



# Operating instructions

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## Tandberg tape recorders 9100X and 9200XD

## Power requirements

Standard model: 230 V/50 Hz.

English model: 240 V/50 Hz.

U/S model: 115 V/60 Hz.

Make sure that your tape deck is wired for the voltage in your area.

Changing from one line voltage and/or line frequency to another should be carried out by a competent service technician.

The power consumption of the tape deck is less than 100 watts.

Paragraphs marked with an asterisk (\*) applies to the 9200XD only.

*The word "Dolby" is a trademark of Dolby Laboratories Inc.*

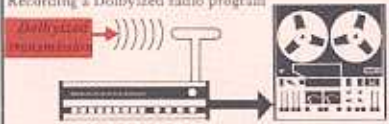

## The DOLBY N.R. knob (\*)

9200XD is equipped with the Dolby Noise Reduction System which reduces tape hiss without affecting the quality of the recorded program.

During a recording with Dolby the program is encoded in a certain way to reduce the effect of the tape noise. A program encoded in this manner is called a *Dolbyized program*. During playback the program is decoded.

You can make Dolbyized recordings on your 9200XD. You can also record programs that have been Dolbyized beforehand (some radio stations broadcast Dolbyized FM programs).

The Dolby system is controlled by the knob marked DOLBY N.R. The table below shows how you should set this knob for various types of recordings.

Type of recording	Set DOLBY N.R. to	Comments
Recording from a record player	NORM	The recording is Dolbyized. Keep the knob in position NORM during playback of this tape.
Microphone recording		
Recording an ordinary radio program		
Recording a stereo radio program	FILTER	The recording is Dolbyized and a filter removes the pilot tone. Set the knob to NORM during playback.
Recording a Dolbyized radio program 	DOLBY FM	Set the knob to NORM during playback.
Copying a program from a non-Dolby tape or cassette	NORM	The recording is Dolbyized. Keep the knob in position NORM during playback of this tape.
Copying a program from a Dolbyized tape or cassette 	NORM	The Dolby System of the recorder which the program is copied from should be activated in order to decode the Dolbyized program. Set the knob to NORM during playback.

### NOTE 1

There is one exception to the above rules. If the recorded tape is to be played back on another tape deck without Dolby facilities, then the Dolby System should not be used (the knob should be set to OFF).

### NOTE 2

Always set the DOLBY N.R. knob to NORM during playback of Dolbyized tapes. Set the knob to OFF during playback of tapes which have been recorded without Dolby.

# What are the controls for?

**EDIT/CUE.** Depress this button to:

- listen during wind and rewind
- listen for cueing or editing purposes when the STOP button has been depressed and the tape is moved by hand.

**SPEED.** For selection of tape speed during recording and playback.

**POWER on/off switch.** The green lamp above the switch lights when the power is on.

**Program level meters.** Indicate program level during recording and playback. When recording, set the INPUT LEVEL controls for the inputs in use so that the pointers deflect up to the red sector (0 dB).

**MIC INPUT LEVEL, Left and Right channels.** When recording from microphones, adjust each knob so that the pointer of the corresponding program level meter deflects up to the red sector (0 dB).

**LINE INPUT LEVEL, Left and Right channels.** When recording from a program source connected to RADIO or LINE IN, adjust each knob so that the pointer of the corresponding program level meter deflects up to the red sector (0 dB).

**REC SELECT, Left and Right channels.**

- |                   |   |
|-------------------|---|
| Stereo recording: | Depress both buttons.                               |
| Mono recording:   | Depress only the button for the channel to be used. |

**SOURCE/TAPE, Left and Right channels.**

- |                  |  |
|------------------|--|
| Stereo playback: | Depress both buttons.                                      |
| Mono playback:   | Depress only the button for the channel to be played back. |
- Use the SOURCE/TAPE buttons also to check the quality of the recorded sound (see "Monitoring", page 8).

**Function selector buttons.**

**RECORD:** Recording can be started only when one or both REC SELECT buttons are depressed and the STOP button lights.

**PLAY, REWIND, STOP, WIND:** These buttons can be used without restrictions.

**SONS.** The knob must be in the OFF position for normal recording (the green lamp above the knob extinguished). In other positions of the knob, the program played off one track can at the same time be re-recorded on either track (Sound-on-Sound, Echo, Language Studies).

**DOLBY Noise Reduction knob (\*).**

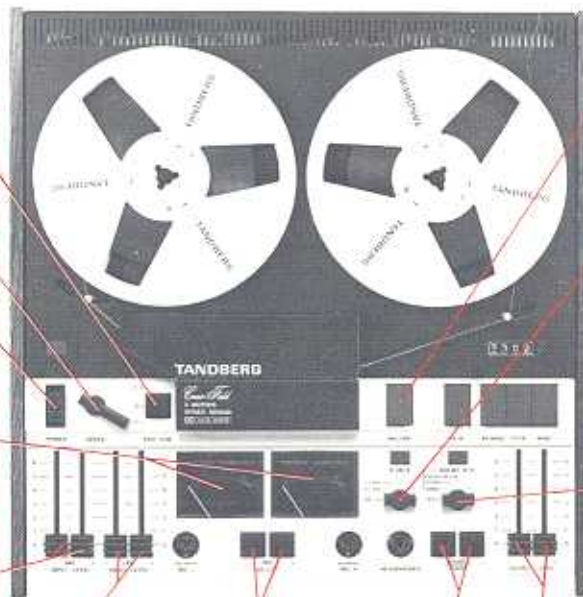
**OFF:** Recording or playback without Dolby (the lamp extinguished).

**NORM:** Recording with DOLBY N.R. a program from any program source (except stereo FM programs and Dolbyized FM programs). Playback of tapes recorded with DOLBY N.R.

**FILTER.** Only for recording a stereo radio program. A filter removes the pilot tone. Otherwise as NORM.

**DOLBY FM:** Only for recording a Dolbyized radio program.

**OUTPUT LEVEL, Left and Right channels.** When playing back a stereo program, adjust the knobs to give the same deflection on both meters. In most cases position 5 or 6 will give a suitable playback level (see "Playback", page 8).



## Tape

The tape deck is adjusted for recording on Tandberg High Output Low Noise (HL) tape or its equivalent. For a given distortion this tape gives 3 to 4 dB higher output level than ordinary low noise tape. HL-tape with matt backing can also be used.

If ordinary low noise tape is used for recording, the deflection of the program level meters should not exceed -2.5 dB if excessive distortion is to be avoided.

Always cut away the adhesive part of the leader tape to prevent the adhesive substance from contaminating the tape heads.

## Vertical mounting

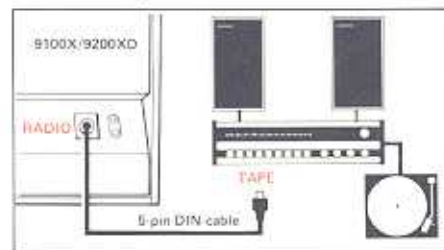
The tape deck can be used in a horizontal or vertical position or any intermediate angle. The front is equipped with rubber feet for vertical mounting.

To prevent the tape reels from falling off during vertical operation, rotate the reel locks 1/4 turn to lock the reels into place.

Never place the tape deck upside down (reels down) as this would damage the tape tension arms.

## Connections

### Radio or amplifier.

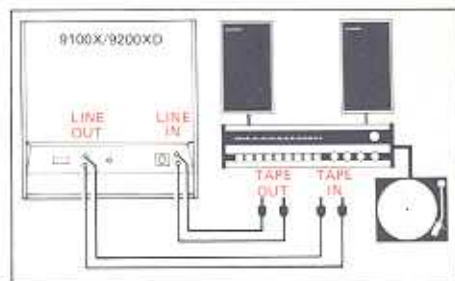


The tape deck does not have built-in power amplifiers and must therefore be used in conjunction with a stereo radio or stereo amplifier.

Connect a 5-pin DIN-cable from the RADIO socket at the rear of the deck (opposite the tape reels) to the TAPE socket on the radio or amplifier.

This connection makes possible *playback* of tapes over the loudspeakers of the radio/amplifier. The connection also renders possible *recording* of radio programs or music from a record player or other program sources connected to the radio/amplifier.

Alternatively, the radio/amplifier can be connected with four phono cables. Connect two cables from sockets LINE OUT L and R on the deck to corresponding sockets marked TAPE IN on the radio/amplifier (*playback*). Also connect two cables from

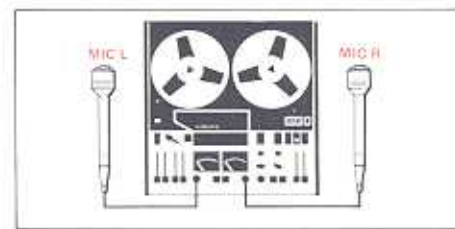


sockets LINE IN L and R on the deck to corresponding sockets marked TAPE OUT on the radio/amplifier (*recording*).

### Microphones.

For mono or stereo recording of live programs, connect one or two microphones respectively to sockets MIC L and R on the top panel.

Use microphones with impedance of 200-700 ohms. The sensitivity of the MIC input automatically adjusts itself for the impedance of the microphone.



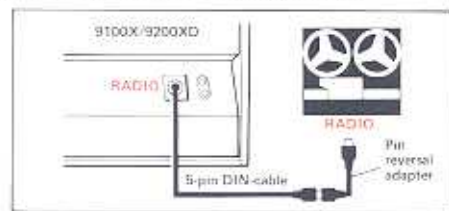
## Automatic stop

The LINE INPUT LEVEL knobs must be set to zero when recording from microphones. Otherwise unwanted mixing may occur.

### Headphones.

Connect stereo headphones to the socket HEADPHONES on the top panel. The headphone impedance should be 8 to 2,000 ohms. The headphones should be disconnected when a tape is played back over the loudspeakers of the connected amplifier.

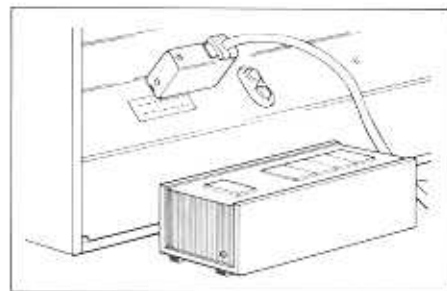
### Cassette deck or second tape deck.



To copy stereo or mono tapes use a 5-pin DIN-cable with a pin reversal adapter connected from the radio socket on the 9100X/9200XD to the RADIO socket on the other tape machine.

Alternatively, phono cables can be used. Connect two cables from sockets LINE OUT on the machine used for playback to sockets LINE IN on the machine used for recording.

### Remote control.



Connect the remote control unit (Tandberg Remote Control 9) to the socket REMOTE CONTROL. This connection makes possible remote control of forward and reverse winding, recording, playback and stop.

Tandberg Remote Control 9 has the same function selector buttons as the tape deck. The function selector buttons on the tape deck can also be used when the remote control unit is connected.

The switch TIMED START on the remote control unit should be in the OFF position except when a timer is used to turn the power on. In that case the switch should be set to either PLAY or RECORD depending on the mode in which it is desired to start the tape deck.

A photoelectric end-stop sensor (located under the head covers on the right side) will stop the machine when the tape runs out or if the tape snaps.

If the tape reel has a transparent section of tape, the machine will also stop when this section is reached. This makes it possible to stop the machine at the end of the tape without the tape running out.

To avoid the tape running off the reel when stopping from full winding speed a transparent section of at least four inches is required. This section should be inserted about 9 ft. from the end of the tape.

To run the tape past the transparent section, depress either one of the buttons PLAY, REWIND or WIND and hold the button depressed until the transparent tape has passed.

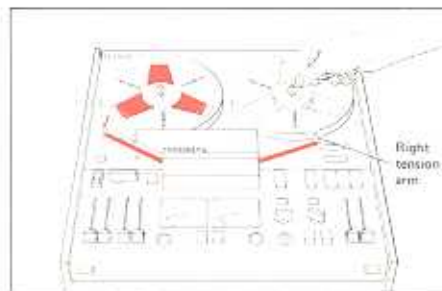
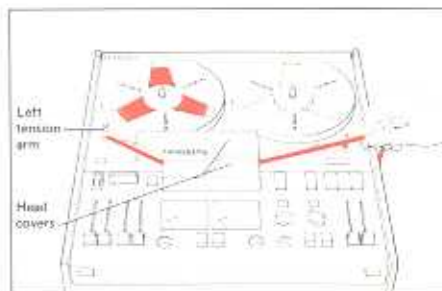
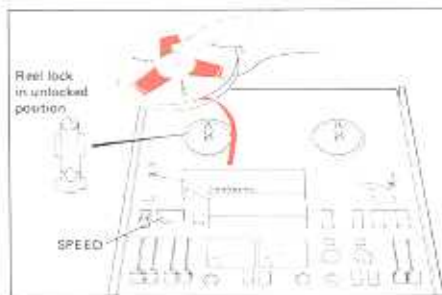
Should the lamp for the end-stop sensor burn out, the recorder will still operate normally, except that it must be stopped manually at the end of the tape.

The photoelectric end-stop sensor will prevent the tape deck from starting until a tape has been properly inserted (see page 6). Wrong threading of the tape may prevent starting.

## Preparation for use

1. Connect the power cable to a power socket.
2. Switch on the tape deck by operating the POWER switch on the left. The green light above the POWER switch will light, and so will the STOP button.
3. Set the SPEED knob for the desired tape speed. The best sound quality is obtained at 7 1/2 ips, while 1 7/8 ips gives the longest playing time.
4. Ensure that both reel locks are in the unlocked position (see top fig.). Put a full tape reel on the left-hand turntable, and an empty tape reel of the same size on the right-hand turntable. Then rotate both reel locks 1/4 turn to lock the reels into place.
5. The tape can be threaded with one hand. First, put the tape around the left tension arm, and pull the tape through the slot between the two head covers (see middle fig.). Then pull the tape around the right tension arm and place the end against the hub of the empty reel (see bottom figure). Take up the slack by rotating the empty reel a few turns anticlockwise.

Do not touch the red and green function selector buttons until threading of the tape is complete.

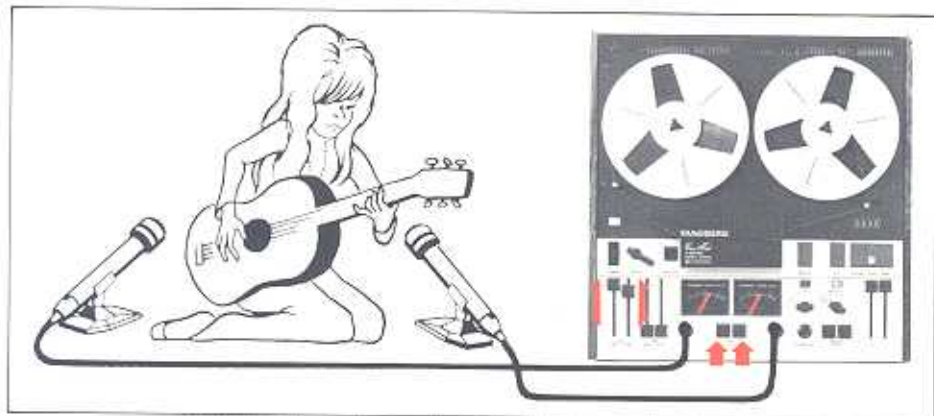


## Recording

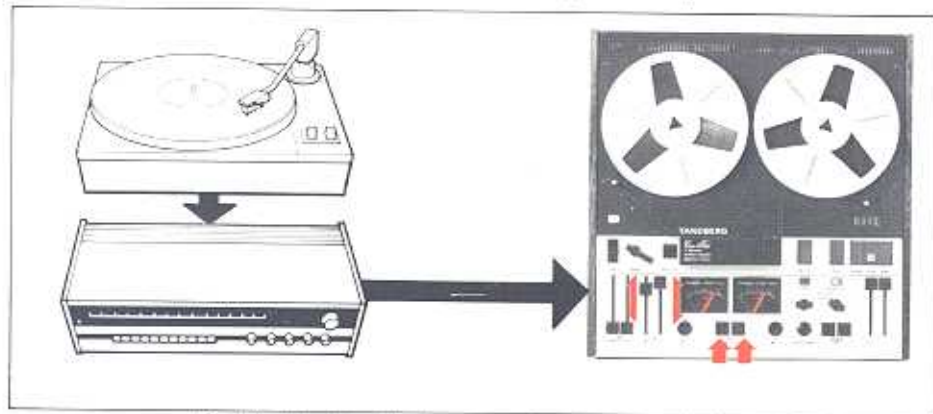
### Stereo.

1. Ensure that the S ON S knob (situated below the red RECORD button) is in the OFF position.
- 2(\*). Set the DOLBY N.R. knob to correct position (see table on page 2).
3. Depress both the black REC SELECT buttons. The program level meters will light.
4. Adjust the input level in the following manner:
  - *When recording from microphones:* Speak or sing into the microphones and at the same time adjust the MIC INPUT LEVEL knobs so that the meter pointers deflect up to the red sectors (see top figure next page). Set the LINE INPUT LEVEL knobs to zero.
  - *When recording from a program source connected to TAPE IN or RADIO:* Start the program source and feed a sample of the program to the tape deck. Adjust the LINE INPUT LEVEL knobs so that the meter pointers deflect up to the red sectors (see bottom figure on the next page). Set the MIC INPUT LEVEL knobs to zero.
  - *When recording a Dolbyized radio program:* A calibration tone is

Recording from several program sources simultaneously: See "Mixing", page 12.



*Adjusting the input level – recording from microphones.*



*Adjusting the input level – recording from record player*

broadcast before the program starts. During this tone, adjust LINE INPUT LEVEL, so that the pointers deflect to the "50%" mark on the meters. This gives the correct input level for the program.

The setting of the two INPUT LEVEL knobs will not necessarily be the same. This is normal because the meters are more accurate than the scale of the knobs.

5. Start the recording by pressing the red RECORD button. To stop the recording, press the STOP button (or any one of the green function selector buttons).

#### **Mono.**

The procedure for mono recording is the same as for stereo except that step 5 changes to:

3. Depress the REC SELECT button for the channel to be used for recording.

When only the REC SELECT button for one channel is depressed, the programs from all inputs are connected to that channel. If one microphone is used, it can therefore be connected to either left or right microphone socket.

More about mono recording: See "Tracks and channels", page 8.

## Monitoring during recording

The sound quality of the recording can be checked by operating the SOURCE/TAPE buttons.

**BUTTONS OUT:** You will hear the program *before* it is recorded on tape. This is called *source monitoring*.

**BUTTONS DEPRESSED:** You will hear the program a fraction of a second *after* it has been recorded on tape. This is called *tape monitoring*.

If the recording has been made correctly, the sound quality before and after recording should not differ audibly.

It is best to use headphones for monitoring. In this case, the volume of the connected amplifier should be turned down. If, however, the amplifier has a TAPE MONITOR button, the program can also be monitored in the loudspeakers. Tape monitoring is then achieved by depressing the TAPE MONITOR button and both SOURCE/TAPE buttons.

During tape monitoring, the volume of the program is adjusted with the OUTPUT LEVEL knobs. Set these knobs so that the volume is exactly the same during source and tape monitoring.

When monitoring a mono recording, operate only the SOURCE/TAPE button for the channel in use.

## Playback

**Stereo.**

1. Set the DOLBY N.R. knob to the position indicated in the table on page 2(\*).
2. Depress both the black SOURCE/TAPE buttons.
3. Press the green PLAY button to start the playback. Both meters light. The meter deflections indicate the output levels in the two channels.

During playback, the meters might not deflect up to the red sector (0 dB) even if the program has been recorded at this level. This is quite normal, and is a result of the higher tones being pre-emphasized during recording. The corresponding de-emphasis in playback conforms to an international standard.

4. The volume of the program can be adjusted both with the OUTPUT LEVEL knobs of the tape deck and with the volume control of the connected amplifier (remember to depress the TAPE button on the amplifier).

The OUTPUT LEVEL knobs should be adjusted so that the program from the tape deck is as strong as programs from other program sources used with the amplifier (e.g. a record player).

**Mono.**

The procedure for mono playback is the same as for stereo except that step 2 changes to:

2. Depress the SOURCE/TAPE button for the channel to be played back.

## Tracks and channels

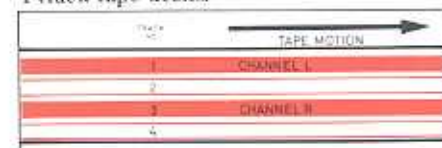
**What is a channel? What is a track?**

A *channel* is the path that the program follows through the tape deck and amplifier during recording and playback. A mono recording requires only one channel, whereas a stereo recording requires two: left and right channels.

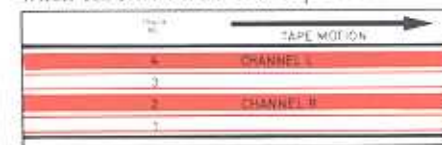
A *track* is the strip of tape that is magnetized during recording, and which is used to "store" the recorded sound.

There are two types of stereo-reel-to-reel tape decks: the 4-track type and the 2-track type.

**4-track tape decks.**



The location of the four tracks across the width of the tape is such that when starting from one end of the tape, track 1 will be recorded when REC SELECT L is depressed and track 3 will be recorded when REC SELECT R is depressed.



When starting from the opposite end of the tape, recording will take place on

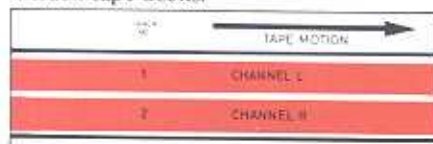


# How to make a good recording

track 4 when REC SELECT L is depressed and on track 2 when REC SELECT R is depressed.

This means that you can make one stereo recording or two mono recordings from each end of the tape.

## 2-track tape decks.



A stereo recording made from one end of the tape occupies the full width of the tape so that recordings cannot be made from the other end. This means that if you have a 2-track tape deck, you can make only one stereo or two mono recordings on each tape. Notice that when a mono recording has been made from one end of the tape and the tape has been turned over and returned to the left-hand turntable ready for recording from the other end of the tape, the REC SELECT buttons should *remain unchanged*.

It is the properties of the tape deck and not the tape that determines whether the system is 4-track or 2-track. The same kind of tape can be used on 4-track and 2-track tape decks.

The following six tips will help you obtain the best possible performance from your tape deck.

### 1. Choose the right tape.

Always use tapes of high quality from well-known manufacturers. Make sure that you choose the kind of tape for which your tape deck has been adjusted. See paragraph on "Tape", page 4.

### 2. Choose the correct speed.

7 1/2 ips gives the best sound quality. However, the Tandberg Cross-Field recording technique ensures excellent results even at 3 3/4 ips. The lowest tape speed - 1 7/8 ips - is suitable for recording of speech and background music.

### 3. Adjust the input level correctly.

Correct adjustment of the INPUT LEVEL knobs is extremely important. Therefore you should always watch the meters closely when recording. If the pointers deflect into the red sectors for long periods the tape will be oversaturated and the recorded program distorted. If, on the other hand, the pointers do not deflect up to the red sectors (0 dB) for the strongest signals, the recorded program will be too weak and the tape noise will be much more noticeable during playback.

Some tapes require a higher input level than others. When starting to use a new brand of tape, you should therefore make a few recordings at different INPUT LEVEL settings to find out how far into the red sectors the pointers can deflect before any audible distortion occurs.

If you sample the loudest passages of the music when adjusting the INPUT LEVEL knobs, you will not have to readjust later.

### 4. Monitor the program during recording.

Read the paragraph on monitoring (page 8) again. Monitoring provides an excellent control of the recording quality. Always use it when recording.

### 5. Clean the tape path regularly.

Dust as well as oxide particles and plastic binder particles from the tape will eventually be deposited on the parts of the tape deck that are in contact with the tape. This will result in reduced sound quality unless the parts are cleaned regularly. See "Maintenance", page 14.

### 6. "Polish" new tapes to avoid drop-outs.

Before starting to record on a new, blank tape set the recorder to PLAY and run through the whole length of the tape once in each direction. The small irregularities in the tape surface will then be reduced and there will be less chance of drop-outs.

# Sound-on-Sound

Instructions marked with an asterisk (\*) applies to the 9200XD only.

Always set the S ON S knob back to OFF when a Sound-on-Sound recording has been completed.

The Sound-on-Sound recording technique allows a program played back from one track to be mixed with another program and re-recorded on another track on the same tape. With this technique you can add your own voice to a recording of an orchestra, you can sing in many voices by adding one voice after another, or you can play many instruments, forming a band with yourself as the only musician.

Assuming that the first program will be recorded on the top track (left channel), Sound-on-Sound recording can be carried out as follows (voices are used in this example):

1. Connect microphone (s) to MIC L or MIC R (or both) and headphones to the socket HEADPHONES.
2. Set OUTPUT LEVEL L and R to normal listening level for headphones.
3. **Applies to 9100X only:** Ensure that both SOURCE/TAPE buttons are out.
4. Reset the tape counter.

## Recording the first voice.

1. The first recording of the Sound-on-Sound operation is an ordinary mono recording. Set the S ON S knob to OFF, depress REC SELECT L, sing into the microphone and adjust to 0 dB deflection on the left-hand meter with

MIC INPUT LEVEL (L or R depending on which socket the microphone is connected to).

2. Press the RECORD button,

## Adding a second voice.



1. Rewind to zero on the counter.
2. *Unplug all cables from the sockets LINE IN and RADIO at the rear of the tape deck.*
3. Set the S ON S knob to L → REC. Release REC SELECT L and depress REC SELECT R.

- (\*) Depress SOURCE/TAPE L. (SOURCE/TAPE R should be out).
4. Sing into the microphone and adjust to slightly less than 0 dB deflection with MIC INPUT LEVEL (L or R). At the same time set LINE INPUT LEVEL R between 3 and 4.
5. Press the RECORD button. The first voice is played back from the tape, and you will hear it in the headphones. Sing into the microphone to add the second voice. The level of the first voice

is adjusted with LINE INPUT LEVEL R, the level of the second voice with MIC INPUT LEVEL (L or R). The meter deflection for both voices combined should be 0 dB.

Normally, a few test recordings are necessary to achieve the desired balance

## Adding a third voice.



The procedure for adding a third voice is the same as for adding a second voice, except that step 3 changes to:

3. Set the S ON S knob to R → REC. Release REC SELECT R and depress REC SELECT L.
- (\*) Release SOURCE/TAPE L and depress SOURCE/TAPE R.

The level of the voices played back from the tape (first and second voice) is adjusted with LINE INPUT LEVEL R.

A **fourth voice** is added in the same way as the second voice, a **fifth voice** is added in the same way as the third voice.

# Language learning

# Echo

Instructions marked with an asterisk (\*) applies to the 9200XD only.

The Sound-on-Sound technique can be used for language learning. The following procedure assumes that a master program<sup>1)</sup> is prerecorded on the left channel.

## Recording your own exercises.

1. Set the S ON S knob to L→REC and depress REC SELECT R.
- (\*)Depress SOURCE/TAPE L.
2. Speak into the microphone and adjust to 0 dB deflection with MIC INPUT LEVEL L, or R. Set LINE INPUT LEVEL R between 3 and 4.
3. Press the RECORD button. You will hear the master program in your headphones. The level of the program is adjusted with LINE INPUT LEVEL R. Listen to the program and repeat the exercises during the pauses.

## Playback and comparison.

1. Rewind to the beginning of the program.
2. Depress SOURCE/TAPE R (SOURCE/TAPE L should be out) and press PLAY.
3. Listen and compare your own responses with the master program. If you are not satisfied with the result, release SOURCE/TAPE R, rewind and record your own voice once more as described above.

1) A master program is a recording with "native" speakers of phrases and sentences to be practiced by the student. Between each sentence, there is a suitable gap (about 1 1/2 times as long as it takes to say the sentence) to give the student time to repeat. Prerecorded master programs are available, but you can also record the program yourself from a school broadcast or gramophone record.

A mono recording with echo can be made on either the left or the right channel. The echo time is dependent on the tape speed - 7 1/2 ips gives the most "natural" echo, whereas a "special effect" echo is achieved at 3 3/4 and 1 7/8 ips.

## Recording with echo on the left channel.



1. Connect microphone(s) to MIC L or MIC R (or both) and headphones to the socket HEADPHONES.
2. Set OUTPUT LEVEL L and R to normal listening level for headphones.
3. Set the S ON S knob to L→REC and depress REC SELECT L. (REC SELECT R should be out).

- (\*)Depress SOURCE/TAPE L. (SOURCE/TAPE R should be out).
4. Sing into the microphone and adjust to slightly less than 0 dB deflection with MIC INPUT LEVEL. (L or R depending on which socket the microphone is connected to).
5. Press the RECORD button to start the

recording. Listen in the headphones and adjust the echo level with LINE INPUT LEVEL R. If necessary, readjust MIC INPUT LEVEL, to achieve 0 dB deflection on the meter.

## Recording with echo on the right channel.



The procedure is the same as for recording on the left channel except that step 3 changes to:

3. Set the S ON S knob to R→REC and depress REC SELECT R. (REC SELECT L should be out).
- (\*)Depress SOURCE/TAPE R. (SOURCE/TAPE L should be out).

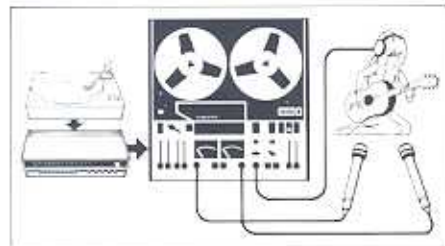
An echo recording can also be made from program sources other than microphones. The program source is then connected to LINE IN L, and the recording level is adjusted with LINE INPUT LEVEL L, no matter which channel the echo is recorded on. The echo level is adjusted with LINE INPUT LEVEL R.

**Do not forget to set the S on S knob back to OFF when the echo recording has been completed.**

## Mixing

Two stereo programs or four mono programs can be mixed and recorded simultaneously with full control of the mixing ratio.

### Mixing two stereo programs.

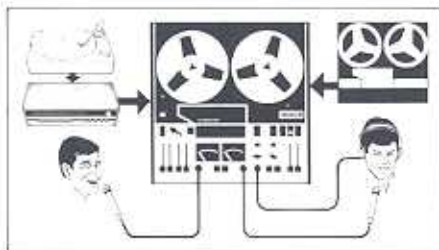


A stereo program from microphones can be mixed with a stereo program from a program source connected to either the RADIO socket or the LINE IN L and R sockets (a record player is used in this example, see fig.). The level of the microphone program is adjusted with MIC INPUT LEVEL L and R, the level of the music from the record player is adjusted with LINE INPUT LEVEL L and R. Make sure that the meter deflection for both programs combined does not exceed 0 dB. Otherwise, follow the instructions for stereo recording given on page 6.

The person making the microphone recording should use headphones to monitor the music from the record player

(both SOURCE/TAPE buttons out). The music can also be monitored in the loudspeakers, but in that case the volume must be set so low that the microphones do not pick up the music.

### Mixing four mono programs.



Two mono programs from microphones can be mixed with two mono programs from other sources, connected to LINE IN L and LINE IN R respectively. This operation can be useful for example when recording a commentary with music and sound effects for a film or program of slides.

The level of each program is adjusted separately with the corresponding INPUT LEVEL knob. If only one REC SELECT button is depressed, all programs are recorded on the same track.

Make sure that the meter deflection does not exceed 0 dB.

## The tape deck used as an amplifier

The tape deck can be used as a microphone amplifier or as a mixing unit for a microphone program and a music program. It is also possible to play back a mono tape program and at the same time use the tape deck as a microphone amplifier. This makes the tape deck suitable for department stores, auditoriums, small discoteques and other places where it is desirable to distribute music interrupted by commentaries from a microphone.

### Microphone program.

1. Connect microphone(s) to the MIC socket(s) and set the REC SELECT and SOURCE/TAPE buttons as indicated in the table below.

	REC SELECT	SOURCE/TAPE
Mono	Depress button for desired channel.	Both buttons out.
Stereo	Depress both buttons.	Both buttons out.

2. Set OUTPUT LEVEL L and R to maximum.
3. Depress the TAPE button on the radio or amplifier which the tape deck is connected to. Singing or speech picked up by the microphone(s) will be reproduced over the loudspeakers of the radio/amplifier. Adjust the volume with the MIC INPUT LEVEL knob(s) on the tape deck and the VOLUME control on the radio/amplifier.

Instructions marked with an asterisk (\*) applies to the 9200XD only.

Do not place the microphones too near the speakers as this may lead to acoustic feedback (howling).

#### Combined speech/music program.

If the connected radio/amplifier has a TAPE MONITOR button, the microphone program can be mixed with a program from another program source connected to the radio/amplifier. In this example we assume that the microphone program is to be mixed with a music program from a record player.

The procedure is the same as for "Microphone program" except that step 3 changes to:

3. Depress the TAPE MONITOR and PHONO buttons on the connected radio/amplifier. Adjust the volume for the music program with LINE INPUT LEVEL and the volume for the microphone program with MIC INPUT LEVEL. Use the VOLUME control on the radio/amplifier if necessary.

#### Combined playback/amplifier function.

A program can be played back in mono while the tape deck is simultaneously used as a microphone amplifier.

1. Set the S ON S switch to L→REC when playing back from the left channel and to R→REC when playing back from the right channel.

**Applies to 9100X only:** Ensure that both SOURCE/TAPE buttons are out.

2. Connect a microphone to MIC L or MIC R and depress either one of the REC SELECT buttons.
  3. Set OUTPUT LEVEL L and R to maximum
- (\* ) Depress the SOURCE/TAPE button for the channel to be played back.
4. Depress the TAPE button on the radio or amplifier which the tape deck is connected to.
  5. Press the green PLAY button. Both the program played back and the microphone program can now be reproduced in the speakers. The volume of the program played back is adjusted with LINE INPUT LEVEL R. The volume of the microphone program is adjusted with MIC INPUT LEVEL.
- (\* ) The combined tape/microphone program is available only on the channel where the SOURCE/TAPE button is released.

The RECORD button must not be depressed.

## How to locate a program on the tape

#### Tape counter.

When recording, set the counter to zero at the beginning of the tape and write down the counter reading at the beginning of each piece of music. This will make it easy to locate the various pieces of music later on.

#### EDIT/CUE button.

When the EDIT/CUE button is depressed you can hear the programs on tape during wind and rewind (provided the SOURCE/TAPE button(s) are depressed and the OUTPUT LEVEL knob(s) are turned up). This enables you to roughly locate a certain program.

#### EDIT/CUE used for editing.

For editing purposes it may be necessary to locate a point on the tape more accurately - for example the end of a program.

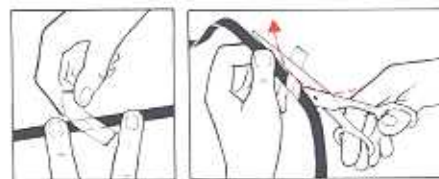
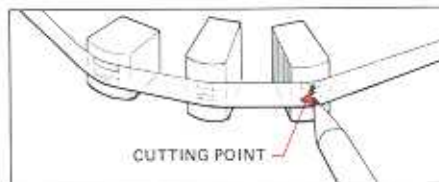
Play back the tape and at the end of the program depress the STOP button. Then depress the EDIT/CUE button, turn the tape reels by hand and listen on headphones or loudspeakers to determine exactly when the end of the program is at the playback head. If you want to cut and splice the tape, see page 14. If you want to start a new recording immediately after the program, turn the tape reels so that the tape moves 3/4" to the left. If a new recording is started from this point, there will be no gap between the previous and the new recordings.

## Editing and splicing of tape

Programs are not always recorded in the same sequence as they are required for playback. It may therefore be necessary to edit tapes, i.e. cut and splice to present the programs in the desired sequence.

1. Locate the cutting point as described in the paragraph "EDIT/CUE used for editing", page 13.
2. When the cutting point has been located, remove the front head cover (the one with "Cross-Field" printed on it) by lifting it straight up.
3. Use a soft pen (felt or fibre) to mark the tape at the playback head (see top figure). This mark indicates where the tape should be cut and spliced.
4. Lay one tape over the other with the same sides of the tape facing upwards. Cut the tape with scissors or knife (non-magnetic!) at an angle of about 45 degrees. Do not touch the tape surface with your fingers more than is absolutely necessary.
5. Lay the tape ends against each other with no gap or overlap and with the shiny side up (when using tape with a matt backing, this side should face up). Lay the splicing tape across the join parallel to the cut, and press firmly, squeezing out any air bubbles.
6. Cut the splicing tape along both edges. The cut should curve slightly into the

Cutting and splicing for editing purposes must not be performed if there is a second program of value on another track.



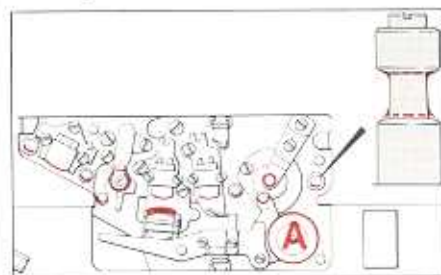
edge of the recording tape to prevent adhesive on the splicing tape from being deposited on the magnetic heads.

Adhesive tape that is not expressly intended for splicing of recording tapes must under no circumstances be used, as such tape may damage the tape deck. Special splicing tape is available from audio shops.

Splicing will also be necessary if the tape has snapped or if leader tape is required.

## Maintenance

### Cleaning



The parts of the tape deck that are in contact with the tape surface should be cleaned regularly, otherwise the sound quality will be greatly reduced.

**When to clean.** If the tape deck is used every day, cleaning should be performed at least once a month. A good time to clean is just before making an important recording.

**What to use.** The cleaning can be done with cotton wool or a piece of flannel wrapped around a small stick and moistened with pure alcohol or methylated spirit. A kit intended for this purpose, "Tandberg Professional Tape Head Cleaner", is available.

Do not use solvents, such as acetone or trichlorethylene, as they may damage the heads.

**How to clean.** Remove the two head

covers (see page 6) by pulling them straight upwards. Clean the spots indicates in color on the figure.

Pay particular attention to the sharp corners of the tape guide posts where deposits tend to settle (tape edge).

The pinch roller (A) needs to be cleaned only if the tape motion is uneven or if there are visible deposits on the roller (four to six times a year will be satisfactory for even a frequently used machine). Dry the roller after cleaning.

**DO NOT USE ANY SHARP OBJECTS WHEN CLEANING. DO NOT TOUCH THE ADJUSTMENT SCREWS.**

#### Degaussing.

A marked increase in background noise from the tape may indicate that the heads or other parts in the tape path should have the residual magnetism removed (degaussing).

If required, degaussing should be carried out as follows. Switch off the recorder. Remove the two head covers and move the degausser slowly past each one of the metal parts normally in contact with the tape. Take great care not to let the degausser touch the heads or metal parts in the tape path. Do not switch off the degausser until it is at least 3 ft from the recorder.

## The Dolby System explained (\*)

The Dolby System takes advantage of the fact that the tape noise is most annoying during soft passages in the recorded music, whereas during loud passages it will not be heard. During recording, the system increases the volume of the softer tones in the middle and upper part of the audible tonal range. The increase is *dependent on the signal strength* - the softer the tones, the greater the increase.

During playback, the tones are reduced by the same amount as they were increased beforehand. The softest tones will get the greatest reduction, and the noise lying "under" these tones will be correspondingly reduced. All tones are thus restored to their original levels, and the noise is considerably reduced during soft passages in the music.

#### Two important points.

- The Dolby System reduces the tape noise without cutting down the high tones of the recorded program.
- If the Dolby System is used during recording, it must also be used during playback in order to achieve a correct reproduction.

## Operator's trouble-shooting guide

Problem:	Possible cause:
No light in POWER lamp and STOP button when switching on.	Power cable not connected to power socket. Loose wire in power plug.
Tape does not start when FLAX button is depressed.	Tape not properly inserted (see page 6).
Tape starts but stops again immediately.	Transparent leader tape in front of photoelectric end stop sensor (see page 5).
Tape does not start when RECORD button is pressed.	REC SELECT button(s) not depressed.
No sound in headphones or loudspeakers during playback.	SOURCE/TAPE button(s) not depressed, OUTPUT LEVEL knobs turned down to zero.
No sound in loudspeakers during playback.	TAPE button on connected radio/amplifier not depressed.
0 dB deflection on meters during recording requires different settings of left and right INPUT LEVEL knobs.	This is normal (see page 7). Also check that S ON S knob is in position OFF.
Echo on recording.	S ON S knob not in position OFF.
Not enough audible during playback, "muffled" sound. (*)	DOLBY knob not in position OFF during playback of non-Dolby tapes.
Too much treble during playback, "scratches" sound. (*)	DOLBY knob in position OFF during playback of Dolbyized tapes.
Irregular tape motion, wow, flutter, drop-outs.	Cleaning required (see page 14).
Meter deflection during playback is smaller than during recording.	This is normal (see page 8).

# Function table

OPERATION	POSITION OF BUTTONS AND KNOBS				PROGRAM AT OUTPUT
	REC SELECT 1 2 3 4 5	SOURCE/TAPE 1 2 3 4	FUNCTION SELECTOR	8 ON 5 PUSHES	
Store recording on channel L with program monitoring (source tape test)			RECORD	500M	Source test: Mono source to both channels Tape test: Mono tape to both channels
Store recording on channel R with program monitoring (source tape test)			RECORD	500M	Source test: Mono source to both channels Tape test: Mono tape to both channels
Store recording with program monitoring (source tape test)			RECORD	500M	Source test: Stereo source to respective channels Tape test: Stereo tape to respective channels
Store playback from channel L			PLAY	500M	Store L program to both channels
Store playback from channel R			PLAY	500M	Store R program to both channels
Store playback			PLAY	500M	Store program to respective channels
Send on record recording on channel L			RECORD	R → REC	Send on record program to both channels
Send on record recording on channel R			RECORD	L → REC	Send on record program to both channels
Echo recording on channel L			RECORD	L → REC	Echo program to both channels
Echo recording on channel R			RECORD	R → REC	Echo program to both channels
Store program(s) - channel L				500M	Mono program to both channels
Store program(s) - channel R				500M	Mono program to both channels
Store a program(s)				500M	Stereo program to respective channels
Playback from channel L, while using channel R as composite amplifier			PLAY	L → REC	Playback program and rec. program to both channels
Playback from channel R, while using channel L as composite amplifier			PLAY	R → REC	Playback program and rec. program to both channels

# Useful data

## Inputs

	Impedance	Sensitivity	Max. voltage (100 Hz)
REC (BALANCED)	11	150 µV	25 mV
RADIO	200 V, 230 V/50 Hz	50 k ohms	8 µV
	133 V/60 Hz	22 k ohms	10 µV
TONE	200 V, 230 V/50 Hz	100 k ohms	35 mV
	133 V/60 Hz	100 k ohms	100 mV

## Outputs

	Max. load impedance	Output voltage/power
RADIO	5 k ohms	8.75 V
TONE	200 ohms	1.5 V
REPRODUCIBLES	5 ohms	5 mW

## Plugs

Wiring diagrams for plugs to be connected to input and output sockets on the back

The plug can also be used for the wiring seen in the diagram below.

**REC (Standard model)**

**REC (US model)**

Ring and sleeve are interconnected on the socket.

**HEADPHONES**

**RADIO**

**REMOTE CONTROL**

1) Balanced input for dynamic microphones with an impedance of 200 - 500 ohms



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