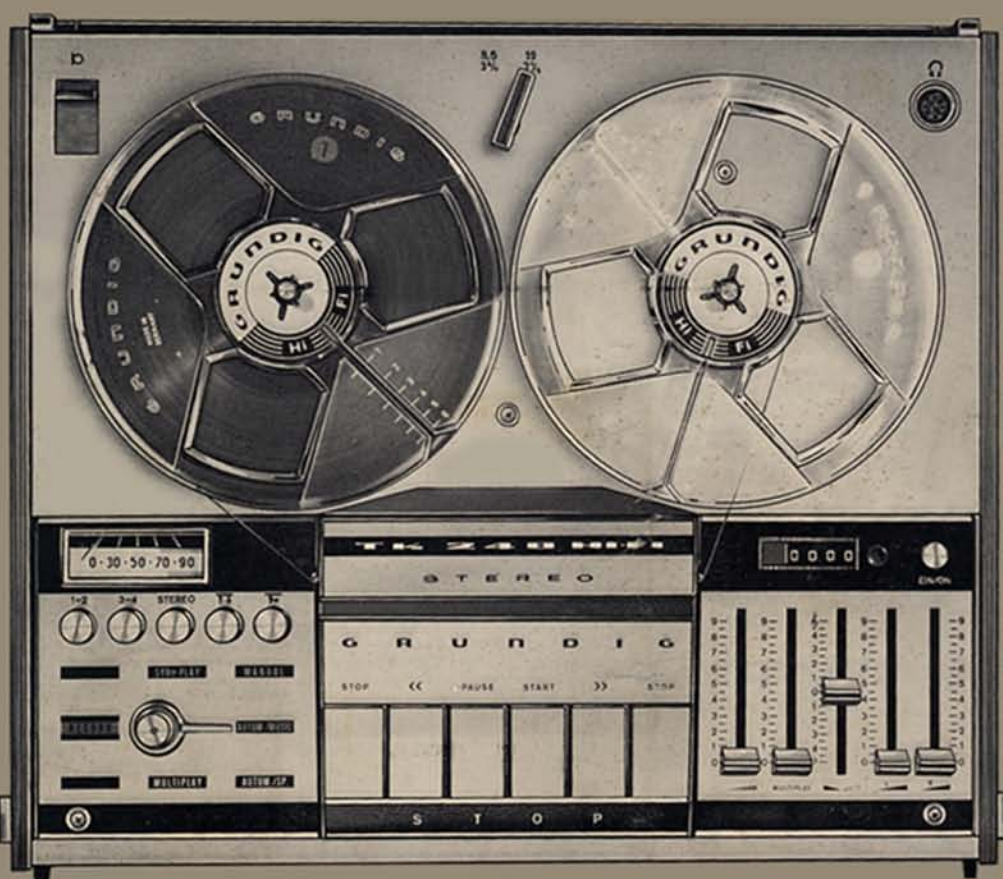


**GRUNDIG**

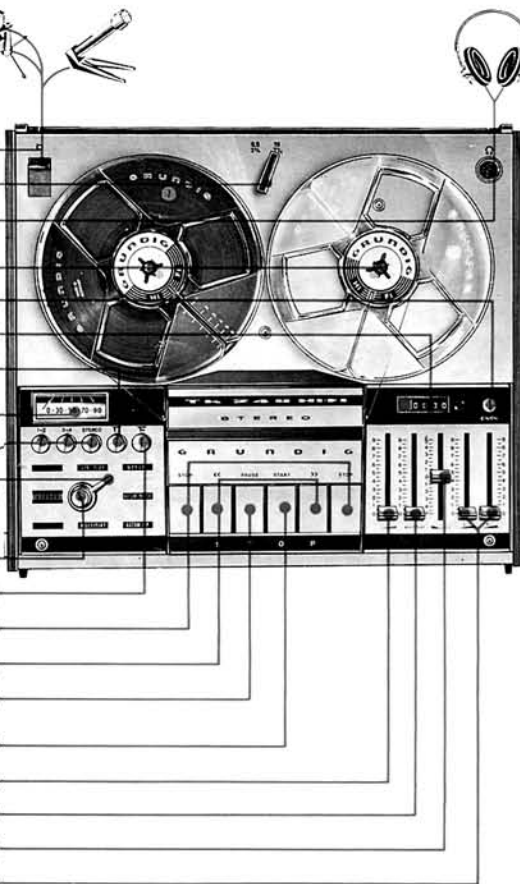
**TK 248 HI-FI**



## Operating Controls

englisch

- Microphone Socket** ①  
for connection of mono or stereo microphones. Open slider to insert plug
- Tape Speed Selector** ②  
Actuate this selector only at switched on machine
- Earphone Socket** ③  
for stereo earphone. Cutout of earphone plug showing outwards = built-in or connected speakers switched off; cutout showing towards spools = speakers rest operational
- Spool Carrier** ④  
Twist the upper part of the spindle — provided with ridges — to hold the spool when recorder is operated in vertical position
- Mains Switch** ⑤  
to press for switching on and off
- Position Indicator** ⑥  
with reset-button for easy location of individual recordings
- Control Button** ⑦  
for via tape monitoring (on mono recordings) and echo recordings. This button does not lock when stereo or pause button is depressed
- Recording Level Meter** ⑧  
Lights up when recording. Is used to set recording level
- Track Selectors** ⑨  
To select tracks 1-2 or 3-4 when recording or playing back at mono.  
Button STEREO for stereo operation
- Recording Selector** ⑩  
Position MANUAL for manual level adjustments. Position AUTOMATIC / MUSIC and SP (= Speech) for the level adjustment by the built-in automatic system  
Position SYN. PLAY, and MULTIPLAY for effect recordings
- Recording Button** ⑪  
Press and hold down until the START button is pressed
- Monitor Button** ⑫  
for monitoring. Pressing this button releases button ⑪
- Stop Key** ⑬  
releases all keys except the track selectors and monitoring button ⑫
- Fast Wind Buttons** ⑭  
◀ = Rewind, ▶ = Fast Forward Wind
- Pause Button** ⑮  
for brief interruptions at recording or play back. To release this button press it once more or press Stop Button
- Start Button** ⑯  
to start tape run at recording and play back
- Recording Level Control** ⑰  
for manual adjustment of recording level. Set to higher figure to increase recording level
- Multiplay Control** ⑱  
for level adjustment of superimposed track
- Tone Control** ⑲  
0 = normal position    ⤴ = max. treble    ⤵ = max. bass
- Volume Control** ⑳  
for built-in output stage. Turn towards a higher figure to increase volume  
L = left-hand channel, R = right-hand channel  
For stereo balance control decrease or increase volume of one channel





## TK 248 HiFi

Your TK 248 HiFi is fully transistorized and ready to use immediately after switching on. It is a four-track machine and operates at two speeds. Maximum playing time (4 x 2 = 8 hours). The TK 248 may be operated in horizontal and in vertical position and is automatically switched off when the tape has come to the end. The built-in automatic recording level control which may be set to music or speech, makes recordings of highest quality. For special purposes (e. g. to fade in or to fade out with a mixer unit) the automatic facility can be switched off. For the connection of a microphone, radio, telephone adaptor and record player separate connecting sockets are provided.

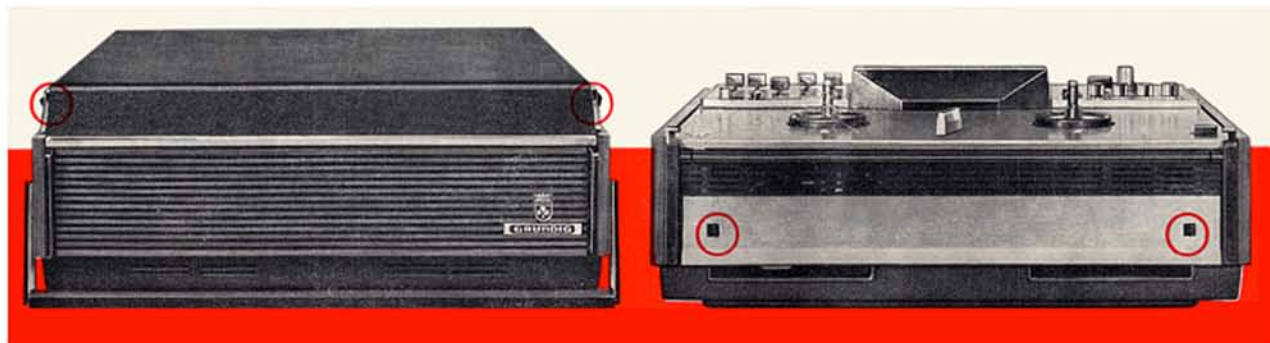
The radio input socket is combined with the output for external amplifiers. When connected to a radio receiver or HiFi amplifier, one lead connection is therefore sufficient to make recordings or to play back through the radio or amplifier.

Two transformerless complementary output stages of 4 Watts each are fitted. They feed the 4 built-in high quality loudspeakers. There are also 2 connecting sockets for extension loudspeakers or earphones. All recordings can be monitored through the output stages. In addition, your TK 248 enables you to make effect recordings such as synchronous, multisynchronous and echo recordings and permits via tape monitoring at mono recordings. The functions start/stop can be remote controlled by means of a foot switch.

For special purposes the following two supplementary kits may be supplied:

1. Dia-pilote-tone head for automatic remote control of projectors in connection with a control unit.
2. Conversion kit for 60 Hz operation.

On page 2/40 you will find a vast range of accessories.



**GRUNDIG**

## TK 248 HiFi

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### General Information

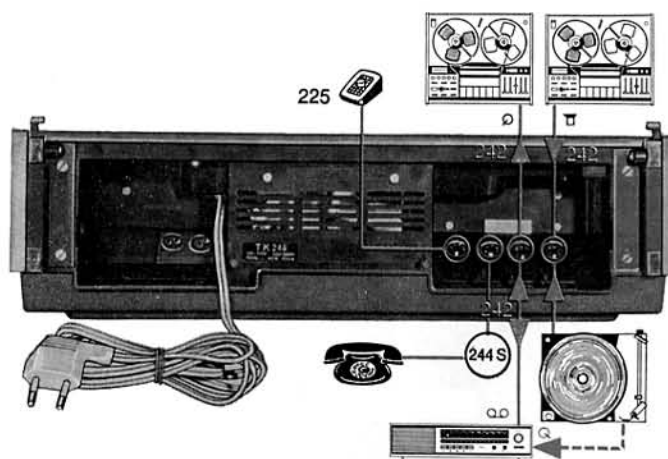
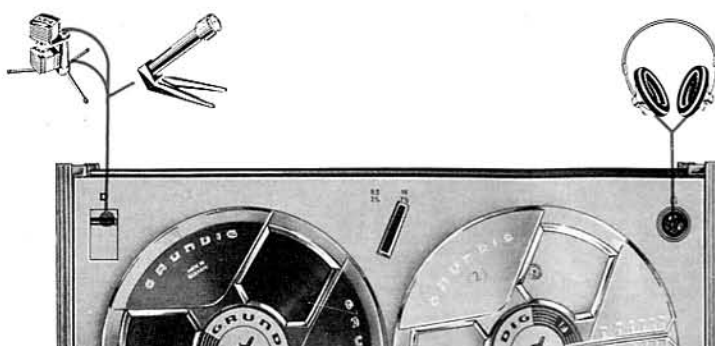
Your TK 248 may be operated in horizontal as well as in vertical position. If not otherwise pointed out, indications such as "at top" or "at bottom" are referred to a recorder being in horizontal position.

Before operation, remove lid of your recorder by lightly depressing the two clips on either side of the lid and lifting it upwards. Always place your machine so that the ventilation grill in the base is not obstructed so that cooling air can reach the motor. When operating the machine in consoles, make sure the machine is sufficiently cooled, if necessary open lid of the compartment containing the machine.


### Mains Connection and Connecting Sockets for Accessories




The mains cord and the sockets for accessory connection are to be found in a compartment in the rear of the machine. The lid of the compartment may be opened and removed by depressing the two clips on either side of it. When the machine is operated in vertical position, it looks better to let the lid of the compartment on its place and to lead out the connecting cables through the cutout provided for this purpose.

Before connecting your recorder to a mains supply please check that your local current and voltage are correct for the setting of the machine. The mains supply requirements of your machine are shown on the outside of the packing carton. If this differs from your local supply then please look up pages 36/37 for further details.




The connecting sockets on the rear of the machine — seen from right to left — are interconnected with other instruments and various accessories as shown in the illustrations. The individual sockets perform following functions:

**Microphone socket**  for mono or stereo microphone.

When opening the slider by inserting the connecting plug, the phono input , radio input  and telephone adaptor input  are automatically disconnected.

As the location of a microphone depends on the acoustical conditions of the room, we principally recommend test recordings. The elements of special stereo microphones are usually arranged at an angle of 90°. The elements may also be removed and placed as single microphones upon separate supports. The distance between the microphones and to the source of sound depends on the extension of the latter. If possible, the distance to the tape recorder should be of the full cable length. At mono recordings and suitable acoustics an omnidirectional microphone may be of advantage. For stereo recordings microphones with cardioid characteristics should preferably be used.

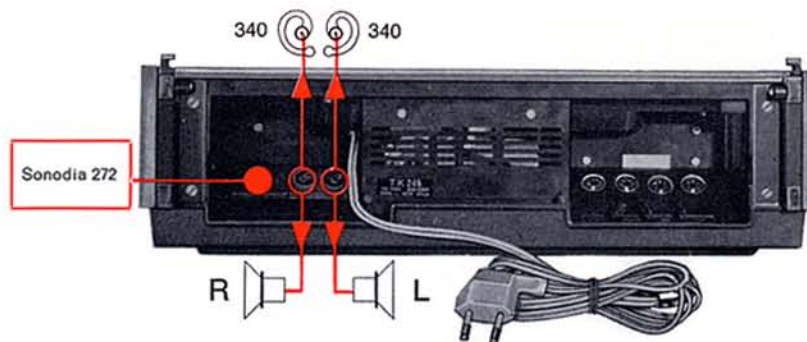
**Phono socket** 


For connection of a phonograph or a second tape recorder (using lead type 242) for rerecording records or tapes. The phonograph may be also connected to a radio receiver if this is provided with separate connecting sockets for phonographs and tape recorders.

**Radio socket** 

For connection of a radio receiver using lead type 242. This connection serves to make recordings from radio programmes and to play back the recordings through the radio as well. This socket also serves for connecting a stereo mixer when recording or an amplifier unit for playing back. If you want to copy tapes playing back with this machine, make the connection from the radio socket to the phono socket of the recording machine.

If you want to record a stereo transmission in mono, select mono on the radio.



**Telephone adaptor socket**  (Fig. see page 10)  
 Connection of telephone adaptor type 244 S for recording of telephone conversations.

Between the four input sockets following correlation exists:

**1. Microphone recording**


By opening the slider when inserting the microphone plug, all other inputs are automatically disconnected. A radio receiver and a record player (or second tape recorder) may rest connected. On the other hand, a telephone adaptor must not be connected to enable monitoring by means of the built-in output stages.

**2. Radio recordings and rerecording of records and tapes**

Neither a microphone nor a telephone adaptor may be connected. A radio receiver and a record player (or a second tape recorder) may be simultaneously be connected, but only one sound source may be operated. Therefore, the connected record player or tape recorder must be switched off whilst recording from the connected radio. For rerecording of records or tapes, the phono or tape button on the radio receiver must be pressed.

**3. Telephone recording**

A microphone must not be connected. A radio receiver and a record player may be connected, but must not be operated.

**Remote control socket**  (Fig. see page 10)

Connection of foot switch type 225 for START/STOP remote control at recording and play back (function like Pause key).


**Loudspeaker sockets**  L = left channel,  R = right channel

For connection of one speaker of 4...5 Ω impedance to each channel (e. g. two speaker boxes or two earphones 340. Please note, that the connection of a stereo earphone which is provided with **one** plug according to the latest Standard, gives a better fidelity of the stereophonic reproduction). When connecting one or two speakers, the built-in speaker of the corresponding channel is automatically switched off.

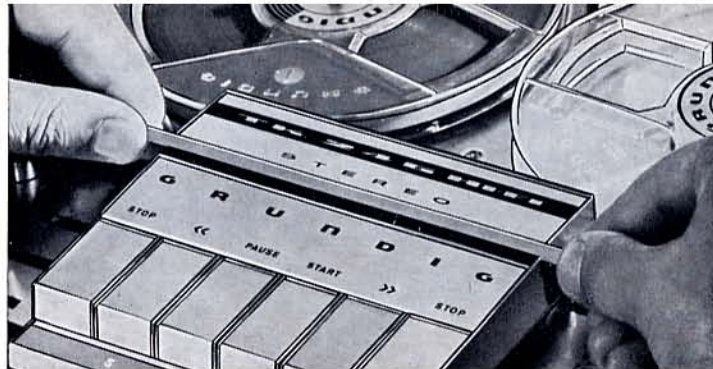
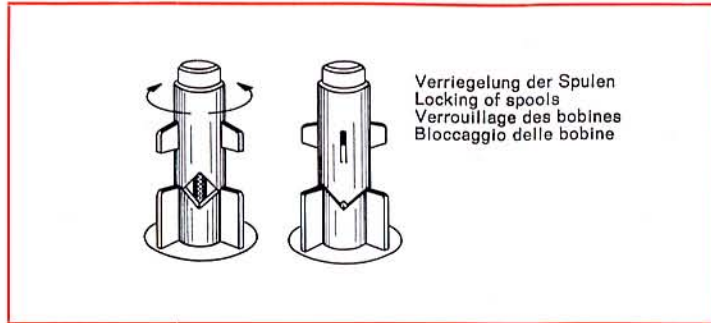
At built-in supplementary kit 127:

**Socket DIA SLIDE**

Connection of a control unit for automatic control of dia or film projectors, (e. g. GRUNDIG Sonodia 272).

**Earphone socket**  for earphones provided with plugs of Standard, DIN 45327. (Fig. see page 10)

The earphone plug may be inserted in two positions (by turning it by 180°) thus allowing to switch off the built-in loudspeakers or to let them operational.



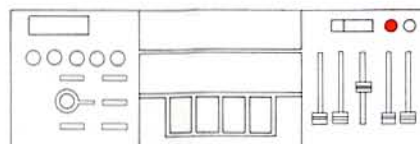
### Threading the Tape

Before placing the spools on the spindles please check that the ridges on either spindle are superjacent for easy fitting of the spools. If the ridges are not superjacent, the upper ones may be twisted by slightly pulling them upwards. Place the full spool on the left-hand spindle, the empty spool on the right-hand one and turn the spools until they fall into place. When operating the machine in vertical position twist the upper ridges of either spindle to hold the spools in place.

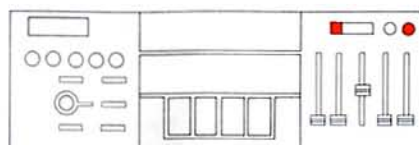
Pull off about 10" of tape and, whilst holding it tight between the fingers of both hands, drop it vertically into the tape leading slot. Make sure that the tape passes the two metal pins situated at the right and the left of the tape leading slot. Bring the end of the tape through the slot in the upper flange of the empty right-hand spool, turn the right-hand spool anti-clockwise whilst still holding the tape end and turn until all coloured leader tape and the metal foil are fully wound on the right-hand spool.

### Position Indicator

Whenever fitting a tape to the machine, depress the small button adjacent to the **position indicator** to set this to 0000. Make a note of the figures showing whenever you start a new recording and keep these notes as an index. To locate any particular recording, simply re-set the **position indicator** to 0000 when fitting the tape and wind the tape on at fast speed until the required numbers appear.



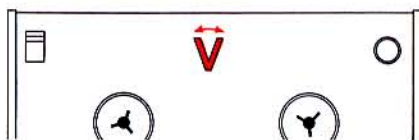
Zählwerk auf 0000 stellen  
 Setting to 0000 of position indicator  
 Mise en 0000 du compteur  
 Contanastro su 0000



Ein- und Ausschalten  
 Switching On and Off  
 Marche/Arrêt  
 Accensione e spegnimento

### Switching On and Off

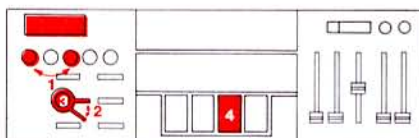
Depress the **mains switch** to switch the machine on. The red square besides the **Position Indicator** will light up. Depress the same button once more to switch off.



Wählen der Bandgeschwindigkeit  
 Selection of tape speed  
 Sélection de la vitesse de bande  
 Selezione della velocità di nastro

## Tape Speed

Please actuate the **tape speed selector** only after having switched on the machine. Select the speed 19 cm/s (7.5 ips) for high quality recordings and the speed 9.5 cm/sec (3<sup>3</sup>/<sub>4</sub> ips) for maximum playing time.



Vorbereitungen und Aufnahme  
 Preparations and recording  
 Préparatifs et enregistrement  
 Preparativi e registrazione

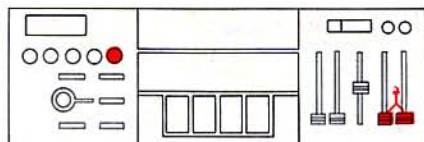
## Preparations to Record

We assume that your TK 248 is properly installed as shown on page 6/7, a tape is fitted and the machine is switched on. Same is valid for programme source: e. g. a radio receiver must be switched on and the desired waveband and station must be selected.

The illustrations show, additionally to the description, and in correct sequence, the operation of the recorder.

For mono recordings press **track selector** button 1-2, for stereo recordings the **button STEREO**. Exact explanations concerning the track selectors you will find on page 22.

Now make your first recording using the automatic recording level control. According to the kind of the recording-music or speech-set the **recording selector** to AUTOMATIC/MUSIC or AUTOMATIC/SPEECH. Now press the **recording button**! The machine is automatically set to the correct level. In the case of radio recordings make the adjustment whilst the transmission of music or spoken programmes. At microphone recordings try to find out the loudest part of a dialogue or a music piece. In the case of a gramophone recording or a tape transfer, try to find out the loudest passage. After this return the tone arm to the beginning of the record or rewind the tape you want to copy.



Mithören  
 Monitoring  
 Possibilité de contrôle  
 Controllo del livello  
 in registrazione

## The Recording

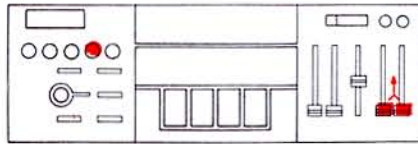
Depress the **recording button** and whilst holding it down press the **start button**. Now the tape starts moving and recording begins. The correct working of the automatic level control may be seen by means of the **recording level meter**.

## Checking the Recording

### a) Monitoring

We recommend that you monitor your recordings, particularly when these are microphone recordings of mixed sound sources (e. g. one or more vocalists accompanied by a band). This allows you to check the recording level of anything recorded at the same time. For example, you can check whether a vocalist is recorded in the correct relationship (depending on the distance vocalist - microphone) to the musical accompaniment. Monitoring is possible at mono as well as at stereo recordings. Generally, the **monitor button** is always depressed. Adjust the monitor volume by the **volume control**, independent from the recording level. You can listen in through the built-in loudspeaker but in the case of microphone recordings, particularly where the recorder and the microphone are in the same room, you will have to use a pair of headphones (to connect to socket ♂). Otherwise you may get acoustic feedback — a continuous howl of ever increasing volume.

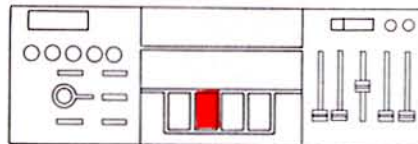




Hinterbandkontrolle bei Mono  
Via tape monitoring at mono

#### b) Via tape monitoring

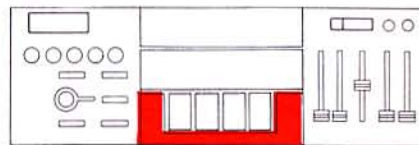
When pressing the **via tape monitoring button** ( $\uparrow\downarrow$ ) at mono recordings, you will hear with a delay of 140 or 280 ms (depending on tape speed) the playback of the just recorded signal. In this case, also use an ear-phone for listening to avoid undesired echo recordings. The via tape monitoring button is released by pressing button **Monitor**, **Pause** or **Stop**. At stereo recordings, via tape monitoring is not possible.



Pause

### Short Interruptions

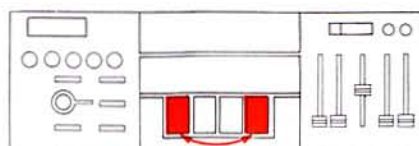
You may wish to stop recording or playback of a tape for short periods of time (e. g. if you do not wish to record the announcements between two musical numbers). Simply press the **pause button** to stop the tape. To start tape run again, press same button once more.



Halt  
Stop  
Arrêt  
Arresto

### Stop

Pressing the **stop button** disengages all buttons previously being pressed (except the **track selector** and the **monitoring button**) and stops all kinds of operation.



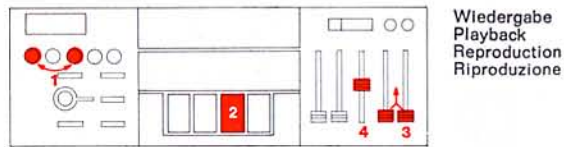
Umspulen  
Fast-winding  
Bobinage rapide  
Avvolgimento rapido

### Fast-winding the Tape

To listen to a recording you have made, you must first return the tape to the beginning of the recording. On the other hand, if you wish to pick out a particular recording from a full reel of tape or if you wish to by-pass part of a recording, then you must wind the tape forward. For this, simply press one of the fast-wind buttons. « = Fast Rewind; » = Fast Forward Wind.

### Automatic Stop at Tape Ends

Metal foils are fitted to the tape to actuate a switch when the tape has come to the end after Start or Fast Wind. To switch the set on again after switching off by the metal foils, simply press the corresponding button.

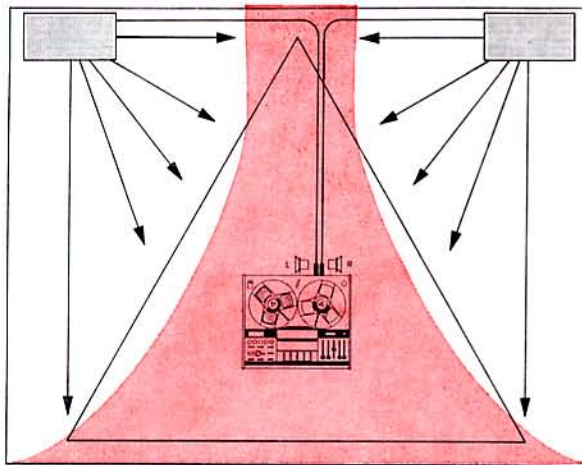


## Playback of Mono and Stereo Recordings

Press the same **track selector button** as for recording (1-2 or STEREO).

### A) Playback through a radio receiver or a HiFi amplifier

Connect your tape recorder as for recording. Set the radio receiver or the amplifier as required to play back from a record player or a tape recorder and depending on the kind of the recording to mono or stereo. Turn the **volume controls** of the tape recorder to 0 and press the **start button**. Adjust volume and tone (and balance at stereo) on the radio receiver or amplifier.



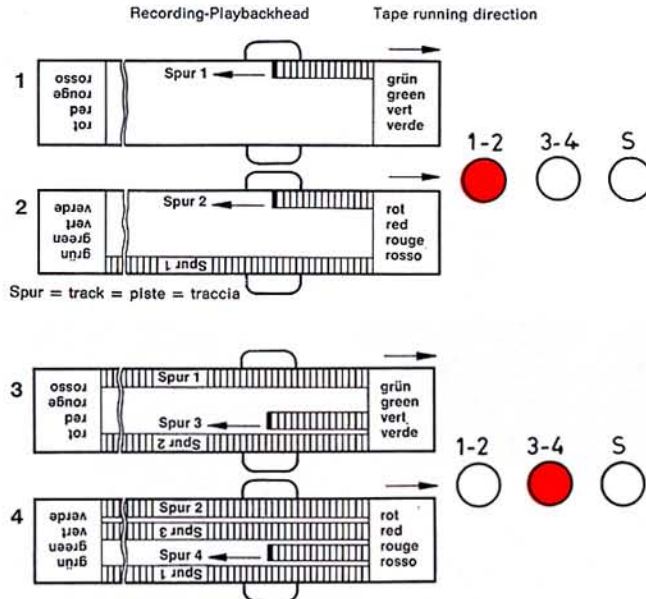
### B) Playback through the built-in output stage

After pressing the **start button**, the playback commences. Adjust volume and tone as required. At stereo reproduction a supplementary control — the so-called **Balance Control** — becomes necessary. This control is effected by decreasing or increasing the volume of **one** channel. This enables to restore the acoustic balance in case this should be shifted by means of unfavourable acoustic room conditions. The illustration above gives a general idea of placing the stereo set-up. The best sound impression of stereo reproductions is obtained when placing yourself within an equilateral triangle, the sides of which corresponding approximately to the length of the sound base (the distance between the loudspeakers). For greater listener groups, this sound base must be enlarged. The coloured section in the illustration shows the ideal listening range.

## Now some Technical Features

You have made your first recording and familiarised yourself with the operation of your tape recorder. Now to learn a little more about getting good recordings.

Your tape recorder is designed for mono or stereo recording and playback on 4 tracks. The difference between a monophonic and a stereo tape recorder is based on the fact that a stereo tape recorder incorporates a double electrical installation: two amplifiers, double inputs and outputs and two superposed systems in each of the head assemblies for erasing,



recording and playback. Operation of all double systems is effected simultaneously. Only exception are the volume controls which are adjusted separately when they are used as stereo balance! Further reasons for separate adjustment of the volume controls are shown in paragraph »Effect Sound Recordings«.

The four tracks are recorded side by side on the tape. At mono operation one after the other, at stereo operation two tracks simultaneously.

Numbering of tracks of GRUNDIG Tape Recorders other possibility

1	=	1
4	=	2
3	=	3
2	=	4

#### Mono operation

To record on tracks 1-2, simply press **track selector button 1-2**. Now the upper head systems are in operation.

The leader tapes at the beginning and at the end of the tape are coloured for easy identification. Simply remember the following:

First recording = track 1. Starting with a green leader tape.

When track 1 has been fully recorded, turn the full spool over, re-fit to the left-hand spindle and place the empty spool on the right hand spindle.

Second recording = track 2. Starting with red leader tape.

After you have recorded the two outside tracks in this fashion, remove the spool and refit the full spool to the left, the empty spool to the right. Now press the **track selector button 3-4** to switch on the lower head systems.

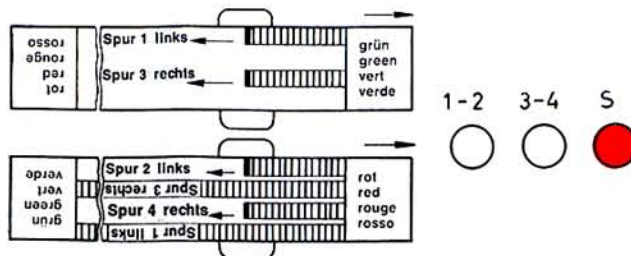
Third recording = track 3. Starting with green leader tape.

After recording this track, again change over tape and spool as shown above.

Fourth recording = track 4. Starting with red leader tape.

When you have filled the fourth track, the tape is fully recorded. To play back proceed exactly as shown above for recording.

The tracks of the GRUNDIG four-track tape recorders are numbered in accordance with the sequence of the recordings. Other companies number the tracks from top to bottom. See also figure on top of next page.



Spur = track = piste = traccia  
links = left = gauche = sinistra  
rechts = right = droit = destra

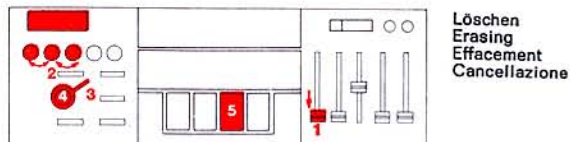
#### Stereo Operation

Press track selector **"STEREO"** to switch on both systems of each head. Starting with the green leader tape, tracks 1 and 3 are simultaneously recorded. At the end of the tape, change over tape and spool as under mono operation. Starting with the red leader tape the tracks 2 and 4 are simultaneously recorded. At the end of the tape, all 4 tracks are fully recorded. For playback also press track selector button **"STEREO"**. Thus both amplifiers are in playback operation and the tracks 1-3 (2-4) are simultaneously reproduced through the two systems in the recording/playback head.



### Exchange of Tapes

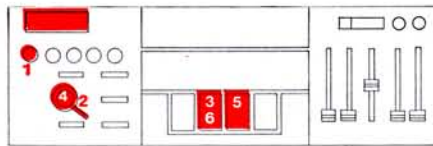
When exchanging tapes with your friends, please observe the following: Principally you may play back on your machine any tape recorded on a two-track machine. For this simply press **track selector 1-2**. On the other hand, a four-track recording from your machine may be reproduced by a two-track machine when only **track one** and **track two** are recorded. This is obtained when recording on a blank tape and **track selector 1-2** being depressed. If, however, you want to record on a tape already fully recorded, first erase it completely by means of an erase coil or a permanent magnet. An explanation for this is given by the illustration above: To 1) The track width of a two-track recording corresponds to two quarter-tracks plus a little space between. To 2) When making a new quarter-track recording, only parts of the two-track recording corresponding to tracks 1 and 2 are erased. When playing back with a two-track machine both recordings (the rest of the old two-track and the new four-track recording) are to be heard. To 3) As a remedy you can erase the tracks 3 and 4. It may happen however, that parts of the old two-track recording will remain unerased (as shown) and distort at reproduction on a two-track machine.



### Erasing

Your recording is automatically wiped off as soon as you make a new recording over the same part of the tape. This means it is immaterial whether you are using new or used tape for a new recording.

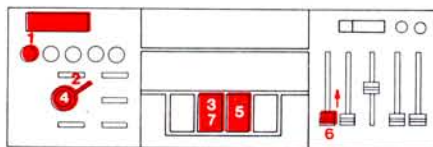
If you only wish to erase a tape without making a new recording, simply turn the **recording level control** to "0" and press the **track selector** button corresponding to the track you want erase. Now turn the **recording selector** to **MANUAL** and depress the recording and start button.



Telefonaufnahme  
Telephone recording  
Enregistrement téléphonique  
Registrazioni telefoniche

### Telephone Recording

The telephone adaptor is connected to socket . Whilst the recording no microphone must be connected. A radio receiver or a record player may be connected, but must be switched off. The **recording selector** must be set to position AUTOMATIC/SPRACHE (speech). According to regulations of the german postal authorities monitoring is not possible with the telephone adaptor connected. For playback of the telephone recording pull out telephone adaptor plug.

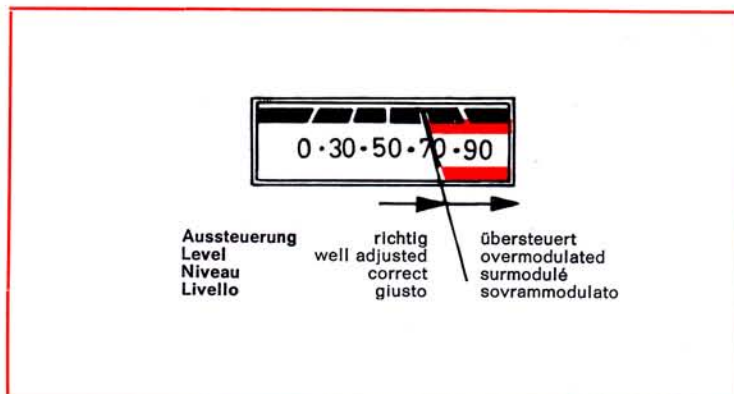


Aufnahme ohne Automatik  
Manual recording level  
adjustment  
Enregistrement non automatique  
Registrazione senza regolazione  
automatica di livello

### Manual Recording Level Adjustment

For special cases you may wish to disconnect the automatic recording level facility of the machine. For example to fade a recording by a mixer unit. To do this you proceed as follows:

After selecting the correct track (1-2, 3-4 or S), turn the **recording selector** to MANUAL and press **pause button**, **recording button** and **start button**. Just as for an automatic recording, there should be a brief test recording. Turn the **recording level control** towards its number 9 and you will note that the pointer of the **recording level meter** fluctuates in sympathy with the speech or music. The correct position of the recording level control is found when the pointer of the recording level meter reaches its mark 70 during the loudest passages of the speech or the music. We say the recording is fully modulated. Now release the **pause button** to start recording.



### Remote Control


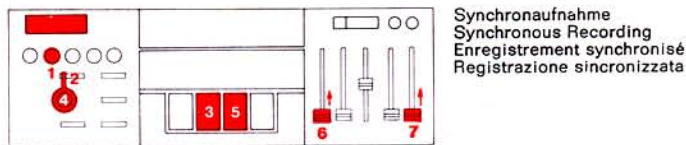
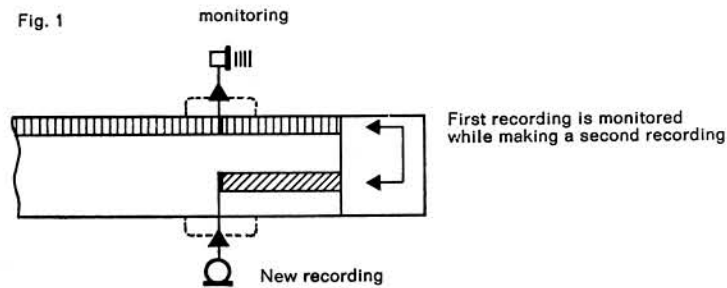
The foot switch 225 is connected to socket  (remote control). It enables the remote control of Start and Stop of the tape run at recording and playback with the **start button** being pressed. The foot switch being at stop position impairs the fast tape wind-for this reason always set the foot switch to its Start position or disconnect it from the machine after use.

Fig. 1



### Effect Recordings

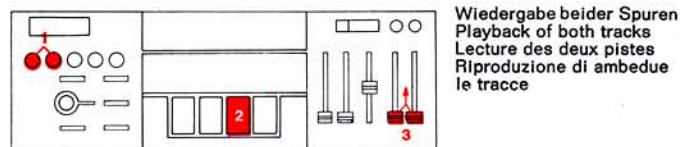
With a little practice, the TK 248 will enable you to solve many problems arising at the setting to music of amateur films and slides and at the recordings in "studio" quality of vocalists or amateur bands. In the following a few examples how to proceed. It is of great advantage if the performer (singer or bandsman) must not operate himself the tape machine. This is especially the case for example No. 2. That's why it is distinguished in the following between performer = artist and operator = "sound engineer" (recordingist).

#### Example 1: Synchronised Recordings

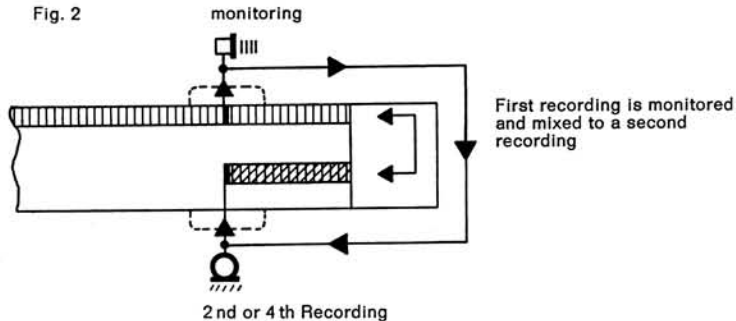
As the term implies, synchronised recordings are two or more separate recordings which are played back together in synchronization. So you may add for example your singing to an instrumental recording as practiced in the Studios. An other possibility is that you may sing a duet with yourself. A further application is given in adding sound to cine or slide shows. You may record the spoken text and the music on separate tracks such making possible the correction or renewal of either recording.

As simplification let us assume that we have made an instrumental recording on track 1 (marked by III in the illustration). Now we want to add a vocal part on track 3 (marked by // in the illustration). For this a normal microphone recording is necessary, with the only difference, that the artist must hear the instrumental recording as "leading track". For this reason, connect a microphone to socket Q and an earphone to socket R. In addition press **track selector 3-4**.

After having set the recording selector to SYN. PLAY and pressed buttons **Start** and **Pause**, you can adjust the correct recording level of the second recording (singing) by means of the **recording level control**. As soon as you release the **Pause button**, the artist hears through its earphone the instrumental recording and can sing in synchronization to this recording.



The volume of the leading recording is adjusted by means of the **volume control R**. The recording of the singing may be repeated as often as desired without influencing the quality of the instrumental recording. As soon as you believe that the recording of the singing has been a fully success, you may play back both recordings simultaneously by simply pressing **track selector 1-2 plus selector 3-4**. For easier understanding, our illustrations shows the procedure with two tracks only. It stands to reason, that the remaining two tracks may also be used after having turned over the tape.



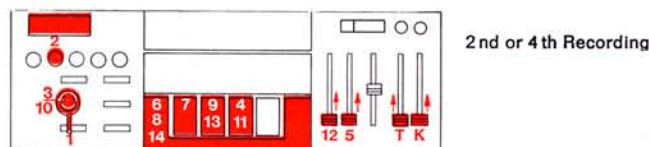
In case the first (leading) recording has been made on track 3-4, press **track selector 1-2** for the second recording.

### Example 2: Multi-synchronous Recordings

In the case of multi-synchronous recordings a fresh recording on one track is combined with another recording already on the tape. The combined two recordings can now be added to a further recording and this process can be repeated as often as required. If you want to accentuate the solo part of a voice or an instrument, make this as final recording on the free track as shown in example 1.

To play back the multi-synchronous recording, always select that track on which the last recording has been made. For mixed recordings (i. e. synchronous recordings plus multi-synchronous recordings) press track selector 1-2 **plus** selector 3-4.

Let us assume again that we have an instrumental recording on track one (marked by III in illustration) and that we want to mix this recording with a singing of several voices (marked by /// and \\\).



### Second recording

One earphone is connected to socket  $\square$ R and used by the artist, a second earphone for the "tone engineer" is connected to socket  $\square$ L. Connect the microphone to socket  $\square$ Q, set the **recording selector** to position MULTIPLAY and press **track selector 3-4**. When combining the first recording (III) with the new recording, adjust the level of the first recording by means of the control Multiplay and the level of the new recording with the level control. Start by adjusting the level of the first recording. For this set the **level control** to "0" and press **recording button plus button Start**. Now adjust to correct level by means of the **Multiplay control**. (Whilst this short testing, the recording III of track one is scanned and transferred to track 3.)

After having stopped and rewound the tape, press again the **Pause button**, the **recording button plus button Start**. Now the level of the second recording is adjusted by means of the **level control**. The setting of the **Multiplay control** must remain unaltered. As soon as you release the **pause button**, the "artist" hears the first recording through his earphone and may sing to it in synchronization. The monitoring volume of the first recording is adjusted with **volume control R**. The second recording

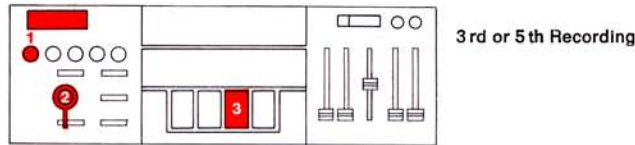
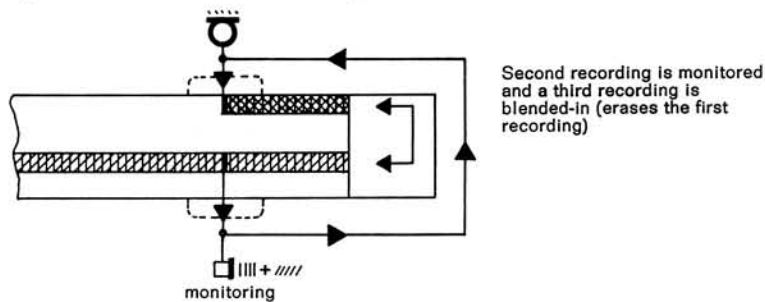


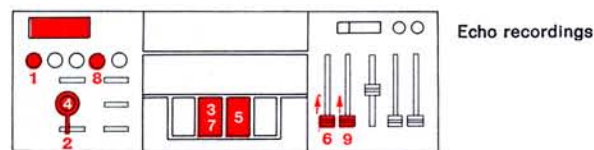
Fig. 3 3rd or 5th Recording



/// on track 3 is combined with the first recording ||| of track 1. The "tone engineer" monitors both recordings ||| + /// and thus has the possibility to correct the level of both recordings even during the recording (||| with **multiplay control**, /// with **level control**). The second recording /// may be repeated as often as desired.

### Third recording

As soon as you have succeeded in doing your second recording you simply have to press the **track selector 1-2** after having stopped the recording and rewind the tape. All other adjustments remain unaltered. To start the third recording again press the **recording and start button**. The "artist" hears through its earphone the first two recordings (||| + ///), the "tone engineer" hears the two first recordings plus the new recording (||| + /// + \\\). If correction of level adjustments should be necessary, proceed as described above. When making a fourth or fifth recording, simply select the corresponding tracks and let all other adjustments unaltered.



### Example 3: Echo Recordings

All mono recordings (microphone, radio, record recordings etc.) may be provided with echo effects. Depending on the tape speed, the recorded signal is monitored with a delay of 140 or 280 ms and fed back into the just recorded signal, resulting in an echo effect, the intensity of which depending on the strength of the level of the fed back signal.

After having selected the desired tape speed and track, set the **recording selector** to MULTIPLAY. Now press the buttons "**pause**", "**recording**" and "**start**". After having adjusted the **level control**, start tape run by releasing the **pause button** and press the via-tape-monitoring button  $\uparrow \downarrow$ . The intensity of the echo effect is now adjusted by means of the **multiplay control**.





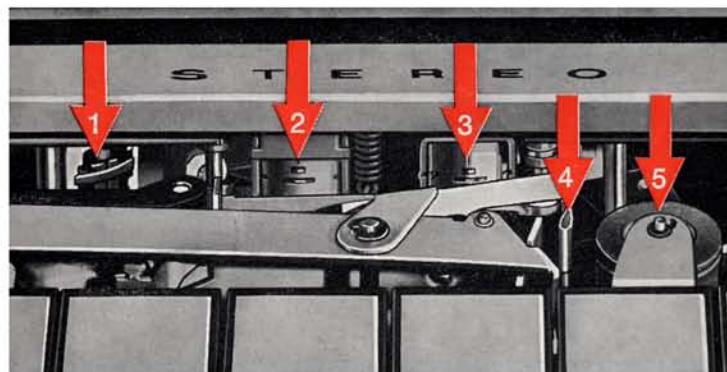
Klebeschiene  
Joining channel  
Guide de collage  
Guida di incollaggio

### How to Treat and Join the Tapes

Never place your tapes on top of a radiator or close to any other source of heat. This could deform them and make them useless.

Tapes which you have used often should be cleaned before making a new recording. As shown in the illustration, locate the enclosed tape cleaning fork in the two holes of the top deck and hold it whilst running the tape at fast speed from left to right past the felt rings of the fork. Run the tape without stopping from beginning to end. When the felt rings become dirty or discoloured, turn them a little. When they are completely dirty, use replacement felts.

If your tape breaks, use one of the better tape-joining kits to fix the two ends together. To align the tape so that is affixed without kinking, use the built-in tape joining channel next the tape loading slot. Ensure that the joining tape never protrudes over the edge of the tape. This would prevent proper and uniform tape movement.



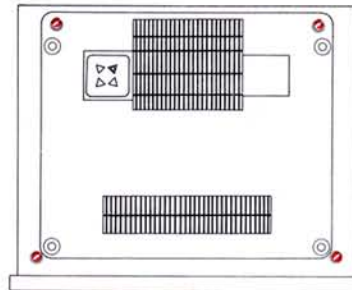
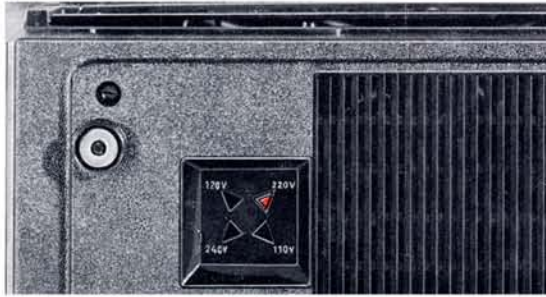
### Maintenance of Your Tape Recorder

The design of your machine ensures a maintenance-free operation over a long period of time. If, however, any distortion should be observed, please call your dealer. He can easily eliminate the fault. But you for your own too, may do something for your tape recorder. You may clean yourself the pressure tape, the front of the heads and the pressure roller from the dust and iron particles. For this remove cover as shown. The pressure tape may be easily removed and refitted by means of a pair of tweezers.

As long as the flock-sprayed surface of the pressure tape is unobjectionable, you only have to brush it. Clean the heads and the rubber pressure roller with alcohol or test benzine and a soft cloth. If the heads are excessively dirty, you can also use a match.

**Never use a metal object to clean the front side of the heads facing the tape. It could render your machine useless, resulting in costly repairs.**

Never do any other work and never apply any oil!



For mains voltage adjustment unscrew the colour marked screws

Before carrying out any of the following adjustments, disconnect the machine from the mains.

### Mains Voltage Adjustment

The TK 248 can be operated from 110 and 220 V mains supply.

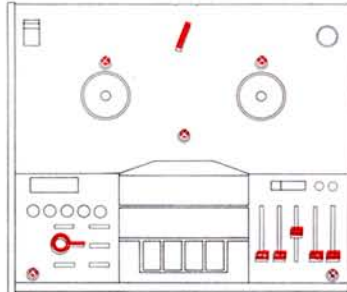
The TK 248 U can be operated from 110, 120, 220 and 240 V.

You can check the voltage adjustment by the position of a red three-cornered pin which may be seen behind the corresponding cut-out in the bottom of the machine.

For the voltage adjustment first unscrew and remove bottom cover. Now lightly lift the red selector knob and turn it to the voltage marking required where it locks. When replacing fuses make sure that the replacements are of correct values (indicated at the fuse holders). Besides the fuses on the voltage selector board a further fuse is to be found on the printed circuit board.

**Attention!** Never use repaired fuses!

For conversion to 60 Hz operation, pull off all colour marked parts and unscrew screws



### Use on a Different Mains Frequency

The TK 248 can be converted to 60 Hz operation with a conversion kit type 129 (you may purchase this conversion kit from your GRUNDIG dealer). The TK 248 U is already equipped with the drive pulley necessary for this conversion. The pulley is fastened to the chassis below the left spool carrier (unscrew bottom cover). When carrying out the conversion, mount the 50 Hz pulley being exchanged in place of the 60 Hz pulley to the chassis. Thus it is disposable when re-setting to 50 Hz operation once should be required.

For conversion proceed as follows:

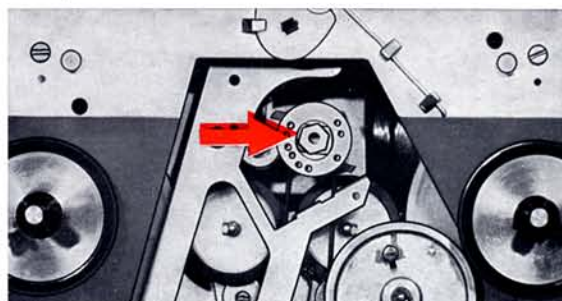
Set speed selector to 19 cm/s position and pull off selector knob. Also pull off control knobs of the selector switch and the slider controls. Remove 5 screws holding top cover and remove cover.

Take belt from drive pulley. Loosen hexagonal screw of drive pulley. To loosen the collet, press the pulley slightly downwards and then lift up. (At U-machines: insert collet and screw into the 60 Hz pulley.)





Slide 60 Hz pulley onto spindle and re-hook drive belt into upper groove.

Align drive pulley so that the belt passes the switching lever exactly in middle and fasten the hexagonal screw holding the pulley.

Refit top cover and controls.



## Technical Data

Power Supply:		
TK 248:	110 V, 220 V, AC, 50 Hz, for 60 Hz operation conversion kit 129 is available	
TK 248 U:	110 V, 120 V, 220 V, 240 V, AC, 50/60 Hz, conversion kit included	
Power Consumption:	approx. 55 W	
Fuses:	5 x 20 mm SB	
Mains Fuse:	0.8 A	
Pre-amplifier:	0.1 A	
Output Stage:	1.6 A	
Output Transistors:	2 x 0.8 A	
Transistors:	17 silicon-, 4 germanium- and 1 field effect transistor	
Diodes:	9 silicon diodes, 1 Zener diode, 2 rectifiers	
Track Standard:	international four track	
Recording Level Indication:	by moving coil meter	
Tape Speeds*:	19 cm/s (7 1/2 ips.)	9.5 cm/s (3 3/4 ips.)
Frequency Range*:	40 . . . 16 000 Hz	40 . . . 12 500 Hz
Signal/Noise Ratio:	> 50 dB measured with GRUNDIG reference and alignment tape type 468	
Wow and Flutter*:	≤ ± 0.15 ‰	≤ ± 0.2 ‰
Playing Time of an 18 cm Spool at Mono:	4 hours	
Doubleplay tape:	8 hours	
Longplay tape:	3 hours 6 hours at stereo, half playing time	
Fast Wind Time:	approx. 330 sec. for 730 m duo-tape on 18 cm reel	
Automatic Facilities:	Automatic level control and switch off at tape end	
Inputs:	2 x microphone 	1 . . . 100 mV at 100 kΩ
	2 x radio 	1 . . . 100 mV at 33 kΩ
	2 x phono 	50 . . . 5000 mV at 1.5 MΩ
Outputs:	2 x amplifiers (combined with radio input), 800 mV at 20 kΩ	
	2 x loudspeaker 	4 W at 4 Ω
Dimensions:	approx. 430 x 360 x 165 mm (17 x 14 x 6 1/2 ")	
Weight:	approx. 12,5 kg	
	Alterations reserved	

\* Tolerances and measurements according to DIN 45500

## Accessories

### **Dynamic Microphones:**

GDSM 331, GDM 318, GDM 321, GDM 322

### **Microphone Extension Cords:**

Type 267 with cable transformer, 5, 10 and 15 m long

Type 268 without cable transformer, 10 m long

Type 274 for stereo microphone GDSM 331, 10 m long

### **Microphone Connecting Leads:**

Type 278 for connection of two mono microphones to microphone socket for stereo recordings

Type 279 for connection of stereo microphones with standard plugs to speaker sockets for effect recordings

### **Connecting Lead:**

Type 242 for connection of a radio receiver, a second tape recorder or stereo mixer

### **Earphone:**

Type 340 for monitoring purposes

### **Stereo Earphone:**

Type 211 b or 220 for recordings of highest performance

### **Sonodia:**

Type 272; is used in connection with the supplementary kit 127 to trigger automatic slide change projectors.

### **Stereo Mixer:**

Type 422 for fading in moving sound sources at stereo recordings; to mix or fade up to four different input signals (e. g. microphone, radio, pick-up or second tape recorder). Two inputs are provided with transistor pre-amplifiers to prevent loss of level. Connection to radio socket of tape recorder by a lead type 242.

### **Transparent Cover:**

Type 472 may be fitted in place of normal cover

### **Tape Recorder Adaptor:**

Type 480 to record the sound of television programmes. Connection is made via cable 237 or 242. The adaptor is built into your television receiver by your GRUNDIG dealer.

### **Supplementary Kits:**

Type 127. Is built-into tape-recorder to enable connection of a slide projector control unit type Sonodia 272 or a control unit type "Synton" for narrow film projectors, the latter unit being manufactured by Volland/Erlangen.

Type 129 for conversion to 60 Hz operation

### **Telephone Adaptor:**

Type 244 S to connect the recorder to telephone lines and to record both sides of a telephone conversation

**Footswitch:** Type 225 for Start/Stop remote control

### **Tapes:**

For this recorder we recommend GRUNDIG HiFi doubleplay tapes in 15 or 18 cm storage cassettes.