

OTARI®

THE MTR-12 SERIES



Technology you can Trust.



MTR-12
MASTERING/PRODUCTION RECORDERS

The MTR-12 Mastering & Production Recorder is designed to be the most advanced available for the audio professional. Whether you consider yourself an artist, an engineer—or both, these superlative machines will deliver the performance necessary for your most challenging audio requirements today, and tomorrow. You'll discover that the MTR-12 makes sense for the way you work with audio—that these are truly "intelligent" machines that will quickly become a dependable and powerful extension of your expertise.

You'll also find that the MTR-12's quiet and natural sound speaks well for its excellent technical specifications, and that the machine as a whole is logically laid out and easy to use—so you can concentrate on what's *really* important. So work in close with a "12". Spill tape quickly off the front and sides. Note how the controls recessed into the deck eliminate tape tangle and back-up. Work with the control buttons. They're where you need them—every time.

And deep into one of those, long, long sessions, you the artist—and you the engineer—will discover the true value of "The Technology You Can Trust".

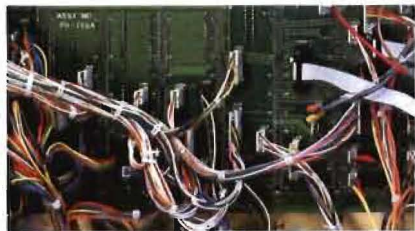


THE TRANSPORT: FAST, SMOOTH AND EFFICIENT

The MTR-12 Series incorporates the first fully microprocessor-controlled tape transports. Under all operating conditions, the computer monitors tape motion and loading, and communicates with all three DC motors for the smoothest and fastest tape handling possible. Microprocessor control assures reliability by reducing the number of electronic and mechanical parts—fewer linkages, fewer relays, and fewer critical adjustments

Software-programmed Constant Tension

The tape tension control on the MTR-12 Series is the most sophisticated on the market. A software program compares the rate of rotation of both reel motors with the output of the tape tachometer idler to achieve extremely precise constant tension. In addition, four infra-red reel size detectors sense all reel sizes, so manual switching is not required. This flexible system provides any combination of different reel sizes, and allows you to "rock" tape with one hand without tape slack or spillage.



A separate card cage assembly for the audio and transport electronics houses a motherboard and all plug-in PC boards. All harnesses have plug-in, locking connectors, and rear panels are hinged for access to rear motherboard sections of Card Frame and Power Supply. This makes routine set-up and troubleshooting fast and easy. Convenient and safe access to the under-deck components is achieved by a rear-hinged, tilting transport which is supported by two secure arm mechanisms.

Accuracy and Flexibility from a DC Servoed Capstan

A 9600 Hz crystal referenced, DC servoed capstan motor provides extremely accurate tape speeds. Three Play and Record speeds of 3.75, 7.5 and 15 IPS, or 7.5, 15 or 30 IPS are available on the top panel.

The MTR-12's Master CPU for advanced transport function control.

A built-in variable speed control adjusts tape speed over a $\pm 20\%$ range for retiming cuts, creating special effects or for speed error correction. Excellent tape slewing characteristics are obtained because the MTR's CPU automatically compensates for a high rate of change

in the 9600 Hz input by applying dynamic reel motor control.

To accurately re-create special effects, or to find the exact setting for a speed correction, an LED display indicates the deviation (in percentage, or in IPS)

of the capstan motor from Play speed.

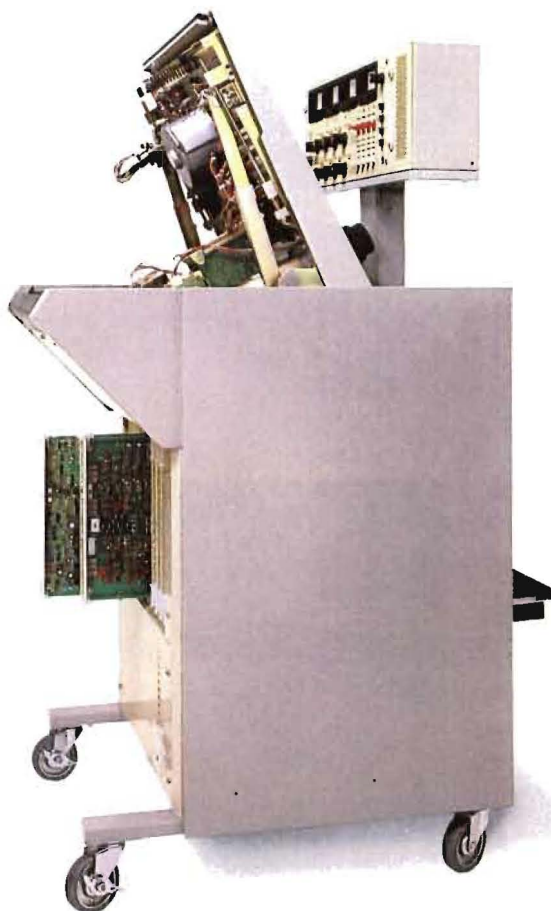
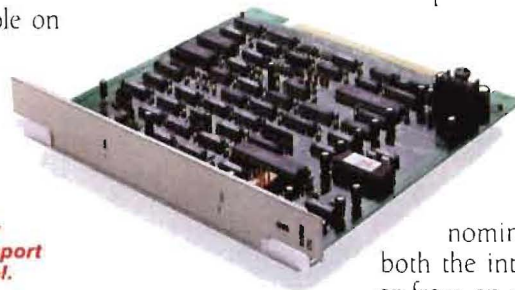
This readout will reflect the deviation in

nominal speed from

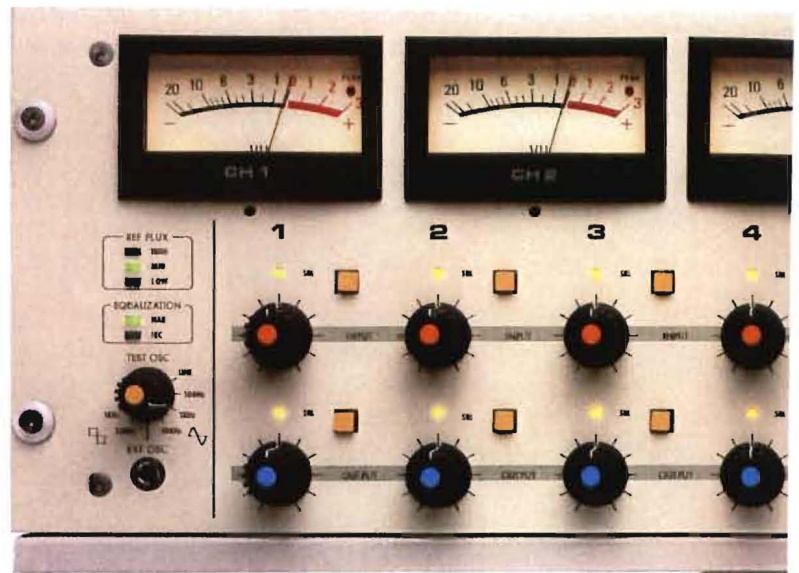
both the internal *vari-speed* or from an external source,

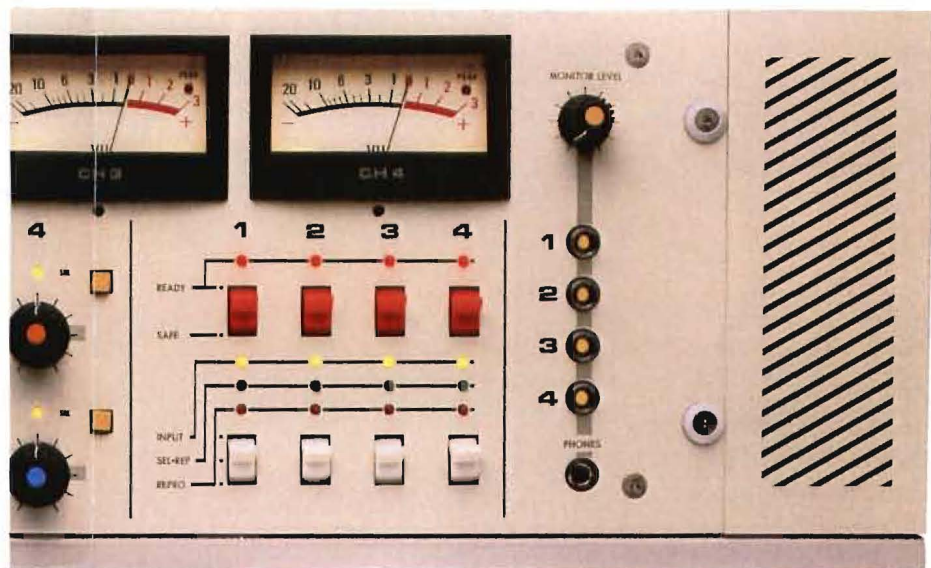
such as a SMPTE time-code based synchronizer, editor or machine controller.

The interface to an external system is easily accomplished with a single rear-panel connector, so everything you need is in one place, with no wire tangle.



- For fast and precise location of edit points, the cue button allows direct control of the reel motors for tape shuttling.
- For quick location in low light levels, all control buttons remain dimly lit when power is on, while the active mode buttons are confirmed by a slightly brighter light level.
- Deck plate release levers are located *underneath* the reel flanges to prevent accidental damage to 12½" reels during under-deck examination.
- A 120 IPS *controlled wind* mode in either direction provides a smooth tape pack with little or no tape edge feathering to prevent tape damage.





□ To eliminate tape stretch or breakage, dynamic braking is used during all mode transitions.

□ For accurate zero-tape positioning with no overshoot, a search-to-zero mode directs the transport to fast wind toward zero from either a positive or negative domain.

□ A dual solenoid-actuated pinch roller provides plenty of clearance during initial tape threading, but otherwise moves closer to the capstan for extremely fast, quiet tape starts.

□ The tape transport's logic resides in the microprocessor software, so future revisions or updates can be easily incorporated into existing transports. Your machine will never be outdated.



AUDIO ELECTRONICS: THE ULTIMATE IN ANALOG

The MTR-12 Series features transformerless, balanced inputs and outputs. Final output circuitry is a high current, differential design which incorporates extremely low source impedance and +28 dBm capability!

This configuration provides minimal level loss and low distortion when driving low impedance loads and/or long tie-lines.

Dedicated Circuit Boards for Convenience and Reliability

Only one circuit board is used for an entire channel's electronics. This improves reliability, simplifies set-up and makes troubleshooting quick and easy. Circuit boards are glass/epoxy with gold-plated, self-cleaning edge connectors for low resistance and long life.

Precise Bias Adjustments

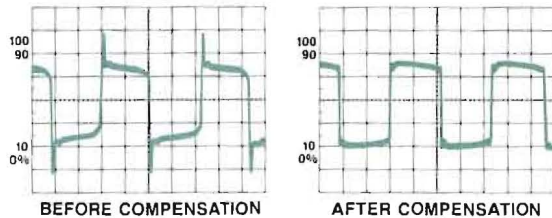
Master bias level is adjustable for all channels simultaneously. A second set of three master bias trimmers may be switch-selected so that a second tape type can be accommodated without time-consuming bias recalibration—a feature that saves time and reduces costs, especially in facilities that often change tape speeds and formulations.

Exceptional Head Wear and Signal Performance

The MTR-12 Series heads have been selected for their exceptional signal performance and extended wear characteristics. The playback head employs a "butterfly" configuration pole piece which reduces low frequency contour effects. To minimize noise and distortion, the playback head is coupled without the use of transformers to a special IC head amplifier.

Record and Playback Levels Optimized Automatically

Any of three standard reference flux levels can be automatically set for the record and playback systems in order to quickly and easily compensate for changing recording tasks.



User adjustable phase compensation for each speed results in higher recording level for complex wave-forms before saturation.

Extended Performance for Tape Duplication Applications

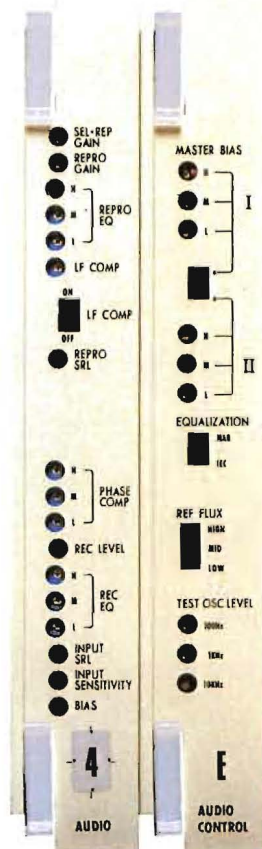
The MTR-12/4 is available in an LX version (low speed, extended performance), that is specifically adapted electronically as a "mastermaker" for duplication facilities. At 3.75, 7.5 and 15 IPS, the LX offers tape duplicators superb audio tailored to their requirements. (Dolby HXTM modules are available for retrofit to any MTR Series audio channel to extend the low speed, high frequency headroom.)

More Electronics Features for Your Convenience

A built-in test oscillator provides 100 Hz, 1 kHz, and 10 kHz sine waves for alignment, plus 1 kHz and 10 kHz square waves for phase compensation adjustments. Oscillator output levels are individually adjustable at the three sine wave frequencies. A front panel input jack is also provided so you may apply your own test/alignment signal to all inputs.

A cue amplifier with speaker and individual channel select switches plus a jack for headphone monitoring, are standard features. A dual-element metering system provides user-adjustable, peak-reading LEDs

for monitoring of transient peaks to avoid tape saturation, plus standard VU metering for adjustment of program levels. All operational audio controls are conveniently located on the audio control panel. To avoid confusion during operation, the "Record Ready" switch is separated from the monitor switches. Reproduce level and record level may be manually adjusted on the audio control panel, or standard reference level may be instantly obtained by engaging an SRL switch adjacent to the level controls. Actual reference levels are adjustable for each channel with trimmers on the front panel.



Each channel has selectable record and reproduce high frequency equalization which may be set to NAB or IEC characteristics for 3.75, 7.5 & 15 IPS (AES characteristic is automatically provided at 30 IPS).

CONTROL AND INTERFACE: TOTAL FLEXIBILITY

The transport CPU memory contains a complete multi-position, full-function autolocator program, which can be accessed through an optional external keyboard. This unique arrangement provides superior reliability because "smart" electronics are not contained in the autolocator itself. Heat, cable length, and power supply considerations are thus less important, and the unit can be compact and light-weight.

The optional CB-109 Autolocator offers the ultimate in remote control for fast editing and overdubbing. This plug-in unit provides 10 memories which allow the operator to return exactly to a desired cue point. (Five of these memories allow *search-and-store* with a single keystroke). The CB-109 also includes full transport controls, redundant tape location and *locate time* readouts, plus tape motion and pitch controls. Autolocator special features include a Shuttle button for repeating any desired segment of the tape, *auto rewind*, and *search-to-zero*.

When remote control is desired without an Autolocator, there are two units available. The CB-102 Remote Control duplicates the basic transport functions (play, stop, rewind, fast forward and record) and incorporates a Record LED. The CB-111 is a more sophisticated Remote Control on which the transport buttons are all duplicated, including *search-to-zero*, *cue* and *pitch control* functions. The CB-111 includes the dual level lighting feature of the MTR-12.

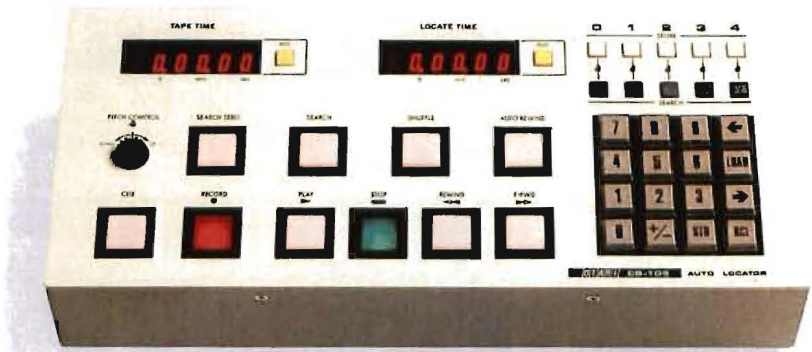
Efficient Interface to Editors, Machine Controllers, and Synchronizers

The MTR-12 Series are easily interfaced to any SMPTE/EBU time code based editing system, tape controller or tape synchronizer. All transport functions, tally-backs, and 9600 Hz signals for

video signal with sync. An internal reference of 50.000, 59.940, or 60.000 Hz, generated from a crystal-controlled oscillator, may also be selected as a reference source.

Center-Track Time Code

The MTR-12 Series incorporates a carefully designed, low cross-talk center track-time code which



The optional CB-109 Autolocator features full transport controls, tape location and tape time readouts, as well as 10 memories for quick editing and overdubbing.

the capstan speed control are available on one rear panel multi-pin connector. Tape location is easily accomplished with information either from the low-slippage, real-time tachometer, or with the optional wide-band playback amplifier for reading high-speed SMPTE/EBU Time Code.

Engineered for Video and Film Interface Applications

Otan's optional EC-402 Resolver is designed specifically for the MTR Series as a multi-purpose speed controller for video and film interface applications. Card slot plug-in provides convenient, inexpensive, application without external wiring. The tape machine control track may be a Mono (biphase) or FM pilot signal, SMPTE/EBU time code, or any signal in the 40 Hz to 80 Hz range. External reference inputs to the system may be SMPTE/EBU time code, AC house mains, any 40 Hz to 80 Hz TTL level signal, or any

is compatible with all center track systems. So now, both audio tracks can be used for program material during synchronized operation. No longer is it necessary to buy a four channel machine when a two-channel will do the job.

Reliability: The Industry Standard

A heavy-duty regulated power supply features a massive toroidal power transformer and large heat-sinks. Each circuit card is locally regulated, and front panel LEDs on each power supply confirm the presence of the various secondary voltages. A conservatively rated power supply design and adequate ventilation eliminate the need for a noisy cooling fan, even in mobile vans and in other high ambient temperature environments.

The MTR-12. Reliability, performance, quality. In synchrony.

Options & Accessories

- CB-109 ten memory, fully addressable autolocator with shuttle; includes transport controls.
- CB-111 transport remote control; includes search and variable speed.
- CB-102 transport remote control
- PB-14X single channel audio electronics card
- PB-76X extender card for audio and transport electronics
- WBR-2 reproduce processor for high speed time code reading
- ZA-53F tally interface PCB
- ZA-52W input isolation transformer
- ZA-52X output isolation transformer
- ZA-53V RS232C adaptor for serial control of transport functions
- 1/4" & 1/2" empty metal reels (NAB hub)
- 1/4" & 1/2" NAB or EIA reel hold downs
- Service manual
- EC-401 & EC-402 Resolvers
- Dolby* HX Pro circuitry
- Complete head assemblies for center track time code, mono and FM stereo pilot tone.
- Complete head assemblies for all 1/4" & 1/2" two and four track machine versions.

*Trademark Dolby Licensing Corporation

MTR-12 SERIES SPECIFICATIONS

TRANSPORT

Configuration:	1/4" (6.3 mm) two-channel, 1/2" (12.7 mm) two-channel, 1/2" (12.7 mm) four-channel			
Tape Speeds:	30/15/7.5 or 15/7.5/3.75 ips			
Rewind Time:	User adjustable to 65 sec. for 2500 ft.			
Reel Size:	5 to 12.5" automatically compensating			
Motors:	3 D.C. Servo: 9600 Hz., PLL capstan—microprocessor controlled			
Wow and Flutter: (DIN 45507 peak wtd.)	30 ips	15 ips	7.5 ips	3.75 ips
	0.04%	0.05%	0.06%	0.10%
Pitch Control:	± 20%, variable speed			
Max. Speed Deviation	± 0.03%			
Start Time (12.5" reels):	30 ips	15 ips	7.5 ips	
1/4" configuration	300 ms	175 ms	175 ms	
1/2" configuration	500 ms	350 ms	350 ms	

ELECTRONICS

Inputs:	Active Balanced (optional transformers 10 kOhms ZA-52W) 20 kOhms impedance +4 dB nominal input level (ref. .775 V)
Outputs:	Active Balanced, Direct Coupled (optional transformers 600 Ohm ZA-52X) Less than 5 Ohms source impedance +28 dB (ref. .775 V) maximum output level into 200 Ohms or greater
Equalization:	NAB/IEC switchable, AES—30 ips Adjustable record phase compensation for all speeds.
Bias Frequency:	250 kHz

Frequency Response (+1, -2 dB):	1/4" two-channel	1/2" two-channel	1/2" four-channel
Record/Reproduce	30 ips 40-27 kHz	33-27 kHz	60-29 kHz
	15 ips 18-24 kHz	18-25 kHz	30-25 kHz
	7.5 ips 15-16 kHz	—	20-15 kHz
	3.75 ips 12-12 kHz	—	20-12 kHz
Sel-Rep	30 ips 60-20 kHz	60-20 kHz	60-20 kHz
	15 ips 30-12 kHz	30-12 kHz	30-12 kHz
	7.5 ips 20-5 kHz	—	20-5 kHz
Signal-to-Noise Ratio: (3% third Harmonic to Noise Floor) unwt'd. 30-18 kHz	1/4" two-channel	1/2" two-channel	1/2" four-channel
	30 ips 74 dB	77 dB	73 dB
	15 ips 71 dB	73 dB	70 dB
	7.5 ips 72 dB	—	70 dB

Operating Level: 250 nWb/m, all measurements made with 3M #226 tape at operating level except where specified.

Distortion:	Less than 0.15% third harmonic (7.5 to 30 ips)		
Crosstalk: (adjacent channels, 1 K)	1/4" two-channel	1/2" two-channel	1/2" four-channel
	55 dB	60 dB	55 dB

Depth/Erasure (1 kHz): Greater than 80 dB

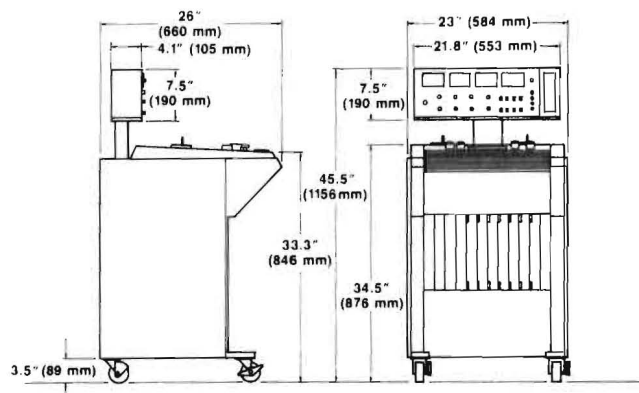
Oscillator Frequency: 100 Hz, 1 kHz, 10 kHz sine wave, 1 kHz, 10 kHz square wave

PHYSICAL

Power Requirements:	100, 117, 200, 220 or 240 VAC, 50/60 Hz, 180 watts
Operating Environment:	40 to 104 degrees F (5 to 40°C), 20 to 80% R.H.
Storage Environment:	-5 to 113 degrees F (-20 to 45°C), 10 to 80% R.H.
Weight:	250 lbs. (113.4 kg) in shipping crate

MTR-12 MODELS

MTR-12-2	1/4" two-channel 12.5" reel size in low-profile cabinet 7.5/15/30 ips same as above in overbridge cabinet
MTR-12-C	same as above in overbridge cabinet
MTR-12-G	1/2" two-channel 12.5" reel size in low-profile cabinet 7.5/15/30 ips same as above in overbridge cabinet
MTR-12-H	same as above in overbridge cabinet
MTR-12-4	1/2" four-channel 12.5" reel size in low-profile cabinet 7.5/15/30 ips same as above in overbridge cabinet
MTR-12-I	same as above in overbridge cabinet



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The MTR Series. Professional Mastering/Production Recorders from Otari.

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OTARI.

**MTR
SERIES**

Model MTR-10 and MTR-12 Series II Two Channel and Four Channel Mastering/Production Recorders

The Otari MTR-10 and MTR-12 Series II microprocessor controlled recorders are designed for recording studio, audio post production, and broadcast professionals. The series includes 1/4" two-channel, 1/2" two-channel, 1/2" four-channel, and an optional 1/4" two-channel with IEC standard (SMPTE/EBU) time code center track kit. (A conversion kit with a plug-in head assembly allows you to quickly convert the four-channel version to the 1/4" format.) The MTR-12 allows 12.5" diameter reels for applications requiring extended program lengths. All machine versions are housed in an overbridge, roll-around console.

The Series II machines feature several modifications and updates from the original version. A cast aluminum alloy deckplate has been added, and the tape path has been refined for even smoother tape handling and easier format conversion. Cabinet strength and rigidity is improved, and the paint finish is now high grade pebble. All major subassemblies remain interchangeable with the Series I recorders.

The MTR-10 and MTR-12 Series II transport and editing controls are conveniently located on a separate panel. The

entire transport assembly swings up for easy access. Audio, transport circuitry, and power supply assemblies are contained on plug-in modules for quick diagnosis and repair.

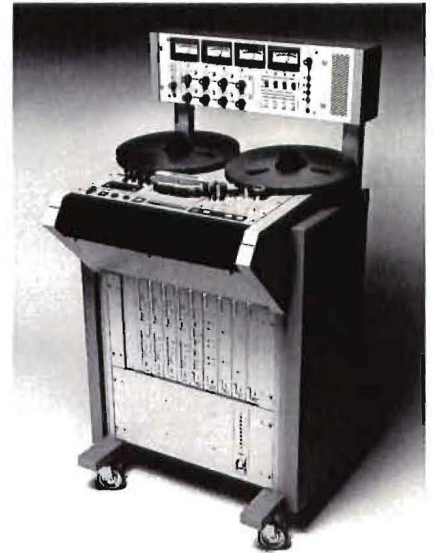
The MTR machines are designed for easy interface with any SMPTE/EBU time-code-based synchronizer, editor, or machine controller. All transport functions and tallies, 9600 Hz capstan speed override, and tachometer data are available on one rear panel multipin connector.

There are three choices of optional remote controls available:

Model CB-109 — A full-function auto-locator which includes ten assignable memories with one stroke keyboard access, vari-speed control and dual LED displays for both tape and locate timing

Model CB-111 — A remote transport controller with dual-lit controls, cue, variable speed control, and return to zero

Model CB-102 — A remote transport controller



The MTR-12; 1/2 inch, four-channel recorder.

continued on back side



Plot 8800-00

continued from front side

Each MTR-10 and MTR-12 Series II incorporates these standard features:

- Three speeds: 30/15/7.5 or 15/7.5/3.75 ips, user configurable
- Full servo, DC PLL capstan
- 5" to 10.5" reel size capacity (12.5" with MTR-12). Automatic reel size sensing
- Electronically balanced I/O with direct-coupled high current outputs (transformers available if required)
- One hand "reel rocking"
- ±20% variable speed control with percentage and ips display
- Cue control with tape lifter defeat and transport shuttle (variable speed in forward or reverse)
- Monitoring with headphones or built-in cue speaker
- Internal multi-frequency square/sine wave generator including convenient external oscillator input
- User-adjustable record phase combination
- Three selectable record flux calibration levels: 185, 250 & 320 nWb/m
- NAB/IEC/AES selectable equalization
- Direct access to head assembly and head calibration adjustments
- Proprietary Otari microprocessor for timing functions and transport control
- Master bias switching for two tape types at all speeds
- Controlled wind mode in either direction
- Return-to-zero from positive or negative domain. Machine will accept and store a play command while searching zero
- Back timing mode
- Dump edit mode
- Integral splicing block

Options available:

- IEC standard SMPTE/EBU time-code center track on all 1/4" configurations, retrofittable to MTR-10 and MTR-12 models, Series I or II
 - 1/2" Two-channel conversion kit
 - 1/4" Mono full-track conversion kit
 - Mono and FM pilot-tone conversion kits for use with Otari EC-400 series resolvers
 - Remote controls as described on page 1
- Call or write for full color, descriptive brochure.

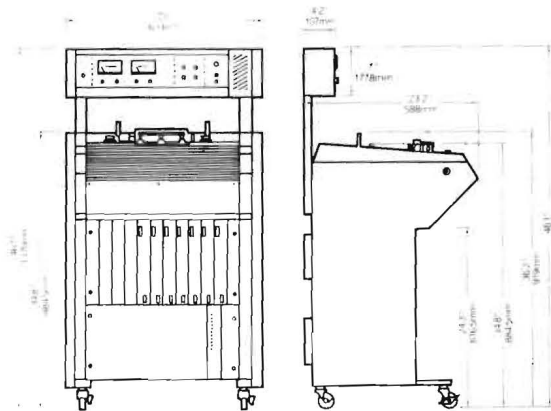
Warranty: The MTR-10 and MTR-12 Series II recorders have a one-year parts and 90-day labor limited warranty. NOTE: Heads and pinchrollers are not included in the one-year parts warranty.

NOTE: Low speed versions (15/7.5/3.75 ips) can be ordered by adding an "L" suffix to catalog number

Manufactured in Japan by Otari Electric Co., Ltd. Otari reserves the right to change specifications without notice or obligation.

MTR-10 and MTR-12 Series II Specifications

TRANSPORT				
Configurations:	1/4" two-channel; 1/4" two-channel with track time-code, and 1/4" mono prewired for two channels			
Tape Speeds:	30/15/7.5 ips or 15/7.5/3.75 ips			
Fast Wind Time:	65 sec. for 2500 ft., adjustable			
Reel Size:	5" to 10.5" (12.5" MTR-12) automatically compensating			
Motors:	DC servo 9600 Hz PLL capstan, and DC servo controlled, high torque reel motors			
Drive System:	Triple tachometer, closed loop, constant tension servo			
Wow and Flutter (Din 45507 peak wtd.)	30 ips 0.04%	15 ips 0.05%	7.5 ips 0.06%	3.75 ips 0.10%
Pitch Control:	± 20% variable speed			
Max. Speed Deviation:	± 0.03%			
Start Time (10.5" Reels):	30 ips 240ms	15 ips 160ms	7.5 ips 160ms	3.75 ips 140ms
1/4" Configuration:				
ELECTRONICS				
Inputs:	Active balanced transformerless 20 kOhms source impedance, nominal input level: 4 dBm.			
Outputs:	Active balanced transformerless direct coupled, less than 5 Ohms source impedance, maximum output level + 28 dBm into 200 Ohms or greater.			
Equalization:	30 ips: AES; 15/7.5/3.75 ips: NAB IEC, switchable. Adjustable record phase compensation for all speeds.			
Bias Frequency:	250 kHz			
Frequency Response:	1/4" 2-Channel	1/2" 2-Channel	1/2" 4-Channel	
Record/Reproduce: (+1, -2dB)	30 ips 42 Hz-29 kHz	33 Hz-27 kHz	60 Hz-29 kHz	
	15 ips 20 Hz-25 kHz	18 Hz-24 kHz	30 Hz-25 kHz	
	7.5 ips 20 Hz-20 kHz	—	20 Hz-15 kHz	
	3.75 ips 20 Hz-12 kHz	—	20 Hz-12 kHz	
Selective Reproduce:	30 ips 60 Hz-20 kHz	60 Hz-20 kHz	60 Hz-20 kHz	
	15 ips 30 Hz-12 kHz	30 Hz-12 kHz	30 Hz-12 kHz	
	7.5 ips 20 Hz-5 kHz	—	20 Hz-5 kHz	
Signal-to-Noise Ratio (30-18 kHz, 3% THD to noise floor, unweighted)	1/4" 2-Channel	1/2" 2-Channel	1/2" 4-Channel	
	30 ips 74dB	77dB	73dB	
	15 ips 70dB	73dB	69dB	
	7.5 ips 72dB	—	69dB	
Operating Level:	250 nWb/m, all measurements made with AMPEX #456 tape at operating level except where specified.			
Distortion:	Less than 0.30% third harmonic (30 to 7.5 ips) at 1 kHz			
Crosstalk: (Record/Reproduce, adjacent channels, 1 kHz)	1/4" 2-Channel	1/2" 2-Channel	1/2" 4-Channel	
	55dB	60dB	55dB	
Erase Depth:	Greater than 80dB			
Oscillator Frequency:	100 Hz, 1 kHz, 10 kHz sine wave, 1 kHz, 10 kHz square wave.			
PHYSICAL				
Power Requirements:	110, 117, 220 or 240 VAC, 50/60 Hz, 180W			
Operating Environment:	40 to 104° F (5 to 40° C) 20 to 80% R.H.			
Storage Equipment:	-5 to 115° F (-20 to 45° C) 10 to 80% R.H.			
Weight:	220 lbs. (100 kg) in shipping crate			
Dimensions:	Width: 25" (635mm); depth: 26" (660mm)			
Standard Accessories:	Reel hold down knobs, 10.5" NAB take up reel, operation manual and power cord			
MODELS				
MTR-10-B:	1/4" full-track prewired for two channels in floor console			
MTR-10-C:	1/4" two-channel in floor console			
MTR-12-C:	1/4" two-channel 12.5" max. reel size in floor console			
MTR-12-H:	1/2" two-channel 12.5" max. reel size in floor console			
MTR-12-I:	1/2" four-channel 12.5" max. reel size in floor console			
MTR-12-ILX:	1/2" four-channel 12.5" max. reel size in floor console optimized for duplication master-making (data sheet available)			



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BP3873K