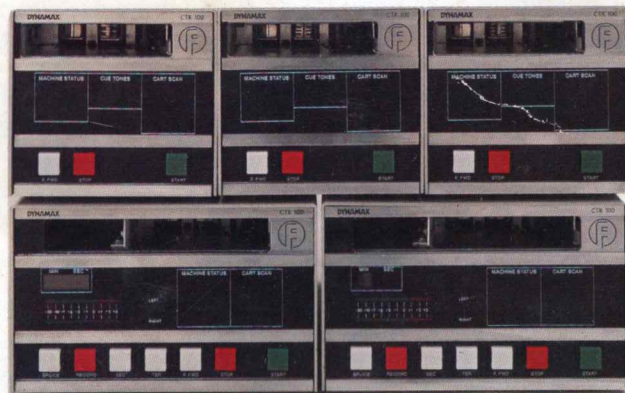




Fidelipac Corporation □ P.O. Box 808 □ Moorestown, NJ 08057 □ U.S.A. □ 609-235-3900 □ TELEX: 710-897-0254 □ Toll Free 800—HOT TAPE



Distributed By

DYNAMAX[®]



Broadcast Products by Fidelipac

For thirty years, we've been waiting for a machine like this.

In 1954, Fidelipac cartridges were recorded and played on very basic equipment: four-pole motors with belt driven flywheels, pinch rollers engaged by hand and actuated by electro-magnet, single cue tones, and response within 6 dB from 100 to 8,000 cycles.

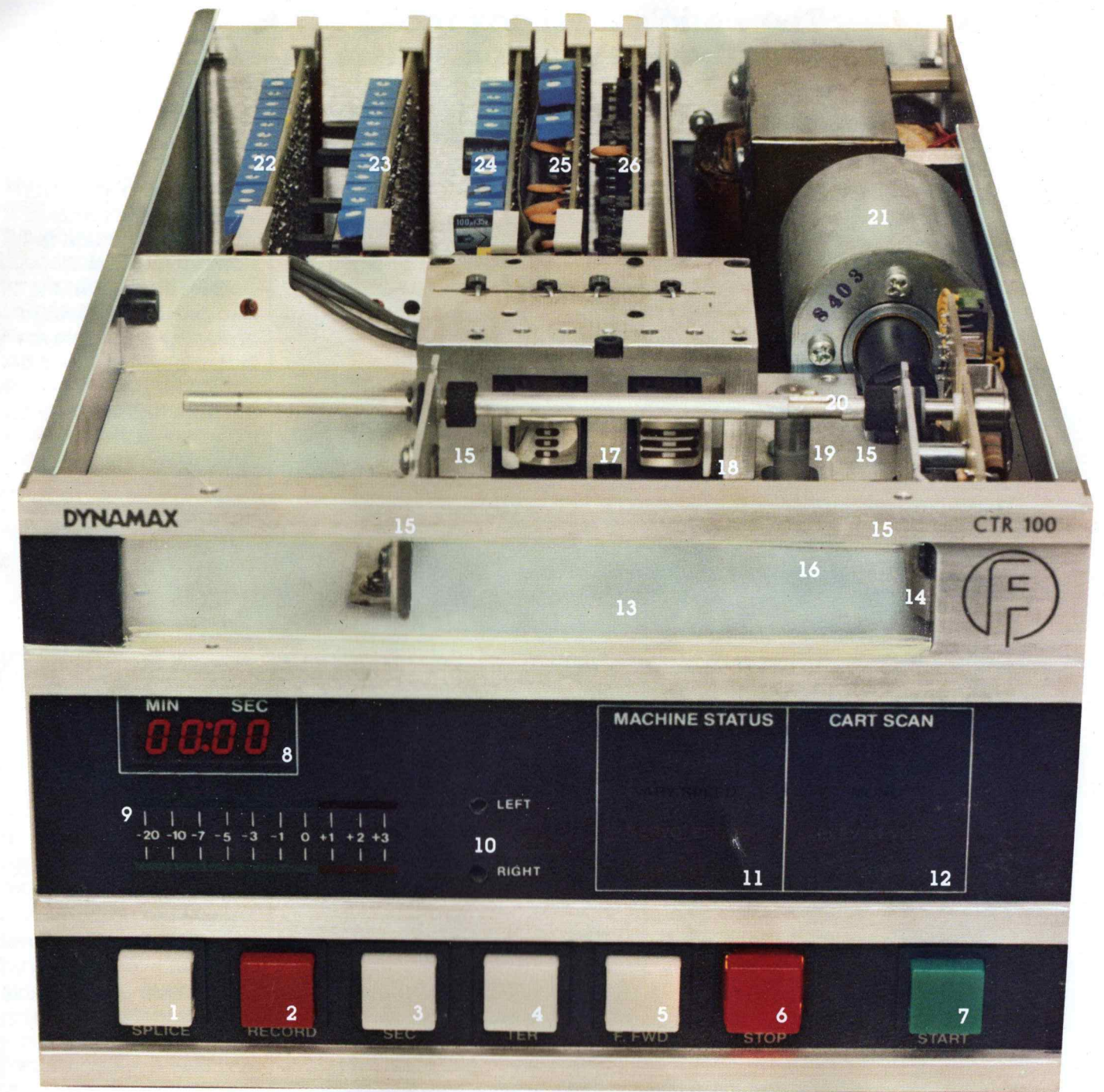
Since then, we've watched the cartridge machine evolve to become the primary source of audio programming in the world today. Modern cartridge machines offer DC servo motors for lower flutter, air-damped solenoids with better tape pulling capacity, three cue tones for increased versatility, and improved response within 4 dB from 50 to 16,000 Hertz.

But today's cartridge machines have a lot in common with their predecessors. They still record and play at only one bias, equalization and level setting, prohibiting the intermix of different types of tape. Cue tone detectors function at only fixed tape speeds, preventing playback of cartridges at non standard speeds, or synchronization with other audio or video equipment.

Digital clocks, if available, measure the passage of time, rather than the passage of tape, resulting in erroneous readings when in FAST FORWARD. And, in keeping with tradition, even the latest design cartridge machines are difficult or impossible to keep clean.

Introducing the DYNAMAX CTR100 Series from Fidelipac. The inventor of the tape cartridge has re-invented the cartridge machine.

We just couldn't wait any longer.



1. SPLICE FINDER
2. RECORD SET
3. SECONDARY
4. TERTIARY
5. FAST FORWARD
6. STOP
7. START

8. Real Time Tape Counter
9. LED VU Meters
10. Recessed Input Level Controls
11. Machine Status Display
12. CARTSCAN™ Status Display
13. Half-inch Tool Plate Deck

14. Cleaning Switch
15. Cartridge Steering & Hold Down Rollers
16. Self-Aligning Pressure Roller
17. Positive Reference Head Bridge
18. Flat Response Long Life Heads
19. Variable Speed DC Servo Motor

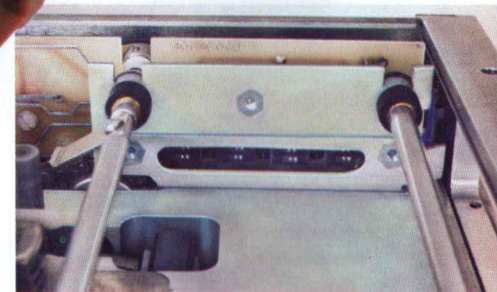
20. Cartridge Position Sensor
21. Constant Current Solenoid
22. Record Amplifier
23. Tone Generator
24. Play Amplifier
25. Tone Sensor
26. Logic

CARTSCAN™

The world's most advanced cartridge preparation system.™



The DYNAMAX CARTSCAN System allows cartridges recorded at elevated level, mono and matrix stereo to be intermixed with carts recorded in standard level and discrete stereo formats. It also provides a method of coding cartridges so that insertion of specific cartridges into the machine will activate an external function, such as noise reduction, tally lights, EBS equipment, etc.



When the CARTSCAN Status Display is not illuminated, stereo machines record and reproduce the standard NAB stereo format at normal record and reproduce levels.

CARTSCAN labels are preprinted on adhesive-backed thin-film Mylar®. An appropriate label is selected and affixed to the right edge of each cartridge prior to recording. Optically coded reflective areas of the label are read by infrared sensors in the DYNAMAX CTR100 Record and Playback machines. CARTSCAN labels automatically switch the CTR100 to the preselected format. Unlabeled cartridges are recorded and played normally.

Label sheets are available for all functions, as well as combinations of functions. CARTSCAN labels are semi-permanent; they will not come off in normal use but can be removed if the cartridge is to be re-recorded in a different format.

Mylar is a registered trademark of E.I. DuPont de Nemours and Co.

ELEVATED LEVELS

CTR100 Series recorders contain two separate sets of bias, equalization and level controls. Playback electronics contain corresponding normal and elevated level output attenuators.

Typically, the normal set of controls would be set for standard level, bias and equalization recording on standard tape. In this manner, unlabeled cartridges would be recorded at 160 nanoWeber per meter fluxivity (1975 NAB Standard Reference Level) when the front panel VU meters read 100 per cent.

Cartridges tagged with an ELEVATED LEVEL label cause the machine to switch to elevated level format. The elevated set of controls are optimized for the newer High-Output Low-Noise tapes. To utilize the full benefit of these improved tape formulas, recordings may be made at up to 8 dB higher levels while VU meters read normally.

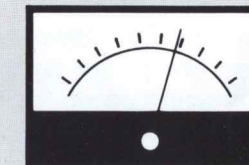
On playback, elevated level carts are attenuated by an amount equal to the record level boost, providing uniform output level when intermixing normal and elevated level tapes.

Benefits of using ELEVATED LEVEL Recording in conjunction with HOLN tapes

- Wider dynamic range
- Lower distortion component
- Multigeneration production capability now possible by mastering on cartridge

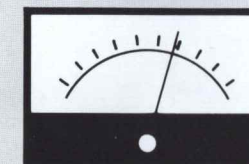
CARTSCAN Functions

NORMAL RECORDING & PLAYBACK

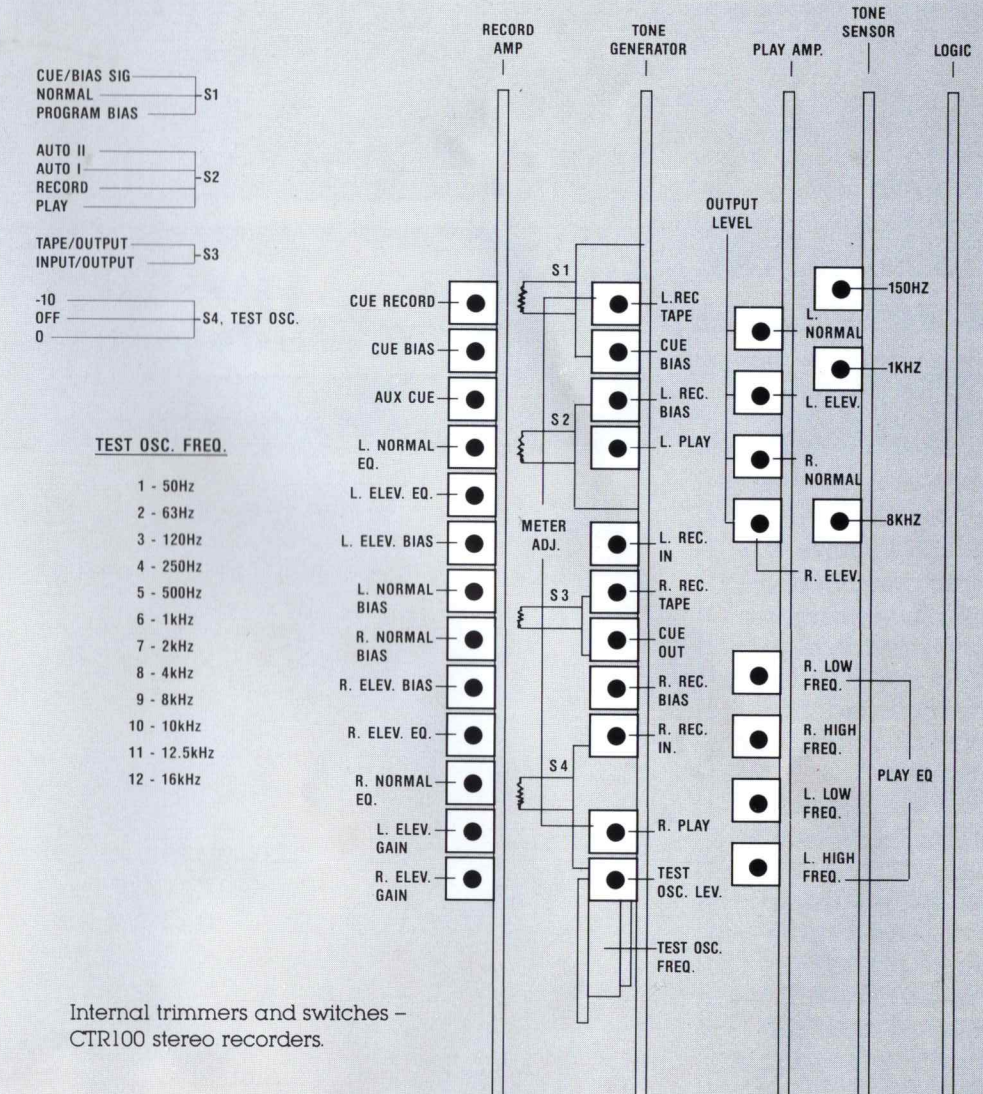


===== 160 nWb/m

ELEVATED LEVELS



===== 400 nWb/m

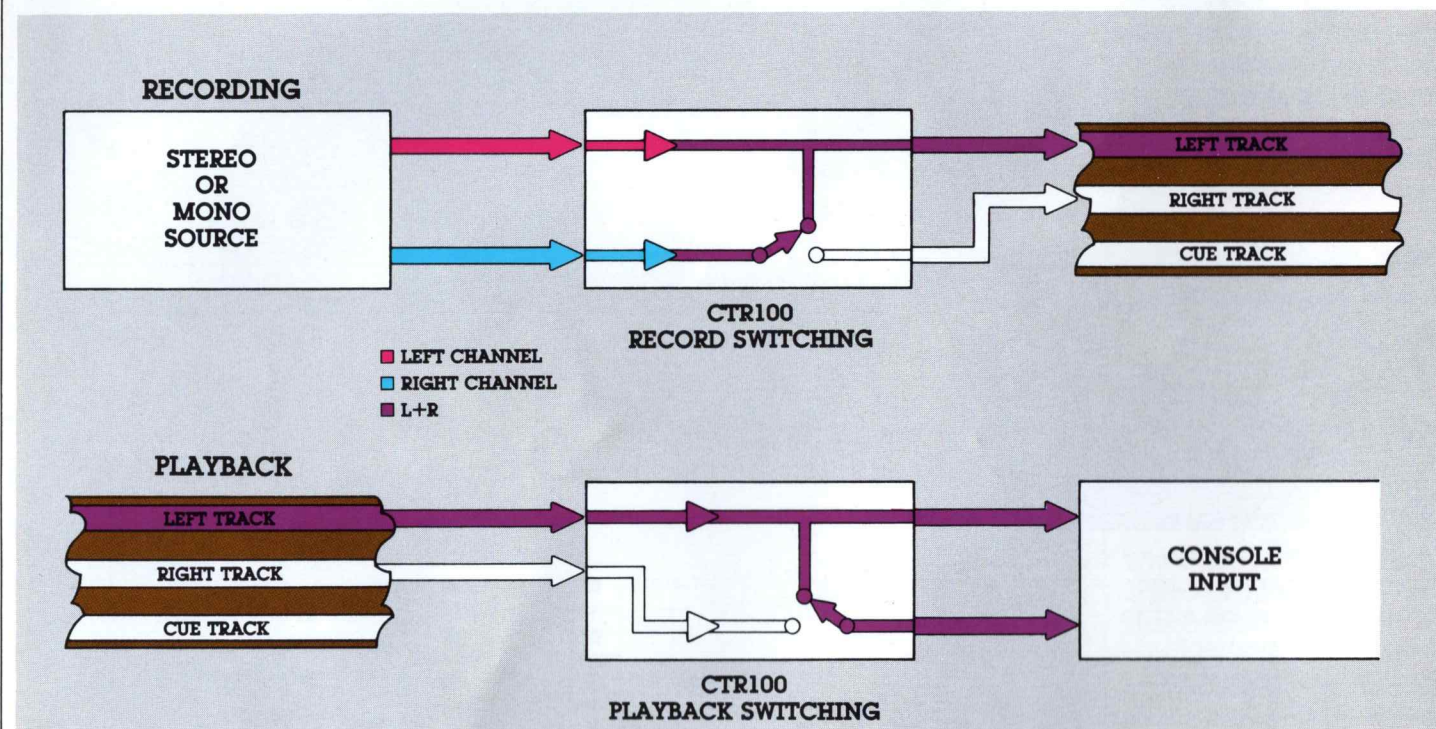


CARTSCAN Functions

MONO

Tagging a cartridge with a MONO label tells a stereo recorder to mix left and right inputs and record them on the left tape track.

On playback, the left track is fed to both left and right playback outputs providing a perfect mono signal, totally free of phase errors.



Typical MONO CARTSCAN Benefits

- Permits continued use of a mono library during conversion to stereo
- Permits stereo material to be recorded for playback on mono equipment
- Allows mono source material to be intermixed with stereo programming on same machine with no possible phase cancellation
- Eliminates need for second mono recorder in production room

CARTSCAN Functions

MATRIX

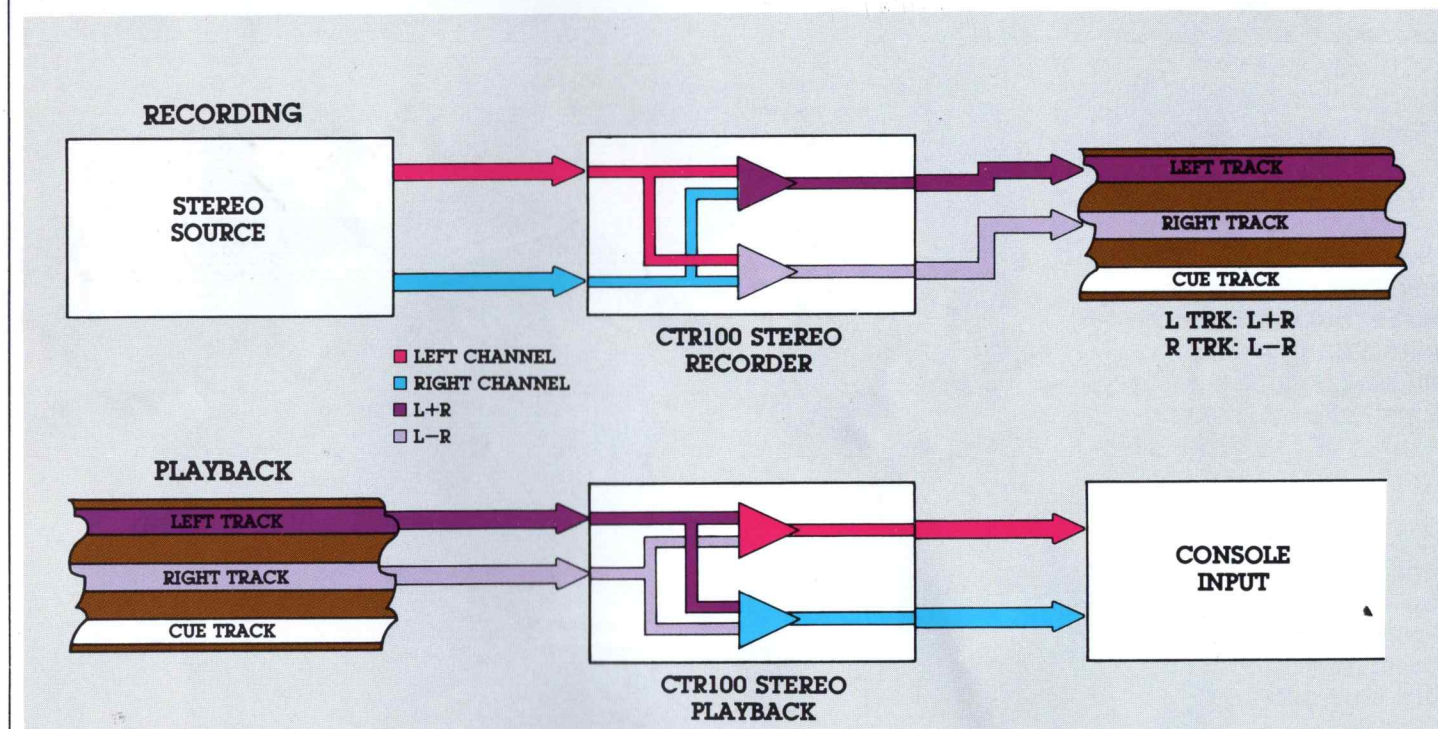
The matrix system is currently being used for stereo recordings in television in which perfect mono recombination is a primary requirement. Stereo CTR100 recorders and players are equipped with on-board matrix

encode and decode circuitry activated by the MATRIX CARTSCAN label. In matrix recording, the mono sum of left and right stereo channels (L+R) is recorded on the left tape track, and the difference (L-R) is recorded on the right

track. On playback, the sum and difference channels are used to reconstruct a discrete stereo signal. Cartridge induced phase errors, when present, are eliminated.

AUXILIARY

Cartridges tagged with an AUX CARTSCAN label trigger a collector-to-ground output at the remote plug, allowing a wide range of external functions to occur when an AUX-labeled cartridge is inserted.



Typical MATRIX CARTSCAN Benefits

- Eliminates cartridge-induced phase errors.
- Matrix format cartridges can be played on conventional mono playback equipment
- Matrix format cartridges can not be reproduced on conventional stereo machines unless an external decoder is used, preventing unauthorized cartridge use

Typical AUX CARTSCAN Uses

- Activate Dolby® or dbx noise reduction equipment
- Activate EBS equipment
- Activate tally lights
- Automatic enable of VARY SPEED mode

Vary Speed

Variable speed playback from cartridges. A practical working system.

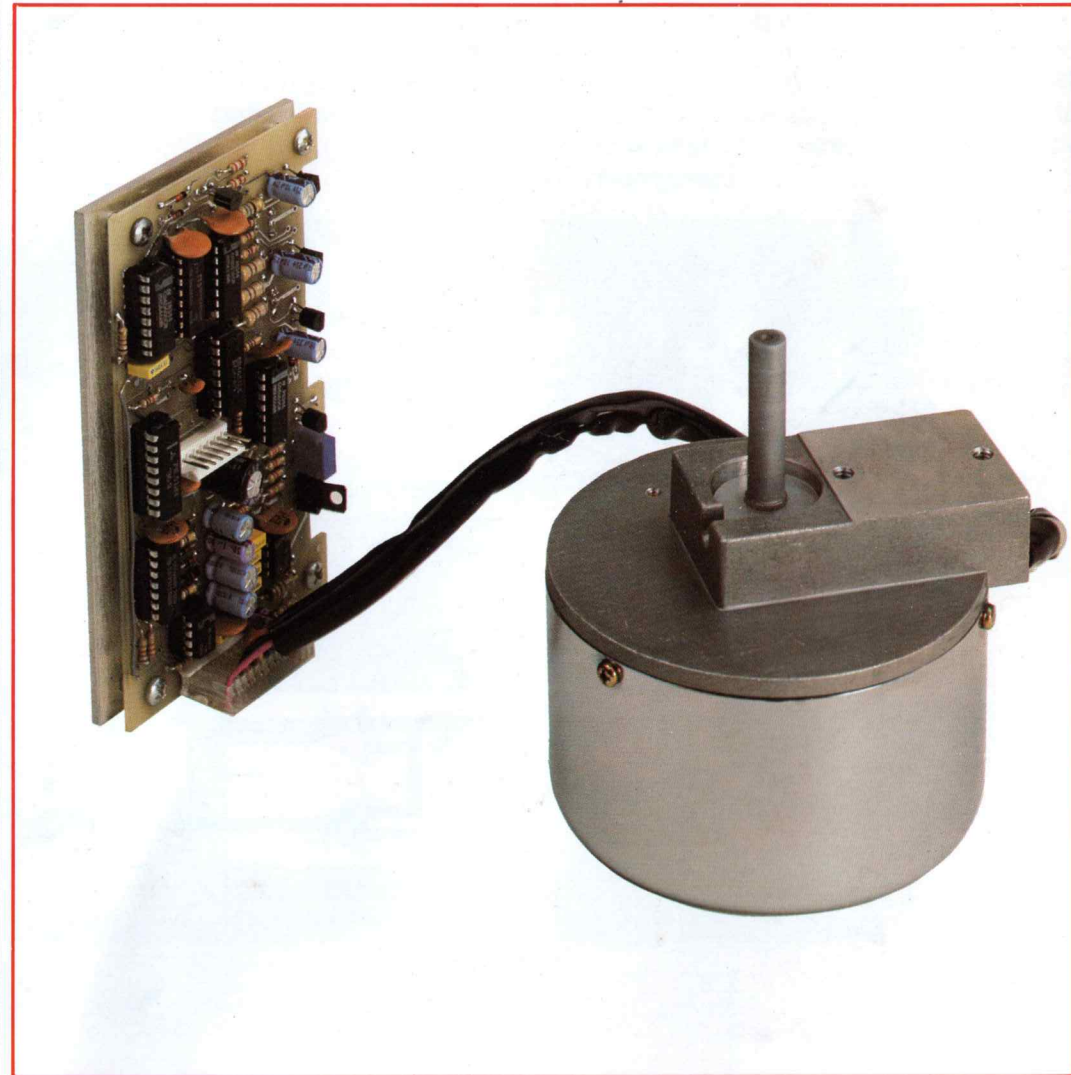
The DYNAMAX CTR100 is equipped with a variable speed DC Servo Motor. Although capable of running at fixed speeds of 3.75, 7.5 and 15 i.p.s., the motor can be externally controlled to operate precisely at speeds within 30 per cent of the preselected speed.

The CTR100 Vary Speed system is unique. The cue tone detectors and the tape timer are synchronized to the motor tachometer, thus providing reliable cue tone sensing, as well as accurate time-keeping, at any tape speed.

Vary Speed allows music cartridges to be played uptempo, and spots to be shortened or lengthened. Special effects can be pitch controlled.

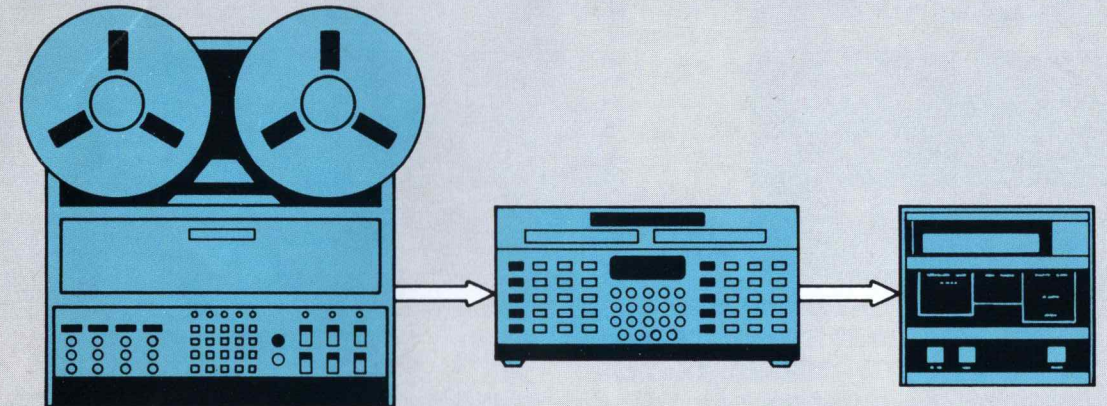
The Vary Speed system uses 9,600 Hz as a reference frequency. This frequency is fast becoming the international standard for audio and video synchronization. Vary Speed enables the cartridge machine to be interlocked with other machines using a SMPTE controller or a 9,600 Hz-based synchronizer.

FAST FORWARD is standard on the CTR100. When the motor is strapped for 3.75 and 7.5 i.p.s., FAST FORWARD is three times normal speed. When the motor is strapped for 15 i.p.s., FAST FORWARD is automatically limited to 30 i.p.s.



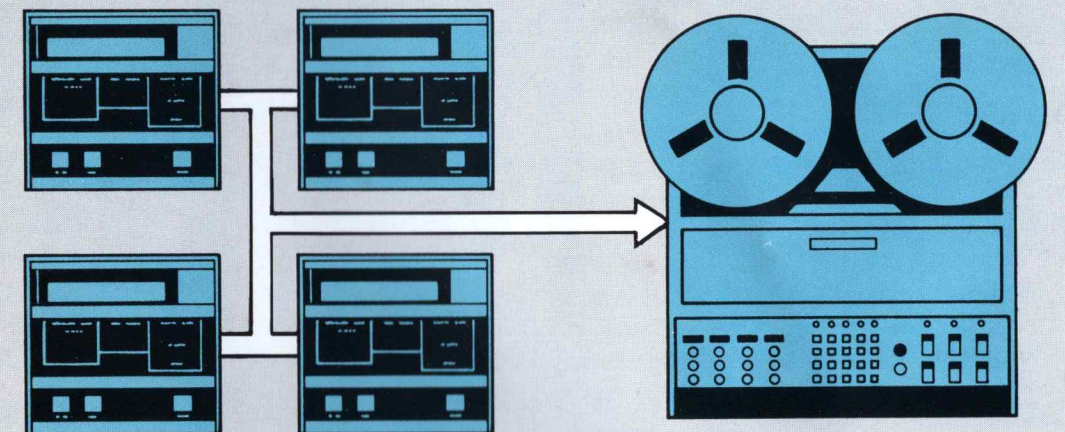
VIDEO APPLICATIONS

Slaved to a VTR using SMPTE Time Code

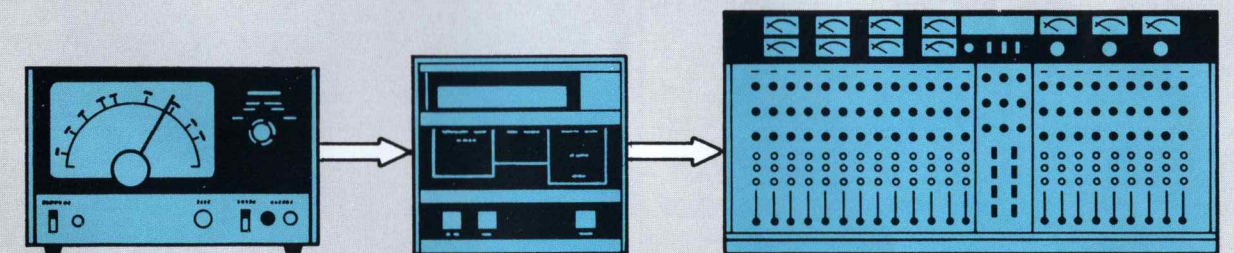


VIDEO APPLICATIONS

Post Production Sweetening



AUDIO PRODUCTION APPLICATIONS



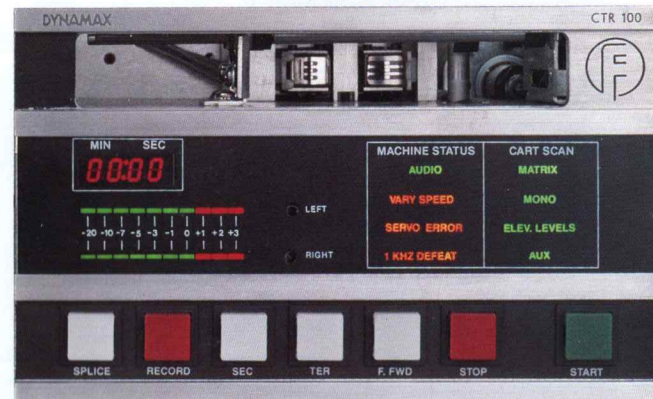
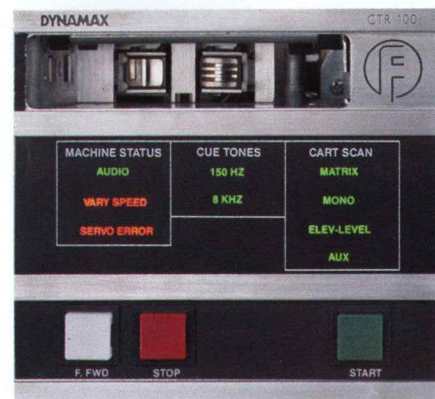
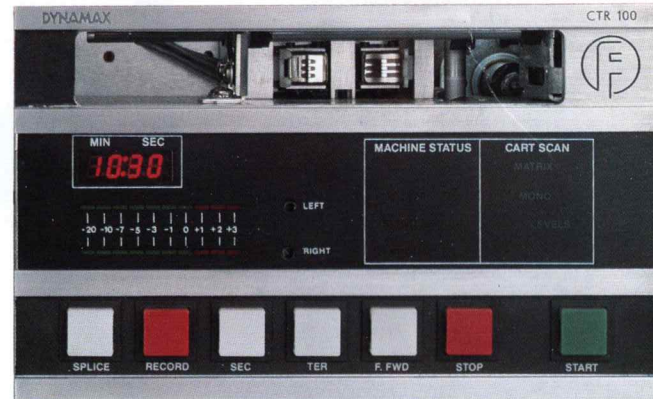
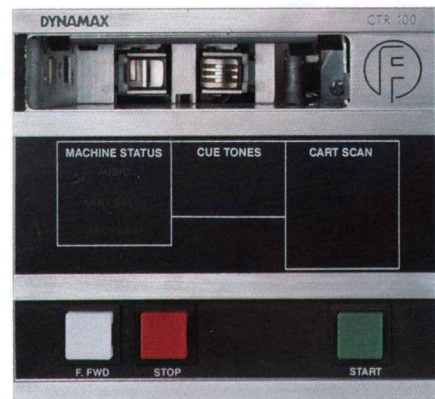
Audio Oscillator

9,600 Hz center frequency yields on-speed operation. Varying oscillator frequency within 30 percent varies motor speed.

Blackout Status Panels

Only what you need to know

Under normal conditions, the CTR100 front panel is blacked out, avoiding needless distraction to the operator. In the recorder, only the timer is illuminated displaying the time of the last cartridge played.



All Status Lamps illuminated for identification

MACHINE STATUS

AUDIO

Identifies machine with audio gate open. Audio gates of all machines may be interconnected so that the last machine started mutes audio from all other machines. This feature is especially useful when more than one machine is paralleled into the same console input. Audio mutes when in FAST FORWARD, except when FAST FORWARD button is held in. Audio gate can be turned off on leading or trailing edge of 150 Hz Secondary tone.

VARY SPEED

Indicates that motor is under external speed control. VARY SPEED is locked out in RECORD mode, eliminating the possibility of recording a cartridge at the wrong speed.

SERVO ERROR

Illuminates during transition from normal speed to FAST FORWARD, or vice versa, or whenever motor is out of servo lock.

1 KHZ DEFEAT

Indicates that automatic recording of primary cue tone has been disabled. 1 KHZ DEFEAT is achieved by pressing the RECORD button twice prior to recording. It is cancelled by pressing the STOP button or removing the cartridge. Normally, the timer resets when a cartridge is restarted; however, the timer does not reset when in 1 KHZ DEFEAT, permitting the total time of the produced cartridge to be measured.

CUE TONES

150 HZ and 8 KHZ

Illuminate during cue tones. On Record/Play machines, buttons illuminate. Tones can be recorded at any time during either RECORD or PLAY, and may be recorded singly or in combination. Normally open relay contacts are standard for each tone.

1 KHZ

The primary cue tone can be manually recorded while in RECORD or PLAY by pressing the RECORD button. Tone duration is automatically set in accordance with NAB Standards.

Additional Operating Features

The DYNAMAX CTR100 is the only fully equipped cartridge machine available in the world today. Additional operating, diagnostic and convenience features are described, several of which are unique.

SPLICE FINDER – a thickness-sensitive splice finder is standard in all Record/Play machines. The splice finder operates at the programmed FAST FORWARD speed. SPLICE FIND mode can be entered from any other machine mode. Because the timer measures elapsed tape time at any speed, SPLICE FIND mode is useful for determining the total tape time of unknown cartridges.

TWO SPEED PLAYED INDICATOR WITH PLAY RESTART DISABLE – STOP lamp flashes at slow rate to indicate cartridge has re-cued. Flashes fast when cart has been manually stopped. START function may be disabled during fast, slow, or both flashing states.

ON-BOARD TEST TONE GENERATOR – recorders are equipped with a 12-tone generator which produces all tones found on the NAB Standard Spot Frequency Test Tape. Tones are switchable for either zero or -10 VU.

FAST FORWARD – can be entered manually from any other mode, or automatically by either leading or trailing edge of 150 Hz tone. Audio is normally muted during FAST FORWARD operation but can be manually unmuted by holding the FAST FORWARD button.

CLEANING SWITCH – allows activation of pressure roller without inserting a cartridge. Makes cleaning the pressure roller easy, especially when machines are rack

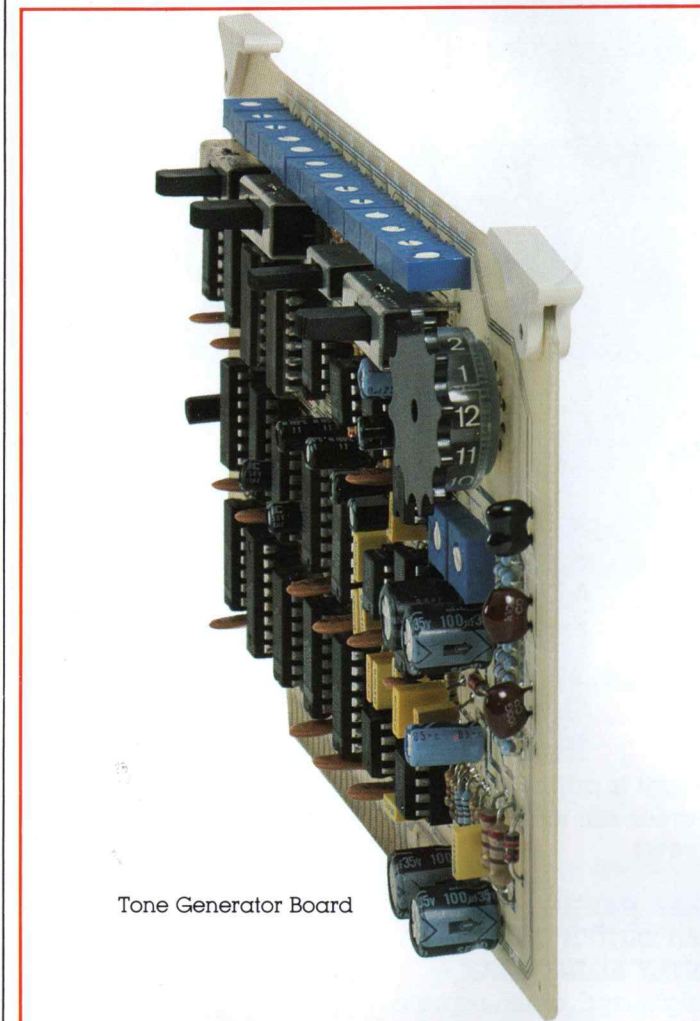
mounted and top access is unavailable. Operation without cartridge inserted also facilitates set up, diagnostics and measurement.

CLOCK FUNCTIONS

- Clock is synchronized to motor tachometer and always indicates tape position
- Clock can be strapped to freeze at beginning or end of Secondary cue tone
- Clock retains last elapsed time until new cartridge is inserted or same cartridge is restarted

METERING FUNCTIONS

- Can be frozen to continuously read audio output
- Can be frozen to continuously read audio input
- Auto I – automatically switches to audio input when the machine is in the RECORD mode, meters audio output at all other times.
- Auto II – monitors audio input when the machine is in the RECORD and STOP mode, meters audio output at all other times. This mode allows the recording level to be present and then automatically switches to give an off-the-tape indication during the recording process
- The VU meters may also be used to monitor program record bias, cue record bias and cue audio in addition to program record and output audio

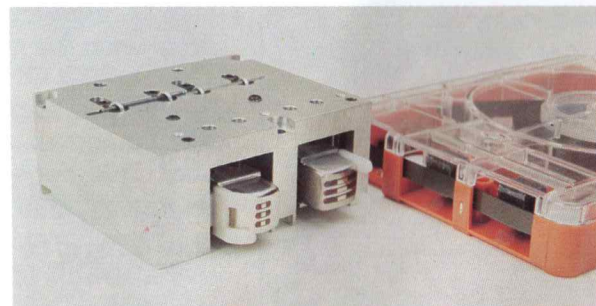
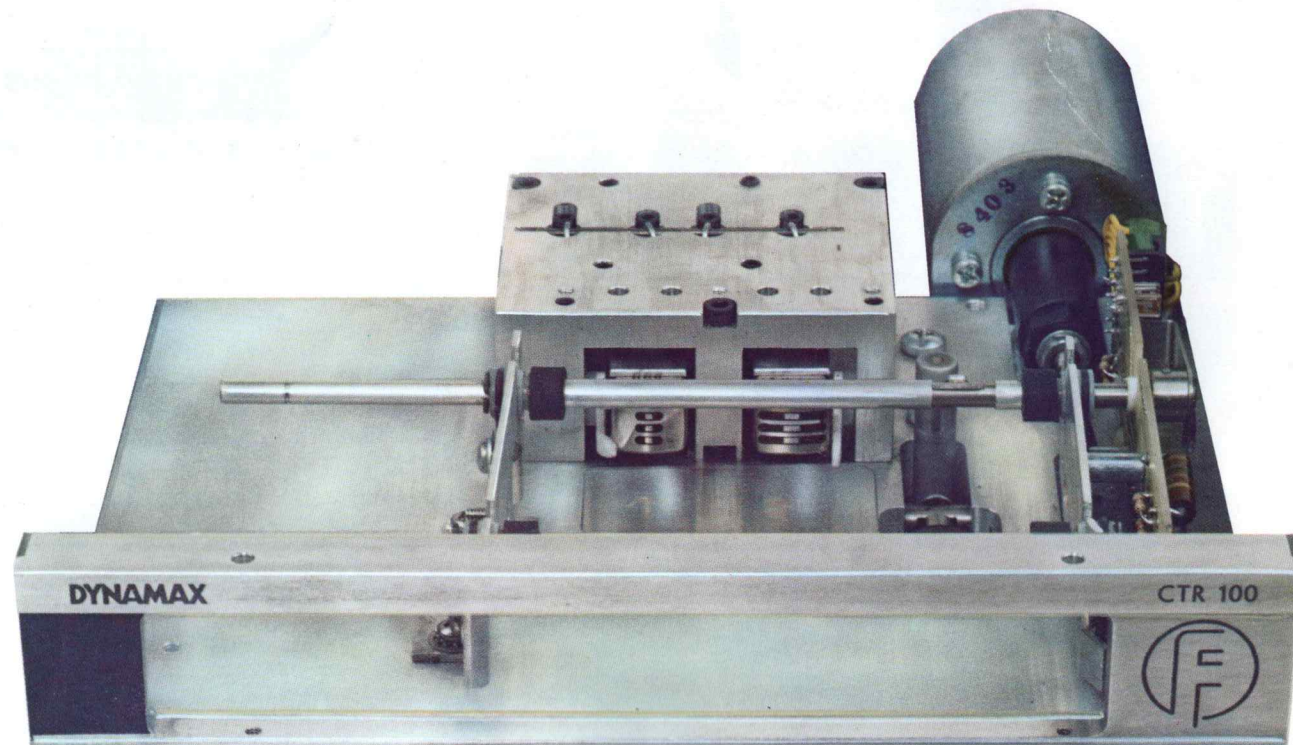


Tone Generator Board



Cartridge Deck Architecture

An intelligent cartridge interface.



REMOVABLE HEAD BRIDGE WITH POSITIVE REFERENCE SURFACES – unmarred by screw heads or other projections which can damage cartridge surfaces and destroy repeatable positioning.

MICRO ADJUSTABLE TAPE GUIDES – mounted in vertical guide channels.

Height is adjustable with vernier self-locking screws.

HEAD HEIGHT, AZIMUTH and ZENITH INDEPENDENTLY ADJUSTABLE – height and zenith remain locked while azimuth adjustment is made.

CANTED HOLD-DOWN ROLLERS – rubber rollers hold carts firmly at edges while urging cartridge to right edge guide during cartridge insertion.

SELF ALIGNING PRESSURE ROLLER – integrated ball-bearing race assures perpendicularity of roller and capstan.

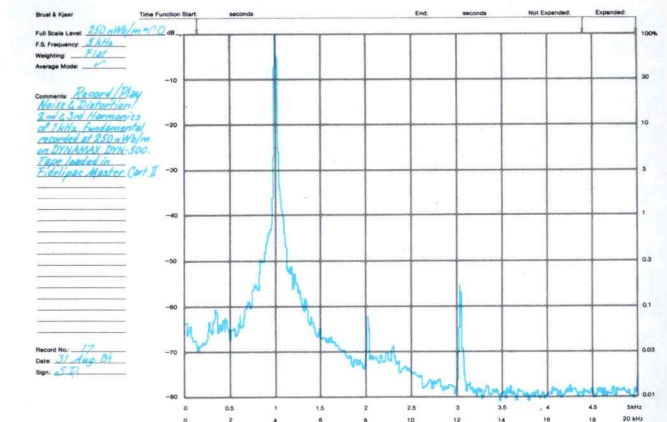
CONSTANT CURRENT LOW VOLTAGE SOLENOID – insensitive to power line voltage changes or solenoid temperature variations. Solenoid receives high current pulse to start, then current is reduced to hold solenoid in.

TROUBLE FREE STAINLESS CAPSTAN – easily cleaned. Will not accumulate tape oxide or soak up cleaning fluid as in ceramic capstans. Provides positive electrostatic grounding to help inhibit formation of static charges in certain tapes.

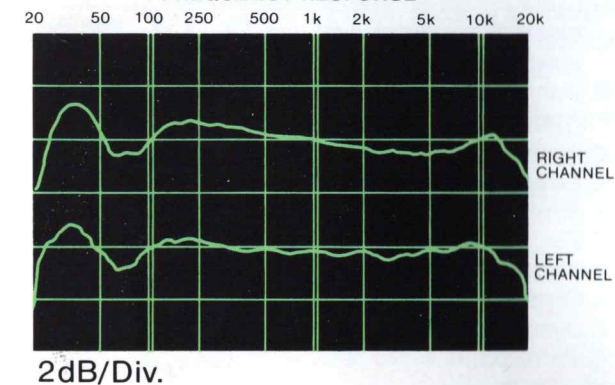
Audio Performance

Specifications don't always tell the whole story of a product's audio performance. Often, what happens within plus or minus 2 dB limits can have an audible effect on the overall sound.

The CTR100 utilizes premium heads and state-of-the-art devices throughout. Herewith, we present the following performance graphs.

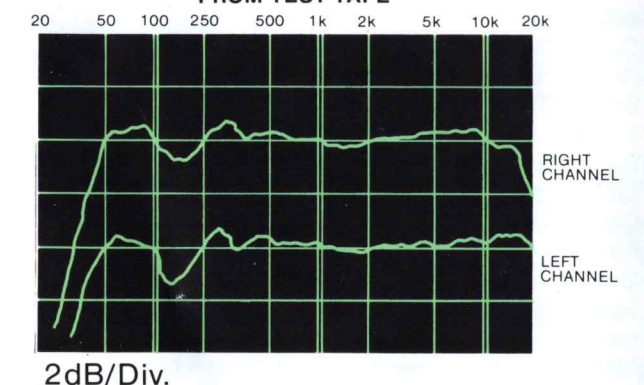


RECORD/PLAYBACK
FREQUENCY RESPONSE

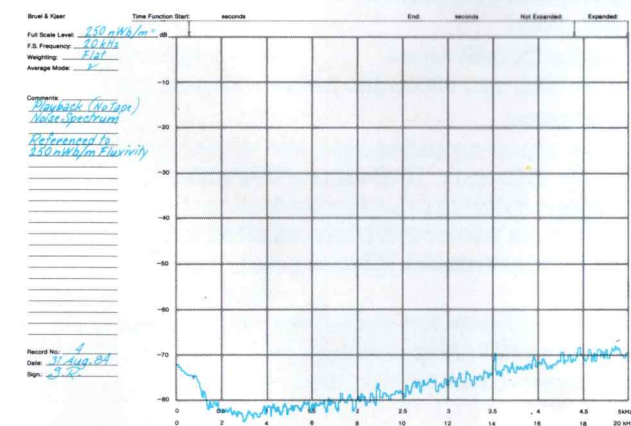


2dB/Div.

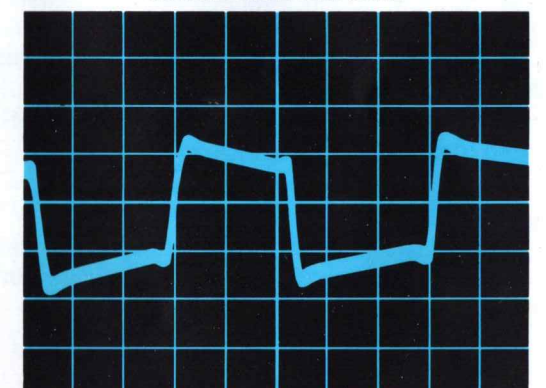
PLAYBACK FREQUENCY RESPONSE
FROM TEST TAPE



2dB/Div.



RECORD/PLAY
SQUARE WAVE RESPONSE



1 kHz Square Wave
200 microseconds per horizontal division, 0.2 volts per vertical division

CTR100 Features
All features listed below are standard

Operational

- CARTSCAN™ System – automatic activation of ELEVATED LEVEL, AUX, MONO* and MATRIX* modes
- Vary Speed – motor speed continuously variable from 1.875 to 30 i.p.s. from external reference
- Cue tone tracking within ±30 per cent of preselected speed
- SMPTE interface for synchronization using 9,600 Hz international reference
- Real time digital tape timer accurate at any tape speed
- Splice finder
- Blackout status display
- Front panel diagnostics
- All front panel switches illuminated
- Fast forward
- Secondary and tertiary cue tones
- Front panel 1 kHz add and defeat
- Selectable multi-speed high speed recue
- Two speed played flashing indicator with multi-machine flash synchronization
- Played restart disable
- Audio Switcher and Mixer
- 150 Hz control of audio gate
- Fully switchable metering with automatic changeover functions
- Bar graph LED level indicators
- Improved heads for flat low frequency response and long life
- On-board test oscillator

Mechanical

- Compact size:
Playback units – 1/3 rack width
Record/Play units – 1/2 rack width
- 1/2 inch anodized tool plate deck
- Removable head bridge with positive reference surfaces
- Micro-adjustable tape guides
- Geometrically correct azimuth adjustment, independent of height & zenith
- Canted hold-down cartridge positioning system
- Low voltage constant current air damped solenoid with multi-level electronic current control
- Self aligning ball bearing pressure roller
- Brushless variable speed 3 phase DC servo motor with electrolyzed non-magnetic stainless steel shaft and permanently lubricated ball bearings, strappable for 3.75, 7.5 and 15 i.p.s.
- Polycarbonate legend overlay panels for durability and ease of cleaning
- Extensive mumetal shielding
- Long-life premium quality switches with bifurcated wiping contacts
- Servo motor electronics removable without removing motor permitting adjustment while playing a cartridge
- Service access to all internal components without destroying outside finish
- Cleaning switch

Electrical

- State-of-the-art audio utilizing a combination of discrete and integrated devices, such as LM394, 5500 and LF series operational amplifiers
- Audio Transformerless circuitry
- Group delay compensation
- Active bias and signal mixing
- Constant current recording with record head incorporated in feedback loop

- Crystal controlled reference for all internal functions
- 144 kHz bias oscillator
- ICs socketed
- Component designations on all circuit boards
- All power supplies regulated
- Full remote controls including lamps, motor tachometer, and function pulses
- Detachable line cord
- 110/220V 50-60 Hz operation

*Stereo machines only

CTR100 Specifications

1. Power

- A. 117 vac ±10% / 234 vac ±10%
- B. 50/60 Hz
- C. 85 watts maximum

2. Tape Speeds

Standard	Fast Forward	Comment
7.5 i.p.s. (19 cm/s)	22.5 i.p.s. (57 cm/s)	Set by Factory
3.75 i.p.s. (9.5 cm/s)	11.25 i.p.s. (28.5 cm/s)	Strappable
15 i.p.s. (38 cm/s)	30 i.p.s. (76 cm/s)	Strappable

- B. Vary speed 1.875 to 30 i.p.s. as controlled by external oscillator
- C. 9600 Hz external reference will produce standard selected speed
- D. Cue tone sensors track motor speed (as varied by external oscillator) within ±30% of selected standard speed
- E. Vary speed feature is locked out in record mode
- F. Front panel vary speed indicator

3. Capstan Motor Drive System

- A. Direct drive capstan
- B. Brushless 3 phase DC servo motor
- C. Electrolyzed stainless steel shaft/capstan non-magnetic
- D. Permanently lubricated ball-bearings
- E. Crystal referenced phase locked loop control
- F. Dynamic breaking from fast forward to normal speed
- G. Front panel servo error indicator

4. Wow & Flutter

- Record/Play maximum
0.12% DIN WTD at 7.5 i.p.s.

5. Speed Accuracy

- Better than ±0.2%

6. Audio Output and Source Impedance

- Differentially balanced, source impedance 440 ohms; RF bypassed

7. Audio Output Level

- +20 dBm into 600 ohms before clipping

8. Distortion

- Reproduce amplifier:
0.05% THD max. 18dB above 250 nWb/m
System distortion, tape limited:
0.5% max 2nd or 3rd harmonic, 1 kHz, at 250 nWb/m
0.8% THD max at 1 kHz

9. Noise

- A. Signal/noise measured with bias/no signal at 7.5 i.p.s.
Mono-57 dB (minimum)
Stereo-55 dB (minimum)

- B. Hum and Noise – no tape
Mono-63 dB (minimum)
Stereo-61 dB (minimum)
- C. Squelch noise –70 dB (minimum) measured over a 20 – 20 kHz bandwidth, reference 250 nWb/m at 1 kHz

10. Cross Talk

- Within 50 dB minimum separation between program channels at 1 kHz

11. Frequency Response

- ±2 dB 50Hz – 16 kHz

12. Equalization

- A. 1975 NAB EQ Standard normally supplied 7.5 i.p.s.
- B. IEC Standard on request (pot adjustment) 7.5 i.p.s.
- C. Field strappable for 1964 NAB EQ
- D. Adjustable low and high frequency playback EQ
- E. Adjustable high frequency record EQ

13. Head Configuration

- A. NAB, Mono/Stereo
- B. Maxtrax™ Stereo (optional at extra cost)

14. Cue signals

- A. NAB primary cue 1 kHz
- B. NAB secondary cue 150 Hz with front panel indicators
- C. NAB tertiary cue 8 kHz with front panel indicators
- D. Open collector sinking signal (ground switching) available upon sensing secondary or tertiary cue tones, 15 volts, 200 mA maximum, saturation less than 1v at 200 mA
- E. Open relay contacts available upon sensing secondary or tertiary cue tones (contacts close with tone present)
- F. Cue tone sensing over a ±30% speed variation in playback vary speed mode

15. Logging Signals

- A. Not internal to machine
- B. Cue audio input, cue audio output and cue track bias control available for external use
- C. Output level .5v nominal from a logging signal of 35 nWb/m tape fluxivity
- D. Logging output impedance 1k ohms
- E. Cue audio input .5v nominal
- F. Input impedance 47k ohms

16. Audio Input Level

- A. -17 dBm minimum input to record 160 nWb/m in normal mode, or up to 400 nWb/m in elevated level mode
- B. +20 dBm maximum input level, unbalanced input connection
- C. +26 dBm maximum input level, balanced input connection

17. Audio Input Configuration

- Differentially balanced bridging 10k ohms

18. Metering

- A. Audio Metering, switch selectable
 - 1. Play only – monitors output level
 - 2. Record only – monitors record input level
 - 3. Auto 1 – monitors record input level when machine is in RECORD mode, automatically switches to output level at all other times
 - 4. Auto 2 – monitors record mode when machine is in RECORD and STOP (ready) mode, automatically switches to output level at all other times

B. Test Metering

- 1. Left program bias displayed on left meter; right program bias displayed on right meter
- 2. Cue bias displayed on left meter; cue audio displayed on right meter

19. Bias Oscillator

- 144 kHz crystal generated

20. Tape Capacity

- A. NAB sizes A and AA (CTR111 and CTR112)
- B. NAB sizes A and AA, B and BB (CTR123 and CTR124)

21. Start Time

- Typically 100 milliseconds (timing dependent upon solenoid air damping adjustment)

22. Stop Time

- Tape stop time typically 100 milliseconds (dependent on type and length of cartridge)

23. Ambient Operating Temperature Range

- 10-50°C (50° to 122°F)

24. Remote Control Signals

- A. All front panel controls and indicators (except record input controls and meters)
- B. Vary speed control and reference
- C. Cue track input, output and bias control
- D. Start, Stop and Cartridge Sense pulses for external timer

25. External Connectors

- A. 9 pin "D" audio connectors (mating connectors supplied)
- B. 50 pin "D" – remote control
- C. Plug-in line cord

26. Mounting

- A. Table top standard
- B. Rack mount (optional rack mount available)

27. Ordering Information and Dimensions

Model No.	Description	Height	Dimensions	
			Width	Depth
CTR111	A Size Mono Play	14.29 cm 5.625 in.	15.24 cm 6 in.	40.64 cm 16 in.
CTR112	A Size Stereo Play	14.29 cm 5.625 in.	15.24 cm 6 in.	40.64 cm 16 in.
CTR123	B Size Mono Record/Play	14.29 cm 5.625 in.	22.23 cm 8.75 in.	40.64 cm 16 in.
CTR124	B Size Stereo Record/Play	14.29 cm 5.625 in.	22.23 cm 8.75 in.	40.64 cm 16 in.

28. Shipping Information

Model No.	Shipping Weight		Shipping Volume	
	Pounds	kg.	cu. ft.	cu. m.
CTR111	30	13.6	1.4	0.04
CTR112	30	13.6	1.4	0.04
CTR123	35	15.9	1.8	0.05
CTR124	35	15.9	1.8	0.05

This product is manufactured under U.S. Patent Number 4,583,669.