

TANDBERG



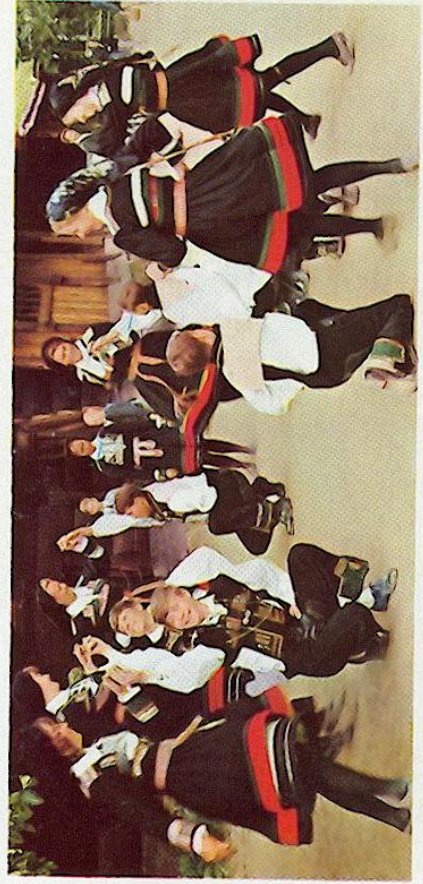
Every Instrument has its own Sound...

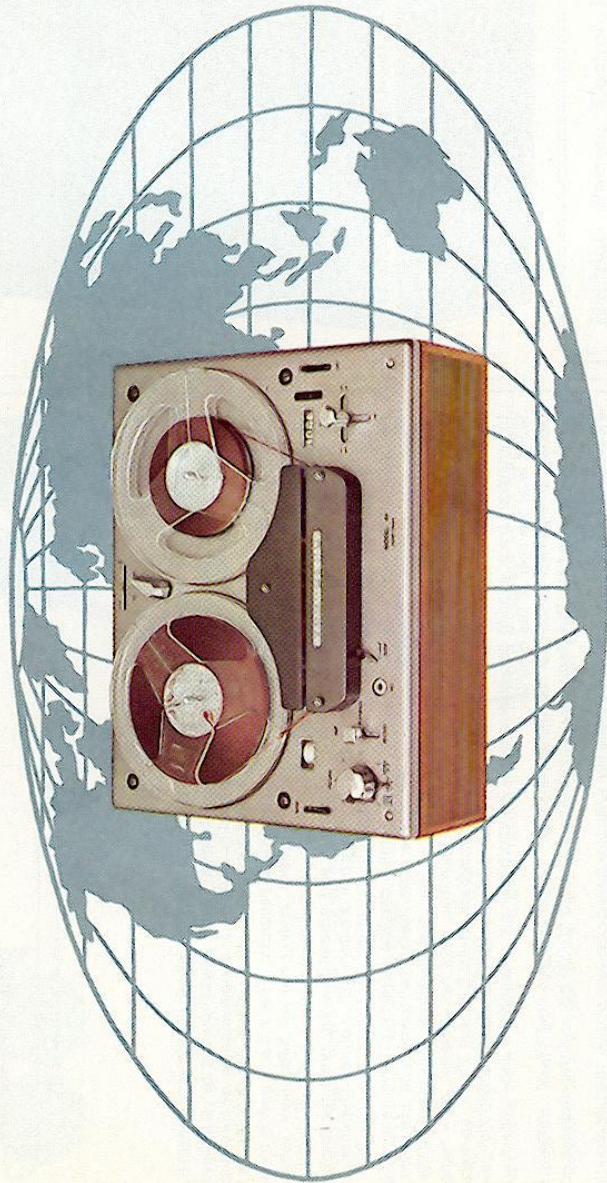
The Violin, the French Horn, the Grand Piano, the Drums, a multitude of sound waves from all the instruments of the orchestra combine to make up the music we hear. This complicated pattern of frequencies, with its harmonics and overtones determines the warm, living glorious sound that reaches our ears.

There is all the difference in the world between an ordinary violin and a Stradivarius, and in the same way there can be wide extremes in the capabilities of "Audio" equipments to reproduce these instruments.

Take away the original character of the music and only a pale, dead, flat shadow picture is left. We are well aware of what the addition of colour does to a picture, and how flat and dull a black and white drawing can be. Many people are accustomed to listening to sound reproduction from which the life and colour brilliance are missing and they do not realize what a wonderful experience it can be to hear their favourite orchestras reproduced by modern Tandberg equipment.

Thanks to Tandberg Engineers it is possible to-day to have sound reproduction which is very close to the original, keeping its own living sound, and bringing the original performers into your own home.





Tandberg

«Tandberg-Sound» has a world wide reputation. It does not have special characteristics, it simply reproduces the living sound, the one you hear in the concert hall. Nothing is added, nothing is removed. To-day the name Tandberg is synonymous with truthful natural sound reproduction. Three times Tandberg has been rated top in comprehensive American Consumers Tests for tape recorders. Wherever the demand is for precision, reliability and natural sound reproduction Tandberg is the natural choice.

Tandberg tape recorders are functional in operation and design. With a Tandberg you have an audio mirror which provides an image indistinguishable from the original.

A Tandberg Tape Recorder — and you can create your own recording of music. Several Stages of copying are necessary between the original performance and the commercial gramophone record, or pre-recorded tape. Many F.M. transmissions

are degraded by long land lines and in addition some are recorded programmes. A «Live» original recording made on a Tandberg stereo tape recorder using Tandberg TM3 Microphones can achieve an amazing degree of natural realism. Tandberg tape recorders are capable of semi-professional performance and will do justice to the finest loudspeakers and power amplifiers, which may be used with them.

The new Huldra 8 offers you two 10 watt transistorised Hi-Fi amplifiers, a FM Tuner, and Pre-amplifiers suitable for low output magnetic pickups. In addition, it incorporates a complete AM Radio with four wave-bands. A music system is only as good as the weakest link in the chain of components, and Tandberg loudspeakers in scientifically designed acoustic enclosures do justice to the outstanding electronic circuitry preceding them.



series 8



Tandberg Series 8 is the ideal general purpose tape recorder for it will faithfully record and playback music and speech for entertainment, education, or for business purposes. Reliability is ensured by rigid quality control and operation is simple and fool-proof.

Series 8 is a 2 speed ($3\frac{3}{4}$, $1\frac{1}{8}$ i.p.s.) monaural tape recorder. The 2 track and 4 track versions are available in teak cabinets of modern styling, or in handsome fabric covered portable cases.

One control lever selects fast forward and rewind and normal forward drive for record and playback. 4 digit revolution counter with zero indicator and indirect illumination make it easy to return to any place of the tape.

An electronic beam indicator (magic eye) permits precise control of the recording level. Pause switch instantly starts or stops the tape during recording and playback. All models incorporate a $7\frac{1}{2} \times 4$ inch loudspeaker. The loudspeaker selector switch provides a choice of playback through internal speaker, external speaker, or a radio or amplifier. The bass can be increased during playback. Both DIN and Phono sockets are available for connections to radio or other equipment. The input sensitivity can be adjusted by a special potentiometer. A compartment for microphone and connecting leads is at the rear of the recorder.

Series 8 can be used as a straight-through amplifier with the tape transport mechanism stopped. The frequency response is 20 c/s to 20,000 c/s and the undistorted output is 3 watts.

The 4-track models have a track selector position marked "Duo". In this position it is possible to playback two tracks simultaneously through one loudspeaker (e.g. 4-track stereo tapes can be played back monaurally).

The 4-track models also have an output for "Free" head and this enables the Tandberg Slide Synchroniser to be used.

It is possible to monitor the recording by means of earphones when using the 2-track models.

The cabinet models in handsome Siamese teak are ideal for incorporation in furniture or bookshelves, etc. For portability they can be quickly fitted into a luggage type carrying case or a soft carrying bag which has a protecting plastic dust cover inside it. These are optional extras. The fabric covered portable models have a carrying handle and detachable lid.

Dimensions: Cabinet models: Length 15", height $6\frac{1}{2}$ ", width $11\frac{1}{8}$ ".

Weight 20.5 lbs. (9.3 kg).

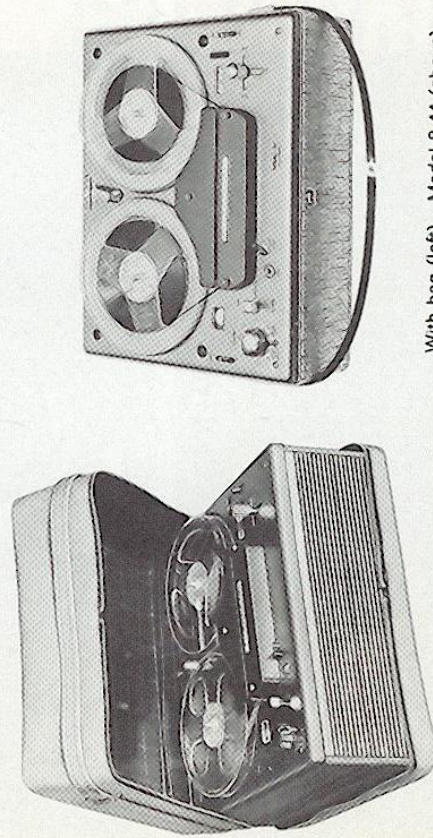
Portable models: Length $15\frac{3}{4}$ ", height $7\frac{1}{8}$ ", width $11\frac{7}{8}$ " (+ handle).

Weight 22.5 lbs. (10.1 kg).

See also Technical Data and Accessories.

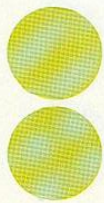
Model 8-43 (4-track, in teak cabinet)
Model 8-44 (4-track, portable)
Model 8-23 (2-track, in teak cabinet)
Model 8-24 (2-track, portable)

Series 8 with electrical remote control, see next page.



With bag (left). Model 8-44 (above).

series 9



Tandberg Series 9 is the natural choice for anyone requiring fine monaural recording and playback from a tape recorder. It is ideal for school use and is officially approved by Educational Authorities in many countries.

Available as a 2-track model only, it has three speeds $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{1}{8}$ i.p.s. It has the same simple operational features as Series 8, 2-track. A single control lever for operation of tape transport, pause button, bass switch, loudspeaker selector, and 4 digit revolution counter with indirect illumination. A micro-switch stops the motor if the tape breaks or runs out.

Connections are duplicated by means of DIN and Phono contacts, and recordings can be made from microphone, radio, or record player. There is an output for an extension speaker or other equipment. The input has a pre-set potentiometer, which can be adjusted to any input signal, and protects the input from being overloaded. A small compartment at the rear accommodates microphone and leads. The loudspeaker selector provides choice of internal 7" x 4" speaker, external speaker, or both speakers playing at the same time.

Series 9 will function as a straight amplifier with the tape transport stopped, for lectures, concerts, etc. Frequency response is 20–20 000 c/s and the undistorted power output is 3 watts. An efficient electronic beam indicator ensures that a correct recording level is maintained. Monitoring is possible by means of headphones. Series 9 is housed in a handsome teak cabinet.

Dimensions: Length $15\frac{1}{5}$ ", depth $11\frac{1}{8}$ ", height $6\frac{3}{4}$ ". Weight 20.5 lbs (9.2 kg)

See also Technical Data and Accessories.

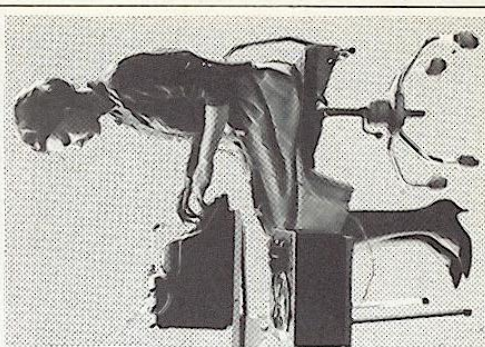
Model 9-23 (2-track, in teak cabinet)



Electrical Remote Control (F-Equipment).

The suffix F after Models 8 and 9 denotes that these tape recorders can be remotely controlled to start, stop and rewind. A push-button or foot-switch will operate the tape recorders over long or short distances as required.

The F Models are therefore particularly suitable for all types of dictation or for recording conferences, or where the operator is at a distance from the tape recorder. A typist with a foot controller can start, stop and rewind without removing her hands from the typewriter. Thanks to the clear, natural sound quality every word can be heard clearly and distinctly and the work flows easily without strain.





Ideal for Language Teaching

"Language Laboratories" are a new and efficient aid in all language teaching. Tandberg is installing language laboratories at schools and universities in a number of countries, and already educational establishments in many parts of the world are using Tandberg Electronic Teaching Systems.

Similar techniques to those used in a language laboratory are available to the owner of a Tandberg 7B tape recorder. The same principle applies "Listen, Respond, Record, Compare". A lesson, interspersed with pauses, is recorded on channel 1. The lesson is played back and monitored by means of headphones, and the exercise is repeated into a microphone in the pauses, and recorded on channel 2. Afterwards both channels can be played back simultaneously when a comparison can be made between the operator's pronunciation and the master programme. A special centre channel output socket is provided in order that both channels can be heard simultaneously in both earpieces of a headset. In this way it is possible to practice again and again. The master programme remains on channel 1 and is not erased, but a recording can be made on channel 2 as many times as is considered necessary. An advanced student wishing to perfect his pronunciation can make master recordings in various languages from foreign radio stations, and the Huldre radio receiver is particularly suitable for this purpose.

series 7B



Series 7B is a complete mono and stereo recording and playback system with its own power amplifiers and built-in loudspeakers. It is possible to record and playback stereo tapes with Series 7B without the addition of any other equipment. It has three speeds, $7\frac{1}{2}$, $3\frac{3}{4}$, and $1\frac{1}{8}$ i.p.s. and is available in two versions: Model 74B (4-track) and 72B (2-track). Microphone inputs for each channel are located on the top plate, and in addition there are input sockets with phono contacts at the back of the machine with pre-set controls for adjusting the sensitivity.

Output sockets, with phono contacts are for external loudspeakers, high impedance into Hi-Fi amplifier, and derived centre channel mixing both playback channels into headphones.

A five position selector switch provides choice of various internal and external speaker combinations. Series 7B can also be used as a stereo amplifier, with a total output of 2×3 watts. A lecturer can use one channel as a microphone amplifier while simultaneously recording his lecture on the other channel.

One control lever operates the tape transport system, there is a pause switch, 4 digit illuminated revolution counter, bass switch and automatic end stop.

Series 7 is housed in a teak cabinet and overall dimensions are as follows: Length $15\frac{1}{3}$ " depth $11\frac{3}{4}$ " height $6\frac{7}{8}$ ". Weight 27.6 lbs. (12.5 kg).

A luggage type carrying case and a soft carrying bag are available as extras. See also Technical Data and Accessories.

Model 74 B (4-track, in teak cabinet)
Model 72 B (2-track, in teak cabinet)

series 6



More and more discriminating tape recorder enthusiasts throughout the world are preferring this stereo tape deck which is universally acknowledged to be in the semi-professional class. Series 6 is a complete instrument for recording and playing back mono and stereo material. It has speeds of $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{1}{8}$ i.p.s. and three separate heads for erase, record, and playback are fitted. Series 6 has cathode follower outputs and is designed for use with external power amplifiers and speaker systems. It is available in two versions: Model 64 (4-track) and 62 (2-track).

By means of the special "A-B Test" feature it is possible to compare the copy with the original a fraction of a second after the recording has been made, and the recording is not interrupted in any way.

Multiple recordings are possible in the "Sound-on-Sound" position by transferring programmes from one track over to the other, and at the same time recording additional material. It is possible for the operator to add several items, one after the other, and in complete synchronisation.

There are three inputs and individual controls for each channel so that mixing is possible. The output channels are also individually controlled.

Other technical features of Series 6 are one control lever for all tape transport operations, press buttons for electrical functions and track selection, 4 digit illuminated revolution counter, automatic end-stop, pause button, and optional addition of remote start—stop.

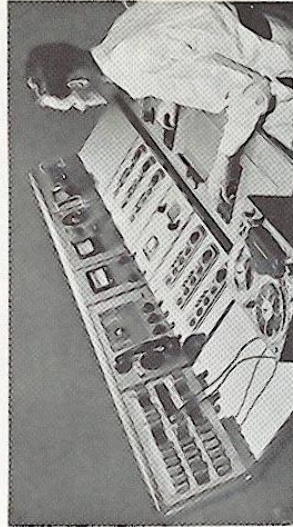
Series 6 is housed in a teak cabinet, and a carrying case and bag are available as extras.

See also Technical Data and Accessories.

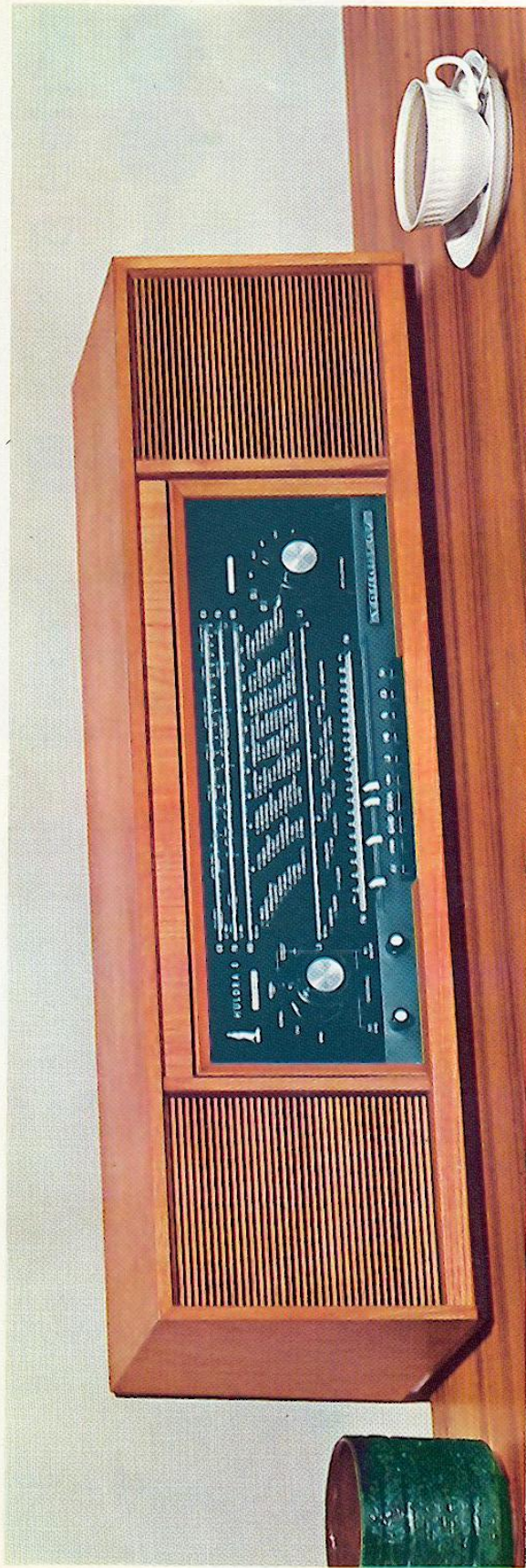
Dimensions: Length $15\frac{1}{2}$ " , depth $11\frac{3}{4}$ " , height $6\frac{7}{8}$ " . Weight 25 lbs. (10.5 kg).

Model 64 (4-track, in teak cabinet)

Model 62 (2-track, in teak cabinet)



Series 6 is frequently used by film and broadcasting companies and professional recording engineers, in various parts of the world, particularly where high class portable equipment is required. The technical specifications for frequency response, wow, signal-to-noise ratio, distortion, and speed tolerance are very rarely matched in this price class.



Huldra 8

This model can truly be described as a High Fidelity Instrument, and not only will the quality of reproduction satisfy the most discriminating listener, but the long range performance will also please those who require a receiver capable of world-wide reception.

Features include

FM Tuner with provision for stereo multiplex reception later, AM radio with four wave bands, Two 10 watt amplifiers (20 watts total, mono or stereo). Separate pre-amplifiers for magnetic, ceramic, and crystal pickups. Intercommunication equipment (listen-respond system).

Huldra 8 is partially transistorised having 20 transistors and 5 tubes. The tubes are used in the high frequency stages where they are still superior to transistors. The operations are simple and logical. Huldra 8 has large easy to read dials, duplex tuning, station-markers, automatic frequency control on FM, interference filter and selectivity switch for AM.

Tone regulation is achieved either by a tone switch selecting fixed sound curves, or by continuously variable bass and treble controls.

Huldra 8 incorporates a host of unusual technical features which attract all who look for the latest and finest developments in a home music system.

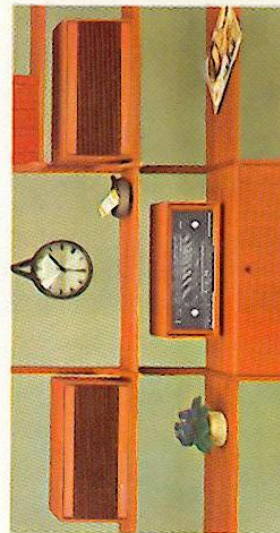
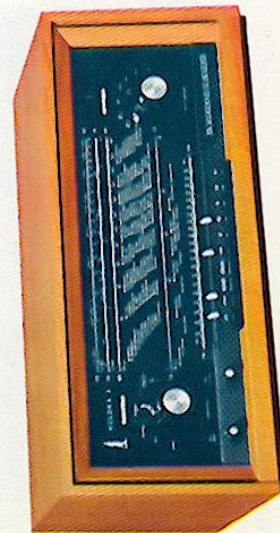
Huldra 8-56

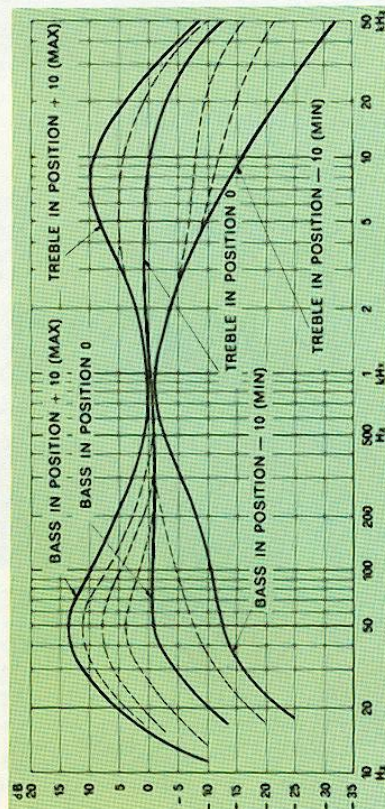
An exclusive table radio in the luxury class. Huldra 8-56 incorporates two Hi-Fi loudspeakers in scientifically designed acoustic pressure chambers capable of full bass reproduction. Each system consists of a woofer and a tweeter with cross-over net-work. (System 113/106). The handsome cabinet is available in Siamese teak. Dimensions: Length 32 3/4", height 9 3/8", depth 10".

Huldra 8-55

This model is designed for use with external Hi-Fi loudspeaker systems. Therefore the dimensions are smaller and you can select Hi-Fi loudspeakers system for your own requirements. (See description of loudspeakers).

Huldra 8-55 fits well into modern wall sections and the cabinet is available in first class Siamese teak. Dimensions: Length 19 1/4", height 8 5/8", depth 10".





Technical Specification:

5 tubes: ECH 81, EAF 801, EF 89, ECC 85, EM 87.

20 transistors: 1 SE 1002, 5 U 3962, (SE 4010), 4 SE 4001, 2 SE 6001, 2 AC 127, 2 AC 128 (AC 152), 4 AD 150 (AD 149).

6 diodes: 2 1N 542 (AA113), 2 1S920, 1 OA 81, 1 BA 124.

3 rectifiers: 1 B 30 C 2200, 1 BY 112, 1 2B ST, 1.

Printed Circuits for improved stability and reliability.

5 wavelengths:

Longwave 150—350 Kc/s (2000—857 m)
Mediumwave 510—1610 Kc/s (590—186 m)
Coastal wave 1.6—5.9 Mc/s (187—50.9 m)
Shortwave 5.9—23 Mc/s (50.9—13 m)
FM-Band 87.5—108 Mc/s (3.44—2.78 m)

FM-Multiplex: Huidra 8 has provision for stereo Radio reception and a space is reserved within the cabinet, and connecting terminals are provided, for fitting a FM-Multiplex Decoder later. A separate indicator is illuminated during stereo reproduction.

Duplex-Tuning: Two separate tuners are incorporated, one for FM and the other for AM. The same tuning knob is automatically connected to the correct AM or FM pointer when the wave band is selected.

Station-Markers: 4 movable markers (arrows) facilitate identification of the tuning positions of popular FM stations.

The FM-tuner: This has three tuning circuits with band-pass filters in the high frequency stage.

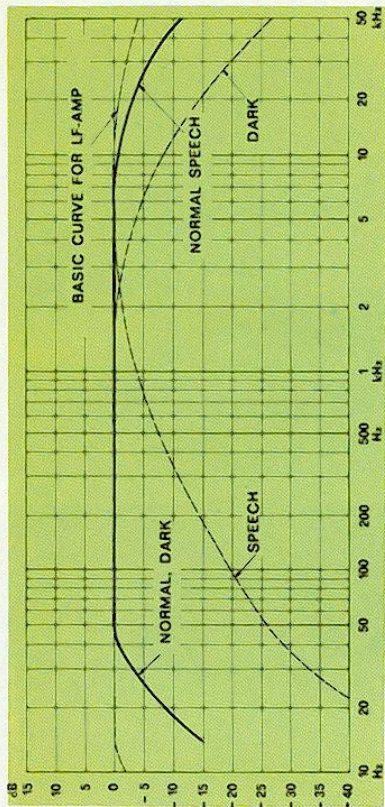
The intermediate frequency amplifier has four stages with band-pass filters and discriminator.

Automatic Frequency Control (A.F.C.) for the FM-Band: The A.F.C. automatically takes care of the fine tuning adjustment when the pointer is set to the station-marker for the required station. The A.F.C. can be switched off by means of a push-button.

Interference Filter: A 9 Kc/s filter is provided for AM reception.

Selectivity Switch: One position assists the separation of adjoining distant stations and the other permits a more extended frequency range for local stations, on the AM band.

Tone Controls: The Huidra 8 is unique in the fact that it combines a selection of fixed frequency characteristics and in addition variable bass and treble controls. A tone control selector has six positions of which four positions provide a choice of carefully designed frequency response curves and these are marked Bass, Speech, Normal, and Normal and Bass. The continuously variable bass and treble controls do not operate in these positions. One of the two remaining positions pro-



vides a straight line response with the continuously variable bass and treble controls in circuit. The remaining position for low volume listening, brings in a circuit which automatically lifts the bass response as the volume is decreased.

All the above tone controls operate on both channels simultaneously.

Power Amplifiers: The Huidra 8 has two transistorised power amplifiers (class B). These amplifiers, which have individual controls, can be used independent of each other, or they can be operated in parallel when a total of 20 watts is available.

Frequency range: 20—20 000 c/s (—3 dB at 30 and 17 000 c/s).

Power output: 2 x 10 watts

Amplifier for Magnetic Pickup: A 2 channel pre-amplifier, with four transistors, will drive the output amplifiers to their full rated power when a low output magnetic pickup is used. The input selector switch takes care of the correct sound equalisation for magnetic, ceramic, and crystal pickups.

Connections: The Huidra 8 has both Continental DIN and International Phono contacts (parallel) for connections to mono-stereo tape recorders and record players. A diode output is provided in order that anything which is being reproduced by Huidra 8 can be recorded on a tape recorder.

In addition to the amplifier outputs to the internal speakers, there are DIN contacts and Phono plug sockets to which external speakers can be connected, and internal and external speakers are switched.

In addition to the above mentioned speaker connections, outputs are provided which are connected direct to the power amplifiers and are independent of the speaker selector.

The impedance at all speaker terminals is 4 ohms.

10 Push-Buttons select wave-length, tape recorder, record player, Mono/Stereo, selectivity when receiving the AM-bands, and automatic frequency control when receiving the FM band.

Speaker Selector: The speaker selector has three functions with 7 positions: A. Choice of internal speakers only, external speakers only, or internal and external speakers at the same time. B. It is possible to feed one mono programme to the internal speakers, and another programme to the external speakers. C. The internal and external speakers can be used for inter-communication between the Huidra 8 and other parts of the house.

Power Supply: Easy change-over for 115, 130, 150, 220 and 240 volts mains 50—60 c/s.

Power Consumption: Normal 55 watts. Continuous run at rated power 2 x 10 W: 85 watts.

Tandberg Loudspeakers

The loudspeaker is the final and decisive link in the chain of components which determine the quality of the sound which reaches your ears. The very greatest care should therefore be taken in selecting a loudspeaker as otherwise all the care and money you have expended on the preceding equipment will be of no avail. Some of the most important characteristics of a loudspeaker are the frequency range, efficiency, and radiated power at low, medium, and high frequencies. A loudspeaker radiates low frequencies equally in all directions, but in the upper register the radiation becomes progressively more concentrated into a narrower angle.

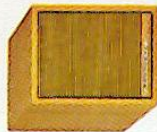
It is necessary to mount the speaker in a specially designed compartment, of pre-determined size, in relation to the unit used, and this is sometimes known as a "Pressure Chamber". The speaker unit is used in this way in order to avoid cancellation of the bass frequencies, due to the sound waves from the front and rear face of the cone conflicting with one another.

Every loudspeaker cone has a certain mass and stiffness of suspension and has a 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 will be the bass reproduction. Mounting a loudspeaker unit in a closed cabinet increases the resonance frequency. The larger the cabinet is, the better the low note reproduction.

The resonance frequency can also be lowered by increasing the weight of the cone and the moving system. As a result more power will be required to move the cone assembly and the efficiency of the loudspeaker decreases. Similar bass reproduction to that of a large enclosure is obtainable with a small cabinet but at the cost of the efficiency of the system.

The loudspeakers used in Huldra 8-56 and Hi-Fi System 113/106-10 have been designed along the lines of the last principle. Tandberg engineers have compensated for the low speaker efficiency by incorporating two 10 watt power amplifiers in Huldra 8 and these provide wonderful sound quality and ample volume for the ordinary living room. The maximum radiated power which a loudspeaker can reproduce without distortion will, among other things, be determined by the maximum amplitude of the cone which in turn is dependent on the concentrated field in the magnet gap. Here again the bass reproduction decides the limit. To maintain the same sound level the cone amplitude increases with decreasing frequency, and if the voice coil has to move outside this concentrated field then distortion increases rapidly. A musical instrument, or group of instruments, having maximum sound power in the medium frequency range will therefore be reproduced with greater sound power than for instance a large organ which produces maximum sound power in the lower frequencies e.g. 50 c/s.

Hi-Fi System 113/106-10.



External Loudspeaker Model 9.



Hi-Fi System 112-7.



Hi-Fi System 114/116-8.



As a direction for the choice of Hi-Fi systems one may use the following table:

	Normal living room volume (approx. 80 db)	Strong living room volume (approx. 100 db)
	Medium Bass (orchestra)	Strong Bass (orchestra)
Small living room (180 sq ft.)	113/106-10	112-7
Large living room (450 sq ft.)	113/106-10	114/116-8
Small hall (900 sq ft.)	112-7	114/116-8
Large hall (1800 sq ft.)	112-7	114/116-8

External Loudspeaker Model 9.

A first class extension loudspeaker for the living room, the kitchen, or other parts of the house. Incorporates loudspeaker chassis HT110 which has a dual cone for wide range reproduction. The speaker has an extremely low cone-resonance, is of moderate size, and has a long concentrated field ensuring minimum distortion at low frequencies. Dimensions: Length 14 1/2", height 10 1/2", depth 9 1/4". Teak cabinet. Internal volume: 8.5 litres. Loudspeaker chassis: HT110 with dual cone. Diameter: 6.5". Impedance (at 400 c/s): 5 ohms. Maximum continuous input: 5 watts. Efficiency (radiating from one side only): 1.5%. Bass resonance frequency: 115 c/s. Frequency response: 80-14 000 c/s.

Hi-Fi System 113/106-10.

This loudspeaker has been scientifically designed in order to provide a full bass response from a unit in a very small cabinet and this has been achieved by means of a heavy cone and a fairly low efficiency.

The system combines two loudspeakers with a cross-over network, one loudspeaker taking care of the lower and medium frequencies and the other is a Tweeter for frequencies above 3000 c/s. Dimensions: Length 7 1/2", height 9 1/2", depth 9 1/4". Teak cabinet. Internal volume: 6.5 litres. Loudspeakers: HT-113 Woofer 6.5" HT-106 Tweeter 2". Impedance (at 400 c/s): 4 ohms. Maximum continuous input: 8 watts. Efficiency (radiating from one side): 0.5%. Bass resonance frequency: 90 c/s. Frequency response: 60-16 000 c/s.

Hi-Fi System 112-7.

This model is specially designed to accommodate the full output of 10 watt amplifiers and provide maximum power and outstanding frequency response throughout the entire range.

The loudspeaker incorporates the Hi-Fi system Tweeter mounted in the center of it taking care of frequencies above 3000 c/s, the low bass reproduction and long magnetic field ensure excellent bass reproduction.

Dimensions: Length 20 1/2", height 10 1/2", depth 9 1/4". Teak cabinet. Internal volume: 25 litres. Loudspeaker chassis: HT112 with Tweeter. Woofer: 10" x 6". Tweeter 2". Impedance (at 400 c/s): 3.2 ohms. Maximum continuous input: 8 watts. Efficiency (radiating from one side): 2.5%. Bass resonance frequency: 85 c/s. Frequency response: 60-16 000 c/s.

Hi-Fi System 114/116-8.

Hi-Fi System 114/116-8 is a high efficiency combination designed for perfect reproduction of the entire audible range from 45 c/s to 16 000 c/s and capable of dealing with input power up to 20 watts. The HT116 is co-axially mounted in front of the large Woofer. An efficient filter network crosses over at 3000 c/s. The powerful long magnetic field permits bass amplitude up to 1.5 mm without distortion. Dimensions: Length 27 1/2", height 13 1/2", depth 11". Teak cabinet. Internal volume: 50 litres. Loudspeaker chassis: HT114 with Tweeter HT116. Woofer: 10". Tweeter 2.5". Impedance (at 400 c/s): 4 ohms. Maximum continuous input: 15 watts. Efficiency (radiating from one side only): 4%. Bass resonance frequency: 65 c/s. Frequency Response: 45-16 000 c/s.

Tandberg Microphone TM3

This crystal microphone has been specially designed for use with Tandberg tape recorders. It is combined with a detachable, adjustable stand made of unbreakable plastic material, and is provided with a cord to go around the neck, which enables the microphone to be suspended on the chest.

Tandberg TM 3 is a high quality microphone suitable for making high fidelity recordings, of both speech and music. Careful measurements and tests, made both in the laboratory and in the field, have confirmed that TM 3 is capable of results comparable with microphones which are much more expensive.

When large volumes of sound and low frequencies are to be recorded this microphone is a real help to obtain clear and distinct results.

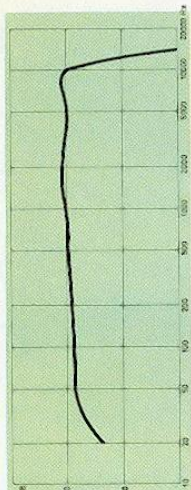
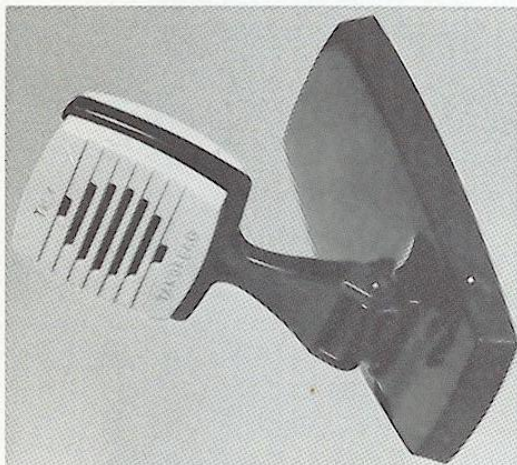
The TM 3 is omnidirectional and accepts signals from all directions, but of course it is most effective when the sound source is immediately in front of it.

The microphone element is protected from shocks by an intermediate layer of foam plastic material which makes the microphone easier to handle and less sensitive to external shocks.

TM 3 weighs a mere 25 grams (1 oz.) without the stand and the dimensions are $1\frac{1}{8}'' \times 1\frac{1}{4}'' \times \frac{7}{8}''$. The stand is comparatively heavy, the weight being 225 grams.

The base is furnished with an intermediate layer of foam plastic which prevents unwanted sounds being transmitted through the stand to the microphone. TM 3 is supplied with a screened connecting lead, 4 metres long terminated with a standard jack plug.

Technical data:
Frequency response: ± 3 db 30—12 000 c/s. Sensitivity: 1.25 mV/ μ Bar. (by 1000 c/s)
Impedance: 2.2 M ohm. Dimensions: $1\frac{1}{8}'' \times 1\frac{1}{4}'' \times \frac{7}{8}''$. Weight: 25 gram.
stand 250 gram.



Tandberg Transistor Radio and Car Radio



The TTR/Auto is truly portable with a performance comparable to many larger receivers. It can be used in any part of the house where it provides world wide reception on its own aerials, or it can be fitted into a special bracket under the dash board of a car where it becomes a first class car radio. It slides easily into the special mounting brackets under the dash board, and automatically connects to the car aerial and car battery. There is provision for an external loudspeaker.

4 wavelengths: long wave (145—320 Kc/s), medium wave (518—1600 Kc/s), short wave (5.8—18.5 Mc/s) and extended FM band (87.3—104.5 Mc/s).

There is a built-in telescopic aerial for FM and short wave reception, and a frame aerial for the long and medium bands. The separate input circuits which connect to the car aerial have additional sensitivity. Push-button dial illumination as a portable and continuous dial illumination as a car radio. The large $8 \times 3\frac{1}{2}''$ loudspeaker gives excellent sound quality. Continuously variable bass and treble controls. Output for tape recorder and record player. Nine transistors and four diodes. Powered by five standard 1.5 volt batteries, obtainable anywhere in the world. Can be operated direct from the AC mains if an optional extra Tandberg mains unit is used. Cabinet of best quality walnut. Mains unit, mounting bracket for the car, and a smart carrying case are available as extra accessories.

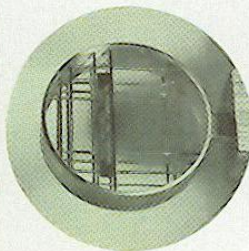
Dimensions: Length $12\frac{1}{8}''$, height $7\frac{7}{8}''$, depth $3\frac{1}{4}''$. Weight including batteries: 6.2 lbs. (2.8 kg).



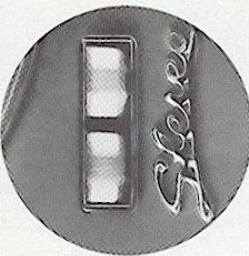
Technical Data

	series 8	series 9	series 7B	series 6
MAINS VOLTAGE	220 V, 50 c/s or 110 V, 60 c/s	220 V, 50 c/s or 110 V, 60 c/s	Variable for 110, 125, 145, 200, 220 and 245 V, 50 or 60 c/s	Variable for 110, 125, 145, 200, 220 and 245 V, 50 or 60 c/s
POWER OUTPUT	50 watt	50 watt	65 watt	65 watt
TUBES	ECC83, ECL86, EAM85 and 1 Selenium rectifier	ECC83, ECL86, EAM85 and 2 Selenium rectifiers	1 ECC82, 4 ECC83, 2 EL84, 2 EAM85, 1 rectifier & 2 transistors AC107	4 ECC83, 2 ECC81, 3 ECC82, 2 EAM85, and 2 Selenium rectifiers
SPEEDS	3 3/4 i.p.s. & 1 1/8 i.p.s.	7 1/2, 3 3/4 & 1 1/8 i.p.s.	7 1/2, 3 3/4 and 1 1/8 i.p.s.	7 1/2, 3 3/4 and 1 1/8 i.p.s.
SPEED TOLERANCE	± 2%	± 1.5%	± 1.5%	± 1%
FREQUENCY RESPONSE Record/Playback to NAB standards	3 3/4 i.p.s. 40-12000 c/s (± 2 dB 60-10000 c/s) 1 1/8 i.p.s. 40-7000 c/s (± 2 dB 60-5000 c/s)	7 1/2 i.p.s. 40-20000 c/s (± 2 dB 40-16000 c/s) 3 3/4 i.p.s. 40-12000 c/s (± 2 dB 60-10000 c/s) 1 1/8 i.p.s. 40-7000 c/s (± 2 dB 60-5000 c/s)	7 1/2 i.p.s. 40-20000 c/s (± 2 dB 40-16000 c/s) 3 3/4 i.p.s. 40-12000 c/s (± 2 dB 60-10000 c/s) 1 1/8 i.p.s. 40-7000 c/s (± 2 dB 60-5000 c/s)	7 1/2 i.p.s. 40-20000 c/s (± 2 dB 40-16000 c/s) 3 3/4 i.p.s. 40-12000 c/s (± 2 dB 60-10000 c/s) 1 1/8 i.p.s. 40-7000 c/s (± 2 dB 60-5000 c/s)
WOW % R.M.S.	3 3/4 i.p.s. better than 0.2 % 1 1/8 i.p.s. better than 0.3 %	7 1/2 i.p.s. better than 0.15 % 3 3/4 i.p.s. better than 0.2 % 1 1/8 i.p.s. better than 0.3 %	7 1/2 i.p.s. better than 0.15 % 3 3/4 i.p.s. better than 0.2 % 1 1/8 i.p.s. better than 0.3 %	7 1/2 i.p.s. better than 0.15 % 3 3/4 i.p.s. better than 0.2 % 1 1/8 i.p.s. better than 0.3 %
DISTORTION (Max. recording Level)	5 %	5 %	5 %	3 %
SIGNAL TO NOISE RATIO	At 5 % distortion: 4 track 50 dB, 2 track 53 dB	At 5 % distortion: 2 track 56 dB	At 5 % distortion: 4 track 53 dB, 2 track 56 dB	At 5 % distortion: 4 track 55 dB, 2 track 56 dB At 3 % distortion: 4 track 52 dB, 2 track 55 dB
INPUT IMPEDANCE Sensitivity (at 1000 c/s & max. volume)	Mike input 1 M ohm & 75 mV max. Sensitivity 2 mV. Radio input 0.3-0.5 M ohm. Adjustable 2 mV-7 V. Sens. (Level set max.) 2 mV.	Mike input 1 M ohm & 75 mV max. Sens. 2 mV. Radio input 0.3-0.5 M ohm. Adjustable 2 mV-7 V. Sens. (Level set max.) 2 mV.	For each ch. Mike input 3 M ohm & 50 mV max. Sens. 2.5 mV. Radio input 0.1-0.5 M ohm. Adjustable 2.5 mV-7 V. Sens. (Level set max.) 2.5 mV.	For each ch. Mike input 5 M ohm & 50 mV max. Sens. 1.5 mV. Radio input 1 M ohm & 3 V max. Sens. 50 mV. Lo max. Sens. 4 mV.
OUTPUTS	3 watt (3.5 V over 4 ohm). Can also go unloaded and be used as amplifier.	3 watt (3.5 V over 4 ohm). Can also go unloaded and be used as amplifier.	2 x 3 watt (3.5 V over 4 ohm). Centre channel min. 400 ohm and .Pre Amp. 0.5-1 volt at min. 100 K ohm each ch.	Cathode follower for connecting to output amplifiers 1.5 V at min. 2 K ohm each ch.
DIMENSIONS	Cabinet model: L. 15 1/4", h. 6 1/2", d. 11 1/2" Case model: L. 15 3/4", h. 7 1/8", d. 11 1/2"	L. 15 1/2", h. 6 1/4", d. 11 3/4"	L. 15 1/2", h. 6 1/2", d. 11 3/4"	L. 15 1/2", h. 6 1/2", d. 11 3/4"
WEIGHT	Cabinet Model: Weight 20.5 lbs. with carrying case 25.5 lbs. Case Model: Weight 22.5 lbs.	20.5 lbs. with carrying case 25.5 lbs.	27.6 lbs. with carrying case 32.6 lbs.	25 lbs. with carrying case 30 lbs.

Special Tandberg Features



Design. Tandberg tape recorders have several times been awarded prizes for outstanding and functional design. The materials used are steel and teak.



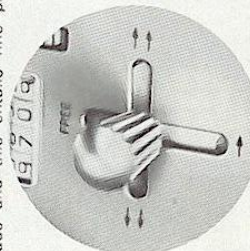
Electronic Beam Indicator. An electronic beam indicator is without mass and mechanical motion. Any increase of the sound level is precisely and instantly indicated. A delayed falling off avoids flickering.



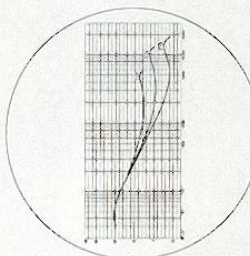
The Heads. The ability of a tape recorder to provide perfect sound reproduction is to a very large extent dependent upon the quality of the heads. Tandberg make their own heads and this entails fine precision work.



4 Digit Revolution Counter with indirect illumination and zero indicator make it easier to locate any part of the tape.

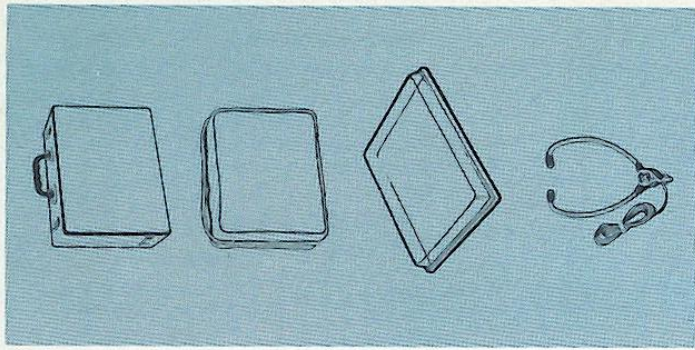


One Lever Control of the tape transport mechanism ensures simple and precise operation reducing the possibilities of mistakes. Pause switches are fitted to all models for momentary start and stop.



Fixed Frequency Responses ensure that a tape recorded on one Tandberg recorder will provide exactly the same sound reproduction when played back on any other Tandberg tape recorder.

Accessories



Carrying Case. Accommodates all the teak models, provides good protection and can be locked. Weight 2.5 Kg.

Carrying Bag in attractive strong plastic material is supplied complete with loose dust cover inside which protects the top plate and reels, etc.

Dust Cover suitable for all current models. Slightly smoke coloured transparent Polyester. Protects the recorder against dust or accidental damage when the machine is not in use.

Microphone TM 3. A high class crystal microphone which is specially designed for use with Tandberg tape recorders. (See special description). Is available with stand and 12 ft. connecting cables.

Telephone Pickup for recording of telephone conversations. Attaches to the telephone by means of a suction cup.

Stetoscet Headphones. Light and comfortable for monitoring and private listening.

Foot Controller for F Models. For remote operations of start, stop, and rewind.

Tapes. Magnetic recording tapes with Polyester base.

Tandberg Slide Synchronizer.



Accompany your coloured slides with music and/or commentary. Automatic picture change through a silent impulse from the tape recorder. The synchroniser enables any automatic slide projector to be controlled by a stereo tape recorder or the Tandberg Model 8 4-track. This model has a stereo record head and output for a "Free" head. Music and/or commentary are on one track and a synchronising impulse for the picture change on the other track. The synchroniser has an adjustment for timing and length of the impulse. It is fully transistorised with 8 transistors and 8 diodes. Dimensions: Length 8 5/8", height 4 7/8", depth 3"



AN EXPANDING COMPANY . . .

To-day Tandbergs Radiofabrikk A/S has 1000 employees. A new plant, which will employ an additional 500 persons, is in the course of erection and will shortly go into operation. More and more quality-minded customers throughout the world are choosing Tandberg.

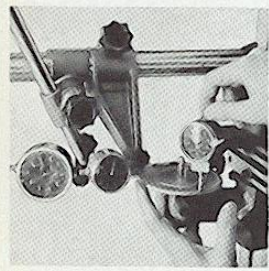
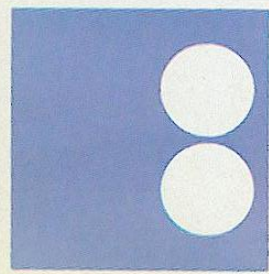


Individuals create a company, not machines. That is why Tandbergs Radiofabrikk A/S has an atmosphere more akin to a large family unit than a commercial undertaking. Tandbergs working conditions and social benefits are unique and it is doubtful if they can be duplicated anywhere else in the world to-day.

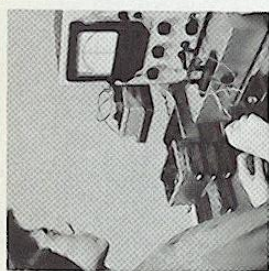


"Only when we are happy and free from worries and cares can we do our best. Then we shall have the extra strength and enthusiasm which will keep us on top." Vebjørn Tandberg

Here are some of the checking points:



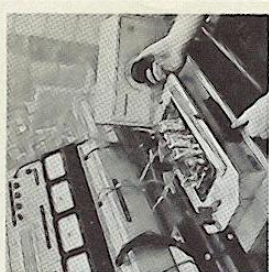
All parts are inspected on arrival at the factory. This picture shows the checking of the turntables for accuracy.



All electric components are tested — this shows the method of checking the resistors and capacitors.



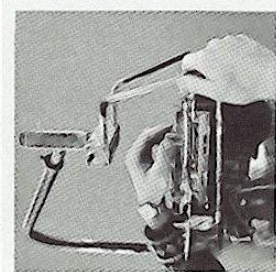
Optical inspection of the printed circuits.



Electrical check of the printed circuits.



Tandberg manufacture the heads themselves — this picture shows the examination of the head gap.



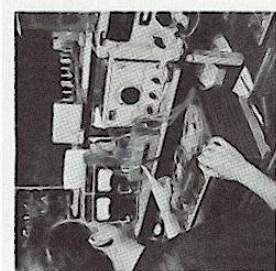
Inspection of the turntable alignment.



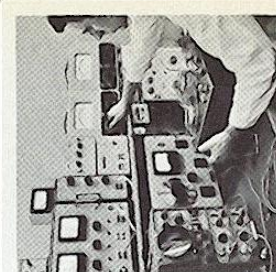
Inspecting the alignment of the recording head — just one of the many electrical checks.



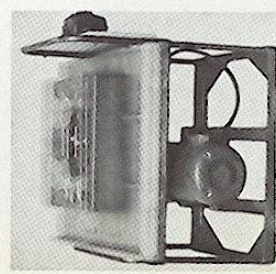
Measuring the take-up torque of the right turntable.



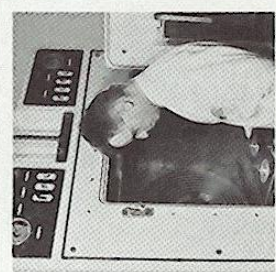
After the final inspection point is passed, every recorder is given a two hour warm up run, and is then given a recheck before packing.



Sample testing. Records taken at random from final production are thoroughly analysed and checked out, with a view to maintaining high standards.



Samples taken from stock are put through some stringent tests. This shows the machine which shakes the recorder very forcibly.



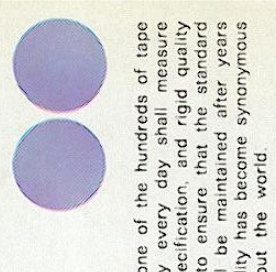
Reliability test in the climate chamber — from arctic cold to tropical humidity.



After specially hard handling the recorder is put through a thorough measurement and inspection routine.



A new Tandberg Tape Recorder is ready for despatch carefully packed in the special polystyrene shell.



Tandberg policy insists that everyone of the hundreds of tape recorders which leave the factory every day shall measure up to the advertised technical specification, and rigid quality control does everything possible to ensure that the standard of performance and reliability will be maintained after years of intensive use. That is why quality has become synonymous with the name Tandberg throughout the world.



TANDBERGS RADIOFABRIKK A/S

OSLO

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