



TANDBERG



THE LIVING FIRE . . .

To the modern man an open fire means peace and relaxation—a gathering place for his family. Originally the hearth was the very centre of every home. The fire offered light and heat, it created a pleasant atmosphere, surroundings conducive to dreams. In the glowing embers these dreams took form, the tongues of flame created pictures carried upwards in blue smoke.

We have retained the open fireplace, and made additions which draw the family even closer together, giving a new meaning to "Home".

Radio, tape recorder and television provide entertainment and pleasure for the entire family, and form a basis for stimulating impulses and development. Modern techniques make possible musical reproduction so enchanting and natural that perfect harmony is created with performers and listeners in intimate association.



Perhaps this is how the tradition of Huldra came into being: in the flickering flames of the open fire the shape of a beautiful woman appears to the lonely forester; he reaches out for her, but she flees into the forest and disappears. But in his heart, the dream of Huldra will live for ever.

Throughout the ages Huldra revealed herself to many lonely forest dwellers, singing, dancing, always alluring. Her beauty, that of another world, for those who encountered Huldra could never forget her. Huldra became the symbol of longing, the dream of perfection, the almost unattainable. In the spacious gardens surrounding Tandbergs Radiofabrikk in Oslo is a bronze statue of Huldra — there she stands, surrounded by flowers, radiating beauty, an inspiration to those who, each day, strive constantly to achieve perfection in their work and the world around them.



**TANDBERGS RADIOFABRIKK
PLANT I AND II.**

Commonly referred to as "the factory in a park" by visitors, these plants employ about 800 people for the production of Tape Recorders as well as research and administration divisions. The interior of the buildings blends with the open and friendly exterior, and no effort has been spared to create first class working conditions.



TANDBERGS RADIOFABRIKK III was brought into use during the second half of 1966. The production of Television sets is concentrated at this plant, which at present employs about 500 people under ideal conditions.

This new plant is dimensioned to accommodate about 700 employees, and plans for the next "satellite plant" are already under way.



TANDBERG SERIES 14

The tape recorder for the whole family

TANDBERG Series 14 is the ideal family tape recorder. Operation is extremely simple, for recording, playback of music, song, speech and not least lessons—the children immediately understand how to operate the recorder. Young people will quickly appreciate that Series 14 can be used with microphone and record

player amplifier with bass and treble controls and a power output of 10 watts. Parents will make use of various other refinements and operational possibilities, including recordings of childrens' voices.

TANDBERG Series 14 is a fully transistorized monaural tape recorder with 2 speeds, $3\frac{1}{2}$ and $1\frac{1}{2}$ i.p.s. It is available in 2 tracks or 4 tracks models. Mixing is possible as there are separate volume controls for microphone and line input. Separate playback volume control gives adjustable monitoring during recording. Output power is 10 watts. There are bass and treble controls, loudspeaker selector, pause

switch, endstop, one control lever for tape transport, visual recording indication with indirect illumination and 4 digit revolution counter. 4-tracks models have a "dual" position, i.e. allowing two tracks (programmes) to be played back simultaneously. The sound is of the highest quality,—one of the reasons why Tandberg Tape Recorders have become world famous.

Tandberg Series 14 is available in various versions, 2-tracks or 4-tracks, in cabinets in teak or rosewood or completely portable in carrying case. See accessories on page 22 and 23. Prices: See separate sheet.





SIMPLICITY OF OPERATION.

Tandberg's well known single lever operation of fast forward, rewind and normal forward drive is simple, quick and positive. A pause switch instantaneously starts or stops the tape during recording and playback. The recorder stops automatically by means of a microswitch when the tape runs out. A visual recording indicator with indirect illumination precisely indicates the recording level and a 4-digit revolution counter with reset button and indirect illumination indicates commencement of programmes.

MIXING. There are two volume controls for recording—one for microphone and one for line input, i.e. programme from radio, record player or another tape recorder. Thus you can easily mix two programmes, e.g. background music and sound effects to lectures, vocalists to music, etc.

MONITORING. During recording you can listen to and control the programme which is being recorded on the tape. The programme may be monitored by means of headphones,

the built-in loudspeaker in the recorder or by an external speaker. With the playback volume control the level of the monitoring can be adjusted from 0 to 10 watts. During mixing monitoring is essential in order to adjust the two programmes to the correct levels.

PLAYBACK. A separate playback volume control is provided. The output power is 10 watts. Tone regulation is achieved by continuously variable bass and treble controls in a range of ± 10 dB. By means of a loudspeaker selector the programme can be played back through the built-in loudspeaker, external loudspeaker or both. During playback the microphone can be mixed in for announcements.

AMPLIFIER. Tandberg Series 14 has a first class microphone and record player amplifier of 10 watts output power, continuously variable bass and treble controls and mixing possibilities. In amplifier position the motor is disconnected. If, at the same time it is wanted to record concerts, lectures etc., the monitoring can be utilized as an amplifier for the audience.

Technical Specifications for Series 14.

Power requirements: 230 V, 50 Hz. May easily be rewired for 115 V operation. **Power consumption:** 50 W maximum. **Reel size:** Maximum 7 inches. **Speed tolerance:** $\pm 1.5\%$. **Fast wind and rewind:** Approximately $1\frac{1}{2}$ min in each direction for 1200 feet of tape without head wear. **Immediate start/stop:** The tape may be started and stopped immediately in record and playback modes.

Number of transistors: 20. **Heads:** 1 erase head and 1 record/playback head for 2- or 4-tracks. **Erase and bias signal:** 85.5 kHz, distortion less than .5%. **Record level indicator:** Moving coil meter with a range of 20 dB. **Frequency response:** $3\frac{1}{2}$ ips 30-13.000 Hz (± 2 dB 50-9.000 Hz) $1\frac{1}{2}$ ips 30-7.000 Hz (± 2 dB 60-4.500 Hz) except Record. **Treble control:** Has a control range of ± 10 dB at 8 kHz, and is active in all modes except Record. **Wow:** $3\frac{1}{2}$ ips less than .15% RMS. $1\frac{1}{2}$ ips less than .35% RMS. **Signal/noise ratio:** Measured according to the DIN-standard at $3\frac{1}{2}$ ips: 57 dB for the 4-track model and 59 dB for the 2-track model. Corresponding figures for linear conditions 56 dB. **Inputs:** A 3-pole DIN-connector for low impedance dynamic microphone, 200 ohms unbalanced, sensitivity, 0.1 mV A 5-pole DIN-connector and a Phono-connector is parallel designated Pickup for high signal level line inputs, impedance 1 Mohm, sensitivity 100 mV. Line inputs for 10 W signal level: A 5-pole DIN connector and a phono connector in parallel designated RADIO Impedance 100 Kohm, sensitivity 10 mV All inputs have a dynamic range 40 dB above specified sensitivity. **Outputs:** The preamplifier output, PRE AMP, has a source impedance of 5 kohm. Output signal from unloaded amplifier is .75 V. The signal level is independent of all manual controls. The preamplifier output is also available at the DIN-connector designated RADIO. The available output power into a separate 4 ohms speaker is 10 W. Internal speaker 7x4 inches. **"FREE HEAD":** From this output signals for automatic slide synchronizers are available. **Dimensions:** Length 15 inches, depth 11 13/16 inches, height 6 $\frac{3}{4}$ inches. **Weight:** 18.8 lbs.



A one lever control, for fast wind, rewind and normal drive for record and playback. Sure, easy and quick.



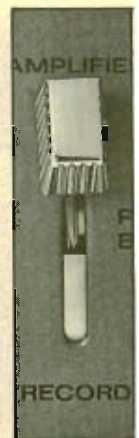
Speaker selector for choice between master, remote loudspeaker, or both.



DIN-contacts for radio recording and playback through radio or for remote loudspeakers. An output for Free Head.



Available in elegant carrying case for transportation of cabinet models.



Series 14 can be used as microphone amplifier during recording. Output power: 10 watt. Mixing possibilities and bass and treble controls.



TANDBERG SERIES 15

**For those who
require the most
life-like sound repro-
duction**

Tandberg Series 15 is the natural choice for anyone requiring fine monaural recording and playback from a tape recorder. Years of experience and demand from the most critical markets of the world has been built into this model. This tape recorder offers you all the possibilities a monaural recorder can give.

Tandberg Series 15 is a completely transistorized monaural tape recorder with 3 speeds, $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{1}{2}$ i.p.s. The output power is 10 watts. There are two volume controls for the inputs—one for microphone and one for line input. Thus the recorder offers full recording possibilities. There are 2 line inputs with different impedance and sensitivity. A separate playback volume control gives adjustable monitoring (from 0 to 10 watts) during recording. VU-meter with indirect illumination gives precise indication of the recording level. There is a 4 digit revolution counter with reset button and indirect illumination. Bass and treble are continuously variable within the area ± 10 dB. Series 15 also offers instant start/stop switch, automatic end stop, loudspeaker selector, an output for "Free Head" and amplifier position. 4-track models have a "dual" position—allowing two tracks to be played back simultaneously.

Tandberg Series 15 is available in several versions with 2 or 4 tracks in teak or rosewood cabinet or complete



in a carrying case. The following special versions of Series 15 are also available:

WITH F-EQUIPMENT — remote control for starting, stopping and rewinding by means of push buttons or pedal. This version is especially suited for recording of conferences.

SL-MODELS are 2-track models intended first and foremost for language instruction while simultaneously recording a programme on the other track. During recording you can listen to your own voice in a pair of headphones. Later both tracks can be played back for comparison. This can be done and over again. The SL-function makes it simpler to synchronize two programmes and it is possible to play back stereo when one of the channels is connected to an extra output amplifier. (e.g. a radio). See also accessories on pages 22 and 23.

Technical specifications for Series 15

Power requirements: 230 V, 50 Hz. May easily be adapted for 115 V operation.

Power consumption: 50 W maximum.

Reel size: Maximum 7 inches.

Tape speeds: $7\frac{1}{2}$ ips, $3\frac{3}{4}$ ips and $1\frac{1}{2}$ ips.

Speed tolerance: $\pm 1.5\%$. **Fast wind**

and rewind: The fast wind and rewind

time for 1200 feet of tape is approx. 1 $\frac{2}{3}$ minutes without wear. **Immediate start/stop:** The recorder has facility for immediate starting and stopping of the tape in record and playback modes. **Number of transistors:** 20. **Heads:** 1 erase head and 1 record/reproduce head for 2- and 4-tracks. **Erase and bias signal frequency:** 85.5 kHz, distortion less than .5%. **Record level indicator:** Moving coil meter with a range of 20 dB.

Frequency response:

$7\frac{1}{2}$ ips 30-20,000 Hz (± 2 dB 40-16,000 Hz)

$3\frac{3}{4}$ ips 30-13,000 Hz (± 2 dB 50-9,000 Hz)

$1\frac{1}{2}$ ips 30-7,000 Hz (± 2 dB 60-4,500 Hz)

In amplifier mode . . . 3 dB from 30-16,000 Hz.

Bass control: Active in reproduce, amplifier ± 10 dB at 60 Hz. **Treble control:**

Active in reproduce, amplifier and side tone modes. Control range ± 10 dB at 8 kHz.

Wow and flutter:

$7\frac{1}{2}$ ips less than .10% RMS

$3\frac{3}{4}$ ips less than .15% RMS

$1\frac{1}{2}$ ips less than .35% RMS

Signal/noise ratio: At $7\frac{1}{2}$ ips the signal/noise ratio measured according to the DIN-standard is 58 dB for the 4-track model and 60 dB for the 2-track model.

Corresponding figures for linear conditions

56 dB. **Inputs:** A low impedance dynamic microphone 200 ohms unbalanced may be

connected via a 3-pole DIN-connector, sensitivity 0.1 mV Line inputs for high signal

level. A 5-pole DIN-connector and a Phono-connector in parallel designated

Pickup, impedance 1 Mohm, sensitivity 100 mV Line inputs for low signal level:

A 5-pole DIN-connector and a Phono-connector in parallel designated Radio.

Impedance 100 kohms, sensitivity 10 mV. All inputs have a dynamic range 40 dB

above specified sensitivity. **Outputs:** The

preamplifier output is available at a connector designated PRE AMP. The pre-

amplifier output has a source impedance of 5 Kohm. Output level for unloaded

amplifier is 0.75 Volts. The signal level is independent of all manual controls. This

amplifier output is also available through the DIN-connector designated RADIO.

The power amplifier will deliver 10 W into a 4 ohms speaker which may be connected

via a DIN-connector, Internal speaker 7"

"FREE HEAD": At this output signals for automatic slide synchronizers are available.

Dimensions: Length 15 inches, depth 11 $\frac{13}{16}$ inches, height 6 $\frac{1}{2}$ inches.

Weight: 19.2 lbs.



Speed selector for $7\frac{1}{2}$ " and $3\frac{3}{4}$ " and $1\frac{1}{2}$ " ips. can be operated while the recorder is running.



To ease threading of tape the automatic end stop is released when lever is set in position "Free" or "Neutral".



Individually bass and treble control at ± 10 dB.



Series 15 SL is ideal for language teaching.



Electrical remote control equipment, (F-equipment). Series 15F is available with remote control of start, stop and rewind, by means of a foot-controller or pushbuttons.

TANDBERG SERIES 1200X STEREO

A highly advanced high fidelity stereo tape recorder with numerous possibilities.

Series 1200X is in itself a complete Hi-Fi system, a fully transistorized stereo tape recorder with 3 speeds,

7½, 3¾ and 1½ i.p.s. and in 2 or 4 track versions, the Hi-Fi stereo amplifier has an output power of 2×10 watts. A separate Cross Field bias head extends the frequency response and improves the signal to noise ratio, e.g. at 3¾ i.p.s. ±2 dB 40-14,000 Hz.

Double volume controls for both inputs and outputs permit monaural mixing as well as monitoring when recording stereo or mono programmes. Bass and treble are continuously variable in the area ±12 dB.

There is an input for magnetic pick-up and input selector for line/microphone, pick-up or monaural mixing. Internal/

external speaker switching. During playback it is possible to mix in a microphone for announcements or to make commentaries to the programme – or if you wish to sing to the music.

Though most versatile the operation of 1200X is simple and logical. There is one control lever for tape transport, VU-meter with indirect illumination, 4 digit revolution counter with reset button and indirect illumination, instant start/stop switch, automatic end-stop and two built-in loudspeakers. Available in 2 or 4 track versions, in teak or rosewood cabinet. See also accessories on page 22 and 23.





Musical installation with tape recorder and amplifier in one . . .

Tandberg 1200X stereo tape recorder can form the heart of a complete Hi-Fi system for it incorporates a first-class stereo amplifier with input selector for tuner, microphone and record player with magnetic pick-up. There are bass and treble controls and 2x10 watts output power. The inputs offer mixing possibilities in mono. One channel can be used for recording while the other is used as an amplifier. There are almost no limits to the possibilities offered. And the sound reproduction is fantastic—provided that first-class loudspeakers are used. On page 21 you will find a description of the Tandberg Hi-Fi systems. When choosing one of these, you are ensuring the best possible results.

IDEAL FOR LANGUAGE EXERCISE . . .

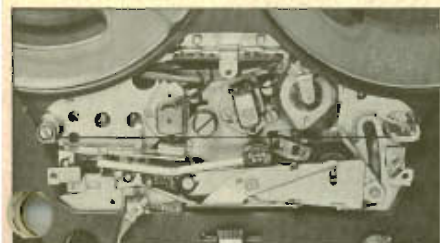
Language is learnt through continual exercise. It is necessary to listen, repeat, and listen, repeat, and then con-

trol the pronunciation. By means of Series 1200X you can play back a master programme on one channel while your own pronunciation is recorded on the other. Then both programmes can be listened to simultaneously. Language laboratories throughout the world are built on these principles today.

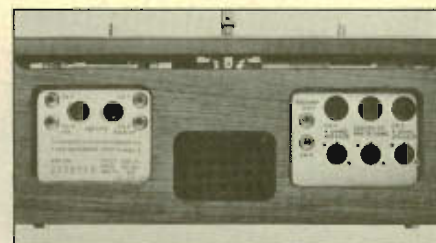
CROSS FIELD BIAS HEAD

Briefly, the principle is that a special bias head is placed in front of the record head. The theory on which this is based, is very complicated and claims the most extraordinary accuracy in the execution. Tandberg have solved these problems in their own way, and have reached results in matter of frequency response and signal-to-noise ratio which can hardly be matched in the world today.

The Cross Field system is also fitted in Series 6X stereo which is carrying everything before it in the world's most discriminating markets, Europe and America.



By means of a separate bias head opposite the record head (Cross-Field technique), Tandberg has reached the most outstanding results for frequency range and signal/noise ratio.



DIN and Phono sockets for connection to radio, record player or another tape recorder. 2-pole DIN connector, phone jack for extension speaker. Center channel output.

Specification 1200X

Record level indicator: Dual moving coil meter with a range of 20 dB. **Frequency response:**

7½ ips 20-25.000 Hz (± 2 dB 40-18.000 Hz)
3¾ ips 20-18.000 Hz (± 2 dB 40-14.000 Hz)
1½ ips 30-12.000 Hz (± 2 dB 40- 8.000 Hz)

in amplifier mode ± 3 dB 30-16.000 Hz.
Bass control: Continuously variable over a 12 dB range at 80 Hz in playback and amplifier modes. **Treble control:** Continuously variable over a 12 dB range at 8.000 Hz in playback and amplifier modes.

Wow and flutter:

7½ ips less than .10 % RMS

3¾ ips less than .15 % RMS

1½ ips less than .35 % RMS

Signal/noise ratio: At 7½ ips measured according to the DIN-standard 58 dB and 60 dB for 4-track and 2-track models respectively. **Inputs:** 2 low impedance dynamic microphones 200 ohms unbalanced, to the 3-pole DIN-connectors, sensitivity .1 mV. Line input: A 5-pole DIN-connector designated LINE is common for the two channels in parallel with two Phono-connectors, impedance 100 kohms, sensitivity 6 mV. All inputs have a dynamic range 60 dB above specified sensitivity. **Outputs:** Pre-amplifier output is available at DIN connector designated LINE.

Impedance 5 kohms. Output level of unloaded amplifier is 2 V. The signal level is independent of all manual controls. A 4 ohms external speaker may be connected to the amplifier. Available power output of each channel is 10 W. Center channel for headphones etc. may be loaded with minimum 75 ohms, output level 3 V unloaded, 1.5 V across a 75 ohms load. Internal speaker 7" x 4". **Dimensions:** Length 15 3/8", depth 11 13/16", height 6 3/4".

Weight: 23.4 lbs. See also table on page 21.

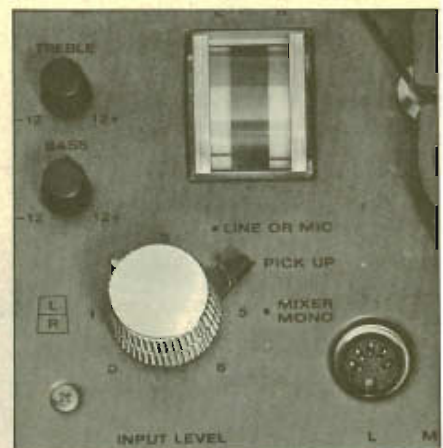
Power requirements: 230 V, 50 Hz. Can easily be adapted for 115 V operation.

Reel size: Maximum 7 inches. **Tape speeds:** 7½, 3¾, 1½ ips. **Speed tolerance:**

± 1.5%. **Fast wind and rewind:** for 1200 feet of tape is approx. 2 mins.

Immediate start/stop: in record and playback modes. **Semiconductors:** 36 transistors, 1 zenerdiode, 1 bridge rectifier.

Heads: 1 erase head, 1 record/playback head and 1 separate bias head. **Erase and bias signal:** 85.5 kHz, distortion less than 5%.



Bass and treble continuously variable within ± 12 dB. 2 input level controls for mixing in mono. Input selector for line/microphone and record player and mixing in mono. Model 1200X has amplifier for magnetic pickup.

TANDBERG SERIES 6X STEREO

Tandberg Series 6X stereo tape deck is the natural choice of the critical hard-to-please user, it has 3 speeds, $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ i.p.s. and 2 or 4 track versions. Outputs are cathode follower to feed external Hi-Fi power amplifiers.

"A.B.-test" allows instant monitoring off the tape, and "Sound-on-Sound" makes possible multiple synchronised recordings in a single track. Trick effects e.g. Echo are possible! Separate heads for erase, record and playback and an additional bias (cross-field) head have resulted in an extended frequency response and signal-to-

noise-ratio which challenge truly professional machines.

Each channel has 3 inputs, and separate volume controls for record and playback. A single lever controls tape transport, and push-buttons stop and select tracks. There are 3 inputs per channel, 4 digit illuminated counter, automatic end stop, optional remote start/stop, and a hysteresis synchronous motor providing constant speed with minimum wow and flutter.

Price: Please see separate price-sheet
Accessories pages 22/23.

**Professional properties
and possibilities –
a world leader.**





TANDBERG SERIES 6X

— professional in the
best sense of the word.

When a tape recorder shall perform as a perfect tool in the daily work, I make two absolute demands: Operation must be simple and sure, and it must have "professional frequency range". Both features characterize a Tandberg 6X, so that is *my* tape recorder, says Jørgen Ingmann, the famous Danish musician and composer, winner of the Melody Grand Prix contest 1963.

Jørgen Ingmann
Jørgen Ingmann.

Technical Specifications for Series 6x

Power requirements: External voltage selector for 110, 125, 145, 220, 245 volts, 50 Hz operations: **Power consumption:** 65 W. **Motor:** Hysteresis synchronous motor. **Reel size:** Maximum 7". **Tape speed:** 7½, 3¾ and 1½ ips. **Speed tolerance:** ±1%. Tolerance for record and playback on the same machine ±2% i.e. 3.6 seconds per 30 minutes. **Fast wind and rewind:** The fast wind or rewind time for 1200 feet of tape is approx. 2 minutes without tape wear. **Instantaneous start/stop:** Push-button-operated electromagnetic system which may be remotely controlled. **Tubes and transistors:** 4 ECC83, 2 ECC82, 2 ECC81, 2 EAM 86, 1 SE 6001, 1 SE 4001, 2 U 2048-1, 2 2N 3705, 2 2N 3702. **Rectifiers:** 2 selenium rectifiers. **Heads:** 1 erase head, 1 record head, 1 play-back head and one separate cross-field bias head. **Erase and bias:** 85.5 kHz. **Distortion:** Less than .5%. **Record level indicator:** Electronic beam indicator for each channel (EAM 86)

Frequency response:

7½ ips 20-25,000 Hz (±2 dB 40-18,000 Hz)
3¾ ips 20-18,000 Hz (±2 dB 40-14,000 Hz)
1½ ips 30-12,000 Hz (±2 dB 40- 8,000 Hz)
In amplifier mode ±2 dB 30-30,000 Hz.

Wow and flutter:

7½ ips less than .10% RMS
3¾ ips less than .15% RMS
1½ ips less than .35% RMS

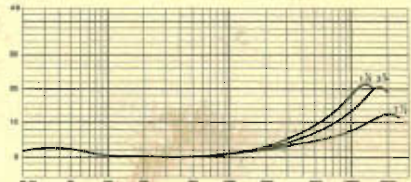
Signal/noise ratio: Measured according to a weighted A-curve at 3% distortion:

	2-track	4-track
7½ ips	63 dB	60 dB
3¾ ips	61 dB	58 dB
1½ ips	59 dB	56 dB

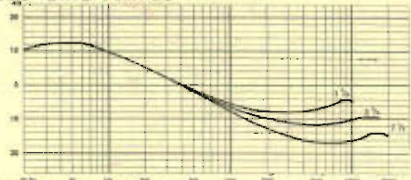
For linear conditions at 3% distortion: 54 dB. Measured according to the DIN-norm 45511-H:

	2-track	4-track
7½ ips	60 dB	58 dB
3¾ ips	59 dB	57 dB
1½ ips	58 dB	56 dB

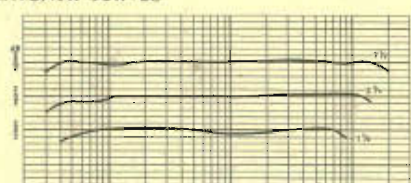
For linear conditions at 5% distortion: 56 dB. **Crosstalk** less than 60 dB. **Inputs:** Microphones may be connected via 2 phone jacks on the top deck, impedance 5 Mohm, sensitivity 1.5 mV. High level inputs: Phono-connectors and 5-pole DIN-connector, LINE, impedance 1 Mohm, sensitivity 50 mV. Low level input: Phono connector and 5-pole DIN-connector, RADIO, impedance 100 kohm, sensitivity 4 mV. All inputs have a dynamic range of 40 dB above specified sensitivity. **Outputs:** Cathode follower outputs are available at Phono connectors and also a 5-pole DIN-connector, RADIO. Impedance 2 kohm, max. signal output for max. record level 1.5 V. Center channel output: Both channels available in parallel on a Phono connector. Impedance 200 ohm, maximum output signal level 1 V. The separate channel outputs at 150 mV level, 10 kohms source impedance are also available at the DIN-connector, LINE. **Record:** A 400 Hz signal recorded at max. record level gives less than 3% distortion, mainly introduced by the tape itself. Minimum load impedance 10 kohm. At maximum record level the contribution to the total distortion from the record amplifier is less than .5%. **Playback:** The distortion introduced by the playback amplifier is less than .2% for a signal level of 1.5 V, across a 10 kohms load. **Mixing:** Recording on one channel gives the following mixing possibilities: 3+3 line inputs, 3 line inputs+1 microphone input or 1+1 microphone inputs. Dimensions: Length 15¼", depth 11 13/16", height 6¾". Cabinet is made of best quality rosewood or teak. **Weight:** Instrument alone 23.2 lbs, with carrying case 28.2 lbs. See also table on page 21.



RECORDING CURVES



PLAYBACK CURVES



TOTAL CURVES



Push-button operation of recording and playback on both channels. Pause button and electrical remote control of start and stop



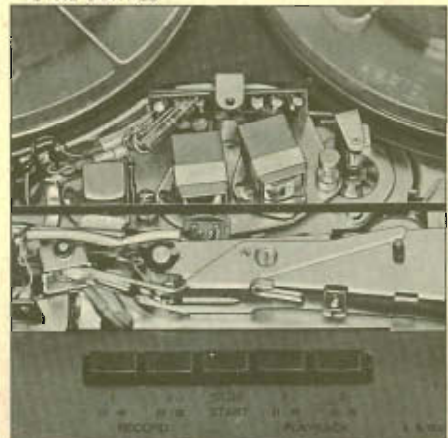
A double control knob for playback on both channels. Sound-on-sound selector with 3 positions.



Electronic beam indicator ("magic eye" with slow backward movement ensures correct recording level.



Series 6X can also be operated in vertical position.



Separate heads for erasing, recording, playback and separate bias head, Tandberg made. (Cross-Field). By introducing the Cross Field technique Tandberg has reached sensational specifications for frequency range and signal/noise ratio.

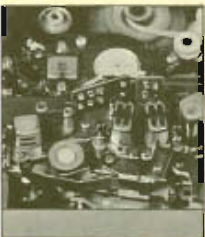
TANDBERG SERIES 11

Battery-driven tape recorder with professional features and performance

Tandberg Series 11 is a fully transistorized, battery-driven full or 2 track tape recorder of the highest quality. It has 3 speeds: $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ ips. With cover removed $7''$ spools may be used, and $5''$ spools with cover in position. Dimensions: Length: $13''$, Height: $4''$, Depth: $10''$. Weight (batteries included): 12.1 lbs. All operational facilities and connections are on the front panel. There are 3 input lines, for dynamic microphone, radio and line. Separate volume controls for microphone and radioline-inputs allow mixing. Separate volume control for output line (600 ohm), monitor (200 ohm headphone) and built-in control loudspeaker. AB-test is possible during recording. Limiter-amplifier (automatic recording control) can be connected. By pushing a button, the VU-meter will indicate the state of the 10 1.5 Volt batteries which power the tape recorder. Tape speed is electronically controlled. This model has a one lever control for tape drive, pause button for instantaneous start/stop and a switch for built-in loudspeaker. Mains operation is possible using additional battery eliminator. An alternative version of series 11 is available with a pilot-tone to permit movie camera synchronisation. (See separate leaflet). Prices are given in separate sheet. Accessories: Please see pages 22 and 23. The Tandberg series 11 was awarded the Certificate of Good Industrial Design for 1967.

Technical Specifications

Power requirements: Battery operation: 10 1.5 V Flashlight batteries. Mains operation: Power pack may be installed in battery



3 heads for erasing, recording and playback, and a tachometer head for electronic speed control.



The tape recorder can be used with $7''$ spools when cover is removed. $5''$ spools with cover in position.



Tachometer wheel continuously controls the speed of tape.



All operation facilities are placed on the front.

compartment or connected externally. **Power consumption:** 2-3 watts.
 $7\frac{1}{2}$ ips current drain: 220 mA
 $3\frac{3}{4}$ ips current drain: 180 mA
 $1\frac{7}{8}$ ips current drain: 160 mA
Reels: With cover removed: Max. $7''$, with cover: Max. $5''$. **Tape speeds:** $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ ips. **Speed tolerance:** $\pm 1\%$, obtained by means of an electronic speed servo.
Fast wind and rewind: Time for 1200 feet of tape is approx. $1\frac{3}{4}$ mins without wear. "Cueing" in wind and rewind modes.
Instantaneous start/stop: Mechanical.
 Semiconductors: 41 transistors, 10 diodes and 2 zener diodes. Heads: 2-track or full-track models. 1 record head, 1 playback head, 1 erase head and 1 tachometer head for speed control. **Erase and bias signal:** 85.5 kHz ± 2 kHz, distortion less than 5%.
Record and playback level indicator: Moving coil meter with a range of 20 dB. 3% distortion from the tape at normal level.

Frequency response:

$7\frac{1}{2}$ ips 40-16,000 Hz ± 2 dB
 $3\frac{3}{4}$ ips 50-10,000 Hz ± 2 dB
 $1\frac{7}{8}$ ips 60- 5,000 Hz ± 2 dB

Wow and flutter:

$7\frac{1}{2}$ ips less than .15% RMS
 $3\frac{3}{4}$ ips less than .25% RMS
 $1\frac{7}{8}$ ips less than .40% RMS

Signal/noise ratio: Measured according to the DIN standard 45511-H:

	2-track	Full-track
$7\frac{1}{2}$ ips	60 dB	62 dB

$3\frac{3}{4}$ ips	59 dB	61 dB
$1\frac{7}{8}$ ips	58 dB	60 dB

Inputs: Low impedance dynamic microphone. Impedance 200 ohms symmetrical, sensitivity 0.15 mV, max. signal 45 mV. The standard version has DIN-connector. On request delivered with Cannon XL31 or XL32 connector. Line inputs: Miniature jack, LOW, for signals between 5 mV and 3 V, impedance 10 kohms. Miniature jack, HIGH, for signals between 125 mV and 1 V, impedance 200 kohms. A limiter with a dynamic range of 25 dB may be used during recording. **Outputs:** Balanced line output for 600 ohms load. For a matched load, the voltage on the line output is 1.55 V for zero indication on the meter. Monitor output for 200 ohms headphones. The max. power output from the 20 ohms internal speaker is 25 W. With the internal speaker functioning the MONITOR and LINE outputs and the indicator are disconnected. Accessories may be connected to the 6-pins DIN-connector.

Dimensions: Length $13''$, depth $10''$, height $4''$. **Weight:** With batteries 12.1 lbs.



The recorder can be carried and used in a sturdy practical shoulder bag. Pocket for tape and window for spools.

Technical data

	SERIES 14 MONO	SERIES 15 MONO	SERIES 1200X STEREO	SERIES 6X STEREO	SERIES 11 STEREO
POWER REQUIREMENTS	230/115 V 50/60 Hz	230/115 V 50/60 Hz	230/115 V 50/60 Hz	110-125-145-200 220-245 V 50/60 Hz	Battery operated 10-115 V
POWER CONSUMPTION	50 W	50 W	58-100 W	65 W	2-3 W
TUBES, TRANSISTORS, DIODES	20 transistors	20 transistors	36 transistors 1 zenodiode 1 rectifier	4 ECC 83, 2 ECC 82 2 ECC 81, 2 EAM 86 8 transistors, 2 diodes	41 transistors 40 diodes 2 zener diodes
SPEEDS	3 $\frac{1}{2}$ ips.	7 $\frac{1}{2}$ -3 $\frac{1}{2}$ ips.	7 $\frac{1}{2}$ -3 $\frac{1}{2}$ ips.	7 $\frac{1}{2}$ -3 $\frac{1}{2}$ ips.	7 $\frac{1}{2}$ -3 $\frac{1}{2}$ ips.
SPEED TOLERANCE	$\pm 1.5\%$	$\pm 1.5\%$	$\pm 1.5\%$	$\pm 1\%$	$\pm 1\%$
FREQUENCY RESPONSE Record/playback curves to NAB (NARTB) standards Max divergence from CCIR (IEC) 1 dB in the range 70-12,000 Hz Amplifier mode	7 $\frac{1}{2}$ ips. 3 $\frac{1}{2}$ ips. 1 $\frac{1}{2}$ ips.	30-20,000 Hz (40-16,000 Hz ± 2 dB) 30-13,000 Hz (50-9,000 Hz ± 2 dB) 30-7,000 Hz (60-4,500 Hz ± 2 dB) 30-16,000 Hz ± 3 dB	20-25,000 Hz (40-18,000 Hz ± 2 dB) 20-18,000 Hz (40-14,000 Hz ± 2 dB) 20-12,000 Hz (40-8,000 Hz ± 2 dB) 30-15,000 Hz ± 3 dB	20-25,000 Hz (40-18,000 Hz ± 2 dB) 20-18,000 Hz (40-14,000 Hz ± 2 dB) 30-12,000 Hz (40-8,000 Hz ± 2 dB) 30-30,000 Hz ± 3 dB	30-20,000 Hz (40-16,000 Hz ± 2 dB) 30-13,000 Hz (60-10,000 Hz ± 2 dB) 30-7,000 Hz (60-5,000 Hz ± 2 dB)
WOW % R.M.S.	less than 0.15% less than 0.35%	less than 0.1% less than 0.15% less than 0.35%	less than 0.1% less than 0.15% less than 0.35%	less than 0.1% less than 0.15% less than 0.35%	less than 0.15% less than 0.25% less than 0.4%
AMPLIFIER DISTORTION Record Amplifier, at max record level (0 dB) Playback Amplifier	less than 0.5% less than 2% at 10 W	less than 0.5% less than 2% at 10 W	less than 0.5% less than 2% at 10 W	less than 0.5% less than 0.2% at 1.5 V	less than 0.5% less than 0.2% at 1.5 V
TAPE DISTORTION At 0 dB record level At -8 dB record level	less than 5% less than 1%	less than 5% less than 1%	less than 5% less than 1%	less than 3% less than 1%	less than 3% less than 0.5%
SIGNAL/NOISE for max. Record level	At 3 $\frac{1}{2}$ ips. 4-track: 57 dB 2-track: 59 dB At 5% distortion: 56 dB	At 7 $\frac{1}{2}$ ips. 4-track: 58 dB 2-track: 60 dB At 5% distortion: 56 dB	At 7 $\frac{1}{2}$ ips. 4-track: 58 dB 2-track: 60 dB At 5% distortion: 56 dB	At 7 $\frac{1}{2}$ ips. 4-track: 58-57-56 dB 2-track: 60-59-58 dB At 3% distortion: 54-54-54 dB At 5% distortion: 56-56-56 dB	At 7 $\frac{1}{2}$ ips. 2-track: 60 dB 1-track: 62 dB 2-track: 57 dB 1-track: 59 dB
INPUT IMPEDANCE AND SENSITIVITY (Input level set at max.)	Mic: 200 ohms/0.10 mV Radio: 100 Kohms/10 mV Pickup: 1 Mohm/100 mV	Mic: 200 ohms/0.10 mV Radio: 100 Kohms/10 mV Pickup: 1 Mohm/100 mV	Mic: 200 ohms/0.1 mV High Level: 100 Kohms/6 mV Low Level: 30 Kohms/2 mV	Mic: 2x5 Mohms/1.5 mV High Level: 1 Mohm/50 mV Low Level: 100 Kohms/4 mV	Mic: 200 ohms/0.15 mV Low Level: 10 Kohms/5 mV High Level: 200 Kohms/125 mV
OUTPUTS Pre-amplifier Power Amplifier Center Channel output impedance/voltage	5 Kohms/0.75 V unloaded 10 W/4 ohms	5 Kohms/0.75 V unloaded 10 W/4 ohms	5 Kohms/2 V unloaded 2x10 W/2-4 ohms 40 ohms/3 V unloaded	Cathode Follower. 2 Kohms/1.5 V unloaded Line: 10 Kohms/150 mV 200 ohms/1 V unloaded	Line: 600 ohms/1.55 V loaded Mount: 200 ohms/1 V loaded 0.25 W/20 ohms
DIMENSIONS Cabinet Model Case Model	L: 15" (38 cm), H: 6-3/4" (17 cm), D: 11-13/16" (30 cm) L: 15-3/4", H: 7-1/8" D: 11-7/8"	L: 15" (38 cm), H: 6-3/4" (17 cm), D: 11-13/16" (30 cm) L: 15-3/4", H: 7-1/8" D: 11-7/8"	L: 15-3/8" (39 cm), H: 6-7/8" (17.5 cm), D: 11-13/16" (30 cm) L: 15-3/4", H: 7-1/2" D: 12"	L: 15-3/8" (39 cm), H: 6-3/4" (17 cm), D: 11-13/16" (30 cm)	L: 13" (33 cm), H: 4" (10 cm) (10 cm), D: 10" (25.5 cm)
WEIGHT (carrying case, all models + 5 lbs.) Cabinet Model Case Model	19.2 lbs. 8.7 kg 16.3 lbs. 7.4 kg	19.2 lbs. 8.7 kg 16.3 lbs. 7.4 kg	23 lbs. 10.6 kg 26.5 lbs. 12.1 kg	23 lbs. 10.5 kg	9.5 lbs. (batteries excl.) 4.3 kg 11.5 lbs. (batteries incl.) 5.5 kg Case 2 lbs. 0.9 kg

TANDBERG PORTABLE RADIO 3-1

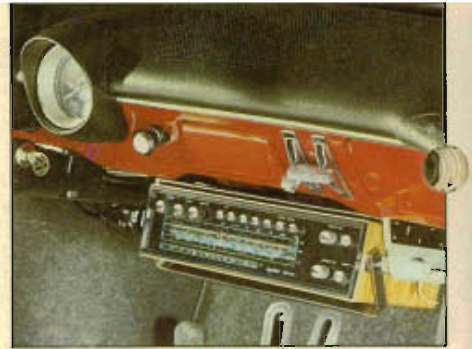
**A handy, elegant model
which can be used
everywhere:
at home, on the beach,
in the car.**

The Tandberg Portable Series 3-1 has 4 wave bands. Longwave, medium- and shortwave and extended FM-band. (87,3-108 MHz). Separate tuning for AM and FM. Automatic fine tuning on FM. For shortwave there is a special button for fine tuning. It is a real pleasure to listen to the shortwave stations on this radio. Dial illumination by pressing a button. Sensitivity is great on all wavelengths. There is an extra long telescopic aerial for FM and shortwave and a ferrite aerial for the long- and mediumwave lengths. Series 3-1 has a large special loudspeaker (3½"×8") which gives excellent sound quality. Output power:

1,2 watts. Continuously variable bass and treble controls work independently of each other. DIN-contacts for record player or tape recorder. The radio slides into a special lockable bracket (optional extra) under the dashboard in the car, and it automatically connects to the car aerial and the battery, dial illumination and to a possible extra speaker. The bracket is available with or without extra power amplifiers.

Technical Specifications: Series 3-1 4 frequency bands:

Longwave, 145-320 kHz (2.068-937 m)
Mediumwave, 518-1.600 kHz (579-187,5 m)
Shortwave, 5,8-18,5 MHz (51,7-16,2 m)
FM-band, 87,3-108 MHz (3,43-2,87 m)
Tuning: FM and AM bands have mutually independent tuning knobs. **Automatic frequency control (AFC):** This feature is operative in FM only and can be disconnected by means of a push-button. **Fine tuning:** A separate knob for fine tuning in the short wave band. **Aerial:** Ferrite aerial for long- and medium waves. Telescopic whip aerial for shortwaves and FM-band. Provisions for connection of car aerial to separate input circuits for long



Tandberg Portable 3-1 is a radio of supreme quality, too good to be left in the car when it is placed in the garage. Just pull it out from the bracket which provides automatic connection to car battery with dial illumination, car aerial and a possible extra speaker.

and medium waves. **Dial illumination:** The dial is illuminated when a button is pressed. **Tone controls:** Separate controls for continuous adjustments of bass and treble. **Tape recorder and record player** can be connected via a DIN-connector. **Loudspeaker:** 3½"×8" elliptical loudspeaker. **Power output:** 1,2 watts. **Batteries:** 2 series connected 4,5 Volts flashlight batteries. **Current drain:** 35-40 mAmps at normal power output. **Dimensions:** Length 11", height 7 9/32", depth 3½". **Weight:** (Batteries included) 5,1 lbs. Car adaptor: Universal adaptor adjustable for 6 and 12 Volts operation has an extra amplifier which increases the output to 1,8 watts at 6 Volts, and 2,5 watts at 12 Volts. A special adaptor without amplifier is available for 12 Volts operation.

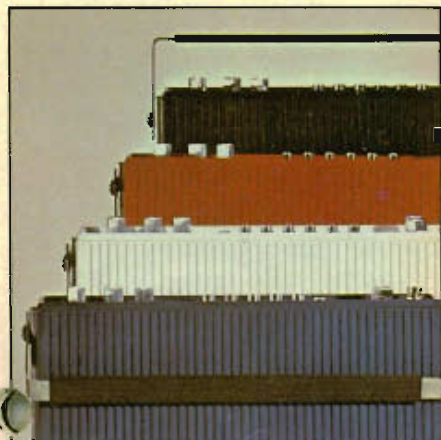
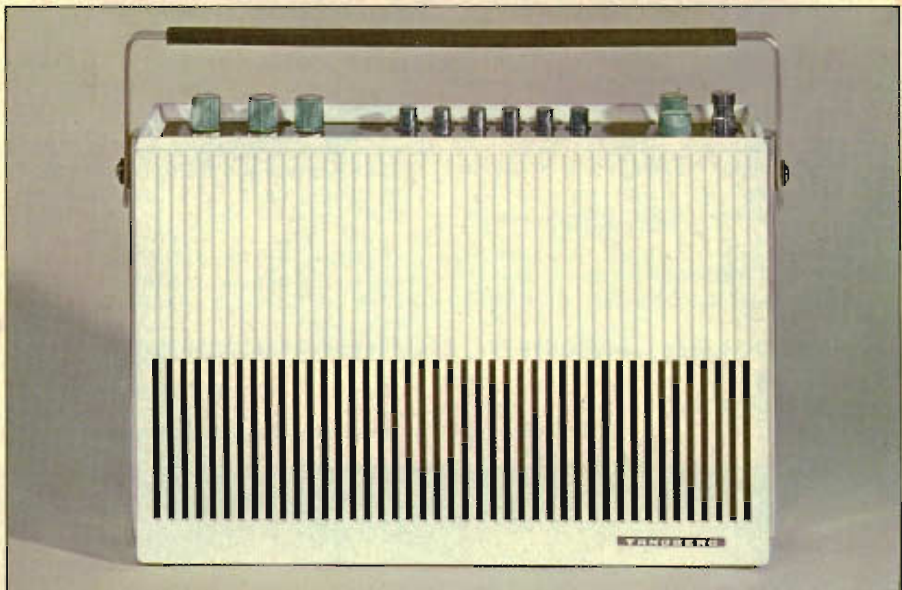


TANDBERG PORTABLE RADIO 3-3

This elegant model has 3 wavebands: Longwave, mediumwave and FM-band (87,3-108 MHz). The FM-band covers all the ranges of frequencies which are used by European and American FM stations. Separate tuning for AM and FM. Automatic fine-tuning for FM. Great sensitivity on all wave bands. Extra long telescopic aerial for FM-band and a ferrite aerial for long- and medium-wave lengths. Tandberg Portable Radio 3-3 has a large special loudspeaker (3½"×8") which provides excellent sound reproduction. Output power is approximately 1,2 watt. Continuously variable bass and treble controls work independently of each other. DIN-contact for connection of gramophone or tape recorder. 2 flat, dry 4,5 volts batteries which are very simple to change. By means of a battery eliminator the radio can be connected to AC-mains. TP 3-3 has no special car connection possibilities. In a car provided with noise suppressor however, very good reception can be achieved on the FM-band, when the radio is connected to the car aerial or a window aerial. The radio can be fitted into a mounting bracket under the dashboard. (Optional extra). The Tandberg Portable Radio 3-3 is available in solid ABS-material in a range of attractive colours. It can also be supplied in walnut cabinet.

Technical specifications Series 3-3

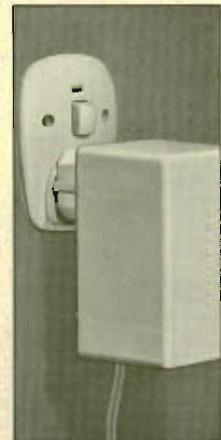
Specifications as for Series 3-1, on page 14, with following exceptions: Series 3-3 has no shortwave and no special connection facilities for car bracket, but it has connection for external aerial.



Tandberg Portable Radio 3-3 is available in walnut cabinet or solid ABS material in a range of attractive colours.



All Tandberg Portable Radios are excellent FM-tuners. Outputs for tape recorder, for recording or amplifying. Use a Tandberg tape recorder as an amplifier (10 W) for FM-sound, and let it be played back through a Tandberg Hi-Fi System and you will be impressed.



Tandberg Portable Radio Series 3-1 and 3-3 can be connected to the AC-mains by means of a Tandberg Battery Eliminator, which is plugged to the AC-mains and connected to the radio by means of a lead.

TANDBERG SØLVSUPER 10 Stereo

If you desire a new radio and a good stereo amplifier at a reasonable price a Tandberg Sølvsuper 10 Stereo is the answer to your problem.

Sølvsuper 10 Stereo has 5 wavebands: Longwave, mediumwave, shortwave I and II and FM-band. The radio is available without or with a decoder for stereo reception. Operation is very simple and easy. By means of fly-wheel tuning one easily covers the large, easy-to-read dial. There is a magic eye and automatic fine tuning on FM (AFC), and 5 movable arrows facilitate the tuning. By means of 8 push-buttons one can choose between wave-bands, tape recorder, record player and AFC for FM. This radio has continuous variable bass and treble controls, and dual controls for volume. Furthermore there is a loudspeaker selector which allows selection between built-in or external loudspeaker, or both at the same time. Output power: 2×6 watts. DIN-contacts for connection of tape recorder, record player and separate loudspeaker.

Sølvsuper 10 is available with or without built-in loudspeakers, designation of the models is respectively 10-72 and 10-71.

Sølvsuper 10 is available in a monaural version designated 10-70.

Sølvsuper 10-71 Stereo

This is a compact elegant radio for use with 2 external Tandberg Hi-Fi loudspeakers.



(Please see page 20). Cabinet in teak or rosewood.

Dimensions: Length 14 $\frac{3}{4}$ "", height 5 $\frac{1}{4}$ "", depth 8 $\frac{13}{16}$ "".

Prices: Please see separate sheet.

Technical Specifications: Sølvsuper 10-71 and 10-72 Stereo.

Export version.

Basic equipment: 4 tubes, 20 transistors 7 diodes and 2 rectifiers. **5 wavebands:** Longwave: 150-350 kHz (2000-857 m) Mediumwave: 518-1600 kHz (579-188 m) Shortwave I: 1610-5850 kHz (186-51,3 m). Shortwave II: 5,85-22 MHz (51,3-13,6 m) FM band: 87,5-108 MHz (3,43-278 m). Ferrite aerial on Long- and Mediumwave. **Station markers:** 5 sliding markers simplify tuning to favourite FM stations. **Automatic frequency control on FM:** AFC takes over and ensures exact tuning when the tuning pointer is moved to the marker for the required station. AFC can be disconnected if desired. **FM multiplex:** Sølvsuper 10-71 and Sølvsuper 10-72 are prepared for the reception of stereo broadcasts. All that is required is

a multiplex decoder which is simply plugged in. A stereo indicator lights up during stereo reception. **FM multiplex decoder:** 6 transistors, 7 diodes, 7 tuned circuits (114 kHz low pass filter included). With SCA filter for American system, without SCA filter for European system. **Printed circuits:** For stability and reliability. **Equalised pre-amplifier:** Stereo-preamplifier for magnetic pickup with RIAA equalisation. Sensitivity 2 mV for 6 watt output power. **Input selector switch:** For magnetic, ceramic or crystal pickup head. **Low frequency amplifier:** 2 transistorized Hi-Fi amplifiers (Class B). Individual volume control for each amplifier. The low frequency amplifiers meet the DIN standard for Hi-Fi amplifiers. **Output power:** 2×6 watts. **Frequency range** 30-20.000 Hz (-3 dB at 40 and 17.000 Hz when tone controls are in center position.) **Tone controls:** Continuously variable bass control. Variation range ±10 dB at 80 Hz. Continuously variable treble control. Variation range ±10 dB at 8000 Hz. Physiological bass compensated volume control, i.e. automatic bass tone increase at reduced volume.

Connections: DIN-sockets for tape recorder and record player connections. Each amplifier has two DIN speaker output sockets. IEC sockets with adaptor for 4



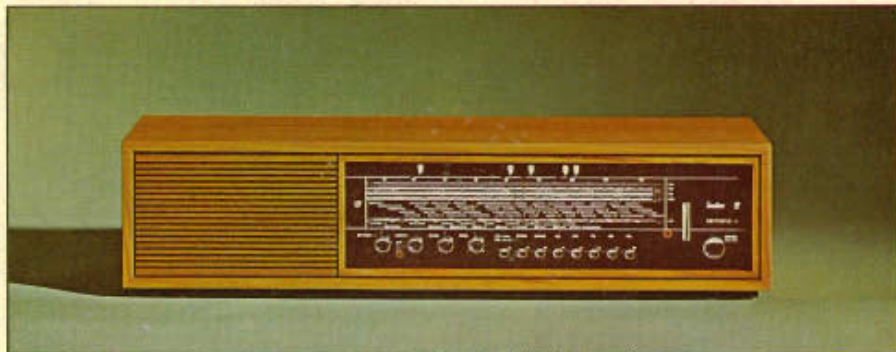
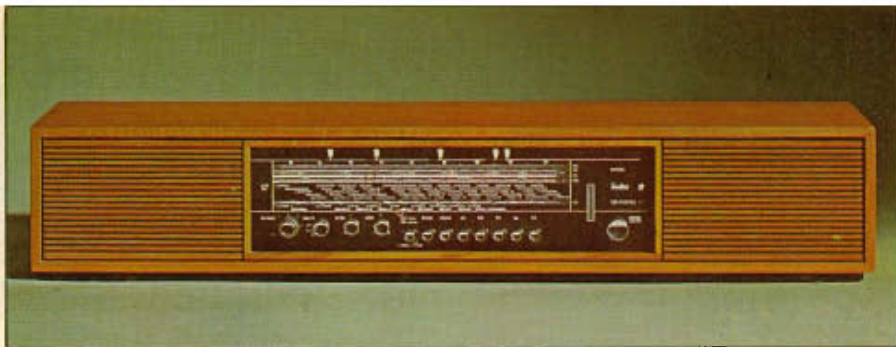
mm banana plugs for AM-aerial, ground connection and for FM-aerial connection. **8 push buttons:** For wavelength selection, tape recorder, record player, interference reduction on AM, AFC on FM and STEREO/MONO changeover. **Speaker selector.** Provides choice between internal speakers, external speakers, or all speakers. **Mains supply:** 115-230 volt, 50/60 Hz, tapped transformer. **Cabinet:** Teak or Rosewood. **Dimensions:** Sølvsuper 10-71: Length 15", height 5½", depth 9". Sølvsuper 10-72: Length 28½", height 5½", depth 9". Sølvsuper 10 Stereo GB (special version for Great Britain): Specifications as the export model above, except for the following: **FM-band:** 87,5104 MHz (3,43-2,89 m). **FM-aerial:** Unbalanced antenna system of 75 ohms impedance. A single dipole with 75 ohms coaxial feeder will match the receiver. Coaxial socket (Belling Lee). **Dial:** With wavelengths, frequencies and BBC program indicated. **Stereo decoder:** On request. **Mains supply:** 240 volt, 50/60 Hz.

TANDBERG SØLVSUPER 10-72

A quality stereo radio and amplifier at a reasonable price. Same wave bands and operating possibilities as Sølvsuper 10-70, but a double volume knob for the amplifiers. 2 pressure chamber loudspeakers are provided but there are also possibilities for connecting external speakers. Output power 2×6 watts. Available in teak or rosewood. **Dimensions:** Length 28½", height 5½", width 9". **Prices:** Please see separate sheet.

TANDBERG SØLVSUPER 10-70

There is much pleasure to be gained from the ownership of a modern high quality radio receiver. The ease of tuning the various stations, the thrill of listening to pure, natural sound reproduction, and the knowledge that this is a radio to be relied upon, a radio which will last for many years. Sølvsuper 10-70 has 5 frequency bands: Longwave, mediumwave, shortwave I and II and FM-band. Operation is extremely simple and easy. By means of fly-wheel tuning the large and clear dial is easily covered. There is a magic eye, and automatic fine tuning on FM (AFC), and 5 movable arrows to facilitate the tuning of favourite stations. 8 pushbuttons make it easy to select waveband, or tape recorder, record player and AFC for FM. Continuously variable bass and treble controls. Loudspeaker selector for built-in loudspeaker, external loudspeaker or both. The audio amplifier is transistorized with an output power of 8 watts.



DIN-contacts for connection of tape recorder, record player or separate loudspeakers. A special loudspeaker mounted in pressure chamber provides excellent sound reproduction. Sølvsuper 10-70 is available in teak or rosewood. **Dimensions:** Length 21¾" Height 5½", Depth 9". **Prices:** Please see separate sheet.

Technical Specifications: Sølvsuper 10-70

Audio amplifier: Transistorized Hi-Fi amplifier Class B.
Frequency range: 30-20.000 Hz (-3 dB at 40 and 17.000 Hz)
Output power: 8 W.
Tone controls: Variable bass and treble controls and volume control with physiological bass compensation, i.e. automatic bass tone increase at reduced volume. Use crystal or ceramic pick-up head. The LF amplifier has two DIN speaker outputs

(master and remote). Optimum load impedance 4-5 ohms.

8 push-buttons: For wavelength selection, tape recorder, record player. **Speaker selector:** Provides choice between master speaker, remote speaker or both speakers.

Mains supply: 220 V, 50/60 Hz (available also for 110 V).

Power consumption: At 1 watt output power: 48 W. At full output power: 56 W.

Cabinet: Teak or rosewood. **Dimensions:** Length 21¾", height 5½", depth 9".

Basic equipment: 4 tubes, 9 transistors, 6 diodes and 2 rectifiers.

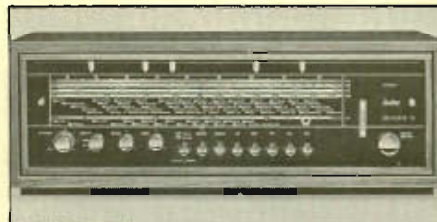
Printed circuits: For stability and reliability.

Wavebands:
Longwave: 150-350 kHz. (2000-857 m)
Mediumwave: 510-1610 kHz (590-186 m)
Marine band: 1610-5850 kHz (186-51,3 m). Shortwave: 5,85-23 MHz (51,3-13 m).
FM-band 87,5-104 MHz (3,43-2,78 m).

Automatic frequency control on FM: AFC ensures exact tuning when the tuning pointer is moved to the marker for the required station. AFC can be disconnected if desired.

Station markers.

Operation is simple and logical. 5 movable markers simplify the tuning on favourite stations.



On the rear, DIN-contacts for connection of tape recorder, record player and remote loudspeaker.

TANDBERG HULDRA 8

Huldra 8 is unique in all respects. It embodies a wealth of advanced technical features—this is the receiver for the most discriminating of music-lovers. Huldra 8 has a FM tuner with provision for stereo multiplex reception and can be supplied with decoder at an option. It has two 10 watts Hi-Fi amplifiers (20 watts total). There are built-in preamplifiers for magnetic, ceramic and crystal pickups. AM-radio with 4 wave bands, Intercommunication system (listen-respond system). In spite of its great versatility, operation of Huldra 8 is simple and logical. It has large, easy to read dials, duplex tuning, station markers and automatic frequency control for FM. For AM there is a 9 Kc/s interference-filter and selectivity switch. Tone regulation is achieved either by a tone switch, selecting fixed sound curves, or by continuously variable bass and treble controls. Huldra 8 is available in two versions:





TANDBERG HULDRAS 8-55

is designed for use with external Hi-Fi loudspeaker systems, therefore dimensions are smaller. You can select the Hi-Fi loudspeakers for your own requirements.

Huldra 8-55 fits well into wall sections or shelves. The cabinet is available in rosewood or Siamese teak. Dimensions: Length: 19 $\frac{3}{4}$ "", Height 8 5/7" , Width: 10" .

TANDBERG HULDRAS 8-56

is an exclusive table radio in the luxury class, incorporating two Hi-Fi loudspeakers in scientifically designed acoustic pressure chambers which are capable of perfect full range stereo reproduction. Each system consists of a woofer and a tweeter with crossover network. Full bass reproduction down to 60 c/s is thus attained. The handsome cabinet is available in Siamese teak. Dimensions: Length 32 $\frac{1}{4}$ "", Width 10" , Height 9 $\frac{3}{8}$ " .

Technical Specifications: HULDRAS 8

5 frequency bands:

Longwave 150-350 kHz (2000-857 m).
Mediumwave 510-1610 kHz (580-186 m)
Marine wave 1,6-5,9 MHz (187-50,9 m).
Shortwave 5,9-23 MHz (50,9-13 m) FM-band 87,5-108 MHz (3,44-2,78 m)

FM Stereo Multiplex: Huldra is prepared for installation of decoder for stereo radio reception. On special request the decoder is installed at the factory.

Duplex tuning: Separate tuners for FM and AM. The tuning knob is automatically connected to the correct tuner when the band is selected.

The FM tuner has three tuning circuits with band pass filters in the high frequency stage. The IF amplifier includes four band pass amplifier stages and a ratio discriminator.

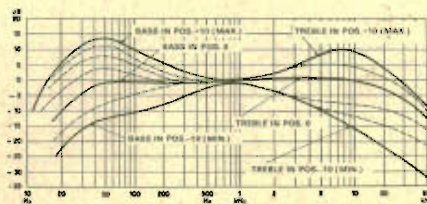
Station markers: 5 movable pointers facilitate FM station tuning.

Automatic frequency control (AFC) for FM: Can be switched on or off as desired.

Interference filter: 9 kHz for AM.

Selectivity switch: Push-button for increased selectivity when receiving distant stations.

Tone controls: A tone selector for fixed frequency characteristics plus continuously variable bass and treble controls having the same effect on both amplifier channels.



Amplifiers: 2 transistorized, class B power amplifiers can be operated in parallel for the same program, or can be used independently for 1 stereo or 2 monaural programs.

The amplifiers have separate volume controls.

Frequency range: 20-20.000 Hz (30-17.000 Hz ± 3 dB).

Power output: 2 \times 10 watt.

Pick-up amplifier: 2-channel preamplifier with 4 transistors will drive the power amplifiers to their full rated output when used with a pick-up. An input selector provides selection of the appropriate frequency correction for magnetic, ceramic or crystal pick-ups.

Connections: Huldra 8 has DIN sockets for connection to tape recorder and record player. The tape recorder is fed from the demodulator diode output, and is therefore independent of volume control. Each one of the power amplifiers has separate DIN sockets for master and remote speakers. Optimum speaker impedance is 4 ohms per channel.

The export model has phone jacks for loudspeaker connection and phono connector for tape recorder and record player. **10 push-buttons** for band selection, recorder, record player, mono/stereo, AFC for FM reception and selectivity. The push-buttons render instantaneous choice of any one of 4 programs: AM-stations, FM-stations, tape recorder and record player.

Speaker selector has the following three functions: A) Choice of master speakers only, remote speakers only or master and remote speakers simultaneously.

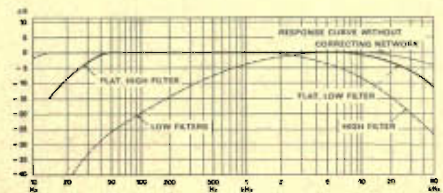
B) One mono program to internal speakers and another different program to external speakers.

C) Listen-talk, or Intercommunication. **Double programs:** One amplifier can be connected to a tape recorder or record player. Alternatively one channel can be used as intercom in LISTEN mode while the other channel is used for program from radio, record player or tape recorder.

The program channel is automatically muted when the Intercom switch is set to TALK.

Power requirements: Easy setting for the following mains voltages: 115, 130, 220 and 140 Volts, 50-60 Hz.

Power consumption: At normal power output: 55 W, at full power output (2 \times 10 W): 85 W.



TANDBERG LOUDSPEAKERS

The quality of a loudspeaker is judged first and foremost by its frequency range, efficiency, and radiated power at low, medium and high frequencies.

When loudspeakers are not properly mounted, the bass frequencies become considerably weakened due to pressure equalisation from both sides of the membrane. This equalisation can be avoided by isolating the rear of the membrane in a closed compartment. This "Pressure Chamber" principle has been exploited by Tandberg for many years.

Every loudspeaker has its own particular resonance frequency. The low frequency roll-off is determined by the point at which this resonance occurs. The lower the resonance frequency the better the bass reproduction will be. When a speaker is

mounted in a pressure chamber, the resonance frequency is raised and increase further yet in indirect proportion to the cabinet size. In other words, the larger the cabinet, the better the low note reproduction.

The resonance frequency can also be lowered by increasing the weight of the membrane. More power is then required subsequently reducing the efficiency of the loudspeakers. Bass reproduction similar to that achieved by a large set is obtainable with a small set but at the cost of the efficiency of the system. The maximum radiated power which a loudspeaker can reproduce without distortion is determined in part by the length of the concentrated field wherein the voice coil moves. Here again the resonance frequency decides the

limit. In order to maintain the same sound level when the frequency is decreased, the membrane vibration amplitude is increased. If the voice coil is forced out of the concentrated field, a sharp increase in distortion occurs.

A musical instrument or a group of instruments having maximum sound power in the medium frequency range can therefore be reproduced with a greater sound power than a church organ which produces maximum sound power in the low frequencies, e.g. 50 Hz. Compared to a 1000 Hz index level piano music will be about 30 dB weaker at 50 Hz and orchestral music approximately 20 dB weaker. In an ordinary room some of the lower frequencies are accentuated due to room acoustics and resonances.

	Normal living-room volume (approx. 80 dB)		Large living-room volume (approx. 100 dB)	
	Medium Bass (Orchestra)	Deep Bass (Organ)	Medium Bass (Orchestra)	Deep Bass (Organ)
Bass reproduction				
Small living-room (269 sq.ft.)	Hi-Fi 10 Hi-Fi 11	Hi-Fi 7 Hi-Fi 12 Hi-Fi 13	Hi-Fi 7 Hi-Fi 12 Hi-Fi 13	Hi-Fi 15
Large living-room (540 sq.ft.)	Hi-Fi 7 Hi-Fi 12 Hi-Fi 13	Hi-Fi 15	Hi-Fi 7 Hi-Fi 13	Hi-Fi 15
Large hall (2100 sq.ft.)	Hi-Fi 7 Hi-Fi 13	Hi-Fi 15	Hi-Fi 15	

LOUDSPEAKERS	HI-FI SYSTEM 10	HI-FI SYSTEM 11	HI-FI SYSTEM 12	HI-FI SYSTEM 7	HI-FI SYSTEM 13	HI-FI SYSTEM 15
DIAMETER	Woofer 6½" Tweeter 2"	Woofer 6½" Tweeter 2"	Woofer 6½" Tweeter 2"	Woofer 10" x 6" Tweeter 2"	Woofer 10" x 6" Tweeter 2"	Woofer 12" Midrange 5" Tweeter 2.5"
INTERNAL VOLUME	6.5 litres	6.5 litres	12.5 litres	25 litres	25 litres	50 litres
IMPEDANCE (AT 400 C/S)	4 ohms	4 ohms	4 ohms	3.2 ohms	3.2 ohms	4 ohms
MAX. CONTINUOUS INPUT	8 W	8 W	8 W	8 W	8 W	30 W
EFFICIENCY (Radiating from one side)	0.5 %	0.5 %	0.5 %	2.5 %	2.5 %	2 %
FREQUENCY RESPONSE	60-16,000 Hz	60-16,000 Hz	50-16,000 Hz	60-16,000 Hz	60-16,000 Hz	35-16,000 Hz
DIMENSIONS	L: 7-1/8" B: 9-1/8" H: 9-1/8"	L: 12-5/8" B: 6" H: 8-1/2"	L: 17-3/16" B: 7-1/2" H: 8-9/16"	L: 20-1/2" B: 10" H: 10-1/4"	L: 25-9/16" B: 9-13/16" H: 8-1/4"	L: 27-1/2" B: 11" H: 13-3/4"
TYPE OF WOOD	Siamese Teak	Siamese Teak Rosewood	Siamese Teak Rosewood	Siamese Teak Rosewood	Siamese Teak Rosewood	Siamese Teak Rosewood



TANDBERG HI-FI SYSTEMS

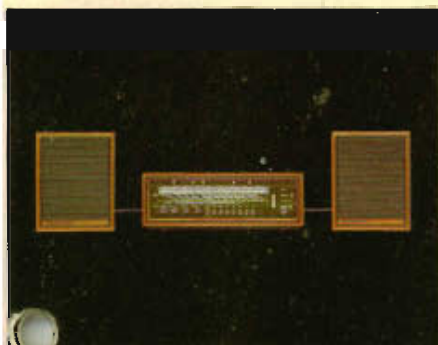


Quality of a loudspeaker is judged first and foremost by its frequency range, efficiency, and radiated power at low, medium and high frequencies. "TANDBERG SOUND" has become world famous. Tandberg's goal has always been to re-create a living sound exactly as if it were heard in a concert hall. "TANDBERG SOUND" is an expression for the most lifelike sound reproduction which technical advancement has been able to achieve. With equipment from Tandberg, you can install a Hi-Fi system to suit your particular requirements—a system which will satisfy very stringent de-

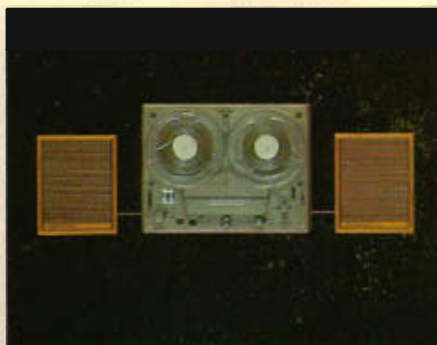
mands. The modern, practical styling blends with the furnishings of any home. Tandberg Tape Recorder Series 1200x is in itself a Hi-Fi system. The high power output (2×10 watts) enables the recorder to function excellently as a Hi-Fi amplifier. By connecting to other Tandberg Hi-Fi systems, you can acquire a sophisticated Hi-Fi system at a moderate price. If you should desire to connect a record player, series 1200x has contacts for magnetic, ceramic or crystal pick-ups. Tandberg-quality also characterizes the unsurpassable Huldrå 8, a high

quality radio with 4 AM bands, 2×10 watts Hi-Fi amplifiers with an FM-tuner and separate bass and treble controls in addition to amplifiers for magnetic, ceramic and crystal pick-ups. Together with Tandberg Recorder Series 6X and Tandberg Hi-Fi loudspeakers, you can construct an advanced Hi-Fi system which will be above criticism.

The expression "High Fidelity" is another way of saying quality. You are sure of quality when you choose Tandberg.



You can start with a set of basic equipment and supplement it little by little. This is the Solvsuper 10-71 with two Tandberg Hi-Fi 10 systems.

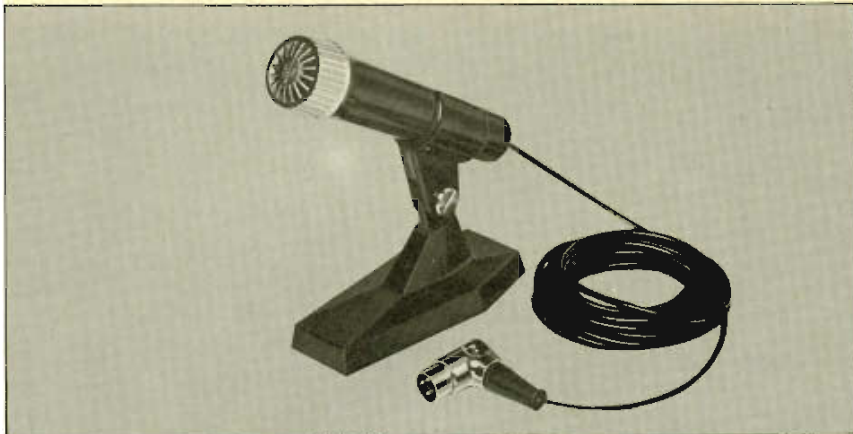


The 1200x Tandberg tape recorder is the perfect basic unit for every Hi-Fi system. With twin 10 watt amplifiers, bass and treble controls, mixing facilities and a separate amplifier for the dynamic pick-up, the 1200x offers the user a wide range of possibilities.



Here is an example of how to lay out a complete system with Huldrå 8-55, Tandberg 6x tape recorder, record player with dynamic pick-up and two Tandberg Hi-Fi speakers.

TANDBERG ACCESSORIES



TANDBERG TM4 COMPLETE

This is a high-quality dynamic microphone, ideal for Hi-Fi recording of both speech and music. Every single microphone is thoroughly tested and checked. Sensitivity and frequency range have been measured to be within the tolerance given in technical specifications. The microphone is omnidirectional, i.e. it accepts signals almost equally well from all directions, although best when received from the front. Technical specifications: Frequency range: ± 3 dB, 50-17.000 Hz. Sensitivity: 0.096 mV/

μ . Bar (at 1000 Hz). Impedance: 200 ohms. Dimensions: Length 5 $\frac{1}{2}$ ", diameter 1 5/12", weight without stand: 5 oz.

Tandberg TM4 Complete is available in a practical case with an adjustable table- and chest stand, cord with clip, a hold-fast for mounting on a tube stand, windscreen, 13 ft line and DIN-plug.



TANDBERG TM4 HANDY

Tandberg TM 4 Handy is a high quality dynamic, omnidirectional microphone, especially suited for recording of speech and music. Each microphone is thoroughly tested before leaving the factory.

TECHNICAL SPECIFICATIONS:

Frequency range: ± 3 dB, 50-17.000 Hz. When the hole is closed: -7 dB at 60 Hz. Sensitivity: 0,096 mV/ μ . Bar (at 1000 Hz). Impedance: 200 ohms. Dimensions: Length 5 $\frac{1}{2}$ ", Diameter 1 5/12". Weight: 1,2 lbs, 5 oz without stand. Tandberg TM4 Handy is available with a table stand, a cord with a clip, 13 ft line with DIN-plug. If you need a longer distance between the microphone and the recorder, special extension lines can be provided. You can extend the line up to 600 feet without getting a noticeable deduction of sound quality or loss of sensitivity.



TANDBERG MICROPHONE TRANSFORMER

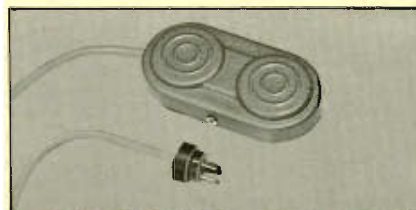
should be used when the Tandberg Microphone TM 4 is connected to any Tandberg Tape Recorder other than Series 11 and 12, or for that matter, to any tape recorder with high ohm input. Input impedance 200 ohms. Ratio for transformation: 1:15. Available with DIN or jack plug.



TANDBERG TM3

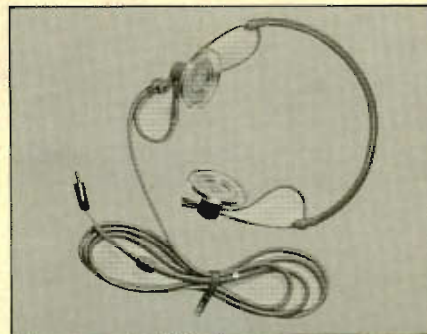
Tandberg TM3 is a high quality crystal microphone suited for Hi-Fi recording of speech and music. TM3 is omnidirectional, i.e. it accepts signals equally well from all directions. The microphone element is fitted with an intermediate layer of foam plastic which cushions shocks.

Technical specifications: Frequency range: 1,25 mV/ μ . Bar (at 1000 Hz). Impedance: 2,2 Mohms. Dimensions: 1 $\frac{3}{8}$ " x $\frac{7}{8}$ ". Weight: 1 oz. Weight with stand: 9 oz. Tandberg TM 3 is available with adjustable table- and chest stand, with a 13 ft line, jack plug and cord for suspension around the neck.



FOOT CONTROLLER for F-models. For remote control of start, stop and rewind.

TAPE of the very best quality made on polyester base. Available in the following lengths: 1800 ft. 1200 ft. 600 ft and 300 ft. Empty spools in following sizes: 7", 5" and 3".



STEREO HEADPHONE K 50 suited for monitoring during recording, mixing etc., as well as private listening during stereo play-back. Available with cable and DIN-plug.

STETOSET HEADPHONES light and comfortable for monitoring and private listening. Easy and light.

Telephone Pick-up for recording telephone conversations. To be attached directly to the base of the telephone. Available in two versions: A high impedance with 13 ft. lead cable and jack plug and a low impedance with 13 ft. cable and DIN-contact.



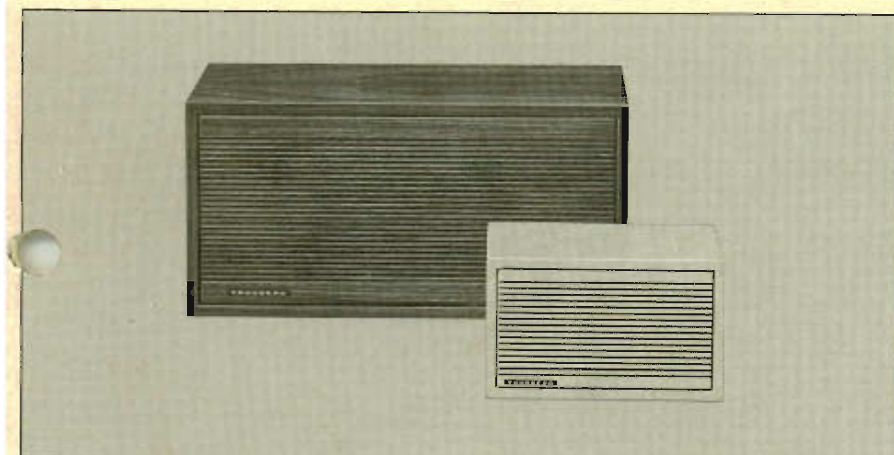
DUST COVER for tape recorders. Made of slightly smoke-coloured plastic.



CARRYING CASE for Tandberg Portable Radio. Smart hard-wearing "skai" material.

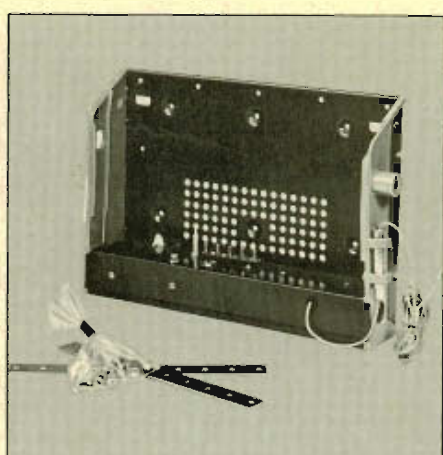


CASE for carrying cassette models. Provides fine protection. Complete with lock. Weight: 2.5 kg.



SEPARATE LOUDSPEAKER 9. A high quality remote loudspeaker for kitchen, sitting-room or sleeping-room. Dimensions: Length 16½", height 8½", depth 6". Volume: 8,5 litres. Teak cabinet.

KITCHEN LOUDSPEAKER. A small, handy loudspeaker for kitchen, bath etc. Dimensions: Length 8 1/16", height 5", Depth 4 5/16", Volume: 1,6 litres. Pearl-gray, laquered wood cabinet.



CARRYING CASE for Tandberg Portable Radio. Smart, hard-wearing "skai" material.

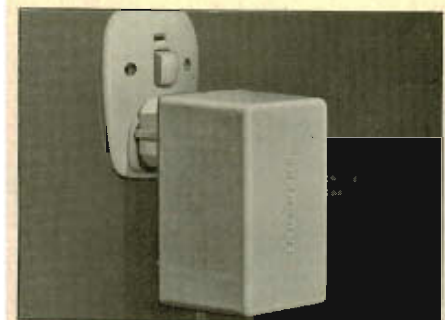
CASE for carrying cassette models. Provides fine protection. Complete with lock. Weight: 2.5 kg.

UNIVERSAL CAR BRACKET adjustable for 6 or 12 Volt, built-in output amplifier, providing 1,8 watt at 6 Volt and 2,5 watt at 12 Volt.

SPECIAL CAR BRACKET for 12 volt (without amplifier).

Both brackets allow automatic connection to car aerial, car battery and remote speaker, and provides automatic dial illumination.

Mounting bracket for fastening of the radio without any connections (fitted for Series 3-3).



BATTERY ELIMINATOR for Tandberg Portable Radio, for connection to 220 Volt AC. To be plugged to the socket, with a line to the radio.



TANDBERG SLIDE SYNCHRONIZER: Accompany your colour slides with recorded music, sound effects and commentary. The slide synchronizer can be used with any automatic slide projector and a stereo tape recorder. Tandberg Series 14 and 15 are also especially well suited. The synchronizer has an adjustment for length of impulse. Fully transistorized. Dimensions: Length 8½", width 3", height: 5".



It is important that people should be happy at their work, the integrity and surroundings of the worker is portrayed in his product. "To exceed, one must enjoy working" says Vebjorn Tandberg. The basic foundation must be quality, and this should permeate everything, the factory buildings, the working conditions and the execution of the work itself—there must be a harmonious whole and a communal pride of participation. This is one of the reasons why the word TANDBERG has become synonymous with quality in most languages throughout the world today. What was once a small Norwegian enterprise is rapidly attaining global stature with a proud reputation founded on craftsmanship and quality—You are safe when you buy TANDBERG.