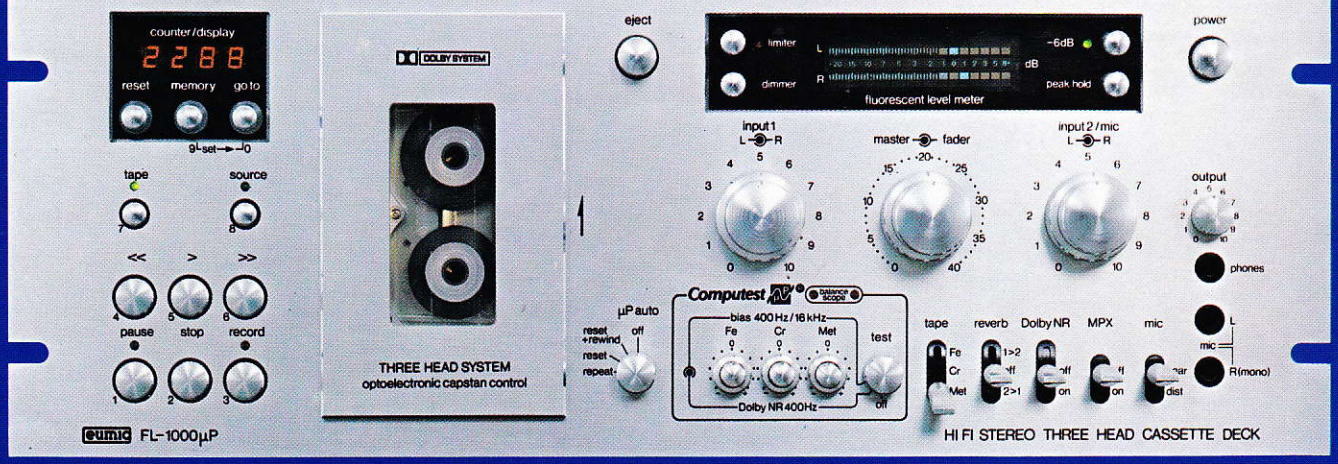
eumig

FL-1000 CASSETTE DECK

AUDIO / HI-FI



Excellence both in engineering and styling combine in the Eumig FL-1000 to create a cassette deck with unexcelled performance, versatility, and elegance.

The front-loading, microprocessor-controlled tape transport features Eumig's exclusive opto-electronic servo system and a sophisticated 3-head design that lets you monitor directly from the tape as it is recorded. Built-in test facilities permit optimizing performance for every tape type and brand, including the new metal-alloy formulations. Microphone and line-level mixing provisions are comparable to those found in studio recording consoles, and a multi-segment fluorescent peak-level display assures positive, easy-to-read indications. And the digital control system of the FL-1000 is even capable of being interfaced with almost every popular microcomputer.

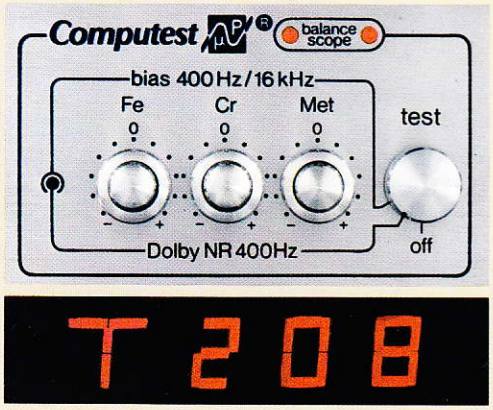
These and many other outstanding features of the Eumig FL-1000 are more fully described below.

ELECTRONICALLY CONTROLLED CAPSTAN

Eumig innovation developed the opto-electronic capstan servo-control system used in the FL-1000. Traditional flywheels respond slowly and may induce rumble. The lightweight Eumig disc, with its 2500 precisely-spaced, photo-etched radii, on the other hand, produces 15,000 pulses per second as the capstan rotates. By comparing the counted pulse-rate against a fixed reference, instantaneous speed-correction signals can be applied to the capstan within microseconds, helping lower the wow and flutter to a mere 0.035% WRMS.

MICRO TESTING

Different cassette tape types—ferric, chromium dioxide, and the newly-developed metal alloy formulations—have different bias requirements. Additionally, however, within each major type of cassette there are brand-to-brand differences in tape sensitivity and optimum bias setting that may affect both the accuracy of the Dolby™ noise-reduction system and the overall frequency response and distortion of the recording.



To compensate for these differing requirements, the FL-1000 incorporates not only the usual 3-position "bias/equalization" switch (which is itself quite sufficient for all but the most critical recordings), but also a built-in Computest® facility that provides individual adjustments for sensitivity and bias for cassettes of each type.

When the Computest® switch is engaged, normal machine inputs are bypassed, and the letter "t" appears on the digital readout. A 400Hz test tone is used to set sensitivity for proper Dolby level, and a combined 400/14,000Hz tone permits bias adjustment for flat frequency response across the entire audio range. Both test positions use a Balance Scope, consisting of two LEDs which flash equally and alternately when the correct control setting is achieved. When the Computest® switch is turned off, the tape automatically rewinds to the exact point at which the test adjustments began, so the adjustment tones will be erased when normal recording begins.

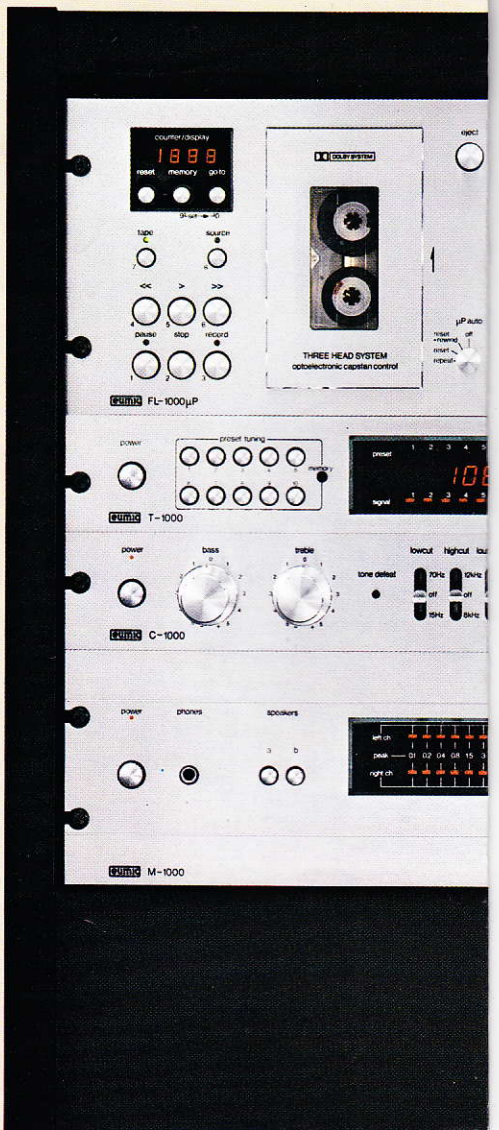
ADVANCED MIXING FACILITIES

The FL-1000 provides two stereo mixing inputs, one of which may be used either for microphones or for a second high-level source. In addition, a 3-position switch is provided that permits adding adjustable reverberation from either input to the other.

An independent master record-level control is included, along with a cross-fade control that makes smooth transitions ("segues") from one set of inputs to the other and helps in establishing optimum instrumental balance.

42-SEGMENT FLUORESCENT PEAK/HOLD DISPLAY

Average-responding (VU-type) meters understate distortion-causing signal peaks, and indeed, no mechanical meter movement can achieve the speed of response and ballistic accuracy of an all-electronic indicator. The 42 fluorescent segments (per channel) of the Eumig FL-1000 are arranged to display true peak signals at 14



EUMIG FL-1000 CASSETTE DECK

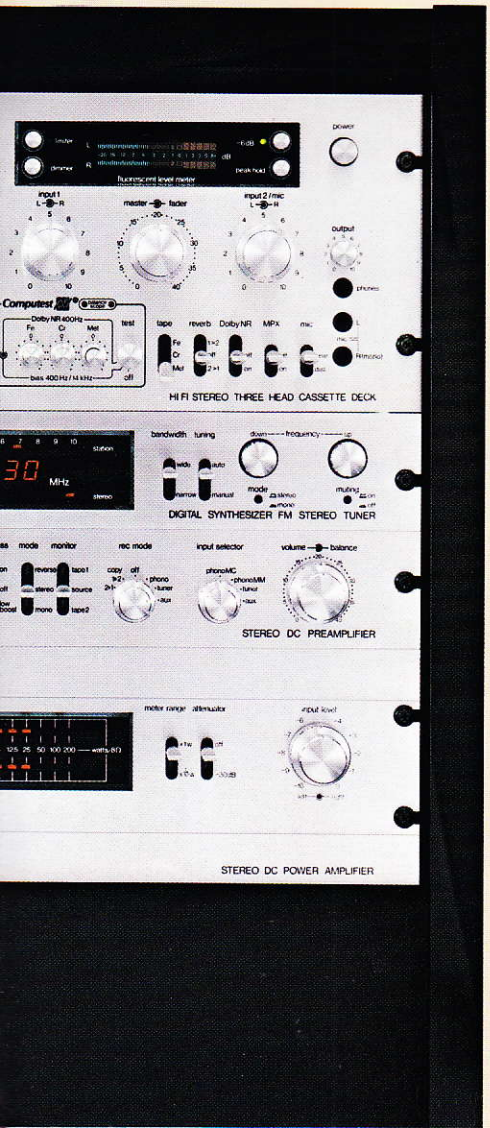
easily-read levels. Moreover, in "source" mode, the Eumig display includes the effects of the record pre-emphasis, so what you see is the exact signal the tape sees. This prevents treble saturation.

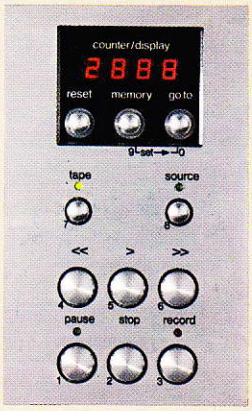
To increase the usefulness of the FL-1000 display still further, it is equipped with a peak-hold switch that retains the highest reading while continuing to indicate lower-level signal variations. A 6dB attenuator switch (for high-output metal tapes) and a 2-position brightness switch are also included.

FULLY COMPUTERIZED OPERATIONS

The "command center" of the FL-1000 is an integrated circuit microprocessor which directs all tape-motion functions. Naturally, the microprocessor provides the fail-safe transistor logic that permits the fast-winding, forward, stop, pause and record

touch-buttons to be depressed in any desired sequence, and provides for automatic rewind (to 0000 or any selected location) with stop or repeat options. But the FL-1000 microprocessor does much more than this.





The tape counter of the Eumig FL-1000 is electronic rather than mechanical. This not only eliminates the usual imprecision caused by belt slippage; it also contributes significantly to the extraordinarily low wow and flutter. And, it allows the same touch-buttons used for transport control to serve a second function, like that of the keys on a calculator.

No matter where you are in a tape, by pressing the "go to" and "memory" buttons simultaneously, then punching in any selected counter reading, the FL-1000 will automatically advance or return to that exact location, slowing down as it nears it, and automatically recovering any slight overshoot. When the end of a side is reached, the word "End" is displayed, as is a "t" (for "test") when the Computest® bias/sensitivity mode is entered.

Because of the extreme accuracy and completely digital microprocessor control of the FL-1000, it can also be interfaced with a number of popular microcomputers. An 8-line bus termination is provided, and adaptors for other formats are available.

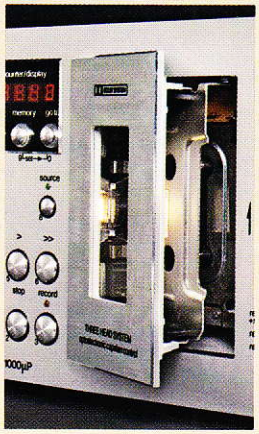
CRAFTSMANSHIP

As pictured at left with its companion components—the M-1000 DC power amplifier, the T-1000 digital synthesis FM tuner, and the C-1000 DC preamplifier—the Eumig FL-1000, available either in matte black or brushed aluminum finish, is more than visually appealing. Its parts and construction throughout, together with additional human-engineered features, make it a deck you can count on enjoying for years.

For example, a separate motor is provided that not only simplifies the reel drive system, but provides the smooth power transfer needed to operate the tape gate, capstan, and braking mechanisms. This eliminates the shocks (which may jar a tape head out of alignment) and sometimes erratic performance associated with conventional solenoids.

Again, while limiters are usually used only for speech recordings, where strict fidelity is less important than with music, the fast-attack, slow release characteristics of the FL-1000 switchable limiter, combined with an LED monitor that glows only when the signal-level is excessive, facilitate its use even when taping musical selections.

A double-Dolby noise reduction system is provided so that even when you monitor the playback while recording the sound you hear is always properly decoded. Further, a switchable multiplex filter is incorporated in the FL-1000 to prevent Dolby system encoding errors that might occur when taping FM stereo broadcasts.



Both fixed and variable-output jacks are included, both to aid in matching the sound levels of different components in your system and to provide variable levels for headphone listening. Standard 19-inch rack mounting dimensions have been strictly observed to facilitate installation.

The performance specifications of the Eumig FL-1000 (printed on the back cover) represent minimum factory quality-control specifications, and together with the two - year limited warranty on both parts and labor, you can be assured that the Eumig FL-1000 will provide you with many years of satisfying, trouble-free operation.

eumig®

EUMIG FL-1000 COMPUTER INTERFACE

Unique among audio components, the Eumig FL-1000 cassette deck can be directly interfaced with almost all 8-bit computer systems, such as the Commodore "Pet," Apple II, Radio Shack, etc. With the multi-machine control program, up to 16 FL-1000's can be individually controlled, simultaneously or sequentially, for any mode and any section of any tape. You can control each and every function of the FL-1000 including record, play, stop, rewind, fast forward, load counter, load memory, go to and many more.

While the multi-machine control program will probably find principal use in commercial applications such as broadcast station automation or discotheques, even the owner of a home computer will appreciate the index program facility that computer interface with the FL-1000 provides. Under computer direction, the titles and locations of up to 15 selections per cassette side can be digitally recorded by the FL-1000 (subject, of course, to user change) on the first few seconds of each side of your cassette. In this way, by merely inserting a programmed cassette in the FL-1000 and punching a few buttons on the computer, you can read out its contents on a CRT and instruct the FL-1000 to play the selections you wish to hear in any order—with, for example, a "rewind" command at the end of your musical menu. Future software may make it possible to sort among all your cassettes to locate, for instance, a particular artist or a particular song done by several artists.

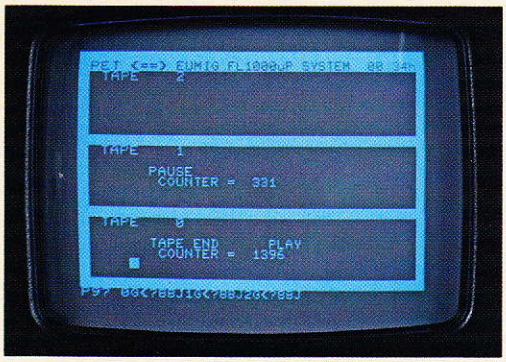
Precisely because the "computerized" operations of the FL-1000 are not limited to dedicated tasks (such as adjusting bias current),as they are in other decks that incorporate "microprocessor" chips, you can write your own ticket (programs) or utilize our own versatile software. Either way, you have a superlative audio component with an almost unlimited control potential.

Technical Description

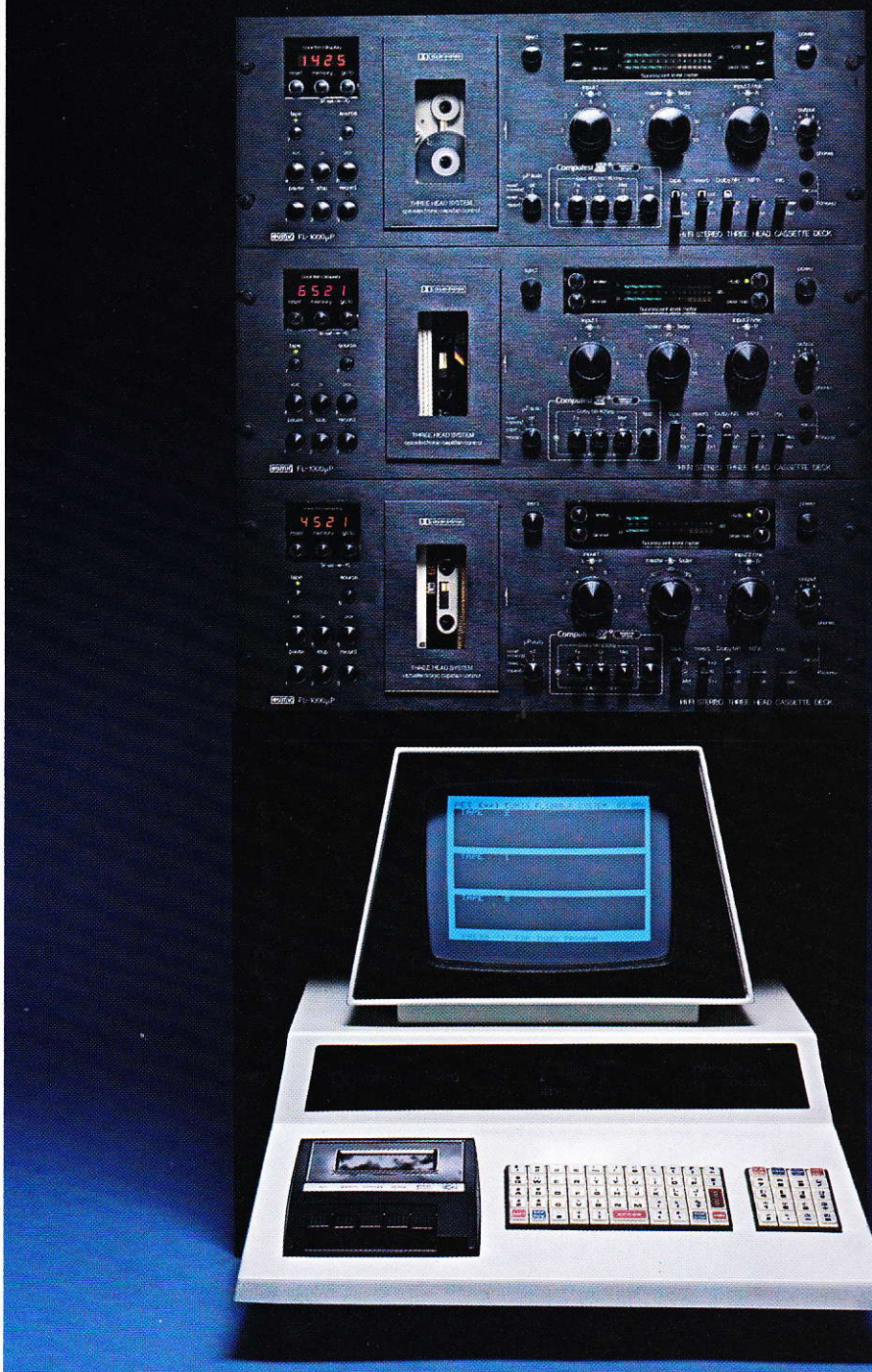
The computer-interface "I/O" port of the Eumig FL-1000 employs an 8-bit parallel bus that can be connected to Commodore, Apple, Radio Shack, or other 8-bit computers.

Each FL-1000 contains a diode matrix (user programmable) that provides a unique machine address for up to 16 decks. The CPU integrated circuit in each deck (a MOSTEK MK3870) is a highly versatile LSI microprocessor, permitting considerable storage within the chip itself, so that whole banks of 16 decks each can not only control themselves, but control other machines as well. For example, the program might say when machine #1 reaches index # 1280, machine #5 should rewind to index #0260 and record the output of machine #1 at that location.

In the Eumig index program, the FL-1000 digitally records all index information on your cassette between counter positions 0031 and 0051 (bypassing the leader section but taking only a few seconds of tape). More extensive index facilities are user-programmable.



As Eumig itself is interested in developing the most useful applications of its remarkable computer-interface potential, we shall be happy to assist interested users in perfecting the most efficient new software routines.



EUMIG FL-1000 COMPUTER INTERFACE

SPECIFICATIONS

Tape system:		4-track stereo Philips cassette
Tape speed:		1⅞ IPS (4.75cm/s) ±1.0%
Frequency response:	Metal alloy	20-20,000Hz ±3dB
	CrO_2	30-20,000Hz ±3dB
	Ferric	30-18,000Hz ±3dB
Signal-to-noise (A-weighted)		with Dolby™ / without Dolby
	Metal alloy	70dB / 62dB
	CrO_2	67dB / 59dB
	Ferric	66dB / 58dB
Bias frequency:		100kHz (nominal)
Wow and flutter:		0.035% (WRMS)
Rewind time (C-60):		less than 35 seconds
Start-up time (pause to play):		less than 40m sec
Input sensitivity (impedance):	Input 1, line (RCA jacks)	100mV (100 k-ohms)
	Input 1, DIN	1mV 1k
	Input 2, line (RCA jacks)	100mV (100 k-ohms)
	Input 2, mic, dist. pos.	0.2mV (3 k-ohms)
	Input 2, mic, near pos.	2mV (15 k-ohms)
Limiter control range:	Attack time: 1.6m sec Release time: 0.15 sec	25dB
Output/level display characteristics	Output level(impedance):	0dB, 1kHz, 0.775V (1 k-ohms)
	Peak reading indicator attack time:	10msec (0 VU at 1kHz)
	Peak hold decay time:	(−3dB) 180m sec, 0 to −20dB, 1.5 sec
Headphone output matching:	8-2,000 ohms; ¼" stereo jack	
Electronic complement:		42 integrated circuits 155 transistors 8 FET's, 3 phototransistors 7 LED's 125 diodes, 16 zener diodes
Power requirements:	110/250V switchable, 50/60Hz	50 watts
Dimensions:		19"W × 7"H × 13"D
Weight:		26.5 lbs.

™"Dolby" is a trademark of Dolby Labs, Inc.

Eumig (USA) Inc., Lake Success Business Park, 225 Community Drive,
Great Neck, New York 11020, (516) 466-6533