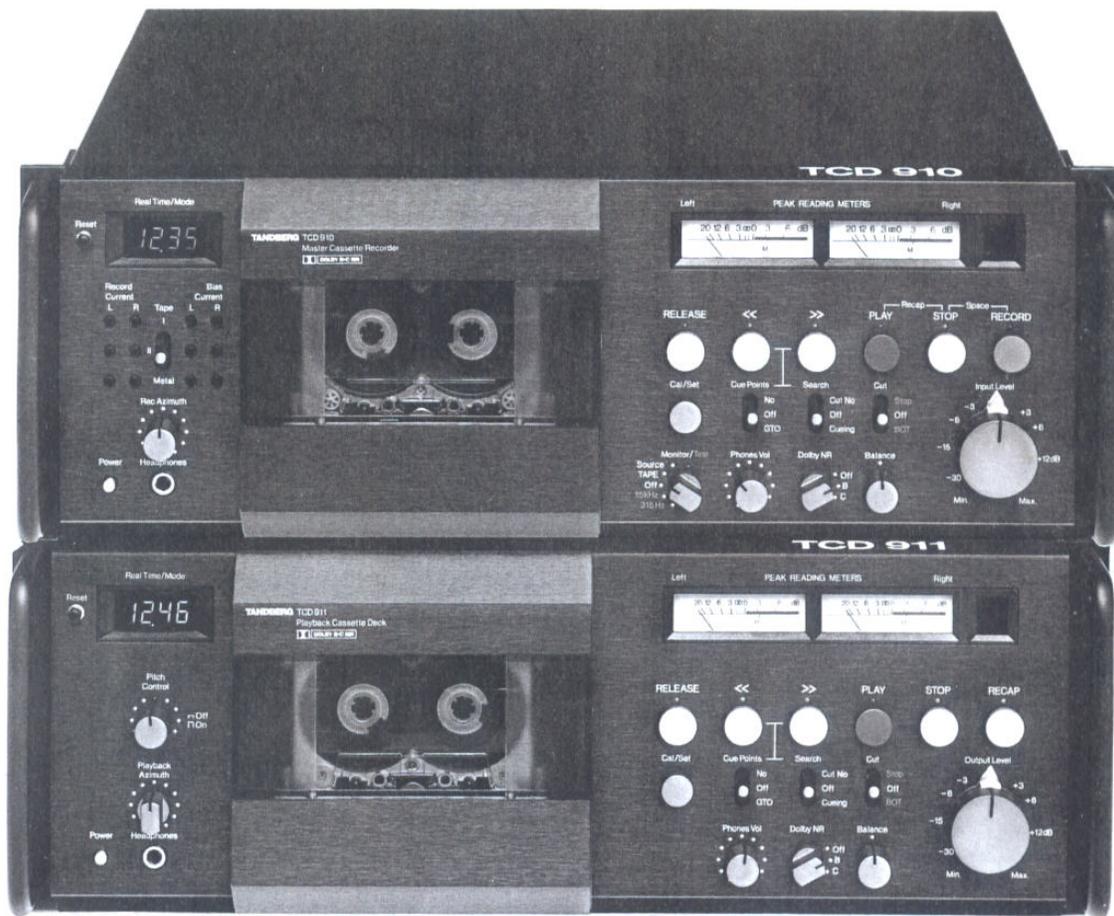


# TANDBERG®

## TCD 900 SERIES

### Professional Cassette Decks



Cassette and rack mount are options.

# The Breakthrough Cassette Decks

Over the past several years the compact cassette has fostered a revolution in the home taping field. The almost complete demise of reel-to-reel used in the home is directly attributable to the rise of high performance, reasonably priced cassette tape units. Until now, however, cassette use in broadcast and recording studios has been, to say the least, limited. Limited by the lack of cassette decks designed with the studio professional's needs as priorities.

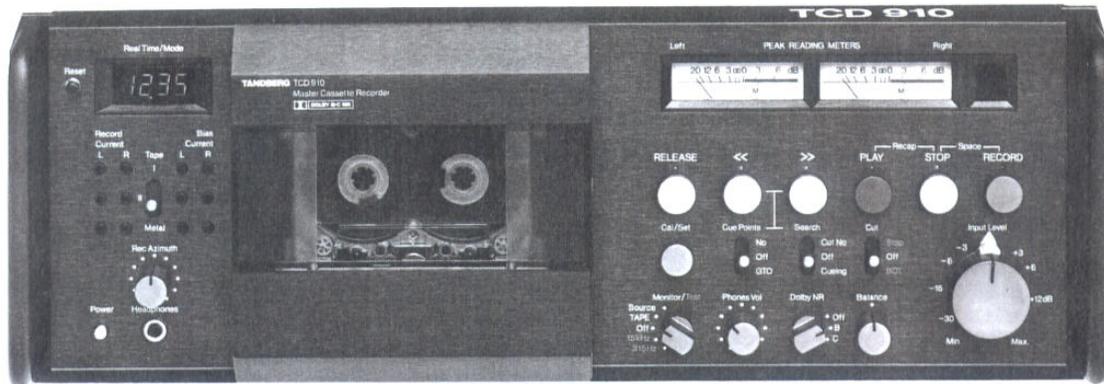
Now, with the introduction of the TCD 900 series, Tandberg breaks through the barrier of professional cassette use. In one machine are combined superior sound capability, superior mechanical and electronic quality, control flexibility based on an 8 bit micro processor with 32 K of EPROM memory, and the experience of 50 year's of electronic and tape recorder design/manufacturing as it's heritage. In fact, for over half a century the Tandberg reputation for quality, outstanding performance and long term owner loyalty has been based on our commitment to total excellence in product, from sub-chassis to external appearance.

Our success is largely due to the decision making process our engineers apply to meeting the challenges in sound reproduction technology. Tandberg's problem solving approach means we closely study every area of concern. We then conduct an exhaustive evaluation of potential solutions. Finally, we choose the best solution for overall performance and integrity.

We suggest you spend a few moments to carefully read this brochure. The information it contains should be of value for any decisions you make regarding the future of cassettes in your applications. We have tried in this small brochure to outline all that is different and unique about the TCD 900 series. For more detailed information contact your Tandberg professional dealer or your nearest Tandberg distributor listed on the last page.



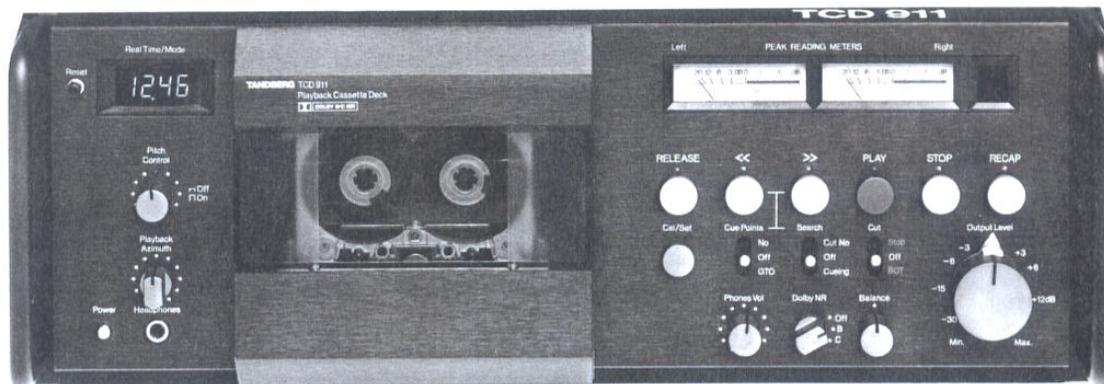
# TCD 910 Master Cassette Recorder



TCD 910 is designed to replace in many uses both reel-to-reel and cartridge machines. This recorder is capable of producing tapes at sound and silent levels beyond that required by broadcasting standards. Combined with its extremely accurate real time counter and computer interface ability, this is truly a multi-purpose cassette recorder. From music, be it live or

taped from other sources, to commercials, to studio news, or to interviews recorded on location. With the extensive control convenience built into the TCD 910 it is also ideal for mixdown and electronic editing. Of course, TCD 910 may also be utilized in broadcast automation systems.

# TCD 911 Playback Cassette Deck



An economical alternative to inferior home tape decks in professional settings, TCD 911 offers the same quality of construction and design as TCD 910 without the components necessary for recording. Special features include:

- Playback pitch control.
- External playback azimuth control.
- In a multi-deck studio situation, TCD 910's combined with TCD 911's makes for the ideal match of performance and price.

## Tape transport and head system

The tape drive and head system represent the heart of any tape recorder. As electro mechanical devices they must function flawlessly

under the most demanding situations. Reliability of the tape drive system is paramount in any professional application. The TCD 900 transport

has been designed from the start with all this in mind. This drive system features:

### Direct cassette positioning

- Direct load, instant access cassette positioning.
- Electro mechanical locking of the cassette for optimum performance and repeatability.
- Four servo control motors - one each iron coreless spooling, one DC servo frequency generator capstan drive and one DC servo pinch roller/head bridge actuation.

### Flat belt drive

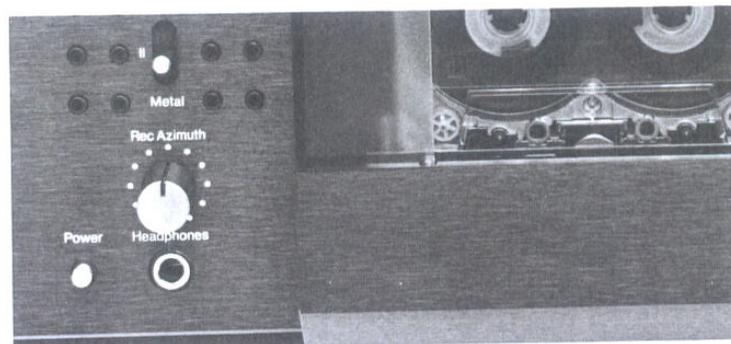
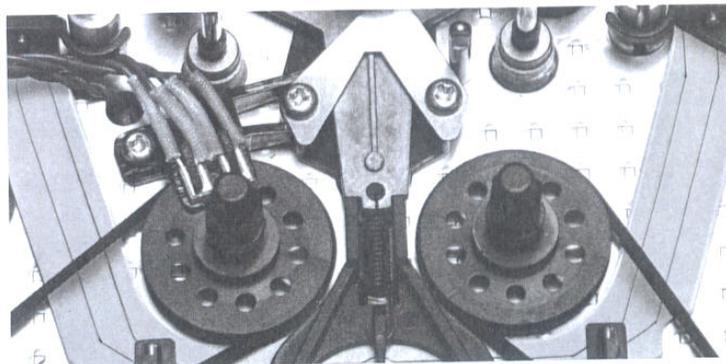
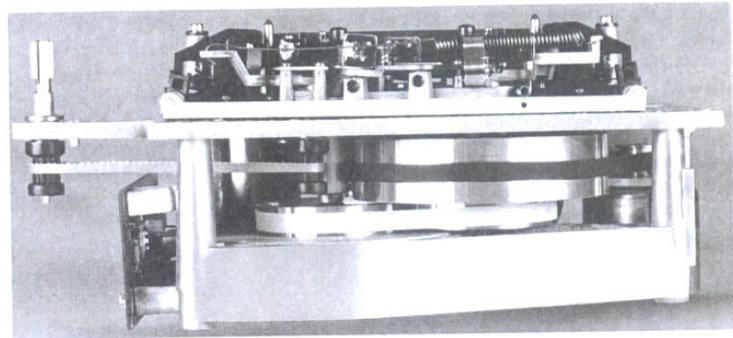
- Precision ground, flat belt drive to eliminate all cogging effect and motor vibration.
- Dual capstan closed loop drive with one 8.4 cm and one 8.2 cm dynamically balanced flywheels.
- All rotating devices (pinch rollers, flywheels) are mass differentiated for minimum resonance.
- The transport itself is built on a 5 mm thick machined aluminum plate which is rolled under 40 tons of pressure to relieve all internal stress and greatly increase strength.
- All bearings are press fit or glued for accurate alignment and long term stability.
- Moving and support components are all special made precision parts.

### Direct opto-electronic sensing

- Direct opto-electronic sensing of hub spindle rotation for precise real time counter accuracy and reference.
- Constant wind three speeds - standard wind is: one second wind equals one minute play/record. Slow wind and search cut speed is  $\frac{1}{2}$  that of standard speed. Cueing speed is further reduced to  $\frac{1}{4}$  for easy locating. Constant wind refers to the deck's ability to adjust in order to maintain constant speed all through the wind/rewind process.

### Built-in azimuth adjustment

- Discrete Tandberg built three-head system with built-in azimuth adjustment system (TCD 911 playback deck incorporates a playback head only with external azimuth adjustment).



## Audio electronics

TCD 900 series decks feature electronics based on state-of-the-art audio technology. Every effort has been made to ensure superb sound quality and maintain long term reliability. We believe, no other manufacturer invests as much technology in the audio stages of a tape recorder. Overall design highlights include:

- Exclusive use of polypropylene capacitors in all audio stages.
- Metal film resistors for lower noise and longer stability.
- 1% tolerance components in all critical stages.
- Fully regulated and shielded power supply.

- DYNEQ® Tandberg's patented headroom extension system for tape recording helps overcome the severe high frequency limitations inherent in the cassette recording process. This is accomplished by a dynamic record equalizer which controls high frequency record boost to enable more signal on the tape without loss of high frequency i.e. better signal-to-noise, less tape saturation.

- ACTILINEAR® II, which is as great a breakthrough in eliminating "the cassette sound" as was Tandberg's proprietary Actilinear. Actilinear II offers a totally re-designed transconductance amplifier which takes the record and bias signals as pure voltage and converts them to a pure current. Actilinear II is a research-grade amplifier with a bandwidth so wide that it can pass square wave bias.

It is totally symmetrical in operation. Its practical benefits include in excess of 20 dB audio headroom increase in the record amplification stages and elimination of interaction between record head impedance and the signals passing through it.

- Face corrective circuitry coupled with wideband electronics means the TCD 900 series is capable of superior transient response and imaging.
- All audio stages including noise reduction are DC coupled or direct coupled.
- Latest generation Dolby\* B and C noise reduction processors. Dolby C includes advanced circuitry which offers substantial improvement in signal-to-noise and better high frequency overload capability. Dolby C in conjunction with Actilinear II and Dyneq achieves an outstanding musical signal, free of annoying background hiss.

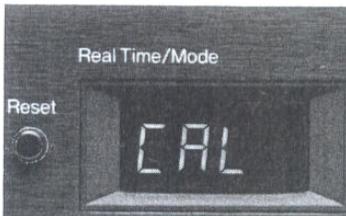
## Microprocessor control

Built-in to this series is one of the most sophisticated control systems available today. The TCD 900 series employs an 8 bit micro processor with 32 k of Tandberg programmed software. This "computer in a tape deck" controls such functions as:

- Transport safety; auto end stop, damaged or defective tape, tape improperly inserted.
- Tape tension including wind, rewind, cue, play and record modes.
- Auto slack take-up prior to all function responses.



- Real Time counter (minutes and seconds) with both primary and secondary count functions.



- Automatic or manual time calibration for high accuracy.
- Up to 10 cue points in real time can be retained in a volatile memory.
- Auto search by cut gaps, by program cut number, and precise positioning at program start.
- Cue/review at ¼ normal wind speed with automatic low pass filter insertion in cue mode for speaker protection.
- Auto stop and/or rewind to beginning of tape (BOT).
- Recap with auto park function.
- Auto record mute (4 seconds) with manual override for longer or shorter spaces.

- Fader start.
- Wired or infra red remote control options available.
- Serial data interface with RS 232 port for program automation systems as well as other uses. RS 232 port is an optional extra.



\* Trademark of Dolby Laboratories Inc.

## Meter circuits

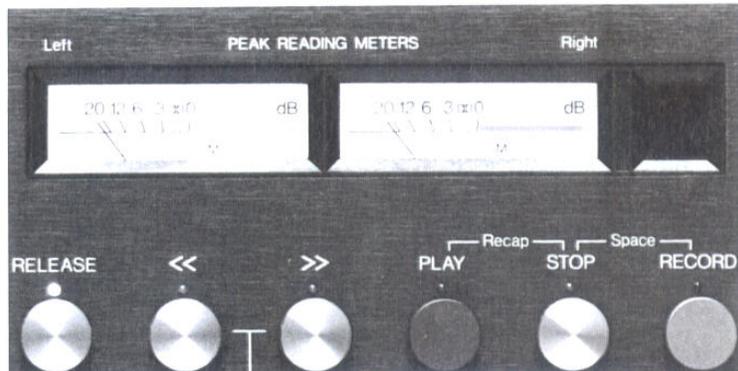
TCD 900 series meters are PPM types. They are highly accurate and will respond to a 2 ms peak within 1 dB. Unlike Bargraph, these meters have no spaces or gaps between segments. They are full wave peak detectors regardless of face. The meters also feature signal display after equalization and show true recording current.

0 VU equals IEC norm 250 nWb/meter.

Metal (type IV) indication mark for higher record levels allowed by this tape type.

High legibility graphics.

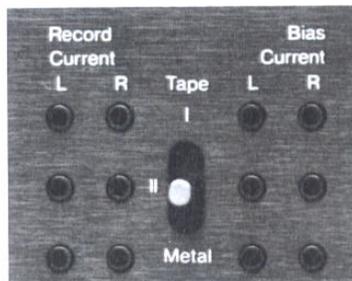
Indication of record level even when the Monitor/Test selector is in TAPE position. This allows audible monitoring of the tape with simultaneous visual monitoring of the record level.



## Tape calibration

The built-in tape calibration system allows optimum performance with all type I, II or IV tapes on the market today. It can also be used to judge the output level performance of different tapes by direct comparison. Precise calibration is achieved with:

- Built-in 315 Hz and 15 kHz oscillators.
- Recessed screwdriver adjustments for bias and record current to avoid accidental misadjustments.
- A separate record head azimuth control (TCD 910 only).



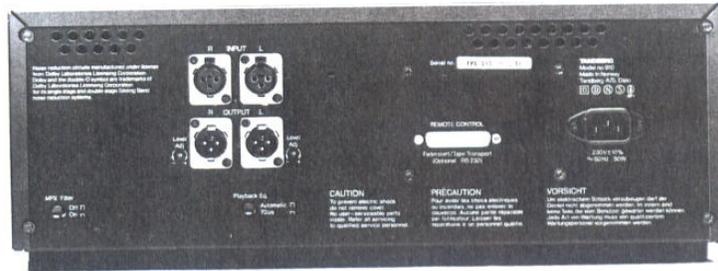
- Built-in meters which electronically shift to minus 24 dB at zero on scale when oscillators are activated.
- Dolby NR systems that are automatically defeated upon turn on of the oscillators.

Accuracy with this system is typically within one ¼ dB of ideal. This accuracy is achievable in under one minute for any single tape type including azimuth adjustment.

## Rear panel

Evidence of the forethought and planning in the TCD 900 series design, is apparent even on the rear panel. Included there are:

- Electronically balanced (transformerless) XLR input/output connectors.
- Remote control connector; including fader start. Additional RS 232 data interface for program automation or auto locator functions (optional).

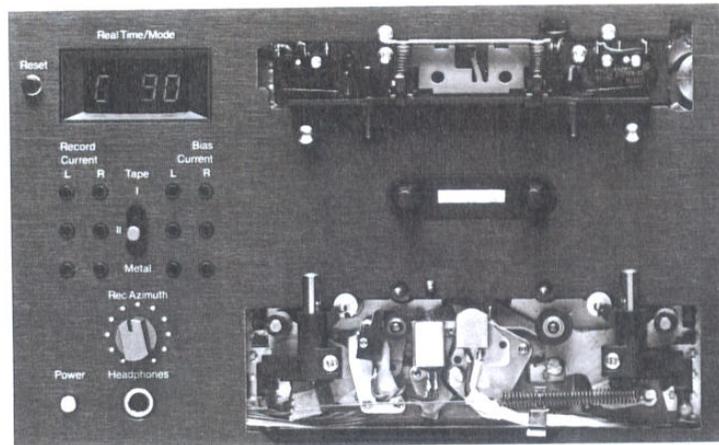


- Individual left and right output level adjustment (recessed for safety).
- RCA connectors available as options.
- Transformer balanced XLR's are also available on special order.

## Service and maintenance

Ease of maintenance is unsurpassed by any other deck available today:

- All head bridge components including alignment adjustments are under a snap off cover.
- Cassette sensing elements, record safety knock-out and play equalization are under another snap off cover.
- Major electronic adjustments are accessible through holes in the bottom of the deck. No disassembly is required for these adjustments.
- All electronics are built upon two mother boards with two Dolby NR processing boards and one computer control board.
- A minimum of point to point wiring is used.



- Computer grade connectors are used exclusively.
- Glass fiber epoxy electronic boards.
- Tape transport is removable with four screws and plug-in connectors.

## Options and accessories

To fill out any professional requirements TCD 900 series features a full line of accessories and options.

- Cable remote control (TCD 910/TCD 911).
- 19 inch rack mount (TCD 910/TCD 911).
- RS 232\* data interface (TCD 910/TCD 911).
- RCA phono in- and output (TCD 910).
- Transformer balanced in and out instead of electronic balanced (TCD 910/TCD 911).
- Infra red wireless remote control (TCD 910/TCD 911).
- Custom software control packages (TCD 910/TCD 911).
- Sidewalls in rosewood or black acrylic (TCD 910/TCD 911).
- A special heavy-duty cast dust cover to replace the standard moulded type (TCD 910/TCD 911).

\* Only available with balanced XLR in and out when ordered on TCD 910.

# Specifications

## Frequency response:

Record/Playback at -20 dB rel. 250 nWb/m	
Tape group I, II, and IV	20 - 20.000 Hz ± 2 dB
Dolby B or Dolby C switched on	
Tape group I	20 - 16.000 Hz ± 3 dB
Tape group II	20 - 18.000 Hz ± 3 dB
Metal IV	20 - 20.000 Hz ± 3 dB

## Output level:

rel. 250 nWb/m	+ 6 dBu (Europa model)
	+ 8 dBu (USA model)
	adjustable from -2 to +14 dBu

## Distortion (THD):

at 1 kHz 0 dB rel. 250 nWb/m Dolby	
Tape group I	Better than 1.8%
Tape group II	Better than 2.8%
Metal IV	Better than 1.5%

## Signal-to-noise ratio:

3% THD, A-weighted (noise band with 20 Hz - 20 kHz)	
Tape group I	70 dB
Tape group II	71 dB
Metal IV	74 dB

## Erase ratio at 1 kHz:

All tapes	min. 78 dB
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## Wow & Flutter:

acc. to DIN 45507/IEC 386 peak, weighted	0.1%
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## Crosstalk (1 kHz):

Side A - B	Better than -78 dB
Track 1 - 2	Better than -45 dB

**Tape Speed:** 4.76 cm/s (1 7/8 ips) ± 0.5%

**Winding times:** approx. 35 sec. for C-60  
approx. 55 sec. for C-90

**Input level:** Calibrated (0 dB level) = + 6 dBu  
for 0 dB level Adjustable from -6 to +12 dBu  
rel. 250 nWb/m (Calibrated position adjustable)

**Inputs:** Electronically balanced input impedance  
> 40 kohm  
up to 100 kHz

**Outputs:** Electronically balanced output impedance  
≤ 30 ohm min. load impedance  
> 300 ohm  
10 Hz to 100 kHz

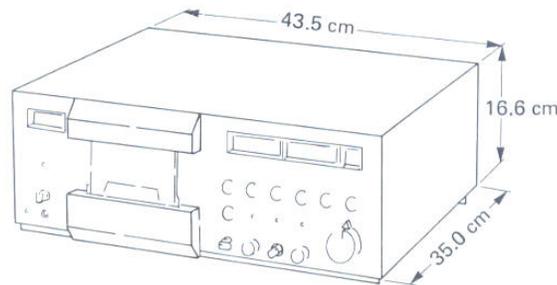
**Level meter:** Symmetric PPM  
(showing true record current)

**Operating temperature range:**  
+ 10 to 40°C (50 . . . . 104°F)

## Dimensions:

Width	43.5 cm (17 1/8")
Height	16.6 cm (6 9/16")
Depth	35.0 cm (13 3/4")
Weight	9.9 kg (21.8 lbs)

Specifications are subject to change without notice.



## YOUR AUTHORIZED TANDBERG REPRESENTATIVE:

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