

# PHILIPS

## STEREO FOUR-TRACK TAPE RECORDER

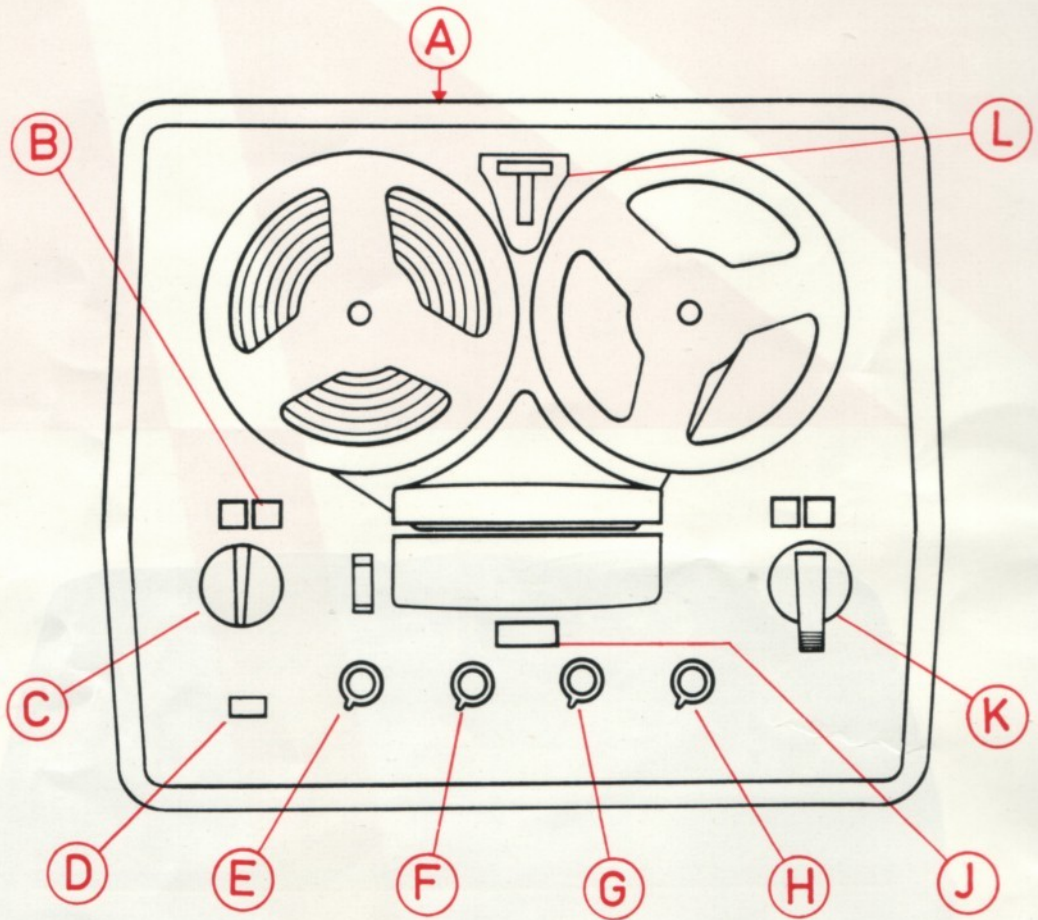


MANUAL

TYPE EL 3547

# FIRST GET ACQUAINTED WITH

by making a short microphone recording a



1. **MAINS VOLTAGE** — The number on the voltage adapter (located in the compartment A at the rear) opposite to “ $\triangle$ VOLT  $\sim$ ” should correspond to the local mains voltage. For alteration of the mains-voltage adjustment, refer to page 6. Connect the recorder to the mains.
2. **CONNECT THE MICROPHONE** to the socket marked “ $\sigma$ ” (also located in the compartment); push the plug firmly home.



# H YOUR NEW TAPE RECORDER

g and by playing it back afterwards

3. **THREADING THE TAPE** — Reel with tape on the left-hand spindle, empty spool on the right-hand spindle.  
Wind the coloured leader tape and the metallized switching leader on the right-hand spool by giving the latter some turns by hand in an anti-clockwise direction. If you have never threaded a tape before, refer to page 8.
4. Set the counter **L** to "0000" by turning the knurled disc to the right.
5. **SWITCH ON THE RECORDER** by turning control **F** clockwise until a click is heard; the pilot lamp **D** should now light up.
6. Set **SELECTOR SWITCH C** to position "1-4" and press **RECORD BUTTON B**.
7. To adjust the **RECORDING LEVEL** speak into the microphone — the word **STEREO** pointed towards you — for a moment at a distance of about 1 foot (30 cm) while turning control **E** slowly in a clockwise direction and watching the recording-level indicator **J**; the recording level is correctly adjusted if the pointer does not quite reach the red segment during the loudest passages.  
(Knob **F** must be turned to its least sensitive position.)
8. **RECORDING** can be started by keeping button **B** pressed down and by depressing control **K** simultaneously.
9. To stop recording depress control **K** again.
10. Set control **K** to position "◀◀" for a moment until the tape counter has returned to position "0000".
11. For **PLAYBACK** depress control **K**; adjust volume with control **F**.  
Tone control is effected with knob **H**. Set control **G** (balance) to its central position.
12. To stop playback depress control **K** once more.

You have made now a simple **MONO** recording and have played it back. With this recorder, however, it is also possible to make **STEREO** recordings and to obtain **STEREO** playback.

On the following pages you will find extensive data and instructions to enable you to operate your new Stereo Tape Recorder without any difficulty; a summary of all controls and connections is given in the lay-out sheet on page 16.

A complete table of contents will be found on page 15.



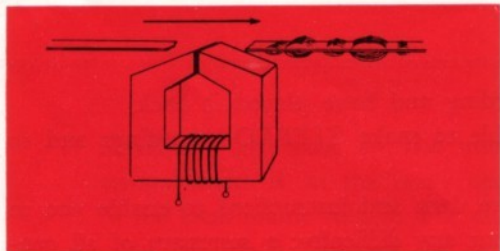
## PRINCIPAL DATA (Subject to modification)

- \* Suitable for both stereo and mono recording and playback.
- \* Operates on the four-track system.
- \* Fully transistorized; no warming-up time required.
- \* Suitable for mains voltages of 110, 127, 220 and 245 V, 50 c/s.
- \* "Multiplay" facilities.
- \* Can be used as a stereo or mono amplifier for record player and microphone.
- \* Two internationally current tape speeds of  $1\frac{7}{8}$ " /sec. and  $3\frac{3}{4}$ " /sec. (4.75 and 9.5 cm/sec.).
- \* Suitable for reels with a diameter up to 15 cm.
- \* Monitoring facilities during recording by means of stereo headphones.
- \* Lockable pause button.
- \* Special stereo microphone.
- \* Balance control for obtaining the best stereo balance during playback.
- \* Frequency response at a tape speed of  $1\frac{7}{8}$ " /sec. (4.75 cm/sec.):  
80—10,000 c/s  $\pm$  3 dB,
- \*  $3\frac{3}{4}$ " /sec. (9.5 cm/sec.):  
80—15,000 c/s  $\pm$  3 dB.
- \* Two built-in 3-W loudspeakers.
- \* Automatic stopping at the end of the tape during recording and playback.
- \* Fast wind and rewind: 900 feet (260 m) of tape in 180 seconds.
- \* Power consumption: about 35 W.
- \* Three inputs:  
microphone . . . > 1000 ohms, < 1 mV,  
gramophone . . . 0.5 megohm, 150 mV,  
diode . . . . . 0.02 megohm, 2.5 mV.
- \* Three outputs:  
diode . . . . . 0.02 megohm, 1 V,  
headphones . . . 0.01 megohm, > 200 mV,  
loudspeaker . . . 2 x 5.6 ohms, 2 x 0.6 W.
- \* Dimensions:  $15\frac{6}{16}$ " x  $12\frac{10}{16}$ " x  $6\frac{11}{16}$ "  
(39 x 32 x 17 cm).
- \* Weight: about 20 lbs (9 kg).
- \* Suitable for tropical conditions.

## HOW IT WORKS

In your tape recorder sound is recorded magnetically on tape.

The sound vibrations which the microphone converts into electric voltage variations reach the magnetic head via transistors and a volume control.



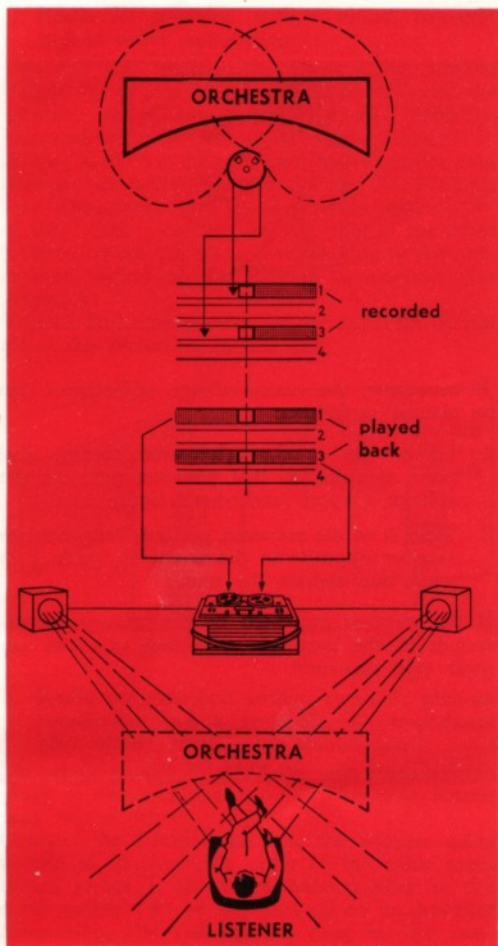
The sensitive side of the tape running past the magnetic head is coated with microscopic iron oxide particles; this head magnetizes the particles

into the characteristic pattern of the sound vibrations.

During playback, the same head scans the magnetic pattern on the tape and re-converts it into electric voltage variations which are then made audible via the same transistors and other controls. A tape can be played back thousands of times and a recording may be kept for years without any deterioration in quality. In addition, a tape can be used over and over again for new recordings. The magnetic pattern already on the tape is then automatically erased by means of a separate erasing head.

This recorder is provided with two magnetic record/playback heads, both switched on for **stereo**. (For **mono** recording and playback, only one of the two heads is switched on.)





## WHAT IS STEREO ?

Anyone who hears with two ears, hears stereophonically, that is to say, he is able to estimate the direction of a sound source by means of his faculty of hearing. An example will explain this. Suppose that you are listening to a symphony orchestra in a concert hall. You will then hear that a certain part of the total sound image comes from the left (e.g. the first violins) and another part from the right (e.g. the brass section); thus you obtain the **impression of spacious sound**.

If this concert is reproduced monophonically, e.g. by means of a **mono** radio set, the originally broad sound image emerges from a single point — the loudspeaker — and thus loses the original effect of spaciousness.

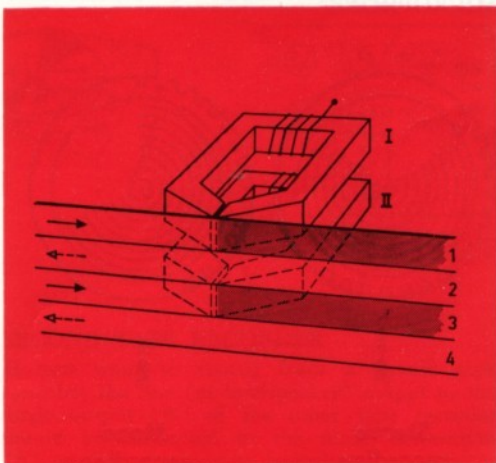
With this stereo recorder, however, the spatial effect is obtained by picking up the sound with a stereo microphone (which consists of 2 separate microphone elements, set at an angle of 90° to one another). The sound coming from the separate microphone elements (left-hand and right-hand part of the sound image) is then recorded on two tracks of the tape and later reproduced via two separate amplifiers and loudspeakers.

Thanks to your new stereo tape recorder, you are now in a position, not only to listen to such stereo recordings, but also to make them yourself.

## FOUR TRACKS

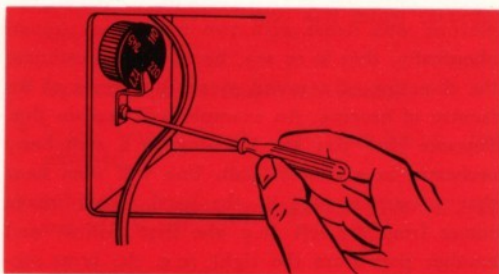
With the four-track system used in this recorder, only  $\frac{1}{4}$  of the total tape width is used for each track; consequently there is space for four tracks on one tape. The tracks are numbered 1 to 4 with number 1 at the top. (See adjacent figure.) In **stereo** recording, two of these tracks are used simultaneously, viz. for the left-hand and the right-hand side of the sound, tracks 1 and 3 (see adjacent fig.) or — after the reels have been interchanged and reversed on the recorder — tracks 4 and 2.

When the recorder is used **monophonically**, only one track is required at a time. It can be selected by means of a switch, e.g. track 1 or 3, or — after the reels have been interchanged and reversed on the recorder — track 4 or 2.





## CHECK THE MAINS VOLTAGE!



The voltage of the electric lighting system is by no means the same everywhere. This recorder can, however, be adjusted to different mains voltages, viz: 110 (100-120), 127 (120-135), 220 (200-230) and 245 (230-250) V, 50 c/s. (Adjustment for 60 c/s can be effected by your dealer.)

Before connecting the recorder to the mains, it is **ABSOLUTELY NECESSARY** to check whether the adjustment of the recorder corresponds to the local mains voltage: see triangle near voltage adapter at the left-hand side of the stowage compartment.

If necessary, the mains-voltage adjustment can be altered as follows:

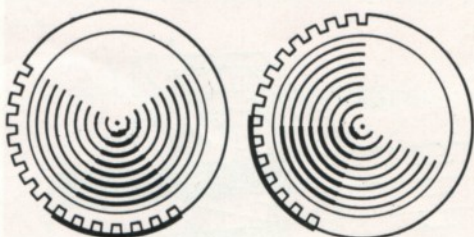
1. Loosen the bracket (left-hand figure) and move it aside, so that you can pull out the voltage adapter (right-hand figure).
2. Turn it to the required position (appropriate number opposite to the triangle), push it in again and tighten the screw.

If the number indicated by the triangle corresponds to the local mains voltage you can use your tape recorder!

## CONNECTIONS

With this recorder it is possible to make recordings with the aid of a microphone, a radio set, a record player or a second tape recorder. In this chapter you are shown how to connect these sound sources to the recorder.

### MICROPHONE



Stereo  
recording

Mono  
recording

Connect the microphone to the socket marked "Q" in the compartment.

For stereo recordings the plate with the inscription "STEREO" must be pointed towards the centre of the sound source(s), see left-hand figure.

For mono recordings only the lower microphone element is switched on; in that case turn the microphone 45° clockwise; see right-hand figure.

### RADIO

Since radio programmes are generally broadcast monophonically, only examples of connections for monophonic recording/playback via a radio set are given.

**Note:** If you wish to connect the recorder to an A.C./D.C. radio set, see your dealer for a safety arrangement.

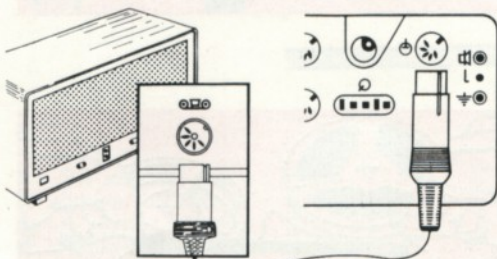


**1. Radio set provided with a round, five-pole tape-recorder connection**

Connect this socket (in most cases marked "⊖") to the socket marked "⊕" on the recorder via connecting cable EL 3768/04, provided with two round, five-pole plugs.

If your radio has a flat, 2-pole tape-recorder connection, use cables EL 3768/04 and EL 3768/06 (see also under 2.); black plug in socket "⊖" of the "⊖" connection, red plug in the other socket (for recording) and white plug in the non-earthed socket of the pick-up connection (for playback).

Volume and tone controls of the radio set do not affect the recording in this case.

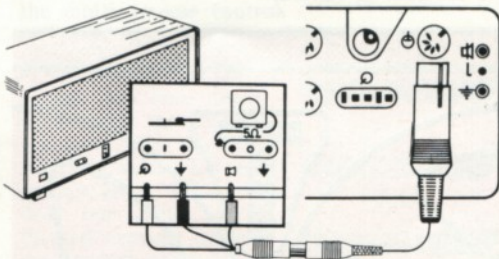


**2. Radio set provided with a two-pole pick-up connection and a two-pole, low-impedance (3-7 ohms) loudspeaker connection**

Use adapter cable EL 3768/06, with three banana plugs at one end and a round, five-pole female plug at the other.

Connect the five-pole plug of the adapter cable to one of the five-pole plugs of the cable mentioned under 1, the black banana plug to the earth socket (⊖) of the pick-up or loudspeaker connection, the red banana plug to the non-earthed socket of the loudspeaker connection (for recording) and the white banana plug to the non-earthed socket of the pick-up connection (for playback by means of the radio set).

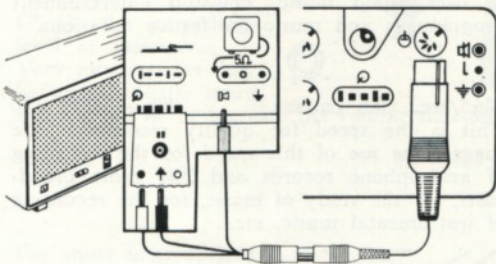
In this case the recording is affected by the volume and tone controls of the radio set. It is best to adjust the radio set to a volume of room level with trebles mostly.



**3. Radio set with flat, five-pole pick-up connection and two-pole, low-impedance (3-7 ohms) loudspeaker connection**

The same applies here as in example 2, except that now you need adapter AG 7022, which can be inserted into the pick-up connection.

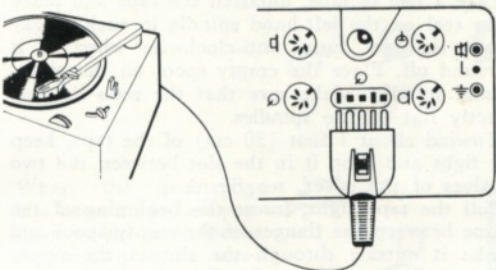
Next, connect the white plug to the left-hand or right-hand socket and the black plug, where appropriate, to the centre socket of the adapter.



**RECORD PLAYER**

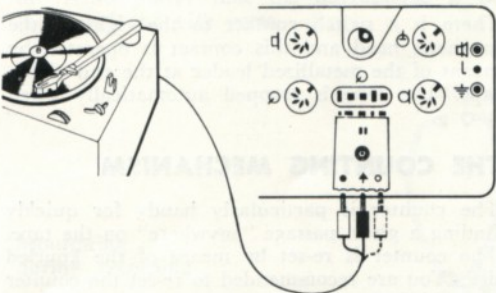
**1. Record player with a flat, five-pole plug**

Connect the record player to the flat five-pole connection marked "⊖" on the recorder.



**2. Record player with a round, five-pole plug**

Connect the record player to the round five-pole connection marked "⊖" on the recorder.



**SECOND TAPE RECORDER**

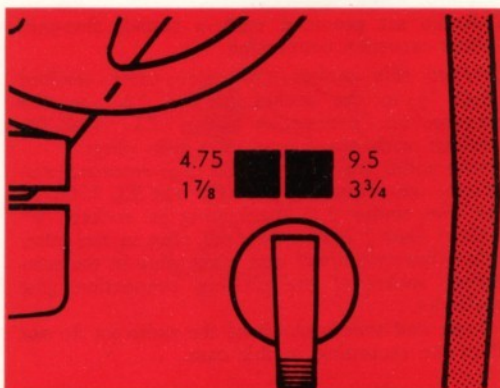
If you want to record from a second tape recorder, the line (or loudspeaker) output or the diode output "⊖" of the other tape recorder should be connected to the diode connection "⊖" on your stereo tape recorder.



## TWO TAPE SPEEDS

1 7/8" /sec. (4.75 cm/sec.) ..... 80—10,000 c/s.  
This speed is particularly suited to dictation, spoken letters, announcements, speeches, radio talks, pronunciation exercises, oral reports; also to background music, non-stop entertainment programmes and music for festive occasions.

3 3/4" /sec. (9.5 cm/sec.) ..... 80—15,000 c/s.  
This is the speed for quality recordings. We suggest the use of this speed for the recording of gramophone records and FM radio broadcasts, for the study of music, for the recording of instrumental music, etc.



## THREADING THE TAPE

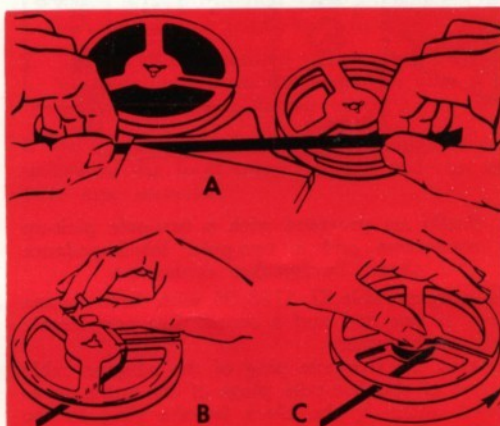
Make sure that the multi-purpose control has not been depressed.

Take a reel of tape, unfasten the tape and place the reel on the left-hand spindle in such a way that the reel turns anti-clockwise when it is wound off. Place the empty spool on the right-hand spindle. Make sure that the reels lie perfectly flat on the spindles.

Unwind about 1 foot (30 cm) of the tape, keep it tight and drop it in the slot between the two halves of the cover, see fig. A.

Pull the tape tight, insert the beginning of the tape between the flanges of the empty spool and take it outside through the slot in the upper flange of the reel, see fig. B.

Hold on to this end of the tape and give the tape a few turns about the hub of the empty spool by winding the latter by hand to the left until the coloured leader and the metallized leader are on the take-up spool, see fig. C. The tape should now be just tight.



## AUTOMATIC STOPPING

There is a switch contact to the right of the magnetic head and this contact is operated by means of the metallized leader at the end of the tape. The tape is stopped automatically when

the metallized leader runs past the switch contact. To prevent the tape from being stopped when it is not meant to, make sure that the metallized leader is on the take-up spool before the recorder is started.

## THE COUNTING MECHANISM

The counter is particularly handy for quickly finding a given passage "anywhere" on the tape. The counter is re-set by means of the knurled disc. You are recommended to re-set the counter to "0000" immediately after a reel of tape is put on the machine and make notes of the counter readings for important passages on the tape (e.g., the beginning of conversations or of a piece of music). Later it is an easy matter to find these passages by rewinding or fast forward winding.





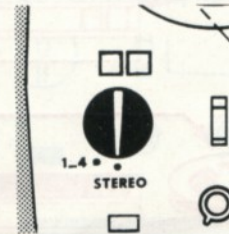
## RECORDING

**IMPORTANT:** It should be remembered that recording of radio programmes (and copying of gramophone records) is only permissible in so far as copyright or other rights of third parties are not thereby infringed.

Turn the playback volume control clockwise until a click is heard; the pilot lamp will now be lit.



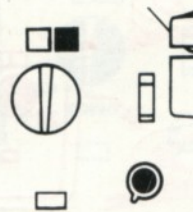
Set the selector switch to position "STEREO" for a stereo recording or to position "1-4" for a mono recording.



### Recording-level adjustment

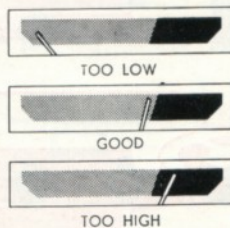
If you depress the record button, you can — before starting the tape — already adjust the recording level with the recording-level control.

When the record button is depressed, the position of the selector switch cannot be altered. In that case first unlock the record button by slightly depressing the multi-purpose control.



A recording-level indicator has been built in to check the recording level. This level is correctly adjusted if the pointer of the indicator does not quite reach the red segment during the loudest passages.

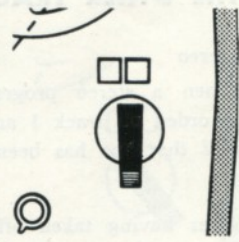
If the pointer should indicate the red segment, the recording level is too high; then turn the recording-level control slightly anti-clockwise.



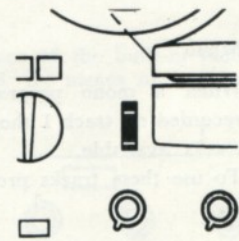
Recording is started by keeping the record button pressed down and by depressing the multi-purpose control at the same time.

Check the recording-level at intervals.

Very soft passages may be given a little more volume, but never increase the volume suddenly.



For short interruptions in the recording push the pause button away from you; it can be unlocked by pushing it slightly to the right.



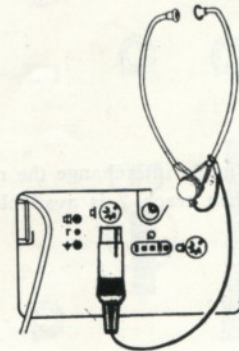
When the recording has been made, all you have to do is to press the multi-purpose control so that it rises.



**Note:** Make sure during a recording from radio or record player that the microphone is not connected and vice versa.

### Monitoring during recording

Monitoring during recording is possible when stereo headphones are used; the headphones should be connected to the socket marked "4" on the recorder.



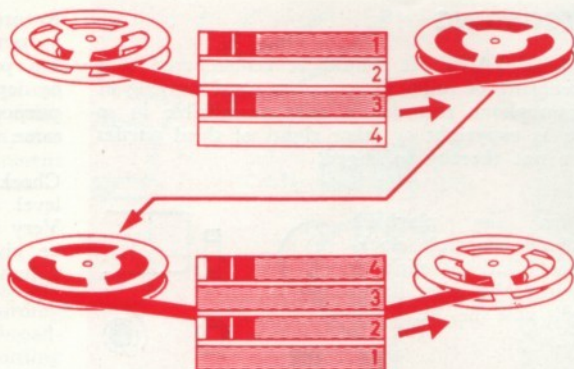


## THE OTHER TRACKS

### Stereo

When a stereo programme has been recorded on track 1 and track 3, only half the tape has been used.

After having taken off the full right-hand reel and placed it upside down on the left-hand spindle (empty spool on the right-hand spindle) another stereo programme can be recorded on track 4 and track 2.



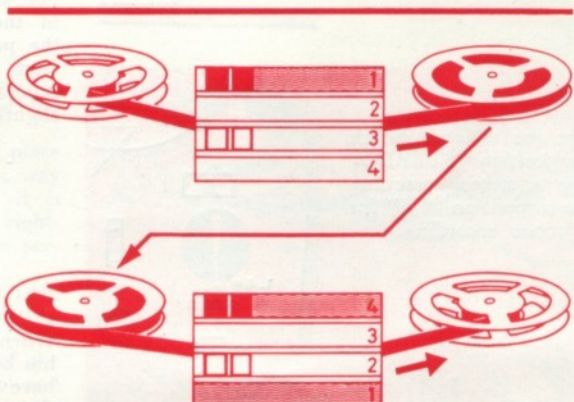
### Mono

When a mono programme has been recorded on track 1 there are still three tracks available.

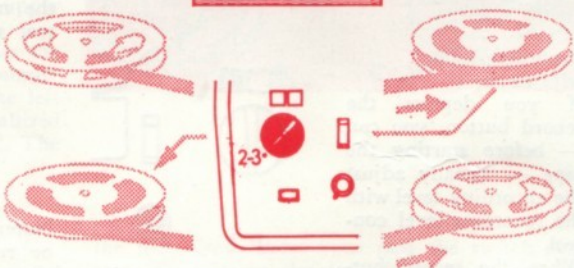
To use these tracks proceed as follows:

Take off the full right-hand reel and place it upside down on the left-hand spindle. Place the empty spool on the right-hand spindle.

Track 4 is now at your disposal and you can continue recording on it.

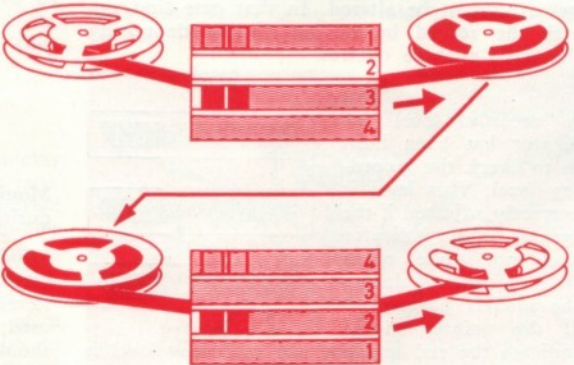


To use the next track interchange the reels once more and set the selector switch to position "2-3".



You can now use track 3.

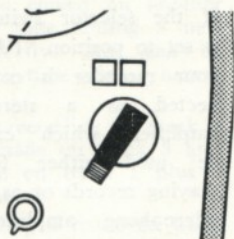
Finally interchange the reels once again; then track 2 is available.





## FAST WIND AND REWIND

To reach the beginning of the tape again, it can be rewound by setting the multi-purpose control to position "←←". (Don't depress the control, but just turn it clockwise.)



By setting the control to "→→" the tape is wound in the other direction. (Turn control anti-clockwise.) The tape is wound or rewound as fast as possible when button "3¾ (9.5)" is pressed.



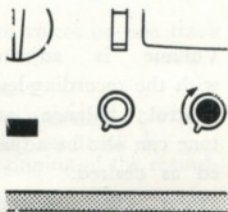
To stop the tape, reset the multi-purpose control to its centre position. Never use the pause button during fast winding or rewinding!

## PLAYBACK

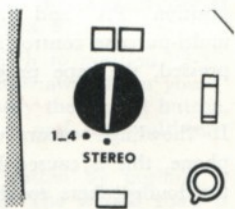
A STEREO programme recorded on tape can be played back: 1. By means of the built-in loudspeakers. 2. By means of (an) additional loudspeaker or loudspeakers. 3. By means of a stereo radio set or a stereo amplifier.

### 1. Playback by means of the built-in loudspeakers

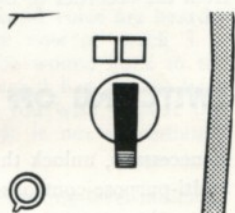
If necessary, turn the playback volume control clockwise until a click is heard; the pilot lamp should then light up.



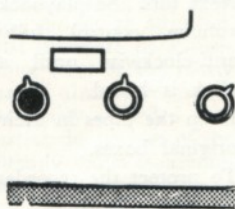
Set the selector switch to position "STEREO".



Depress the multi-purpose control and the programme will be played back.



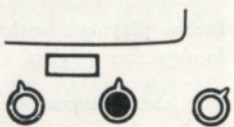
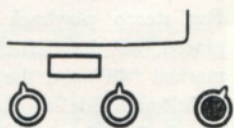
Adjust volume as desired with the playback volume control.



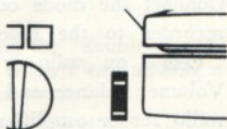
With the tone control you can adjust the desired tone colour (more or less high notes).

The balance control can be used during stereo playback to obtain the best stereo effect.

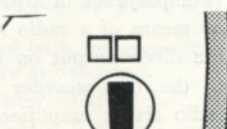
(During mono playback the sound is reproduced by means of both loudspeakers if the balance control is set to its centre position; by turning it clockwise or anti-clockwise the sound will be reproduced by means of the loudspeaker in the front wall and the one in the left-hand side wall respectively.)



For short interruptions during playback push the pause button away from you; it can be unlocked by pushing it slightly to the right.

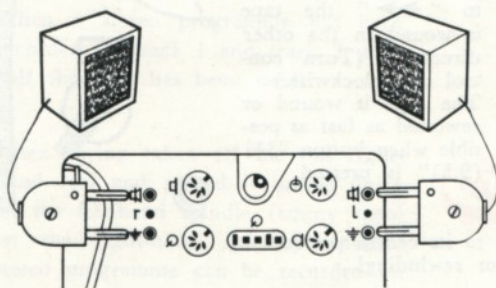


To stop playback all you have to do is to press the multi-purpose control so that it rises.





2. Playback by means of (an) additional loudspeaker or loudspeakers



The recorder has been fitted with sockets marked "4l" and "4r", to which low-impedance (3-7 ohms) loudspeakers can be connected.

For stereo playback connect the loudspeaker placed at the left-hand side to the sockets marked "4l" and the loudspeaker placed at the right-hand side to the sockets marked "4r".

The built-in loudspeakers are then automatically switched off.

Volume, balance and tone are adjusted in the normal way on the recorder.

Stereo playback with the aid of one additional loudspeaker (e.g. of a radio set) is also possible.

For that purpose interconnect the additional loudspeaker output marked "4l" of the recorder and that of the radio set.

3. Playback by means of a stereo radio or amplifier

Connect the diode output marked "6" on the recorder to the tape recorder socket marked "6-6" on radio or amplifier. (See page 7.) Volume, balance and tone are adjusted on the radio set or amplifier.

MONO

Of course a mono programme can also be played back by the methods described under 1 and 2. (For playback of a programme recorded on tape by means of a radio set or an amplifier connect the diode output on the recorder, marked "6", to the tape-recorder or pick-up input on the radio set or amplifier.)

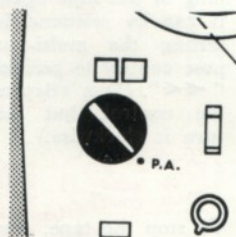
In that case the selector switch should be set to position "1-4" or "2-3", depending on the track to be played back.

WHEN USED AS AN AMPLIFIER

If the selector switch is set to position "PA" your recorder is connected as a stereo amplifier, which can be used either for playing records or as a microphone amplifier.

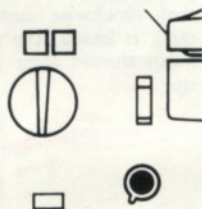
(When a mono sound source is connected to the recorder the programme is reproduced automatically only by means of the left-hand loudspeaker.)

You can now interrupt a programme recorded on tape for making announcements or for playing a record.



Volume is adjusted with the recording-level control; balance and tone can also be adjusted as desired.

When the selector switch is set out of position "PA" and the multi-purpose control is pressed, the tape programme is continued.



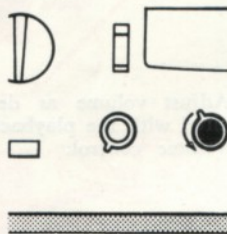
If "howling" occurs when you use the microphone, this is caused by acoustic feedback from the loudspeakers to the microphone. It can be avoided by moving the microphone further away from the recorder or by keeping the volume down.

SWITCHING OFF

If necessary, unlock the multi-purpose control so that the tape stops. Next turn the playback volume control fully anti-clockwise until a click is heard.

Keep the tapes in their original boxes.

To protect the recorder against dust replace the lid after use.





## MULTIPLAY

In the case of "Multiplay" the programme of a particular track can be copied on another track whilst at the same time adding a new programme, recorded directly. This can be repeated several times, each time adding a new programme.

For example, start the first recording on track 1. The second recording is made on track 3 and consists of the programme on track 1 plus a newly recorded programme.

After that the third recording is made on track 1 again, consisting of the combination of track 3 plus a further programme newly recorded. Now a programme consisting of three components has been recorded on track 1.

This procedure can be continued to produce a more composite recording.

Of course, when combining recordings in this way, monitoring by means of headphones is necessary in order to obtain good synchronization and a proper balance of recording levels.

**Example for recording three voices on one track**  
Sequence of operations:

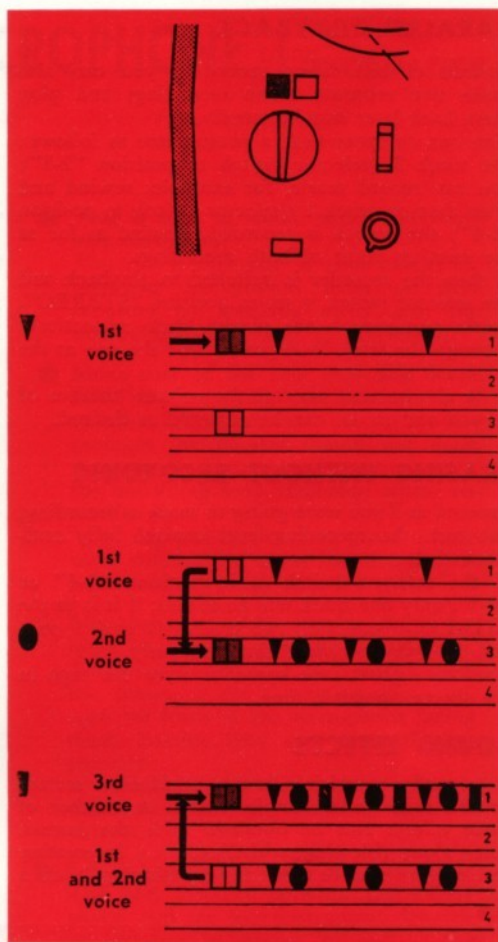
### a. First recording on track 1

1. Set selector switch to position "1-4".
2. Record the first voice on track 1.
3. Wind back to the beginning of the recording.

### b. Second recording: copying the first voice on track 3 and simultaneous direct recording of the second voice on track 3

1. Set the selector switch to position "2-3".
2. Push the pause button away from you.
3. Depress simultaneously the record button, the multiplay button and the multi-purpose control.
4. Unlock the pause button by pushing it slightly to the right. The second voice is now recorded in the normal way. (When monitoring with headphones both the first and the second voice are heard.)
5. Both recordings are now on track 3 so that the tape can be wound back to the beginning. Since track 1 has not yet been erased, you can if you wish, repeat this process if the result is not immediately satisfactory.

**N.B.:** The pointer of the recording-level indicator deflects in the normal way when a programme is copied from one track to another; the level of this recorded programme cannot be adjusted. The recording balance must therefore be adjusted by adapting the recording level of the newly recorded programme to that of already recorded. The recording level of the newly recorded programme is difficult to adjust as the pointer of the recording-level indicator already shows maximum deflection as a result of the copied programme.



So listen carefully to what you hear in the headphones and first make a test-recording. It may be helpful to note down the position of the recording-level control for the programme to be recorded.

### c. Third recording: copying the "double-recording" from track 3 onto track 1 and making a new direct recording on track 1

1. Set the selector switch to position "1-4".
2. Push the pause button away from you.
3. Depress simultaneously the record button, the multiplay button and the multi-purpose control.
4. Unlock the pause button by pushing it slightly to the right. You can now proceed with the recording, adding the third voice as described.
5. All three voices are now on track 1.

**Important:** It is recommended first to record the accompanying voices and finally the voice singing the melody.



## PARALLEL-PLAYBACK

Instead of one stereo recording you can also make two separate mono recordings and play them back later simultaneously.

You can compose such a programme as follows: On track 3 (selector switch to position "2-3") you can record music, for example; rewind and after that on track 1 (selector switch to position "1-4") the speech is recorded. Rewind as far as the starting point of both recordings.

If then the recorder is switched to playback and the selector switch is set to position "STEREO", music and speech are played back respectively through the front loudspeaker and the one at the left-hand side.

With the balance control the volume balance of speech and music can be adjusted as desired.

## ERASING WITHOUT RECORDING

Proceed as if you were going to make a recording, but turn the recording-level control fully anti-clockwise.

If the selector switch is in position "1-4" or "2-3", only one track will be erased; if it is in the "STEREO" position, two tracks (1 and 3 or 4 and 2) will be erased simultaneously.

Use the highest tape speed to erase the tape in the shortest possible time.

## SOUND EFFECTS

It is really surprising how a number of sounds can be faked with simple means. A number of these effects can be obtained with the human voice alone (blowing, whistling, etc.) Interesting results can also be obtained by playing back a

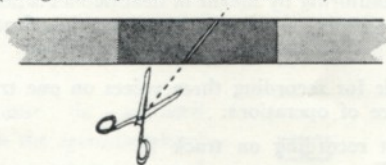
recording at a speed different from the one at which it was originally recorded. Other examples: crumpling up paper (fire), shaking a large sheet of tin plate (thunderstorm), switching a vacuum cleaner on and off (lift), etc.

## SOUND EDITING

It will hardly ever be necessary to join tape because it has broken. It may happen, of course, that you wish to cut certain passages from a tape or edit your tape and splice several short recordings together.

When editing a tape, always remember that there are four tracks on each tape and that editing one track necessarily means cutting the other tracks. Use PHILIPS splicing tape and proceed as follows:

- Cut the relevant part from the tape.
- Put the two ends of the tape that you want to splice on top of each other so that they overlap and cut diagonally across this overlap. (Diagonal splices are inaudible.)



- Place the two ends together and align them carefully. Place a piece of splicing tape, about 1" (2 cm) long, on the insensitive side of the tape across the cut.

**Note:** The splicing tape must not be allowed to overlap the edges of the recording tape. To assist in editing we recommend the use of the PHILIPS tape splicing kit.

## PLAYING TIME OF THE TAPE

The playing time of a tape depends on the speed of the recorder, the number of tracks, the diameter of the reel and the type of tape.

The table gives the approximate playing time for any possible combination.

The playing times given are valid for stereo recordings. For mono recordings these times are doubled.

TYPE OF TAPE	REEL DIAMETER	4.75 cm/sec. (1 $\frac{7}{8}$ " /sec.)	9.5 cm/sec. (3 $\frac{3}{4}$ " /sec.)
Long-play	8 cm (3 ")	2 x 22 min.	2 x 11 min.
	10 cm (4 ")	2 x 45 min.	2 x 22 min.
	13 cm (5 ")	2 x 1 $\frac{1}{2}$ h.	2 x 45 min.
	15 cm (5 $\frac{3}{4}$ ")	2 x 2 h.	2 x 1 h.
Double-play	8 cm (3 ")	2 x $\frac{1}{2}$ h.	2 x 15 min.
	10 cm (4 ")	2 x 1 h.	2 x $\frac{1}{2}$ h.
	13 cm (5 ")	2 x 2 h.	2 x 1 h.
	15 cm (5 $\frac{3}{4}$ ")	2 x 3 h.	2 x 1 $\frac{1}{2}$ h.
Triple-play	8 cm (3 ")	2 x 45 min.	2 x 22 min.
	10 cm (4 ")	2 x 1 $\frac{1}{2}$ h.	2 x 45 min.
	13 cm (5 ")	2 x 3 h.	2 x 1 $\frac{1}{2}$ h.

*In order to get the best results with your stereo four-track tape recorder we recommend the use of long-play, double-play or triple-play tape.*



## SPOKEN LETTERS

You cannot give your family abroad or a sick friend greater pleasure than sending them a spoken letter, illustrated with some music. The small 3"-(8-cm) reels of double-play or triple-play tape are ideal for this purpose.

Make sure that the recipient's recorder works on the four-track system too and has facilities for the same speed. When in doubt, it is better to record only on the outer tracks 1 and 4 with a tape speed of  $3\frac{3}{4}$  "/sec. (9.5 cm/sec.).

A recording made on these tracks only, can be played back on a **twin-track** tape recorder.

A recording made with a **twin-track** recorder can be played back on a **four-track** recorder when the selector switch is set to position "1-4".

## STORAGE OF TAPE

Store your tapes at room temperature (not in the sun or near a heater) and in reasonably dry surroundings.

Keep your tapes and recorder spotlessly clean and put every tape in its box **immediately** after use.

Apart from strong magnetic fields (e.g. very close to a loudspeaker magnet or transformer) there is very little that can harm the tapes or the recordings on them.

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## MAINTENANCE

Your tape recorder is an apparatus of high mechanical precision. Under normal conditions it will give you many years of troublefree service. After some time, however (especially when the recorder is frequently used), dust particles will gradually accumulate on the magnetic heads, which will spoil the reproduction of the high notes. The heads should be cleaned from time to time. For this purpose remove the lower plastic cover: pull the cover towards you and lift it. (First make sure that the multi-purpose control has not been pressed and that the recorder has been disconnected from the mains.)

The fronts of the magnetic heads must be cleaned (carefully) with a small rag wrapped around a little stick and saturated with pure alcohol or methylated spirit. Never use other cleaning fluids and never touch the heads with sharp and/or metal articles which could damage them or which could have undesirable magnetic influences on them.

If necessary you can clean the capstan; this is the spindle against which the rubber roller presses when the recorder is in the recording or playback position. Take care that the cleaning fluid does not come into contact with the rubber roller. You can, if required, remove any dust from various parts with a soft brush (without metal band).

Make sure that all parts are dry before replacing the cover.

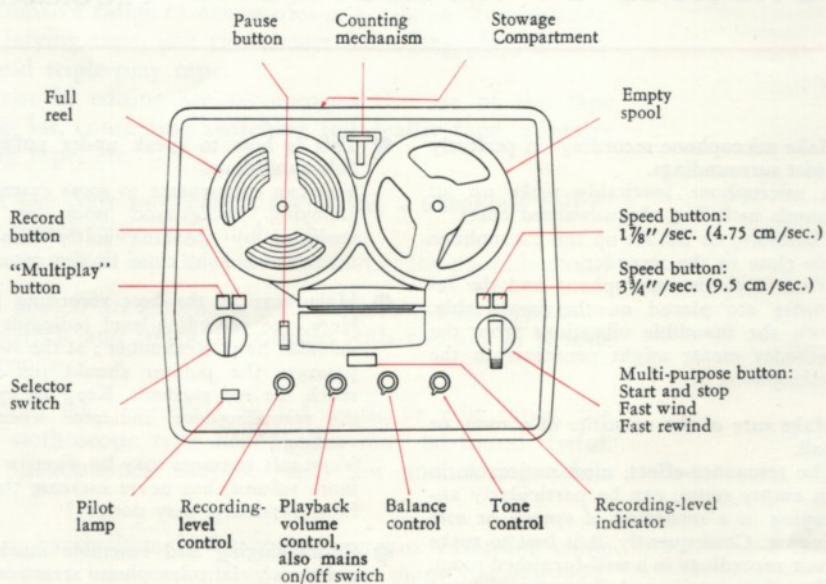
Furthermore it is recommended to have your recorder overhauled by your dealer, e.g. once a year or after every 500 operating hours, when the recorder can be cleaned, checked and, if necessary, adjusted. Also worn out parts can easily be replaced. Always remember that prevention is better (and cheaper) than cure!

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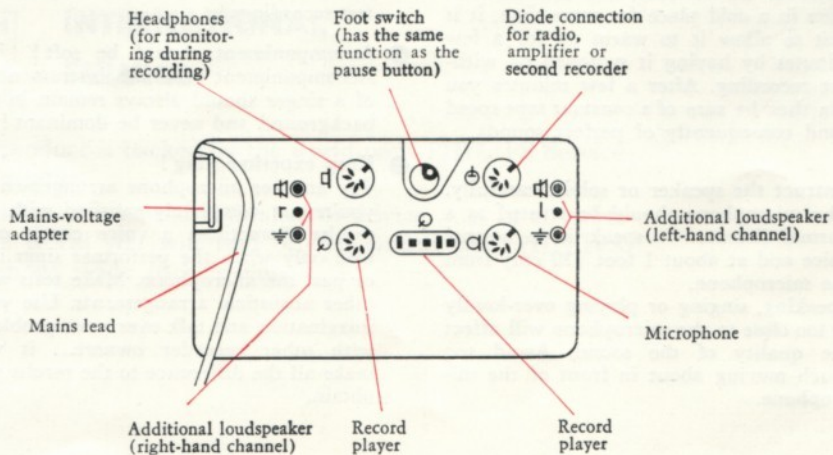
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## CONTROLS AND PRINCIPAL PARTS



## CONNECTIONS





# RECORDINGS BY MICROPHONE ( FURTHER INFORMATION )

- **Make microphone recordings in perfectly quiet surroundings.**  
A microphone inevitably picks up all sounds including the unwanted ones. Therefore, do not set up the microphone too close to the recorder.  
When both the microphone and the recorder are placed on the same table, even the inaudible vibrations from the recorder motor might penetrate to the microphone.
- **Make sure of the acoustics of a room or hall.**  
The resonance-effect, most noticeable in an empty room, can be particularly annoying in a recording of speech or solo singing. Consequently, it is best to make your recordings in a well-furnished room. Close the curtains and, if necessary, drape the hard, reverberating walls with sound-absorbing cloth.  
Remember, however, that choral-singing and some instrumental music may be improved by resonance. In this case the curtains should be open and sound-absorbing objects, such as upholstered armchairs and thick carpets should be removed.
- **Allow a cold recorder to warm up for a few minutes.**  
The lubricants used are suitable for normal operating temperatures and will remain fully effective even in tropical climates. If, however, the recorder has been in a cold place for some time, it is best to allow it to warm up for a few minutes by having it switched on without recording. After a few minutes you can then be sure of a constant tape speed (and consequently of perfect sound).
- **Instruct the speaker or soloist carefully.**  
The microphone should be treated as a normal listener — speak in a normal voice and at about 1 foot (30 cm) from the microphone.  
Speaking, singing or playing over-loudly or too close to the microphone will affect the quality of the sound. Avoid too much moving about in front of the microphone.
- **This is how to speak under unfavourable conditions.**  
You can compensate to some extent for annoying background noise or poor acoustics by speaking softly into the microphone held close to the mouth.
- **Make sure of the best recording level.**  
Here, the recording-level indicator is a valuable help. Remember : at the loudest passages the pointer should not quite reach the red segment. Keep an eye on the recording-level indicator when recording !  
Very soft passages may be given a little more volume, but never increase the volume suddenly; easy does it !
- **Choral-singing and ensemble music require a special microphone arrangement.**  
Place the microphone in front of or in the centre of the singers or musicians, with the front of the microphone facing them. Soloists may step forward temporarily.  
A test-recording is the best way to determine whether the recording level is correct.
- **Solo instruments require test-recordings.**  
The best distance between the microphone and the solo instrument depends on the type of instrument and on the strength of the sound which it produces; it may be anything between 2—7 feet (0.5—2 m). The best position for the instrument can only be found by making test-recordings !
- **Accompaniment should be soft !**  
Accompaniment of a solo instrument or of a singer should always remain in the background and never be dominant !
- **Keep experimenting !**  
Try another microphone arrangement if you're not completely satisfied with the results. Sometimes a voice comes over well only when the performer sings into or past the microphone. Make tests with other acoustical arrangements. Use your imagination and talk over your problems with other recorder owners... it will make all the difference to the results you obtain.



## ACCESSOIRES (Available on order)

An extensive range of accessories is available. For instance, when buying tape, you can choose from **long-play**, **double-play** and **triple-play** tape.

To assist in editing we recommend the use of the **tape splicing kit**, containing **switching foil**, **leader tape**, **adhesive splicing tape**, etc.

If you use your recorder at the office, a **telephone coil** or a **foot switch** may come in handy.

(The foot switch has the same function as the pause button.)

If you possess an automatic slide projector, synchronization with speech and music is possible with the aid of a **slide synchronizer**.

For those who regularly record music or edit tapes, the stereo **stethoscope type headphones** may be found useful. These headphones can be used for monitoring while recording.

Another handy item is the **connection box/extension cable** for making a **mono** recording with two **mono** microphones.

In shopping centres and supermarkets, programmes which have to be repeated over and over again are frequently required. For this purpose we have a particularly useful accessory: the **endless loop tape cassette**.

Furthermore there are **connecting leads** and **adapters** for connecting the recorder to different types of radio sets.

### IMPORTANT

When ordering accessories from your dealer please state the type number of your recorder.



## INTERNATIONAL SERVICE

This product is backed by the world-wide PHILIPS Service Organization.

Should you ever need assistance or advice ..... in all parts of the world you will find official dealers and PHILIPS workshops ready to help you.