

CONCEPT

The Ultimate in
Sound Reproduction



CONCEPT ELC

The Design

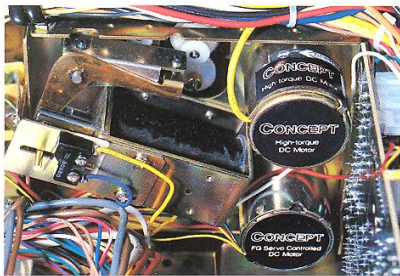
The design goal for any Concept product is to be the ultimate in sound reproduction. Our research and success with the high-technology Concept electronics and Concept Constant Energy loudspeakers made us acutely aware of the need for a better recording instrument. Our goal was to match the performance of the highest quality open reel decks without the attendant expense, and at the same time retain the basic convenience of the cassette format.

As our preliminary design work proceeded, thorough examination found available technology and its application to be inadequate. Most existing cassette decks suffer from limited frequency response, restricted dynamic range, excessive distortion and other electronic limitations, and as often from clumsy, imprecise tape transports. The several really good examples require complex, repeated adjustment and are priced out of reach to all but a select few.

In order to achieve both convenience and outstanding specifications, we needed a new technology for both the tape transport and the electronics. An intensive four-year development program transformed the idea into laboratory prototypes and finally into an uncompromised product. The final result is the superb Concept ELC, a most exceptional cassette deck. Listen to the Concept ELC, the ultimate in sound reproduction.

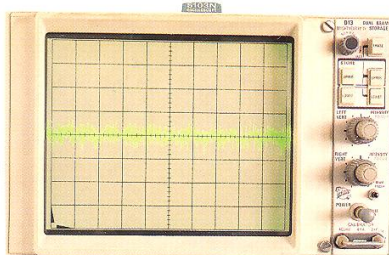
The Transport Technology

The Concept ELC transport is superior in several significant respects. It utilizes *two* motors, each specialized for different functions. To achieve rock-steady speed, a precision DC motor is driven by an electronic, self-correcting servo circuit. This motor drives *only* the capstan via an oversized, balanced flywheel. It operates at only one speed—exactly.



Rugged dual motor transport has fewer moving parts.

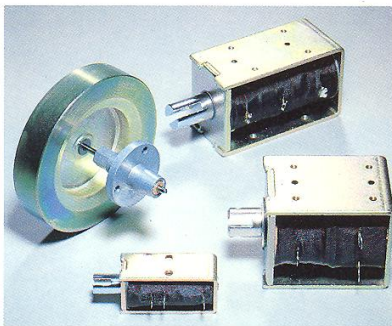
For improved fast winding, the Concept ELC uses a DC high-torque motor that is both strong and quiet. Powerful industrial-grade solenoids lock the cassette firmly for exact, repeatable tape-to-head contact. Because all mechanical functions are switched *electrically*, the Concept ELC dispenses with complex levers, clutches, pulleys and springs, all of which are subject to wear. The elegant mechanical simplicity of the Concept ELC provides far greater long-term adherence to the exacting original specifications as well as vastly increased reliability.



Concept ELC wow and flutter, IEC weighted. Each horizontal division is 1 second. Guaranteed spec is .04%, this sample measures only .03%.

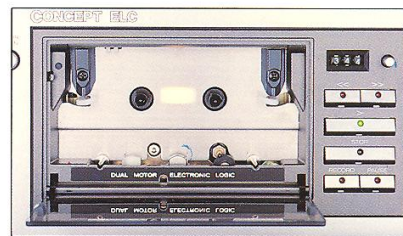
Electronic Logic Controls

The Concept ELC takes its name from the unique computer-derived Electronic Logic Controls. Feather-touch buttons activate an electronic "brain" that controls the functions of the motors and solenoids. Tape motion is controlled by circuitry that senses and reacts to tape movement; when you switch directions, the ELC automatically pauses before changing to eliminate stress on the cassette. The circuitry even applies a measured voltage to instantly bring the tape up to speed *within its wow and flutter specs*.

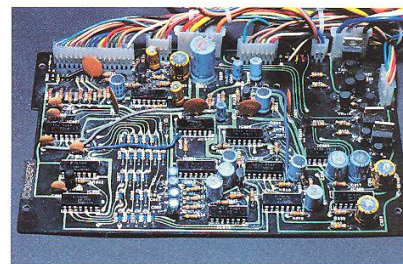


Generous machined flywheel and capstan revolve in precision bearings. Solenoids are industrial-grade.

Electronic Logic prevents the ELC from acting on conflicting accidental or careless commands; it establishes priorities for fast, accurate tape handling. Each control button incorporates a light-emitting diode (LED) to give you visual indication of the transport function engaged.



Light touch controls with LED illumination.



Electronic logic control board. IC's replace function of thousands of transistors.

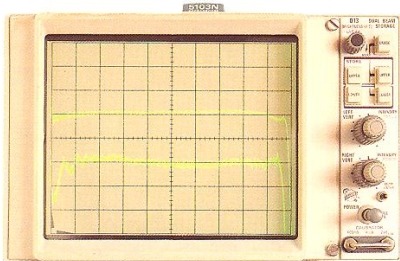
The Circuitry

The hallmark of every Concept product is a standard of accuracy unmarred by significant audible or measurable distortion. The ELC recording and playback preamplifiers are built to provide startling dynamic range without compromising this design goal. Hand-picked transistors assure a superb signal-to-noise ratio; close-tolerance capacitors and resistors result in perfectly complementary record/play equalization, critical for accurate reproduction.

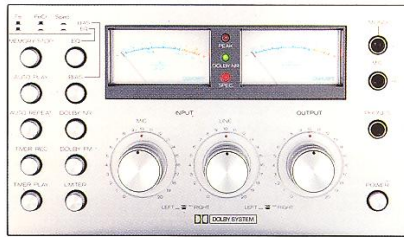
The advanced Dolby Noise Reduction circuits of the ELC are contained in special integrated circuits (IC's) for even greater hiss reduction without impairment of frequency response. The Dolby circuits can also be switched to decode Dolby-encoded FM broadcasts; the correct 25 μ sec de-emphasis standard is automatically selected with this button.

Separate bias and equalization switches match the Concept ELC to most premium-quality cassette tapes, including the latest generation of ferric tape formulations designed to challenge chromium dioxide. When either a CrO₂ tape or one of these new super-high-output tapes is loaded, the ELC automatically switches to the correct bias and equalization.

The Concept ELC overcomes the dynamic range limitations of the cassette medium in several ways. The metering system makes it easy to see how to set the recording levels. A separate, calibrated level meter for each channel gives readings of average recording level, while a peak LED monitors instantaneous peaks that the meters might miss. Using these aids, you can make tapes on the ELC that will capture musical peaks with absolute clarity while avoiding distortion and background hiss.



Concept ELC record/play frequency response. Each vertical division is a full 2 dB. Top trace is input signal from 20—20,000 Hz as processed by record circuitry, rolloff at 20 kHz from MPX filters. Bottom trace is actual playback of same signal recorded on ELC. Response nearly ruler flat from 60—16 kHz!



Complete metering system includes Peak LED and switchable limiter.

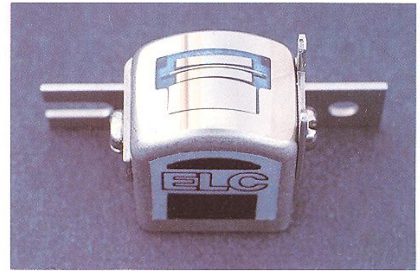
A limiter is provided for those times you don't wish to pay such close attention to the recording levels. It restricts musical peaks to +3 dB—just below the point at which the peak light will flash to indicate possible distortion from tape saturation. The limiter circuit has been designed to "attack" instantly and "decay" slowly so that its action has a negligible effect on the apparent dynamic range of your recording.

The sophistication of the Concept ELC circuit design has been matched by the great care taken in its construction details. Among the no-compromise features are a heavily regulated power supply, abundant hum shielding, premium hand-selected multiplex filters and modular, plug-in circuit boards.

The Tape Heads

The tape heads of the Concept ELC are the critical interface between its sophisticated circuitry and the tape itself. Great care has been taken in the manufacture of a special alloy record-play head. It is of a new design in which small alloy particles have been compressed, or *sintered*, for optimum magnetic properties. This Concept head provides not only long life, but a startling linearity and freedom from saturation that could obscure musical detail. The erase head is of ferrite construction because long life, not uniform frequency response, is essential.

The gap width of the ELC record-play head is carefully calculated for optimal application or recovery of a signal from the cassette tape. Results of a thorough study obviated the need for separate record and playback heads to optimize frequency response. These are only beneficial on higher-speed open-reel decks.



New sintered alloy Concept R/P head.



We considered using separate record and playback heads to provide monitoring capability, but found that this might, in fact, degrade the performance of the ELC. Cassettes themselves are not designed to accommodate three heads. "Forcing" the design requires constant user adjustment to maintain proper azimuth, or performance will audibly suffer. "Combination" heads cannot position the record and play gaps properly under the cassette's pressure pad, making the tape more prone to skewing and "drop-outs." The Concept ELC has thus been designed to avoid needless complexity or any compromise in performance.

Special Features

Utilizing electronic transport controls permitted us to add a number of features that help make the Concept ELC the ultimate in convenience as well as sound reproduction. With these features, you can realize the full potential of the Concept ELC.

Memory Stop makes it easy to return to a preselected spot on the tape. With the *Auto Play* function engaged, the deck will automatically begin play after the tape is rewound to its beginning or to a point selected with the *Memory Stop*.

Auto Repeat takes this convenience one step farther: The tape will rewind automatically when it reaches the end, then begin play either at the beginning of the tape or at the point chosen with *Memory Stop*. This will continue as long as the *Auto Repeat* feature is engaged.

The Concept ELC can also be used in conjunction with a clock timer to automatically begin recording or playback at a preset time. This is particularly useful for recording something while you're out of the house.

The microphone inputs accept any high-quality, low impedance microphones using standard 1/4-inch phone plug connectors. Mic-line mixing facilitates recording of special effects.

The Concept ELC also has special markers at each level control to make returning to a pre-set level easy.

The Concept ELC is the uncompromised product of new technology and attentive craftsmanship. The proof of a great cassette deck is in the listening. Listen carefully to Concept, and discover the ultimate in sound reproduction.

Specifications

Electronic

Frequency Response:
30-16 kHz \pm 3dB (CrO₂, FeCr, Special tape)
30-14.5 kHz \pm 3dB (Fe, Normal tape)
50-12 kHz \pm 1dB at typical level
Signal-to-Noise Ratio:
52dB
62dB with Dolby
Total Harmonic Distortion:
Less than 1% at +3dB, typically less than 0.3%
Bias and Erase Frequency:
85kHz
EQ Time Constants:
Normal or Fe tape, 3180 μ sec + 120 μ sec;
Special, FeCr, CrO₂, 3180 μ sec + 70 μ sec
Input Sensitivity:
Line, 60 mV
Mic, 0.27 mV
Input Impedance:
Line, 47 K Ω
Mic, 600 Ω
Output Level:
Line, 1.0 V at +3dB
Headphone, 100 mV
Output Impedance:
Line, 47 Ω
Headphone, 8 Ω

Mechanical

Wow and Flutter:
0.04% WRMS
Speed Accuracy:
Within 0.2%
Fast Forward, Rewind Time:
75 seconds C60
80 seconds C90
Drive System:
Two Motor; DC Electronic Servo for capstan, DC Hi-Torque for hubs
Control System:
Electronic computer logic with solenoid assist
Tape Heads:
Erase, Ferrite
Record/Play, Special Alloy Linear Phase

Other

Recording Indicators:
Two level meters, dB calibrated; LED calibrated to +4 dB
Recording Limiter:
Calibrated to +3dB
Solid State Devices:
69 Transistors
14 IC'S
72 Diodes
8 LED'S
Dimensions:
Width, 19 1/8" (486 mm)
Height, 5 1/2" (149 mm)
Depth, 11 3/8" (289 mm)

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