

Tandberg
RADIO



Tandberg Radiofabrikk A/S, Kjelsås.



Tandberg Radiofabrikk A/S, div. Kjeller.

TANDBERGS RADIOFABRIKK A/S
P. O. B. 9, Korsvoll, Oslo 8, Norway

Contents

	Page
Introduction	3
General	3
Removing the top panel	3
Maintenance	4
Cleaning the tape path.	4
Lubrication	4
Mechanical service	5
Centering the reel motors	5
Changing a pinch roller	6
Changing the drive belt and the flywheel.	7
Pinch roller solenoid	9
Spring contacts	9
Electrical checks	10
Temporary replacement of INPUT and OUTPUT controls	10
Playback correction	11
Record correction	12
Changing the power supply transformer tapings	13
Tape path adjustments	14
Electrical adjustments	16
 Circuit diagrams	
A1 Main board	18
A4 Equal. rec. amp.	19
A2 Logic	20
A3 Output, mic./line amp.	21
A6 Equal. playback amp.	22
A5 Dolby encoder	22
A7 Dolby decoder	23
A8 Oscillator	24
A9 Meter amp.	25

1. INTRODUCTION

1.1 GENERAL

Before adjustment are made the tape path must be cleaned and demagnetized. Check that the capstans are clean, see page 4.

1.2 REMOVING THE TOP PANEL

The cassette compartment can also be opened by means of the manual cassette release lever when the machine is not connected to the mains, see Figure 1.1.

Pull the cassette compartment cover plate (with the coloured window) right off. Close the cassette compartment. Pull off the INPUT and OUTPUT knobs.

Open the azimuth-adjustment compartment by pressing the cover slightly towards the mode buttons and lifting it. Remove the circlip Rolding the cover and lift off the cover.

Remove the six screws marked in colour in Figure 1.2. Lift up the top cover by the back edge.

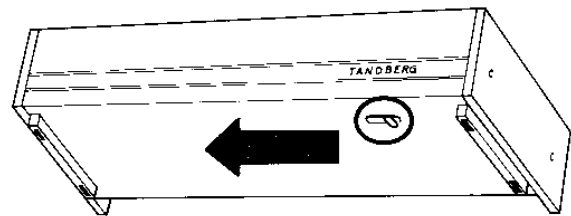


Fig. 1.1 Manual cassette release lever

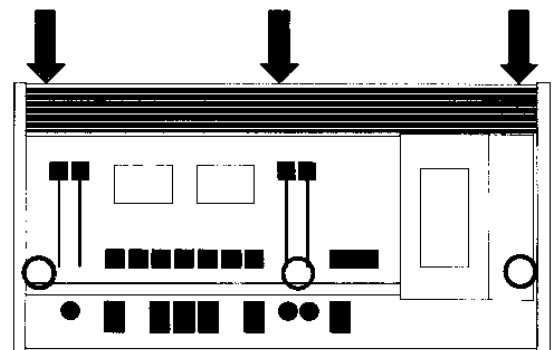


Fig. 1.2 Removing the top panel

1.3 REMOVING THE METER PANEL

Pull off the POWER and REC. PRESET knobs. Remove the six screws marked in colour in Figure 1.3. Lift the meter panel straight off.

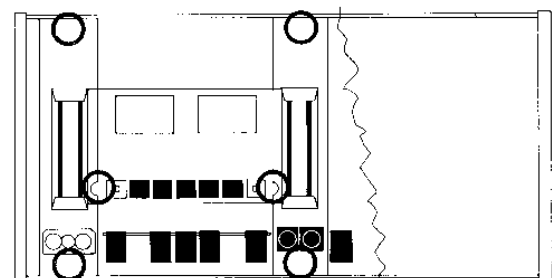


Fig. 1.3 Removing the meter panel

2. MAINTENANCE

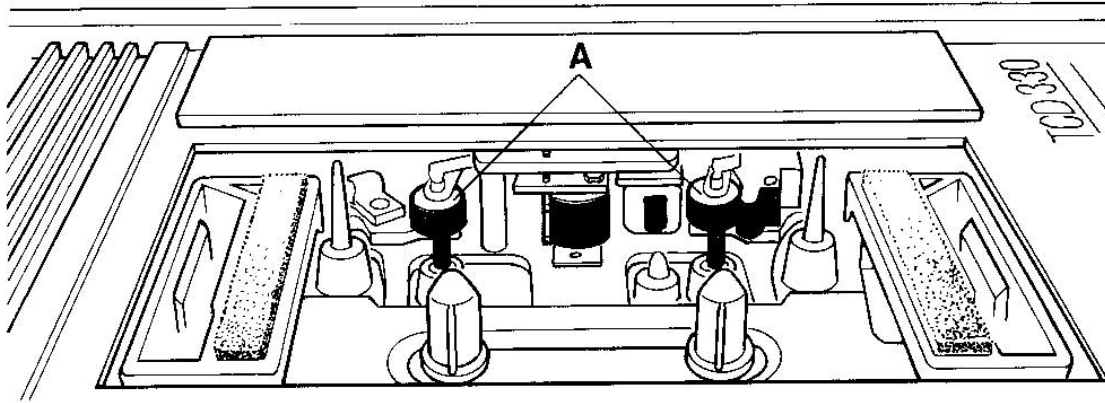


Fig. 2.1 Cleaning the tape path

2.1 CLEANING THE TAPE PATH

The parts that come into contact with the tape path must be cleaned at regular intervals. Make sure that the capstans are clean.

Press the EJECT button or use the manual cassette lever. Remove the cassette, and remove the cover of the cassette compartment by pulling it straight up.

For cleaning use cottonwool buds (Q tips) lightly dipped in pure alcohol or methylated spirit. A special cleaning kit called Tandberg Professional Tape Head Cleaner is also available. Aerosol cleaners for video tape recorders can also be used, but it is not sufficient just to use the spray. You must also use the cottonwood buds.

Clean the parts marked in colour in Figure 2.1. The pinch roller A should be cleaned if the tape flows unevenly, or if there are visible deposits on the pinch rollers. Four to six times a year should be sufficient. Dry the pinch rollers well after cleaning.

2.2 LUBRICATION

When the machine has been in use for about 3000 hours a single drop of oil should be applied to each bearing in the capstan motor and reel motors. Use the following types of oil:

Capstan motor: ANDEROL (from Tenneco Chemicals USA) or oil from Tandberg
Reel motors: NUTO H36 (or SPINESSO 34) from Esso



2 MAINTENANCE

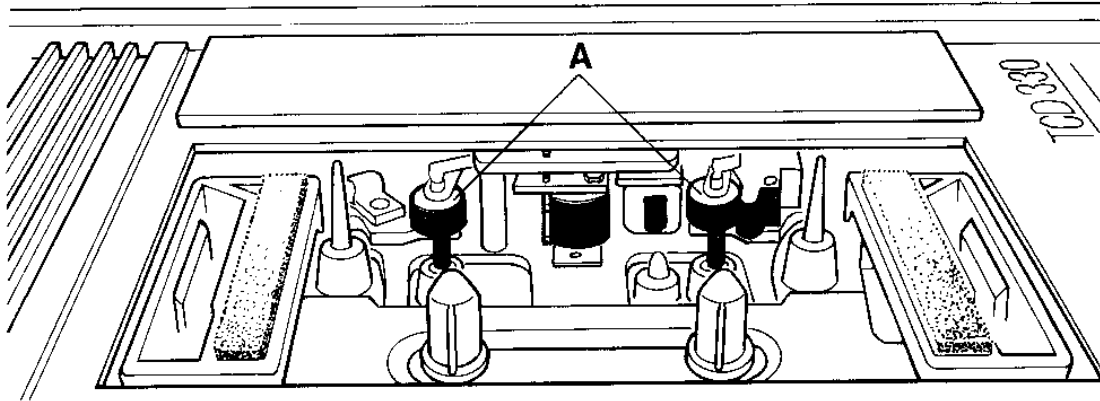


Fig. 2.1 Cleaning the tape path

2.1 CLEANING THE TAPE PATH

The parts that come into contact with the tape path must be cleaned at regular intervals. Make sure that the capstans are clean.

Press the EJECT button or use the manual cassette lever. Remove the cassette, and remove the cover of the cassette compartment by pulling it straight up.

For cleaning use cottonwool buds (Q tips) lightly dipped in pure alcohol or methylated spirit. A special cleaning kit called Tandberg Professional Tape Head Cleaner is also available. Aerosol cleaners for video tape recorders can also be used, but it is not sufficient just to use the spray. You must also use the cottonwood buds.

Clean the parts marked in colour in Figure 2.1. The pinch roller A should be cleaned if the tape flows unevenly, or if there are visible deposits on the pinch rollers. Four to six times a year should be sufficient. Dry the pinch rollers well after cleaning.

2.2 LUBRICATION

When the machine has been in use for about 3000 hours a single drop of oil should be applied to each bearing in the capstan motor and reel motors. Use the following types of oil:

Capstan motor: ANDEROL (from Tenneco Chemicals USA) or oil from Tandberg
Reel motors: NUTO H36 (or SPINESSO 34) from Esso



3. MECHANICAL SERVICE

3.1 CENTERING THE REEL MOTORS

Remove the cover of the cassette compartment. Insert a cassette and lock the compartment. The reel spindles must sit in the centre, see Figure 3.1.

With the cassette compartment open, normally you can slacken the mounting screws on the reel motors. If you cannot loosen the mounting screws for the reel motors, the top panel must be removed, see page 3. Then remove the circlip on the locking arm, see Figure 3.2. Centre the reel motors and tighten the screws.

3.2 CHANGING A REEL MOTOR

First remove the bottom panel. Pull off the reel spindle from the old motor and push it into the new motor.

NOTE! Remember the belt for the counter on the supply motor.

Fit the new motor and centre the spindles.

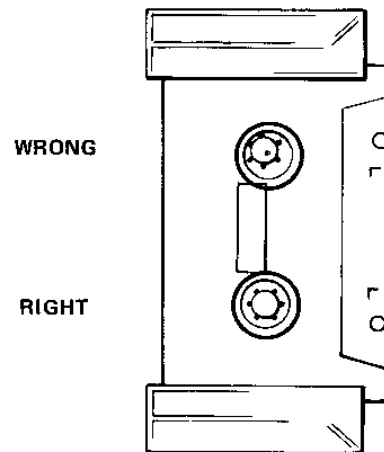


Fig. 3.1 Centering the reel spindles.

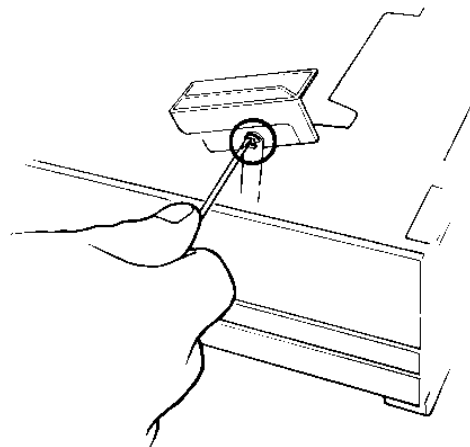


Fig. 3.2 Removing the circlip on the locking arm

3.3 CHANGING A PINCH ROLLER

Place a screwdriver under the hook holding the pinch roller in position, see Figure 3.3. Lift the hook upwards and sideways. Pull the spindle right out and ease the pinch roller out.

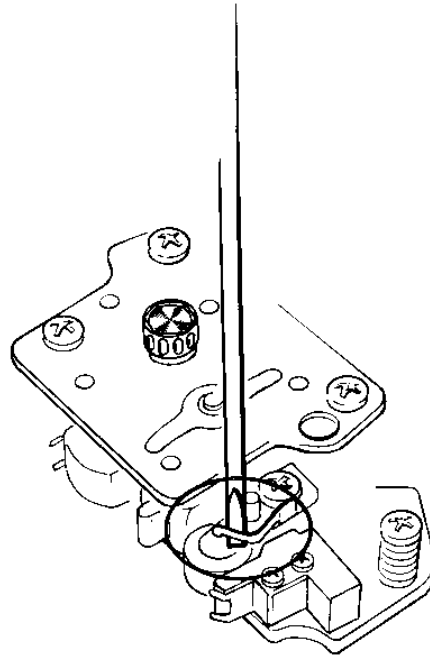


Fig. 3.3 Changing the pinch rollers

After one or both pinch rollers have been changed you must check that the eccentricity screw is correctly adjusted. Connect the machine to the power mains and push the head bridge into the playback position. Check that both pinch rollers meet the capstans at the same time. If necessary, adjust the eccentricity screw. See Figure 3.4.

NOTE! Seal the eccentricity screw after the adjustment.

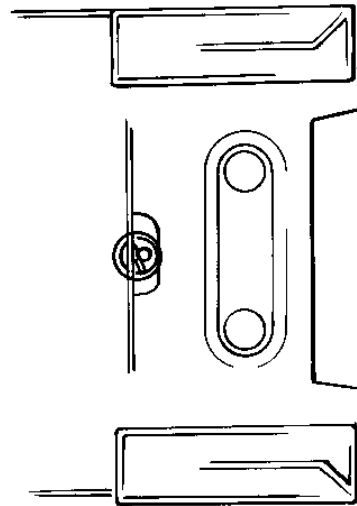


Fig. 3.4 The eccentricity screw

3.4 CHANGING THE DRIVE BELT AND THE FLYWHEEL

When you fit a new drive belt make sure that there is no grease or oil on it.

1. Remove the bottom panel and the top panel, see page 3.
2. Remove the circlip on the locking arm, see Fig. 3.5.

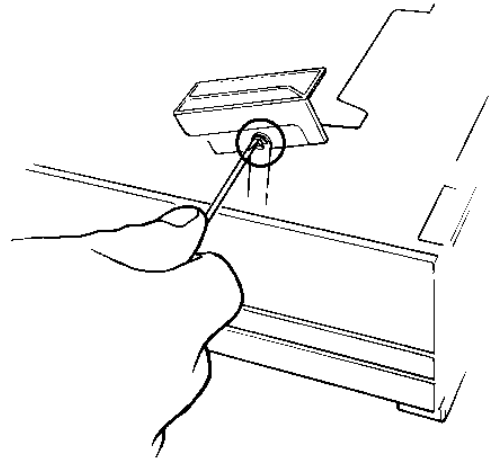


Fig. 3.5 Removing the circlip on the locking arm

3. Remove the right wooden side panel. Remove the 5 screws shown in Figure 3.6 and pull off the right metal side panel. When the metal plate is replaced, it must be properly seated before the screws are tightened.

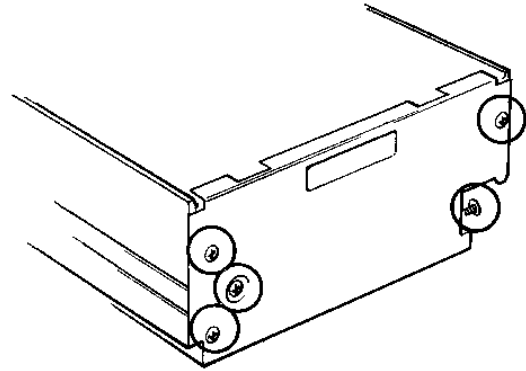


Fig. 3.6 Removing the right metal side panel

4. Before removing the headbridge spring, take note of the notch occupied by the spring, see Figure 3.7. When re-assembling put the spring back into the same notch.

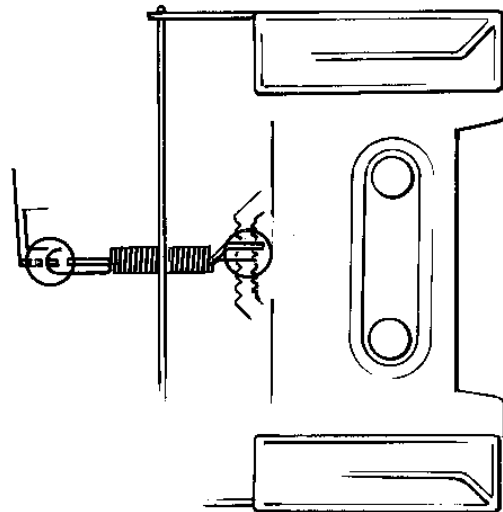


Fig. 3.7 Spring for headbridge

5. Remove the screws holding the head bridge guide brackets, see Figure 3.8. Push the brackets to the left and lift up. Allow the brackets to hang in the springs. Lift the head bridge out and to the side. Remove the drive belt from the counter.

6. The capstan motor is fixed with three or four screws. Before you release these screws, take note of where the motor is fixed. Release the screws and pull the motor over to the side so that the belt becomes slack. When you re-assemble, the motor must go back into the same place.

On capstan motors without a fan, the motor pulley is fixed in place approx. 20 to 21 mm, measured from the top of the pulley to the top of the motor. When re-assembling the capstan motor, the four mounting screws should be screwed down to the same height. Start the capstan motor and check that the drive belt does not climb up and down on the flywheels. If necessary, adjust the mounting screws.

7. Remove the three screws shown in Figure 3.9. When you lift out the flywheel mounting plate make sure that the three ball bearings and the cylindrical bearing do not fall out, see Figure 3.9.

8. Hold the flywheel plate as shown in Figure 3.10 exerting pressure sideways with the fingers and thumb so that the flywheels do not drop out of their bearings.

9. If the flywheels do drop out of their bearings, take care to replace them properly. There must be a small plastic washer on each of the capstans, see Figure 3.11.

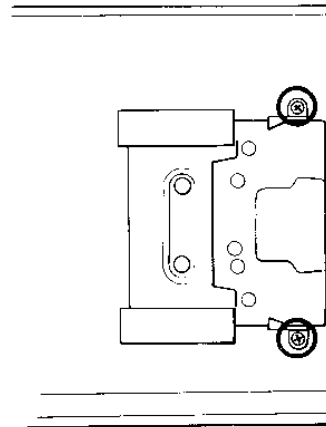


Fig. 3.8 Screws for head bridge guide brackets

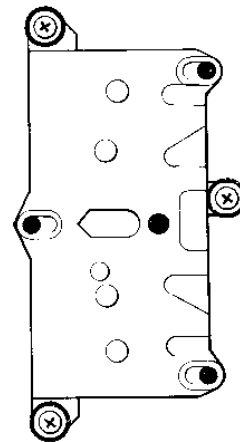


Fig. 3.9 Flywheel mounting plate

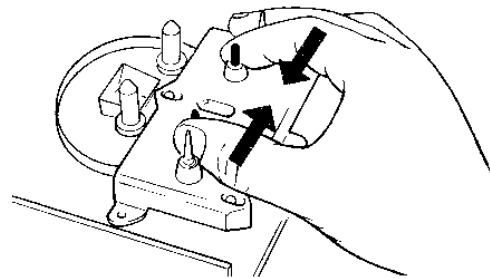


Fig. 3.10 Removing the flywheel mounting plate

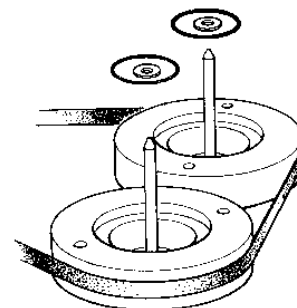


Fig. 3.11 Plastic washers for the capstans

3.5 PINCH ROLLER SOLENOID

Press the PLAY button and check the clearance on the tension spring. The clearance should be between 1.0 and 1.5 mm as shown in Figure 3.12. This clearance corresponds to a pinch roller pressure between 550 to 600 g. on each roller. To check the pressure, place a gauge at point A shown in Figure 3.12 and press the head bridge away from the capstans until the pinch roller stop. If you do not read 1000 to 1200 g. on the gauge, move the spring to another notch.

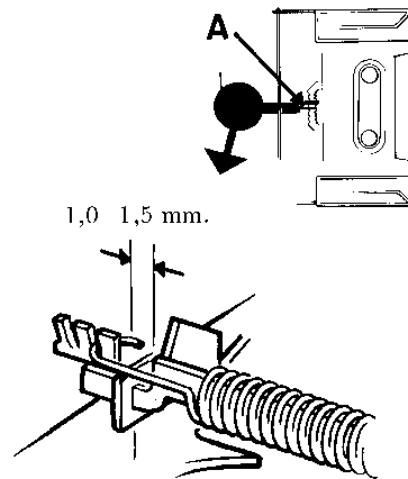


Fig. 3.12 Clearance on the tension spring

Remove the meter panel (see page 3). Adjust the clearance on the tension spring by means of the nylon screw on the solenoid armature. Use a long insulated screwdriver. The screw is under the capstan compartment assembly plate as shown in Figure 3.13. With the machine in the STOP mode, engage the screwdriver onto the screw, then press the PLAY button and set the clearance to between 1.0 and 1.5 mm.

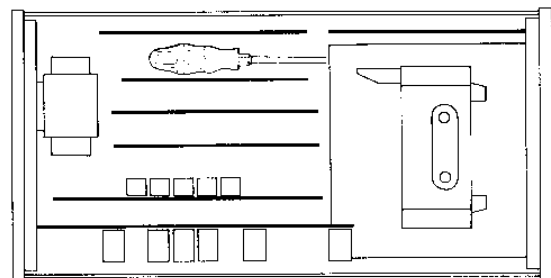


Fig. 3.13 Adjusting the solenoid armature

3.6 SPRING CONTACTS

MS1, SLIDE. Operated by the head bridge. MS1 gives the voltage to the take-up motor when the head bridge is in the play position.

MS1 must make contact when the pinch rollers are 0.5 to 1 mm away from the capstans.

MS2, RECORD. Senses when the protection tab on the cassette has been removed. The machine cannot go into the record mode when the tab has been removed.

MS3, CASSETTE. Senses when a cassette has been inserted into the machine. The logic circuits will not work until a cassette has been inserted.

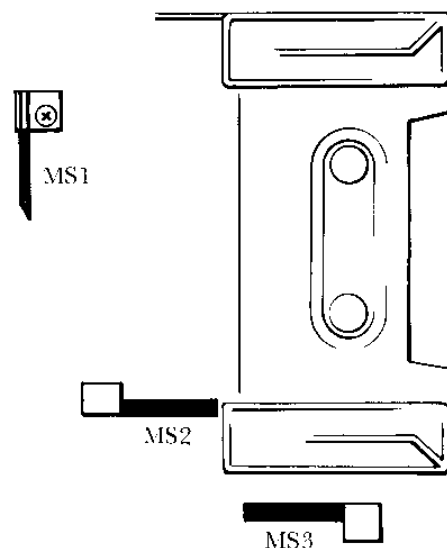


Fig. 3.14 Spring contacts

5. Remove the screws holding the head bridge guide brackets, see Figure 3.8. Push the brackets to the left and lift up. Allow the brackets to hang in the springs. Lift the head bridge out and to the side. Remove the drive belt from the counter.

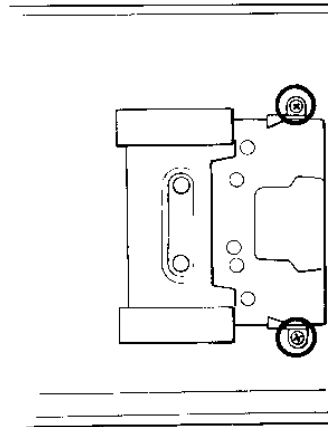


Fig. 3.8 Screws for head bridge guide brackets

6. The capstan motor is fixed with three or four screws. Before you release these screws, take note of where the motor is fixed. Release the screws and pull the motor over to the side so that the belt becomes slack. When you re-assemble, the motor must go back into the same place.

On capstan motors without a fan, the motor pulley is fixed in place approx. 20 to 21 mm, measured from the top of the pulley to the top of the motor. When re-assembling the capstan motor, the four mounting screws should be screwed down to the same height. Start the capstan motor and check that the drive belt does not climb up and down on the flywheels. If necessary, adjust the mounting screws.

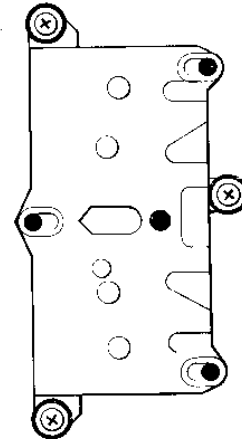


Fig. 3.9 Flywheel mounting plate

7. Remove the three screws shown in Figure 3.9. When you lift out the flywheel mounting plate make sure that the three ball bearings and the cylindrical bearing do not fall out, see Figure 3.9.

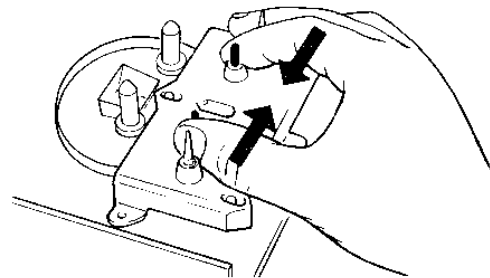


Fig. 3.10 Removing the flywheel mounting plate

8. Hold the flywheel plate as shown in Figure 3.10 exerting pressure sideways with the fingers and thumb so that the flywheels do not drop out of their bearings.

9. If the flywheels do drop out of their bearings, take care to replace them properly. There must be a small plastic washer on each of the capstans, see Figure 3.11.

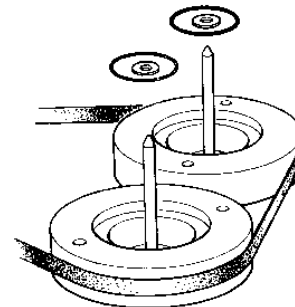


Fig. 3.11 Plastic washers for the capstans

3.5 PINCH ROLLER SOLENOID

Press the **PLAY** button and check the clearance on the tension spring. The clearance should be between 1.0 and 1.5 mm as shown in Figure 3.12. This clearance corresponds to a pinch roller pressure between 550 to 600 g. on each roller. To check the pressure, place a gauge at point A shown in Figure 3.12 and press the head bridge away from the capstans until the pinch roller stop. If you do not read 1000 to 1200 g. on the gauge, move the spring to another notch.

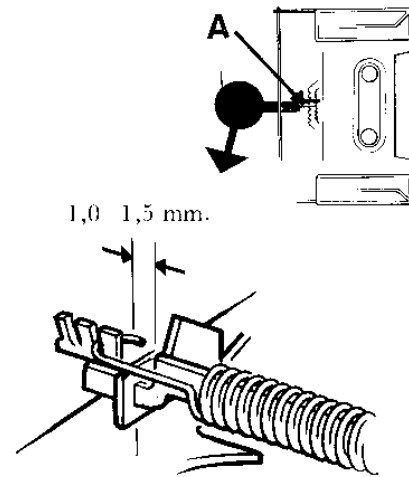


Fig. 3.12 Clearance on the tension spring

Remove the meter panel (see page 3). Adjust the clearance on the tension spring by means of the nylon screw on the solenoid armature. Use a long insulated screwdriver. The screw is under the capstan compartment assembly plate as shown in Figure 3.13. With the machine in the **STOP** mode, engage the screwdriver onto the screw, then press the **PLAY** button and set the clearance to between 1.0 and 1.5 mm.

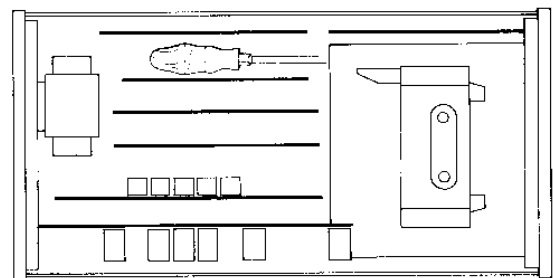


Fig. 3.13 Adjusting the solenoid armature

3.6 SPRING CONTACTS

MS1, SLIDE. Operated by the head bridge. MS1 gives the voltage to the take-up motor when the head bridge is in the play position.

MS1 must make contact when the pinch rollers are 0.5 to 1 mm away from the capstans.

MS2, RECORD. Senses when the protection tab on the cassette has been removed. The machine cannot go into the record mode when the tab has been removed.

MS3, CASSETTE. Senses when a cassette has been inserted into the machine. The logic circuits will not work until a cassette has been inserted.

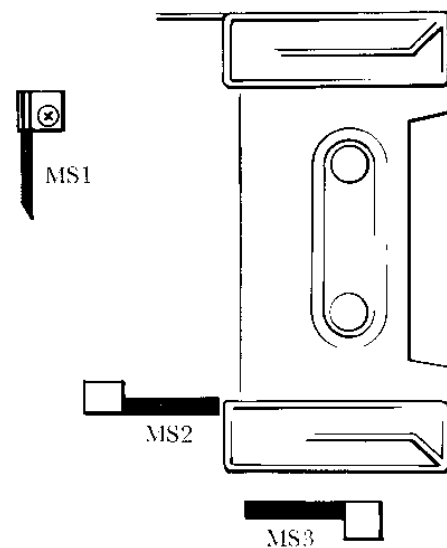


Fig. 3.14 Spring contacts

4. ELECTRICAL CHECKS

4.1 LOCATION OF P.B.s

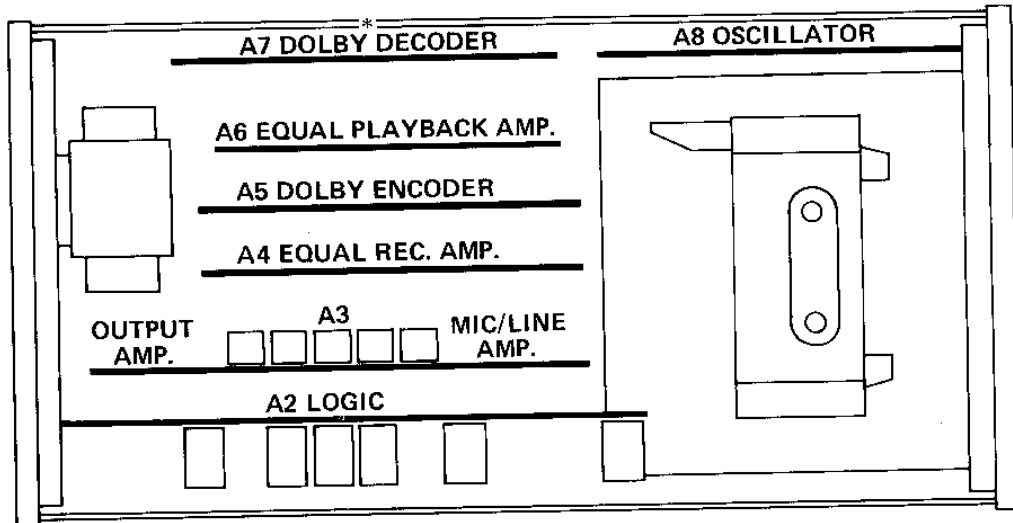


Fig. 4.1 Location of printed boards (meter board removed)

4.2 TEMPORARY REPLACEMENT OF INPUT AND OUTPUT CONTROLS

When the meter board is removed for trouble-shooting, the INPUT and OUTPUT level controls can be temporarily replaced with 27 kohm resistors.

The resistors can be soldered to two Molex connectors and plugged into the playback board as shown in Figure 4.2.

Six extender boards for trouble-shooting can be obtained from our service department.

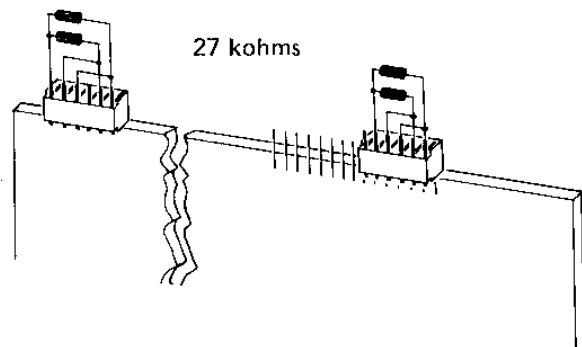


Fig. 4.2 Temporary replacement of the INPUT and OUTPUT controls

* The word *Dolby* is a Trade Mark of *Dolby Laboratories Inc., U.S.A.*
N.R. stands for *Noise Reduction.*

4.3 PLAYBACK CORRECTION

Remove the top panel, see page 3. Remove the three screws shown in Figure 4.3 and lift up the head plate. Unsolder the ground lead from the playback head. Connect the audio sig. gen. and the matching network as shown in Figure 4.4. Press down the SOURCE/TAPE button to TAPE. Insert a cassette and set the machine to PLAY. Set the DOLBY N.R. knob to OFF and the OUTPUT LEVEL knobs to max. Connect a VVM to the OUTPUT socket

Adjust the level on the sig. gen. to -30 dB on 1,5 V reference (1000 Hz). Check the frequency response on the VVM using the curve shown in Figure 4.5

The level meters on the TCD 330 will give a good indication of how the correction is.

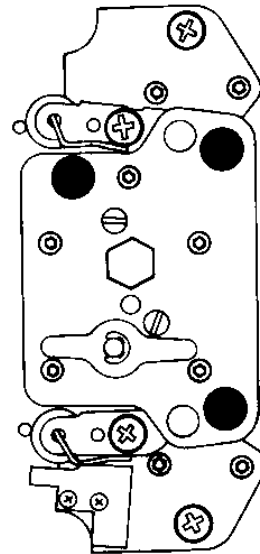


Fig. 4.3 Head plate mounting screws

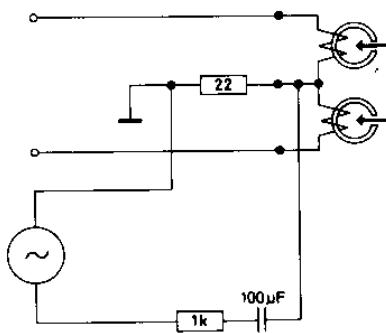


Fig. 4.4 Connecting the audio sig.generator and the matching network

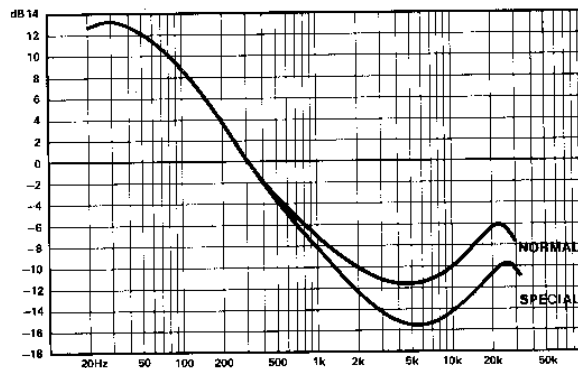


Fig. 4.5 Playback correction

4.4 RECORD CORRECTION

Remove the top panel, see page 3. Connect a 100 ohm resistor in series with the 10 resistors R1501 (left) and R1601 (right) on the oscillator board, see Figure 4.6.

Set the machine to STOP and press down the REC. PRESET button. Set the DOLBY N.R. knob to OFF. Connect an audio sig. gen. to the INPUT or RADIO socket.

Adjust the INPUT LEVEL knobs to obtain 0 dB on the level meters on the TCD 330.

Reduce the level on the sig. gen. by 30 dB to avoid overloading the correction amplifiers. Connect a VVM and check the frequency response against the curve in Figure 4.7.

The level meters on the TCD 330 will give a good indication of how the correction is.

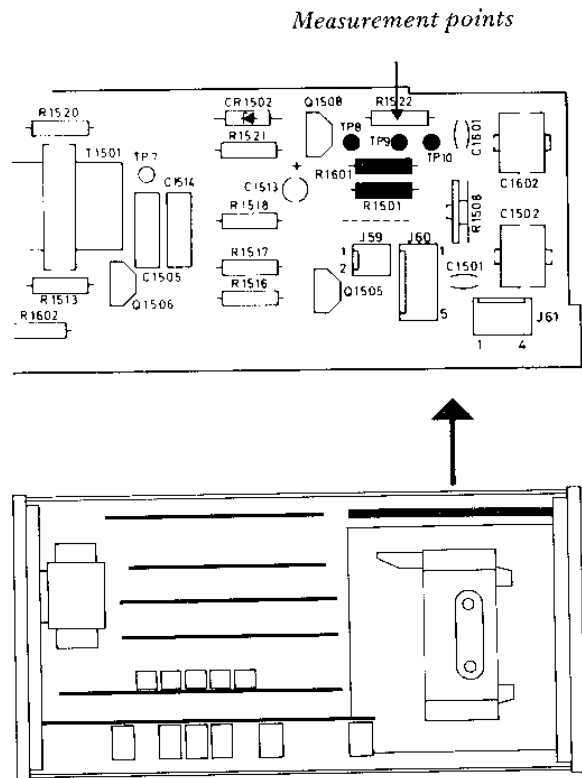
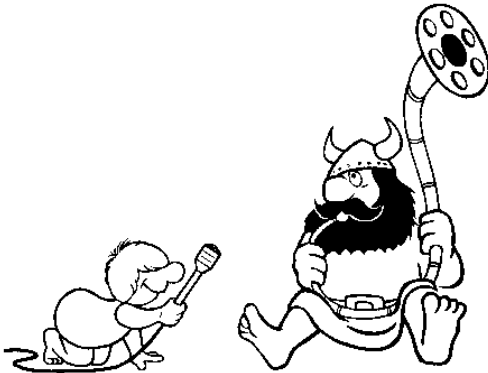


Fig. 4.6 Measurement points on the oscillator board

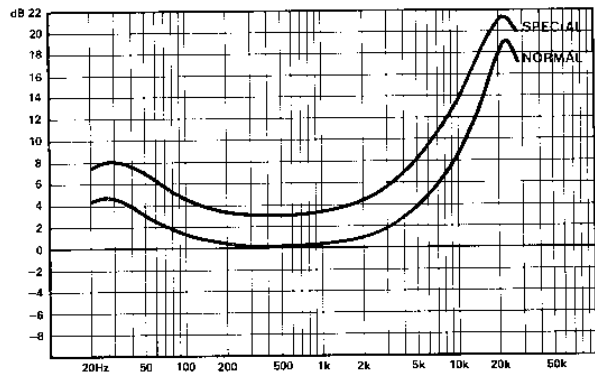
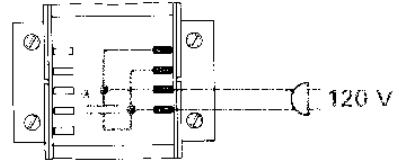
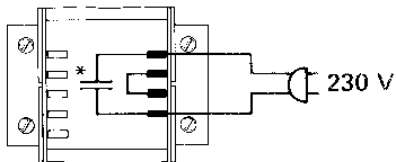


Fig. 4.7 Record correction

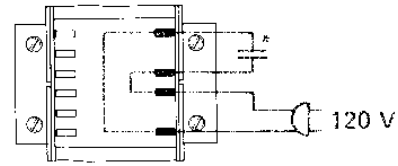
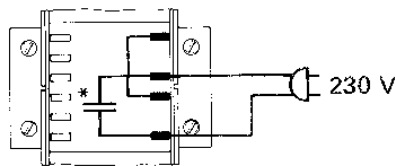
4.5 CHANGING THE POWER SUPPLY TRANSFORMER TAPPINGS

To change the wiring of the power supply transformer to suit another power supply voltage, see figures.

If the supply frequency changes, replace the 50 Hz motor pulley on the capstan motor for a 60 Hz pulley or vice versa.

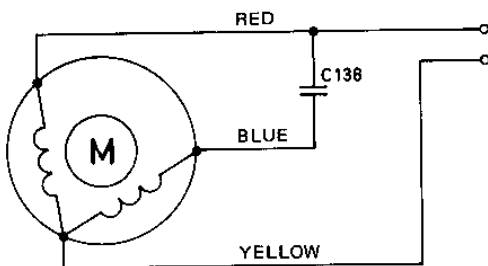


Powertransformer, part No. 345316, ES579

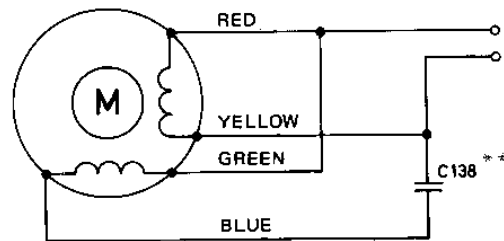


Powertransformer, part No. 352622, UI 48/26 TD2600

C139 – 0.047 μ F



Capstanmotor, part No. 280405, 4ZSC 15 UO2P



Capstanmotor, part No. 283767, HU 443AG

***C138 - 1.3 μ F at 50 Hz and 1.0 μ F at 60 Hz*

5. TAPE PATH ADJUSTMENTS

NOTE! If you use the tape path gage, you must not press the RECORD or PLAY button in because it can damage the head faces. Move part B on the tape path gage slowly and carefully when it is near the heads.

The tape path adjustments must be carried out in the order described since they affect each other.

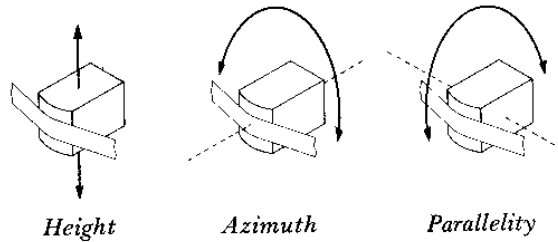


Fig. 5.1 Head adjustments

5.1 PINCH ROLLERS

Adjusting the parallelism

Lay a piece of white paper behind the pinch roller to make it easier to see the parallelism. Push the head bridge into the PLAY/RECORD position and check that the pinch rollers meet the capstans in a parallel fashion, see Figure 5.2. If necessary, adjust the HP screws shown in Figure 5.4.

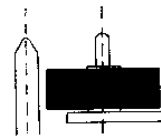


Fig. 5.2 Adjusting the parallelism of the pinch roller

Adjusting the height

To adjust the height you need either a Tandberg tape path gage or an open cassette.

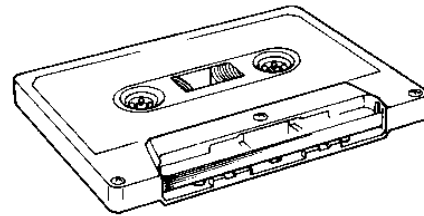


Fig. 5.3 Open cassette

Adjust the height of pinch roller 1 (see Figure 5.4) so that the tape guides on the erase head cross the tape without rubbing on it when the head bridge is pulled into the record/play position. Adjust the pair of HP screws at each end by equal amounts so that the parallelism is not disturbed. Adjust the AZ screw belonging to each pair of HP screws by an equal amount in the opposite direction.

Adjust pinch roller 2 to the same height. Check the height of pinch roller 2 with an ordinary cassette. The pinch roller must not touch the cassette.

Azimuth

Use an ordinary cassette and set the TCD 330 in the PLAY mode. The tape must not climb up the capstans or curl. Adjust screw AZ if necessary, see Figure 5.4.

Finally, check that the height and parallelism settings have not changed.

If you use a Tandberg tape path gage, part B of the gage must fit into the tape guides on the erase head, see Figure 5.5.

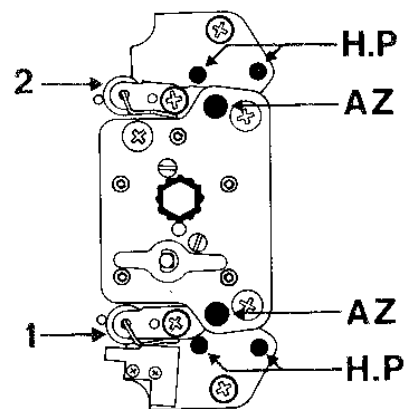


Fig. 5.4 Adjustments for the pinch rollers

5.2 HEADS

The height and azimuth of the record head and playback head can be adjusted by means of the screws on the head bracket, see Figure 5.6.

5.3 PLAYBACK HEAD

Use an open cassette. Adjust the height of the playback head so that the tape guides do not rub on the tape when the head bridge is pulled into the playback position. Adjust the height by means of the screws shown in Figure 5.6. Tighten the tape by rotating one of the reel spindles. Push the head bridge carefully into the playback position. The tape must lie parallel with the head face. The positions of the height adjusting screws give a good indication of whether or not the head face is parallel with the tape. The screws should be screwed down to the same height.

Insert a Tandberg test tape No. 23 or a standard azimuth cassette. Adjust the screw marked Playback, azimuth in Figure 5.6 to obtain max. output measured on a VVM connected to the OUTPUT or RADIO socket.

If you use a Tandberg tape path gauge, part B of the gauge will fit into the tape guides on the playback head when the head is at the correct height. The pointed end of B must be parallel with the head face.

5.4 RECORD HEAD

Adjusting the parallelism

Insert an open cassette make sure that the tape lies parallel with the head face. The positions of the height adjusting screws give a good indication of whether or not the head face is parallel with the tape.

Adjusting the height

Insert a new cassette. Set the machine in the RECORD mode. Record 1000 Hz from an audio sig. gen. at normal recording level. Press the TAPE/SOURCE button down to TAPE and adjust the height of the record head by means of the screws shown in Figure 5.6 to obtain max. output on a VVM connected to the OUTPUT or RADIO socket. When you obtain max. output for record/playback the tracks across the heads will be at the same height. Adjust the height adjustment screws by equal amounts so that the parallelism does not change.

Adjusting the azimuth

Record 10 kHz and press the MONITOR button in to TAPE as you record. Adjust the Record, azimuth screw to obtain max. deflection on a VVM connected to one of the outputs on the TCD 330. You can also adjust the azimuth with the built in oscillator.

If you use a head gage, adjust the height as described, but use the head gage to check the parallelism. The point on part B on the head gage must be parallel with the head face. Adjust the azimuth as described.

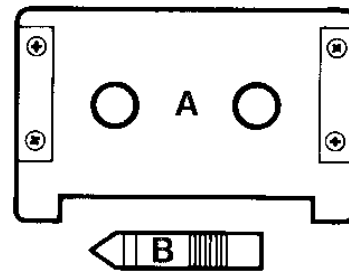


Fig. 5.5 Tape path gauge

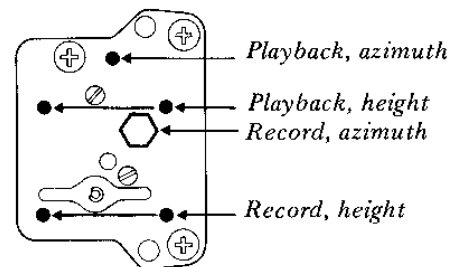


Fig. 5.6 Adjustments for the heads

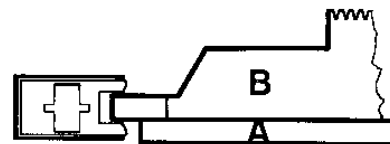


Fig. 5.7 Using the tape path gauge

6. ELECTRICAL ADJUSTMENTS

Equipment required:

- 2 valve voltmeters (VTVM)
- Audio signal generator
- Frequency counter
- Distortion meter
- Wow and flutter meter
- Tandberg test cassettes
 - Nr. 21 (speed check 100 Hz)
 - Nr. 22 (WOW and flutter check 3150 Hz)
 - Nr. 23 (azimuth adj. playback head 6300 Hz)
 - Nr. 24 (playback level adj. 1000 Hz)
 - Nr. 29 (tape path check cassette)
- Tandberg tape path gange
- Tandberg C60XD cassette or equivalent
- Special cassette e.g. TDK C60 CHROM or equivalent

General

Before adjusting, the tape path must be cleaned and demagnetized, see page 4. Many of the adjustments require the tape path to be correctly adjusted, see pages 14 and 15.

Remove the top panel, base panel, and right side panel.

Carry out the adjustments in the order described because the adjustments affect each other. Apply 8 mV to the RADIO socket or 80 mV to the INPUT socket from the audio sig. gen. Set the MPX FILTER to OFF.

Sensitivity

Set the MONITOR button to SOURCE and the INPUT and OUTPUT LEVEL controls to max. Apply 1000 Hz from the sig. gen. to the RADIO or INPUT socket (8 mV or 80 mV resp.). Adjust the SENSITIVITY ADJ. pots R101–R201 to obtain 775 mV measured on a VVM connected to the Dolby encoder output, see Figure 6.1. Move the VVM probe to the Dolby decoder output, see Figure 6.2. Adjust the SOURCE LEVEL ADJ. pots R118–R218 to obtain 775 mV. Check the frequency response.

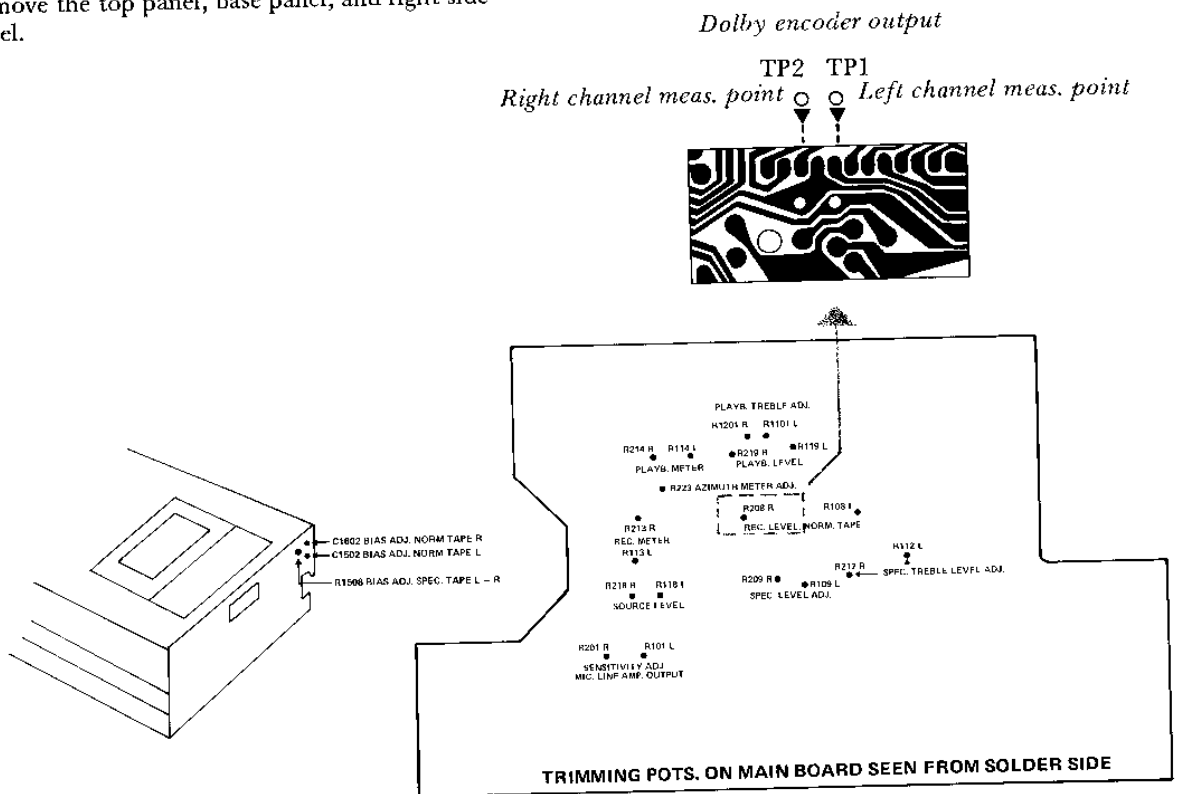


Fig. 6.1 Trimming pots. and Dolby encoders measurement points

Azimuth, playback head

Use a standard azimuth cassette or a Tandberg test cassette Nr. 23. Play back the cassette and adjust the azimuth screw, Figure 6.3, to obtain max. output from the RADIO or OUTPUT socket on a VVM.

Playback level

Use Tandberg test cassette Nr. 24. Measure at the Dolby decoder output, Figure 6.2. Adjust pots R119–R219, PLAYB. LEVEL ADJ. to obtain 775 mV on the VVM.

If you use a Dolby Playback Level cassette, adjust the level to 580 mV.

Overall frequency response with a normal cassette (bias adjustment)

Apply 1000 Hz from the sig. gen. to one of the inputs. Reduce the level at the sig. gen. by 35 dB or reduce the level by a similar amount on the INPUT LEVEL controls.

Set the TCD 330 to RECORD and press in the MONITOR button to TAPE. Adjust the BIAS ADJ. NORM. TAPE capacitors C1502–C1602 to obtain max. output on a VVM connected to one of the outputs. Check the overall frequency response and if necessary trim C1502–C1602 to obtain the correct response, ± 3 dB 30 to 17 000 Hz.

Adjusting the record current (SOURCE/TAPE)

Use the same input level as for the bias adjustment (-35 dB) at 1000 Hz. Adjust the record current by means of the REC. LEVEL ADJ. pots R108/R208 to obtain the same output level for both positions on the MONITOR button. Then depress the DOLBY N.R. button and check the overall frequency response.

Level meters

Apply 8 mV (or 80 mV) 1000 Hz to the INPUT sockets.

INPUT LEVEL controls to maximum. Set the MONITOR button to tape and press the RECORD button. Adjust the REC METER pots R113 and R213 to obtain 0 dB deflection on the TCD 330 level meters.

Zero-adjust the counter and record for about half a minute. Wind back the cassette and press the PLAY button. Adjust the PLAYB. METER pots R114 and R214 to obtain 0 dB on the meters.

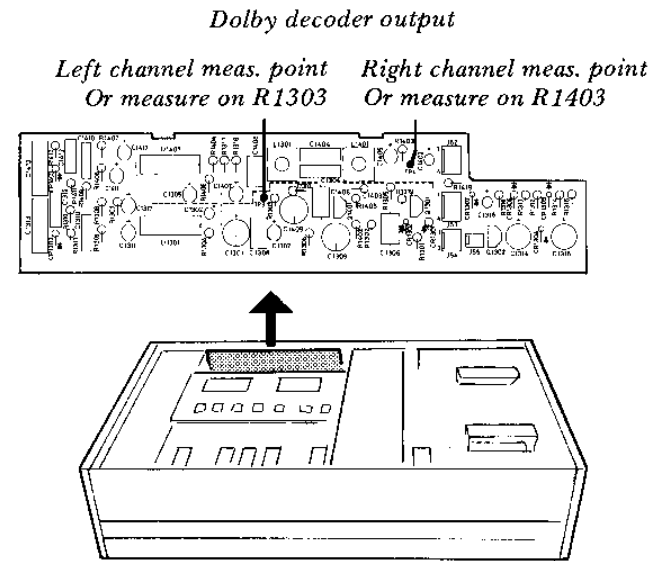


Fig. 6.2 *Dolby decoder measurement points*

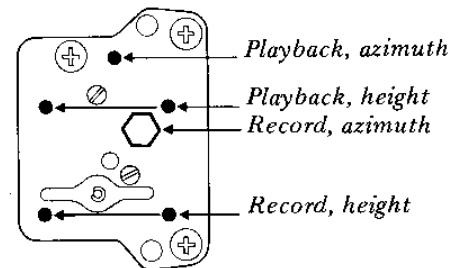


Fig. 6.3 *Adjustments for the heads*

Testing with SPECIAL tape

Insert a SPECIAL cassette and adjust the input level to -35 dB. Connect a VTVM to the output and adjust the BIAS ADJ. SPEC. TAPE pot. R1508 to obtain max. readings at the output. Press the MONITOR button in and out and check that the output level does not change. If necessary, adjust the SPEC. LEVEL ADJ. pots. R109 and R209.

Pots. R112 and R212 affect the treble response in the region 15 to 18 kHz on the record curve for SPECIAL tape. R1101 and R1201 affect the same frequency region on the playback curve for all types of tapes.

With the same input level that was used to check the response curve, and at 1000 Hz, adjust the REC LEVEL NORM TAPE pots. R108 and R208 to obtain the same output level for both positions of the MONITOR button (SOURCE and TAPE).

Press the DOLBY N.R. button in and check that the response curve is correct.

Distortion

Record 1000 Hz at 0 dB deflection on the meters. The max. distortion for record/playback is 3%.

Erase test

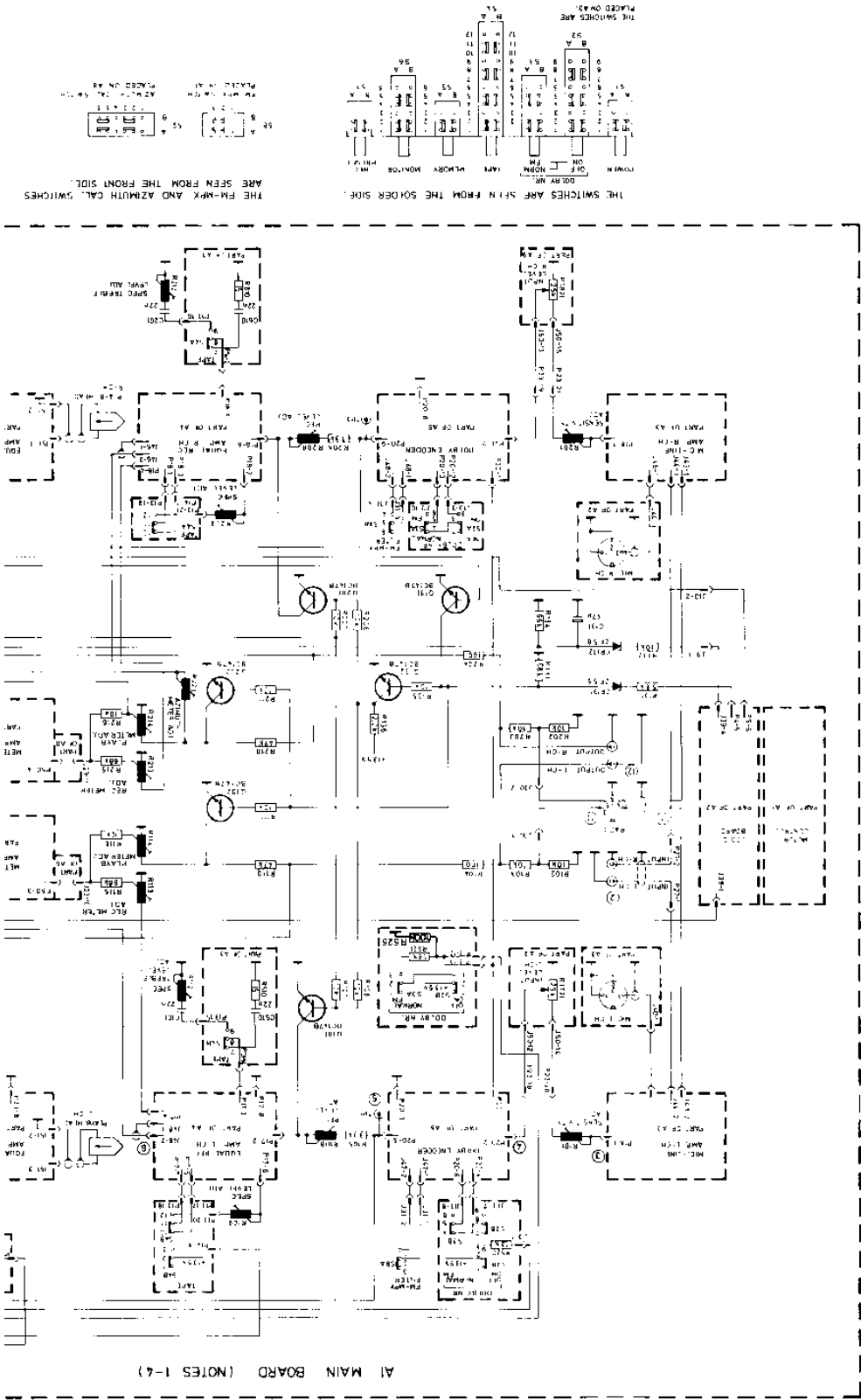
Connect a microphone to the TCD 330 and record an overload signal. Record again to erase the overload recording and play back to ensure that the overload signal cannot be heard.

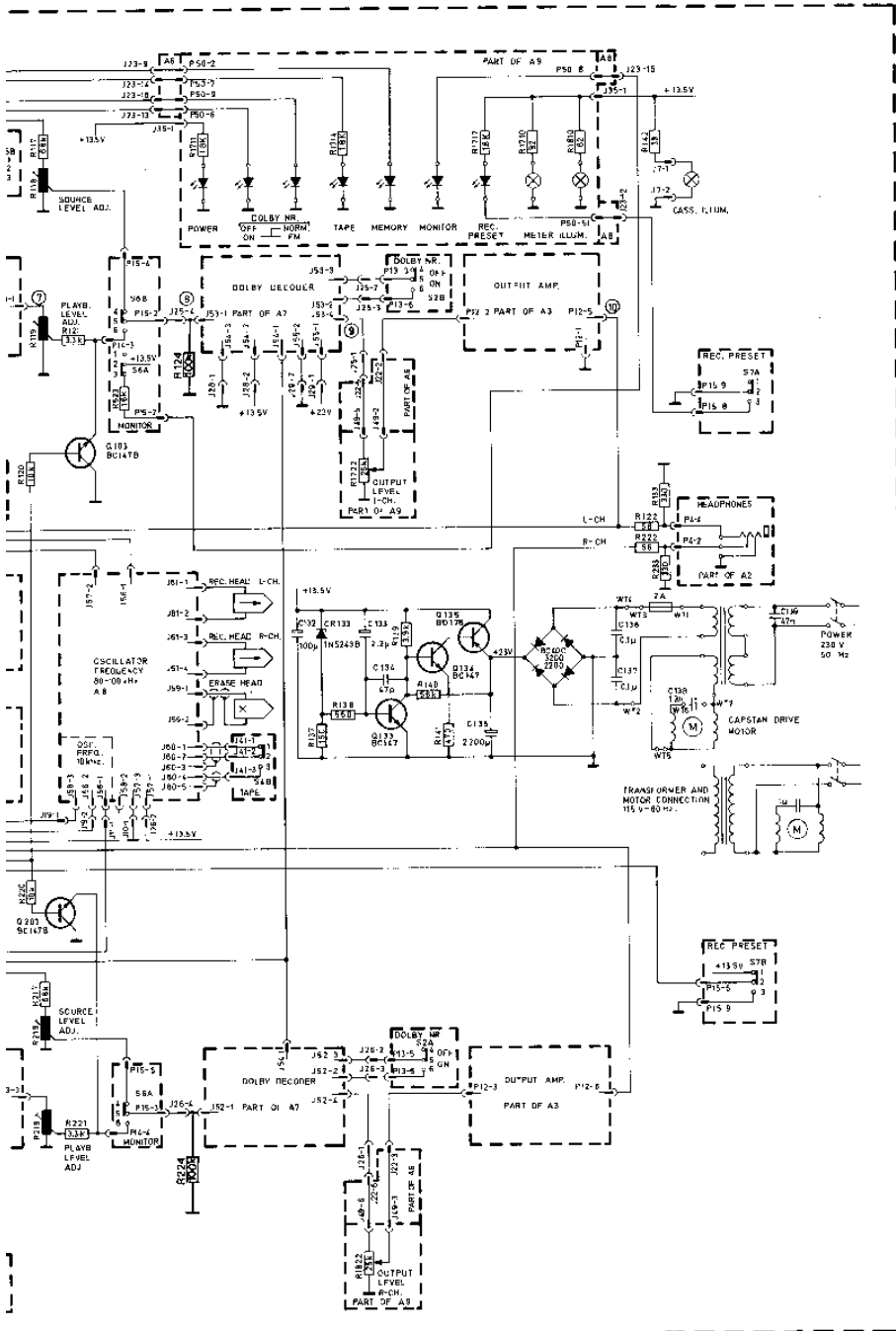
Adjust R223 AZIMUTH METER ADJ. to -5 dB deflection on the right meter when the built-in azimuth oscillator is ON. OUTPUT LEVEL controls to maximum. Adjust with special cassette and check the reading with normal cassette.

Wow and flutter

Use a Maxell C-60 UD cassette. Connect the wow and flutter meter generator to one of the INPUT sockets. Set the deck to RECORD and record for about half a minute. Wind back the cassette and set the deck to PLAY. Measure on one of the OUTPUTS with Wow and flutter meter.

Wow and flutter:	
RMS weighted	0.15%
Peak weighted DIN 45511	0.20%



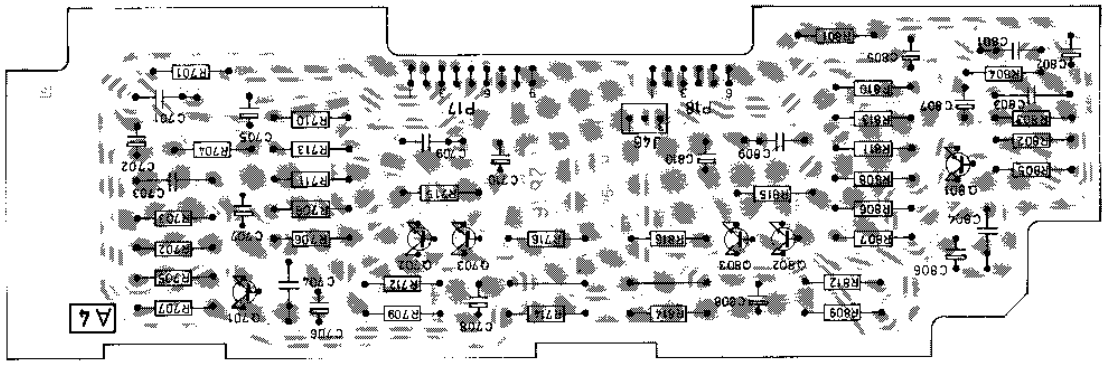


TABLE/ SENSITIVITY OF AMPLIFIERS

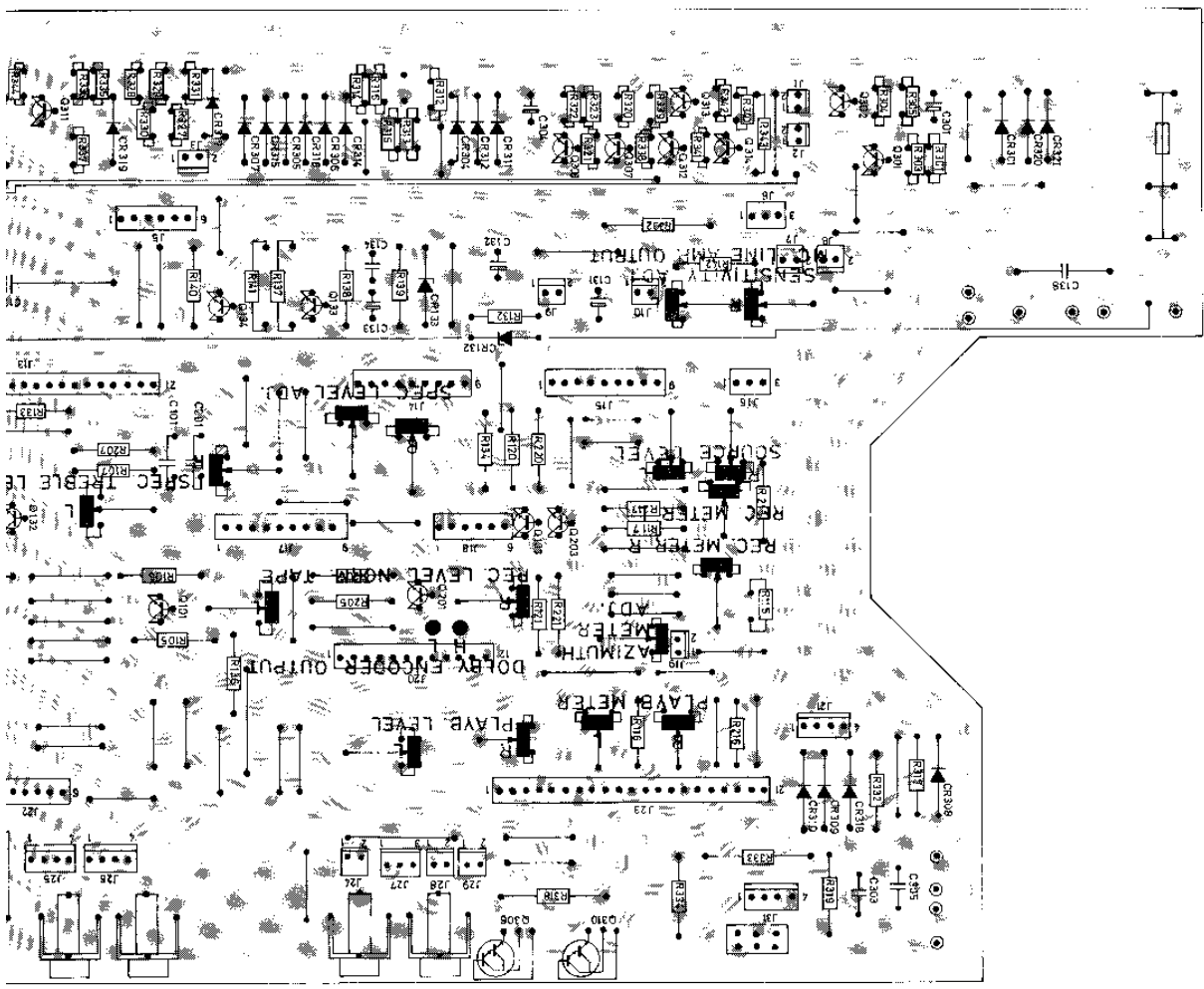
- NOTES:
1. UNLESS OTHERWISE SPECIFIED, RESISTANCE IN OHMS.
 2. ALL SWITCHES ARE SHOWN IN THE "POWER OFF" POSITION.
 3. LEFT CHANNEL COMPONENTS HAVE 101-130, RIGHT CHANNEL COMPONENTS HAVE 201-230. COMPONENTS COMMON FOR BOTH CHANNELS HAVE 301-395.
 4. LOGICAL LEVELS FROM LOGIC BOARD:
 J28-1: ONLY LOW IN RECORD.
 J15-5: ONLY LOW IN PLAY.
 J29-4: ONLY HIGH IN STOP.
 J5-8: ONLY HIGH IN WIND AND REWIND.
 LOW: 5 VOLTAGE BELOW 15V.
 HIGH: 5 VOLTAGE ABOVE 10V.

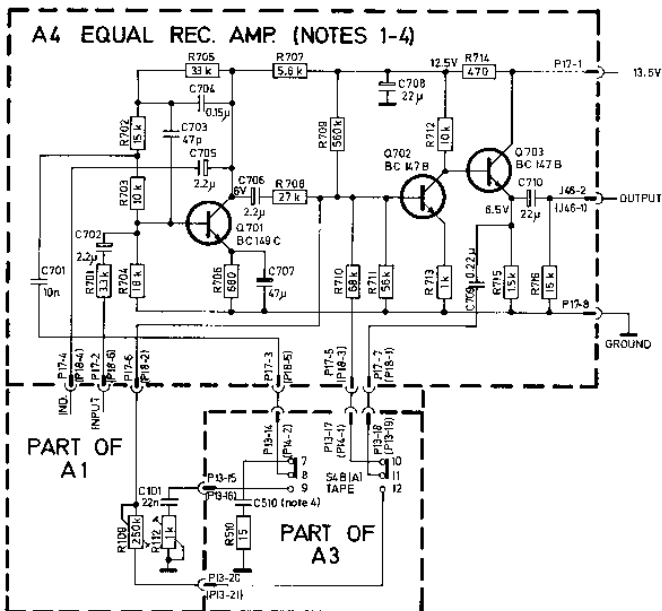
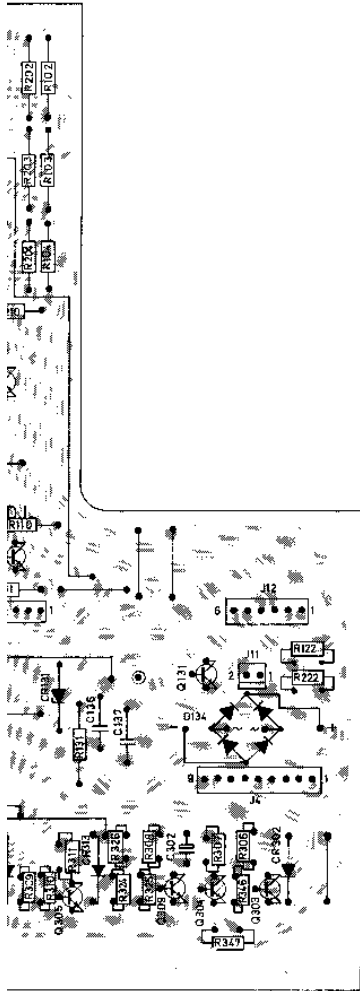
TEST POINT	SENSITIVITY AT 1000 Hz
1	0 mV
2	80 mV
3	25 mV
4	22 mV
5	775 mV
6	11 V
7	80 mV
8	40 mV
9	280 mV
10	1.5 V
11	775 mV
12	1.6 V

A4 EQUAL REC. AMP.

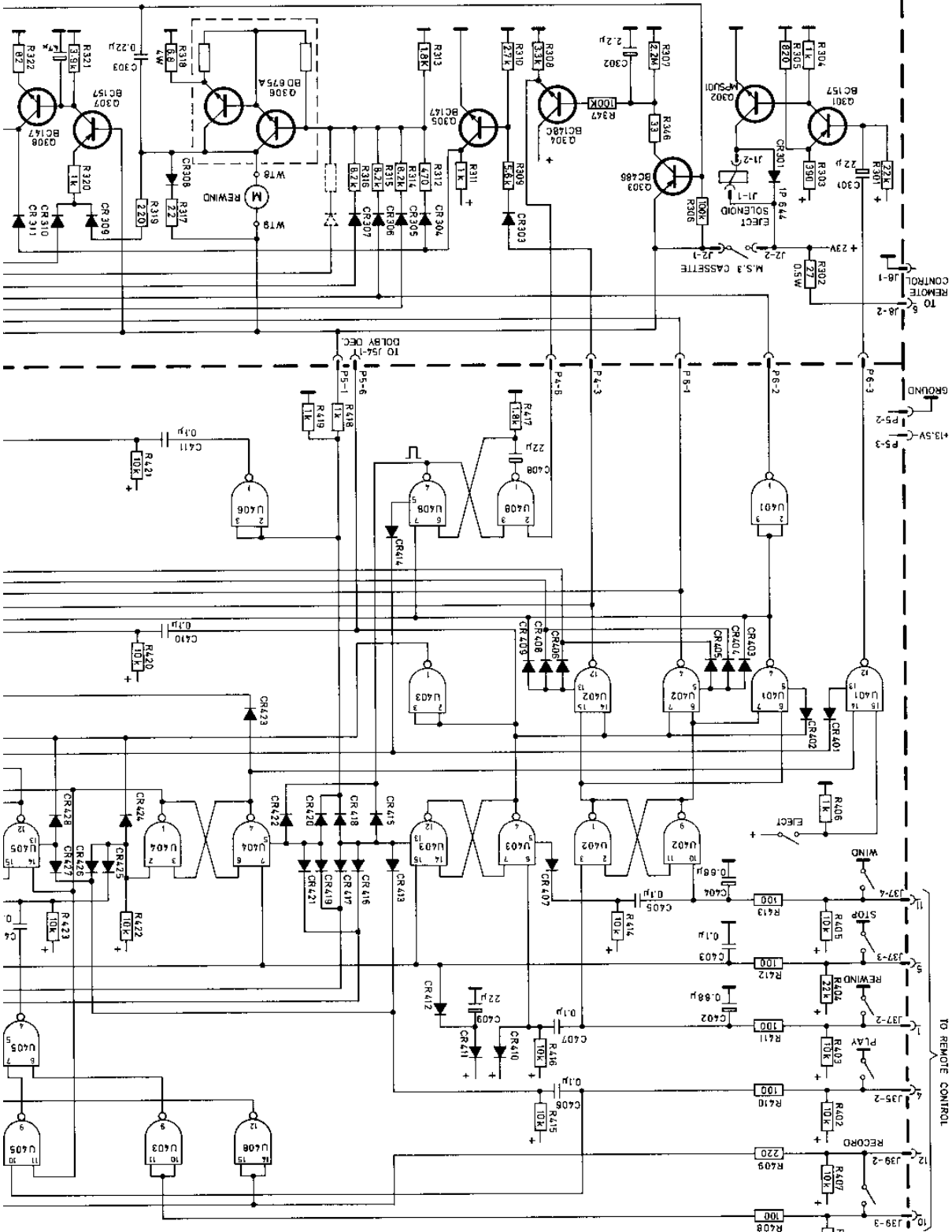


A1 MAIN BOARD



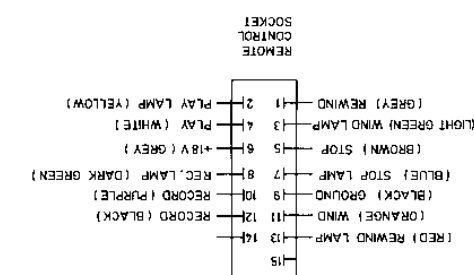
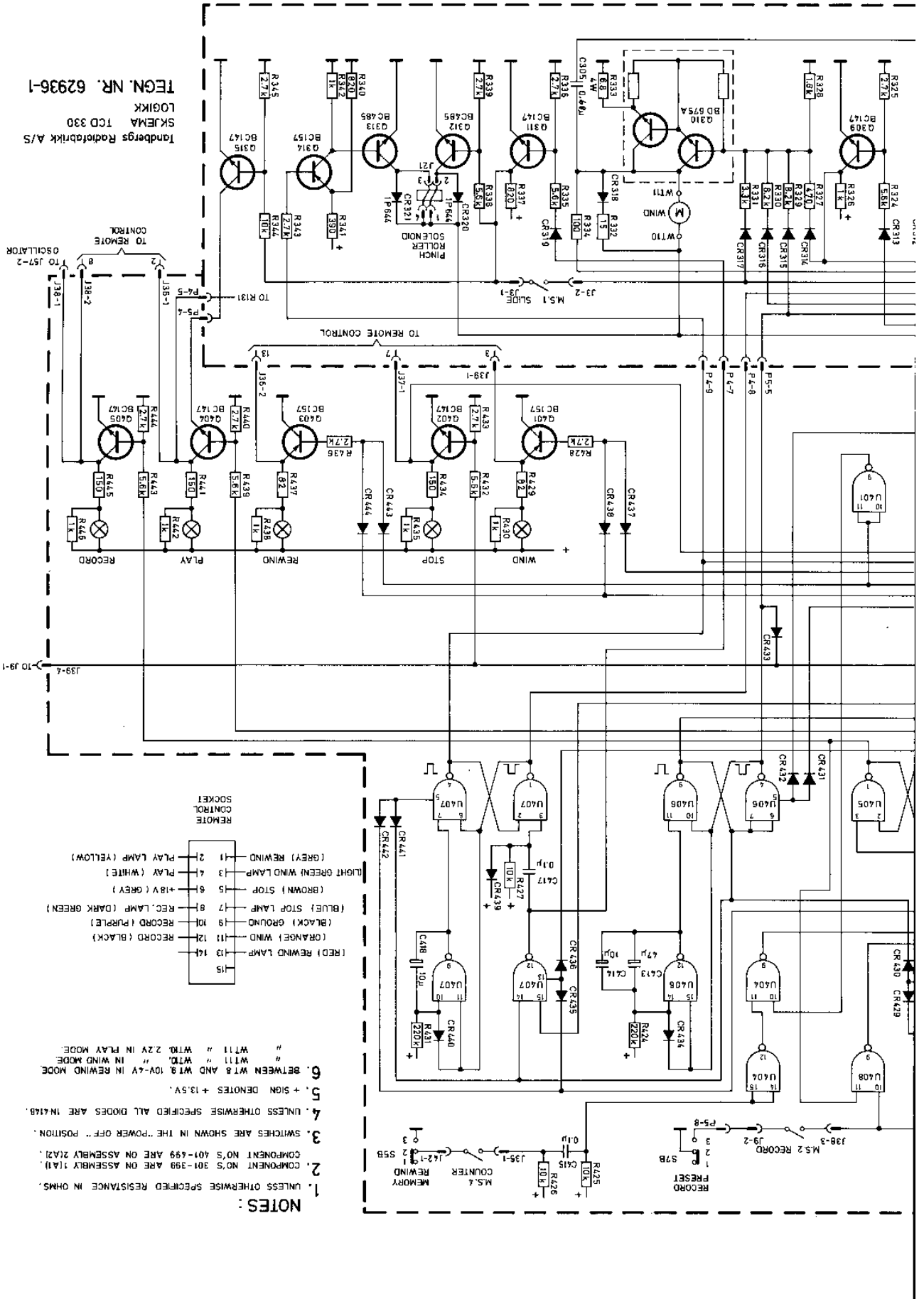


PART OF A1 (MOTOR CONTROL)



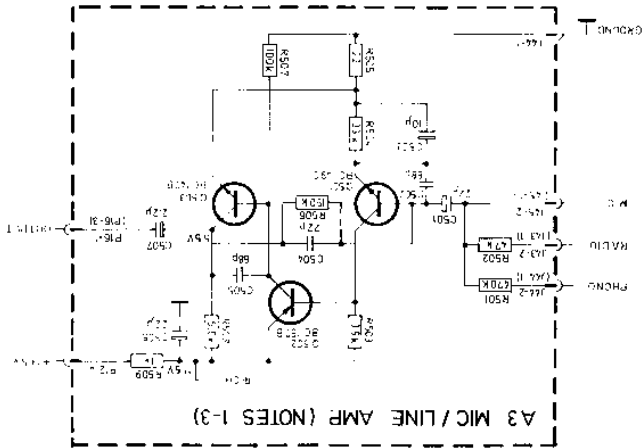
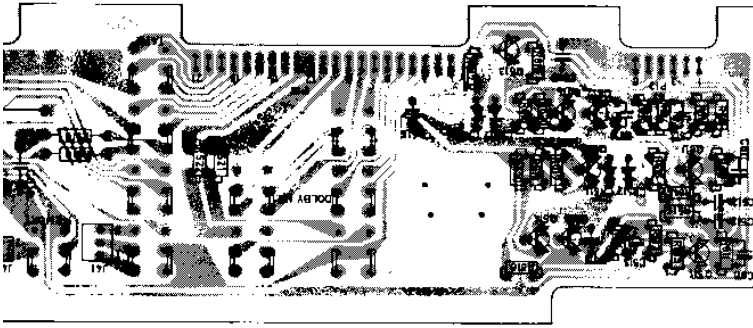
A2 LOGIC (NOTES 1-6)

Tandbergs Radioteknik A/S
 SKJEMA TCD 330
 LOGIKK
 TEGN. NR. 62936-1



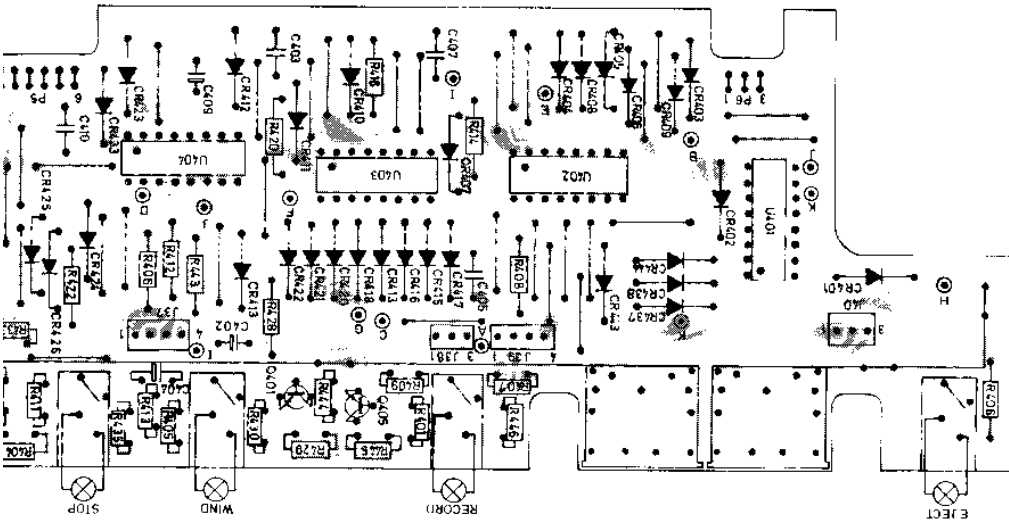
- NOTES:
- UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
 - COMPONENT NOS 301-399 ARE ON ASSEMBLY 1A11.
 - SWITCHES ARE SHOWN IN THE "POWER OFF" POSITION.
 - UNLESS OTHERWISE SPECIFIED ALL DIODES ARE IN4148.
 - + SIGN DENOTES + 13.5V.
 - BETWEEN WT8 AND WT9. 10V-4V IN REWIND MODE.
 # WT11 " WIND " IN WIND MODE.
 # WT11 " WIND 2.2V IN PLAY MODE.

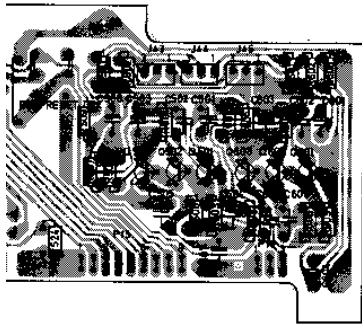
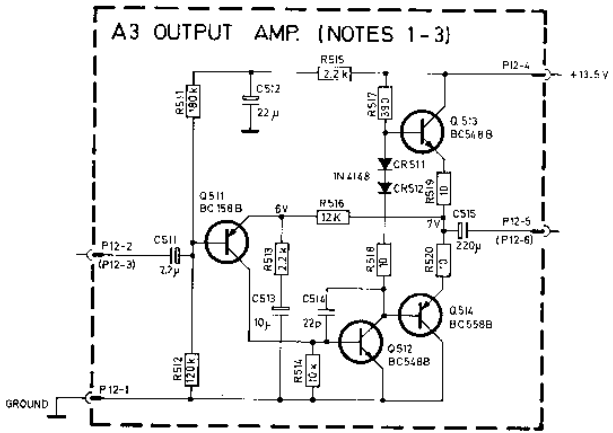
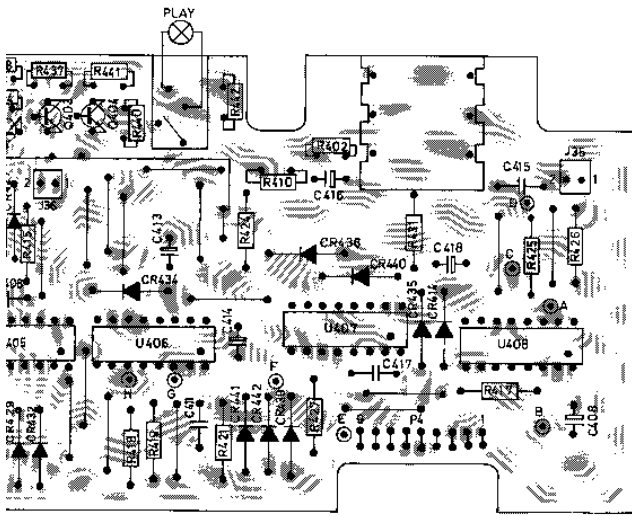
A3 OUTPUT MIC/LINE A

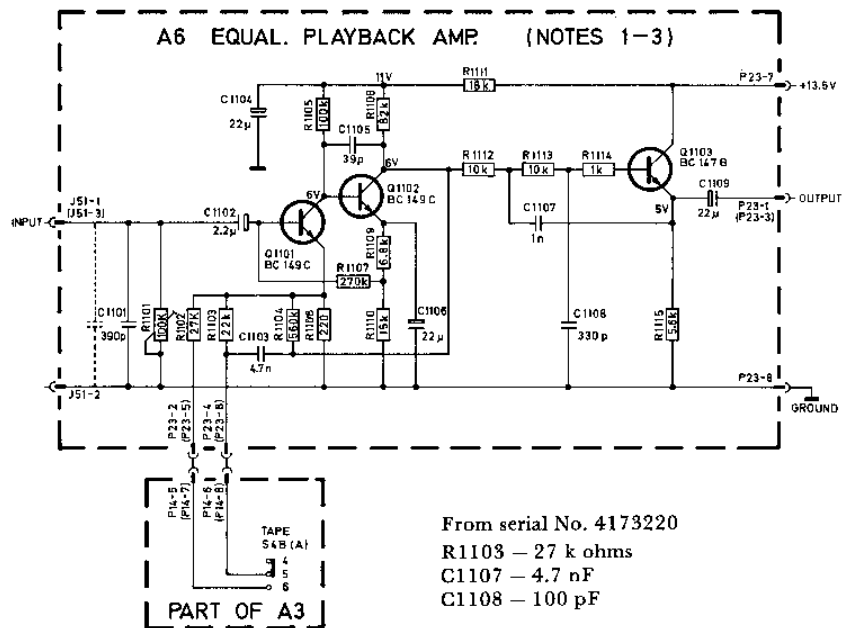
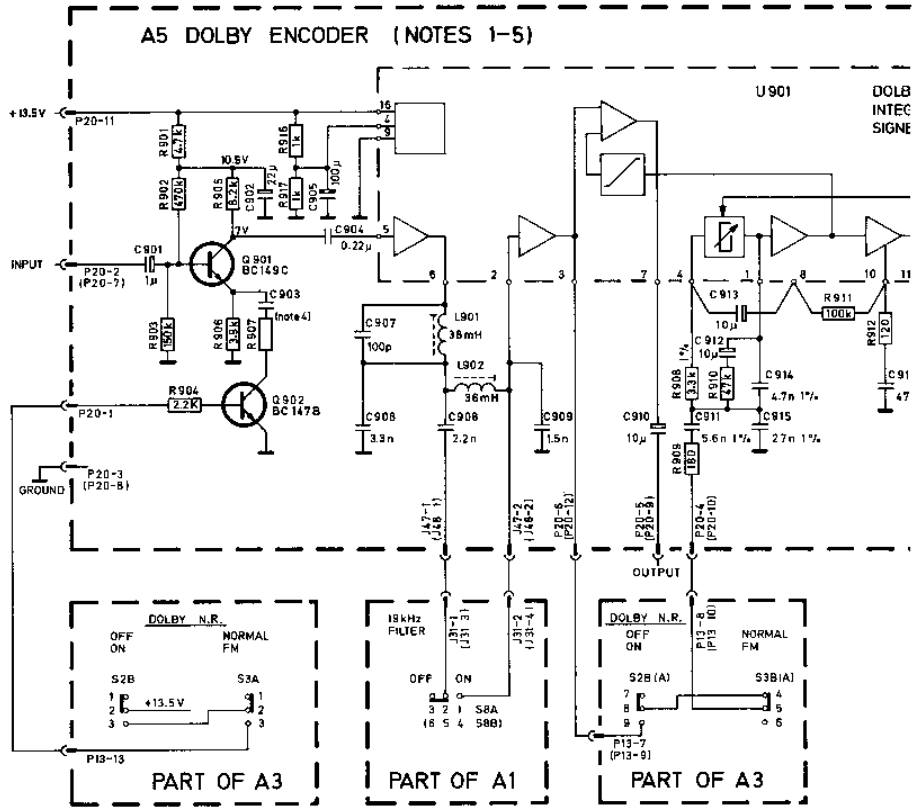


- NOTES:
1. DIMENSIONS OTHERWISE SPECIFIED IN INCHES.
 2. BOARD TERMINAL NC'S FOR THE R CHANNEL ARE SHOWN IN BRACKETS BEFORE THE CHANNEL. ALSO TERMINAL NC'S FOR THE L CHANNEL.
 3. L CHANNEL HAS 90° SWIVEL CHANNEL WITH REFERENCE TO R-CHANNEL COMPONENTS. R-CHANNEL HAS 90° SWIVEL CHANNEL WITH REFERENCE TO L-CHANNEL NC'S. (E.G. R501 OF THE L-CHANNEL HAS THE SAME VALUE AS R501 OF THE R CHANNEL.)

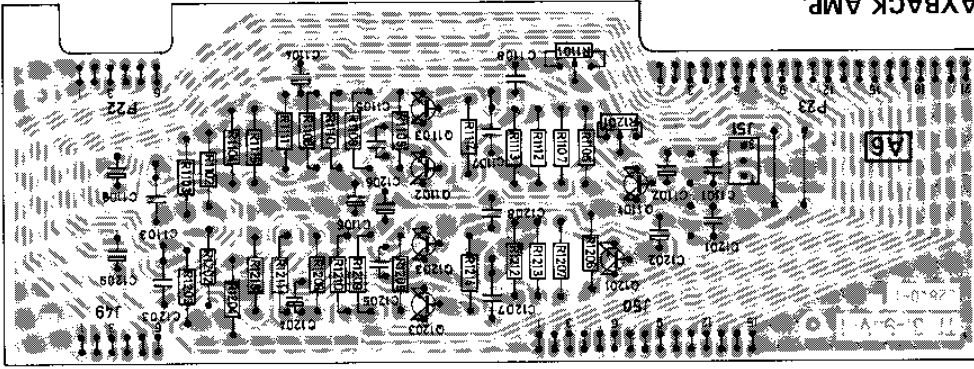
A2 LOGIC BOARD







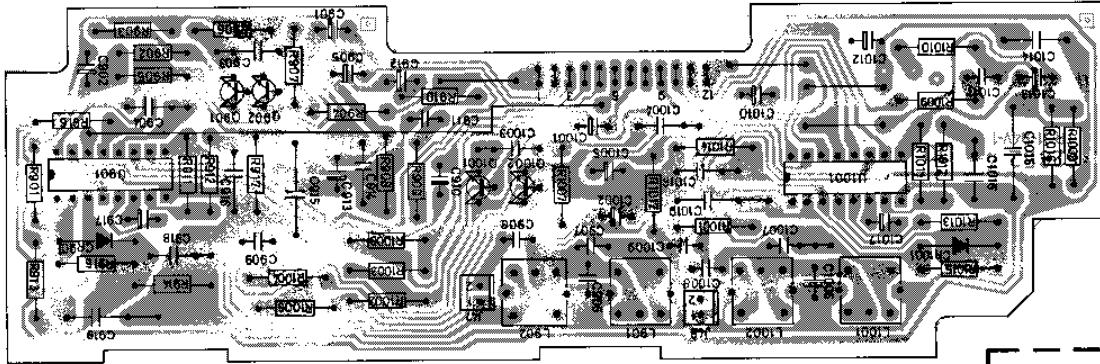
A6 EQUAL PLAYBACK AMP.



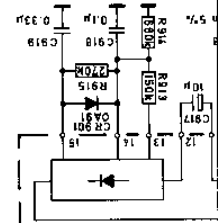
1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
2. PLUG TERMINAL NOS FOR THE R-CHANNEL ARE GIVEN IN BRACKETS BESIDE THE L-CHANNEL NOS.
3. L-CHANNEL HAS 1101-1199, AND R-CHANNEL HAS 1201-1299 AS COMPONENT NOS. WHEN REFERRING TO R-CHANNEL ADD 100 TO THE L-CHANNEL NOS. (E.G. R1101 OF THE L-CHANNEL HAS THE SAME VALUE AS R1201 OF THE R-CHANNEL.)

NOTES:

A5 DOLBY ENCODER

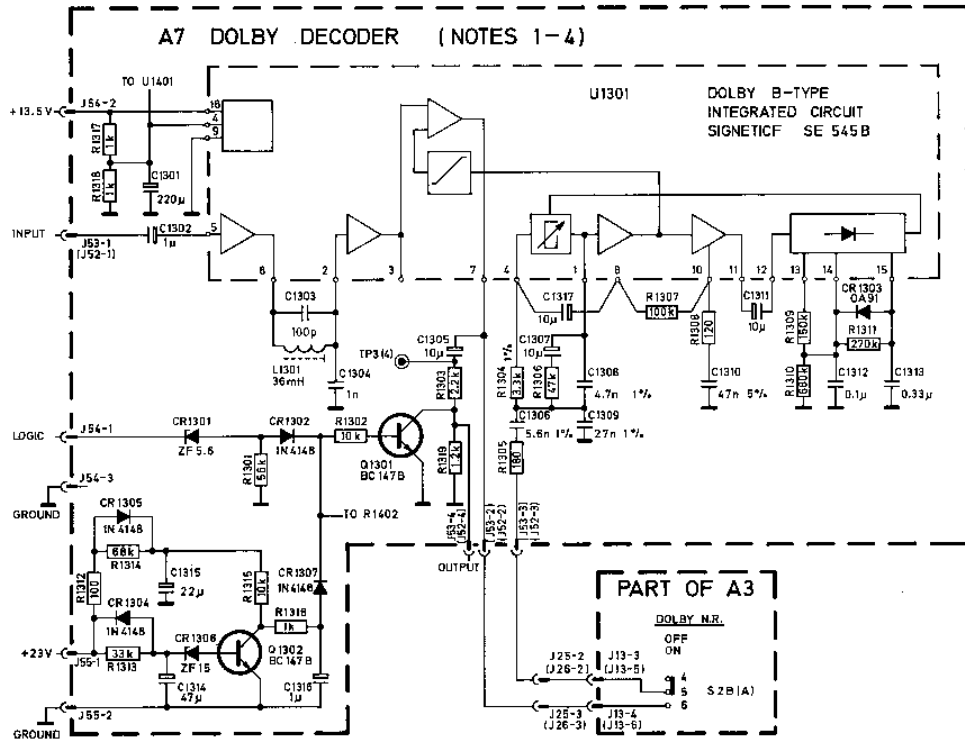


1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
2. PLUG TERMINAL NOS FOR THE R-CHANNEL ARE GIVEN IN BRACKETS BESIDE THE L-CHANNEL PLUS TERMINAL NOS.
3. L-CHANNEL HAS 901-989, AND R-CHANNEL HAS 1001-1099 AS COMPONENT NOS. WHEN REFERRING TO R-CHANNEL COMPONENT ADD 100 TO THE L-CHANNEL NOS. (E.G. R901 OF THE L-CHANNEL HAS THE SAME VALUE AS R1001 OF THE R CHANNEL.)
4. R907-2.2K, C903-15n GIVES D-75-25 DOLBY FM COMPENSATOR
R907-3.9K, C903-12n GIVES D-50-25 DOLBY FM COMPENSATOR



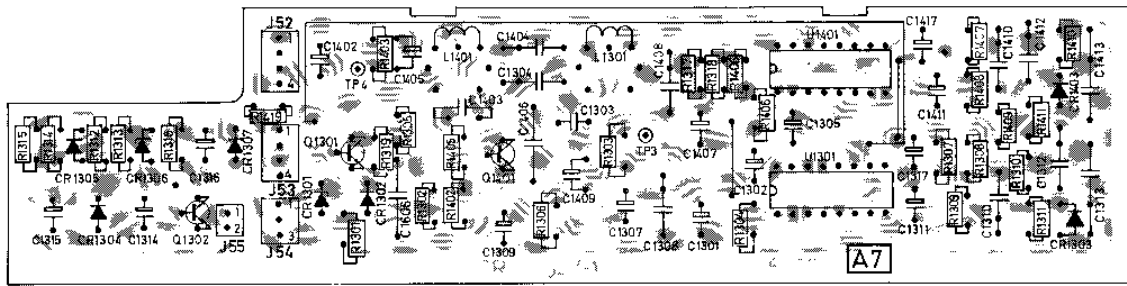
A5 B-TYPE RATED CIRCUIT
VALUES NE 545B

NOTES:

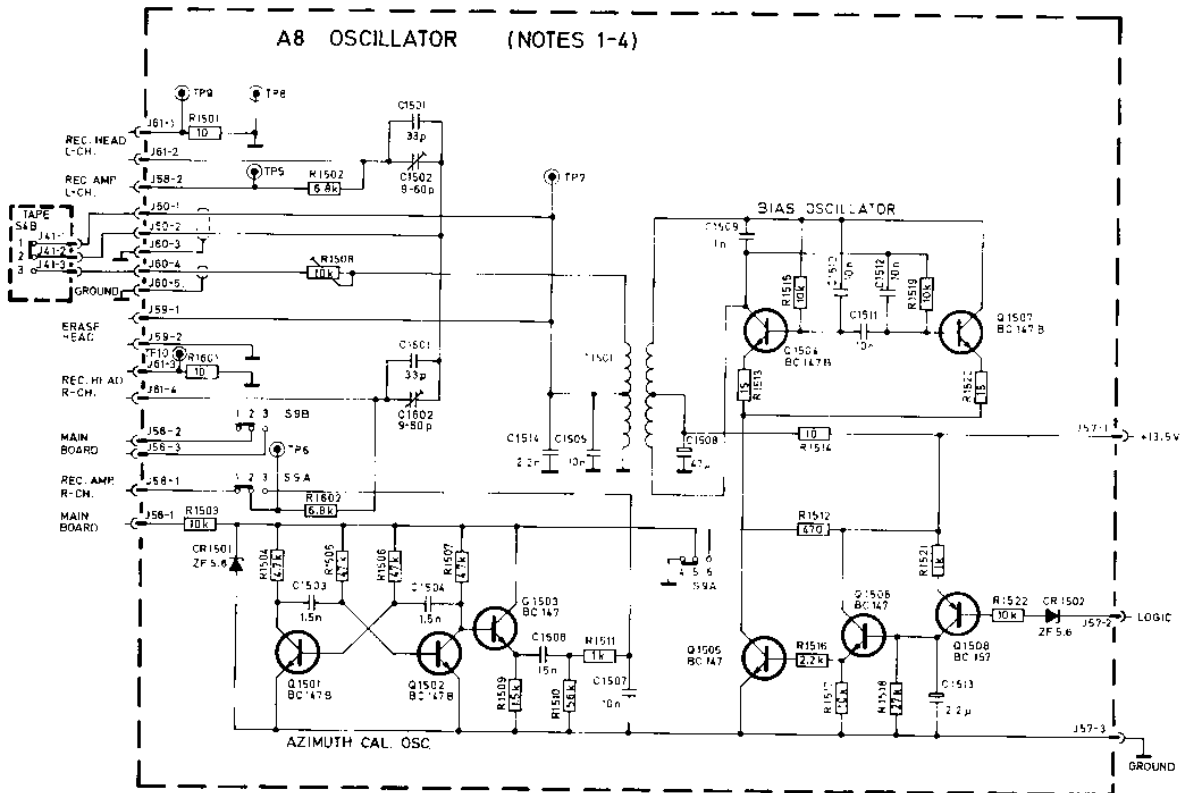


NOTES:

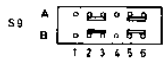
1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
2. PLUG TERMINAL NO'S FOR THE R-CHANNEL ARE GIVEN IN BRACKETS BESIDE THE L-CHANNEL PLUG TERMINAL NO'S.
3. L-CHANNEL HAS 1301-1399, AND R-CHANNEL HAS 1401-1499 AS COMPONENT NO'S. WHEN REFERRING TO R-CHANNEL COMPONENT ADD 100 TO THE L-CHANNEL NO'S. (E.G. R1301 OF THE L-CHANNEL HAS THE SAME VALUE AS R1401 OF THE R-CHANNEL.)
4. P54-1, ONLY HIGH IN WIND-REWIND.



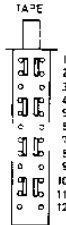
A7 DOLBY DECODER



THE AZIMUTH CAL. SWITCH ARE SEEN FROM THE FRONT SIDE.

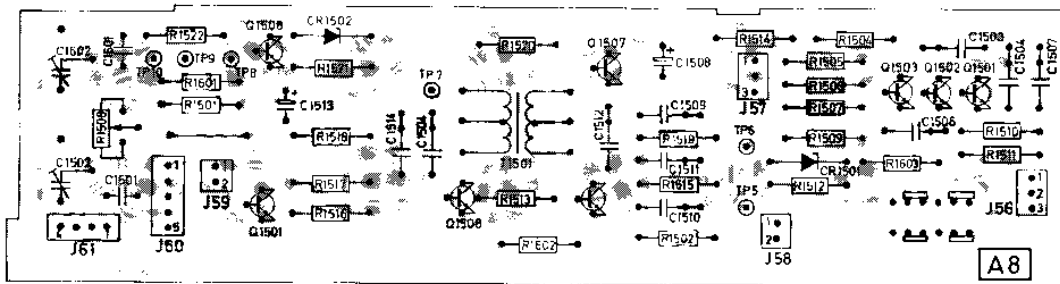


THE TAPE SWITCH ARE SEEN FROM SOLDER SIDE.

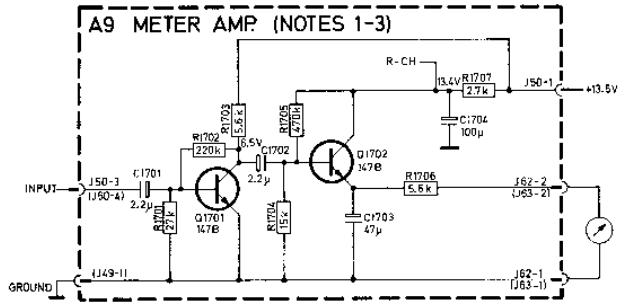


NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
2. PLUG TERMINAL NO'S FOR THE R-CHANNEL ARE GIVEN IN BRACKET'S BESIDE THE L-CHANNEL PLUG TERMINAL NO'S.
3. L-CHANNEL HAS 1501-1509, AND R-CHANNEL HAS 1601-1699 AS COMPONENT NO'S. WHEN REFERRING TO R-CHANNEL COMPONENT ADD 100 TO THE L-CHANNEL NO'S. (E.G. R1501 OF THE L-CHANNEL HAS THE SAME VALUE AS R1601 OF THE R-CHANNEL.)
4. ONLY LOW LEVEL (BELOW 15V) ON J57-2 IN RECORD.

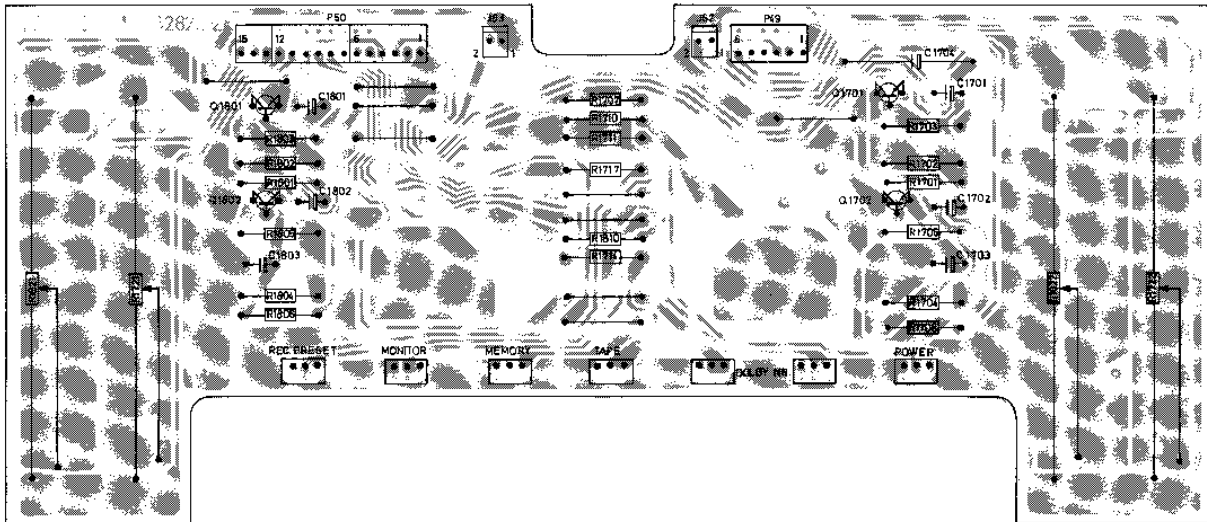


A8 OSCILLATOR



NOTES:

1. UNLESS OTHERWISE SPECIFIED RESISTANCE IN OHMS.
2. PLUG TERMINAL NO'S FOR THE R-CHANNEL ARE GIVEN IN BRACKETS BESIDE THE L-CHANNEL PLUG TERMINAL NO'S
3. L-CHANNEL HAS 1701-1799, AND R-CHANNEL HAS 1801-1899 AS COMPONENT NO'S. WHEN REFERRING TO R-CHANNEL COMPONENT ADD 100 TO THE L-CHANNEL NO'S. (E.G. R1701 OF THE L-CHANNEL HAS THE SAME VALUE AS R1801 OF THE R-CHANNEL.)



A9 METER AMP.

TANDBERGS RADIOFABRIKK A/S
N – 1301 Sandvika – Norway

TANDBERGS RADIOFABRIKK A/S
N – 1301 Sandvika – Norway