

# TANDBERG

# HIFI STEREO 76/77



# TANDBERG

## THE NORWEGIAN PRODUCTS WITH A WORLDWIDE REPUTATION

Every musical performance is an experience. The composer's message is recreated by the players and the conductor for the listener. Tandberg products are designed to carry musical experiences and messages from people: to bring images, ideas, impressions, and contact: to stimulate, inspire and enrich people's lives. For more than 40 years Tandberg has developed and produced advanced electronic equipment with the highest regard for quality and reliability. Personal involvement in good working conditions and a pleasant environment gives the people behind Tandberg products the incentive to design and produce something out of the ordinary.

We receive pleasure and enthusiasm from making products that are amongst the best in the world and we would like our customers to share this same pleasure and enthusiasm through owning a Tandberg product.



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Your radio dealer also has a large informative brochure on Tandberg Colour TV!

# TANDBERG

## TAPE RECORDERS



We present the Tandberg range of tape recorders for 1976/77. We believe it is the most competitive range of tape recorders we have ever produced. Five models that individually and collectively represent the most advanced machines you can buy

anywhere in the world. Tandberg first designed and produced tape recorders more than 20 years ago and the name Tandberg has been a synonym for quality ever since. Confirmation of this claim has come for many years from test re-

ports in top ranking American and European journals. And even when the competition increases and products become steadily more advanced, Tandberg maintains its position at the top!

### Cassette or open reel tape recorder?

Both types have their advantages, but even the best cassette machine in the world cannot compete with a top quality open reel tape recorder.

The main advantage of a cassette machine is that it is easy to operate. So it is very convenient for recording and playing back music from a radio or a gramophone record. But if you must have top quality performance, brilliant recordings, mixing, editing, and trick recording facilities, in general great flexibility, the open reel machine is without equal. The two types cannot replace one another, they are simply complementary.

It is becoming normal to use an open reel machine for recording and editing,

and to transfer the final programme to a cassette machine. So we advise you to think carefully about the main uses for your tape recorder, and about the different advantages offered by the two types before making your final decision.

### Tandberg Crossfield recording technique

This is a special recording technique only found on Tandberg tape recorders. The magnetic tape passes between the record head and the Crossfield head. The tape is magnetized right through and its characteristics are thereby fully exploited. As a result the tape is able to accept very strong signals and reproduce them without audible distortion. During recording the most critical region is the one containing the highest tones. It is exactly in

this region that the Crossfield technique has the most effect providing a wide dynamic range.

### Peak level meters

Tandberg tape recorders have large level meters in the professional class. They have large, open scales making exact readings easy.

Peak level meters always show the parts of the sound containing the most energy — exactly those parts that distort first if the magnetic tape is overloaded (receives too strong a signal). Correct use of the peak level meters provides a safeguard against input overload whilst permitting full exploitation of the tape's properties.

# TANDBERG

## 10 XD STEREO



The 10XD is the star model of the latest range of Tandberg tape recorders — designed for the connoisseur who must have only the best. It is one of the finest tape recorders ever produced by Tandberg.

The 10XD has many of the features and facilities that today are taken for granted on professional machines e.g. 3 motors, 10 $\frac{1}{2}$ " reels, 15 ips speed, and electronic touch controls. But the 10XD also has extra features, first and foremost the Tandberg Crossfield recording technique which was an important advance in tape recorder

technology. And in addition the Dolby B\* noise reduction system.

Read more about the 10XD in the large separate informative brochure.

- 3 speeds: 15", 7 $\frac{1}{2}$ ", and 3 $\frac{3}{4}$ " per second
- 4 heads

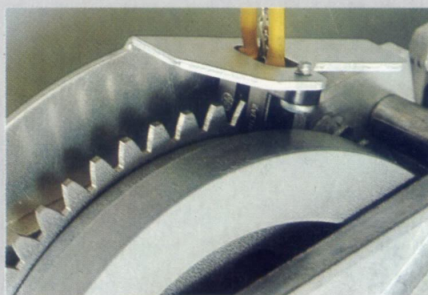
\* The name Dolby is a registered trade mark of Dolby Laboratories Inc., USA.

- Electronic speed regulation (servo system with tachometer)
- Electronic speed selector
- Balanced microphone inputs
- Mixing in stereo
- Echo, sound-on-sound, editing, and source and tape tests
- Peak level meters
- Photo-electric stop
- Direct switchover from playback to record (flying start)
- Remote control available

Model 10XD is the star model in the latest range of tape recorders that confirms Tandberg's leading position in the Hi-Fi market. The combination of the Tandberg Crossfield recording technique and the Dolby noise reduction system means amongst other things: a truly remarkable signal-to-noise ratio at all speeds, minimum distortion, input overload reserve, an extensive tone range and a very wide dynamic range.

#### Electronic speed regulation

Electronic speed regulation is one of the special features of the 10XD. The regulation operates as a servo system. A diode which radiates light is mounted adjacent to a toothed-ring on the flywheel. The teeth break the light beam and the resulting light pulses are transferred to electronic circuits via a photo-transistor. Each speed (15", 7½", and 3¾" per



second) corresponds to a particular pulse frequency. If the comparison shows a deviation the drive motor either increases or decreases its speed accordingly. This provides very tight speed tolerances.

#### Exceptionally versatile

A range of facilities makes this professional model exceptionally versatile. 4 input controls, 2 for microphones and 2 for line (radio or amplifier with option for transcription unit) provide mixing in stereo or mono. The microphone inputs are balanced. The large peak level meters always reflect the strongest part of the sound signal. The meters indicate record and replay levels. All level regulating is by slide potentiometers. A special control allows you to monitor the tape during fast winding (EDIT/CUE) for identifying different parts of a recording and for editing.

Model 10XD will take 10½" spools (professional size). The positions of the speed selector and the spool size selector cause the logic-control to automatically adapt the machine to a particular spool size.

The Tandberg 10XD incorporates operating modes controlled by integrated circuits (IC's). Read more about this and some application possibilities in the section "Logic control" on page 7.

#### 3 motors

2 motors directly coupled to the spool spindles ensure fast wind and rewind of the tape. Forward drive for record and playback is taken care of by a d.c. motor. This special motor is brushless; consequently it does not generate disturbing electrical noise, and it is extremely reliable. The motor is electronically controlled by built-in HALL EFFECT devices.

#### Wood veneers

Model 10XD is delivered in teak or rosewood (oak or walnut to order).

#### Accessories

Tandberg microphones and remote control unit, see page 35. Suitcase, kit for mounting 10XD in a 19" rack (American standard). Adapter for NAB-standard tape spools. Model 10XD can also be equipped with a PITCH CONTROL for studio use (external manual control of the speed within certain limits, used for special editing purposes).

#### General

Adjusted for Tandberg tape or equivalent tape of the Low Noise High Output (LH) type. Largest spool diameter 10½". Fitted with spool locks for use in vertical position. Delivered as a 2- or 4-track machine. Standard equipment: 2 adapters (NAB) and 1 empty spool 10½" (NAB).

**Dimensions** (whithout spools): width 17½" (43.5 cm) height 7½" (18.5 cm), depth 18¾" (45 cm).

**Weight:** 36 lb (16.4 kg).

**Specification, see page 14.**



# TANDBERG

## 9100 X STEREO

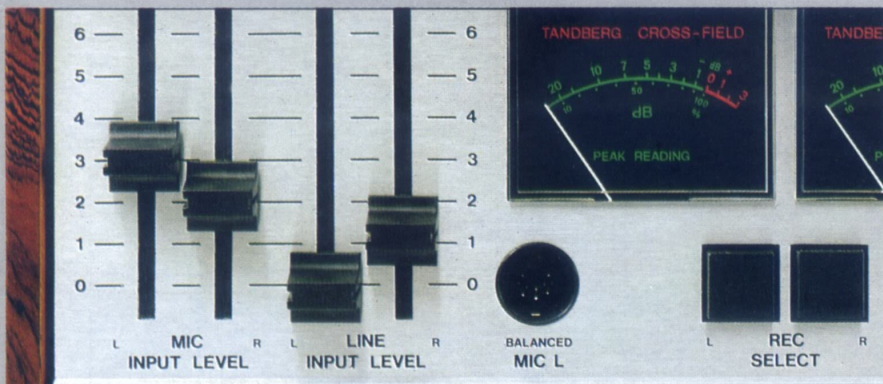


A further development of Model 9000X which received excellent reports from tests in well known Hi-Fi magazines.

- Electronic control with 14 integrated circuits (IC's) gives maximum ease of operation
- Balanced microphone inputs

- 3 speeds:  $7\frac{1}{2}$ " ,  $3\frac{3}{4}$ " and  $1\frac{7}{8}$ " per second
- 3 motors, 4 heads
- Tandberg Crossfield recording technique
- Facilities for mixing in stereo, echo, sound-on-sound, and source and tape tests during recording
- Slide potentiometers

- Editing facility
- Photo-electric stop
- Remote control
- Front output for stereo headphones



#### Mixing in stereo

This is one of the valuable new features on Model 9100X. 4 slide potentiometers (2 for microphone inputs and 2 for line inputs) give you the opportunity to mix sound sources in stereo or mono. The microphone inputs are balanced.

#### Peak level meters

The level meters are the studio type indicating peak levels making it easier to avoid distortion. With the combination of the Tandberg Crossfield recording technique and peak level meters the improved characteristics of modern magnetic tapes can be fully exploited.

#### Logic control

The control system in the 9100X is an electronic brain with 14 high-level-logic integrated circuits (IC's). Electronics has replaced mechanics and the control functions take place firmly and precisely with a light touch on the keyboard. The logic circuits "think for themselves" The electronics and the tape tensioning mechanism always ensure that the tape is correctly transported. When connected to a remote control unit (accessory) all the logic functions can be remotely controlled. The 9100X has all the features Tandberg tape recorders are renowned for: echo, recording with sound-on-sound, source and tape tests during recording. The tape test is an especially useful feature since it permits close control over the quality of the recording while it is being made.

#### Studio-type mechanism

Good sound reproduction demands a tape guidance system that has been carefully designed and assembled. The complete tape guidance system on the 9100X is mounted on a rigid plate ensuring that the tape always flows correctly past the magnetic heads. There are 3 motors – 2 for fast winding in both directions and one for normal driving. The winding motors also act as mechanical brakes. The closed tape loop and the magnetically controlled friction brakes provide a tape handling system that is gentle and smooth.

#### Monitoring during fast winding for editing purposes

The EDIT/CUE facility allows you to listen to a tape during fast forward or backward winding. This enables you to identify particular parts to a tape for editing purposes.

#### Wood veneers

The 9100X is delivered in teak or rosewood (oak or walnut to order).

#### Accessories

Tandberg microphones and remote control unit, see page 35. Case, plastic cover, kit for mounting 9100X in a 19" rack.

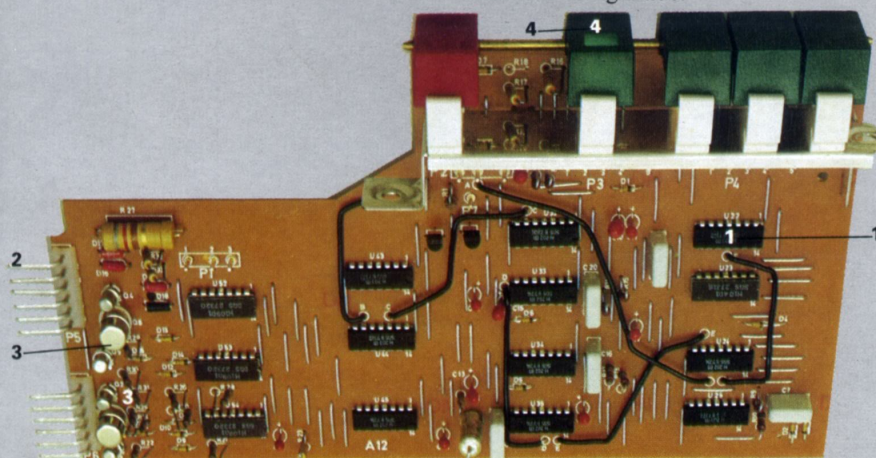
#### General

The 9100X is adjusted for Tandberg tape or corresponding tape of the Low Noise High Output (LH) type. Largest spool diameter 7". Equipped with spool locks for use in vertical position. Delivered as a 4-track machine.

**Dimensions:** width 15<sup>3</sup>/<sub>4</sub>" (40 cm), height 7<sup>1</sup>/<sub>4</sub>" (18 cm), and depth 16<sup>1</sup>/<sub>4</sub>" (41 cm).

**Weight:** 34 lb (15.5 kg).

**Specification, see page 14.**



#### The electronic brain

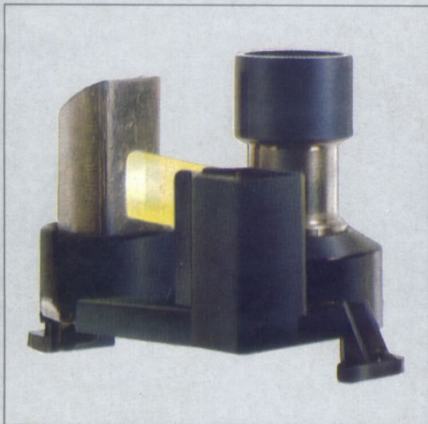
1. 9100X has 14 integrated circuits (IC's) and the functions they perform correspond to the use of several hundred transistors. These integrated circuits provide reliability and a compact design for the control system.
2. The complete logic-board is a plug-in module that can be easily changed if the machine needs servicing.
3. Transistors controlled by the integrated circuits.
4. Lamp to indicate that a function is being carried out.

# TANDBERG

## 3500 X STEREO

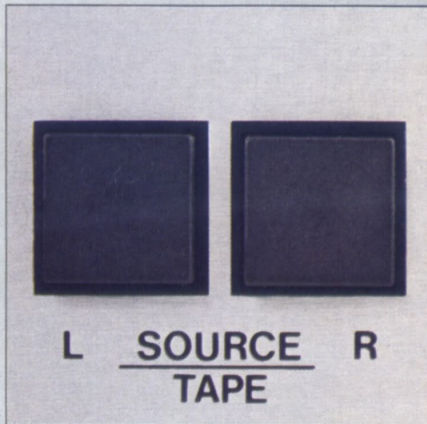




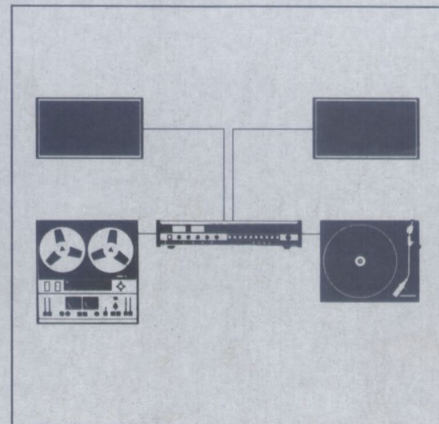


**The photo-electric stop**

Model 3500X is equipped with a photo-electric stop. The tape passes between a lamp and a photo-transistor. At the end of the tape or when the tape is transparent, the forward drive stops automatically.



**Unusual facilities.** The 3500X has unusual facilities for record and playback. The TAPE/SOURCE buttons determine whether record monitoring will be a source (programme) test or a tape test (A test or B test). The tape test is particularly useful because you can listen to tape that has just been recorded while the recording continues.



Tape recorder 3500X is suitable for every music installation. In this example the 3500X is shown with the TR 220, 2 Tandberg Hi-Fi loudspeakers TL 1520 and a transcription unit.

A model in great demand in the middle price bracket with a good performance and many attractive features. Suitable for all Hi-Fi music centres providing record/playback in stereo or mono with excellent sound quality. The 3500X is designed for connection to a good quality stereo amplifier such as the Sølvsuper, the Huldra, or the TR 220.

- Tandberg Crossfield recording technique
- 3 speeds: 7 1/2, 3 3/4, and 1 7/8 ips.
- 4 heads
- Precise control of record and playback levels with slide potentiometers
- Large peak indicating meters — the best way to measure programme levels
- Easy editing with direct switchover from playback to record
- Tape and source monitoring during recording
- Trick recording facilities: sound-on-sound, echo, mixing in mono.
- Photo-electric end stop
- Front jack for stereo headphones

**The recording quality determines the sound quality!**

The playback quality of a tape can never be better than the recording quality. A tape recorded on a poor tape recorder can never be improved even when it is played back on a good machine. Tandberg has always paid particular attention to this point when designing tape recorders. The Tandberg Crossfield technique was specially developed to raise the recording quality. The tape transport and the tape path have been designed to allow the tape to pass smoothly and precisely across the heads without undue stress and strain. The heads have been developed and manufactured by Tandberg to exploit the best features of the latest types of tape. Everything possible has been done to ensure that the recording quality is excellent. Even though the 3500X is reasonably priced it is fully equipped to play a central role in any Hi-Fi music centre.

**Wood veneers**

The 3500X can be delivered in teak or rosewood (oak or walnut to order).

**Accessories**

Tandberg microphones, see page 35. Suitcase, hard dust-cover.

**General**

Adjusted for Tandberg tape or corresponding tape of the Low Noise High Output (LH) type. Largest spool diameter 7". Equipped with spool locks (for use in the vertical position). Delivered as a 4-track machine.

**Dimensions:** width 15 3/4" (40 cm), height 7 1/8" (18 cm), and depth 16" (41 cm).

**Weight:** 4 1/4 lb (9.1 kg).

**Specification, see page 14.**

# TANDBERG

## TCD 330 STEREO



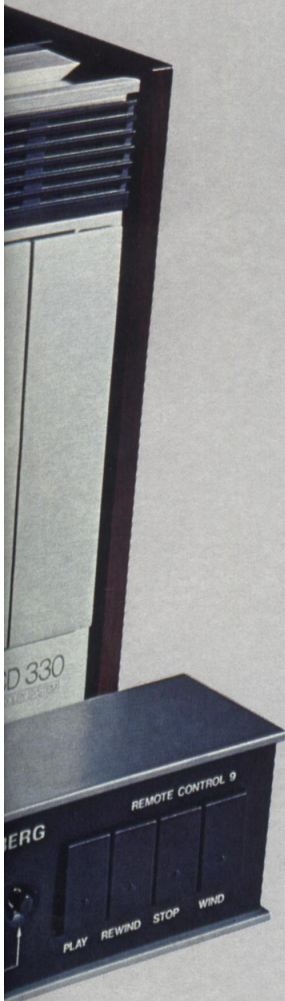
The TCD 330 is the top model in the Tandberg range of cassette tape recorders and in many ways compares favourably with open reel machines: 3 heads, source and tape tests, editing facility, 3 motors, completely electronic controlled, remote control, servo controlled winding, dual-capstan closed-loop tape path, and dual Dolby\*!

- Signal/noise ratio 65 dB minimum (DIN 45 500)!
- Frequency range 20 to 20 000 Hz (DIN 45 500)!
- Speed tolerance  $\pm 0.5\%$  maximum!

- Maximum speed variation 0.12% (weighted RMS)!
- Stable tape transport. Full control over tape movement with exceptionally gentle tape handling
- MEMORY function
- Tandberg-developed input circuits, optimized for minimum noise regardless of source impedance (see page 13)
- Peak indicating meters — the only correct way to measure sound level after equalization. Also indicate playback level
- Editing facility
- Decoder for recording Dolbyized FM programmes
- Built-in MPX filter
- Matched to all types of good quality tape
- Adjustable output level
- Automatic stop for wind and rewind
- Front jack for stereo headphones

\* The name Dolby is a registered trade mark of Dolby Laboratories Inc., USA.

Tandberg was the first company in the world to design a cassette tape recorder with a combination of 3 motors and an advanced tape transport called the dual-capstan closed-loop system (see page 12). On the TCD 330 we have taken the development a stage further and included professional features and facilities normally found only on the most advanced open reel machines. This means that with the TCD 330 Tandberg is setting new standards with the application of advanced technology, professional facilities and a professional performance for cassette machines.



### 3 heads — source and tape tests as you record!

This facility has been normal on open reel machines for many years, but it has been missing on cassette machines. The TCD 330 has separate record and playback heads placed in the tape path where they enable you to listen to the recording as it takes place, but a fraction of a second after it has been recorded (tape test). With this facility we have fully exploited the advantage of 3 separate heads located in the correct places.

### Editing facility

Another important advantage with the TCD 330. Because you can go over directly from playback to record without going via stop, you can edit tapes and clean-up recording overlaps in a simple, precise way without clicks.

### Completely logic controlled

All the operational modes are logic controlled — including even the cassette eject mechanism. The control system is an “electronic brain” with integrated circuits. This corresponds to several hundred transistors and provides a very compact and reliable design. Regardless of how you use the mode buttons, the “electronic brain” always ensures that the tape flows smoothly and is not damaged. The TCD 330 has 3 motors controlled by electronics. The two reel motors are connected directly to the reel spindles while the third motor controls the capstans. The number of moving parts has been reduced to a minimum — a big advantage because all mechanisms sooner or later wear out and need adjusting or replacing. The advantages with electronic control of the TCD 330 are first and foremost, no mechanical time delays between operational modes and second, all operation times are minimal.

### Azimuth adjustable on record head

The critical stage in the recording process is where the tape crosses the record head. Correct reproduction of the highest tones is very dependent on the angle between the tape and the head face. The angle must be 90° to achieve the best performance. A 10° error will give 6 dB loss at 15 kHz, and a 15° error will give 6 dB loss at 10 kHz.

The tape path is always slightly different from one cassette to another because of small deviations in cassette construction. So the tape/head angle will not always be 90°. The TCD 330 has a simple, built-in head-angle adjustment facility (azimuth adjustment) that allows you to set the head exactly to 90° for any cassette. So you get the best results from every cassette!



### Rapid servo-controlled winding

The TCD 330 winds and rewinds rapidly and has an automatic electronic servo-system controlling the wind/rewind speed. The design problem is that the tape can easily be stretched at the ends if the speed and winding power are too great. We solved this problem by automatically reducing the speed as the tape gets near the end. So the tape speed is always correct and the tape is never exposed to powerful tugs when it stops.

### Wood veneers

The TCD 330 is delivered in teak or rosewood (oak or walnut to order).

### Accessories

Tandberg microphones, Tandberg tape, Tandberg remote control unit; see page 35.

### General

**Dimensions:** width 18 1/2" (47 cm), height 4 1/8" (10.5 cm) and depth 9 1/8" (23 cm).

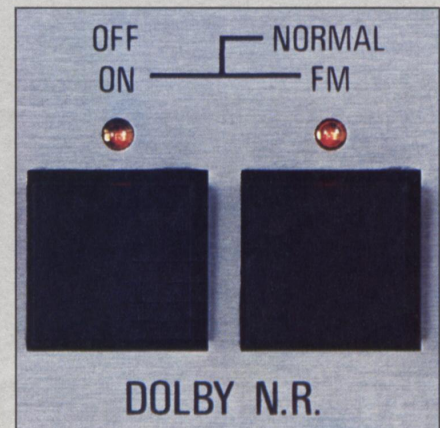
**Weight:** 3 lb (6.6 kg).

**Specification, see page 14.**

### The Dolby B circuits

The TCD 330 Dolby B circuits are used for normal record and playback operations and to record so-called “Dolbyized FM programmes” in stereo! Increasingly more countries are transmitting stereo programmes on FM using Dolby noise reduction systems.

These programmes are virtually free from hiss at the transmitter. But to take advantage of this improvement in the programme quality and to restore the correct frequency response the reproducing equipment must include a Dolby decoder. The decoder can be either in the radio receiver or in the tape recorder. With the DOLBY N.R. button in the position “FM” the TCD 330 acts as a decoder.



# TANDBERG

## TCD 310 STEREO



In professional reel-to-reel tape recorders and in the most advanced semi-professional machines 3 motors are taken for granted. Now Tandberg has made a Hi-Fi cassette tape recorder which is the first in the world with 3 motors, with a very special tape transport system, with peak level meters and with the Dolby B\* noise reduction system.

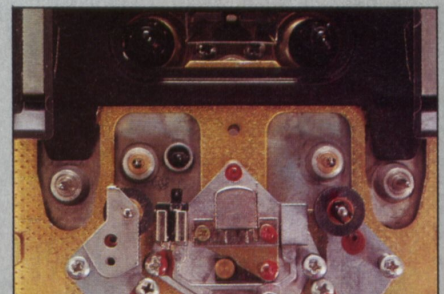
- Specification better than requirements of DIN 45500
- Tape transport system has 2 capstans and 2 pressure rollers (closed loop).

Amongst other things this means that speed variations are reduced to a very low level

- Electronic controls
- High quality magnetic heads
- Large peak level meters
- Mixing in mono
- Automatic stop
- Can be used in vertical position
- For use with separate Hi-Fi stereo amplifier

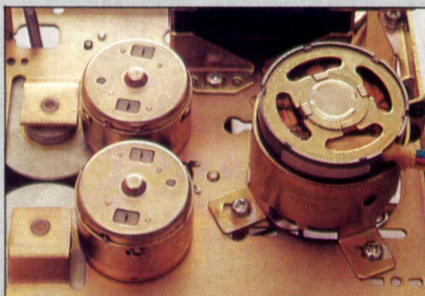
\* The name Dolby is a registered trade mark of Dolby Laboratories Inc., USA.

One of the special features on the TCD 310: the tape transport system with 2 capstans/flywheels and 2 pinch rollers in a closed loop system.





Tandberg TCD 310 is equipped with 3 motors.



### The Dolby B system

The TCD 310 has the Dolby noise reduction system. This reduces tape noise by about 10 dB compared with conventional systems. The Dolby system is especially important in a cassette tape recorder because the tape noise is higher than in a reel-to-reel tape recorder. The Dolby system can be connected and disconnected with a switch.

### The tape transport

In a tape recorder it is a big advantage if the number of moving parts is reduced to a minimum. All mechanisms sooner or later wear out, and complicated clutch systems and mechanical linkages contribute to a worsening performance. This is particularly true for cassette machines because the cassette's construction gives narrow tolerances for high quality sound reproduction.

Even heavily worn cassettes will not be damaged in the TCD 310 because it has a built-in safety device that automatically stops the tape-drive if the tape is jammed. The dual-capstan closed-loop system consists of 2 capstans with precision flywheels and 2 pinch rollers. This provides a stable tape path with minimum speed variations. The mechanism is simple and solid giving a reliable performance. The tape transport system provides the correct tape tension across the magnetic heads and cancels irregularities in the sound level caused by the pressure pad in the cassette. During record/replay and fast wind/rewind the driving mechanism is automatically disconnected at the end of the tape.

### Tape selector

The magnetic heads and the electronic circuits in the TCD 310 were designed for maximum exploitation of the best characteristics of the newest tapes. A selector allows you to adjust the tape recorder to optimum for different types of tape.

### Peak level meters

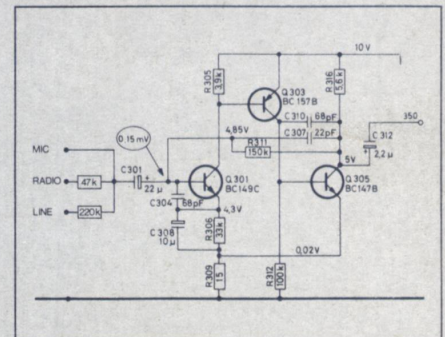
These provide the best method of controlling a recording. The meters can also be used to indicate the replay level.

### 3 motors

The TCD 310 has one synchronous motor

for record/replay and two motors for fast forward and backward winding. These two motors are in direct contact with the spool spindles. This ensures that the number of moving parts is reduced to a minimum, and there is no complicated mechanical transmission that could eventually wear and reduce the performance of the machine. The spooling speed is high and it only takes about 40 seconds to spool a C60 cassette.

### Self-adjusting input amplifier



This novel self-adjusting input amplifier was specially designed at Tandberg's Radiofabrikk. While conventional input amplifiers are optimized to a particular programme source and are often badly matched to other programme sources, this amplifier adjusts itself automatically to different programme sources (radio, record player with ceramic pick-up, amplifier, microphone). The result is something that cannot be achieved with conventional amplifiers: a full dynamic range and the absolute minimum noise from the input circuits — regardless of which programme source and which recording level are used.

### Wood veneers

TCD 310 is delivered in teak or rosewood (oak or walnut to order).

### Accessories

Tandberg microphones and Tandberg tape, see page 35.

### General

**Dimensions:** width 17" (43 cm), height 4 1/4" (10.5 cm) and depth 9 1/4" (23 cm).

**Weight:** 15 1/2 lb (6.5 kg).

**Specification, see page 14.**

# SPECIFICATIONS, TAPE RECORDERS

Note that the figures given in the data are closely related to the measurement method used. (See signal/noise figures below.)  
 Meanings of figures are clarified in left-hand column.

Technical specifications All specifications better than requirements of DIN 45 511	SERIES 10XD STEREO DECK		SERIES 9100X STEREO DECK		SERIES 3500X STEREO DECK		CASSETTE DECK TCD 330 STEREO		CASSETTE DECK TCD 310 STEREO	
	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track	2-track 4-track
POWER REQUIREMENTS 50 or 60 Hz	240/230/115 V	240/230/115 V	240/230/115 V	240/230/115 V	240/230/115 V	230/115 V	230/115 V	230/115 V	230/115 V	230/115 V
POWER CONSUMPTION	100 W	100 W	96 W	96 W	45 W	40 W	40 W	40 W	34 W	34 W
TAPE SPEED i.p.s.	15 - 7 1/2 - 3 3/4	15 - 7 1/2 - 3 3/4	7 1/2 - 3 3/4 - 1 1/2	7 1/2 - 3 3/4 - 1 1/2	7 1/2 - 3 3/4 - 1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
SPEED TOLERANCE max. 1)	± 0.3 %	± 0.3 %	± 0.7 %	± 0.7 %	± 1 %	± 0.5 %	± 0.5 %	± 0.5 %	± 1 %	± 1 %
WOW and FLUTTER, max.										
Peak DIN 45 511	0.07 % 0.09 % 0.15 %	0.07 % 0.09 % 0.15 %	0.09 % 0.15 % 0.30 %	0.09 % 0.15 % 0.30 %	0.1 % 0.18 % 0.35 %	0.18 %	0.18 %	0.18 %	0.2 %	0.2 %
Weighted R.M.S.	0.04 % 0.06 % 0.11 %	0.04 % 0.06 % 0.11 %	0.06 % 0.11 % 0.21 %	0.06 % 0.11 % 0.21 %	0.07 % 0.12 % 0.25 %	0.12 %	0.12 %	0.12 %	0.15 %	0.15 %
FREQUENCY RESPONSE:										
DIN 45 500	30-30 000 Hz 30-26 000 Hz 30-20 000 Hz	30-30 000 Hz 30-26 000 Hz 30-20 000 Hz	30-26 000 Hz 30-20 000 Hz 30-11 000 Hz	30-26 000 Hz 30-20 000 Hz 30-11 000 Hz	30-26 000 Hz 30-20 000 Hz 30-11 000 Hz	20-20 000 Hz	20-20 000 Hz	20-20 000 Hz	30-16 000 Hz	30-16 000 Hz
± 3 dB	30-25 000 Hz 30-22 000 Hz 40-18 000 Hz	30-25 000 Hz 30-22 000 Hz 40-18 000 Hz	30-22 000 Hz 40-18 000 Hz 40-9 000 Hz	30-22 000 Hz 40-18 000 Hz 40-9 000 Hz	30-22 000 Hz 40-18 000 Hz 40-9 000 Hz	30-18 000 Hz	30-18 000 Hz	30-18 000 Hz	40-14 000 Hz	40-14 000 Hz
SIGNAL/TAPE NOISE RATIO at highest tape speed with Tandberg Tape or equivalent tape IEC, A-curve (DIN 45 500, weighted) IEC, unweighted R.M.S. (DIN 45 500, unweighted)	Dolby 2-track   4-track 75 dB   73 dB 62 dB   62 dB	Dolby 2-track   4-track 75 dB   73 dB 62 dB   62 dB	Normal 2-track   4-track 67 dB   65 dB 58 dB   58 dB	Normal 2-track   4-track 67 dB   65 dB 58 dB   58 dB	Normal 2-track   4-track 67 dB   65 dB 58 dB   58 dB	64 dB 57 dB	64 dB 57 dB	64 dB 57 dB	Dolby 65 dB 55 dB	Dolby 65 dB 55 dB
CROSSTALK ATTENUATION at 1000 Hz, minimum	Mono Stereo 60 dB 50 dB	Mono Stereo 60 dB 50 dB	Mono Stereo 60 dB 50 dB	Mono Stereo 60 dB 50 dB	Mono Stereo 60 dB 50 dB	60 dB 50 dB	60 dB 50 dB	60 dB 50 dB	Side 1 to side 2, Track 1 to track 2, 60 dB	Side 1 to side 2, Track 1 to track 2, 60 dB
HARMONIC DISTORTION, max. From amplifier at 0 dB From tape at 0 dB record level	0.2 % 2 %	0.2 % 2 %	0.2 % 3 %	0.2 % 3 %	0.3 % 3 %	0.3 % 3 %	0.3 % 3 %	0.3 % 3 %	0.3 % 3 %	0.3 % 3 %
INPUTS Input impedance/sensitivity, max. voltage at 400 Hz (MIC inputs are suitable for dynamic microphones. The sensitivity is automatically adjusted for the mic impedance)	MIC (balanced): 0.23 mV-35 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 200 k ohms/30 mV-5 V	MIC (balanced): 0.23 mV-35 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 200 k ohms/30 mV-5 V	MIC (balanced): 0.23 mV-35 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 200 k ohms/30 mV-5 V	MIC (balanced): 0.23 mV-35 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 200 k ohms/30 mV-5 V	MIC (balanced): 0.23 mV-35 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 200 k ohms/30 mV-5 V	MIC: 130 µV-25 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 500 k ohms/100 mV-10 V	MIC: 130 µV-25 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 500 k ohms/100 mV-10 V	MIC: 130 µV-25 mV RADIO: 50 k ohms/8 mV-1.2 V LINE: 500 k ohms/100 mV-10 V	MIC: 0.15 mV-20 mV LINE: 220 k ohms/40 mV-5 V RADIO: 47 k ohms/8 mV-1 V (stereo)	MIC: 0.15 mV-20 mV LINE: 220 k ohms/40 mV-5 V RADIO: 47 k ohms/8 mV-1 V (stereo)
OUTPUTS Min. load impedance/voltage with unloaded output or power output for each channel	RADIO: 5 k ohms/0.775 V LINE: 150 ohms/1.5 V HEADPHONES: 8 ohms/5 mW	RADIO: 5 k ohms/0.775 V LINE: 150 ohms/1.5 V HEADPHONES: 8 ohms/5 mW	RADIO: 5 k ohms/0.775 V LINE: 150 ohms/1.5 V HEADPHONES: 8 ohms/5 mW	RADIO: 5 k ohms/0.775 V LINE: 150 ohms/1.5 V HEADPHONES: 8 ohms/5 mW	RADIO: 5 k ohms/0.775 V LINE: 150 ohms/1.5 V HEADPHONES: 8 ohms/5 mW	RADIO: 5 k ohms/0.775 mV LINE: 0.1 k ohms/1.5 V HEADPHONES: 100 ohms/5 mW	RADIO: 5 k ohms/0.775 mV LINE: 0.1 k ohms/1.5 V HEADPHONES: 100 ohms/5 mW	RADIO: 5 k ohms/0.775 mV LINE: 0.1 k ohms/1.5 V HEADPHONES: 100 ohms/5 mW	RADIO: 10 k ohms/0.775 V	RADIO: 10 k ohms/0.775 V

1) With nominal mains voltage and normal operating temperature.  
 Note that the signal-to-noise ratios for Dolby and non-Dolby models cannot be compared directly because the Dolby system does not cover the entire frequency range used for the signal-to-noise measurements.

# TANDBERG

## RADIO RECEIVERS, STEREO AMPLIFIERS



This is the Tandberg range of radio receivers and stereo amplifiers for 1976/77. A wide selection that few manufacturers can equal. Models in this range are designed to meet a variety of needs so that you personally can find just the model that suits you.

Over the years the names Sølvsuper and Huldra have become known as leading Norwegian quality products. This reputation was earned primarily by combined multi-waveband receivers and stereo amplifiers. But there is also a wide choice of combined FM receivers and stereo amplifiers with different performances and at different prices, such as the TR 1040 and the TR 220. The TR 220 is the top compact model and is made in three versions with a record player and a

cassette tape recorder. The Sølvsuper can also be delivered with a cassette tape recorder. The TA 300 M is a pure amplifier.

The 2000 series embraces all the top models from Tandberg and includes the very cream of the best receivers in the world. The 3 models in this series set new performance standards for combination models. The leading model in this series, the TR 2075, has been rated by American and European technical journals as one of the very best receivers available from any manufacturer in the world, with a performance that can only be equalled by far more expensive separate units!

On page 30 you will find the performance specifications in a single table. You can compare the performances of the Tand-

berg models with each other or with any other model on the market. But make sure the measurement methods are the same when you compare Tandberg models with other models. Tandberg always expresses its specifications according to recognized, defined methods of measurement. The output power, for example, is expressed as a continuous sine wave which should not be confused with "music power". Tandberg products have so-called "minimum specifications" which means that every single product unit leaving the factory has a performance better than the specification. Tests carried out by well-known Hi-Fi journals often report that they find the actual performance of Tandberg products is far better!

# TANDBERG

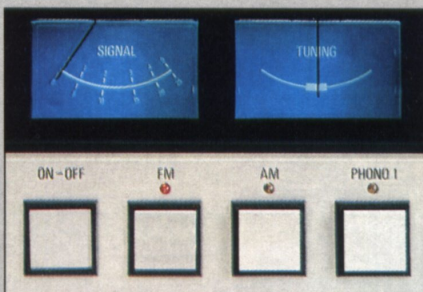
## TR 2075



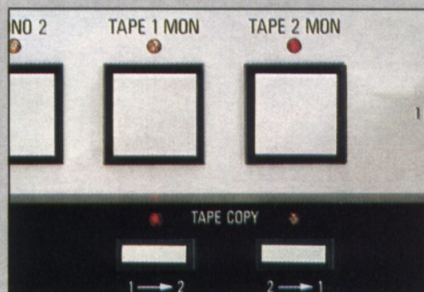
The TR 2075 is the most powerful and most advanced stereo tuner/amplifier Tandberg has ever produced — and one of the most advanced in the world! The “power house” of an amplifier delivers more than 75 watts sine wave output power to each channel with an 8 ohm load and with a maximum of 0.15% distortion over the whole frequency range (20 to 20 000 Hz)! The tuner section comprises a top quality FM stereo tuner and an AM (medium wave) tuner.

Read more about the TR 2075 in the large separate informative brochure.

**Large tuning meters.** The TR 2075 has two tuning meters: the signal strength meter gives full scale deflection for strong aerial signals (200 mV). This meter also has a scale for indicating audio output power. The centre-zero meter makes it easy to tune-in FM stations spot on and is particularly important for stereo transmissions.



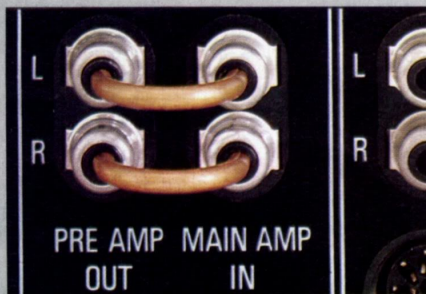
**TAPE MONITOR and TAPE COPY facilities.** Both tape recorder inputs have a TAPE MONITOR facility permitting source and tape testing during recording. The TAPE COPY facility allows copying in both directions between two tape recorders connected to the TR 2075. Copying can take place without affecting any other programme that is going to the loudspeakers.







Output from pre-amplifier and input to power amplifier. The pre-amplifier and the power amplifier can both be used as separate units. At the back of the TR 2075 there are phono sockets for the input and output of each channel. This means you can connect the pre-amplifier to another amplifier or to other Hi-Fi unit. In the same way the power amplifier in the TR 2075 can be used independently.



Highly efficient ferrite-rod aerial. The AM aerial is situated at the back of the receiver and can be rotated through 270° to the best position for reception. The TR 2075 also has sockets for outdoor aerials for FM and AM.



#### THE FM SECTION

- MOSFET transistors, 4-pole ceramic filters and integrated circuits (IC's)
- Signal/noise ratio 75 dB in stereo and 78 dB in mono (IHF)!
- Automatic switchover to FM stereo with illuminated indicator
- Electronic tuning. Heavy flywheel making tuning a pleasure
- Muting for quiet tuning
- Large tuning and signal strength meters for spot-on tuning
- FM 25  $\mu$ s de-emphasis switch for use with external Dolby\* decoder when receiving FM Dolby\* broadcasts

#### THE AM SECTION (medium wave)

- 2 MOSFET transistors in the HF stage and the mixer provide equally good reception with strong and weak aerial signals
- 2 tuned RF circuits mean that the signal/noise ratio is excellent and the image frequency rejection ratio is greater than 90 dB!

#### THE AUDIO SECTION

- Extremely low distortion
- 2 inputs for transcription units, one with adjustable sensitivity. Large dynamic range
- 2 inputs for tape recorders with adjustable sensitivity. Large dynamic range and TAPE MONITOR facility
- Copying facilities for 2 tape recorders
- Output for tone-controlled programme
- 3 tone controls for each channel
- 3 filters. 2 HIGH and 1 LOW. Steep slopes
- 2 front output jacks for stereo headphones
- Automatic protection against all kinds of overload
- Recommended speakers: Tandberg Studio Monitor (see pages 32 to 34)

#### General

Delivered in teak, rosewood, or walnut.

**Mains voltage:** 240 V 50/60 Hz (internal tapings for 120-220-240 V).

**Dimensions:** width 20 1/2" (51.5 cm), height 6" (15.3 cm), and depth 14" (35.3 cm) plus 1" (2.4 cm) for knobs. **Weight:** 27.5 lb (12.5 kg).

**Specification, see page 30.**

\* The name Dolby is a registered trade mark of Dolby Laboratories Inc., USA.

# TANDBERG

## TR 2055



Also a model that bears comparison with the best receiver/amplifiers on the market. The same superb FM stereo tuner as the TR 2075 (pages 16 and 17). The power amplifier delivers more than  $2 \times 55$  watts into 8 ohms over the complete frequency range 20 Hz to 20 000 Hz with less than 0.15% total distortion!

### THE FM SECTION

- MOSFET transistors, 4-pole ceramic filters and integrated circuits (IC's)
- Signal/noise ratio 75 dB in stereo and 78 dB in mono (IHF)!
- Automatic switchover to FM stereo with illuminated indicator
- Electronic tuning. Heavy flywheel making tuning a pleasure
- Muting for quiet tuning
- Large tuning and signal strength meters for spot-on tuning
- FM 25  $\mu$ s de-emphasis switch for use with external Dolby\* decoder when receiving FM Dolby\* broadcasts

### THE AUDIO SECTION

- Inputs for 2 transcription units and 2 tape recorders
- Adjustable sensitivity for one of the transcription unit inputs and for both the tape recorder inputs

- Both tape recorder inputs have a **TAPE MONITOR** facility
- Copying facilities for 2 tape recorders
- Front output jack for recording a tone-controlled programme (**TAPE CONTOUR OUT**)
- Frequency/loudness compensated volume control
- 2 filters (**LOW** and **HIGH**)
- 2 front jacks for stereo headphones
- Extra light push buttons
- Light diode indicators (**LED**) for the most important operational modes

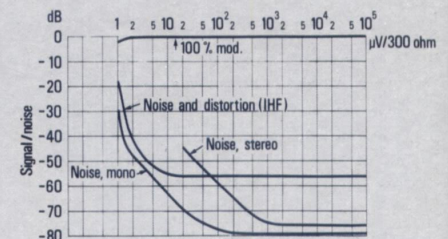
\* The names Dolby and Dolbyized are registered trade marks of Dolby Laboratories Inc., USA.

### Wood veneers

Delivered in teak, rosewood, or walnut.

### General

**Mains voltage:** 240 V, 50/60 Hz (internal tapings for 120-220-240 V).  
**Dimensions:** width 20" (51 cm), height 6" (15.3 cm), and depth 14" (35.3 cm) plus 1" (2.4 cm) for knobs.  
**Weight:** 28 $\frac{3}{4}$  lb (13 kg).  
**Specification, see page 30.**



Signal/noise ratio in stereo and mono, and distortion for the FM receiver.



# TANDBERG

## TR 2025



The TR 2025 completes the TR 2000 series — 3 top models to meet a variety of needs and pockets. The stereo FM section has pre-tuning for 5 stations. The power amplifiers deliver more than  $2 \times 25$  watts in 8 ohms over the complete frequency range from 20 to 20 000 Hz with less than 0.15% total distortion.

### THE FM SECTION

- Excellent stereo tuner. MOSFETS, IC's, and  $3 \times 4$ -pole ceramic filters providing extremely good sensitivity and selectivity
- Automatic switchover to stereo
- Automatic frequency control (AFC) disconnects itself during tuning and connects itself again when tuning is completed. Can also be operated manually
- Heavy flywheel gives smooth, precise tuning
- 2 large sensitive meters
- Muting for quiet tuning
- Stereo amplifier with the same high quality as the more expensive models (see specifications on page 30)
- DIN sockets for 2 tape recorders. Both inputs have TAPE MONITOR facility
- Input for transcription unit (mag. p.u.)

- Copying facilities for 2 tape recorders simultaneously
- LOW and HIGH filters
- Frequency/loudness compensated volume control
- Front output jack for stereo headphones

### Wood veneers

Delivered in teak, rosewood, or walnut.

### Recommended speakers for the TR 2025

First we recommend the TL 3520, a 3-way system with a wide frequency range and high power handling capacity. An alternative is the TL 2520. See pages 32 to 34. 2 or 4 speakers can be connected to the TR 2025.

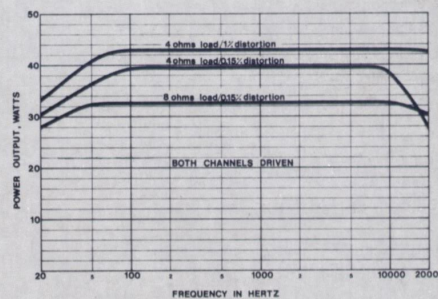
### General

**Mains voltage:** 240 V, 50/60 Hz (internal tapings for 120–220–240 V).

**Dimensions:** width  $20\frac{1}{2}$ " (51.5 cm), height  $5\frac{3}{4}$ " (14.3 cm), and depth  $12\frac{3}{4}$ " (32 cm) plus  $\frac{7}{8}$ " (2 cm) for knobs.

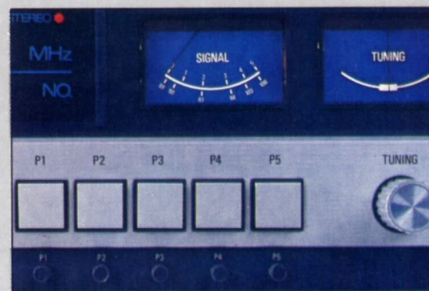
**Weight:** 19 lb (8.3 kg).

**Specification, see page 30.**



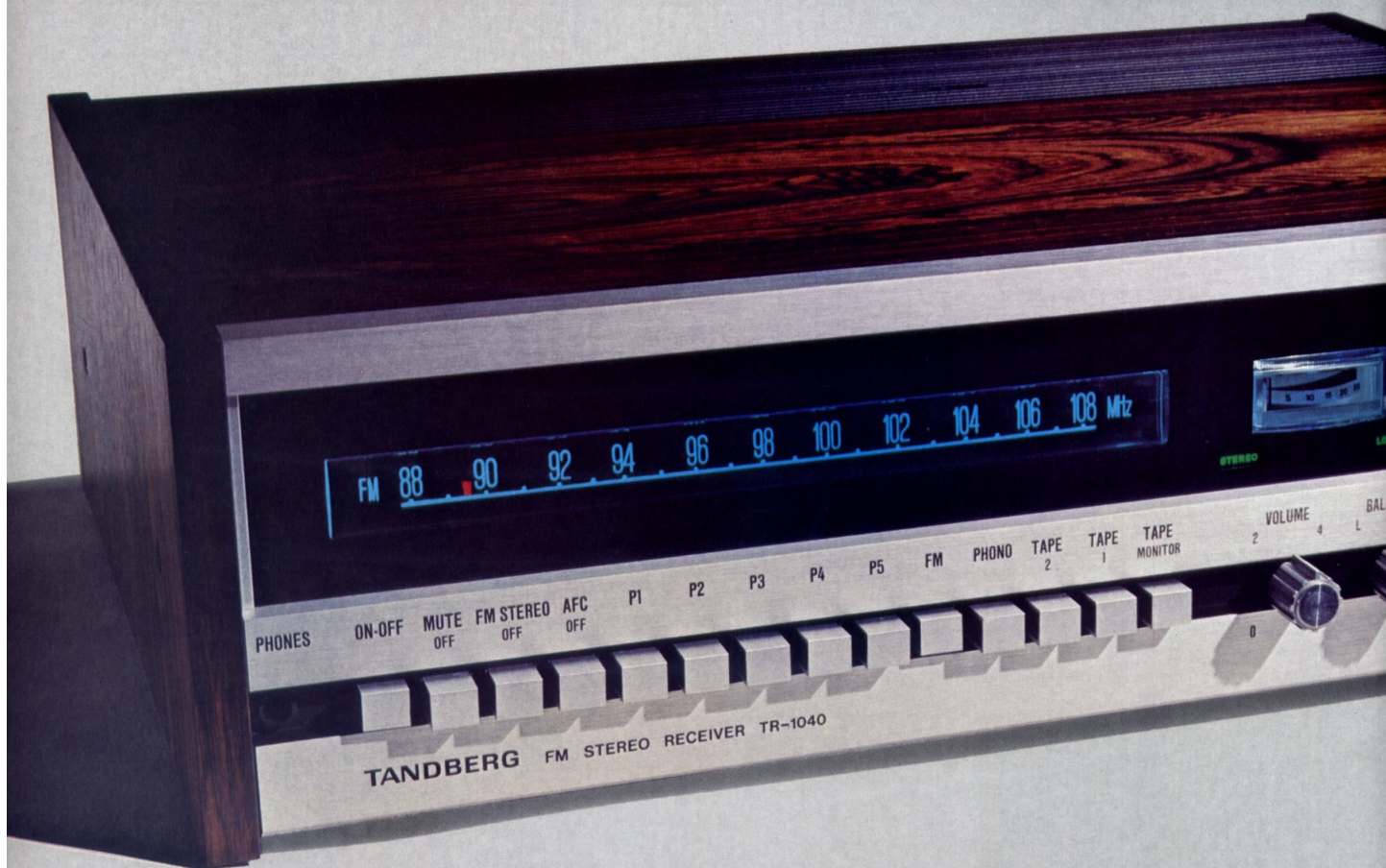
Audio output power as a function of frequency (both channels driven simultaneously, 0.15% distortion).

**2 large meters.** Signal strength meter (left) is dual purpose. For manual FM tuning it indicates signal strength with a large dynamic range. It is also a frequency scale for the 5 pre-tuned stations. The meter on the right is a fine-tuning meter.



# TANDBERG

## TR 1040 P



Developed from the TR 1000 and the TR 1010 which have received excellent reports in Hi-Fi journals in many countries.

The TR 1040 P has an FM tuner and pre-tuning for five stations. The stereo amplifier delivers  $2 \times 40$  watts sine wave output power in 8 ohms from 20 to 20 000 Hz!

- Stereo FM tuner with MOSFET transistors, 4-pole ceramic filters and integrated circuits (IC's)
- Automatic switchover to FM stereo
- Electronic tuning. The flywheel provides smooth precise station tuning
- Muting on FM
- Signal strength and centre-zero meters for spot on station tuning
- Sockets for transcription unit and two tape recorders
- Adjustable sensitivity on the inputs
- Front output jack for a third tape recorder for recording a tone-controlled programme (PRE-AMP REC)
- Frequency/loudness compensated volume control

- Separate bass and treble controls for each channel
- 3 filters (1 LOW and 2 HIGH)
- Push buttons for stereo, mono left channel, mono right channels, mono left plus mono right channels, and stereo with channels reversed
- TAPE MONITOR facility
- Front output jack for stereo headphones

#### The FM receiver

The FM receiver has MOSFET transistors giving good reception for weak and strong stations. Extra linear phase response and high selectivity with 4-pole ceramic filters. A good performance is obtained from the integrated FM amplifier and detector. The FM stereo decoder has integrated circuits that include a phase-locked-loop oscillator giving good channel separation over the complete frequency range. The stereo decoder has automatic or manual change-over between mono and stereo. Efficient filters remove the stereo system's pilot tone and auxiliary carrier wave. This is important

for good quality if you record an FM stereo programme on magnetic tape. Precise tuning is easy with the two large tuning meters, a big advantage, especially with stereo transmissions. The FM receiver is equipped with a muting circuit that removes inter-station noise when you are tuning.

#### Power amplifier

The amplifier has been designed to handle extremely heavy loads. Automatic protection circuits keep watch over it constantly. The TR 1040 P has a direct coupled, shortcircuit proof output stage. Complementary output transistors give very low distortion. An electronic controlled relay protects the loudspeakers from accidental d.c. damage. Thermal protection disconnects the amplifiers if they are overheated (from bad ventilation) and connects them again immediately the temperature has fallen.

The pre-amplifier is designed for a transcription unit or record player with a magnetic pick-up. All the inputs are



operative. An extra refinement is the separate bass and treble controls for each channel which permits equalization for bass and treble differences resulting from asymmetrical positioning of loudspeakers.

#### Connecting other Hi-Fi units

The TR 1040 has an input for a transcription unit or record player with magnetic pick-up, and 2 inputs for tape recorders. At the front there is an extra tape recorder input for recording frequency corrected programmes. All inputs are adjustable. There are 4 loudspeaker outputs and in addition a front output for stereo headphones.

#### Wood veneers

Delivered in teak or rosewood. (Oak or walnut to order).

#### Tandberg loudspeakers for the TR 1040 P

The wide selection of Hi-Fi loudspeakers in the TL 20 series (see pages 32 to 34) includes several models that are an excellent match for the TR 1040 P. The speaker we recommend most is the TL 5020 with a frequency range from 35 to 20 000 Hz (DIN).

#### General

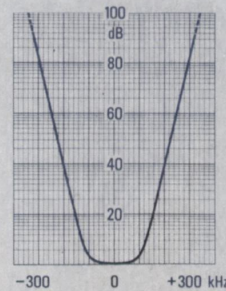
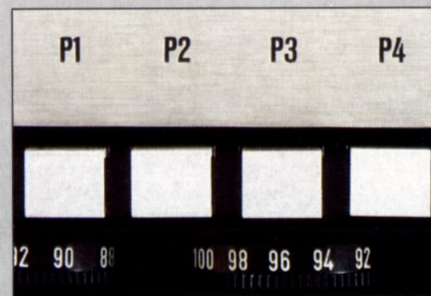
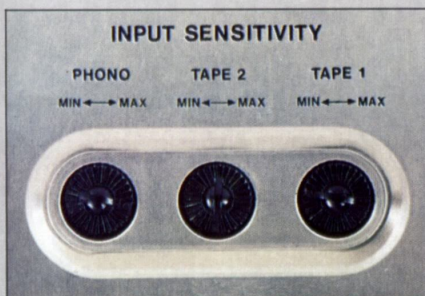
**Mains voltage:** 240 V (internal connections for 120–220–240 V), 50/60 Hz.  
**Dimensions:** width 17½" (44 cm), height 5<sup>3</sup>/<sub>16</sub>" (13.2 cm), depth 12¼" (31 cm) + knobs ¾" (2 cm).  
**Weight:** 20 lb (9 kg).  
**Specification, see page 30.**

**Pre-tuning for 5 FM stations (TR 1040 P).** The buttons for the fixed FM stations (P1, P2, . . .) are located adjacent to their respective tuning wheels behind a hinged flap at the front. This allows you to pre-tune up to 5 stations so that afterwards any station can be instantly selected by its P button. The AFC circuit ensures that the stations stay in tune – even if the conditions vary!

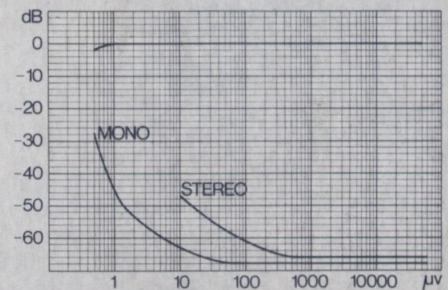
adjustable so that the same input levels can be obtained from different programme sources.

Three effective filters (1 LOW and 2 HIGH) attenuate disturbing noise from programme sources. Illuminated text on the scales shows which functions are

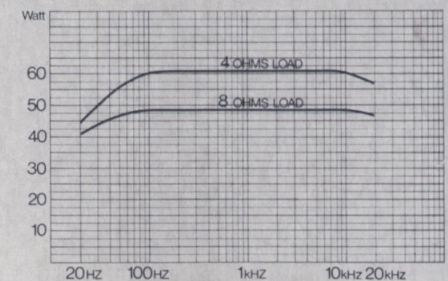
**Adjustable sensitivity for the inputs.** The input level for all the inputs can be adjusted. This means that the 1040 P can have optimum matching to different programme sources (transcription unit, tape recorders) so that the sound level from one source is made to be equal to the sound level from another source.



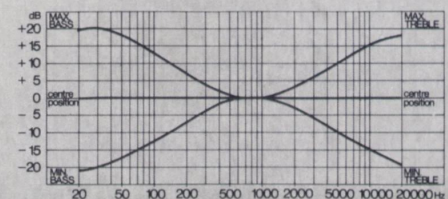
Selectivity curve for the FM tuner.



Signal/noise ratio against aerial voltage for the FM tuner (mono and stereo) with 75 ohms aerial impedance.



Output power as a function of frequency (both channels driven simultaneously, 0.2% distortion).



Frequency response curves with bass and treble controls at maximum, mid, and minimum settings (without frequency/loudness compensation).

# TANDBERG

## TR 220



**FM stereo tuner and powerful stereo amplifier: 2 × 17 watts sine wave output power in 8 ohms, 2 × 25 watts sine in 4 ohms.**

- FM stereo receiver
- Tuner has MOSFET transistors, ceramic filters and integrated circuits (IC's)
- Pre-tuning for 4 stations
- Muting
- 2 large meters
- AFC (automatic frequency control)
- Pre-amplifier designed for record player with magnetic pick-up (RIAA)
- Frequency/loudness compensated volume control
- LOW and HIGH filters
- Inputs for 2 tape recorders, one with TAPE/MONITOR facility
- 4 speaker outputs
- Front jack for stereo headphones

### The FM tuner

The Tandberg TR 220 has an excellent FM tuner constructed with field effect transistors (MOSFETS) and integrated circuits (IC's). This combination provides good sensitivity and prevents interference from strong neighbouring stations. The tuner also has ceramic filters providing good selectivity and minimum distortion. The stereo decoder has integrated circuits and a phase-locked-loop oscillator providing good channel separation and low distortion. The 2 large meters make it easy to tune-in stations spot on.

### The powerful stereo amplifier

The stereo amplifier has full complementary output stages giving low distortion — i.e. pure sound. There is a balance control and a common volume control for both channels. The volume control can be frequency/loudness compensated. The bass and treble controls are very effective. The TR 220 is also equipped with efficient filters (HIGH and LOW) which attenuate undesirable noise from programme sources.

### Input/output sockets

The TR 220 can be connected to a record player with a magnetic pick-up and 2 tape recorders.

One of the tape recorder inputs has a TAPE/MONITOR facility making it

The TR 220 has two large meters. One meter indicates signal strength from the aerial and also has a scale for the 4 programme buttons (pre-tuned stations). The other meter is the centre-zero type indicating precisely where the station tunes-in best. This is a very great advantage for tuning-in FM stereo programmes.



possible to test and control the programme being recorded in two ways, source test and tape test. There are 4 speaker outputs and a front jack for stereo headphones. The extra input can also be used for connecting a portable radio with AM bands (long, medium, and short waves).

### Wood veneers

The TR 220 can be delivered in teak or rosewood. Oak or walnut to order.

### General

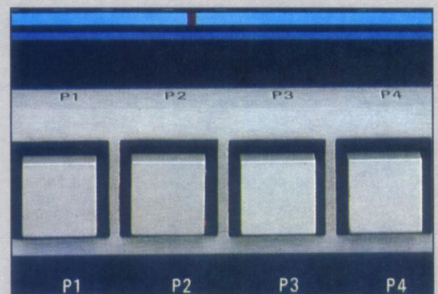
**Mains voltage:** 240 V, 50/60 Hz (internal tapings for 120–220–240 V).

**Dimensions:** width 22¼" (56.7 cm), height 4¾" (11.7 cm), and depth 12½" (31.2 cm) plus knobs ¾" (1.6 cm).

**Weight:** 14.5 lb (6.6 kg).

**Specification, see page 30.**

**Pre-tuning for four stations.** The 4 programme tuners operate with their respective station select buttons and are located at the bottom of the front panel. The signal strength meter has a scale for the programme tuners. Each of the programme tuners can be tuned-in anywhere on the scale.



# TANDBERG

## TR 220 G, TR 220 GC



Two compact models in the same quality class as the TR 220. The stereo amplifier and the FM tuner are identical with the TR 220. The TR 220 G also has a built-in record player with a magnetic pick-up. The TR 220 GC has a built-in record player and a cassette tape recorder. Tandberg loudspeakers are ideal for use with the TR 220 series and we recommend first the TL 1520 or the TL 2520 with the Fasset as a good alternative.

### The record player

The TR 220 G and the TR 220 GC both have the same record player. It has two speeds and combined automatic and manual control. The pick-up arm has a damped lowering action that prevents damage to records. The magnetic pick-up

**Manual speed control.** The speed of the record player can be controlled within certain limits. With the stroboscopic disc supplied, the required fine adjustments can be made.

has a diamond stylus and a wide frequency range.

### The cassette tape recorder

The TR 220 GC is equipped with a record player and a cassette tape recorder for recording from the radio, the record player, another tape recorder, or a microphone. Recording FM stereo broadcasts is a particularly useful facility.

The cassette tape recorder has manual level controls for recording, peak indicating level meters, high quality heads, an automatic end stop, and the Dolby B\* noise reduction system that really does cut the tape noise.

\* The name Dolby is a registered trade mark of Dolby Laboratories Inc., USA.

**Variable playing weight.** The playing weight can be varied by adjusting the stylus pressure between 0 and 5 grammes. This allows you to adjust the pick-up to suit different types of cartridges. In addition there is a separate adjustment for the anti-skating device.

### General

**Mains voltage:** 240 V, 50 Hz (internal tapings for 120–220–240 V).

**Dimensions:** width 22 1/2" (56.7 cm), height 7 1/2" (18.6 cm), with cover, and depth 13 1/2" (33.9 cm) plus 3/4" (1.6 cm) for knobs.

**Weight:** TR 220 G: 24 lb (11 kg).

TR 220 GC: 27 lb (12.3 kg).

**Specification:** see TR 220 on page 30 for specifications on the receiver and the stereo amplifier.

### Specification for record player type 1225

**Speed variations:** less than  $\pm 0.15\%$ .

**Rumble:** better than 37 dB measured unweighted, better than 56 dB measured weighted.

**Playing weight (stylus pressure):** from 0 to 5 grammes, continuously adjustable. The automatic facility works down to 1 gramme.

**Motor:** 4 pole asynchronous motor.

**Manual speed control:** each speed can be adjusted by about 6% (a semi-tone). Visual check by stroboscope.

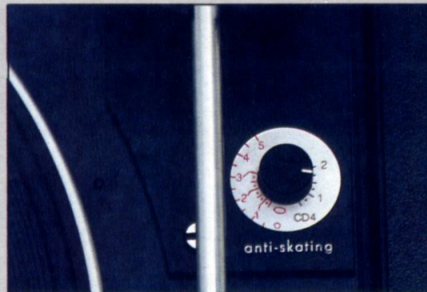
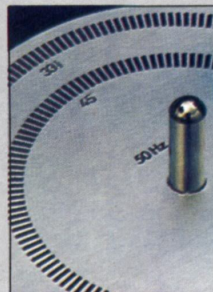
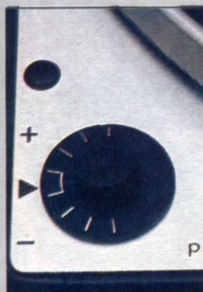
### Specification for cassette tape recorder

**Speed variations:**  $\pm 0.2\%$  (DIN 45511).

**Speed tolerance:**  $\pm 1\%$  (DIN 45511).

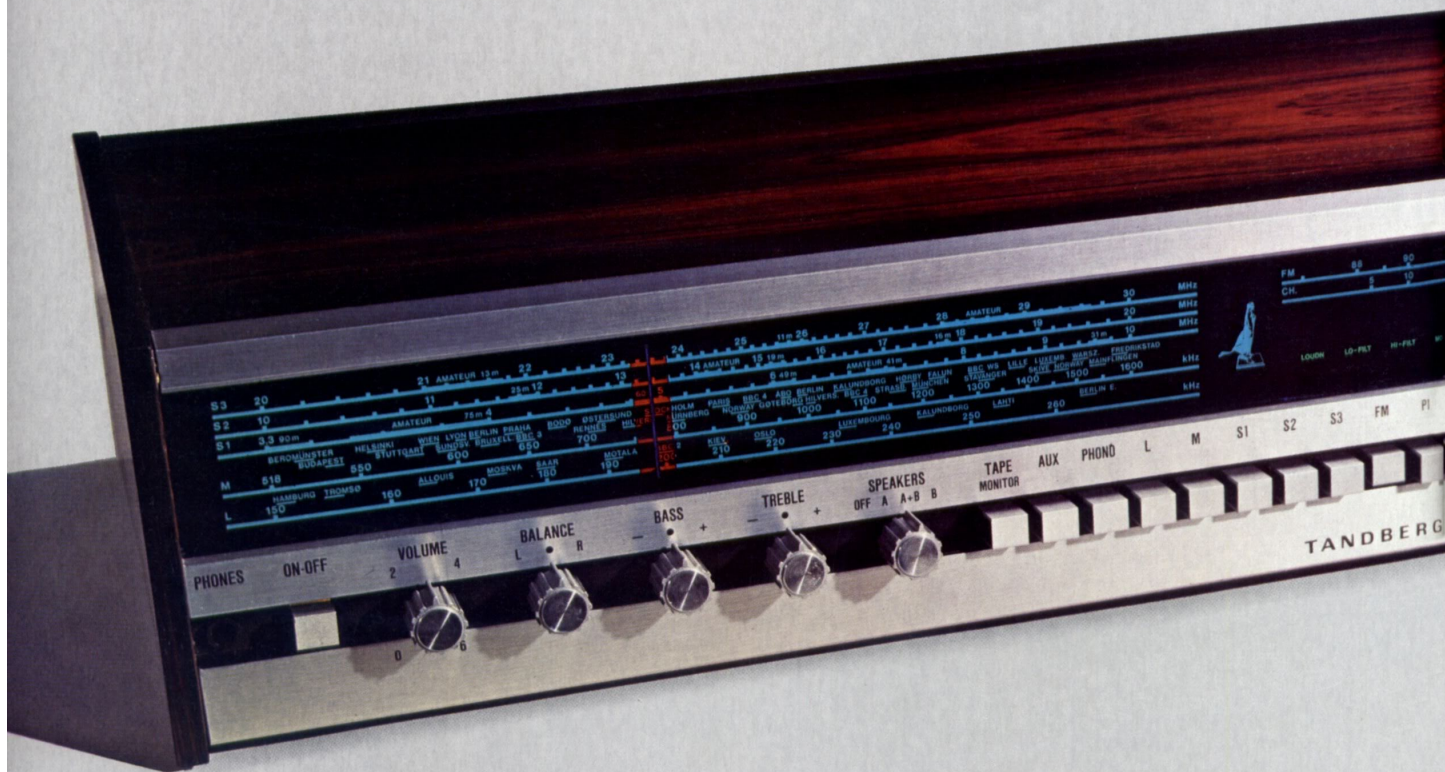
**Frequency range:** 40 to 12 500 Hz (DIN 45511).

**Signal/noise ratio:** greater than 56 dB (with Dolby\*, Geräusch, peak value).



# TANDBERG

## HULDRA 10



Huldra, a leading model with a name full of tradition in the Norwegian radio industry. This is the tenth model bearing this illustrious name: 6 wavebands, powerful stereo amplifier and many refinements making it a very advanced receiver. The Huldra is a top quality product.

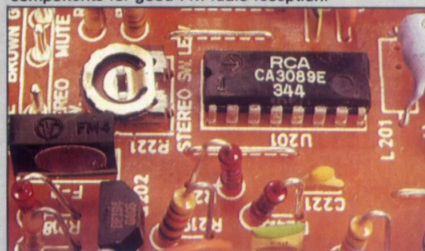
- FM, longwave, mediumwave, and 3 shortwave bands
- Large, open scale
- FM stereo decoder
- Pre-tuning for 4 FM stations
- FM muting
- FM receiver with MOSFET transistors, 4-pole ceramic filters and integrated circuits
- AM receiver with MOSFET input stage
- Stereo power amplifier with  $2 \times 25$  watts sine wave output power in 8 ohms
- Frequency/loudness compensated volume control
- HIGH and LOW filters

- Connections for a record player (magnetic or ceramic pick-up) and a tape recorder. In addition connection for an extra programme source
- Front output for stereo headphones

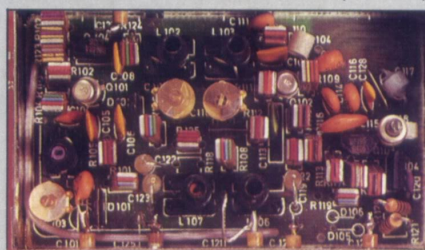
### The FM receiver

The most important characteristic with a receiver is good sensitivity. The FM receiver in the Huldra is based on field-effect transistors (MOSFETs) and integrated circuits: these ensure very good sensitivity and at the same time provide good protection against strong, interfering, nearby stations. The receiver also includes new ceramic filters providing good selectivity and low distortion. The stereo decoder has integrated circuits with a phase-locked-loop oscillator which gives high channel separation and low distortion with reproduction of stereo transmissions. With the two tuning meters it is easy to tune in the stations precisely.

Ceramic filters and integrated circuits – important components for good FM radio reception.



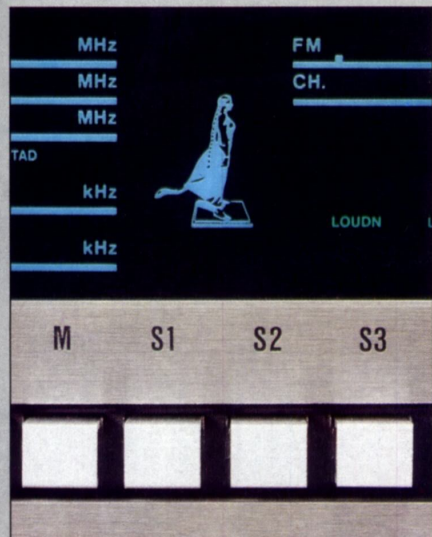
The FM receiver has field-effect transistors (MOSFETs).







With its 6 wave bands and comprehensive facilities Huldra 10 is a radio receiver in the top class. You can enjoy news and entertainment programmes from all over the world. For example, every hour round the clock the BBC World Service transmits the latest news on shortwave.



### The AM receiver

The 3 shortwave bands cover the entire international shortwave spectrum. There is a built-in antenna for longwaves and mediumwaves (can be disconnected). In addition the receiver has special features: six tuned circuits in the intermediate frequency amplifier provide good selectivity. Field-effect transistors also play their part in the AM receiver. The Huldra 10 has such good sensitivity that even very weak stations can be pulled in, but it also tolerates signals from strong stations. A special filter reduces disturbing whistles caused by adjacent stations.

### Power amplifier 2 x 25 watts sine wave

There are many advanced refinements that go towards making Huldra a special receiver. The power amplifier, for example, has a fully complementary output stage giving very low crossover distortion — clean sound. An “electronic protection circuit” prevents damage if the loudspeakers should be accidentally short-circuited. There is a balance control and common volume control for both channels. The loudness compensation on the volume control can be disconnected. Huldra 10 has two very good filters (HIGH and LOW) that reduce noise from programme sources (hiss or rumble). The pre-amplifier is corrected for a magnetic pick-up, (RIAA) with a switch for adjustment for a ceramic pick-up.

### Recommended loudspeakers for the Huldra

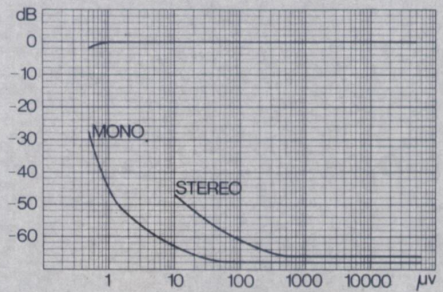
There are three Tandberg speakers particularly suitable for the high quality amplifier in the Huldra 10. First we recommend the TL 2520, a 3-way 25 litre Hi-Fi system giving excellent reproduction from 45 to 20 000 Hz (DIN). An alternative is a larger model, the TL 3520.

### Wood veneers

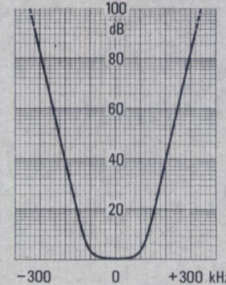
Huldra 10 is delivered in teak or rosewood. Oak or walnut to order.

### General

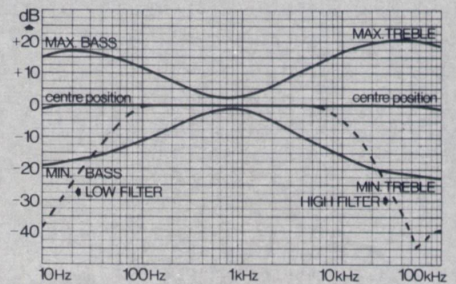
**Mains voltage:** 240 V (internal connections for 220 V, alt. 115–230 V), 50/60 Hz.  
**Dimensions:** width 21" (53.5 cm), height 4 3/4" (12 cm), depth 12" (30.5 cm) + knobs 3/4" (2 cm).  
**Weight:** 18 lb (8.2 kg).  
**Specification, see page 30.**



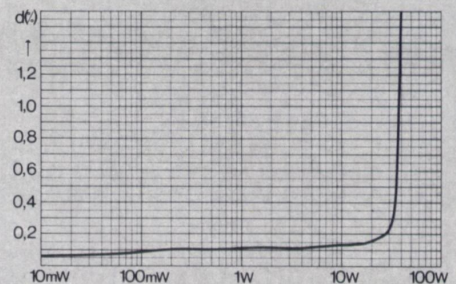
Signal/noise ratio in stereo and mono for the FM receiver.



Selectivity curve for the FM receiver.



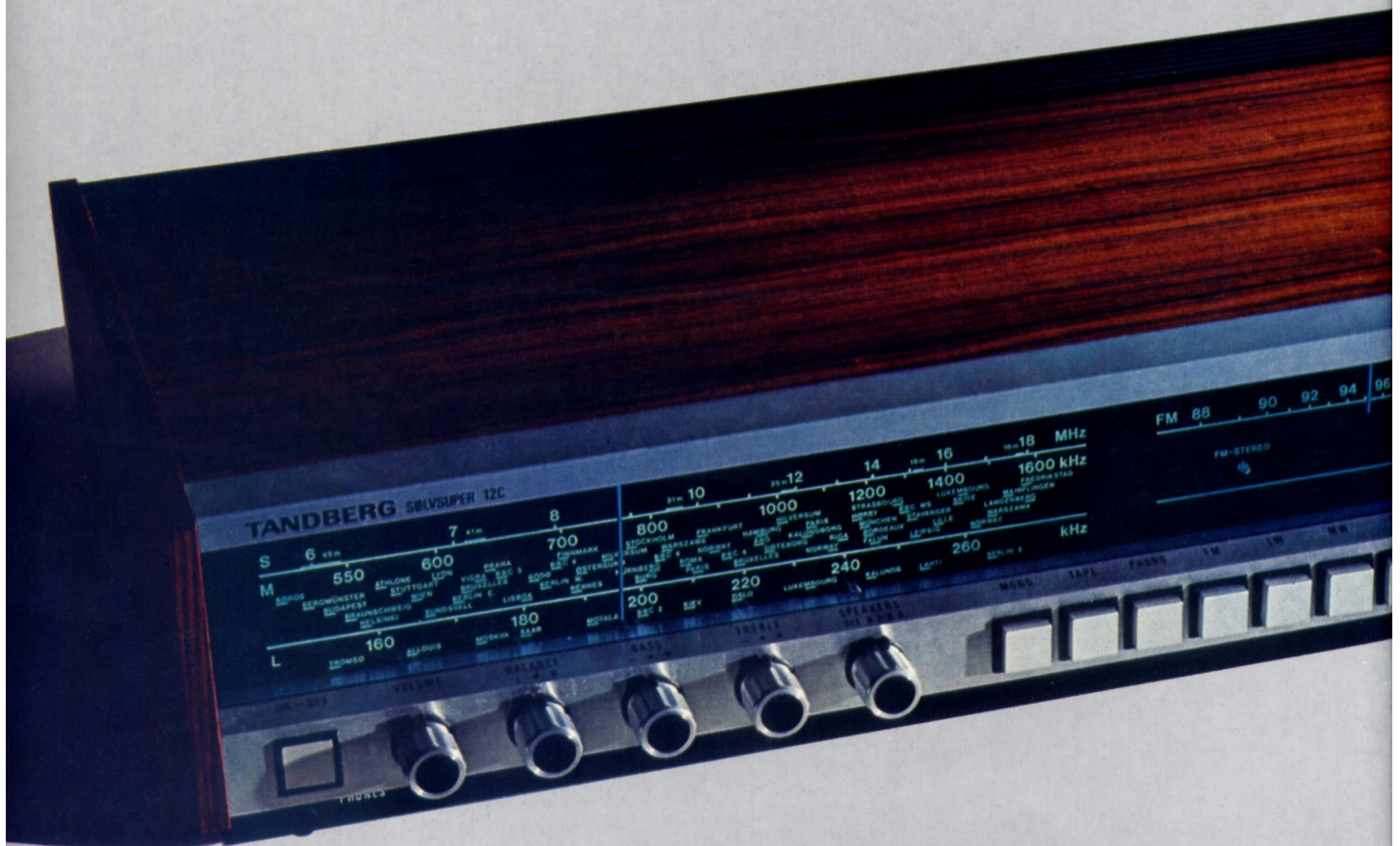
Frequency curves for the audio amplifiers showing the effects of bass and treble controls and filters.



Distortion curves for the audio amplifiers (both channels simultaneously)  $R_L = 4$  ohms.

# TANDBERG

## SØLVSUPER 12, 12 C



Tandberg Sølvsuper — the best selling table receiver in Norway. You can now buy this famous model with a built-in stereo cassette tape recorder as the Sølvsuper 12 C. The cassette tape recorder has a microphone input, manual level controls for recording, and LED record level indicators.

There are many reasons why the Sølvsuper has become so popular. First of all its reliability. Then good design and a clean simple layout for the operating controls. The Sølvsuper 12 has the same quality features as its 11 predecessors. To obtain full enjoyment from it you ought to have loudspeakers that do it justice. We therefore recommend that you ask for the Sølvsuper 12 to be demonstrated with Tandberg Hi-Fi loudspeakers!

- FM stereo, long wave, medium wave, and short wave
- FM stereo tuner with built-in decoder, ceramic filters and integrated circuits
- Muting (no noise between stations)
- AFC (automatic frequency control)
- Powerful stereo amplifier. Sine wave

output power  $2 \times 15$  watts in 8 ohms,  $2 \times 20$  watts in 4 ohms

- Frequency/loudness compensated volume control
- Can be connected to a record player with ceramic or magnetic pick-up and a tape recorder
- Front jack for stereo headphones

#### The receiver

The stereo decoder in the FM tuner has integrated circuits and a light diode on the scale automatically comes on when there is a stereo transmission. The FM tuner has ceramic filters that discriminate well between stations (good selectivity). This is a big advantage especially where two stations lie close together in the band. The muting circuit, which cuts out noise between FM stations, can be connected and disconnected.

#### The high quality stereo amplifier

The stereo amplifier has a great many valuable features. The volume control is common to both channels and the balance between the channels can be

changed by a balance control. There are very effective separate bass and treble controls. The volume control is frequency/loudness compensated. This means that it automatically corrects for the falling frequency response of the human ear at low volumes!

#### Sølvsuper 12 C — the cassette model

The Sølvsuper 12 C cassette model has the same tuner and amplifier sections as the Sølvsuper 12. In addition it has a very good built-in cassette tape recorder for record and playback of programmes from radio, record player, microphone, or another tape recorder. The traditional record level meters have been replaced with light emitting diodes (LED's) for indicating the peak recording level. This is a very safe measurement technique. LED's have an almost unlimited life.

#### The Sølvsuper as the central unit in a Tandberg Music Centre

Most people who own a Sølvsuper use it as the central unit in a music centre.



This enables all the facilities of the stereo amplifier to be fully exploited. The Sølvsuper 12 can be connected to a tape recorder, a Tandsberg 3500X Stereo

for example, and a record player with a magnetic or ceramic pick-up (to achieve the full benefit of quality reproduction from the Sølvsuper a magnetic pick-up is

recommended). The Sølvsuper has 4 speaker outputs (2 for each channel). This means that the music centre can consist of 2 or 4 Tandsberg loudspeakers located together or in two separate groups. Tandsberg gives you a wide choice of Hi-Fi loudspeakers in the TL range (see pages 32 to 34). From this range we recommend the TL 1520 for use with the Sølvsuper 12. The TL 1520 can handle more power than the Sølvsuper can deliver!

#### Wood veneers

The Sølvsuper 12 can be delivered in teak or rosewood. Oak or walnut to order.

#### General

**Mains voltage:** 240 V, 50 or 60 Hz (internal tapings for 120–220–240 V).

**Dimensions:** Sølvsuper 12: width 19 1/2" (49.5 cm), height 4 3/4" (11.7 cm), and depth 9 1/2" (24 cm) plus 7/8" (2 cm) for knobs. Sølvsuper 12 C: width 25 1/2" (64.5 cm), height 4 5/8" (11.5 cm), and depth 9 1/2" (24 cm) plus 7/8" (2 cm) for knobs.

**Weight:** Sølvsuper 12: 12.5 lb (5.8 kg). Sølvsuper 12 C: 18 lb (8.2 kg).

**Specifications for the receiver and the stereo amplifier, see page 30.**

#### Specification for the cassette tape recorder

**Speed tolerance:** ±1% max. (DIN 45500).

**Speed variations:** 0.25% max. (peak, weighted).

**Frequency range:** 45 to 13 000 Hz (DIN 45511).

**Signal/noise ratio:** greater than 47 dB (DIN 45405).



With its 4 speaker outputs and sockets for a record player and tape recorder the Sølvsuper can be combined with other advanced products to make different music centres.

# TANDBERG

## TA 300 M



A top quality stereo amplifier with many facilities.

Lends itself to all kinds of music and amplifier systems in the home, hotels, department stores, conference rooms, schools, discotheques, and sports meetings. A separate input for a microphone with its own volume control allows commentators or vocal performances to be mixed with sound from other programme sources!

- Output power  $2 \times 25$  watts sine wave in 8 ohms,  $2 \times 35$  watts sine wave in 4 ohms
- Fully complementary output stages
- Can be connected to 2 record players with magnetic pick-ups, 2 tape recorders, a receiver, and a microphone
- Both tape recorder connections have TAPE/MONITOR facilities
- HIGH and LOW filters to reduce unwanted noise
- Frequency/loudness compensated volume control (the compensation can be disconnected)

- 4 speaker outputs
- Speaker selector with 4 positions
- Buttons for stereo, mono left channel, mono right channel, or mono left plus mono right channels
- Front jacks for 2 stereo headphone sets

#### The amplifier installation

The TA 300 M has many applications in all kinds of amplifier installations as a straight-forward music amplifier or as a combined speech and music installation. The M means that there is an input for a microphone e.g. a Tandberg TM 6. The sensitivity for the microphone input is 1.2 mV at 200 ohms microphone impedance and for the tuner input 75 mV. The programme from the microphone can be separately amplified or mixed with one of the other connected programme sources (tape recorder, radio receiver, record player). It is exactly this function that makes the TA 300 M so versatile.

There are two filters (HIGH and LOW) to attenuate unpleasant noises e.g. hiss or hum from programme sources. The volume control is loudness compensated. The loudspeaker selector connects the loudspeakers 2 at a time or all 4 at once. When the headphones are in use, all the loudspeakers can be disconnected.

#### A quality amplifier deserves quality loudspeakers

To obtain full enjoyment from the amplifier in the TA 300 M you must have loudspeakers that do it justice. We recommend that you use 2 or 4 loudspeakers of the TL 2520 type or the TL 3520 type. Both these systems have an excellent sound distribution pattern. The TL 3520, which has a larger cabinet, can reproduce slightly lower bass tones. An alternative is the Fasett which has an impressive frequency response in relation to its size and is a very convenient speaker to place. Ask your dealer to demonstrate the



programme being recorded can be tested (monitored) by source and tape tests.

#### Wood veneers

TA 300 M is delivered in teak or rosewood. (Oak or walnut to order.)

#### Accessories

Microphones and headphones, see page 35.

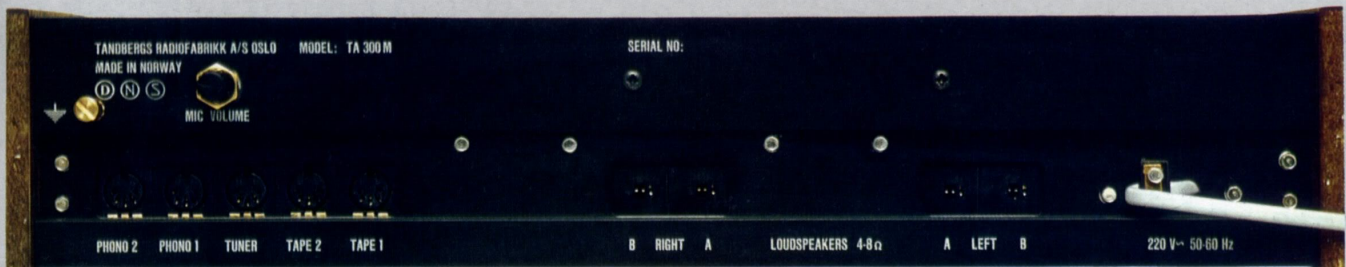
#### General

**Mains voltage:** 240 V (internal connections for 110–220–240 V), 50/60 Hz.

**Dimensions:** width 17" (43 cm), height 3½" (8.7 cm), depth of cabinet 9<sup>5</sup>/<sub>8</sub>" (24.3 cm) + knobs <sup>3</sup>/<sub>4</sub>" (1.8 cm).

**Weight:** 11 lb (5 kg).

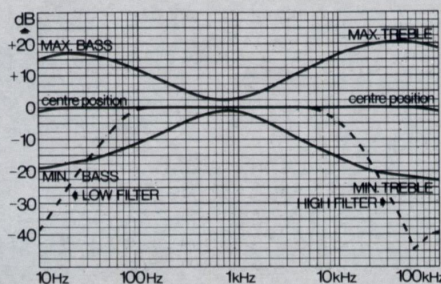
**Specification, see page 30.**



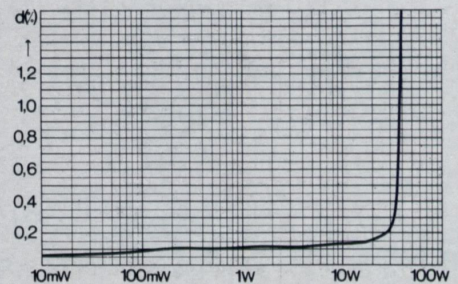
TA 300 M with Tandberg Hi-Fi loudspeakers. Read more about Tandberg speakers on pages 32 to 34!

#### Connecting other Hi-Fi Units

The illustration shows the connections at the back of the TA 300 M. From the left, two inputs for record players with magnetic pick-ups, input for a radio receiver (e.g. Tandberg Portable TP 43), two inputs/outputs for tape recorders. Both tape recorder inputs have a TAPE MONITOR facility which means that the



Frequency curves for the audio amplifiers showing the effects of bass and treble controls and filters.



Distortion curves for the audio amplifiers (both channels simultaneously)  $R_L = 4$  ohms.

# TANDBERG

## SPECIFICATIONS

### RECEIVERS, STEREO AMPLIFIERS

AMPLIFIER SECTION	TR 2075	TR 2055	TR 2025	TR 1040 P	TR 220	HULDRA 10	SØLV-SUPER 12	TA 300 M
<b>Output power</b> per channel, sine wave, with 1 kHz in 8 ohms (4 ohms). Both channels driven simultaneously. DIN 45 500.	95 W (120 W)	60 W (80 W)	32 W (40 W)	48 W (62 W)	17 W (25 W)	28 W (38 W)	17 W (22 W)	28 W (38 W)
<b>Output power</b> per channel, sine wave, from 20 to 20 000 Hz in 8 ohms. Both channels driven simultaneously. Distortion in %.	75 W 0.15 %	55 W 0.15 %	25 W 0.15 %	40 W 0.2 %	14 W 1 %	25 W 0.3 %	12 W 1 %	20 W 1 %
<b>Distortion</b> with output power 1 dB below nominal and lower at 1 kHz in 8 ohms (4 ohms).	0.08 %	0.08 %	0.08 %	0.1 %	0.2 % (0.3 %)	0.1 % (0.15 %)	0.2 % (0.3 %)	0.15 % (0.2 %)
<b>Intermodulation</b> according to DIN 45 500.	0.15 %	0.15 %	0.15 %	0.2 %	0.5 %	0.6 %	0.5 %	0.4 %
<b>Damping factor</b> with nominal output power in 8 ohms (4 ohms).	60 (30) 20-20 000 Hz	50 (25) 20-20 000 Hz	50 (25) 20-20 000 Hz	50 (25) 20-20 000 Hz	40 (20) 1 kHz	60 (30) 1 kHz	30 (15) 1 kHz	60 (30) 1 kHz
<b>Frequency response</b> from linear inputs (-1.5 dB).	6-80 000 Hz	7-80 000 Hz	8-50 000 Hz	7-70 000 Hz	30-30 000 Hz	15-50 000 Hz	30-25 000 Hz	15-50 000 Hz
<b>Channel separation</b> at 1 kHz, minimum.	60 dB	60 dB	60 dB	52 dB	55 dB	60 dB	60 dB	60 dB
<b>Tone controls</b> Treble control at 10 kHz: Frequ./loudness comp. at 10 kHz (max.): Mid-frequency range at 1 kHz: Bass control at 50 Hz: Frequ./loudness comp. at 50 Hz (max.):	±15 dB + 3 dB ± 7 dB ± 15 dB + 8 dB	± 15 dB + 3 dB - ± 15 dB + 8 dB	± 15 dB + 3 dB - ± 15 dB + 9 dB	± 15 dB + 7 dB - ± 16 dB + 12 dB	± 15 dB + 5 dB - ± 15 dB + 10 dB	± 15 dB + 7 dB - ± 16 dB + 12 dB	± 15 dB + 4 dB - ± 16 dB + 5 dB	± 15 dB + 7 dB - ± 16 dB + 12 dB
<b>LOW filter</b> -12 dB (*-6 dB)/octave, -3 dB at	70 Hz	70 Hz	70 Hz	70 Hz	70 Hz*	75 Hz	-	70 Hz
<b>HIGH 1 filter</b> -12 dB/octave, -3 dB at	8 000 Hz	8 000 Hz	8 000 Hz	8 000 Hz	7 000 Hz	7 000 Hz	-	7 000 Hz
<b>HIGH 2 filter</b> -6 dB/octave, -3 dB at	8 000 Hz	8 000 Hz	-	8 000 Hz	-	-	-	-
<b>Input sensitivity</b> for nominal output power in 8 ohms. TAPE 1: TAPE 2 (EXTRA): PHONO 1 magn. (cer.): PHONO 2 magn. (cer.):	150-600 mV 150-600 mV 2.2-10 mV 3.0 mV	150-600 mV 150-600 mV 2.2-10 mV 3.0 mV	170 mV 170 mV 2.3 mV -	130-500 mV 130-500 mV 1.8-6 mV -	150 mV 150 mV 2.5 mV -	280 mV 280 mV 2.4 mV (72 mV) -	150 mV - 2.5 mV (75 mV) -	280 mV 280 mV 2.8 mV 2.8 mV
<b>Signal/noise ratio</b> with 2 x 50 mW in 8 ohms according to DIN 45 500. TAPE 1: TAPE 2 (EXTRA): PHONO 1: PHONO 2:	62 dB 62 dB 60 dB 58 dB	62 dB 62 dB 60 dB 58 dB	61 dB 61 dB 60 dB -	60 dB 60 dB 58 dB -	60 dB 60 dB 60 dB -	60 dB 60 dB 60 dB -	55 dB - 55 dB -	60 dB 60 dB 55 dB 55 dB
<b>FM SECTION</b>								
<b>Wave band.</b>	87.5-108 MHz	87.5-108 MHz	87.5-108 MHz	87.5-108 MHz	87.5-108 MHz	87.5-108 MHz	87.5-108 MHz	
<b>Frequency response</b> (-3 dB).	20-15 000 Hz	20-15 000 Hz	20-15 000 Hz	20-15 000 Hz	20-15 000 Hz	20-15 000 Hz	20-15 000 Hz	
<b>Sensitivity in mono</b> for 26 dB signal/noise ratio according to DIN 45 301 with 75 (300) ohms aerial impedance.	0.8 µV (1.6 µV)	0.8 µV (1.6 µV)	0.8 µV (1.6 µV)	0.8 µV (1.6 µV)	0.8 µV (1.6 µV)	0.8 µV (1.6 µV)	1.0 µV (2.0 µV)	
<b>Sensitivity in stereo</b> for 46 dB signal/noise ratio according to DIN 45 500 with 75 (300) ohms aerial impedance.	20 µV (40 µV)	20 µV (40 µV)	20 µV (40 µV)	20 µV (40 µV)	20 µV (40 µV)	20 µV (40 µV)	40 µV (80 µV)	
<b>Signal/noise ratio</b> with 1 mV aerial voltage: Unweighted according to IHF, stereo (mono) Weighted according to DIN, stereo (mono) Unweighted according to DIN, stereo (mono)	75 (78) dB 62 (66) dB 65 (68) dB	75 (78) dB 62 (66) dB 65 (68) dB	70 (72) dB 60 (62) dB 63 (65) dB	66 (68) dB 54 (58) dB 61 (63) dB	66 (68) dB 54 (58) dB 61 (63) dB	66 (68) dB 54 (58) dB 61 (63) dB	66 (68) dB 54 (58) dB 61 (63) dB	
<b>Distortion</b> according to DIN 45 500, stereo (mono).	0.15 % (0.15 %)	0.15 % (0.15 %)	0.4 % (0.2 %)	0.2 % (0.2 %)	0.4 % (0.2 %)	0.4 % (0.2 %)	0.5 % (0.3 %)	
<b>Selectivity</b> according to IHF, ± 400 kHz.	80 dB	80 dB	75 dB	80 dB	60 dB	80 dB	55 dB	
<b>Image frequency rejection ratio.</b>	70 dB	70 dB	70 dB	70 dB	70 dB	70 dB	46 dB	
<b>AM suppression.</b>	70 dB	70 dB	65 dB	50 dB	50 dB	50 dB	48 dB	
<b>IF rejection.</b>	95 dB	95 dB	95 dB	95 dB	95 dB	95 dB	90 dB	
<b>Limiting</b> (-3 dB) with 75 ohms aerial impedance.	0.7 µV	0.7 µV	0.7 µV	0.7 µV	0.7 µV	0.7 µV	0.7 µV	
<b>Muting threshold</b> with 75 ohms aerial impedance.	4 µV	4 µV	3 µV	1.5 µV	1.5 µV	1.5 µV	2 µV	
<b>Capture ratio.</b>	0.9 dB	0.9 dB	1.5 dB	0.9 dB	0.9 dB	1.5 dB	1.5 dB	
<b>Channel separation</b> acc. to DIN 45 500, measured select.	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	40 dB	
<b>Pilot tone suppression</b> according to DIN 45 500.	70 dB	70 dB	55 dB	68 dB	50 dB	35 dB	50 dB	
<b>38 kHz suppression</b> according to DIN 45 500.	60 dB	60 dB	55 dB	60 dB	50 dB	50 dB	50 dB	
<b>AM SECTION</b>								
<b>Wave bands.</b> Long wave Medium wave Short wave	- 518-1 600 kHz -					150-268 kHz 518-1 600 kHz 3.3-10 MHz 10-20 MHz 20-30 MHz	150-268 kHz 518-1 600 kHz 5.8-18.5 MHz	
<b>Selectivity</b> at 1 MHz ± 9 kHz.	42 dB					43 dB	40 dB	
<b>Distortion</b> with 30 % modulation.	0.8 %					1 %	1 %	
<b>Sensitivity</b> at 1 MHz, 30 % modulation and 20 dB signal/noise ratio.	20 µV					50 µV	50 µV	

# TANDBERG

## TP43



A light, portable, modern table receiver for direct connection to mains or for use with batteries.

- FM, long wave, medium wave, and short wave
- Telescopic aerial for FM/short wave and built-in ferrite-rod aerial for medium and long waves
- DIN standard aerial sockets for use with a communal aerial
- Car aerial sockets
- Outstanding sound quality with special 5" x 9" loudspeaker
- Ample output power
- Separate bass and treble controls
- AFC (automatic frequency control) on FM
- Can be connected to record player, tape recorder, separate amplifier, and extension loudspeaker
- Walnut finished cabinet
- Can be delivered with carrying case (accessory)

In the space of a few years the Tandberg TP 41 has become a best seller on the Norwegian market and has achieved a name for quality far over the Norwegian borders. In the USA for example, it came top of the list in an important set of tests arranged by the leading trade journal Stereo Review. They stressed that the radio's features, general performance, and sound quality are extraordinary for a portable radio and concluded that the TP 41 is the equivalent of a good table receiver!

The TP 43 has been developed from the TP 41 and has the same outstanding features and performance. In addition the TP 43 has a built-in mains unit which makes it a very versatile home radio. It can be connected directly to the mains or run off batteries. In addition the TP 43 has DIN standard aerial sockets for use with communal aerials (suitable for FM and AM).

#### Use it as a home receiver

You can use the TP 43 as the central unit in a home music centre. You can connect it to a tape recorder or a record player as well as an extension speaker.

#### The big loudspeaker

It is of no avail with a good receiver and amplifier if the loudspeaker is not also in the top class. If the loudspeaker is small the sound reproduction will be poor, especially in the bass region. Furthermore, a small loudspeaker cannot handle such loud sounds as a big loudspeaker.

The loudspeaker has been designed to match the high quality of the receiver. This is why it is so big — 5" x 9" — covering the whole front of the radio! The result is good reproduction from the deepest bass tones to the highest treble tones, with a margin of reserve for high volume if required. Listen to it yourself and find out how good the sound quality really is!

#### General

**Dimensions:** width 11" (28 cm), height 7 1/4" (18 cm) excl. handle and buttons, depth 3 1/4" (8.2 cm).

**Weight with batteries:** 6 lb (2.7 kg).

**Batteries:** 6 x 1.5 V, SP 2 type.

# TANDBERG

## LOUDSPEAKERS



**It is important to make the right choice**  
The task of a loudspeaker in a Hi-Fi system is to convert the programme from the gramophone record, tape, or radio into sound via the amplifier. If you have a good quality sound source and a good quality amplifier, the loudspeakers must be of equal quality to accomplish this task. So it is unwise to save money on this last link in the sound reproduction chain.

It is not easy to make the right choice. There are many factors to consider, but when you choose the speakers recommended by the manufacturer to go with a particular amplifier, you are assured of a good performance.

Tandberg loudspeakers are developed for use with Tandberg amplifiers. They take full advantage of the performance characteristics of the amplifiers. However, if you are determined to have a trip in the

loudspeaker jungle to gain first-hand experience, we offer you some good advice on the way.

### **How to compare and evaluate loudspeakers**

Listen to different kinds of music. Make sure that the programme source is good (e.g. a good gramophone record) and the playback equipment is high quality. Check that the tone controls on the amplifier are set in the neutral position (mid-position) to ensure that they do not compensate for weaknesses in individual speakers.

Check that the volume in the room remains the same when the demonstrator switches from speaker to speaker.

Take great care to see that the speakers under comparison are standing on the same level and in the same part of the room i.e. one of them should not be in a corner or nearer the floor than the other.

Listen carefully to the bass, treble, and mid frequency ranges. The bass should be distinct without rumble and not too dominating. The treble should be clean and clearly audible. If you have a transcription unit, a tape recorder, and an amplifier with a wide frequency range choose a loudspeaker that can reproduce this range. The drummer's wire brushes and the crisp triangle tones must be heard!

Use your ears. Think about the reproduction of your own records and tapes. It is mainly you who will listen to the loudspeakers every day!

### **Relation between speakers and amplifiers. The same sound quality**

Today all quality amplifiers give almost distortionless sound reproduction. One of the most important tasks for the loudspeaker designer is to design speakers



# TANDBERG

## STUDIO MONITOR/TL 20 SERIES



that do not add any audible distortion – even at high sound levels. This has always been an important objective with the design of Tandberg speakers!

### The speaker must handle the full power capability of the amplifier

Most modern quality amplifiers deliver high output power. Good loudspeakers must be able to reproduce the peak intensity from the amplifier without being damaged. It is easily done to buy speakers that are under rated. But they will distort the sound at high levels and probably sustain damage because they will not tolerate frequent overloads. At the back of every Tandberg loudspeaker you will find a label stating the maximum continuous power that can be applied to it. This power should be the same or higher than the sine wave power output from the amplifier. So it is very easy to find one or more Tandberg speakers that are suitable for any amplifier if you look at the table on page 34!

### The impedance

The impedance (ohms) of the loudspeaker should coincide as far as possible with the impedance marked on the speaker output of the amplifier. It is also permissible to use speakers with a higher impedance than is marked on the ampli-

fier. Tandberg loudspeakers are specially designed to match Tandberg amplifiers.

### “Design the best loudspeaker on the market!”

This was the challenge delivered to the engineers in Tandberg’s acoustics laboratory. The result was the Studio Monitor – the most advanced loudspeaker system Tandberg has ever made. An 80 litre, 3 way system with 4 drive units that can reproduce more than 100 watts continuously applied power over a frequency range from 25 to 20 000 Hz, measured according to DIN standards! Good transcription units, tape recorders, and amplifiers can reproduce sound practically speaking without distortion. A loudspeaker that can rank with the best of these products must have far better characteristics than conventional loudspeakers. When Tandberg developed the Studio Monitor, it was a requirement that it should be suitable for the best Hi-Fi equipment on the market. Tandberg’s long experience with sound reproduction techniques was put to good use in the design and development of the Studio Monitor. The loudspeaker drive units were selected after thorough evaluation of the best units on the market. The filter, level controls for the mid-frequency and treble frequency

ranges, and a special protection system for the treble drive units were all designed in the laboratories. The system was then put through an extensive programme of comprehensive tests including the all-important practical listening tests. We invite you to compare the Tandberg Studio Monitor under the same conditions with any other loudspeaker system on the market. Let your own ears be the deciding factor when you choose! For more information on the Studio Monitor, see the separate, large brochure.

### The TL 20 Series – designed for all types of music

The TL 20-Series is the top quality series of loudspeakers from Tandberg. New techniques and a new design in keeping with the rest of the Tandberg products. Much emphasis is put on making the sound picture for the sound systems in the TL Series, from the largest to the smallest, the same character. Therefore the difference between them is really that the large systems can reproduce louder sounds and deeper tones in the bass region than the small loudspeakers. The TL 20 Series consists of 4 loudspeakers: TL 5020, TL 3520, TL 2520 and TL 1520 (the first two numbers mean the number of litres in the enclosed volume, also the size). The TL 5020 is the

# TANDBERG

## LOUDSPEAKERS

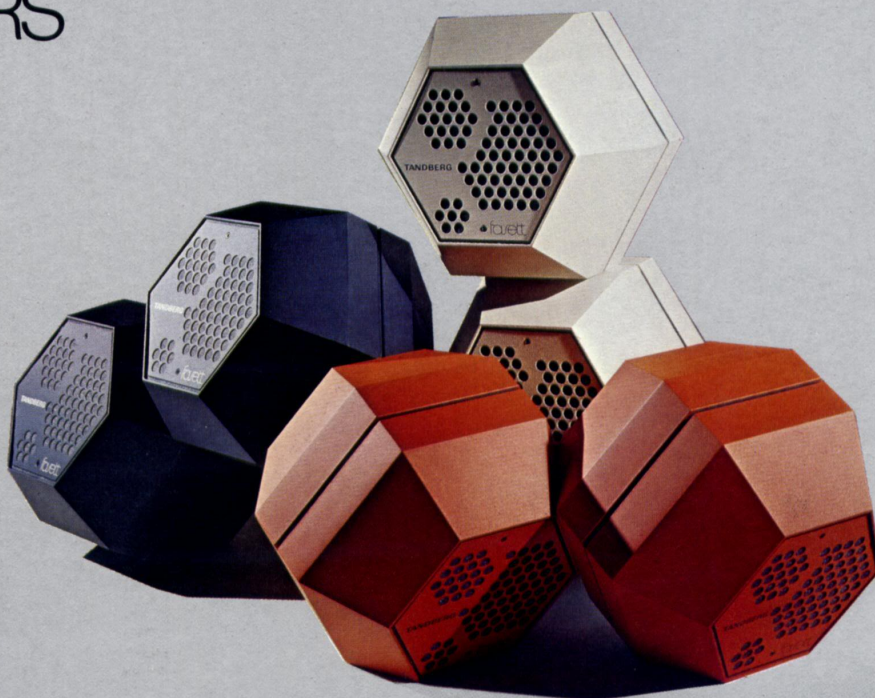
most advanced loudspeaker in the TL 20 series. It is a three-way system with four loudspeakers, 2 dome-tweeters in a column, a middle frequency speaker and a bass speaker. The TL 5020 has special protection for the treble loudspeakers (see separate paragraph about this). The TL 3520 and the TL 2520 are also 3-way systems, but the smallest in the 20-Series, the TL 1520, is a 2-way system with bass and treble loudspeakers. All the systems in the TL 20-Series have wood veneered cabinets with black fabric and aluminium trimming at the sides.

### Special protection for treble loudspeakers (the Studio Monitor and the TL 5020)

To ensure that the treble loudspeakers are not overloaded and damaged, a special protection circuit has been developed. It starts to operate only with extreme overload (above the maximum tolerated by the system) and limits the power in the treble units. The protection system is disconnected again immediately the power falls below the overloading level. The connecting and disconnecting of the protection system passes without notice.

### TL 1500 — the high efficiency loudspeaker

The TL 1500 is a compact Hi-Fi system giving good reproduction and specially designed to deliver a high sound level in relation to the power applied from the amplifier. The TL 1500 has a black polyurethane front and is delivered in a teak, rosewood, or walnut finish.



### Fasett — a new concept in loudspeakers

The Tandberg Fasett combines faithful sound reproduction in a small loudspeaker with the newest ideas in industrial design. Instead of the traditional square box the Fasett has a number of small surfaces put together at different angles. This makes it into a very versatile sound source.

The Fasett is a 2-way system equipped with bass reflex, giving an impressive bass response in relation to the loudspeaker's small dimensions.

Fasett is delivered in 3 colours: black, antique white and orange. This makes it easy to adapt to different interiors.

### Play with sound

All radio/stereo amplifiers from Tand-

berg have outputs for 4 loudspeakers. This gives many opportunities for improving the sound picture in a particular music installation. With 4 Fasett loudspeakers, or 2 Fasett and 2 TL-systems, you can experiment with a broader sound picture in the room with combinations of direct and indirect sound.

The Fasett was specially designed to be mounted in many different positions. If two loudspeakers (one for each channel in the music installation) are beamed directly at the listener, the other two loudspeakers can be pointed to the side, backwards or upwards against a hard wall or ceiling. These loudspeakers contribute to the reflected sound and increase the space effect.

### Specifications, loudspeakers

	Studio Monitor	TL 5020	TL 3520	TL 2520	TL 1520	Fasett	TL 1500
Outside dimensions (inches)	W: 18 <sup>1</sup> / <sub>2</sub> H: 30 D: 13 <sup>1</sup> / <sub>2</sub>	W: 25 <sup>3</sup> / <sub>4</sub> H: 14 <sup>3</sup> / <sub>4</sub> D: 11	W: 23 <sup>1</sup> / <sub>4</sub> H: 14 D: 10 <sup>1</sup> / <sub>4</sub>	W: 21 H: 12 D: 8 <sup>3</sup> / <sub>4</sub>	W: 16 <sup>1</sup> / <sub>2</sub> H: 10 <sup>1</sup> / <sub>2</sub> D: 8 <sup>3</sup> / <sub>4</sub>	W: 11 H: 10 <sup>1</sup> / <sub>2</sub> D: 8 <sup>3</sup> / <sub>4</sub>	W: 16 <sup>1</sup> / <sub>2</sub> H: 11 D: 8
Enclosed volume	80 litres	50 litres	35 litres	25 litres	15 litres	6.5 litres	15 litres
Frequency response, DIN 45 500	25–20 000 Hz	35–20 000 Hz	40–20 000 Hz	45–20 000 Hz	48–20 000 Hz	50–20 000 Hz	50–20 000 Hz
Resonance frequency	30 Hz	50 Hz	53 Hz	60 Hz	70 Hz	85 Hz	70 Hz
Sensitivity <sup>*)</sup> , DIN 45 500	6 watts	3 watts	4 watts	4 watts	3 watts	6 watts	3 watts
Max. sine wave driving power, DIN 45 500	100 watts	60 watts	50 watts	40 watts	30 watts	25 watts	25 watts
Music power, DIN 45 500	160 watts	100 watts	75 watts	65 watts	45 watts	40 watts	40 watts
Impedance	8 ohms	8 ohms	8 ohms	8 ohms	4 ohms	4 ohms	4 ohms
Size of speakers	Woofer 12"	12"	10"	8"	7"	5"	8"
	Mid-range 2" Dome	5"	3 <sup>3</sup> / <sub>8</sub> "	3 <sup>3</sup> / <sub>8</sub> "			
	Tweeter 2×1" Dome	2×1" Dome	1" Dome	2"	2"	2 <sup>1</sup> / <sub>4</sub> "	2 <sup>1</sup> / <sub>2</sub> "
Wood veneer or colour	T.R.W. Black	T.R.W. White	T.R.W. White	T.R.W. White	T.R.W. White	Black, antique-white, orange	

<sup>\*)</sup> Driving power to reach a sound level of 96 dB measured at a distance of 1 metre from the speaker.

T = Teak, R = Rosewood, W = Walnut.

# TANDBERG ACCESSORIES



## Tandberg Magnetic Tape

The quality of the record and replay on a tape recorder is to a large extent dependent on the magnetic tape characteristics. Tandberg has more than 20 years experience with the development and production of tape recorders. Therefore we are qualified to provide specifications for a magnetic tape which satisfies the demands from users. Strict requirements are made for the electrical, acoustic and mechanical properties of Tandberg magnetic tapes. A comprehensive testing system with close tolerances gives even, high quality. This is the basis for good results on your tape recorder. Tandberg Magnetic Tape is delivered in the following lengths:

**Cassette tape**  
Tandberg Tape C60  
Tandberg Tape C90

## Tandberg TM 6 Microphone

An elegant case in extruded aluminium. Suitable for reproduction of speech, vocal and instrumental music. The TM 6 is not sensitive to touch noise and is well damped for wind noise and breath noise. This means that it can also be used very near to the sound source for singing or speaking. The TM 6 has a spherical characteristic and can accept sound from practically any direction. The TM 6 is delivered in an elegant plastic case with a table stand and fixture for mounting on a floor stand. As an accessory a

bigger and more stable table stand can be delivered.

**Frequency response:** 50–15 000 Hz (+3, -6 dB).  
**Directional characteristic:** spherical (omnidirectional).  
**Principle:** electro-dynamic (moving coil).  
**Sensitivity:** 0.1 mV/ $\mu$ bar (at 1000 Hz).  
**Impedance:** 250 ohms.  
**Connections:** permanently connected to a 4 m lead with a DIN plug.  
**Dimensions:** length 7<sup>5</sup>/<sub>16</sub>" (185 mm), max. diameter 1<sup>5</sup>/<sub>16</sub>" (23.5 mm).  
**Weight:** 5 1/2 oz (160 g) with cable and plug.

## Tandberg Remote Control Unit

For Models 10XD, 9100X and TCD 330 with 16 feet of cable. Remote control of wind, rewind, record, playback and stop. The same keyboard as on the tape recorder (even if the remote control unit is connected the keyboard on the tape recorder continues to work). The remote control unit can be connected to a timer which gives automatic record, playback, and stop at chosen times.

## Tandberg Slide Synchronizer Model 3

This synchronizer provides automatic slide projection synchronized with recorded music and a commentary. The commentary is recorded on one tape track while shift pulses are recorded on a second track by the synchronizer. During playback the synchronizer changes slides at the right moments. The Tandberg slide synchronizer can be used with any auto-

matic slide projector and stereo tape recorder, and also with a mono tape recorder equipped with a free head output.

## Loudspeaker for kitchen and bathroom

Small compact loudspeaker. Easy to mount on a wall or in a book case. Teak veneered cabinet. Dimensions: breadth 8<sup>1</sup>/<sub>4</sub>" (20.5 cm), height 5" (12.5 cm), depth 4<sup>3</sup>/<sub>8</sub>" (11 cm).

## Stereo headphones HD 424 and HD 414

Top quality headphones providing outstanding sound reproduction. Light and comfortable to use. Supplied with 10 ft (3 m) lead and DIN plugs or a 1/4" stereo jack. Impedance: 2000 ohms per set. Frequency response: 16 to 20 000 Hz for HD 424 and 20 to 20 000 Hz for HD 414.

# TANDBERG



Tandberg believes that good working conditions are necessary for the manufacture of good products. Therefore small factories are preferred located in pleasant surroundings. About 3000 employees are today divided between Tandberg's seven factories.

The HULDRA – a legendary Nordic symbol – also a symbol of Tandbergs Radiofabrikk A/S.

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 **TANDBERG**  
Legendary perfection