



Tandberg
RECORDERS

Instruction manual

TANDBERG

TAPE RECORDER

Model 11

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Tandberg Tape Recorder model 11

The Tandberg Tape Recorder Model 11 is a fully transistorized, battery powered tape recorder. It is an instrument of the highest quality, designed for professional and semi-professional use amongst radio inter-viewers, journalists, scientists, film photographers and other similar professions—people who place the most stringent demands on the quality of the recordings and on the range of applications.

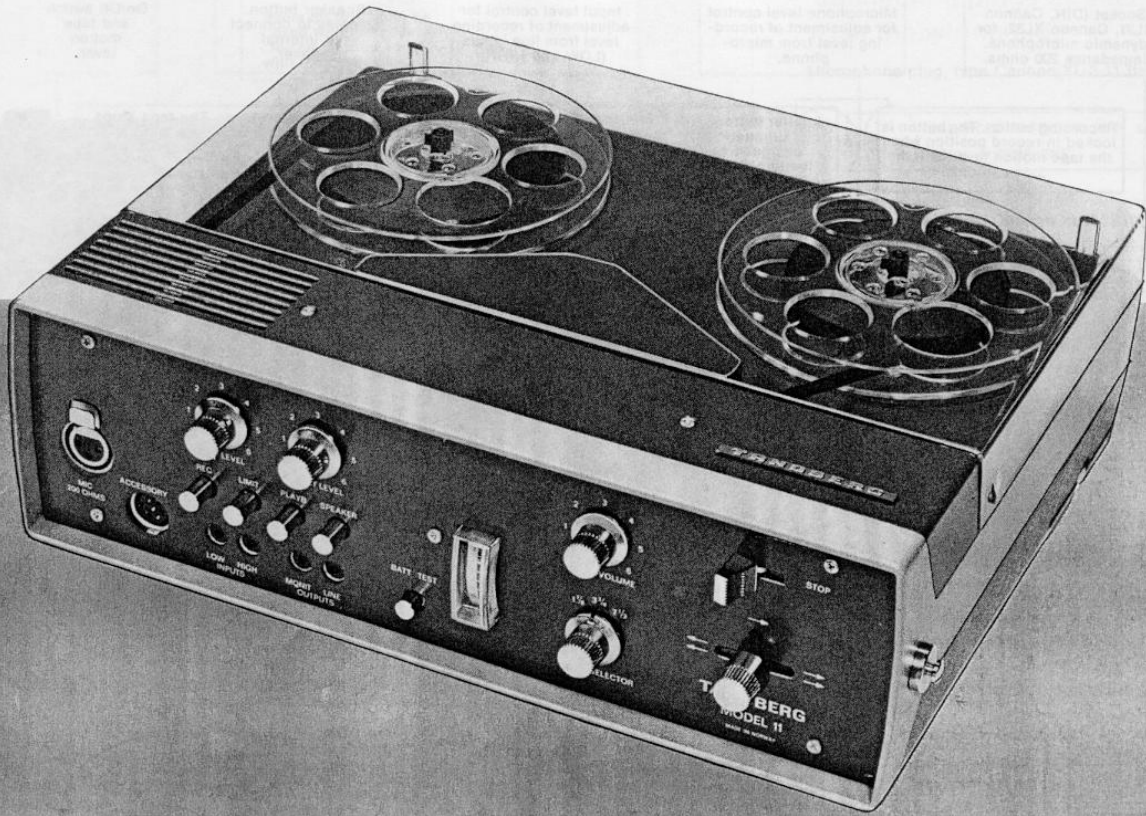
The Model 11 is a mono tape recorder with 2 tracks and 3 speeds. An electronic governor ensures constant speed. The tape is automatically kept under constant tension by means of a servo brake system. There are no pressure pads in the tape path and matte back professional tapes may therefore be used. Easy and quick operation is provided by the single operating lever. There are push button controls for recording, play-back, monitor speaker and the automatic recording level control. This automatic control prevents overloading of the inputs during recording. There is a balanced input for a 200 ohms dynamic microphone and two line inputs for high and low signal levels. Balanced line output for 600 ohms load for playback and monitor output for 200 ohms headphones. Internal monitor speaker. Separate level controls for microphone and line inputs makes mixing possible. Separate volume control for playback. A and B tests can be made. The model 11 is equipped with separate heads for recording, playback and erasing.

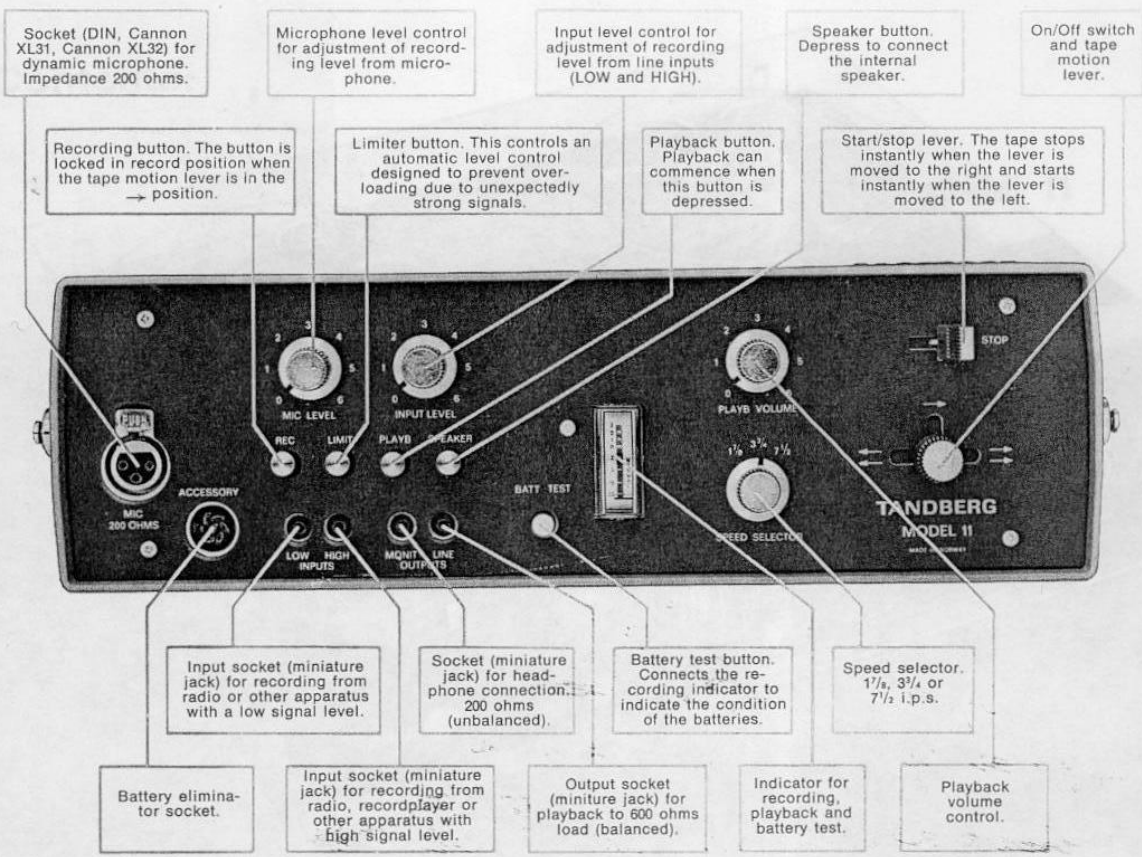
Output power 1/4 watt.

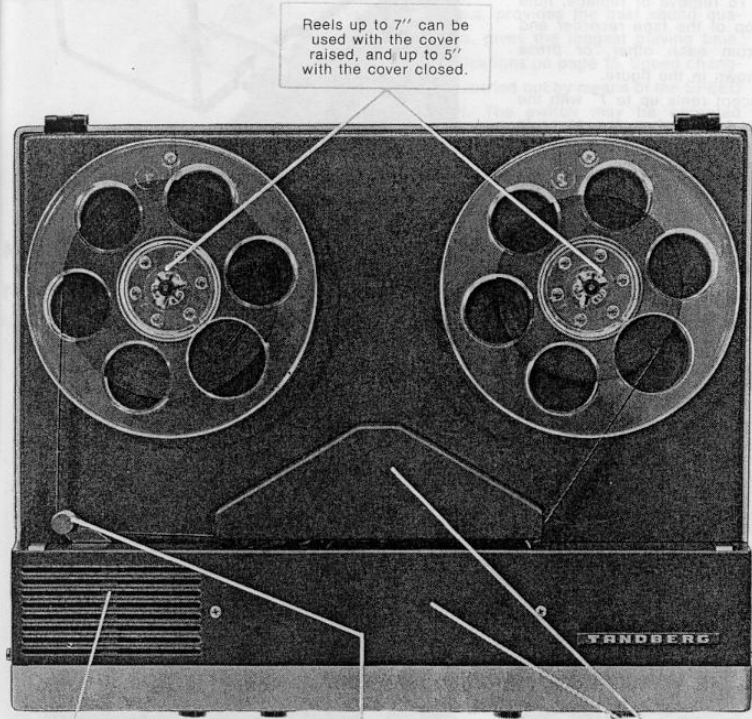
The model 11 is designed to operate within a temperature range of between -5°C to $+45^{\circ}\text{C}$.

A carrying handle or shoulder strap can be fitted.

A strong practical carrying bag is also available. This has a shoulder strap, pocket for spare tapes and a transparent window over the left turntable.







Reels up to 7" can be used with the cover raised, and up to 5" with the cover closed.

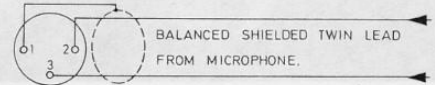
Monitor speaker, 20 ohms.

Tensioner, ensuring constant tape tension.

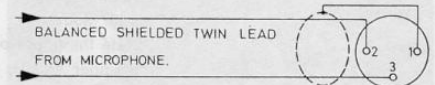
Covers. Removable for cleaning heads and tape path.

Connecting plugs as seen from the wiring side

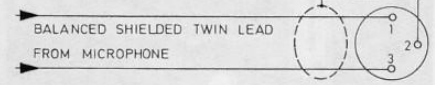
Microphone plug, type Cannon XL-3-11 (female).



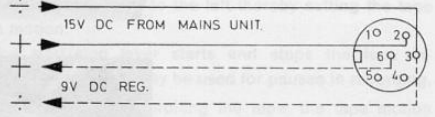
Microphone plug, type Cannon XL-3-12 (male).



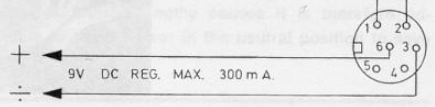
Microphone plug, DIN bajonet, 3 pins.



Accessory plug, DIN, 6 pins.



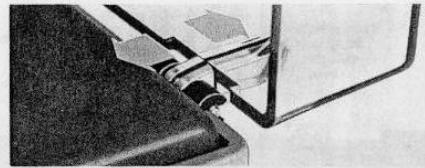
Accessory plug, DIN, 6 pins.



Preparation for recording

Lift up the plastic cover. To remove or replace, hold the cover at 90° to the top of the tape recorder and pull the hinges away from each other, or press together to replace, as shown in the figure.

The tape recorder will accept reels up to 7" with the cover open and reels up to 5" when the cover is closed.



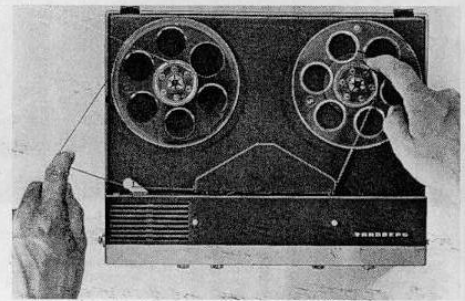
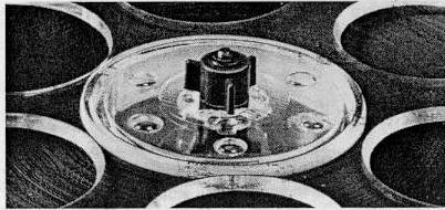
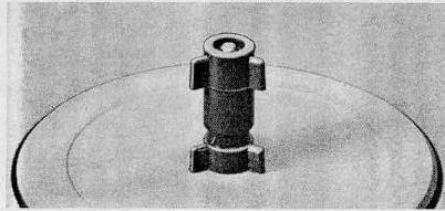
Inserting the tape

On portable tape recorders the reels must be locked in position, and this is done in the following manner on the Model 11:

Rotate the upper part of the spindle about 60° so that the upper locking pegs are in line with the locking

pegs on the fixed part of the spindle. Place a full reel on the left hand turntable and an empty reel on the right hand turntable. Turn the upper part of the spindles back to the locked position, thereby firmly locking the tape reels.

Pull out about 18" of tape. Lead the tape over the tensioner and through the tape slot, making sure that the shiny side is towards you. Insert the end of the tape in the slot in the empty reel and hold in position while turning the reel in an anti-clockwise direction until the tape loop is taken up.



Speed selection

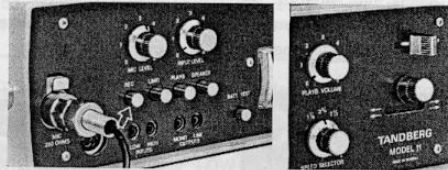
There is a choice of three speeds, $7\frac{1}{2}$ i.p.s., $3\frac{3}{4}$ i.p.s. and $1\frac{7}{8}$ i.p.s. $7\frac{1}{2}$ i.p.s. provides the best sound quality whereas $1\frac{7}{8}$ i.p.s. gives the longest playing time. See Technical Specifications on page 15. Speed changing is electric and is carried out by means of the SPEED SELECTOR SWITCH. The switch may be operated while the tape recorder is running.



Microphone recording

The microphone input socket, MIC is designed to accept a low impedance microphone (200 ohms).

Plug the microphone into the MIC socket. Move the start/stop lever in the direction of the arrow to the STOP position. Depress No. 1 push button marked REC and hold down while the tape motion lever is moved to the \rightarrow position. The recording level is controlled by the knob marked MIC LEVEL, and the vo-



lume should be adjusted to obtain the correct deflection on the indicator. Deflection up to 0 at short strong signals is permissible. Distortion will result if the level control is turned up too high, but it must also be noted that a low recording level gives an unfa-



avourable signal to noise ratio. To start recording move the start/stop lever to the left thereby setting the tape in motion.

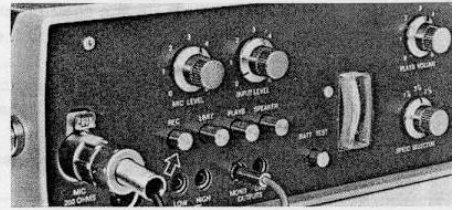
The start/stop lever starts and stops the tape instantaneously and may be used for pauses in recording.

NOTE. Besides controlling the tape, the tape motion lever also acts as the On/Off switch. The current is on when the lever is in one or other of the operating positions. During lengthy pauses it is therefore advisable to put the lever in the neutral position to save the batteries.

Monitoring

If you want to make a listening test, or monitor a programme during recording, plug in headphones (200 ohms) to the MONITOR output socket. The monitoring volume is adjusted by the playback volume control, PLAYB VOLUME.

The programme can also be monitored through the internal control speaker by depressing the button marked SPEAKER. Monitoring volume is adjusted by the PLAYB VOLUME. When the SPEAKER button is depressed the signal to the output sockets is disconnected.



A-test

B-test

Monitoring a programme **before** it is recorded on the tape is called the A-test. The quality of the recording heard in the A test is not, however, identical with the quality you will hear when playing back. Monitoring a programme **after** it has been recorded on the tape is called the B test. It is only possible to carry out this test on tape recorders which are equipped with separate recording and playback heads and separate recording and playback amplifiers, as is the case on the Model 11. The playback head is located after the re-

recording head in the tape path. The programme is recorded on the tape at the recording head and can be played back at the playback head a split second later. This provides an excellent method of checking the recording, as the programme is heard as it is recorded on the tape and as it will be heard when played back later.

The PLAYB button is not depressed when making the A test. Depressing the PLAYB button during recording provides the B test.



A-test



B-test

Automatic recording level control

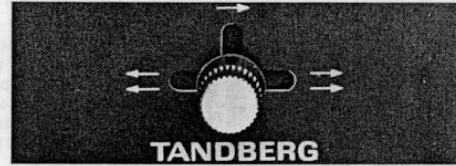
It is often difficult to keep a constant distance between sound source and microphone during microphone recording, and this can lead to considerable variation in the signal strength to the tape recorder. To reduce the possibility of overloading, and to keep the recording level as constant as possible, the Model 11 is fitted with a signal limiting device which is connected by depressing push button No. 2, marked LIMIT. When the limiting device is connected, strong signals are automatically subdued to a level which the amplifier can control. Before connecting the limiting device, however, the recording level control should be adjusted so that the average signal level is below the overload limit (pointer within the green area on the



indicator). The signal limiting device operates on all inputs.

Ending the recording

When you wish to terminate the recording, move the tape motion lever to the neutral position, thereby also switching off the power supply to the tape recorder. Fast winding and re-winding is controlled by the tape motion lever. Position \rightarrow for fast winding. Position \leftarrow for fast re-winding. By setting the tape recorder for playback, the tape can be played during fast winding and rewind. Due to the high speed the sound will be distorted, but recognizable, so that the starting point for playback or a new recording can be found.



Recording through line inputs

To record from radio, record player or tape recorder, use the sockets marked INPUTS. The operative sequence is the same as described for recording with a microphone. Connect the signal to one of the INPUT sockets, either LOW or HIGH depending on the impedance at signal source and the signal level. Proceed as follows to decide which of these sockets to use: With a steady signal plugged into the HIGH socket, set the INPUT LEVEL volume control at about 5 to 6. If the deflection on the indicator is then insufficient, the LOW input socket must be used. Adjust the recording level by means of the INPUT LEVEL volume control.



Mixing

The Model 11 has separate recording level controls for microphone and line inputs, and it is therefore possible to mix programmes from these inputs on to one track and have full control over the mixing ratio. It is possible to mix programmes from three inputs simultaneously, i.e. MIC, LOW and HIGH, although the volume ratio between the signals to LOW and HIGH cannot be varied as both these inputs are connected to the same level control, INPUT LEVEL. When mixing recordings, the programme should be monitored as described on page 8.



Playback through internal speaker

Depress the PLAYB and SPEAKER buttons and move the tape motion lever to the → position. Playback volume is adjusted by the PLAYB VOLUME knob. Use the start/stop lever for short pauses during playback. When longer pauses are required use the tape motion lever. The built in output amplifier supplies an approximate maximum of 1/4 watt, and playback through external speakers must be fed through an external amplifier. See page 11.



Playback through headphones

Plug the headphones (200 ohms impedance) into the MONIT socket and depress the PLAYB button. Adjust the volume by means of the PLAYB VOLUME knob. The indicator now operates as a playback indicator, the position 0 representing normal playback volume.
Note. If the SPEAKER button is depressed the signal to the OUTPUTS sockets and to the indicator will be disconnected.



Playback through external amplifier

The tape recorder's built in output amplifier supplies an approximate maximum of 1/4 watt to the speaker. To obtain a higher output power an external output amplifier and an external speaker will be required. Connect the output amplifier to one of the OUTPUT sockets. Depress the PLAYB button and commence playback. Turn up the PLAYB VOLUME control until the indicator pointer deflects up to the red section. Adjust to the required volume by means of the volume control on the external amplifier.



Playback through line output

The Model 11 has a balanced line output which is adjusted for direct playback to a telephone line (600 ohms). Depress the PLAYB button and adjust the volume by means of the PLAYB VOLUME knob. The output level is shown on the indicator, the 0 division representing the standardised line voltage (1.55 volts over 600 ohms). The programme can be monitored by headphones to the MONIT socket.
Note. If the speaker button is depressed the signal to the OUTPUTS sockets and the indicator will be disconnected.



The tape recorder used as a microphone pre-amplifier

Connect an external power amplifier with an external speaker to one of the OUTPUT sockets. None of the push-buttons should be depressed. Plug the microphone into the MIC socket and move the motion lever to the → position. Volume can be adjusted by the MIC LEVEL and PLAYB VOLUME knobs, as well as by the volume control on the exter-

nal amplifier. If the volume controls are turned up too high the amplifiers will oscillate due to acoustical feedback between speaker and microphone. If you wish to record your speech, the button marked REC must be depressed before the tape motion lever is moved to the → position. Start the tape by means of the start/stop lever.

Recording and playback on 2 tracks

The procedure for two track recording is as follows: Place the tape reel on the left hand turntable with side 1 uppermost. Recording will now take place on track 1. Reverse the tape when it has run right through so that side 2 is uppermost and place the

full reel on the left hand turntable. You will now be recording on to track 2. When playing back, the programme on track 1 is obtained when side 1 is uppermost and the programme on track 2 when side 2 is uppermost.

Power source

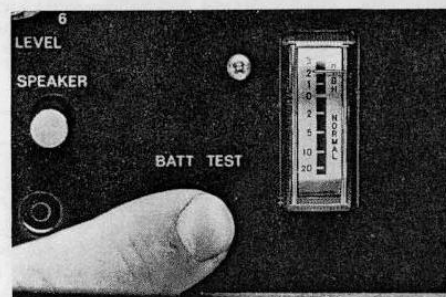
The Model 11 tape recorder is designed to run on ten 1.5 volt batteries. Use transistor batteries which have a longer life, and have less tendency to leak. Chargeable accumulator cells may also be used. It is also possible to run the tape recorder off the mains by

using a Mains unit. This can either be fitted in place of the batteries or plugged in to the ACCESSORY socket. In the latter case the batteries will automatically be disconnected when the eliminator is plugged in.

Testing battery voltage

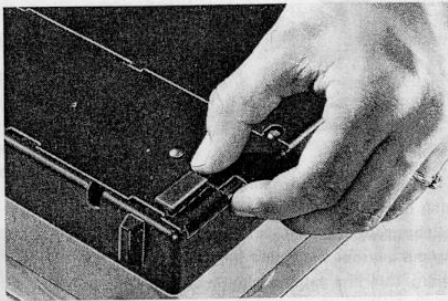
When you depress the BATT TEST button, the condition of the batteries will be shown on the indicator. The battery test can be made during any of the tape recorder's functions, but for preference the batteries should be tested while they are under heavy load, e.g. during normal forward motion of the tape. The batteries can be considered to be in good condition if the pointer deflects to the top of the red section, but if it only reaches the beginning of the red section the batteries will have to be changed, or charged if chargeable cells are used.

Note. Dry batteries which are flat must not be left in the tape recorder. Remove them as soon as possible to avoid eventual acid leakage.

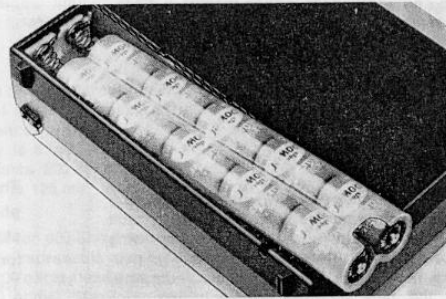


changing
batteries

With the tape recorder lying face downwards, press the battery cover locking spring upwards with the forefinger and at the same time slide the cover out sideways until it is free to be removed completely. The



battery holder can now be removed. Insert the positive terminals first when replacing batteries in the holder.



power
consumption

When using dry batteries, the operating time attainable depends largely on how the tape recorder is used. Playback at high volume and fast winding uses more current than normal recording and playback, and the following figures are **average** operating times with fresh batteries:

The operating time available when running continuously on dry batteries will be approx. 5 to 6 hours. If the tape recorder is run for only about half an hour per day, the total operating time available will be approx. 20 hours.

mains unit

The Model 11 can be run off the mains by using the Tandberg Battery Eliminator 4 designed to fit in place of the batteries inside the recorder or to be used outside by means of a cable plugged into the ACCESSORY contact. In the last case the batteries can remain in the battery compartment, while the power to

the tape recorder is drawn from the battery eliminator. Check the voltage setting of the battery eliminator before connecting to the mains. The battery test will always check the power supply in use i.e. either the internal or external power supply.

Fitting the carrying handle

The ends of the carrying handle are fitted to the studs at each end of the tape recorder by pressing the ends on to the studs and pulling on the handle until a click is heard. The carrying handle is then locked in place. To remove the handle, push in the opposite direction and remove from the studs.

Erasing

When recording a new programme, any earlier programmes on the same track will automatically be erased as recording takes place. If you wish to erase a programme without making a new recording, set the tape recorder for recording, turn the recording volume controls down to zero and run the tape through.

Cleaning the heads

The heads and tape guide posts should be cleaned at regular intervals. Unscrew the two cross-head screws which hold down the largest of the two covers and remove. Pull upwards to remove the smaller cover. Wrap a clean piece of flannel round a small wooden stick and dampen with purified petrol (gasoline). Do NOT use acetone or trichlorethylene which can cause damage. Clean the heads and guide posts. Replace the covers.

NB. The adjusting screws on the heads must not be disturbed.

Accessories

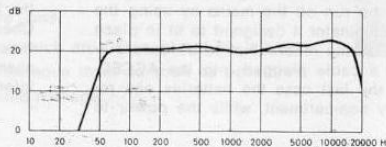
Microphone TM4



The TM4 is a 200 ohms dynamic microphone which is supplied with an adjustable stand of unbreakable plastic and a cord for hanging the microphone round the neck. The Tandberg TM4 is a high quality microphone with spherical characteristics, well suited for Hi Fi recording of both speech and music.

Technical specification:

Frequency curve: ± 3 dB, 50–17,000 Hz.
Sensitivity: .096 mV/ubar (at 1000 Hz).
Impedance: 200 ohms.
Length: 133 mm.
Diameter: 33.5 mm.



Shoulder strap

The shoulder strap is fitted in the same manner as the carrying handle, described earlier.

Carrying bag

This is a strong practical bag having a shoulder strap, pocket for spare tapes and a transparent window so that the left turntable is visible. This bag provides excellent protection during use and transport.



Technical specifications

Battery powered: Ten 1.5 volt (15 volts) U.2 transistor batteries. Chargeable accumulators may also be used. A battery eliminator for 110 V/220 V 50/60 Hz may be fitted in the tape recorder in place of the batteries or plugged in externally to the ACCESSORY socket.

Consumption: 2 to 3 watts.

Motor: 9 V pulse driven DC motor.

Tape speed: 7 1/2 i.p.s., 3 3/4 i.p.s. and 1 7/8 i.p.s.

Speed tolerances: Relative: $\pm .2\%$. Absolute: $\pm .5\%$.

Electronic speed control.

Playing time: Mono, 2 track recording and playback on a 1200 ft. tape gives the following playing times:

7 1/2 i.p.s.: 2 x 32 min.

3 3/4 i.p.s.: 2 x 64 min.

1 7/8 i.p.s.: 2 x 128 min.

Fast winding and rewinding: Approx. 1 2/3 min. for 1200 ft. tape.

Tape: Maximum reel diameter: 7". With cover closed: 5".

Instant start/stop: Mechanical.

Heads:

- 1) Half track erase head.
- 2) Half track recording head.
- 3) Half track playback head.
- 4) Tachometer head for speed control.

Frequency response:

7 1/2 i.p.s.: 40-16,000 Hz ± 2 dB.

3 3/4 i.p.s.: 50-9,000 Hz ± 2 dB.

1 7/8 i.p.s.: 60-4,500 Hz ± 2 dB.

Distortion: Below .5% from the amplifier. Below 3% from the tape.

Noise level: 58 dB below signal level at 3% distortion at tape.

Wow:

7 1/2 i.p.s.: Better than .2% peak (.14% R.M.S.).

3 3/4 i.p.s.: Better than .3% peak (.21% R.M.S.).

1 7/8 i.p.s.: Better than .5% peak (.36% R.M.S.).

Erase and bias frequency: 85.5 kHz ± 2 kHz.

Below .5% distortion.

Level indicator: Indicating range 20 dB plus overload. Pointer deflection to 0 at 3% distortion at tape.

Limiting device: A signal limiting device can be switched in during recording. This operates on all inputs. Limit range approx. 25 dB over maximum level.

Inputs:

MIC: Input for 200 ohms microphone. Max. input voltage 45 mV. At 1000 Hz and level control at max., the sensitivity is .15 mV.

LOW: Input impedance 10 kohms. At 1000 Hz and level control at max., the sensitivity is 5 mV. Max. input voltage 1 V.

HIGH: Input impedance 200 kohms. At 1000 Hz and level control at max., the sensitivity is 125 mV. Max. input voltage 10 V.

Outputs:

Balanced line output for 600 ohms telephone line. Deflection to zero division on indicator represents standardized 1.55 V output voltage. Monitor output for 200 ohms headphones.

Internal speaker (20 ohms). Maximum output power: 1/4 watt.

Signals to indicator, monitor and line output are disconnected when playing back through the speaker.

Transistors: 41.

Diodes: 8.

Zener diodes: 2.

Dimensions: Width 13". Depth 10". Height 4".

Power consumption: Battery voltage can be checked by depressing the BATT TEST button and reading the indicator. Battery voltage should not be allowed to drop below 9 volts (deflection to zero on indicator). With new batteries, consumption will be approx. 220 mA at 7 1/2 i.p.s., approx. 180 mA at 3 3/4 i.p.s. and approx 160 mA at 1 7/8 i.p.s.

Connecting plugs: A standard DIN plug is used for microphone connection. Cannon sockets XL31 or XL32 can be fitted on order.

Line inputs HIGH and LOW, miniature jack plugs.

Line output LINE, miniature jack plug.

Headphones, miniature jack plug.

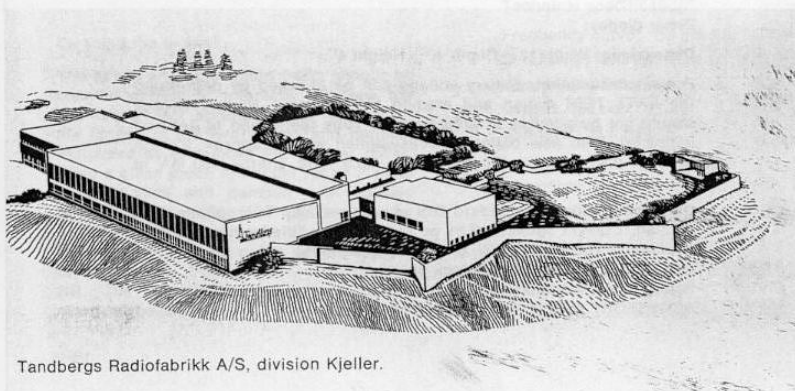
ACCESSORY socket, standard 6 pin DIN plug.



Tandbergs Radofabrikk A/S, Kjelsås.

TANDBERGS RADIOFABRIKK A/S

KJELSÅSVEIEN 161 — OSLO — NORWAY



Tandbergs Radofabrikk A/S, division Kjeller.

TANDBERG has a world wide reputation for quality. This quality finds its source in every phase of production. Continuous research, perfect construction plus incessant testing of components and finished products are prerequisites for high level quality. But it is of primary importance that the demand for quality begins with the people who work at Tandberg. TANDBERG RADIOFABRIKK A/S has 1300 employees in the Oslo area alone. The positive effort and skill which these people have given has been decisive in maintaining and extending Tandberg's reputation. Therefore great emphasis is placed on creating and maintaining an ideal working atmosphere. Even the architectural design of the plant and its location in this typical Norwegian setting has been carried out with maximum consideration given to creating a pleasant and friendly atmosphere. Tandberg working conditions and social benefits are unique in the world.

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