# A77

# Service Manual

REVOX

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# REVOX A77

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# 1. CONTENTS

11. REPLACEMENT PARTS LIST

12. SPECIAL VERSION
12.1. Revox A77 – DOLBY

## 2. GENERAL

The Stereo-Recorder can be obtained as CHASSIS, WALNUT CABINET, and CARRYING CASE models. Here are the applicable codes ( order numbers )

| | With 2 Output Ampl. | With 2x2 Loud-speakers | Codes 2-Track | Codes 4-Track |
|---|---|---|---|---|
| Wood Cabinet | | | 1102 | 1104 |
| Wood Cabinet | X | | 1122 | 1124 |
| Carrying Case | X | X | 1222 | 1224 |
| Chassis | | | 1302 | 1304 |
| Chassis | X | | 1322 | 1324 |

Outline and Installation Dimensions, see : S 1

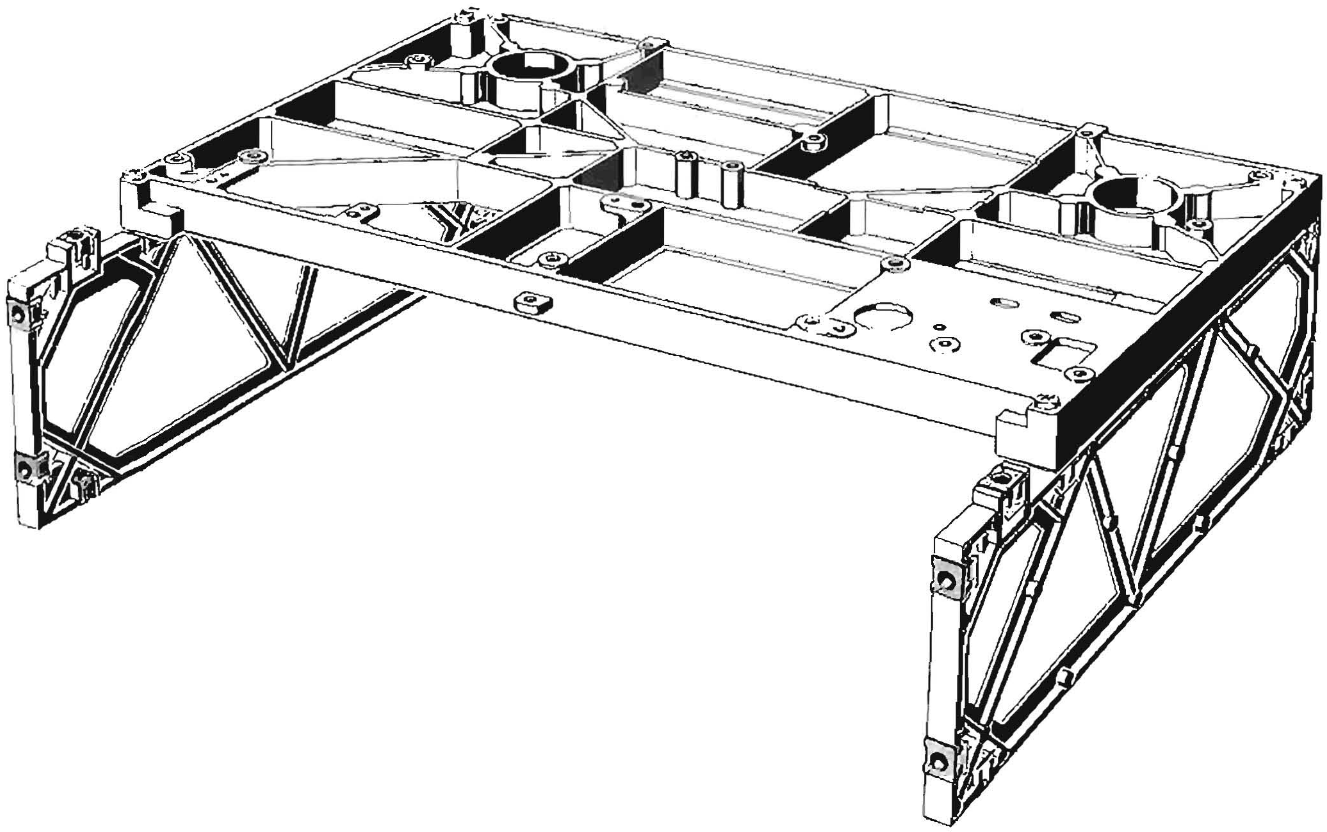
Following codes apply to accessories only :

| | |
|---|---|
| Output Amplifier ( per Channel ) | 1900 |
| Walnut Cabinet | 1950 |
| Carrying case, incl. Cover and 2x2 Loudspeakers | 1960 |

The basic configuration is identical for all models.
A pressure cast aluminum alloy chassis supports the 3-motor drive, one is the electronically regulated capstan motor. All amplifiers are plug-in modules.

An exchange service is organized for the circuit cards. Faulty cards will be exchanged at minimum charge by factory representatives in the respective country. The same applies to etched circuit boards with connectors ( control board, regulator, motor control, switch board ).

This permits a very efficient service, limiting, in most cases, repair work to finding the faulty module.



## 2.1. Front Panel, Rear Panel

( Numbering corresponds to REVOX manual )

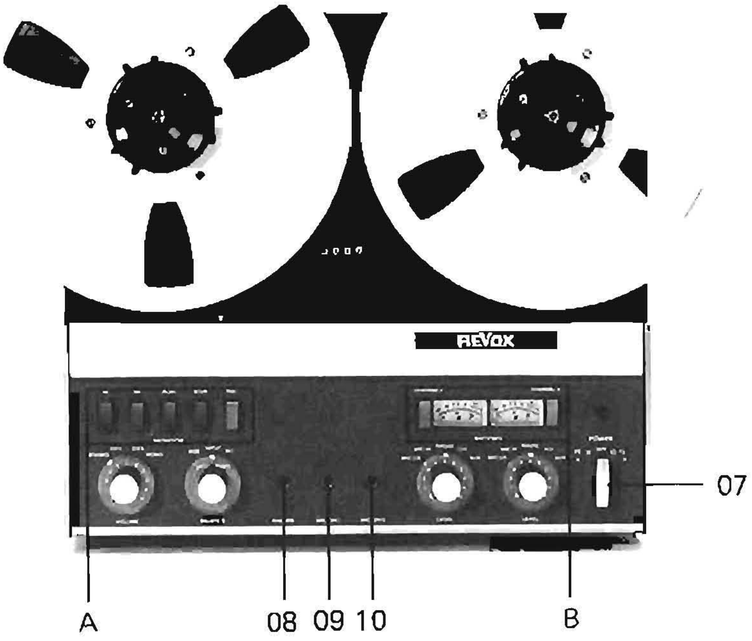


Fig. 2.1–1

| | | |
|---|---|---|
| A | Push buttons | |
| | << | Fast rewind |
| | >> | Fast forward |
| | PLAY | Playback |
| | STOP | Stops all operating functions |
| | REC | Record ( depress simultaneously PLAY ) |

B VU-Meters, record pre-selector buttons

Record CH I ( upper track ) :
Depress left record pre-selector button

Record CH 2 ( lower track ) :
Depress right record pre-selector button

Record Stereo ( both tracks ) :
Depress both record pre-selector buttons

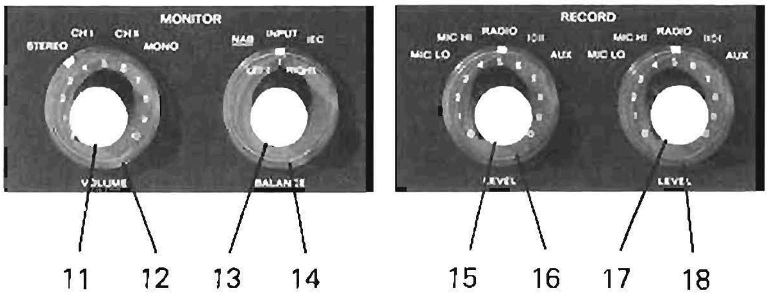


Fig. 2.1–2

| | |
|---|---|
| 07 | Power switch, tape speed, tape tension |
| 08 | Headphone socket ( 200 - 600 Ohm ) |
| 09 | Microphone socket, CH 1 |
| 10 | Microphone socket, CH 2 |
| 11 | Playback volume control |
| 12 | Playback mode switch |
| 13 | Balance control |
| 14 | Before-and-after tape switch |
| 15 | Record volume control, CH 1 |
| 16 | Input selector, CH 1 |
| 17 | Record volume control, CH 2 |
| 18 | Input selector, CH 2 |

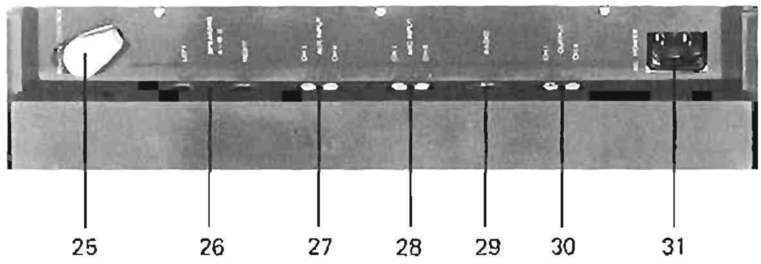


Fig. 2.1–3

| | |
|---|---|
| 25 | Remote control plug |
| 26 | Loudspeaker socket ( DIN, 4 - 16 Ohm ) |
| 27 | AUXILIARY – Input ( 35 mV ) |
| 28 | Microphone – Input ( .15/2,5 mV ) |
| 29 | RADIO, DIN connection: Input 2,5 mV<br>Output 1,2 V |
| 30 | OUTPUT ( 2.5 V / 600 Ohm ) |
| 31 | Socket for power cable |

# 3. DISMANTLING

Table of Wire Colors

| | | | |
|---|---|---|---|
| red | = red | – rouge | Rot |
| org | = orange | – orange | – Orange |
| yel | = yellow | – jaune | – Gelb |
| grn | = green | – vert | – Grün |
| blu | = blue | – bleu | – Blau |
| vio | = violet | – violet | – Violett |
| brn | = brown | – brun | – Braun |
| gry | = gray | – gris | – Grau |
| blk | = black | – noir | – Schwarz |
| wht | = white | – blanc | – Weiss |

## 3.1. Removal of Housing

- Set instrument face down on soft basis. Remove remote control dummy plug.
- Remove housing fasteners. Pull housing carefully upward. Disconnect loudspeaker connectors on regulator card ( fig. 3.9 · 13 ) in the carrying case.
- Reinsert remote control plug.
- Bridge power disconnect jack ( 2-pole protective disconnector ) with two insulated banana plugs.

## 3.2. Removal of Cover Panel

- Tilt access lid down. Pull off head cover.
- Undo screw A ( fig. 3.2 –4 ). Pull cover panel off ( Upper rim, 3 retainers ).

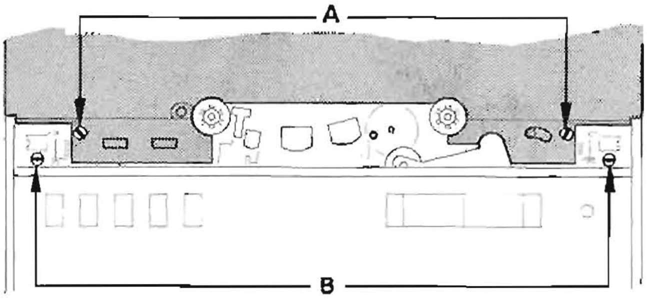


Fig. 3.2–4

## 3.3. Removal of Front Panel

- Undo screws B ( fig. 3.2 –4 ). Pull out power switch knob as well as all rotary knobs and discs. Save retaining ring of power switch.
- Pull up monitor panel ( 4 retainers ).

## 3.4. Removal of Power Switch

- Disassemble retaining ring of slide switch ( equalization switch )
- Unfasten 3 screws. Remove power switch carefully.
- Take off plug connectors.

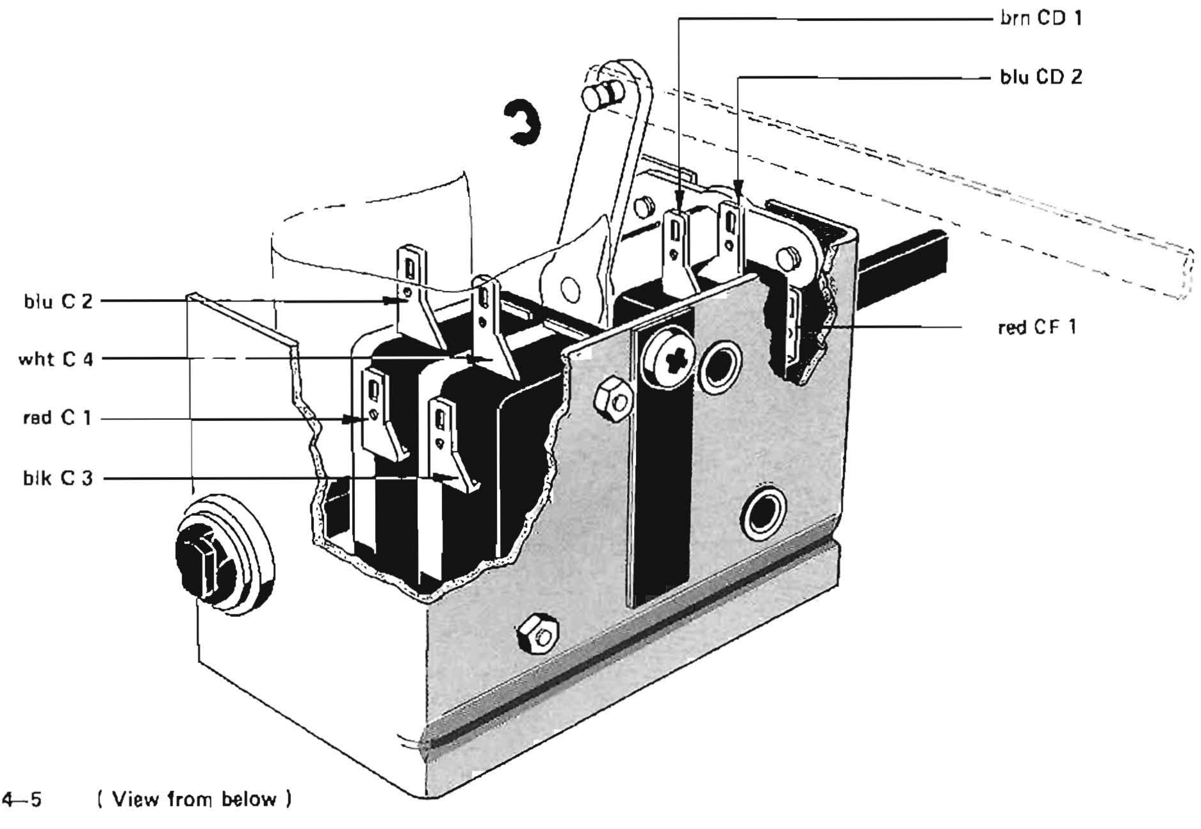


Fig. 3.4–5 ( View from below )

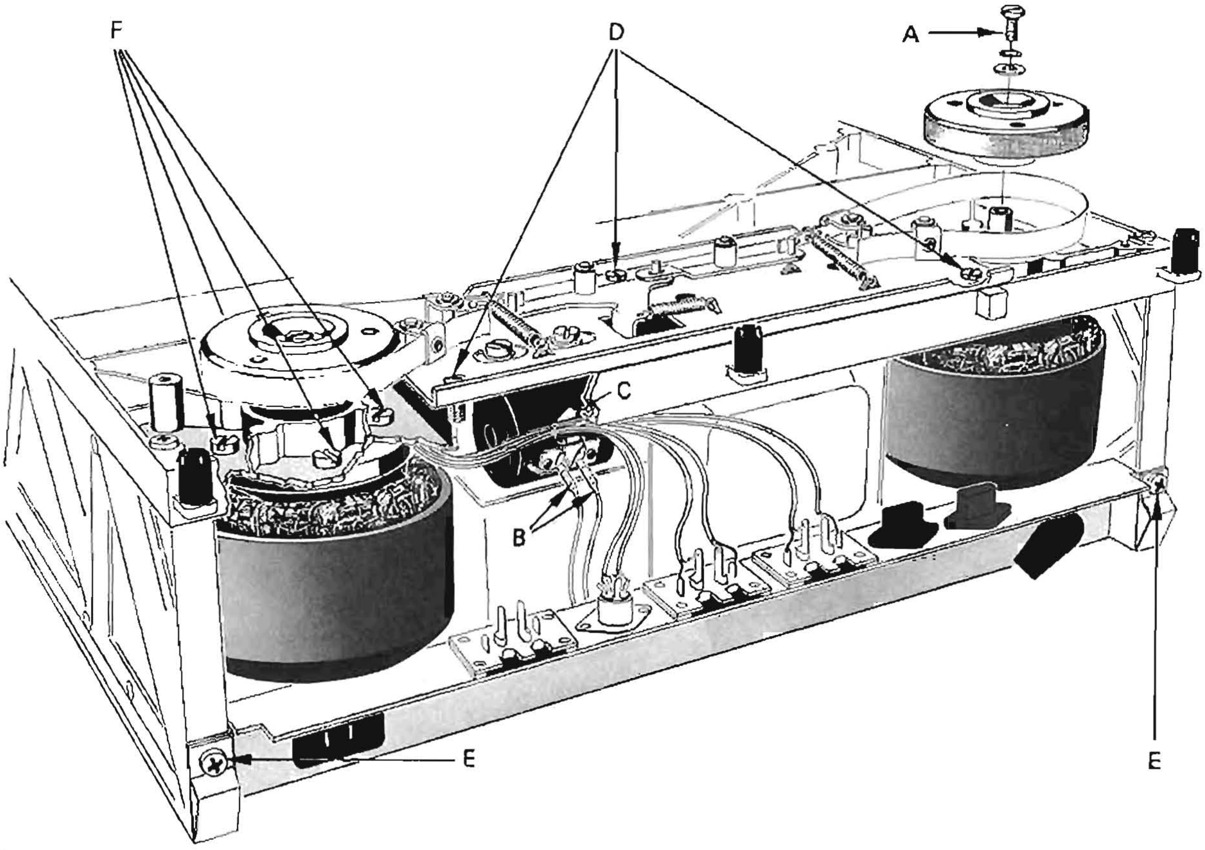


Fig. 3.5–6

### 3.5. Removal of Brake Unit

- Remove cover panel per 3.2.
- Remove reel plates ( 3 screws each ).
- Brake drums: Undo center screws A ( fig. 3.5 –6 ), loosen brakes and lift drums carefully upward.

Be careful not to kink brake bands. Don't touch brake linings. Grease traces reduce braking effect.

- Remove connections B ( fig. 3.5 –6 ).
- Separate cable bundle ( shielded wires ) at C ( fig. 3.5 –6 )
- Remove 3 chassis screws D ( fig 3.5 –6 ) and lift chassis carefully out.

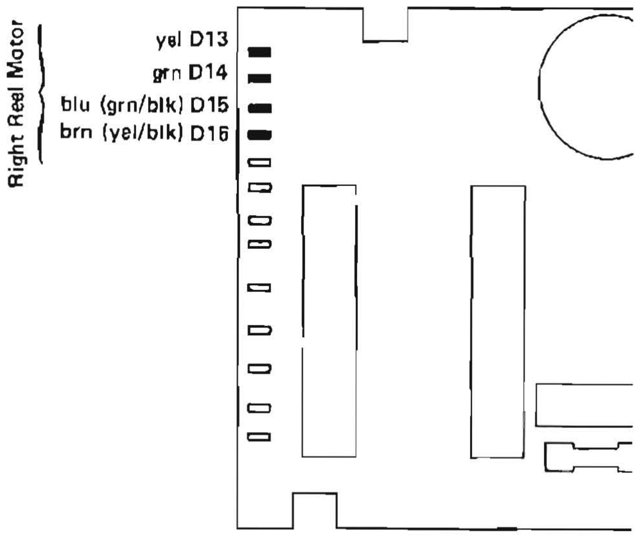


Fig. 3.6–7

### 3.6. Removal of Reel Motors

- Remove brake drums per 3.5.
- Remove frame screws E ( fig. 3.5–6 ).
- Unplug output amplifiers ( if present ).
- Unplug motor cable connectors; right reel motor, regulator card ( fig. 3.6–7 ); left reel motor, control card ( fig. 3.6–8 ).

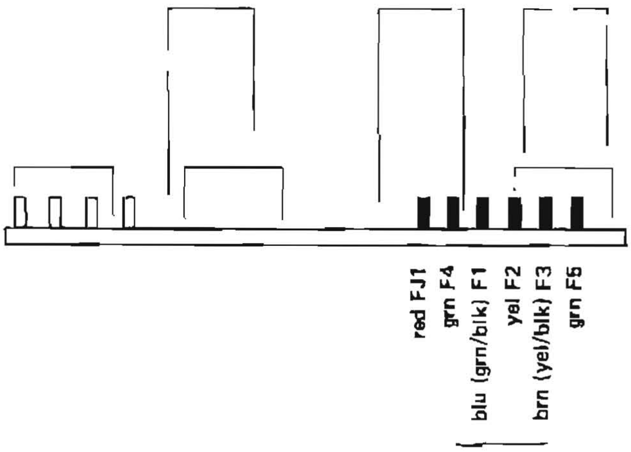


Fig. 3.6–8

- Remove 4 reel motor screws F each ( fig. 3.5 –6 ) and lower motors carefully.

## 3.7. Removal of Capstan Motor

- Remove output amplifiers ( if present ).
- Disconnect capstan-motor and pick-up cables; connections are on control card ( fig. 3.7 –9 ).

Note:

For improved signal to noise performance, the capstan motor connections may be reversed on some recorders in the following manner: E3 = gry, E4 = yel, E5 = grn. Carefully note wire colors before disassembling.

- Undo cable clamps A ( fig. 3.7 9 ).
- Remove cover and monitor panels per 3.2. and 3.3.
- Unscrew motor fasteners B (fig. 3.7 – 10) on headblock. The other screws on headblock shall not be touched as they retain the headblock itself.
- Remove capstan motor carefully downward. Guard absolutely against bumping (axis run-out is better than .001 mm – 40 micro · inch ! )

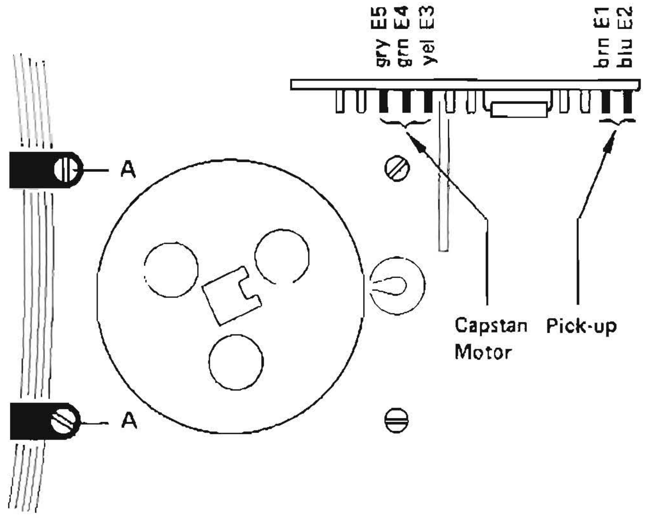


Fig. 3.7–9

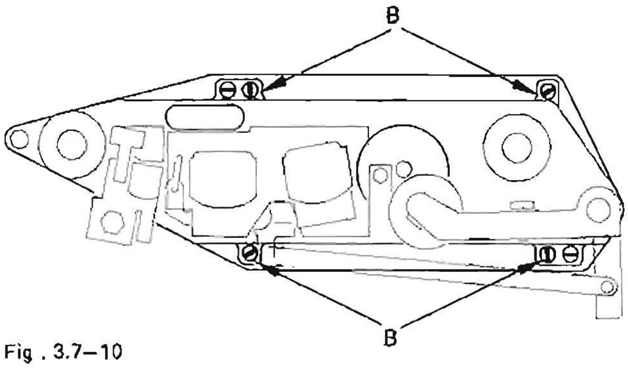


Fig . 3.7–10

## 3.8. Removal of Control Board

- Remove cover and front panels per 3.2. and 3.3.
- Undo screws A( fig. 3.8- 11). Pull control board downward.
- Remove connectors as needed

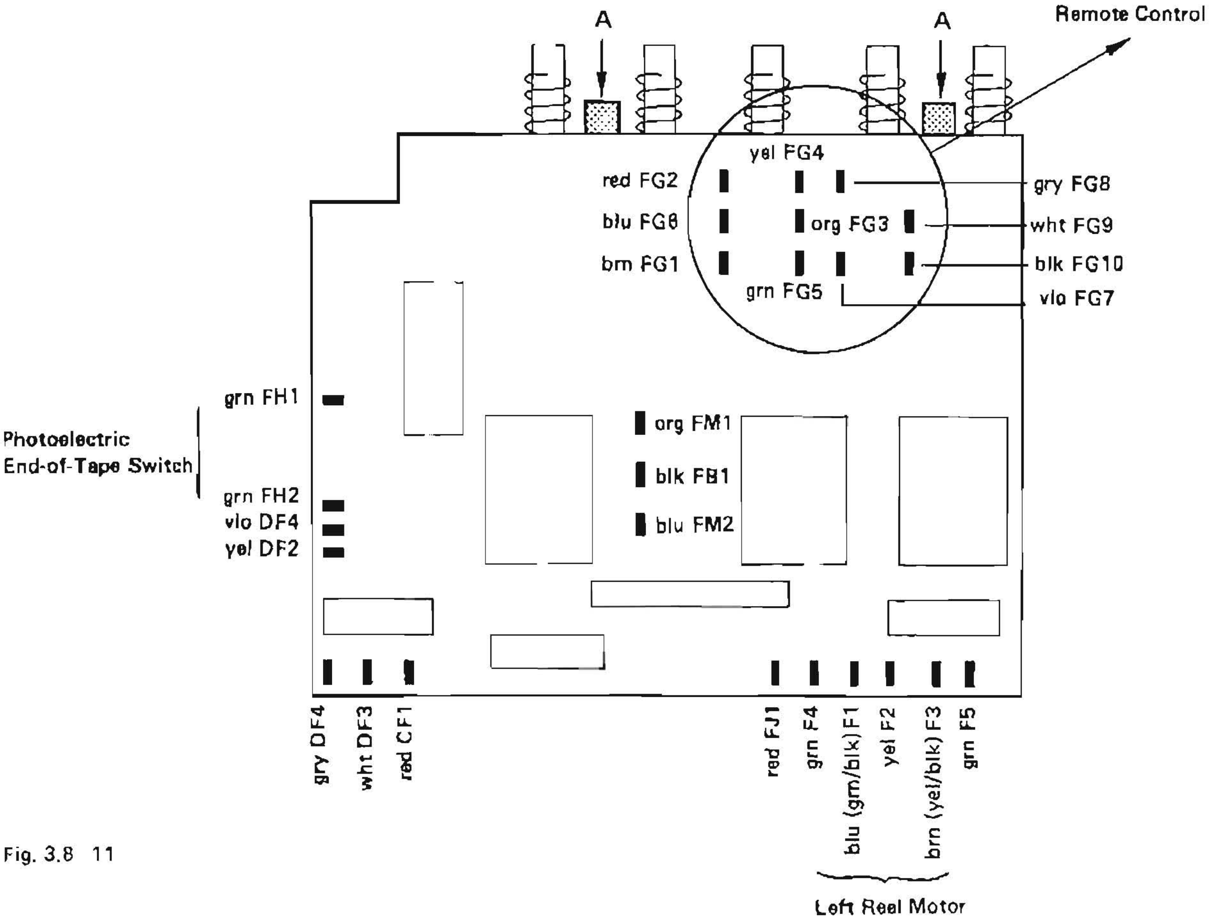


Fig. 3.8 11

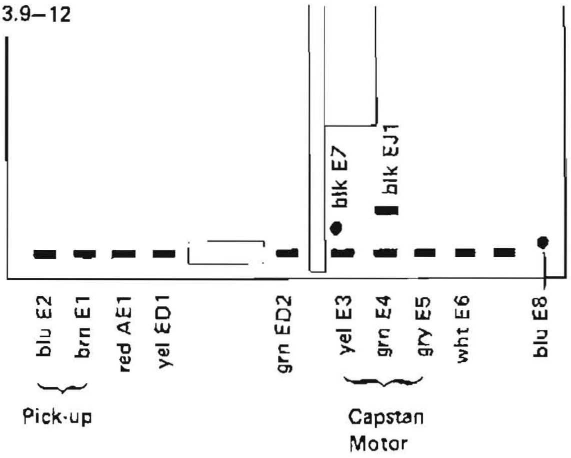
## 3.9. Removal of Power Transformer

- Remove output amplifiers ( if present ).
- Disconnect brake solenoid cables ( unsolder ) per fig. 3.5 –6, B.
- Disengage cable to right-hand reel motor on regulator board ( fig. 3.6 –7 ).
- Disengage cable to capstan motor and pick-up on motor control board ( fig. 3.7 9 ).

Note:

For improved signal to noise performance, the capstan motor connections may be reversed on some recorders in the following manner: E3 - gry, E4 = yel, E5 = grn. Carefully note wire colors before disassembling.

Fig.3.9–12



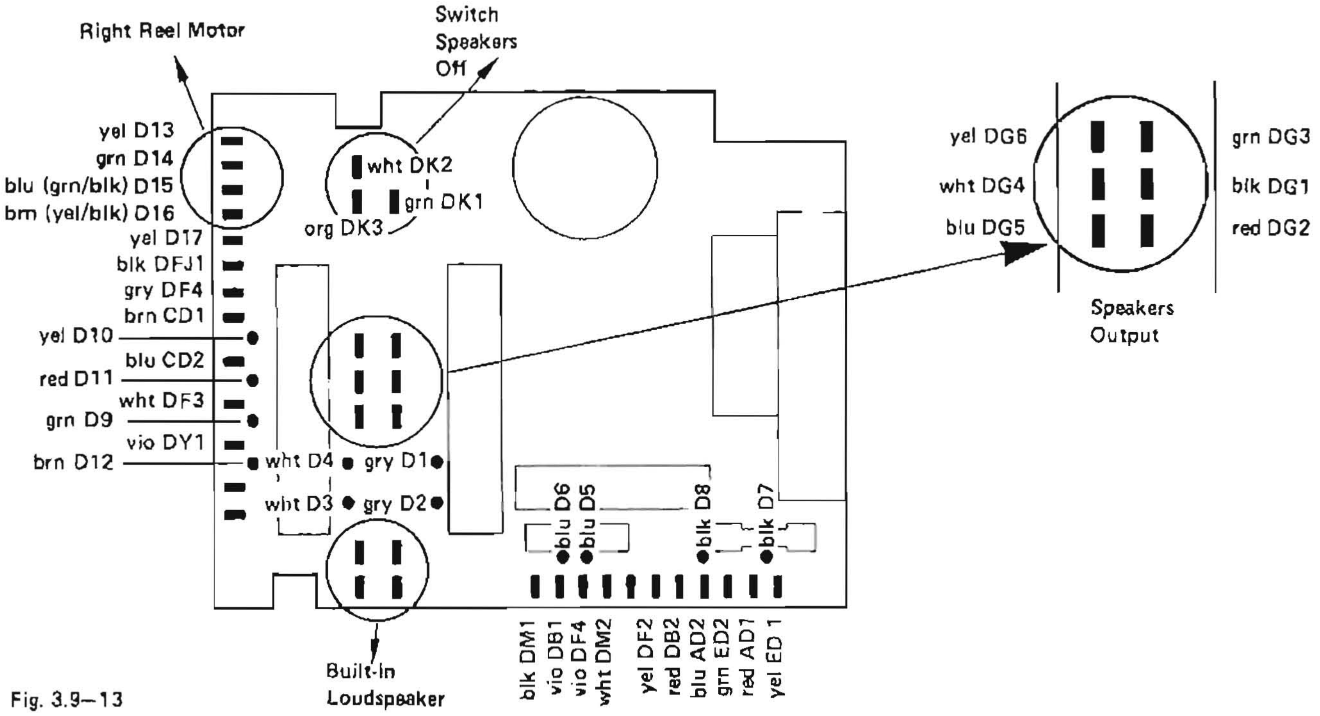


Fig. 3.9–13

- Unscrews transformer fasteners and remove entire assembly carefully downward.

  Pull off circuit cards and corresponding connectors as needed (fig. 3.9 – 12 and 3.9 – 13).

## 3.10. Removal of Amplifier Cards

- Mark record and playback amplifiers before removing. The amplifiers have to be reinserted in their respective places to maintain correct level settings.
- Remove cover panel on the front side and pull amplifier cards.

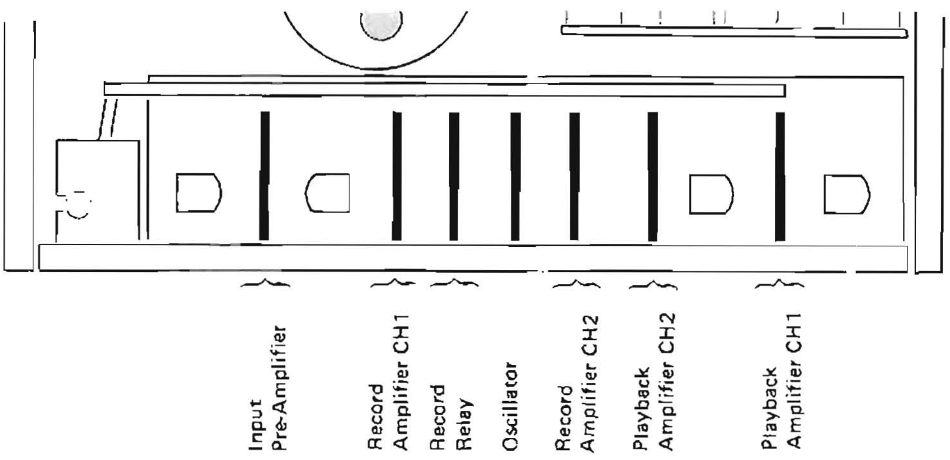


Fig. 3.10–14

### 3.11. Removal of Potentiometer

- Unsolder wires.
- Unscrew fasteners from below (fig. 3.11 –15)

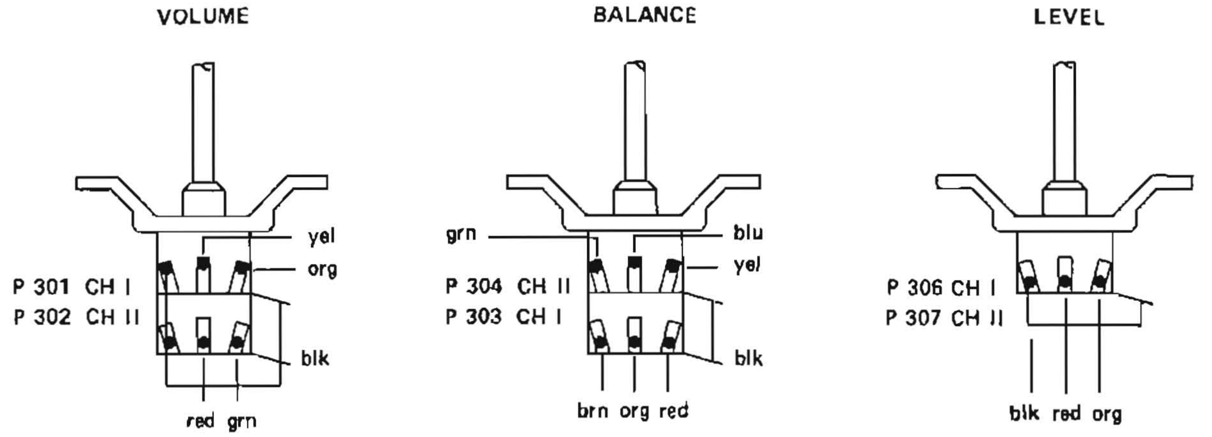


Fig. 3.11–15

### 3.12. Removal of Switch Board (fig. 3.12 –16)

- Remove plug-in amplifiers (fig. 3.10).
- Remove pusher mechanism (screws A).
- Remove shield (screws B).
- Remove reset spring C (tape lift lever).
- Connectors: disengage headblock-VU-meter board.

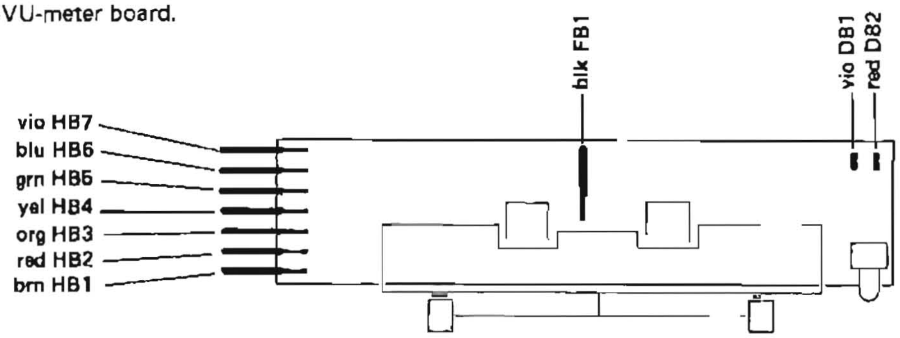
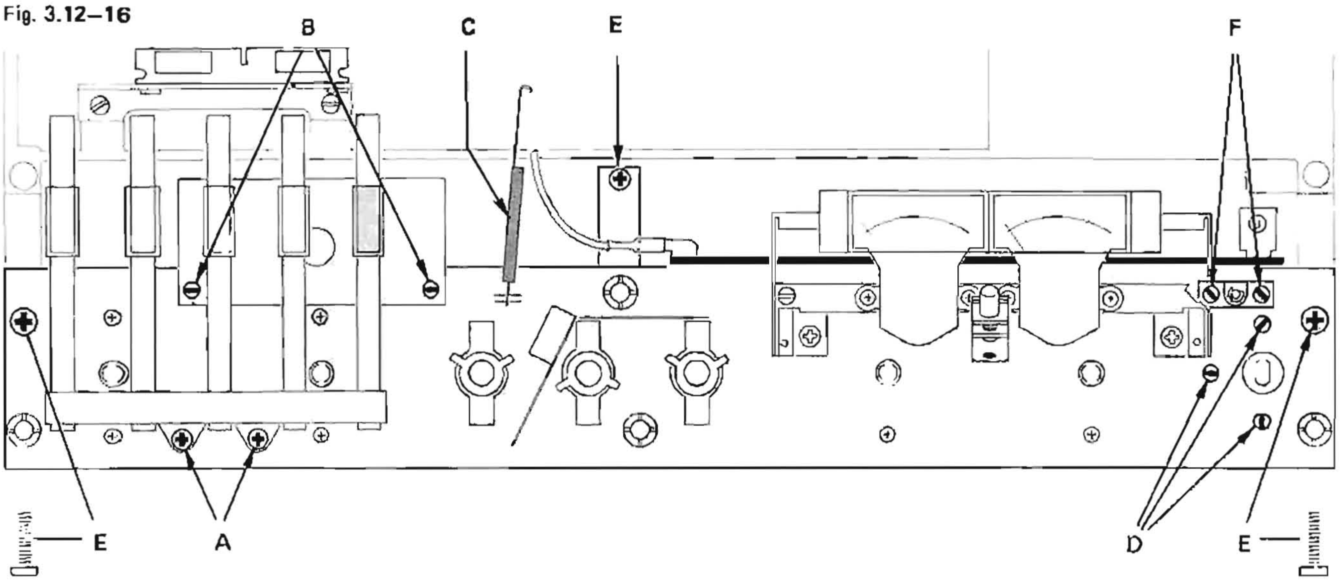


Fig. 3.12–16



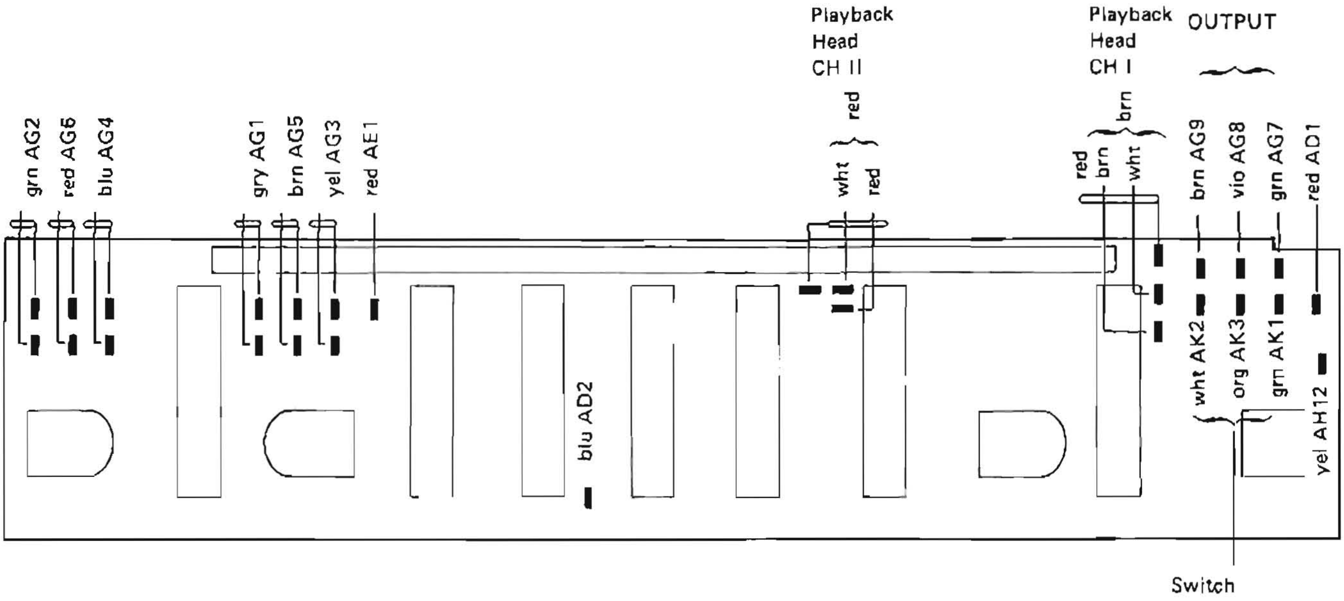


Fig. 3.12–17

- Remove power switch retaining rings and fasteners D. Lower power switch carefully ( avoid linkage rod ).
- Disconnect all terminals on the switch board ( fig. 3.12–17 ).
- Unscrews 5 fasteners E ( fig. 3.12–16 ) and remove complete assembly forward.
- Disengage remaining VU-meter connections.

Position of the equalizing slide switch has to be checked at reassembly. Adjust screws F ( fig. 3.12–16 ) if necessary ( see also 5.1. ).

Observe, furthermore, that pressure roller is in rest position ( trip lever of playback cut-off contact S 5, left of release lever ).

### 3.13. Removal of Frame ( Removal of Rotary Switches )

- Unscrew VU-meter carrier; lift off carefully ( observe playback cut-off contact S 5 behind VU-meter board ).
- Pull connectors from Jacks. ( fig. 3.13–18 ).
- Unscrew rotary switch fasteners from above. Disconnect ground strap ( brown ). Remove carrier.

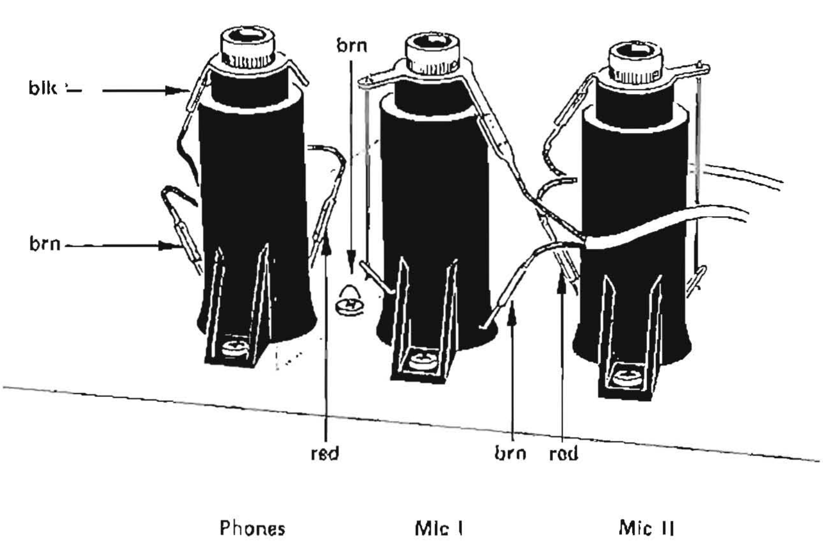


Fig. 3.13–18

# 4. MECHANICS

The three-motor drive assures almost maintenance-free service of the mechanical section. Adjustments and measurements are limited to the few movable parts.

Special tools needed :

Retaining ring pliers
Spring scales or contactors 200 g ( 7 oz. av ), 2000 g ( 4.4 lb. av ).

## 4.1. Headblock

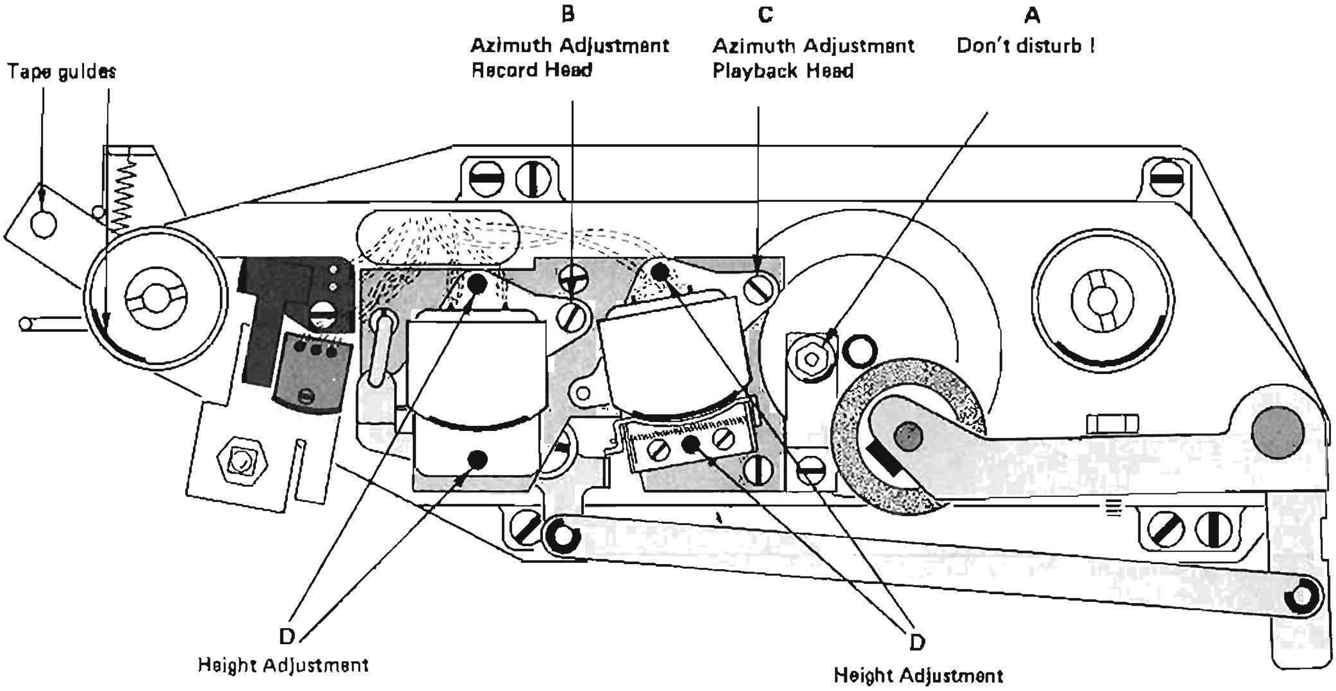


Fig. 4.1–19

### 4.1.1. Tape guides ( fig 4.1 –19 )

- Clean tape guides; don't disturb tape guide A ! To remove tape guide A, unscrew only the fastener to the block ( near upper end of capstan axis ).

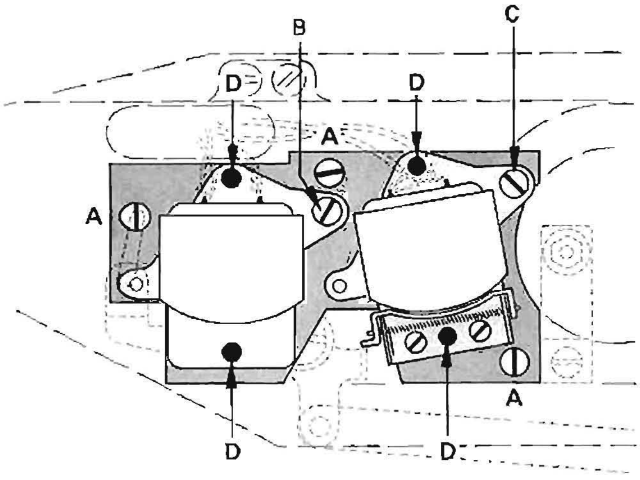


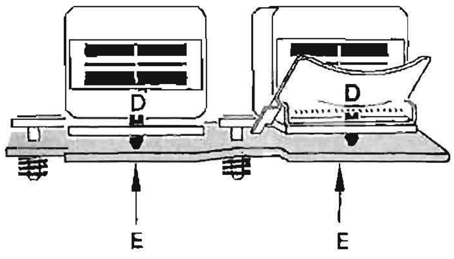
Fig. 4.1–20

### 4.1.2. Head Mounting ( fig. 4.1 –20 )

Record and playback heads are mounted on a common base plate which is fastened in turn to the headblock with 3 screws A.

Don't disturb setscrews D (height adjustment). The heads can be removed while base plate is off (fastening E).
If height adjustment is required after change, the respective setscrews D are turned by a like amount front and back.

B = Azimuth adjustment, record head (per 6.5.1.)
C = Azimuth adjustment, playback head (per 6.3.1.)



Once adjustments are made on the headblock, the loosened screws must be resecured with lacquer.

Note:

For improved signal to noise performance the connections to both playback head channels may be reversed on some recorders from the wiring shown in Diag. 3, in other words the colored conductors will be soldered to the right-hand terminal. When replacing heads, re-wire in the same manner.

### 4.2. Tape Tension

- Cover light at the optical end-of-tape switch.
  Measurement values are taken on a core of diameter 115 mm ( 4,5 " ).
- Load and lock empty reel.
- Wind several turns of thread on empty reel and pull thread off slowly in the sense indicated, resulting in the following values:

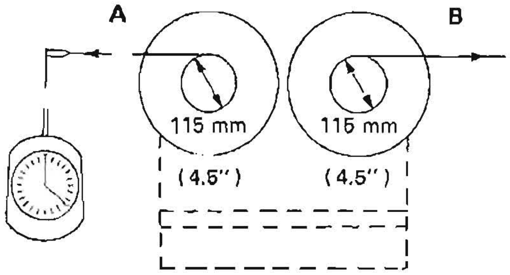


Fig. 4.2–21

| Function | 7.5 ips or 3.75 ips | A | B |
|---|---|---|---|
| PLAY | tape tension, high | 70 gr<br>( 2.5 oz.av ) | 85 gr<br>( 3 oz.av ) |
| PLAY | tape tension, low | 30 gr<br>( 1 oz.av ) | 50 gr<br>( 1.75 oz.av ) |
| ≪ | | 210 gr<br>( 7.4 oz.av ) | about 20 gr<br>( .7 oz.av ) |
| ≫ | | about 20 gr<br>( .7 oz.av ) | 230 gr<br>( 8.1 oz.av ) |

Table 4.2–22

Check operating voltages of reel motors and phase shift capacitors if these values aren't attained; see table 5.9 –46 and section " Modifications " per 8.1.( Rewind ).

### 4.3. Brakes ( Stop )

The stop brakes are effective with solenoid de-energized.
– Push STOP button.

### 4.3.1. Brake Torque Measurement

Preparation for measurement per 4.2.
Correctly set brakes have following torques:

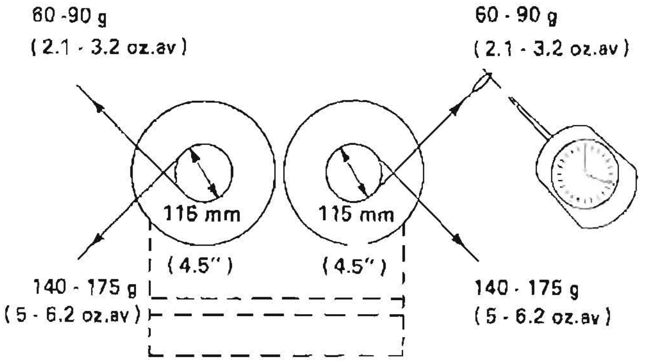


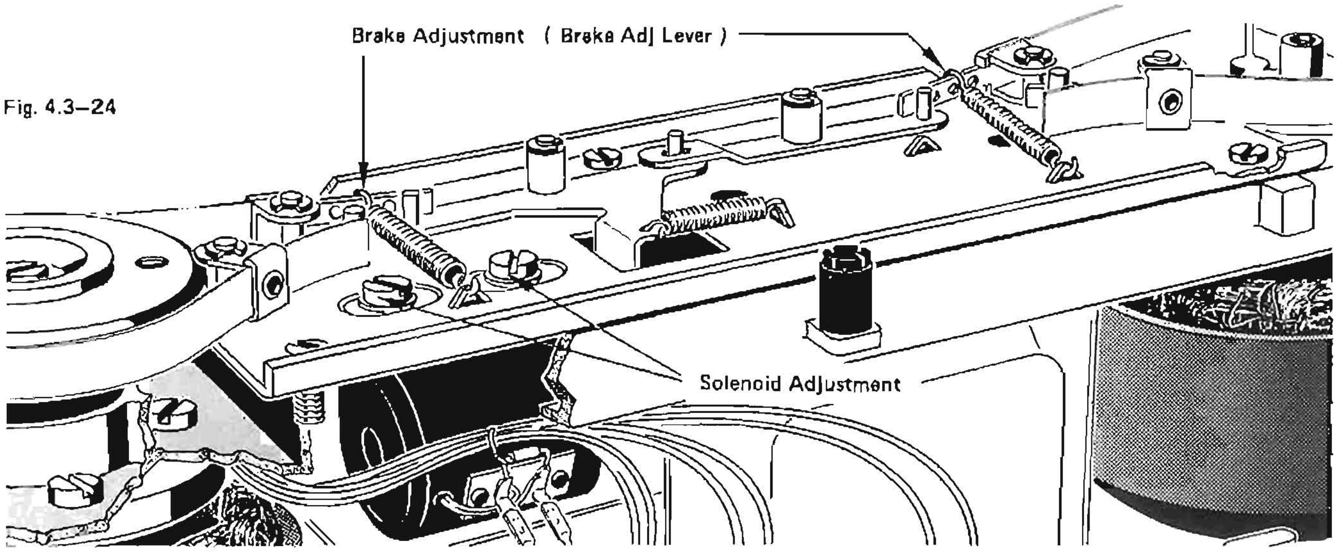
Fig. 4.3–23

### 4.3.2. Brake Adjustment

Check brake system if above mentioned torques are not reached. Brake linings and bands must be absolutely clean and **free of grease**. Brake bands must be devoid of kinks and lay up full-width on lining.

Details on the modified brake system (brake return spring attached **to both ends** of the brake-band) are shown on page PL 7a of the parts list. Brake mechanism and solenoid stroke are reset after exchanging band and/or linings.

Fig. 4.3–24



- Loosen brake manually ( push in solenoid core ).
- Check if both brakes clear simultaneously; if not unscrew the 3 chassis fasteners partly, slide chassis around till both bands are clear.
- If necessary, bend one brake adjustment lever.

The solenoid has to be energized for adjustment.

- Cover light at the optical end-of-tape switch.
- Depress " Reel Motors off " ( 42 ), depress button ≪ ( fast rewind ).
- Loosen fastening of solenoid and reset so that the bands clear rollers by from .1 -.2 mm ( . 040" to . 080" )
- Secure solenoid during this adjustment. Braking torque can be varied by hooking springs at different places on the brake adjustment lever.

### 4.4. Pressure Roller

The pressure lever is actuated electromechanically. Pressure is set by the variable spring force ( fig. 4.4 –25 ).

### 4.4.1. Pressure Measurement

- Load tape with 1 kHz record.
- Switch on PLAY.
- Tie nylon thread to pressure roller axis ( or to a pin affixed thereto )
  and pull with a spring scale ( or contactor ) in sense A till sound volume drops noticeably.
  The spring scale must show 1.5 kg ( 3.3 lb. av ).
- Screw C sets pressure force.

### 4.4.2. Pressure Solenoid Readjustment

- Switch instrument to PLAY. If no tape is loaded, cover light at optical end-of-tape switch.
- Slide pressure solenoid to the right gap B (fig. 4.4–25) is .3 mm ( . 012" )
- Block pressure solenoid.
- Check if solenoid core is in end position. The core shall not move if the lever is pulled slightly from the capstan axis.
- Secure fasteners of solenoid with a drop of lacquer.
- Check pressure, reset screw C if necessary.

### 4.4.3. Exchange of Pressure Roller

- Hold pressure roller axis at groove from above ( fig. 4.4 –25 ) and remove bolt fastening E to the side.
- Pull pressure roller axis up and roller to the side. Reassembly is explained in the replacement parts list.

Make sure that no cleaning fluid gets to the sintered bearing while cleaning the roller.

### 4.4.4. Pressure Lever Readjustment

After exchanging the pressure lever, it is necessary to readjust it with respect to lever F ( fig. 4.4 –25 ). When the lever is stopped ( solenoid core fully out ), the distance between capstan axis and pressure roller shall be 10 mm ( .4 " ).

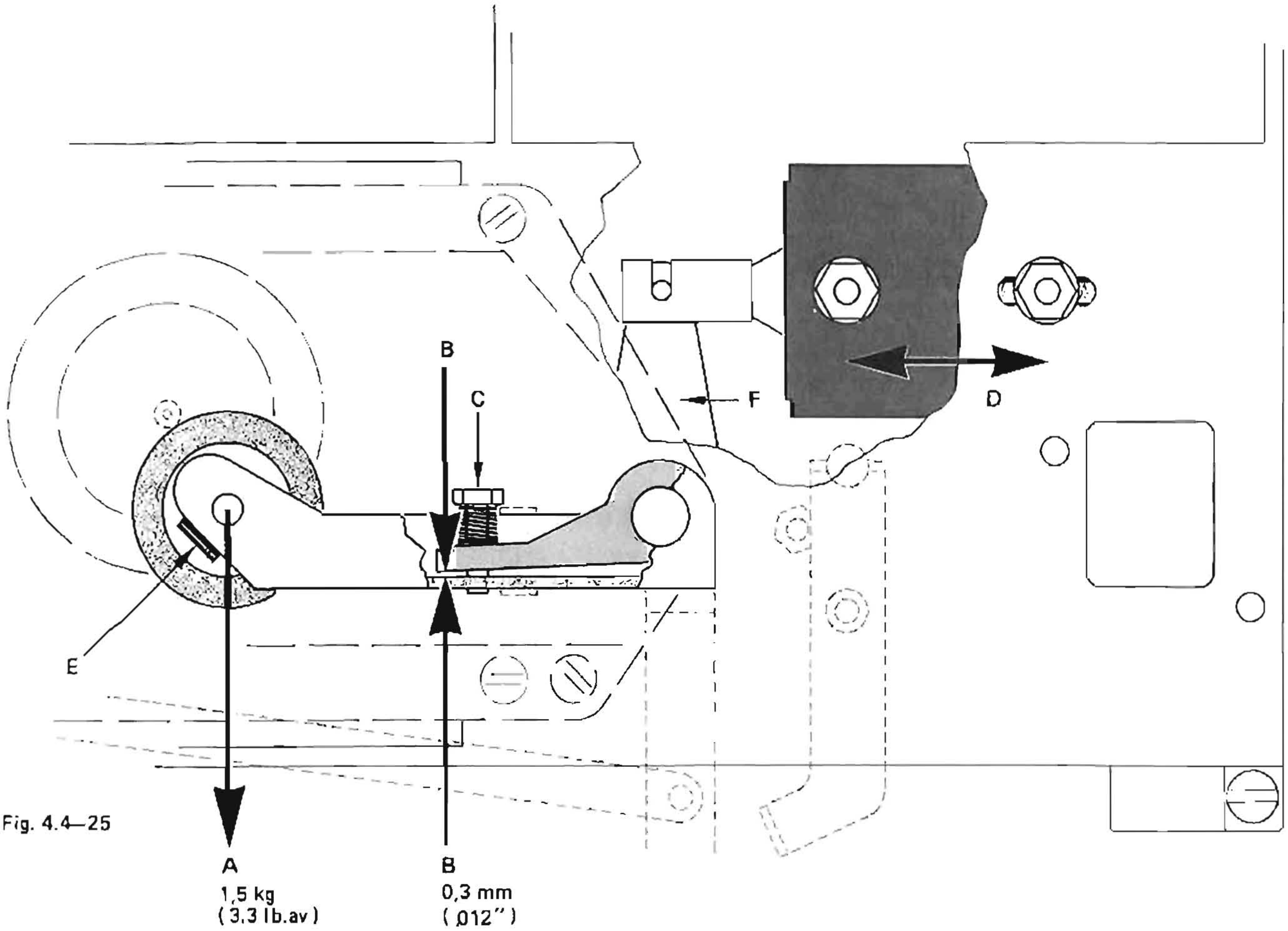


Fig. 4.4–25

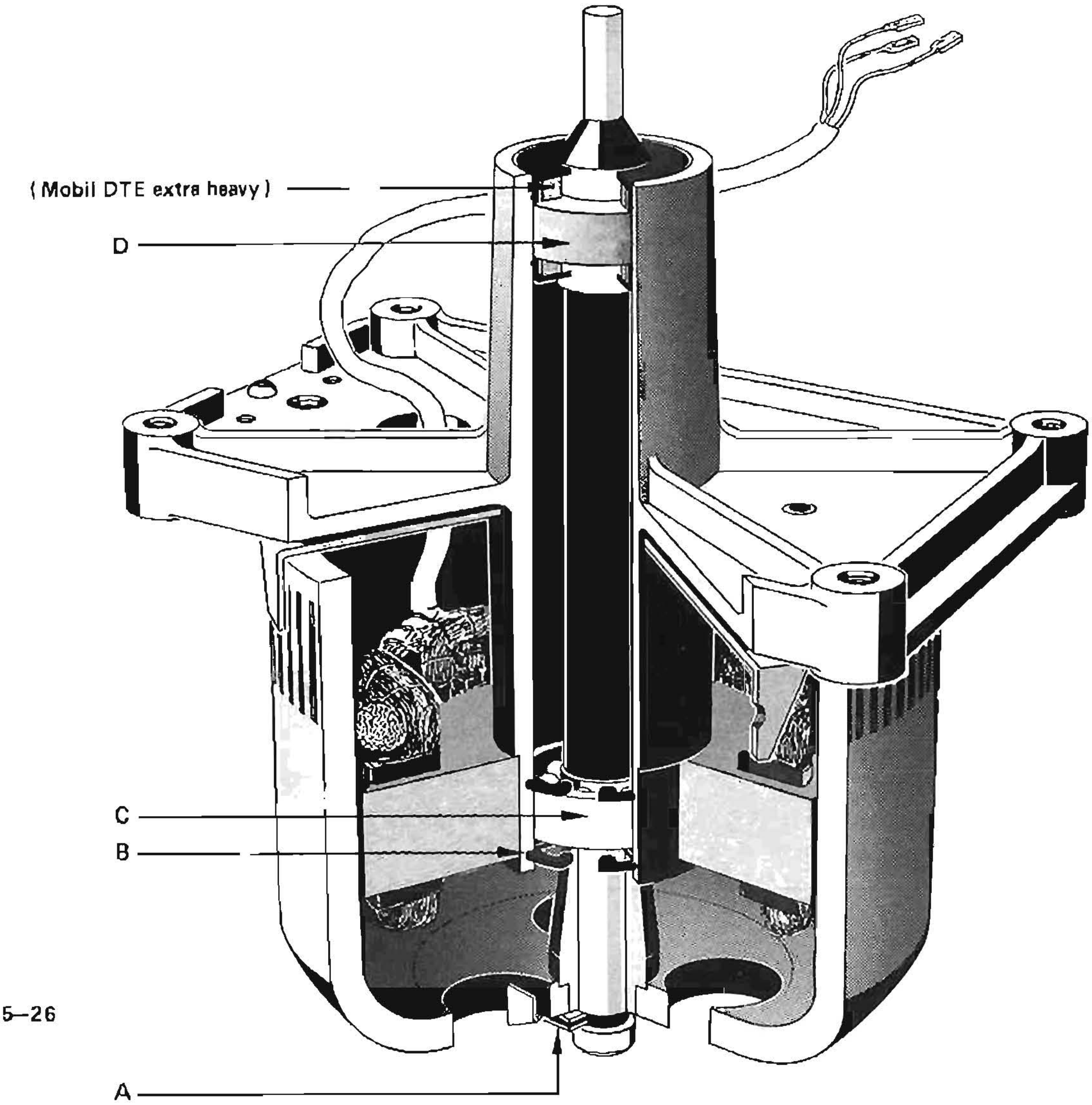


Fig. 4.5–26

ATTENTION

**Capstan Motor with Sleeve Bearings**
Modification effective from
serial Nr. S 60483
G 78003
see section 8.6./page 35

### 4.5. Capstan Motor (with Ball Bearing) Fig. 4.5.–26

( Control circuitry see 5.10 & 6.2. )
The capstan axis goes completely through the motor. It is held by a sintered bronze bearing ( D ) and below by a ball bearing. Both bearings are lubricated for their life and should normally require no service. Capstan axis and ball bearing can be exchanged very easily. A defective sintered bearing is to be sent to the nearest factory representative. ( Disassembly see para 3.7. )

### 4.5.1. Removal of Capstan Axis, Ball Bearings

The capstan motor need not be removed to get axis and bearing out.

- Unfasten securing clip A. Lower capstan rotor.
- The axis can be taken out through the top if the tape guide between playback head and capstan axis has been screwed off ( don't disturb guide setting ).
- If the retaining ring B is removed, the capstan axis can be lowered with bearing C.

Bearing C is a special tight tolerance part and shall be exchanged only with an original bearing.

**Special care must be taken with handling the capstan axis and bearings to avoid damage or entry of dust into the precision parts** ( run-out better than 1/1000 ·mm = 40 micro - inch ! ).

Instructions for installation of the new no-turn device A in conjunction with old rotors are given on page PL 9 of the parts list.

### 4.6. Exchange of Reel Motor Bearings

- Remove reel motor per 3.6.
- Remove brass sleve A. Open clip B and retaining ring C with retaining pliers, open only wide enough to pull them away. Lower rotor with axis out of motor frame.

The belleville springs (see parts list PL 8) remain on the shaft.

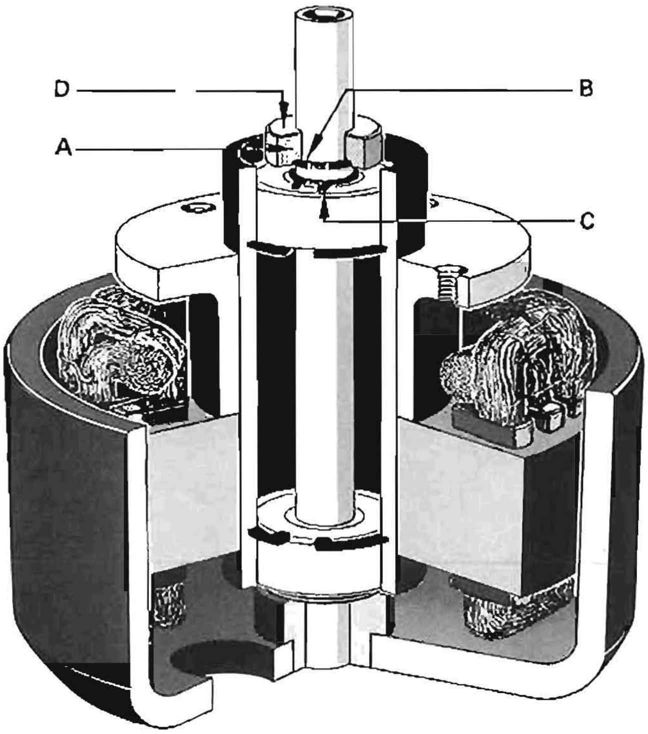


Fig. 4.5–27

In addition to sleeves A there are washers D for height adjustment of the brake drum ( reel plate ). Be sure to put these parts on the same motor axis at assembly.
The reel motor ball bearings shall exchanged only with original bearings.

### 4.7. Lubrication

All bearings are lubricated for their life and should normally require no service. They shall be exchanged only with original bearings, in case of malfunction. If the capstan axis is exchanged, the upper felt washer of sintered bearing D ( fig. 4.5 –26 ) is to be lubricated with some drops MOBIL DTE extra heavy.

### 4.8. End-of-Tape Switch ( Operation: per 5.9.1. )

The light source of the optical end-of-tape switch can be removed by lifting it upward.

# 5. ELECTRONICS

The electronic circuitry is divided into groups, plug-in modules for the most part. There are etched circuit card plug-in modules for :

- Input amplifier, record amplifier, playback amplifier, oscillator, and record relay.
- Output amplifier.

There are several etched circuit boards, rigidly mounted but with plug-on connectors for:

- Regulator
- Drive control with photoelectric end-of-tape switch.
- Capstan motor control.

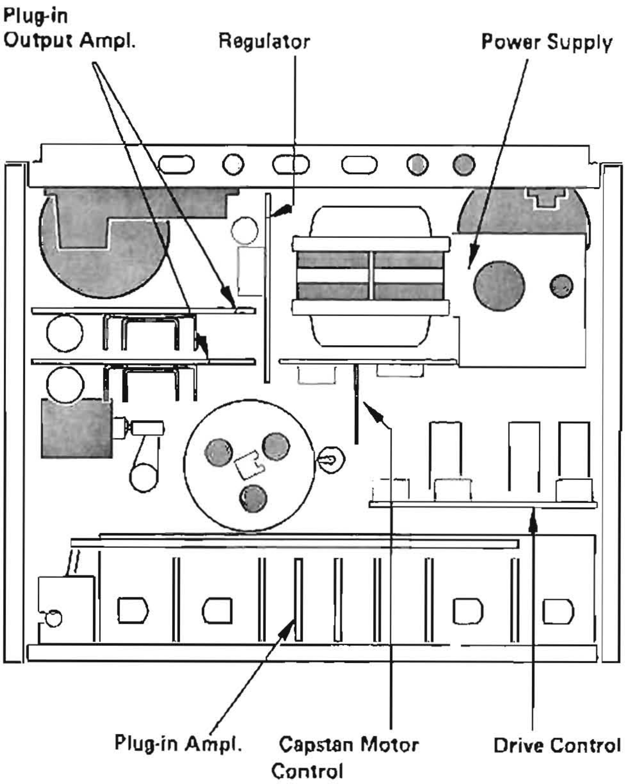


Fig. 5.–28

**Block Diagram** ( Amplifiers )

The block diagram shows the relationships between the plug- in amplifiers.

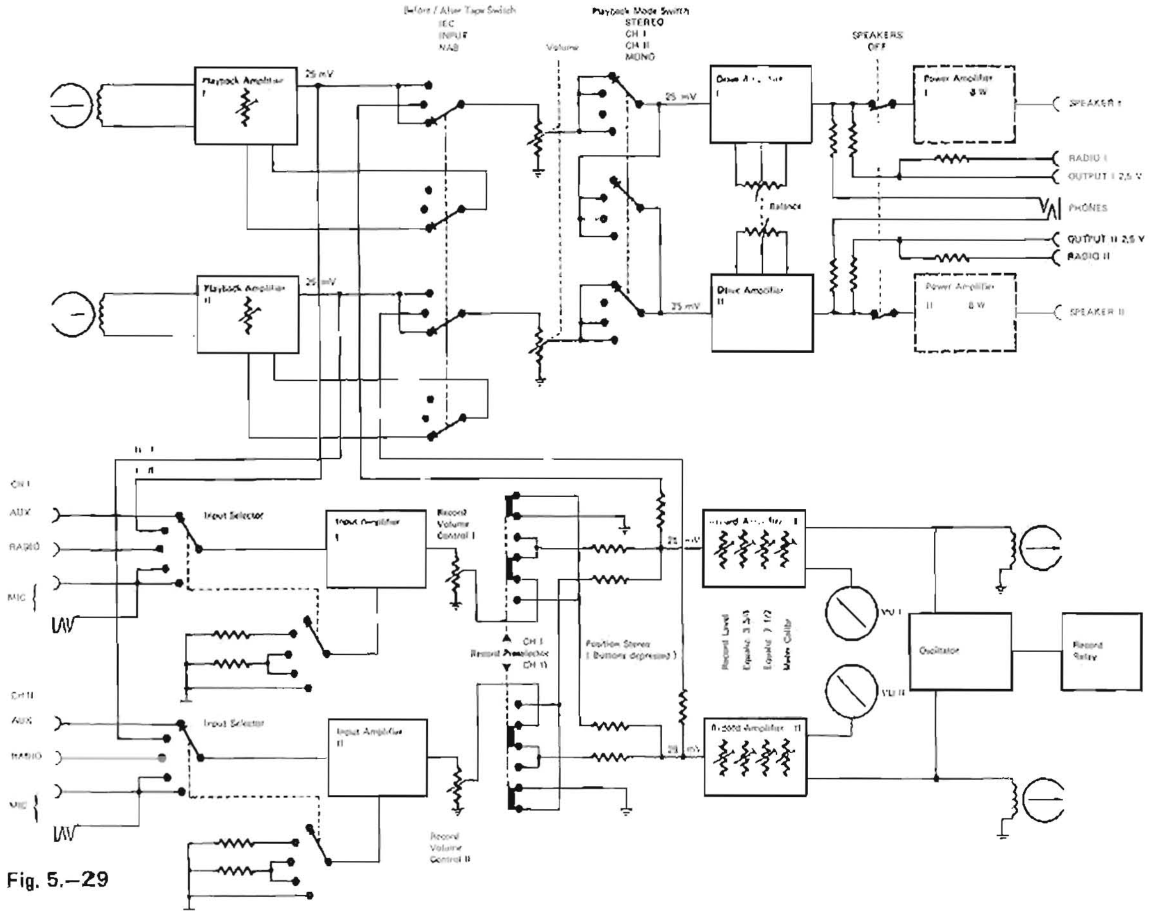


Fig. 5.–29

## 5.1. Switch Board and VU-Meter Board

( Diagram No. 1.077.435 & 1.077.480 )

( Removal per 3.12 )

The switch board carries plug-in amplifiers ( without output amplifiers ), control switches and potentiometers for inputs, balance and volume. The shielded inputs can be plugged on the switch board ( below, left-hand ). Inputs for playback amplifiers as well as outputs for OUTPUT and output amplifiers can also be plugged in ( right-hand ).
The equalization slide switch is controled through the power switch. It has to be readjusted in case of exchange. This is done with screws F ( fig. 3.12 –16 ).
The switch terminal contact areas for input selector, before-and-after tape switch, and playback functions are printed directly on the board. The rotary switches are encased and indexed against misorientation. Check fig. 5.1 –32. for case and contact configurations. Assembly information is in the spare parts list.

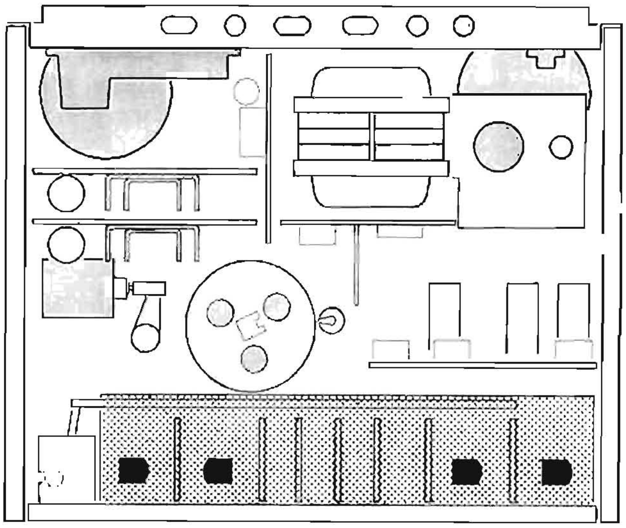


Fig. 5.1–30

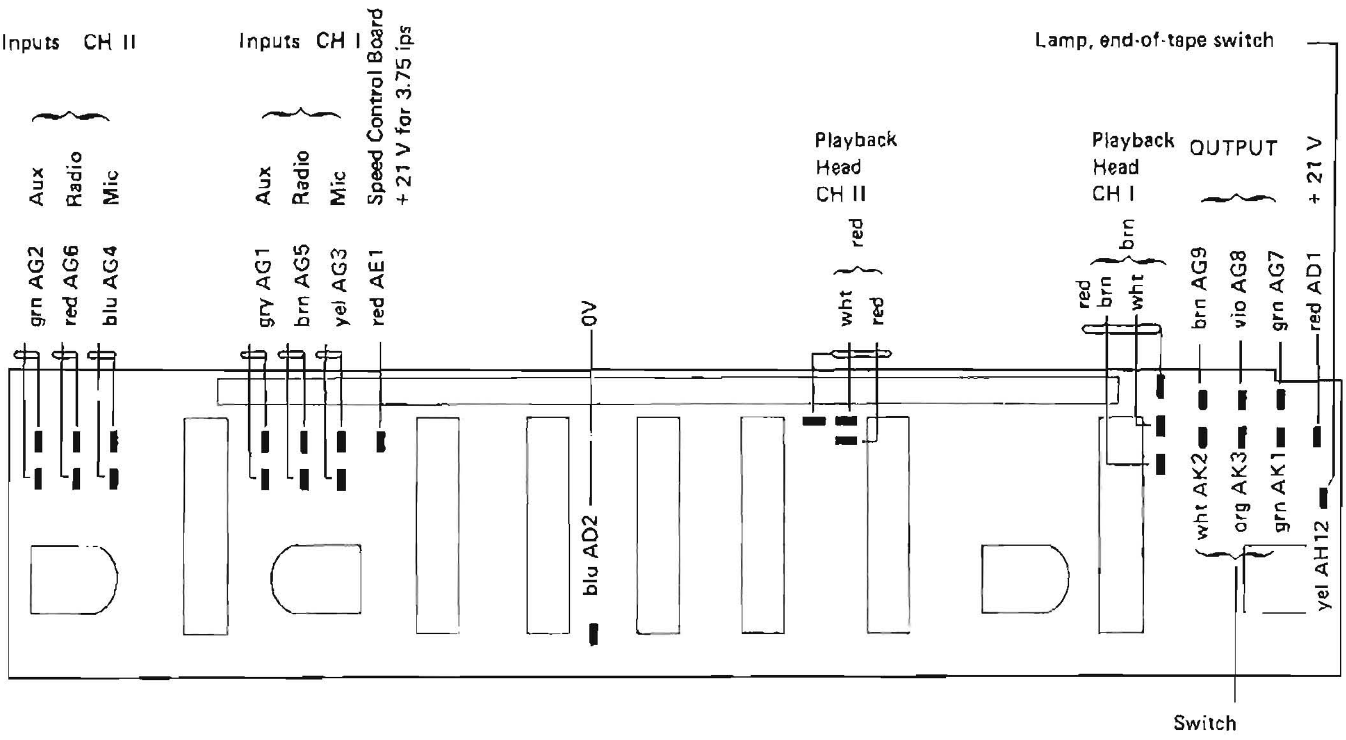
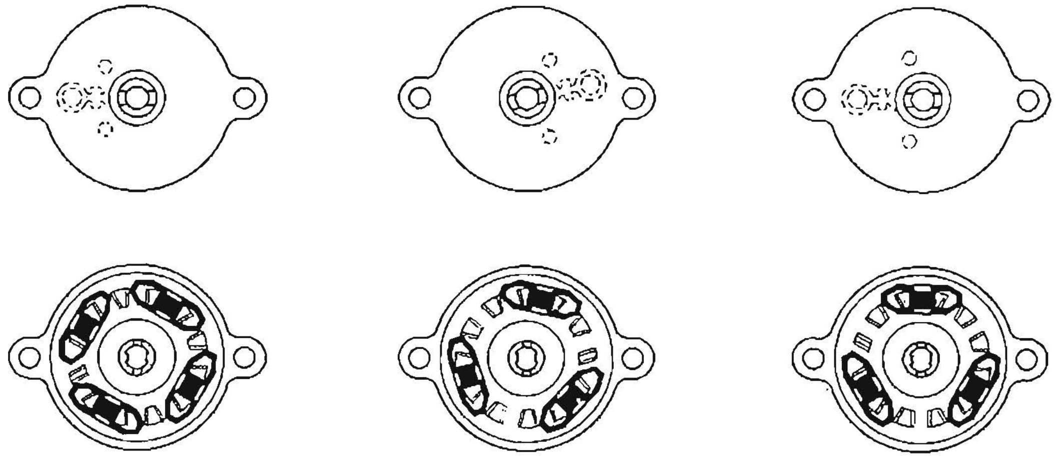


Fig. 5.1–31



Before / After Tape switch
( Playback selector )

Playback
Mode Switch

Input selector

Fig. 5.1—32

The VU-meter board is linked to the switch board by connectors. It carries the preselector buttons for CH 1 and CH 2; they switch the record-erase signals. ( Note that the audio signal has to be switched inversely on the record amplifier when neither button is depressed ! )

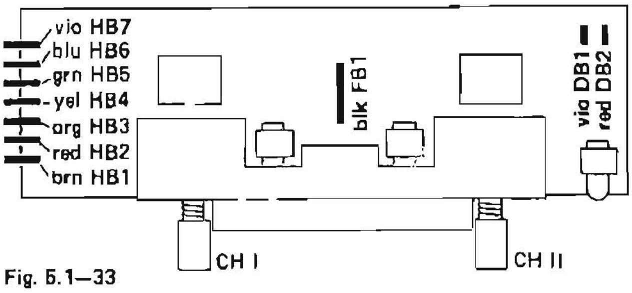


Fig. 5.1—33

## 5.2. Input Amplifier ( 1.077.700 )

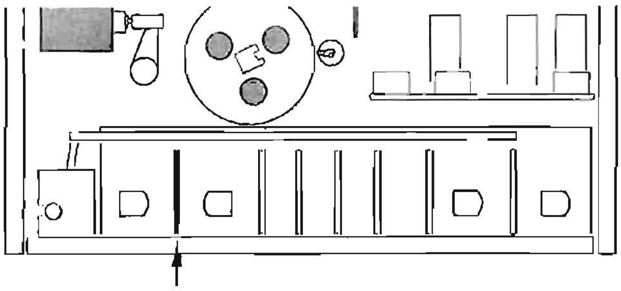


Fig. 5.2—34

The input amplifier card contains the pre-amplifiers for both channels.
Input sensitivity is matched through a stepped variable feedback (d.c. feedback fixed) at the signal source voltages AUXILIARY ( 35 mV ), track transfer ( 8 mV ), RADIO ( 2,5 mV ), MICROPHONE high ( 2,5 mV ), MICROPHONE low ( .15 mV ).

Resistor R 406 / R 426 ( 100K ) is bridged or reduced by parallel resistors for this purpose. If R 406 / R 426 is shorted, amplification of the whole stage is A = 460 approx with 1K in parallel A = 20 approx, and without parallel resistor A = 1.2 approximately. Parallel resitors R 316 / R 317 ( CH 1 ) and R 321 / R 322 ( CH 2 ) are on switch board 1.077.435. The output stage configuration has the advantage that the supply voltage can be fully modulated. Output voltage is nominally 50 mVac, but it can deliver up to 6 Vac undistorted.
This corresponds to an overmodulation stability of more than 40 dB. Aside from the overmodulation stability, sensitivity matching of the input stage through feedback has the advantage in that input noise is not worsened by the series-connected voltage divider.

## 5.3. Record Amplifier ( 1.077.705 )

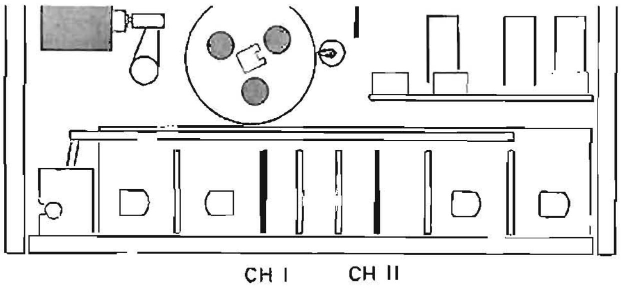


Fig. 5.3—35

The record amplifier cards contain an equalization pre-amplifier ( Q 501, Q 502 ), a VU-meter amplifier ( 503 ), and a driver amplifier ( Q 504, Q 505 ). At the input of the equalization pre-amplifier is a bus voltage level of about 25 mV ( at 1 kHz and nominal input signal, record regulator fully opened ).

Recording is equalized per NAB standard. Lows equalization ( 3180 µsec ) is accomplished by feedback through series-connected C 504 and trimpotentiometers P 501 and P 502. Highs equalization can be set separately for both speeds; P 502 for 7.5ips, P501 for 3.75ips.

Trimpot P 503 serves for voltage balance. The driver amplifiers are laid out for high overmodulation stability. Transistor Q 505 supplies the necessary collector d.c. to Q 504 for modulation.
Q 505 represents high impedance for AF which furnishes the entire output a.c. for modulating the record head. Modulation reserve is better than 15 dB. A tank circuit with a resonant frequency of 38 kHz causes current depending feedback in the emitter circuit of the driver stage ( L 502 / C 514 ) for pilot carrier remainders which could interfere with the erase frequency. Between the decoupling point and record head is another tank circuit for the bias of 120 kHz ( L 501 / C 517 ). The decoupling point is shorted by the record relay during playback.
Amplification of the VU-meter stage can be calibrated on P 504.
To protect the VU-meter indicators against RFI ( radio frequency interference ), resulting in misindication, the stage is decoupled for RF with C 508.

## 5.4. Oscillator ( 1.077.710 )

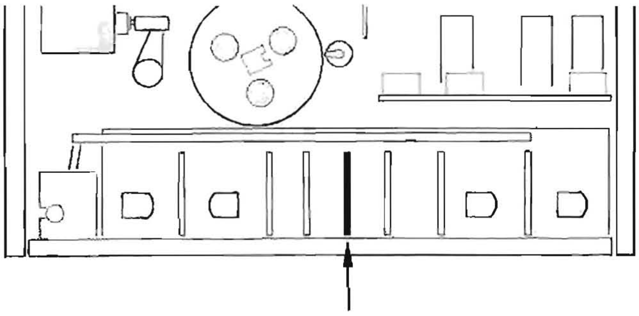


Fig. 5.4–38

The push-pull collector circuit guarantees minimum odd harmonics. Symmetry of sinusoidal waves is assured and interfering d.c. components can't arise. Erase and bias of 120 kHz is high enough to prevent their interfering. The erase frequency is symmetrically decoupled. In mono-operation, load is held constant by the compensation coil ( para 5.5. ) which proves advantageous for voltage and frequency stability.
Bias current can be set with trimpots P 707 to P 710 separately for CH 1 and CH 2 as well as for both tape speeds.

## 5.5. Record Relay ( 1.077.715 )

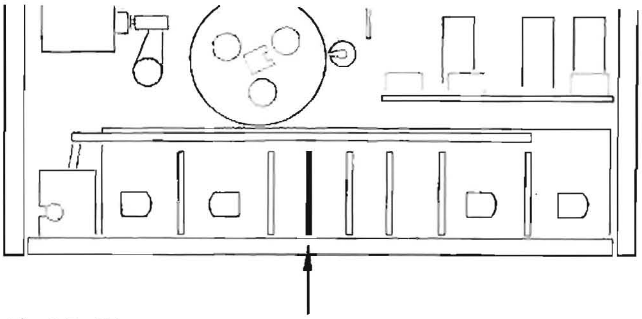


Fig. 5.5–37

Purpose of the record relay with an electronic switch is to turn on the oscillator " softly ". To get an integral curve of the switching voltage, Q 601 ( switching transistor ) is delayed by an RC - network ( R 603, C 602 ).

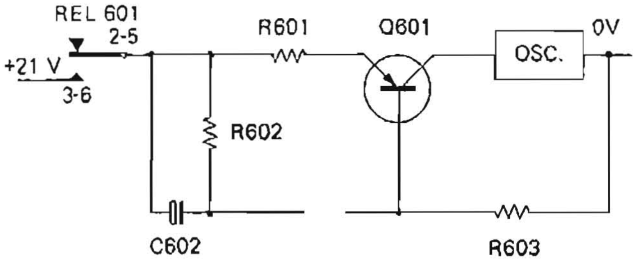


Fig. 5.5.–38

C 602 is discharged at the start and the base of Q 601 is at 0V. If contacts 2/3, 5/6 of record relay REL 601 close, bias voltage rises with the charge on C 602 till saturation. When contacts 2/3, 5/6 open, C 602 discharges over R 602.
The head compensation coil has two winding halves acting as dummy load for the inactive half of the erase head during mono-operation. The compensation coil balances out inductive strays of the erase head.
Resistor R 604 corrects Q - factor and assures minimum voltage jump between monaural and binaural operation ( exchange of erase head may require resetting ).

## 5.6. Playback Amplifier ( 1.077.720 )

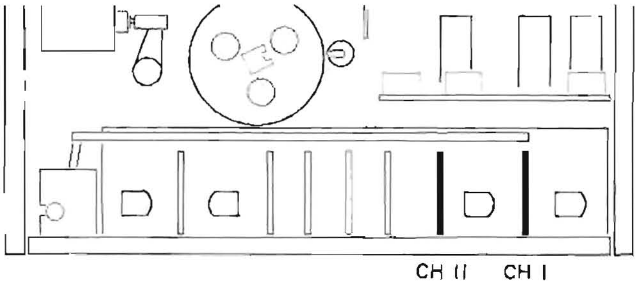


Fig. 5.6–39

Playback amplifier cards each contain one playback ( pre- ) amplifier and one drive amplifier. The playback head is d.c. coupled to the input stage ( Q 801 ). D.c. feedback from the emitter voltage divider of stage ( Q 802 ) goes over the playback head to base ( Q 801 ) and stabilizes its quiescent point. The feedback current is less than 1 µA which avoids magnetization of the playback head. AF-components of the feedback are shunted through C 803. Its capacitive resistance becomes effective at very low frequencies ( less than 20 Hz ) so that these frequencies are fed back. Playback equalization is switchable NAB - IEC ( CCIR ). The equalization circuit is in the feedback branch collector Q 802 / emitter Q 801. The RC-member R 808 / C 805 / takes care of the lows equalization ( 3180 µsec ).

Basic time constants of equalization are obtained by shorting the partial resistors of the circuit. For :

| | | | |
|---|---|---|---|
| 7.5 ips | NAB | ( 50 µsec ) | 3 - 4 - 5 |
| | IEC | ( 70 µsec ) | 3 - 4 |
| 3.75 ips | NAB / IEC | ( 90 µsec ) | 4 - 5 |

At the pre-stage exit is a 120 kHz tank circuit for the bias frequency and trimpot P 801 for setting the level of the bus voltage. The signal is conducted over the before- and - after - tape switch, volume control, and playback mode switch ( channel selector ) to the drive amplifier.
The drive amplifier is three-stage d.c. coupled. It amplifies the signal to the level of the terminals OUTPUT, headphones, as well as for the modulation of the plug-in power amplifiers. D.c. feedback, emitter voltage divider Q 804 / base Q 803 stabilizes the quiescent points of all three stages. Balance regulation is accomplished with potentiometers P 303, P 304 ( coupled ) in feedback branch emitter Q 805 / emitter Q 803.

In STOP position, when the pressure lever is at rest, output of the playback pre-amplifier ( 13 ) is shorted through contact S 5 ( switch board 1,077.435 ).

## 5.7. Power Amplifier ( 1.077.850 )

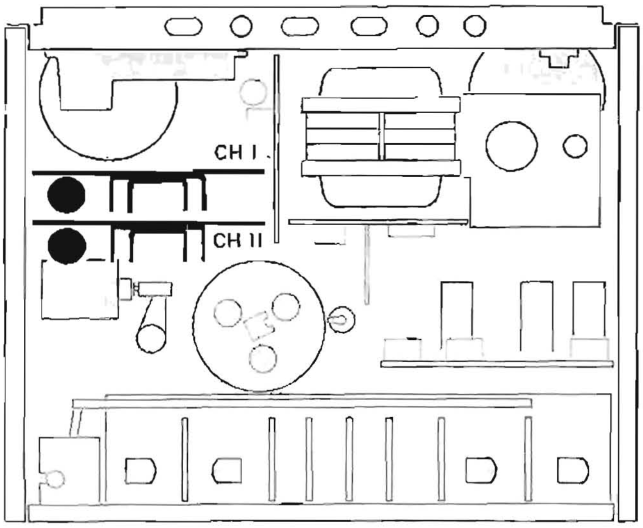


Fig. 5.7—40

The power amplifier cards have separate rectifiers and filters for each channel. The power transformer has two separate windings ( 32 Vac ) for the power amplifiers. The entire amplifier is d.c. coupled and works with a single-ended push-pull output stage. The loudspeaker is, practically free of d.c., in the diagonal of a bridge formed by Q 905 and Q 906 as well as the electrolytic capacitors C 907 and C 908. Q 901 and Q 902 operate as voltage amplifiers.
Series connected D 901, R 911, D 902 are used to keep the no-load current of the output transistors constant, independent of temperature. By strong d.c. depending feedback ( 100 % ), collector Q 906 emitter Q 901, the zero point of the loudspeaker output is held constant. AF-amplification is set by the voltage ratio R 905 to R 906.

## 5.8. Power Supply

( Diagram Tape Drive 1.077.100, No. 1.077.540 )

( Removal, per 3.9. )

Both lines of the power supply can be switched off ( Micro-Switches ) In addition there are two break-contacts which disconnect upon removal of the housing. The sectional tape core power transformer has five windings for following units :

| | | |
|---|---|---|
| Capstan and reel motors: | 130 Vac | (150 Vac) with 4 taps |
| Relay control : | 22 Vac | ( supply voltage 27 Vdc ) |
| Amplifier supply : | 24 Vac | ( supply voltage 21 Vdc, regulated ) |
| Output amplifier : | 32 Vac | ( CH 1 ) |
| Output amplifier : | 32 Vac | ( CH 2 ) |

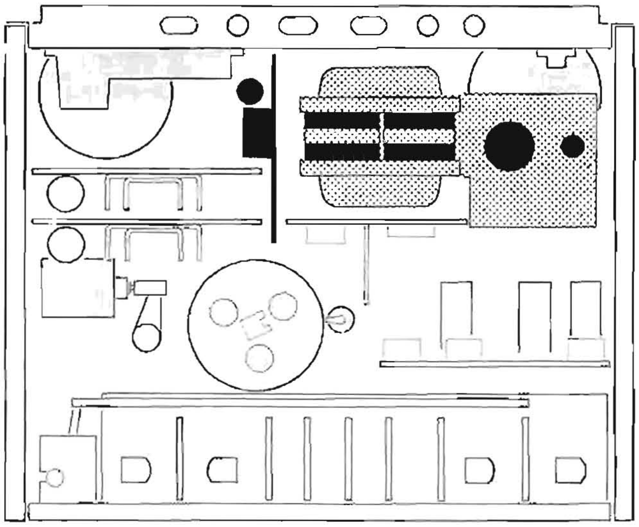


Fig. 5.8—41

Power supply board 1.077.540 carries the output amplifier connectors.
The electronically regulated voltage (21 V) for amplifiers (and oscillator) is adjusted at P 106. The transistor Q 102 acts as a series regulator, whose conductivity is controlled by Q 101. The zenerdiode D 104 provides a 12 V reference for the emitter of this latter transistor.
Diode D 103 protects the base-emitter diode of transistor Q 101 from overload in case of possible short circuit in the amplifier section.

## 5.9. Drive Control

( 1.077.370, Diagram Tape Drive 1.077.100 )

( Removal per 3.8. )

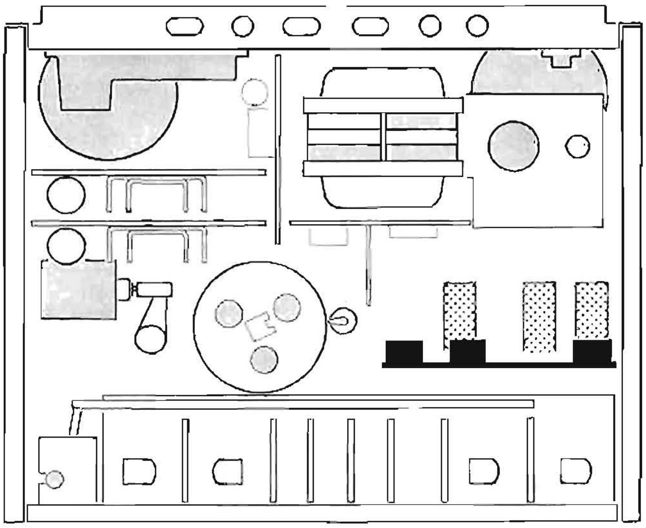


Fig. 5.9–42

The drive push buttons operate contacts on control board 1.077.370. Remote control contacts can be paralleled to these contacts ( remote control contacts F3 to F10 ). To have a minimum of relays, their control is locked by diodes. The principle of their control is explained by an example for better understanding. In the circuit of fig. 5.9–43, relay A is energized and contact a 8/12 ( self-holding ) is closed. This corresponds to mode PLAY. Relay B is without current, contact b 6/10 is open.

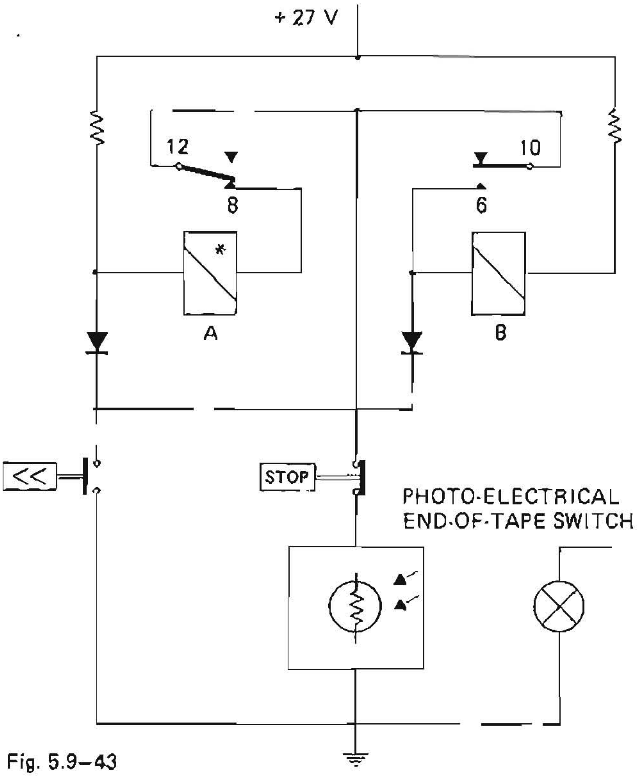


Fig. 5.9–43

If button << is depressed, relay A is shorted and drops off. Simultaneously relay B is energized and holds itself over self-holding contact b 6/10. Self-holding can be interrupted by the STOP button or by the photoelectric end-of-tape switch. The following table indicates which relays and solenoids are energized for corresponding functions.

Table 5.9–44

| | A | B | C | Record Relay | Roller Solenoid | Brake Solenoid |
|---|---|---|---|---|---|---|
| STOP | | | | | | |
| PLAY | x | | | | x | x |
| >> | | | x | | | x |
| << | | x | | | | x |
| REC | x | x | | x | x | x |

To avoid loose tape loops at record and playback starts, the right-hand reel motor receives elevated voltage for about 0.3 sec ( winding reversal voltage 105 V ). Relay C must be energized a short period for this, accomplished by the following circuit :

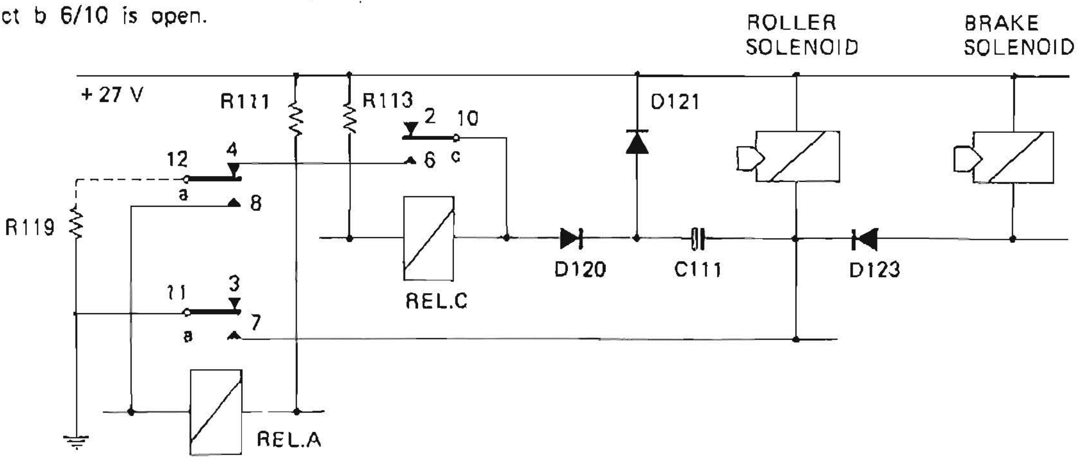


Fig. 5.9–45

If the instrument is in the STOP mode, relay A is without current and contacts a 12 and a 11 are in rest position ( fig. 5.9 –45 ). If relay A is energized ( PLAY mode ), it will hold over self-holding contact a 8/12. Contact a 7/11 closes. A charging current to capacitor C 111 flows over the relay. This energizes relay C and switches the right-hand reel motor to 105 V over contact c 5/9 ( self-holding relay C is interrupted by contact a 12 ). The charging current falls with increasing charge on C 111 and relay C drops off. When switching back to STOP mode, contact a 7/11 opens and capacitor C 111 discharges over the windings of brake and roller solenoids.

The following table summarizes motor voltages for the drive modes.

| Mode | Motor Voltages in Vac | | | |
|---|---|---|---|---|
| | Rewind Motor | | Winding Motor | |
| | ○ | ○ | ○ | ○ |
| PLAY/REC | 55-6 = 49 | 42-6 = 36 | 55 | 42 |
| >> | 21 | | 105 | |
| << | 99 | | 15 | |

Table 5.9–46

### 5.9.1. Photoelectric End-of-Tape Switch

The working current loop of the relays is closed over the self-holding contacts, the STOP button and the collector-emitter path of switching transistor Q 112. Triggering the end-of-tape switch ( Schmitt-trigger ) does the same thing as depressing the STOP button.
As soon as light falls on photoelement R 155, its resistance drops and base voltage at Q 111 rises. Collector voltage at Q 111 drops and cuts off Q 112.

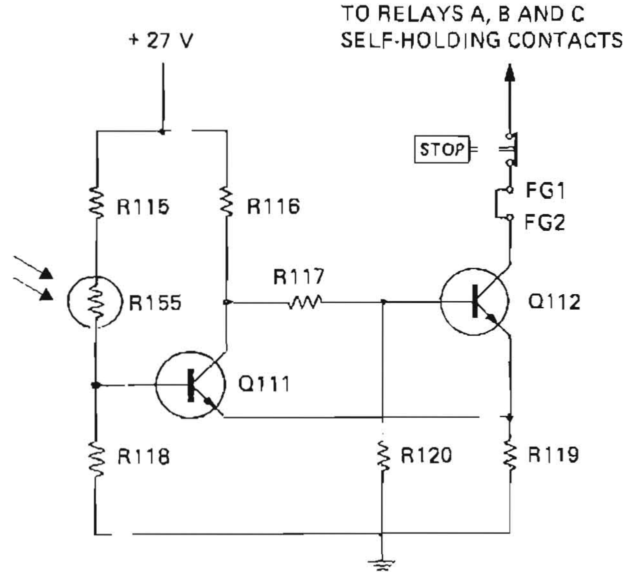


Fig. 5.9.–47

The process is accelerated by the falling emitter voltage on R 119 ( feedback ), so that a pulse-type transcient occurs despite the gliding resistance change of R 155 ( sensitivity inertia ).
The trigger conditions light - dark, generate the following voltages at collector Q 111: light, 1 V; dark about 22 V.
To check the photoresistor, for light and dark values, it must be disconnected from the circuit. Connections FH1 / FH2 ( green ) on switch board ( fig. 3.8 -11 ) have to be pulled for this. The resistances are: light, less than 2 kOhm; dark more than 20 kOhm.
( Don't solder at the soldering terminal of the photoresistor, it is heat sensitive ).

### 5.10. Speed Regulation, Capstan Motor ( 7.077.725 )

( Removal per 3.9. )

The electronically regulated tape drive of REVOX A77 uses a method unknown so far in tape recording. That is why this technology of regulation is described here rather detailed. Checks and adjustment of the regulation electronics are done per 6.2.

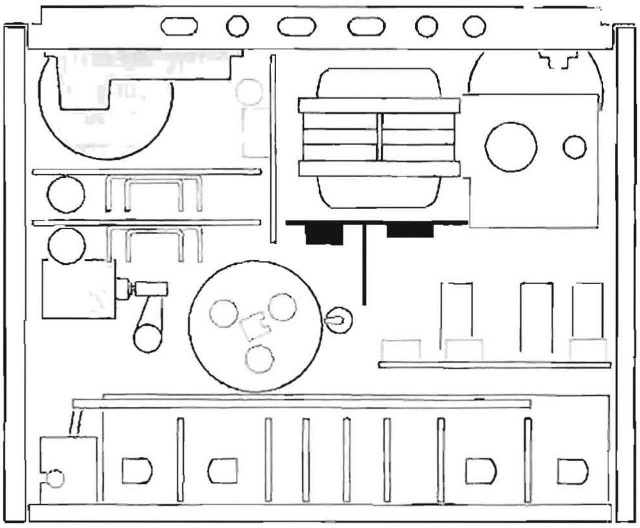


Fig. 5.10–48

The capstan motor speed is electronically measured and continously regulated. The driving element is a robust and unpretentious asynchronous motor, whose homogeneous outer rotor generates a minimum of torque pulses, reflected in scant wow or flutter.
To measure the speed, a 120-teeth high-precision gear is cut into the outside surface of the rotor. They are inductively counted by a special pick-up head. The speed is then transformed into a proportional frequency which is analyzed for momentary value in an electric circuit. Any deviation from the nominal, 1600 Hz for 7.5 ips and 800 Hz for 3.75 ips, is detected as to magnitude and sign, and changes the voltage applied to the motor.

The actually regulating network ( fig. 5.10–49 ) consists of a bridge rectifier in series with the supply, whose diagonal is loaded more or less by a power transistor. A power transistor with nearly constant base current doesn't show a genuine resistance characteristic ( I V ), for it acts as current control element.

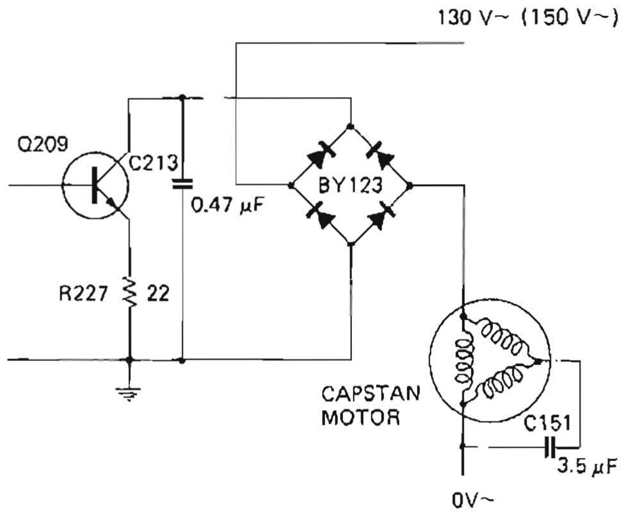


Fig. 5.10–49

Circuit 1.077.725 consists of tachometer signal amplifier ( Q 201 to Q 205 ), the discriminator, and d.c. amplifier with power stage ( Q 206 to Q 209 ). The tachometer signal amplifier amplifies, makes symmetrical and limits the pick-up frequency to supply square wave pulses to the discriminator. D.c. dependent feedback stabilizes the quiescent points of the amplifier stages. The discriminator consists of an LC-series-resonance circuit of utmost constancy due to type of circuit and components used. Best drift characteristics are essential to guarantee the required maximum speed variation of .2 % !

The discriminator frequency can be changed from 1600 Hz to 800 Hz by switching in capacitor C 207. In addition, diode D 201 is polarized in conductive direction, thus requiring at the control side but one low current contact, it also decouples the control line ideally.

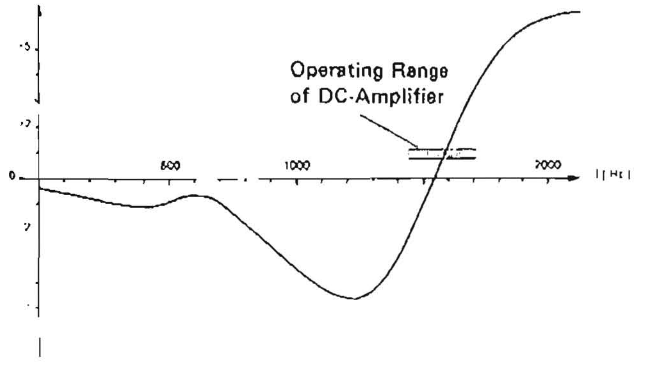


Fig. 5.10–50

The series potentiometer P 201 allows detuning the resonant frequency slightly. This permits calibration of the speed separately. The high speed is set by adjusting primarily the circuit's inductivity. Fig. 5.10 – 50 shows the voltage characteristic as a function of frequency for the whole discriminator. The operating range of the following d.c. amplifier is given for clarification.

The discriminator is temperature compensated along with the entire circuitry. Fig. 5.10 – 51 shows the typical thermal characteristic of the whole system, measured inside the climatic chamber while motor was running.

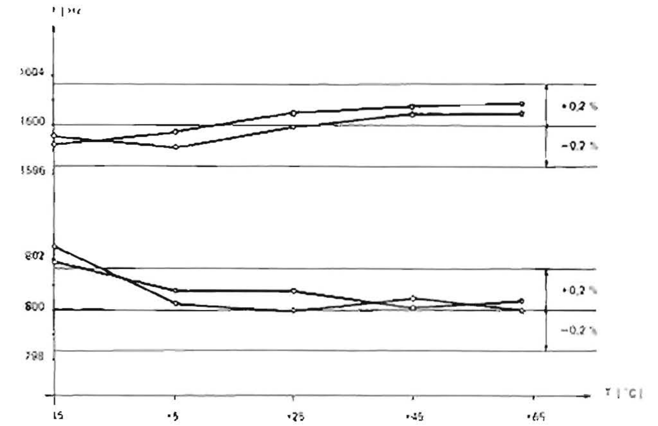


Fig. 5.10–51

The signal, delivered from the discriminator, is stripped of a.c. components from the tachometer frequency by integration ( C 210 & C 211 ). The R 215 - C 209 member corrects phase error in the control circuit and improves stability. D.c. amplifier Q 206 - Q 207, whose operating range is shown in the discriminator characteristic, has an amplification of 40 dB. It brings the signal to the value needed for power amplifier Q 209. The phase inversion stage Q 208 has little amplification. Power stage Q 209 consists of a transistor which resists those peak voltages that can occur during cut-off and is able to conduct the power loss, generated during operation, onto the heat sink.

Some interesting system data :

1. Steepness of the discriminator and amplification factor of the following amplifier cause the motor voltage to traverse from 0 Vac to the maximum value 130 Vac within 3 Hz frequency deviation at the 1600 Hz tachometer signal frequency. This means that the motor receives full or no voltage for a percentage deviation of ±.1%.
2. Line voltage variations of 20 % cause a deviation in speed of the order of ± .04 %.
3. Variations ± 10 % in operating voltage 21 V, cause a deviation of speed by ±.1 % ( operating voltage is additionally regulated ).

4. Changing the supply frequency from 50 to 60 Hz varies motor speed by less than .05 %.

   Point 4 shows that the supply can be alternated between 50 and 60 Hz with absolutely no changes in circuitry. The new motor is considerably lighter than synchronous motors were to date. It has neither flywheel mass nor a soft clutch. The capstan axis is rigidly fixed to the rotor, making interchanges very easy. The relatively low speeds of the capstan motor ( 400 and 800 rpm ) provide a large diameter capstan axis.

**Notes**

# 6. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

Measurement Instruments and Aids

- Demagnetizing coil
- AF-millivolt meter or VTVM ( vacuum tube voltmeter )
- AF - generator
- Distortionfactor meter
- Oscilloscope or digital counter
- Wow and flutter meter

- **Test Tapes** ( Reference Tape )

Test tapes per NAB ( 1965 ), and DIN Heimton 7.5 ips ( 1966 ) and 3.75 ips ( 1967 ) are equalized alike for respective speeds.

7.5 ips = 3180 $\mu$sec, 50 $\mu$sec test tape DIN 45513 / 19 H
( from AGFA or BASF ) or NAB 7.5 ips.

3.75 ips = 3180 $\mu$sec, 90 $\mu$sec test tape DIN 45513 / 9
( from AGFA or BASF ) or NAB 3.75 ips
( 90 $\mu$sec ).

- Adjustment Tape 4 - track ( .25" )

for height adjustment of the magnetic head on 4-track instruments.

All AF and RF measurements are to be taken with shielded cables.

## 6.1. Demagnetizing

- **Magnetic heads and tape guides are to be demagnetized before any measurement or adjustment with running tape.**

Strong d.c. - magnetization disimproves signal-to-noise ratio and frequency response.
It can also permanently damage the test tapes.

## 6.2. Tape Speed ( Regulator Card 7.077.725 )

### 6.2.1. Pick - up Head - Adjustment

The air-gap between pick-up head and rotor shall be .3 - .4 mm ( .012" - .016" ). Adjustment is correct when a 35 - 50 mV tachometer signal voltage is measured ( at 3.75 ips ) on connections blu E2 and brn E1 of the regulator card.

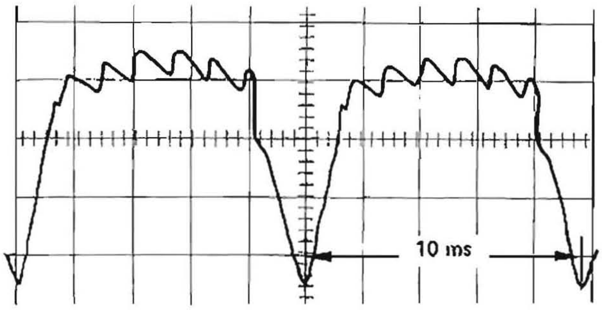
### 6.2.2. Tacho Adjustment

Exact adjustment of the discriminator, respectively of the capstan motor speed, can be accomplished only with a digital counter.

- Connect digital counter to blu E2, brn E1.
- Switch recorder to PLAY ( with tape in place ).
- For 7.5 ips, the frequency must be 1600 to 1601 Hz. Measurement time 10 sec. minimum. Apply corrections to core of discriminator coil T 201.
- For 3.75 ips, the frequency must be 800 to 801 Hz ( 7.5 ips adjustment has to be made first ! ) - Apply corrections to trimpot P 201.

### 6.2.3. Tacho Adjustment with Cathode-Ray Oscilloscope

If need be, adjustments can be made with an oscilloscope referenced to the 50 Hz network frequency test point D ( diagram 1.077.725 ) there is ( closed to 0V ) an a.c. signal of 100 Hz of the following shape :



The superposed frequency comes from the regulating system and is 1600 Hz for 7.5 ips, 800 Hz respectively for 3.75 ips.
Measurement is accomplished in the PLAY mode with tape in place. The superposed frequency must remain standing with respect to the base frequency ( at 50 Hz network frequency ). ( Adjustment procedure per 6.2.2. )

## 6.3. Playback Adjustment

**Preparation :**

Check regulated supply voltage ( 21 V ). Apply corrections to P 106 ( Power Supply Card 1.077.540 ).

Check of Balance Adjustment :

- Connect AF-generator to AUX-input.
- Parallel the signal voltage on both inputs by bridging the solder terminals of the AUX cinch-connectors with alligator clamp.

- Set controls per fig. 6.3–52

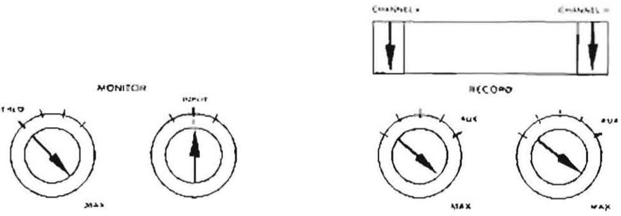


Fig. 6.3–52

- Supply about 30 mV / 1000 Hz.
- Measure signal voltages at the OUTPUT ( 2 V approx ). Both outputs shall have same signal voltages. Apply correction with the balance control for voltage differences at less than 3 dB at the outputs. Check the amplifier channels if the voltage differences are larger.
- Don't readjust the balance control. ,

### 6.3.1. Azimuth Adjustment, Playback Head, Coarse ( Max. Level )

( Assembly and coarse adjustment after head exchange per 4.1.2. )
Check of gap centering with respect to polished face :

- Mark polished face with grease pencil. Let tape run short time. The gap must be in center of worn area.
- Set controls per fig. 6.3 –53.

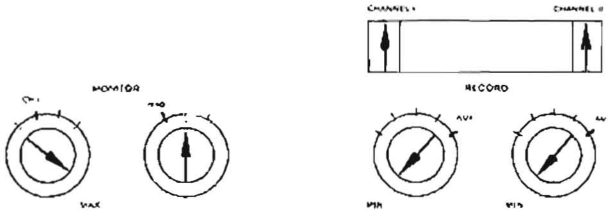


Fig. 6.3–53

- Load 7.5" test tape and advance to azimuth adjustment portion ( 10 kHz ).
- Connect AF-millivoltmeter to an OUTPUT terminal.
- Switch to PLAY and set output voltage to a maximum with screw C ( fig. 6.3 –54 ).

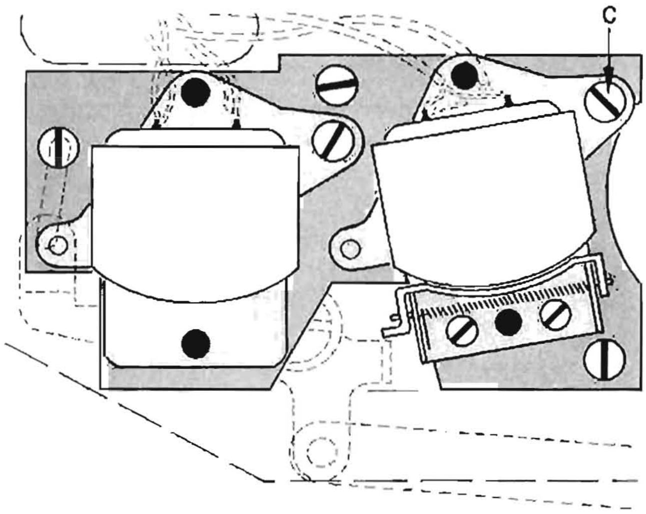


Fig. 6.3–54

### 6.3.2. Azimuth Adjustment, Playback Head, Fine ( Phase Method )

- Set controls per fig. 6.3–55.

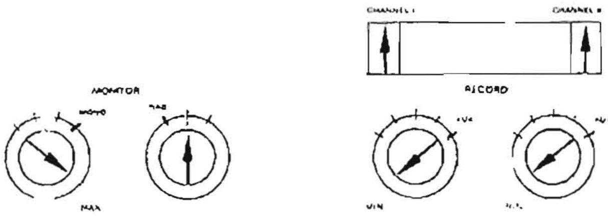


Fig. 6.3–55

- It is absolutely essential to accomplish the coarse adjustment per 6.3.1. before using this method to avoid phase errors larger than 90°.

- Switch to PLAY and set output voltage to a maximum ( sharp ) with screw C.
- Secure screw C with a drop of lacquer.

### 6.3.3. Playback Level from Test Tape

- Set controls per fig. 6.3 –56.

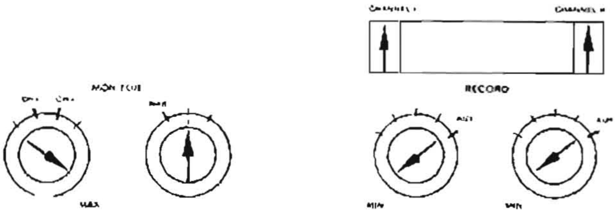


Fig. 6.3–56

- AF-millivoltmeter remains connected to one output ( 3 V range ).
- Advance test tape to level portion.
- Set playback mode switch to CH 1.
- Set output voltage 2 V with trimpot REPR LEVEL CH1 ( fig. 6.3 –57 ).

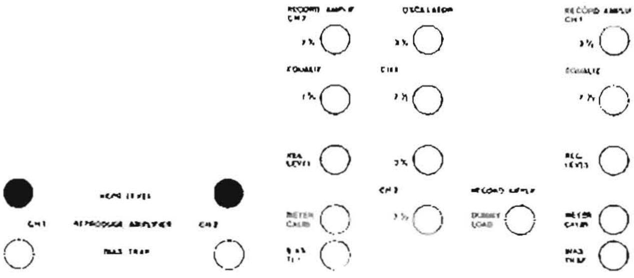


Fig. 6.3–57

- Set playback mode switch to CH 2.
- Set output voltage 2 V with trimpot REPR LEVEL CH 2.

### 6.3.4. Frequency Characteristic, Playback ( from Test Tape )

- Set controls per fig. 6.3.–58.

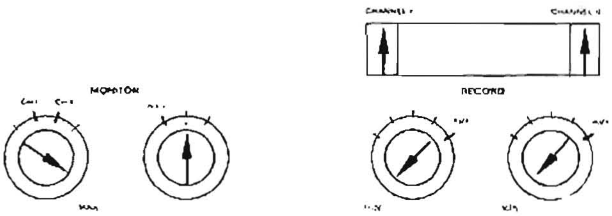


Fig. 6.3–58

- Advance to frequency run portion of DIN or NAB test band.
- AF-millivoltmeter, range 300 mV ( -20 dB ).
  Both channels can be measured simultaneously by changing back or forth between each frequency section ( CH 1 / CH 2 ).

## 6.4. Oscillator and RF - Adjustments

### 6.4.1. RF - Voltages and Frequency Checking

– Set controls per fig. 6.4 –59

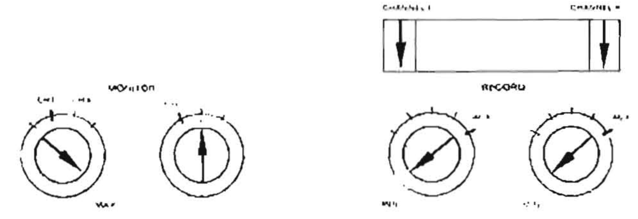


Fig. 6.4–59

– Load tape and switch to RECORD ( STEREO ).

A. – Measure erase head voltage against ground with VTVM at VU-meter board ( fig. 6.4 –60 ) orange HB3 ( CH 2 ) and blue HB6 ( CH 1 ).

2 - Track = 21 Vac each
4 - Track = 16 Vac each

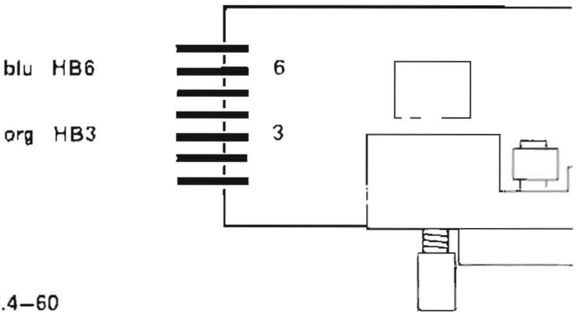


Fig. 6.4–60

B. Oscillator Frequency

- Load tape, switch to RECORD ( STEREO ). Pull out lamp at optical end-of-tape switch if measuring without tape.
- Oscillator frequency is measured with digital counter or oscilloscope. The frequency is 120 kHz ( ± 5 kHz ) and is measured at orange HB3 and blue HB6 ( fig. 6.4 –60 ) against ground. ( Oscilloscope: 12 oscillations per 100 μsec ).

### 6.4.2. Dummy Load

The dummy load compensation is needed only when the erase head is replaced (balance of inductive strays from the erase head during MONO - operation ).

- Load tape, switch to RECORD.
- Connect digital counter or oscilloscope to blue H86 ( fig. 6.4 –60 ).

- Measure RF-frequency in stereo mode.
- Disengage record pre-selector CH 2 and balance DUMMY LOAD till same frequency is reached as in stereo mode.

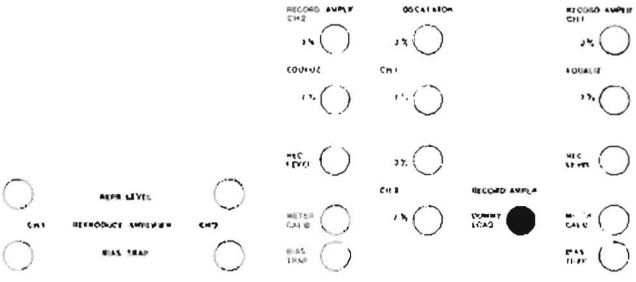


Fig. 6.4–61

– Depress record pre-selector CH 2 and disengage CH 1. Connect oscilloscope or digital counter to orange HB3.
– Correct DUMMY LOAD if necessary.

– Repeat adjustment procedure until any remaining frequency deviations are symmetrical around the nominal frequency ( e.g. CH 1 + 1 kHz, CH 2 - 1 kHz ).

### 6.4.3. RF - Traps, Record

– Set controls per fig. 6.4 –62

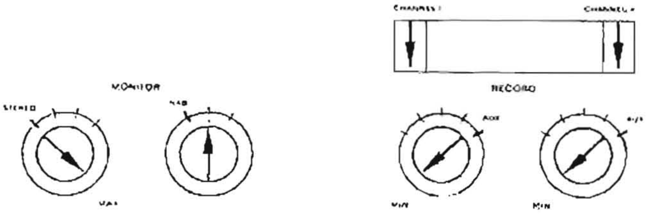


Fig. 6.4–62

– Load tape, switch to RECORD ( STEREO ).
- Connect VTVM to test point C 515 of the respective record amplifier ( fig. 6.4 –63 ), see also diagram 1.077. 705.

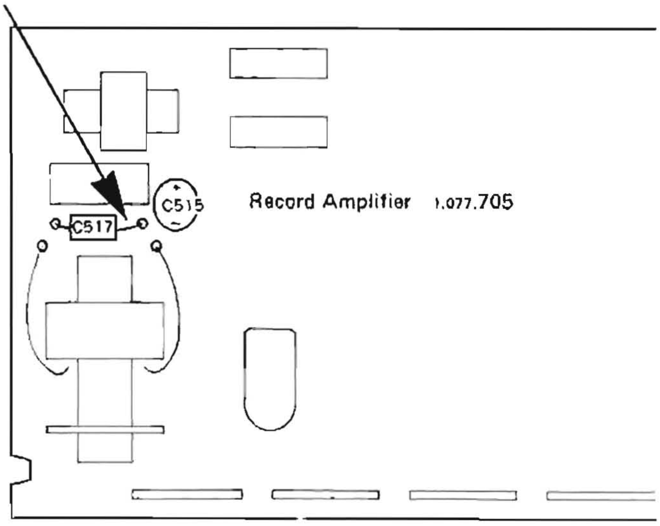


Fig. 6.4.–63

- Set minimum voltage at BIAS TRAP CH 1 and CH 2: Less than < 300 mV ( fig. 6.4 –64 ).

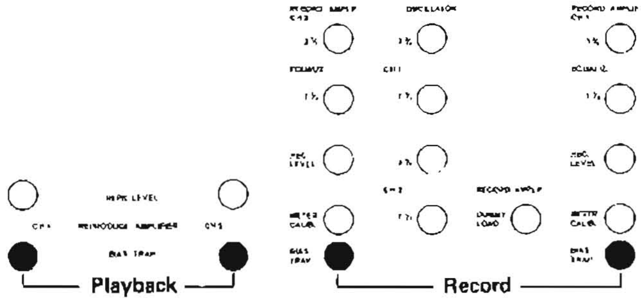


Fig. 6.4–64

### 6.4.4. RF - Traps, Playback

- Under same conditions as 6.4.3. but, connect VTVM to OUTPUT terminals CH 1 and CH 2 and set BIAS TRAP of playback amplifier to a voltage minimum : Less than < 50 mV ( fig. 6.4 –64 ).

### 6.5. Record - Adjustments

**Preparations :**

Following measurements ( 6.5.1. to 6.5.6. ) are to be taken with a record level of – 20 dB below full modulation level. ( To avoid over-modulating high frequencies ).

- Set controls per fig. 6.5 –65.

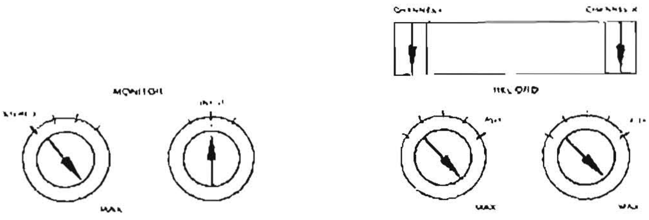


Fig. 6.5–65

- Connect AF-millivoltmeter to OUTPUT terminal.
- 300 mV range
- Adjust AF-generator ( 3 - 4 mV ) at 1000 Hz to obtain 200 mV at the OUTPUT terminal ( voltage as for playback from test tape per 6.3.3, but 20 dB lower ).

### 6.5.1. Azimuth Adjustment, Record Head, Coarse

- Set controls per fig. 6.5 –66.

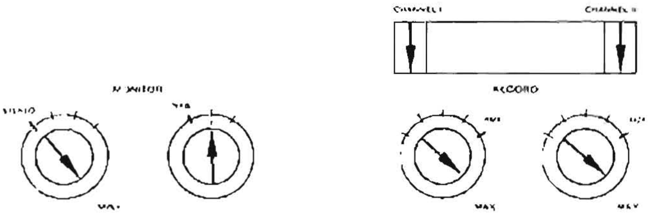


Fig. 6.5–66

- Set AF-generator to 10 kHz ( see 6.5. preparations ).
- Load tape and switch to RECORD.
- Adjust for maximum signal with screw B ( fig. 6.5 –67 ), ( turn slowly – indication delay I ).

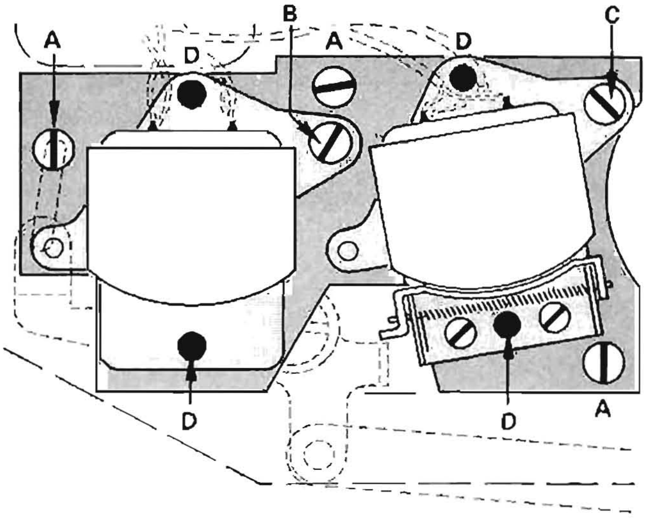


Fig. 6.5–67

### 6.5.2. RF - Bias

Since the high frequency playback voltage is bias dependent in a curve with distinct maximum, a relationship which can be used to determine the operating point ( fig. 6.5 –69 ). The measurement is per 6.5.1. ( 10 kHz, –20 dB ). Controls OSCILLATOR CH 1 and CH 2, 3.75 and 7.5 ( fig 6.5 –68 ) are turned from the left limit in clockwise fashion until maximum AF output voltage is reached ( playback mode switch by choice CH 1 / CH 2 ).

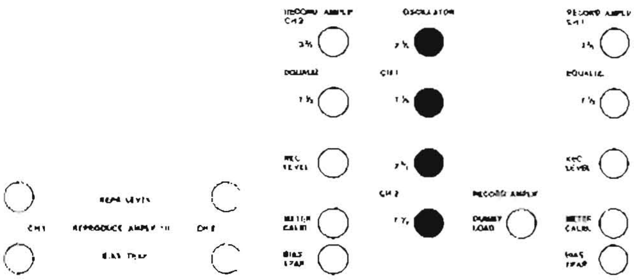


Fig. 6.5–68

Note the pointer deflection at the maximum and continue turning in the same sense till AF-output voltage has dropped by the amount ( ΔV ) shown in the following table.

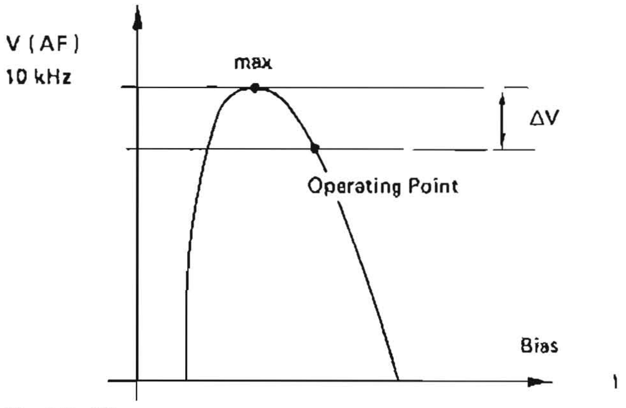


Fig. 6.5–69

| Type of Tape | ΔV - 3.75 ips | ΔV - 7.5 ips | ΔV-15 ips |
|---|---|---|---|
| AGFA PE 31 | 4 dB | 3 dB | |
| REVOX PE 36 RX<br>REVOX 207<br>REVOX 601<br>AGFA PE 36<br>BASF PES 35 (LH)<br>SCOTCH 202/203 | 5 dB | 4 dB | 2 dB |
| SCOTCH 150/215 | 5 dB | 5 dB | |

Table 6.5–69

### 6.5.3. Azimuth Adjustment, Record Head, Fine

Set controls per fig. 6.5 –70

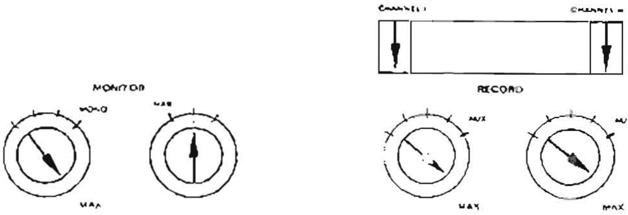


Fig. 6.5–70

- The balance regulator must be set accurately ( per 6.3, preparations ).
- Other conditions as up to now ( Record, Stereo, 10 kHz, 20 dB ).
- Set output voltage to a maximum ( sharp ) with screw B ( fig. 6.5 · 67 ) turn slowly - indication delay ! ).
- It is absolutely essential to accomplish the coarse adjustment per 6.5.1. before using this method to avoid phase errors larger than 90°.

  Control possibility :

  Pass through lower frequencies with sound generator. Output voltage shall remain constant.
- Secure setscrew with a drop of lacquer.

### 6.5.4. Record level

- Set controls per fig. 6.5 –71.

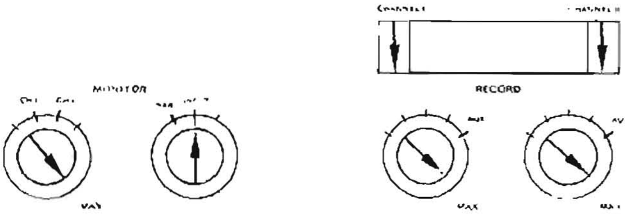


Fig. 6.5–71

- Playback level ( per 6.3.3. ) and balance adjustment ( per 6.3. preparations ) must be set.
- AF-generator to AUX-input ( connect in parallel ). AF-millivoltmeter to one OUTPUT terminal, range 300 mV.

- Load tape, switch to RECORD ( Stereo ).
- Before-and-after-tape switch to INP. Supply 1000 Hz from AF-generator, set generator level such that OUTPUT terminal voltage is 200 mV.
- Switch to NAB and adjust REC LEVEL trimpots ( fig. 6.5–72 ) to obtain 200 mV at OUTPUT terminal, playback mode switch to CH 1 or CH 2 respectively.

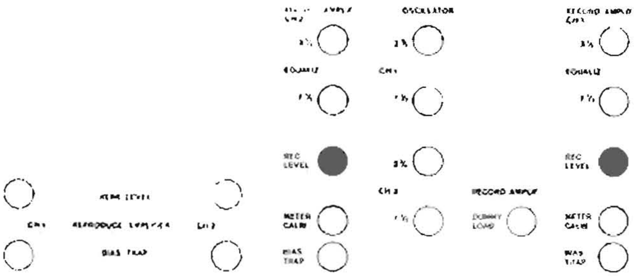


Fig. 6.5–72

### 6.5.5. Record Equalization

- Switch AF-generator at same voltage (–20 dB) to 12 kHz.
- Set controls per fig. 6.5 –71 ( NAB ).

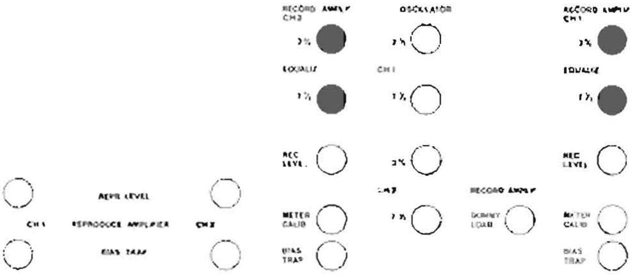


Fig. 6.5–73

- Adjust output voltage from 0 to + 1 dB with trimpots EQUALIZ. ( 0 dB = 200 mV / 1000 Hz per 6.5.4 ). Playback mode switch CH 1 both speeds, likewise CH 2 both speeds.

### 6.5.6. Frequency Characteristic via Tape

- Set controls per fig. 6.5 –71 ( NAB ).
- Calibrate AF-millivoltmeter ( change slightly the signal voltage till 0 dB or even-numbered indication is reached ).
- Measure frequency characteristics 7.5 ips and 3.75 ips ( by changing playback function switch CH 1 / CH 2, both channels can be measured, one after the other ).

## 6.6. Distortion Factor Measurements
VU-Meter Calibration
Noise Measurement
Erase Attenuation
Crosstalk Attenuation

### 6.6.1. Distortion Factor ( via Tape ), VU-Meter Calibration

- Set controls per fig. 6.6 –74.

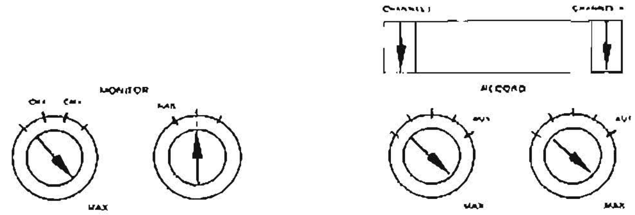


Fig. 6.6–74

- AF-generator ( 500 Hz ). Switch 20 dB higher with respect to previous setting ( input voltage about 40 mV )

- Connect distortion factor meter to an OUTPUT terminal.
- Load tape, switch to RECORD ( Stereo ) 7.5 ips.
- Measure distortion factor ( CH 1 and CH 2 ).
- Set input level so that the distortion factor is 2 % on the worse channel at 7.5 ips.
- Repeat procedure with 3.75 ips. Distortion factor may be 3 %. In case of higher values, reduce input level till 3 % distortion factor is achieved.
- Distortion factor control " Before-tape ": Set before-and after-tape switch to INP. Distortion factor shall be 1 % maximum !
- Switch back to NAB lower input level by 6 dB.
- Adjust METER CALIB ( fig. 6.6 –75 ) with trimpots CH 1 and CH 2, VU-meter indication 0 dB ( 100 % ).

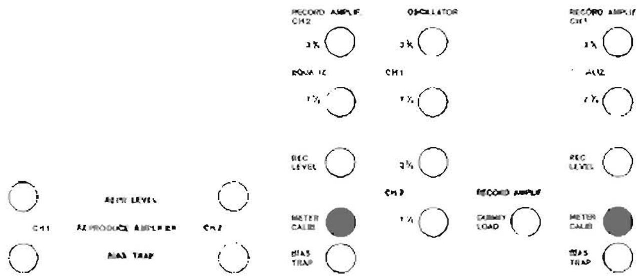


Fig 6.6–75

6.6.2. Noise Voltage ( and External Voltage ) via Tape

- Noise voltage measurements refer to full-modulation ( distortion factor 2 % at 7.5 ips, 3 % at 3.75 ips resp. per 6.6.1. )
- To avoid RF-interference errors, a tape erased on the recorder is measured in the PLAYBACK mode.

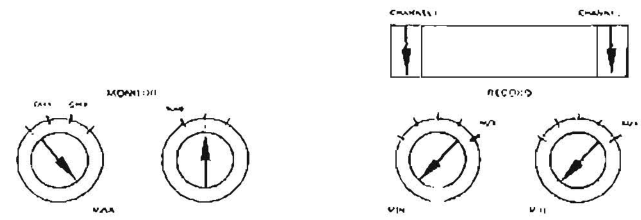


Fig. 6.6–76

Effective values (weighted, CCIF filter) of the noise and external voltages can be seen for the REVOX 601 tape in the following table:

| | 2 Track | | 4 Track | |
|---|---|---|---|---|
| | 7.5 ips | 3.75 ips | 7.5 ips | 3.75 ips |
| Noise Voltage | > 66 dB | > 63 dB | > 62 dB | > 59 dB |
| Ext. Voltage | > 58 dB | > 57 dB | > 56 dB | > 54 dB |

Table 6.6–77

If these noise and external voltage separations are not attained, the tape guide elements and magnetic heads are, once more, to be demagnetized carefully.

6.6.3. Noise Voltage, External Voltage " Before-Tape " ( Check )

- Switch recorder to STOP.
- Before-and-after-tape switch to INP ( fig. 6.6 –78 ).

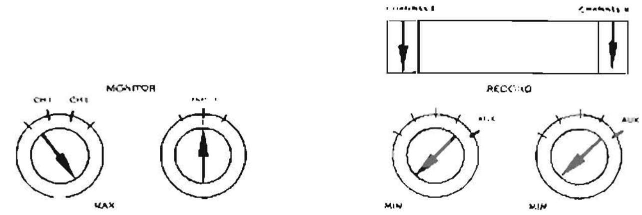


Fig. 6.6–78

The noise and external voltage separation shall be more than 75 dB, referred to full-modulation.

Check of Input Amplifier :

- Set controls per fig. 6.6 –79

- To avoid hum interference during this procedure, the microphone inputs ( jacks or cinch connectors ) are to be terminated with 200 ohm.

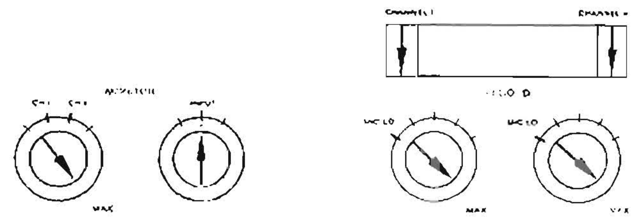


Fig. 6.6–79

The noise and external voltage separations shall be more than 45 dB referred to full-modulation.

### 6.6.4. Erase Attenuation

Following Measurements: Erase attenuation, crosstalk, mono and stereo ( 6.6.4 — 6.6.6. ) can be taken with a selective VTVM ( band width less than 100 Hz ).

To measure erase attenuation, a frequency of about 1000 Hz is recorded and consecutively erased. The record remaining on the tape is then measured.

- Set controls per fig. 6.6 –80
- Record 1000 Hz, full-modulation.

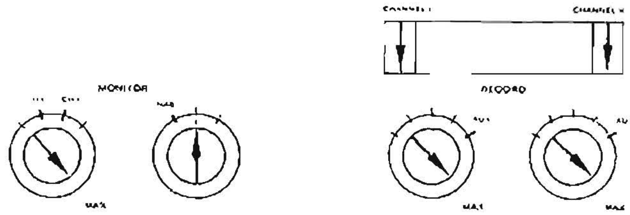


Fig. 6.6–80

- STOP, rewind tape.
- Close record volume controls ( fig. 6.6–81 ).

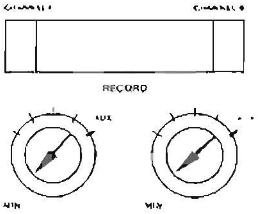


Fig. 6.6–81

- Switch recorder to Record and measure the erase attenuation.

The remainders on the tape shall be better than 75 dB under the level of full-modulation.

### 6.6.5. Crosstalk, Mono ( selective per 6.6.4. )

A mono-recording 1000 Hz full modulation is appropriately taken 1 min on CH 1 and afterwards 1 min on CH 2 for this measurement on a factory-tape. Note that the record butt on the unused channel is disengaged.

- Set controls per fig. 6.6 –82.

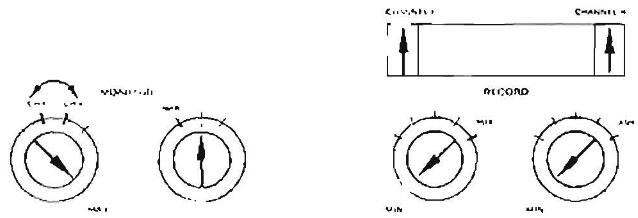


Fig. 6.6–82

Set playback function switch to CH 2, measure the crosstalk separation 1 - 2 and bring with crosstalk compensation trimmer ( fig. 6.6 –83 ) to best value ( more than 60 dB ).

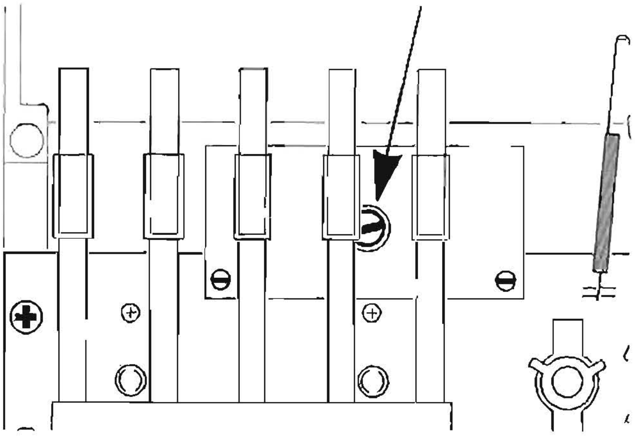


Fig. 6.6–83

- Advance tape to recording on channel 2.
- Set playback function switch to CH 1, measure crosstalk separation 2 - 1, correct P 305 if necessary.

For strong corrections, repeat crosstalk 1 - 2 measurement and adjust for mean value.

### 6.6.6. Crosstalk, Stereo ( selective 6.6.4. )

Measure and if necessary adjust mono crosstalk attenuation per 6.6.5. before checking the stereo crosstalk attenuation.

Don't disturb P 305 compensation trimmer during the following measurements.

- The generator is switched in parallel on the AUX-inputs while measuring stereo crosstalk attenuation. Close the input to the channel to be measured.
- Set controls per fig. 6.6 –84.

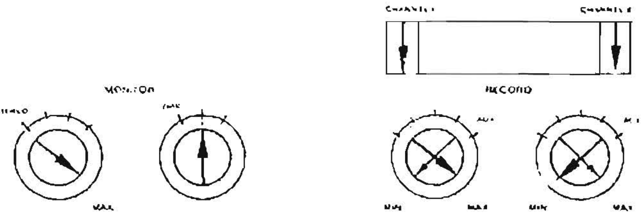


Fig. 6.6–84 → I - II → II - I

- AF-generator 1000 Hz, full modulation, record stereo.

Measurement 1 – 2 :

- AF frequency millivoltmeter at output CH 2, record volume control CH 1 fully open ( at right limit ), record volume control CH 2 fully closed ( left limit ).

Measurement 2 – 1 :

- AF frequency millivoltmeter at output CH 1, record volume control CH 2 fully open ( at right limit ), record volume control CH 1 fully closed ( left limit ).
- Crosstalk attenuation shall be better than 45 dB.

## 6.7. Output Voltage Check

- Set controls per fig. 6.7 –85

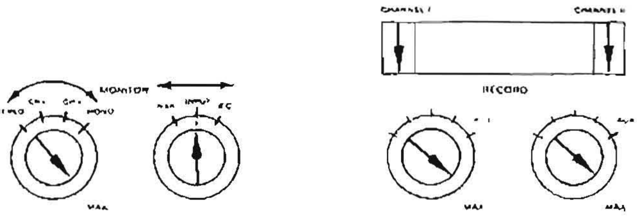


Fig. 6.7–85

- Load tape, switch to Record ( Stereo ).
- AF-generator 500 Hz, full modulation.

AF frequency millivoltmeter at output CH 1 or CH 2. Output voltage shall remain constant ( ± 1 dB ), when the before and-after-tape switch INP / NAB / IEC and the playback mode switch STEREO / CH 1 / CH 2 / MONO is switched around. If the output voltage doesn't stay within the indicated tolerance, proceed per 6.5.4.

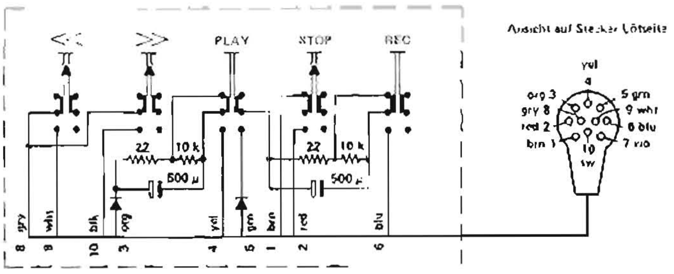
## 6.8. Wow and Flutter

The values given in the technical data are measured with a wow and flutter meter per Std DIN 45507. Values obtained by a different standard can't be compared.

# 7. ACCESSORIES

## 7.1. Remote Control

All push button functions can be accomplished by REMOTE CONTROL. The remote control cable needs no shielding and its length is not critical.
The remote control unit circuitry is per fig. 7.1- 86.



REMOTE CONTROL PLUG ( HIRSCHMANN WIST 10 )

Fig. 7.1–86

The 27 Vdc on terminal 7 is for use with slide projectors (load 150 mA maximum).
The dummy connector must be inserted for operation without the REMOTE CONTROL unit (this dummy connector shorts terminals 1 & 2).

## 7.2. Operation with a Timing Clock

The timing device is to be wired into the electric power feed in a manner which will provide electric current to the REVOX A77 during predetermined intervals only. For operation with a timing clock, the power switch and speed selector remains continuously in the position of the desired tape speed. To select the various functions, two separate switches S1 and S2 are required. Both switches are independent of the timing clock and are to be wired to the REMOTE CONTROL Socket as per the following diagram:

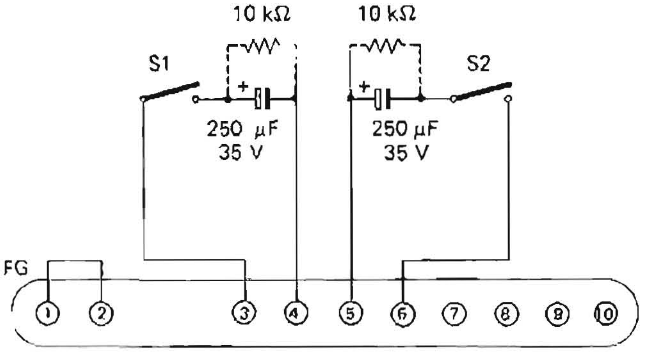


Fig. 7.2–87

| Function | S1 | S2 |
|---|---|---|
| manual control | open | open |
| recording with timer | closed | closed |
| playback with timer | closed | open |

Pointers for Assembly:

S1 and S2: Ordinary On/Off switches

Cable: 4 - wire, equal or more than 0.2 mm² ( 400 ), unshielded, length to suit.

Resistors 10 kOhm: Use only as required ( very short switch rate ).

# 8. MODIFICATIONS

## 8.1. Rewind

For bad rewind with 18 cm ( 7" ) reels :
Replace resistor R 125 ( 820 Ohm ) by resistor 1.2 kOhm, 9 Watt ( drive control 1.077.370 ).

## 8.2. Switch Noise

The following change can improve the situation where operation of the STOP button out of RECORD and PLAY modes causes clicks :

Ground connection brn ( fig. 3.13 –18 ) is unsoldered from the printed side and resoldered to the ground conductor at playback switch S5 ( switch board 1.077.435 ).
Another improvement results from replacing the diode D 601 ( record relay card ) by an RC-network: C = 50 µF / 30 V, R = 100 Ohm / 1/8 W ( series connected, observe polarity ).

## 8.3. RFI

Interference from strong radio an TV transmitters can be removed by the following measures :

Solder 1500 - 5000 pF ceramic capacitors from ground connection shield ( shielded cable ) to chassis ( tubular rivet of connector fastening ) at the disturbed inputs ( see example C 154 OUTPUT terminal ).

Powerful UHF television transmitters may be picked up by the playback head cables. If an interfering buzz occurs, the following change should be effected in the playback amplifier:
Connect a capacitor of 100 pF (maximum 220 pF) from base to emitter of Q 803 (similar to C 803 on Q 801).

## 8.4. Transfer Play Sensitivity

Resistor R 316 and R 321 are 10 kOhm in recorders of lot 1. Substitution with 3.3 kOhm resistors ups recording sensitivity (gain 10 dB approx).

## 8.5. Replacement of Capstan Motor

Starting with Serial Nos. S15500 and G16150 a new type of Capstan-Motor was installed which operates on a 20 V higher supply voltage and therefore requires a modified power-transformer. The voltage appearing at point E8 blu (speed control board 2.077.725) now measures 150 V. When using an old motor in conjunction with a new transformer, a type 40318 transistor must be used in position Q 209 on the speed control board.

## 8.6.
## Capstan Motor with Sleeve Bearings

Modification effective from serial Nr. S 60483 and G 78003

for illustration see parkslist page E 10.

The capstan shaft extends through the full length of the motor and is supported by two sintered-bronze bearings. The lower bearing is designed to restrict the axial movement of the shaft by means of a plastic coated thrust (low-friction) washer. All bearings are lubricated for their life and will normaly not require any service.

Capstan shaft and low-friction washer may be replaced in the field.

If a bronze bearing has become defective, the motor must be sent to the nearest factory service-center. (For disassembly instructions see section 3.7.)

### 8.6.1.
### Removal of Capstan Shaft and low-friction Thrust Washer

Removal of capstan shaft and low-friction washer is possible while the motor remains installed in the recorder.

- Carefully remove shaft lock A by pulling it sideways with a pair of angled pliers. DANGER! Do not attend to pry the lock loose with a screw-driver etc. because it will fly off quite forcefully. Slide off the rotor portion of the capstan motor.
- After removal of the tape quide between the playback head and the capstan shaft, the shaft can be pulled up and out of the motor. (Take care not to disturb the setting of the adjusting nut on the tape quide.)
- To remove the low-friction washer take out the circlip B with the aid of special pliers. The bearing parts can now be disassembled in the following order: Springwasher E, low-friction washer F and thrust bearing G.
- The capstan shaft may now be removed by pulling it downwards and out of the motor.
- When re-assembling the lower bearing, apply one drop of Isoflex PDP65 oil to the low-friction washer.

When handling shaft and bearing, extreme care must be exercised, so as to avoid damaging them and to prevent any dust particles from entering the precision bearings. (runout accuracy 1/1000 mm).

# 9. TROUBLE SHOOTING

Pre - Check :

Check network voltage.

Allowable deviation ( also for short periods ) at respective settings of the voltage selector :

| | | | | |
|---|---|---|---|---|
| 110 Vac : | min | 96 Vac, | max | 125 Vac |
| 130 Vac : | min | 112 Vac, | max | 145 Vac |
| 150 Vac : | min | 130 Vac, | max | 165 Vac |
| 220 Vac : | min | 190 Vac, | max | 245 Vac |
| 240 Vac : | min | 210 Vac, | max | 270 Vac |
| 250 Vac : | min | 225 Vac, | max | 290 Vac |

Use a regulator if the deviations are higher. Note that regulators have a marked leakage field ( keep far from recorder ).

Check of regulated supply voltage 21 Vdc. Adjust on P 106 or replace diode D 104, if necessary.

## 9.1. Faults in the Drive

Capstan Motor fails to run :

Check motor capacitor C 151.
Check regulation electronics, test points ( diagram 1.077. 725 ).

If the capstan motor does not start by itself after manual stopping, the regulator pre-amplifier is oscillating. Exchange R 206 ( 100 Ohm ) against 330 Ohm.

Check capstan bearings, exchange ball bearings against factory - new original ones.

**Capstan motor rumbles :**

Exchange bearings against factory - new original ones.

**Capstan motor whistles :**

Check gap rotor to pick-up ( per 6.2.1 ). Put a strip of rubber or equivalent between pick-up and its mounting surface for vibration isolation.

Unpotted pick-ups are to be exchanged for potted ones.

**Tape Speed too low :**

Check pick-up separation. Measure pick-up frequency ( per 6.2.2 ). Check regulation electronics, test points.

**Wow and Flutter :**

Mechanical causes :

Periodic wow and flutter whose origin is in a defective pressure roller or whipping capstan axis can be recognized by observing the rotating element's rythm ( pressure roller or capstan axis might be marked with felt tip pen ). Pressure roller, see also 4.4.1.

If rythm of wow is identical with the rotation of the left-hand reel motor, the origin may be either mechanical or electrical. The mechanical cause may be defective bearing or misadjusted brake.

Electrical causes :

Overly strong counter torque of left-hand reel motor can be cause for wow; check motor voltages, see table 5.9 —46.

If wow occurs only at 3.75 ips, it may have its origin in too large a distance of pick-up or in the regulation circuit,(see 6.2.1 ).

Wow at both speeds may be caused by a defective capacitor in the RC-network R 215/ . C 209 in the regulation circuit. Replace capacitor.

**Inadequate Starting Behavior, Slow Rewind :**

Reels smaller than 60 mm ( 2 - 3/8" ) should not be used if at all possible.

Optimum behavior can be expected only at nominal line voltage.
Check reel motors with loosened brakes for light run (axial play of reel motors .2 to .3 mm ( .008 to .012" ).

Increase R 125 to 1 or 1.2 kOhm.

**Push Buttons Don't Hold :**

Dummy connector REMOTE CONTROL is missing.

End-of-tape switch is defectife, see 5.9.1, or strong light is incident on photoresistor.

Check relay operating voltage ( 27 Vdc ).

**End-of-Tape Switch Doesn't Function :**

Lamp defective. Check photoresistor and trigger, see 5.9.1.

| | |
|---|---|
| **Pressure Solenoid Doesn't Function :** | Check drive control, relay contacts, and diode. |
| **Brake Solenoid Doesn't Function :** | Check solenoid coil.<br>Clean core.<br>Check relay operating voltage ( 27 Vdc ). |
| **Brakes ( STOP ) too weak, too strong, irregular :** | Check brake bands, check brake lining.<br>Clean and degrease.<br>Measure brake tension per 4.3. |

## 9.2. Faults in Circuitry

| | |
|---|---|
| **Pre-Check :** | See Pre-Check 9. |
| **Playback Amplifier Hums :** | Break in playback head windings.<br>Flap shield doesn't close adequately.<br>Supply voltage 21 Vdc, hum voltage too high.<br>Capstan motor leakage field too high, check supply voltage, 100 $V_{eff}$ max.<br>Possibly strong interference from UHF-TV transmitters, see. 8.3.<br>Line voltage too low, see 9 ( pre-check ). |
| **Playback Amplifier Noisy ( Drive Amplifier )** | **with closed volume control :**<br>Defective transistor Q 803 or Q 804.<br>Amplification too high from defective balance potentiometer.<br>Noisy zener-diode in power supply, replace with planar type.<br>Inadequate matching to following amplifier. Open VOLUME control completely, adjust volume in amplifier. |
| **Playback Amplifier Noisy :** | **with open volume control :**<br>Condition: Function PLAY; without tape in place ( optical end-of-tape switch: Cover light ); before-and-after-tape switch position NAB / IEC.<br>Defective transistor Q 801 or Q 802.<br>Check tantalum capacitors. |
| **Recording Noisy :** | **with closed record volume control :**<br>Check playback amplifier.<br>Clean and demagnetize magnetic heads.<br>Procedure with pulled record amplifier, once fault is corrected, record amplifier found defective :<br>Replace transistor Q 501 or Q 502.<br>Check C 515 for leakage current, check tantalum capacitors.<br>If fault persists with pulled record amplifier :<br>Defective oscillator or erase head - replace. |

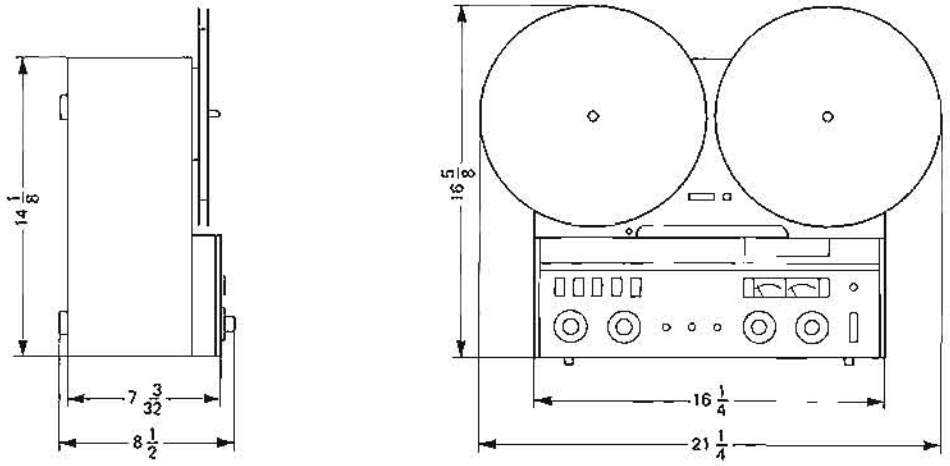
| | |
|---|---|
| | with open record volume control : |
| | If noise occurs only with open record volume control, check input amplifier.<br>Check Q 401 / 421 and Q 402 / 422.<br>Check tantalum capacitors. |
| Highs Playback Weak or Variable : | Dirty magnetic heads.<br>Tape is not of type pre-scribed by manufacturer.<br>Wrong bias ( record equalization ), see 6.5.2. to 6.6.<br>Playback head misadjusted, see 6.3.1.<br>Record head misadjusted, see 6.5.1.<br>Worn magnetic heads. |
| No Record : | Check relays.<br>Check relay Q 601.<br>Replace oscillator. |
| Inadequate Erase : | Dirty erase head.<br>Measure RF-voltage; if it is too low, check supply voltage at oscillator.<br>Defective erase head.<br>Tape extremely over-modulated. |
| VU-Meter, None or Faulty Indication : | Defective VU-meter.<br>Calibration misadjusted, P 504.<br>Defective rectifier D 351 - D 354 ( VU-meter board 1.077.480 ).<br>Defective amplifier, Q 503 ( record amplifier card 1.077.705) |
| Switching Clicks : | see Modifications 8.2. |
| RFI ( Radio Frequency Interference ) : | see Modifications 8.3. |
| Transfer Play Sensitivity Too Low : | see Modifications 8.4. |

## TECHNICAL DETAILS

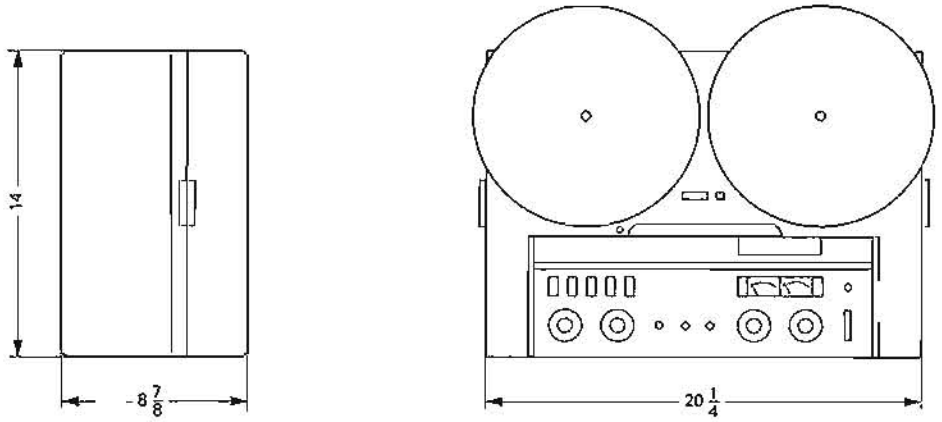
| | | |
|---|---|---|
| | | Measured with REVOX 601 tape |
| Tape transport : | | 3 motor deck. Electronically governed capstan-motor.<br>Electronic speed change . |
| Tape speeds : | | 3 3/4 and 7 1/2 ips. ± .2 % |
| Wow and flutter :<br>( weighted ) | | max. ± .08 % at 7 1/2 ips.<br>max. ± .1 % at 3 3/4 ips. |
| Tape slip : | | less than .2 % |
| Tape spool diameter | | max 10.5 " |
| Operating position : | | Horizontal or vertical |
| Amplifiers : | | Equipped with silicon transistors throughout. Plug-in printed circuit cards |
| Frequency response via tape . | | 30 Hz – 20 kHz + 2 / – 3 dB }<br>50 Hz – 15 kHz ± 1.5 dB } at 7 1/2 ips.<br>30 Hz – 16 kHz + 2 / – 3 dB }<br>60 Hz – 10 kHz ± 1.5 dB } at 3 3/4 ips. |
| Distortion via tape, at 1 kHz peak level and at 0 VU respectively | | 7 1/2 ips: max. 2 % or 0.6 % resp.<br>3 3/4 ips: max. 3 % or 1.0 % resp. |
| Equalization : | | Record : NAB<br>Playback NAB and IEC ( switchable ) |
| Signal to noise ratio, via tape, weighted as per ASA A | | 7 1/2 ips: min. 66 dB ( 4 track min. 62 dB )<br>3 3/4 ips: min. 63 dB ( 4 track min. 59 dB ) |
| Cross talk at 1 kHz : | | Mono better than 60 dB, stereo better than 45 dB |
| Oscillator frequency : | | 120 kHz, push - pull oscillator |
| Inputs per channel : | Cinch / Jack | Microphone, switchable LO/HI<br>LOW: 50 - 600 Ω .15 mV<br>HIGH: up to 100 kΩ 2.5 mV |
| | 5 - pole DIN | RADIO: 33 kΩ 2.5 mV |
| | Cinch | AUX: 1 MΩ 35 mV |
| Outputs per channel : | Cinch | OUTPUT max. 2.5 V / Rs 600 Ω |
| | 5 - pole DIN | RADIO max. 1.2 V / Rs 2.5 kΩ |
| | Jack | PHONES 200 - 600 Ω |
| Remote control : | | Fully electric for all operating functions |
| Output amplifiers : | | Plug - in optional |
| Output power :<br>( 8 Ω load ) | | Music power 20 W ( 10 W per channel ) Continuous power 16 W ( 8 W per channel ) Distortion better than 1 % |
| Output impedance : | | 4 – 16 Ω |
| Built - in loudspeakers :<br>( portable model ) | | Two loudspeakers per channel ( automatically disconnected when a plug is inserted into the DIN loudspeaker sockets ) |
| Transistors, etc. | | 54 transistors, 32 diodes, 4 silicon rectifiers,<br>1 photo resistor, 4 relays |
| Power supply : | | Electronically stabilized |
| Mains voltages : | | 110, 130, 150, 220, 240, 250 V~/ 50 - 60 Hz |
| Power consumption : | | Without output amplifiers 70 W<br>With output amplifiers approx. 70 - 100 W |
| Mains fuses : | | 220 – 250 V~ / .5 A<br>110 – 150 V~/ 1 A |
| Weight : | | Approx. 34 lbs. |

We reserve the right to make technical alterations in the interests of technical improvements.

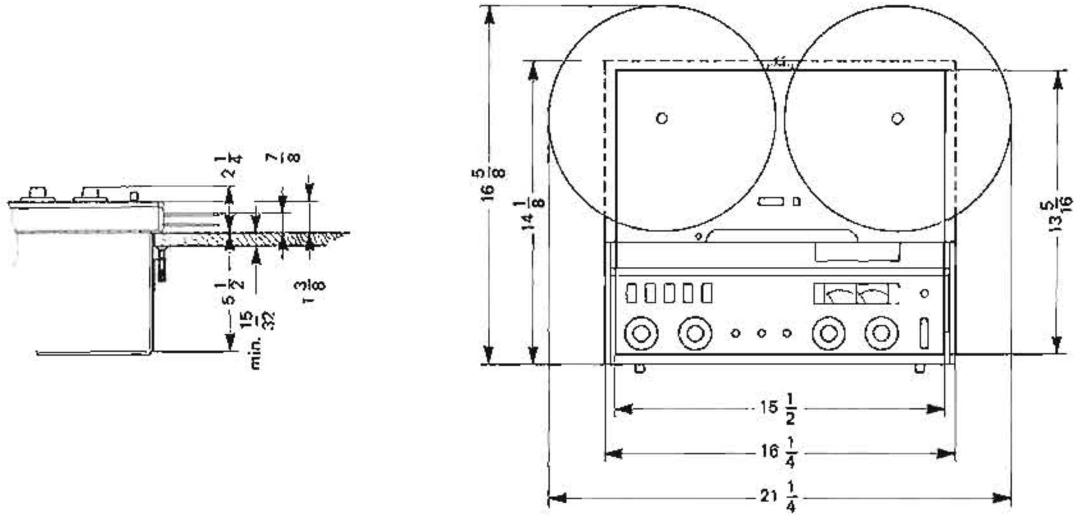
## Dimensions Walnut Cabinet



## Dimensions Carrying Case

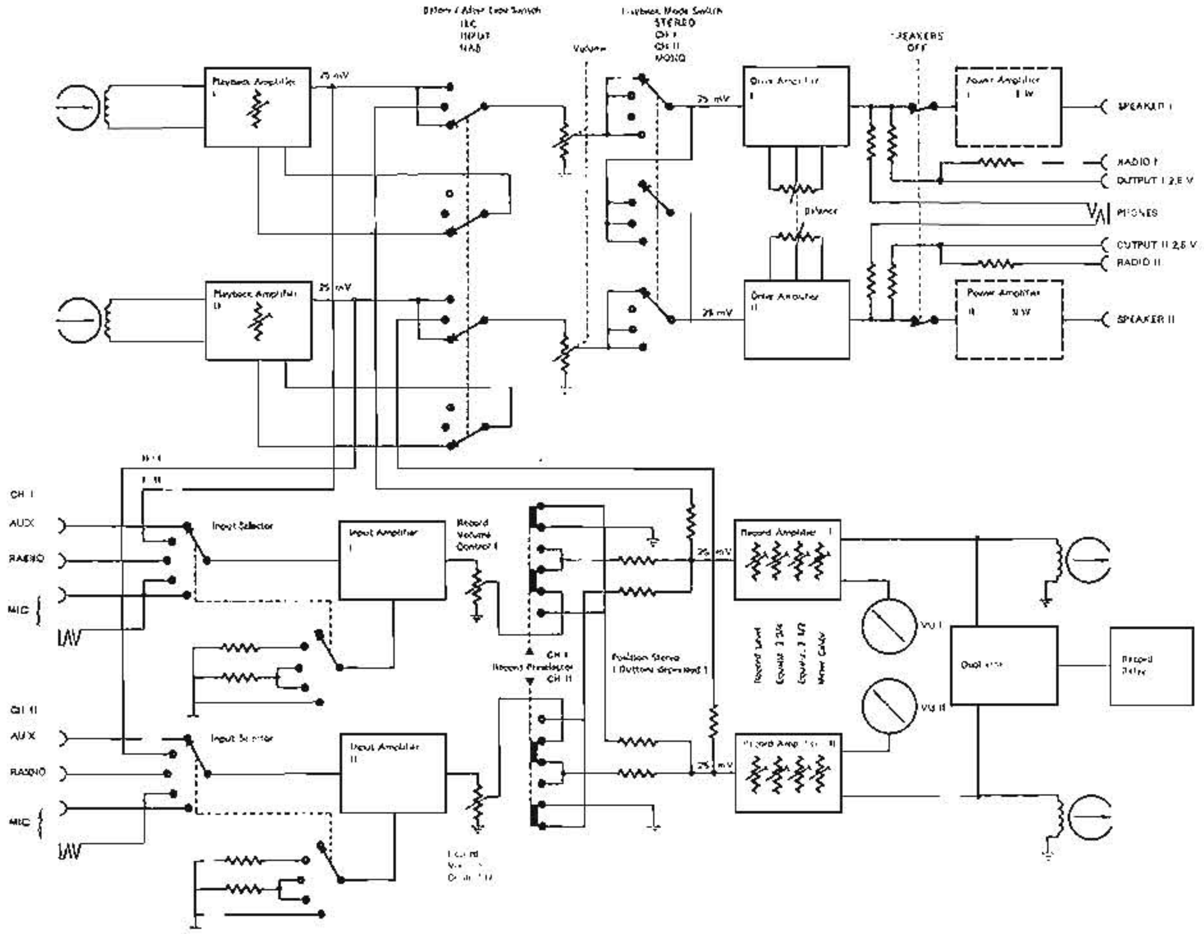


## Dimensions Chassis



## Color Code :

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| red | = red | — rouge | | vio | = violet | — violet |
| org | = orange | — orange | | brn | = brown | — brun |
| yel | = yellow | — jaune | | gry | = gray | — gris |
| grn | = green | — vert | | blk | = black | — noir |
| blu | = blue | — bleu | | wht | = white | — blanc |



**General Measurement Conditions :** ( for voltages in rectangular frames )

D.C. Voltages : vertical letters -e.g. $\boxed{+12V}$ Meter internal resistance 20 kOhm / V min.

A.F. Voltages : slant letters - e.g. $\boxed{25mV}$ Meter: Vac, tube or transistor voltmeter 1 MOhm min.

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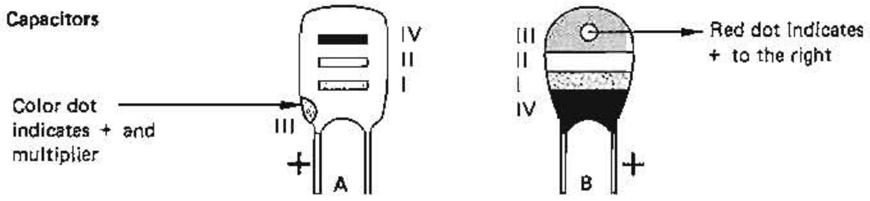
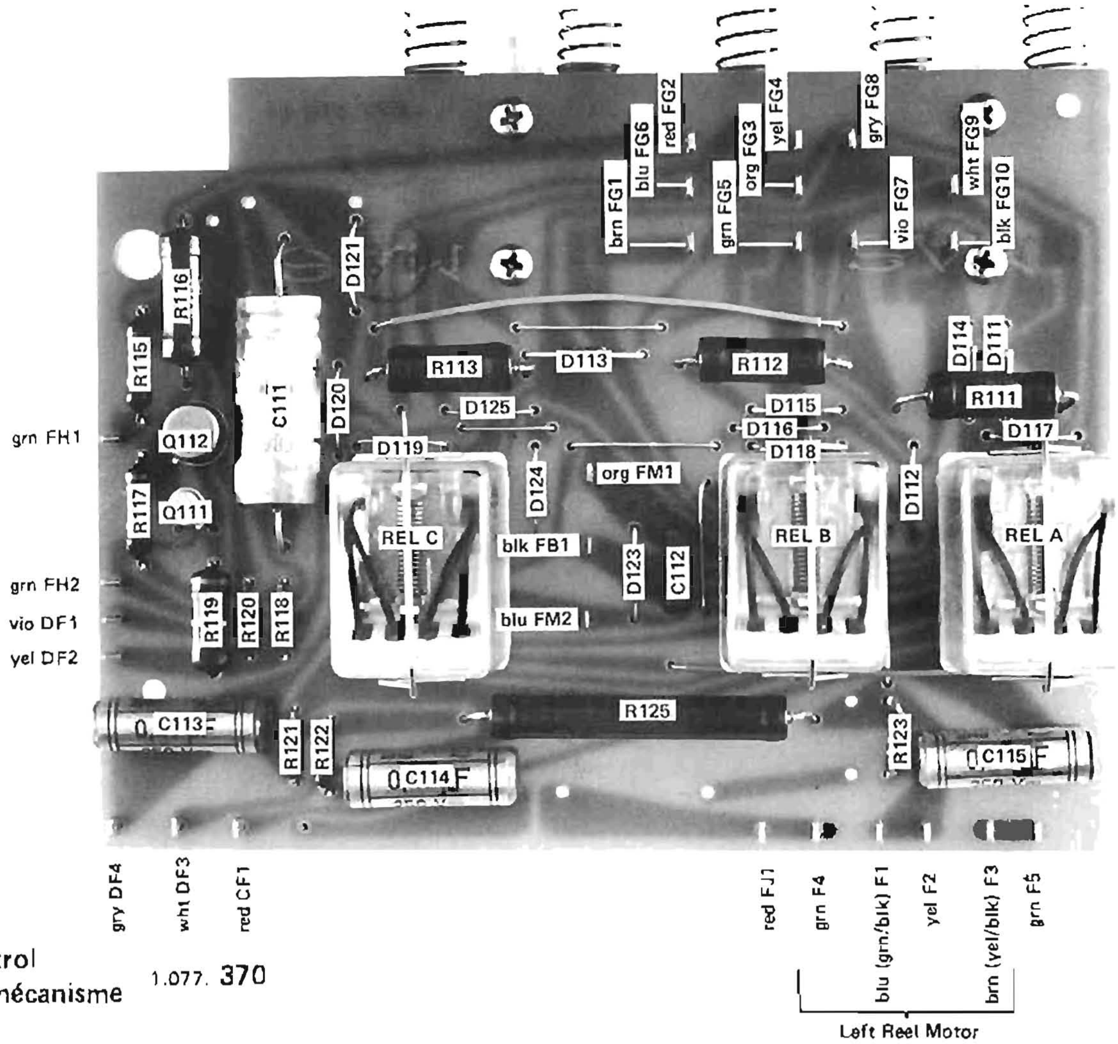
**Markings on Tantalum Electrolytic Capacitors**

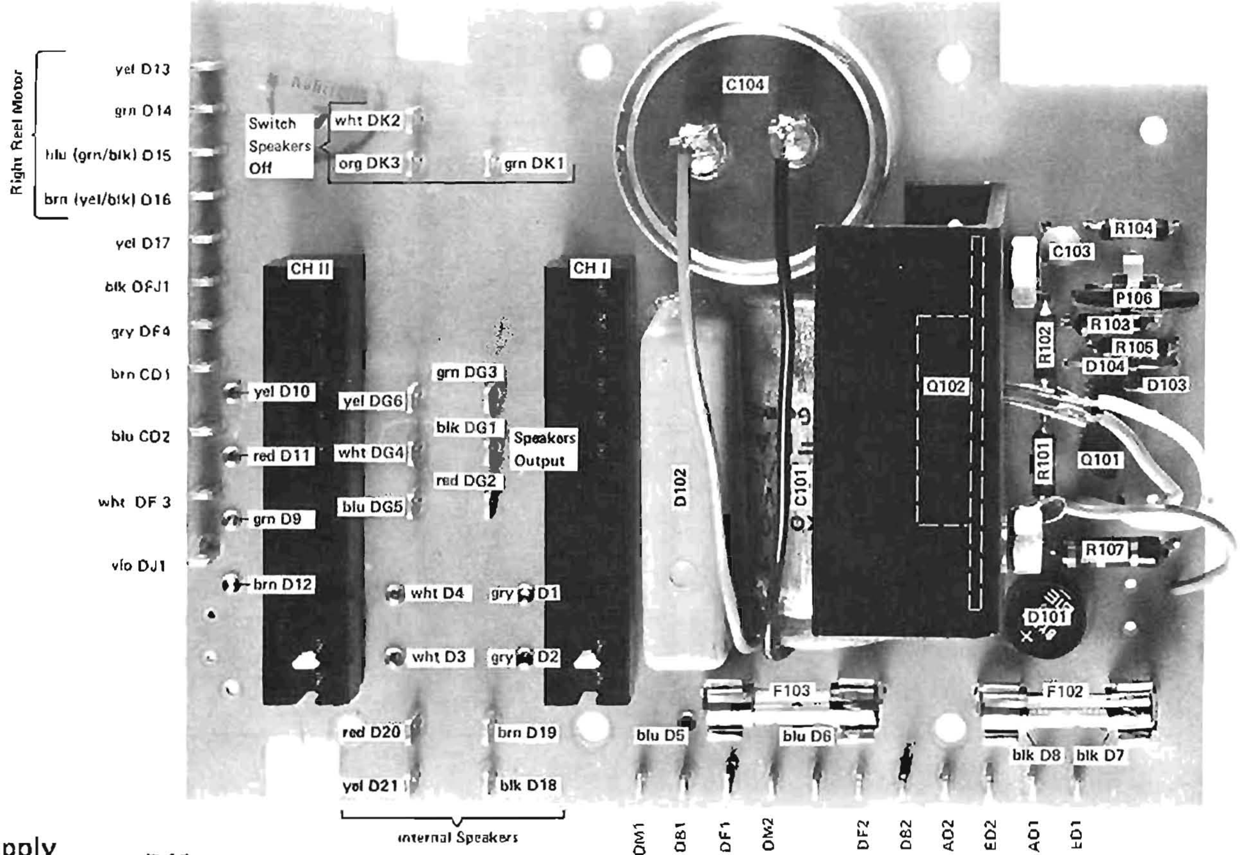


| Color (pink**) | Capacitance in µF | | | Working voltage IV |
|---|---|---|---|---|
| | 1st digit I | 2nd digit * II | multiplier III | |
| black | – | 0 | x 1 | 10 V |
| brown | 1 | 1 | x 10 | – |
| red | 2 | 2 | – | – |
| orange | 3 | 3 | – | 35 V** |
| yellow | 4 | 4 | – | 6 V |
| green | 5 | 5 | – | 16 V |
| blue | 6 | 6 | – | 20 V |
| violet | 7 | 7 | – | – |
| gray | 8 | 8 | x 0,01 | 25 V |
| white | 9 | 9 | x 0,1 | 3 V |

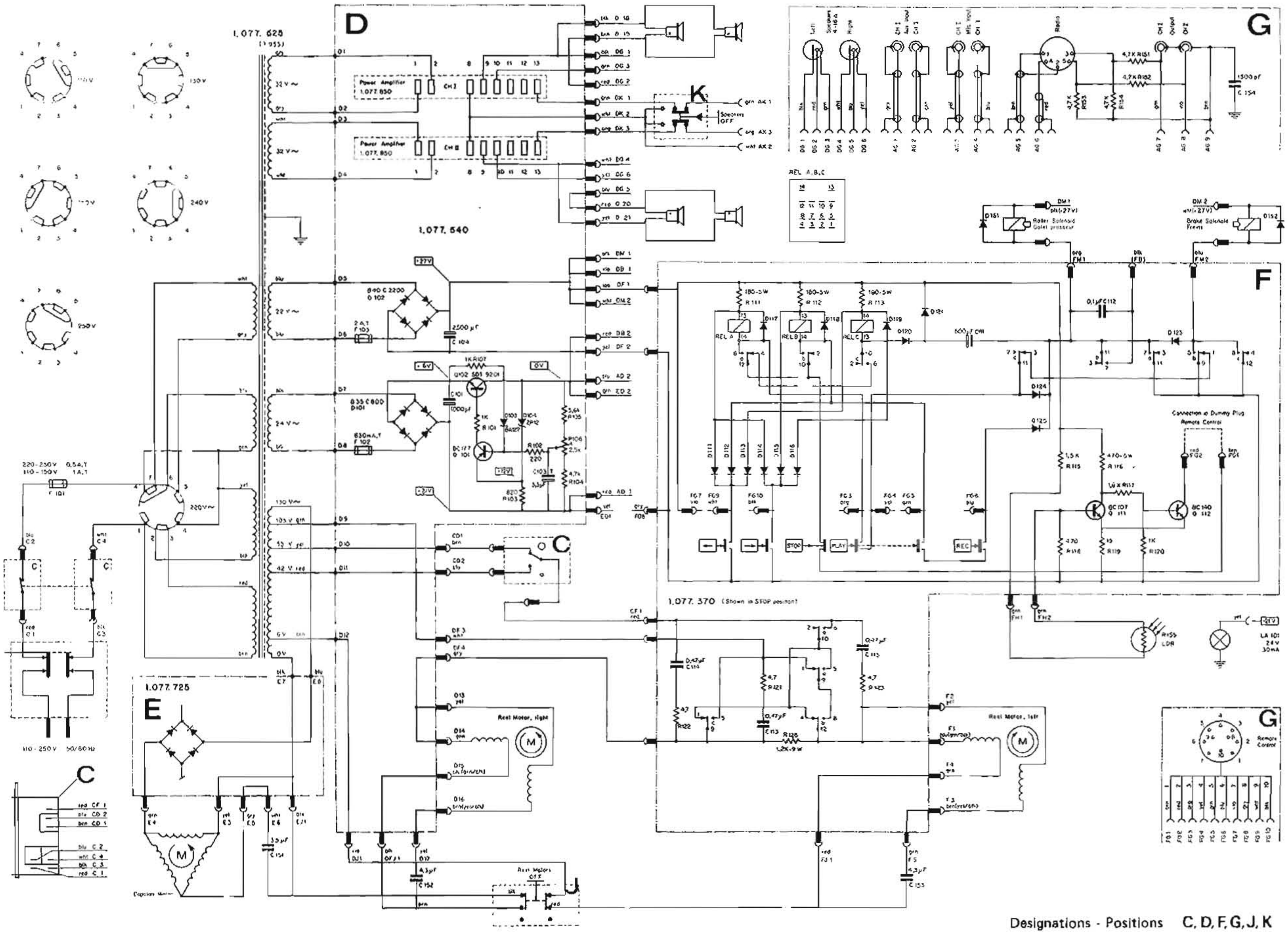
* possibly missihg on model B
** 35 V on model A: pink



Tape Drive Control
Commande du mécanisme 1.077. 370



Power Supply
Alimentation 1.077. 540



Designations - Positions C, D, F, G, J, K

Color Code :
Code des couleurs :

red = red – rouge
org = orange – orange

yel = yellow – jaune
grn = green – vert
blu = blue – bleu
vio = violet – violet

brn = brown – brun
gry = gray – gris
blk = black – noir
wht = white – blanc

**Tape Drive** 1.077.100
**Mécanisme** ( 1.077.370, 1.077.525, 1.077.540 )

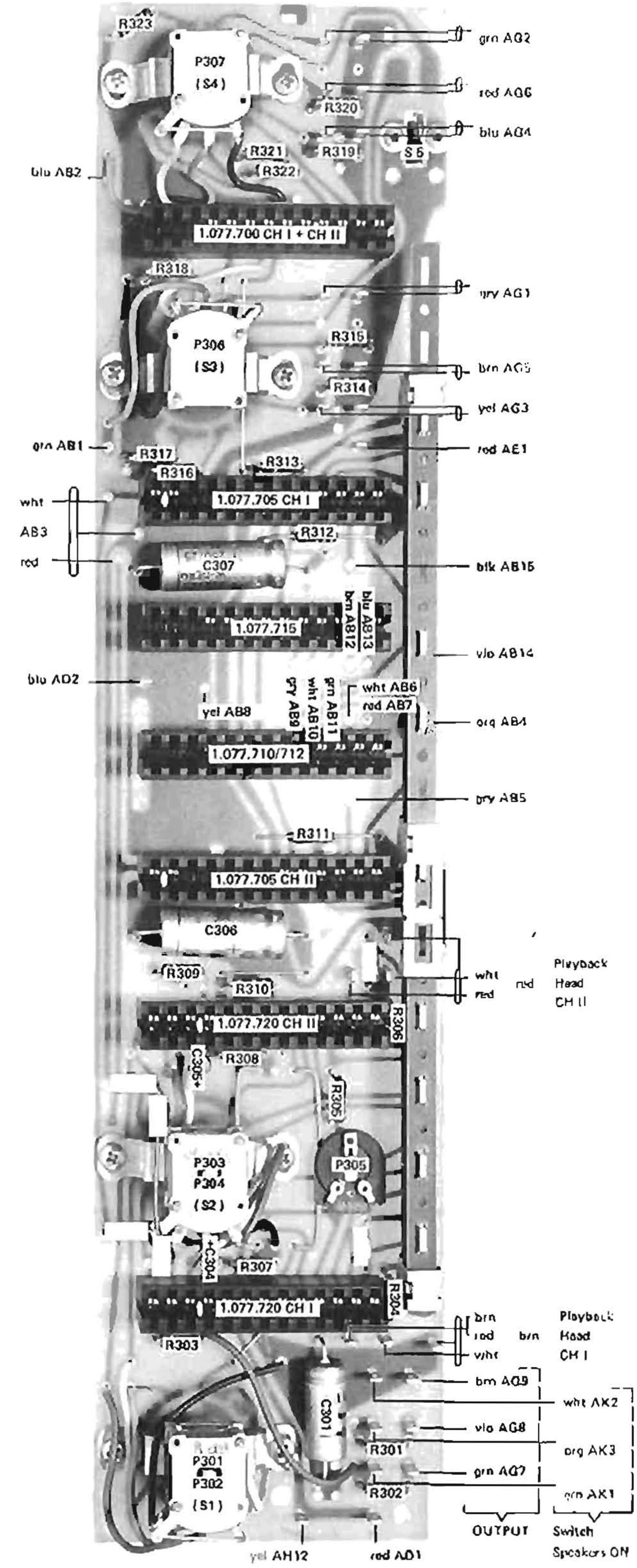
**Diag. 2**

Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification:
1/8 W · 5 %

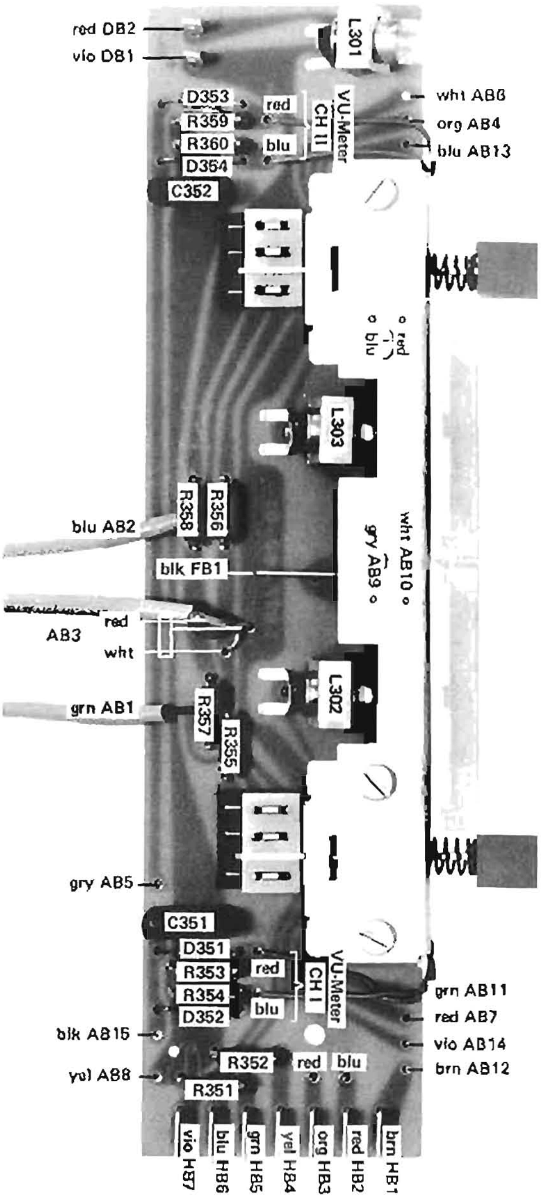
• • Commercial types
• • Type d'usage courant

| Identification<br>Position | Part Name<br>Désignation | | Type / Remarks<br>Type / Remarques | | Specifications<br>Spécifications | Order Number<br>Numéro de commande |
|---|---|---|---|---|---|---|
| | **Power Supply Board**<br>**Plaquette alimentation** | | assembled | complète | | 1.077.540 |
| | Connector | connecteur | | | | 1.077.540 – 03 |
| | Coding Piece | pièce de codage | | | | 1.077.435 – 10 |
| Q 101 | Transistor | transistor | BC 177A, BC 157A | | | * * |
| Q 102 | Transistor | transistor | SDT 9201 | | TO – 5 | * * |
| | | | | | | * * |
| D 101 | Si–Rectifier | redresseur au silicium | B 35 C 800 | | 35 V – 800 mA | * * |
| D 102 | Si- Rectifier | redresseur au silicium | B 40 C 2200 | | 40 V – 2.2 A | * * |
| D 103 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 104 | Z–Diode (Planar) | diode Zener (planar) | ZP 12 | | 12 V – 5% – 400 mW | * * |
| P 106 | Trim–Potentiometer | pot. ajustable | Ruwido P 76 K | | 2.5 k – 0.15 W – 20 % | * * |
| R 101 | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 102 | Resistor | résistance | carbon film | à couche | 220 | * * |
| R 103 | Resistor | résistance | carbon film | à couche | 820 | * * |
| R 104 | Resistor | résistance | carbon film | à couche | 4.7 k | * * |
| R 105 | Resistor | résistance | carbon film | à couche | 5.6 k | * * |
| R 107 | Resistor | résistance | carbon film | à couche | 1 k – 5% – 0.3 W | * * |
| C 101 | Capacitor | condensateur | electrolytic | électrolytique | 1000 $\mu$F – 35 V | * * |
| C 103 | Capacitor | condensateur | tantalum | au tantale | 3.3 $\mu$F – 35 V | * * |
| C 104 | Capacitor | condensateur | electrolytic | électrolytique | 2500 $\mu$F – 35 V | * * |
| F 102 | Fuse | fusible | 5 x 20 mm, slo-blo | retardé | 630 mA | * * |
| F 103 | Fuse | fusible | 5 x 20 mm, slo-blo | retardé | 2 A | * * |
| | **Drive Control Board**<br>**Plaquette commande du mécanisme** | | less push buttons<br>and relays | sans touches ni<br>relais | | 1.077.370 |
| Q 111 | Transistor | | BC 107 A | | | * * |
| Q 112 | Transistor | | BC 140 C ( Siemens ) | | | * * |
| D 111 | Si–Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 112 | Si–Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 113 | Si–Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 114 | S–Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 115 | Si-Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 116 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 117 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 118 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 119 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 120 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 121 | Si–Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 123 | Si–Diode | diode au silicium | PAB 212 | | 50 V – 100 mA – 70° | * * |
| D 124 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| D 125 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |
| R 111 | Resistor | résistance | wire - wound | bobinée | 180 – 10 % – 5 W – 70° | * * |
| R 112 | Resistor | résistance | wire - wound | bobinée | 180 – 10 % – 5 W – 70° | * * |
| R 113 | Resistor | résistance | wire - wound | bobinée | 180 – 10 % – 5 W – 70° | * * |
| R 115 | Resistor | résistance | carbon film | à couche | 1.5 k – 10 % – 0.3 W | * * |
| R 116 | Resistor | résistance | wire - wound | bobinée | 470 – 10 % – 5 W | * * |
| R 117 | Resistor | résistance | carbon film | à couche | 1.8 k – 10 % – 0.3 W | * * |
| R 118 | Resistor | résistance | carbon film | à couche | 470 | * * |
| R 119 | Resistor | résistance | carbon film | à couche | 15 – 10 % – 0.5 W | * * |
| R 120 | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 121 – R 123 | Resistor | résistance | carbon film | à couche | 4.7 | * * |
| R 125 | Resistor | résistance | wire - wound | bobinée | 1.2 K – 5 % – 9 W – 70° | * * |
| C 111 | Capacitor | condensateur | electrolytic | électrolytique | 500 $\mu$F – 35 V | * * |
| C 112 | Capacitor | condensateur | polyester | au polyester | 0.1 $\mu$F – 20 % – 100 V | * * |
| C 113 – C 115 | Capacitor | condensateur | metallized paper | au papier métallisé | 0.47 $\mu$F – 150 V | * * |

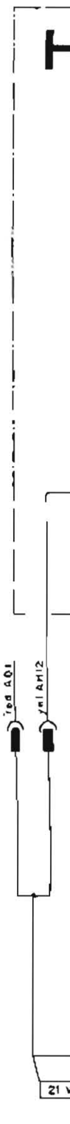
| | | | | | | |
|---|---|---|---|---|---|---|
| REL A – REL C | Relay | relais | 4 x switch contacts 120 V~ / 1 A /<br>4 contacts inverseurs | | 12 V – 180 Ω | 56. 99.0103 |
| | Socket | socle | for relay | pour relais | | 56. 99.0104 |
| | Strap | ressort de maintien | for relay | pour relais | | 56. 99.0105 |
| | Housing, Contact | Slides/boîtier des curseurs | plexi | plexiglas | | 1.077.360 – 01 |
| | Slide, Contact | curseur de contact | 5 pieces | | | 1.077.365 – 01 |
| | Spring, Reset | ressort de rappel | 5 pieces | | | 1.077.360 – 02 |
| | Lock, spring | arrêt de ressort | 5 pieces | | | 1.077.360 – 03 |
| | Spring, Contact | contact à ressort | 6 pieces | | | 1.010.001.55 |
| | **Tape Drive** | **Mécanisme** | assembled | complète | | 1.077.100 |
| | Power Transformer, assembled<br>Transformateur d'alimentation complet | | T 955 | | | 1.077.525 |
| | Voltage Selector | sélecteur de tension | Philberth | | | 53. 03.0126 |
| | Fuse Element | porte - fusible | | | | 53. 03.0113 |
| F 101 | Fuse | fusible | 5 x 20 mm, slo-blo | retardé | 220 – 250 V – 0.5 A, T | * * |
| F 101 | Fuse | fusible | 5 x 20 mm, slo-blo | retardé | 110 – 150 V – 1 A, T | * * |
| C 151 | Capacitor | condensateur | MP ( Rifa ) | papier métallisé | 3.5 $\mu$F – 10 % – 220 V | 59. 99.0451 |
| C 152 C 153 | Capacitor | condensateur | MP ( Rifa ) | papier métallisé | 4.3 $\mu$F – 10 % – 220 V | 59. 99.0452 |
| C 154 | Capacitor | condensateur | ceramic | céramique | 1500 pF – 10 % – 50 V | * * |
| R 151 – R 154 | Resistor | résistance | carbon film | à couche | 4.7 k | * * |
| R 155 | Photoelectric Resistor | photorésistance | LDR ( Philips / Valvo )<br>2322.600.94001 | | | 57. 99.0135 |
| LA 101 | Lamp | lampe | glass socket | socle en verre | 24 V – 30 mA | 51. 02.0140 |
| D 151 | Si- Diode | diode au silicium | PAB 212 | | 50 V – 200 mA – 70° | * * |
| D 152 | Si–Diode | diode au silicium | BA 127 | | 50 V – 100 mA – 70° | * * |



Switch Board
Plaquette des commutateurs 1.077. 435



VU - Meter Board
Plaquette des VU - mètres 1.077. 480



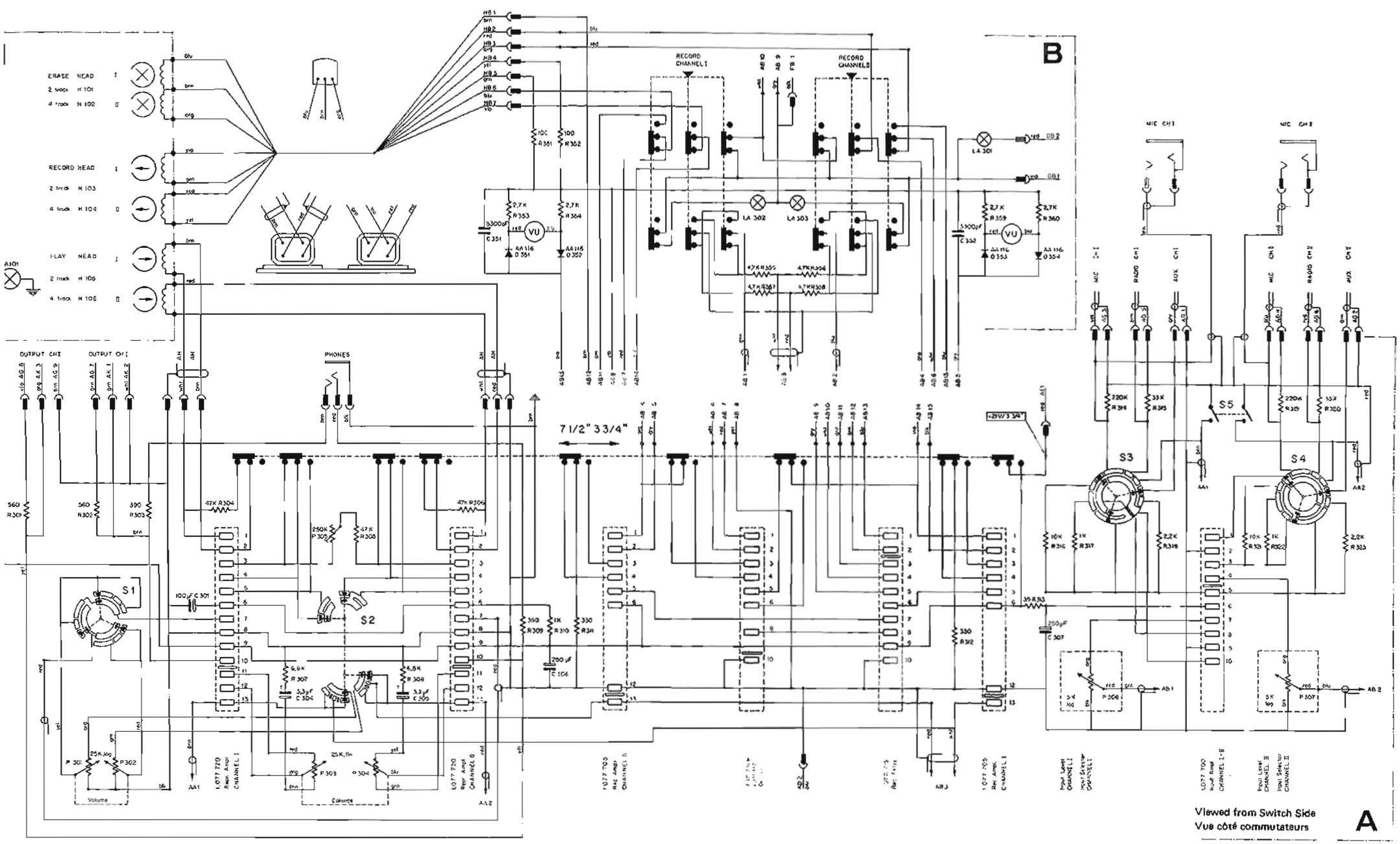
**Color Code :**
**Code des couleurs :**

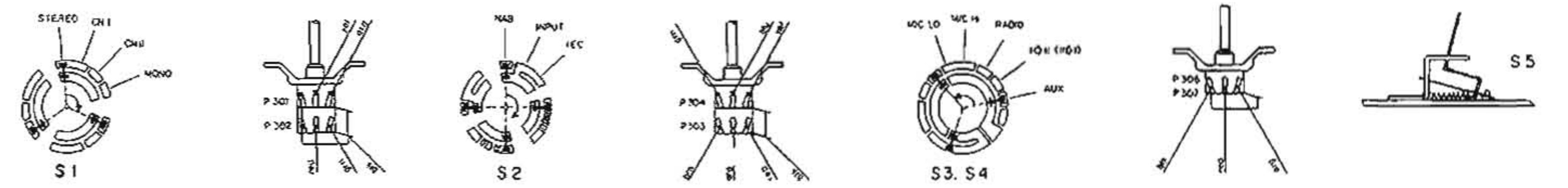
red = red — rouge
org = orange — orange

yel = yellow — jaune
grn = green — vert
blu = blue — bleu
vio = violet — violet

brn = brown — brun
gry = gray — gris
blk = black — noir
wht = white — blanc

10.72





Designations - Positions A,B,H

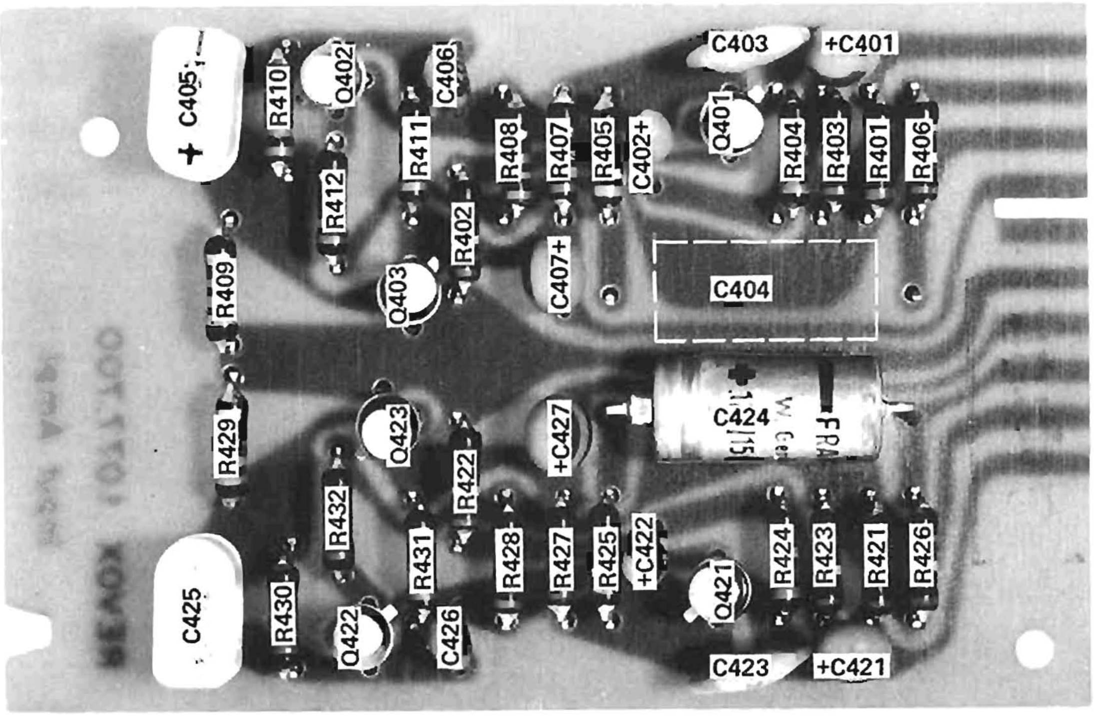
| | |
|---|---|
| VU-Meter Board<br>Plaquette des VU-mètres | 1.077.480 |
| Switch Board<br>Plaquette des commutateurs | 1.077.435 |

Diag. 3

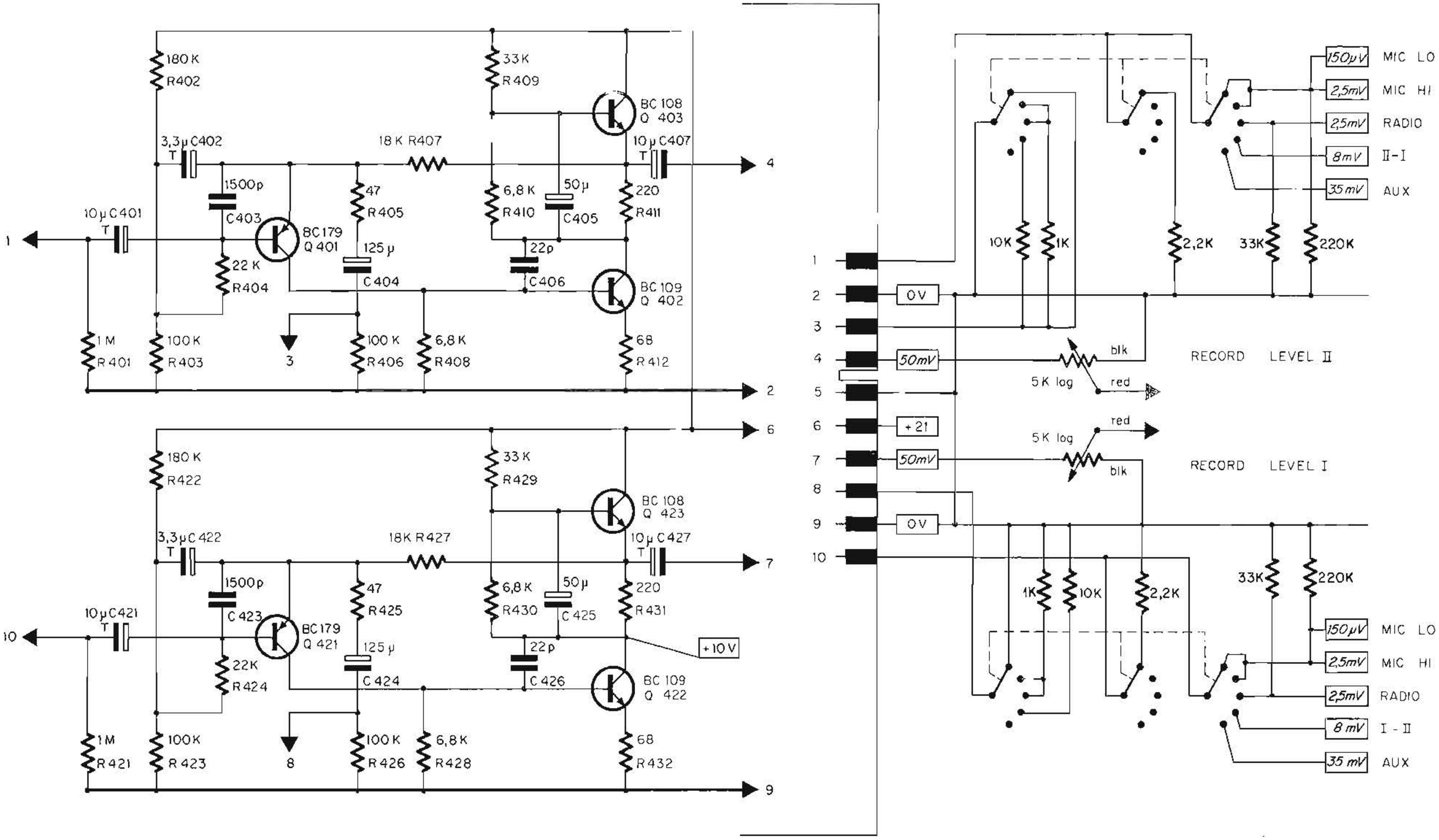
Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification:
1/8 W – 5 %

* * Commercial types
* * Type d'usage courant

| Identification<br>Position | Part Name<br>Désignation | Type / Remarks<br>Type / Remarques | Specifications<br>Spécifications | Order Number<br>Numéro de commande |
|---|---|---|---|---|
| | **Switch Board** Plaquette commutateurs | assembled complète | | 1.077.435 |
| | Connector connecteur | 1 piece ( for / pour 1.077.700 ) | | 1.077.435 – 05 |
| | Connector connecteur | 2 pieces ( for / pour 1.077.705 ) | | 1.077.435 – 03 |
| | Connector connecteur | 1 piece ( for / pour 1.077.715 ) | | 1.077.435 – 06 |
| | Connector connecteur | 1 piece ( for / pour 1.077.710/712) | | 1.077.435 – 04 |
| | Connector connecteur | 2 pieces ( for / pour 1.077.720 ) | | 1.077.435 – 02 |
| | Coding Piece pièce de codage | 7 pieces | | 1.077.435 – 10 |
| | Switch Slide curseur à contacts | | | 1.077.435 – 07 |
| S 1 | Circuit Board Switch, 4 / 9<br>Commutateur pour circuit imprimé | Playback mode switch, assembled<br>Sélecteur du mode de reproduction complet | | 1.011.400 |
| S 2 | Circuit Board Switch, 3 / 10<br>Commutateur pour circuit imprimé | Before / After - tape switch, assembled<br>Commutateur lecture - directe, complet | | 1.011.300 |
| S 3 / S 4 | Circuit Board Switch, 5 / 8<br>Commutateur pour circuit imprimé | Input selector, assembled<br>Sélecteur d'entrée, complet | | 1.011.500 |
| S 5 | Playback Cut-Off Switch<br>Contact de coupure de la lecture | assembled complet | | 1.077.437 |
| P 301 P 302 | Potentiometer potentiomètre | Volume, assembled complet | | 1.077.430 – 09 |
| P 303 P 304 | Potentiometer potentiomètre | Balance, assembled complet | | 1.077.430 – 08 |
| P 306 P 307 | Potentiometer potentiomètre | Input Level, assembled complet | | 1.077.430 – 07 |
| P 305 | Trim-Potentiometer pot. ajustable | Ruwido S 76 K | 250 k – 20 % – 0.15 W | * * |
| R 301 | Resistor résistance | carbon film à couche | 560 | * * |
| R 302 | Resistor résistance | carbon film à couche | 560 | * * |
| R 303 | Resistor résistance | carbon film à couche | 390 | * * |
| R 309 | Resistor résistance | carbon film à couche | 390 | * * |
| R 304 – R 306 | Resistor résistance | carbon film à couche | 47 k | * * |
| R 307 R 308 | Resistor résistance | carbon film à couche | 6.8 k | * * |
| R 310 R 317 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 311 R 312 | Resistor résistance | carbon film à couche | 330 | * * |
| R 313 | Resistor résistance | carbon film à couche | 39 | * * |
| R 314 R 319 | Resistor résistance | carbon film à couche | 220 k | * * |
| R 315 R 320 | Resistor résistance | carbon film à couche | 33 k | * * |
| R 316 R 321 | Resistor résistance | carbon film à couche | 10 k | * * |
| R 318 R 323 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 322 | Resistor résistance | carbon film à couche | 1 k | * * |
| C 301 | Capacitor condensateur | electrolytic électrolytique | 100 $\mu$F – 25 V | * * |
| C 304 C 305 | Capacitor condensateur | tantalum au tantale | 3.3 $\mu$F – 15 V | * * |
| C 306 C 307 | Capacitor condensateur | electrolytic électrolytique | 250 $\mu$F – 25 V | * * |
| | **VU-Meter Board Plaquette des VU-mètres** | assembled complète | | 1.077.480 |
| | VU-Meter VU-mètres | 2 pieces | | 1.077.470 – 02 |
| | Push-Button Switch commuteur à touche | Record pre-selector présélection enreg. | | 1.077.475 – 02 |
| L 301 – L 303 | Lamp Socket socle de lampe | 3 pieces | | 1.077.480 – 02 |
| L 301 | Spring Contact ressort de contact | | | 1.077.480 – 03 |
| L 302 L 303 | Spring Contact ressort de contact | 2 pieces | | 1.077.480 – 04 |
| L 301 – L 303 | Lamp lampe | 3 pieces | 36 V – 50 mA | 51. 02.0104 |
| D 351 – D 354 | Ge-Diode diode au germanium | AA 116 – AA 119 | | * * |
| R 351 R 352 | Resistor résistance | carbon film à couche | 100 | * * |
| R 353 R 354 | Resistor résistance | carbon film à couche | 2.7 k | * * |
| R 359 R 360 | Resistor résistance | carbon film à couche | 2.7 k | * * |
| R 355 – R 358 | Resistor résistance | carbon film à couche | 4.7 k | * * |
| C 351 C 352 | Capacitor condensateur | polyester au polyester | 3300 pF – 400 V | * * |



Input Amplifier
Amplificateur d'entrée 1.077. 700



Input Amplifier
Amplificateur d'entrée

1.077.700

Diag. 4

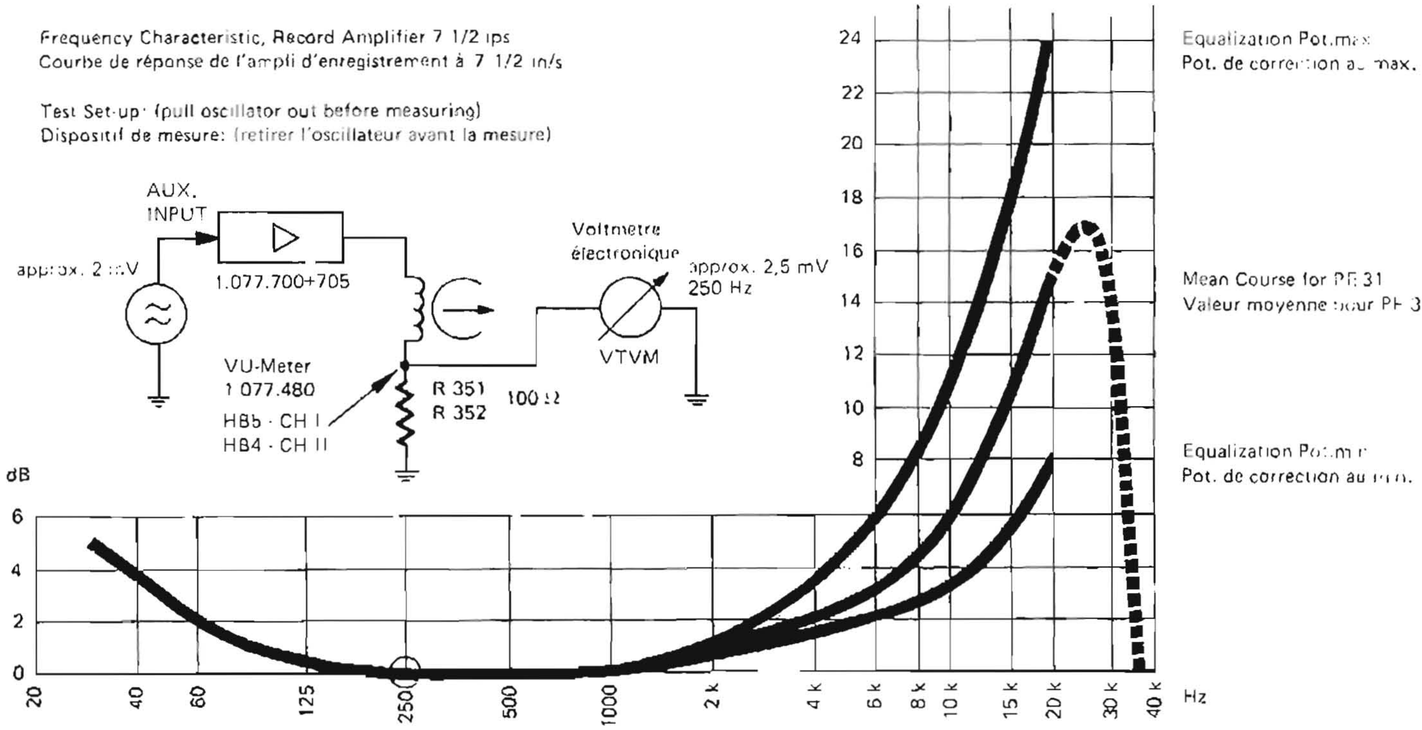
Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification:
1/8 W – 5 %

* * Commercial types
* * Type d'usage courant

| Identification<br>Position | | Part Name<br>Désignation | | Type / Remarks<br>Type / Remarques | | Specifications<br>Spécifications | Order Number<br>Numéro de commande |
|---|---|---|---|---|---|---|---|
| | | Input Amplifier | Amplificateur d'entrée | Board assembled | plaquette complète | | 1.077.700 |
| Q 401 | Q 421 | Transistor | | BC 179 B, BC 159 B | | | * * |
| Q 402 | Q 422 | Transistor | | BC 109 C, BC 149 C | | | * * |
| Q 403 | Q 423 | Transistor | | BC 108 B, BC 148 B | | | * * |
| R 401 | R 421 | Resistor | résistance | carbon film | à couche | 1 M | * * |
| R 402 | R 422 | Resistor | résistance | carbon film | à couche | 180 k | * * |
| R 403 | R 423 | Resistor | résistance | carbon film | à couche | 100 k | * * |
| R 404 | R 424 | Resistor | résistance | carbon film | à couche | 22 k | * * |
| R 405 | R 425 | Resistor | résistance | carbon film | à couche | 47 | * * |
| R 406 | R 426 | Resistor | résistance | carbon film | à couche | 100 k | * * |
| R 407 | R 427 | Resistor | résistance | carbon film | à couche | 18 k | * * |
| R 408 | R 428 | Resistor | résistance | carbon film | à couche | 6.8 k | * * |
| R 409 | R 429 | Resistor | résistance | carbon film | à couche | 33 k | * * |
| R 410 | R 430 | Resistor | résistance | carbon film | à couche | 6.8 k | * * |
| R 411 | R 431 | Resistor | résistance | carbon film | à couche | 220 | * * |
| R 412 | R 432 | Resistor | résistance | carbon film | à couche | 68 k | * * |
| C 401 | C 421 | Capacitor | condensateur | tantalum | au tantale | 10 μF – 15 V | * * |
| C 402 | C 422 | Capacitor | condensateur | tantalum | au tantale | 3.3 μF – 15 V | * * |
| C 403 | C 423 | Capacitor | condensateur | ceramic | céramique | 1500 pF – 10 % – 50 V | * * |
| C 404 | C 424 | Capacitor | condensateur | electrolytic | électrolytique | 125 μF – 3 V | * * |
| C 405 | C 425 | Capacitor | condensateur | electrolytic | électrolytique | 50 μF – 3 V | * * |
| C 406 | C 426 | Capacitor | condensateur | ceramic | céramique | 22 pF – 10 % – 50 V | * * |
| C 407 | C 427 | Capacitor | condensateur | tantalum | au tantale | 10 μF – 15 V | * * |

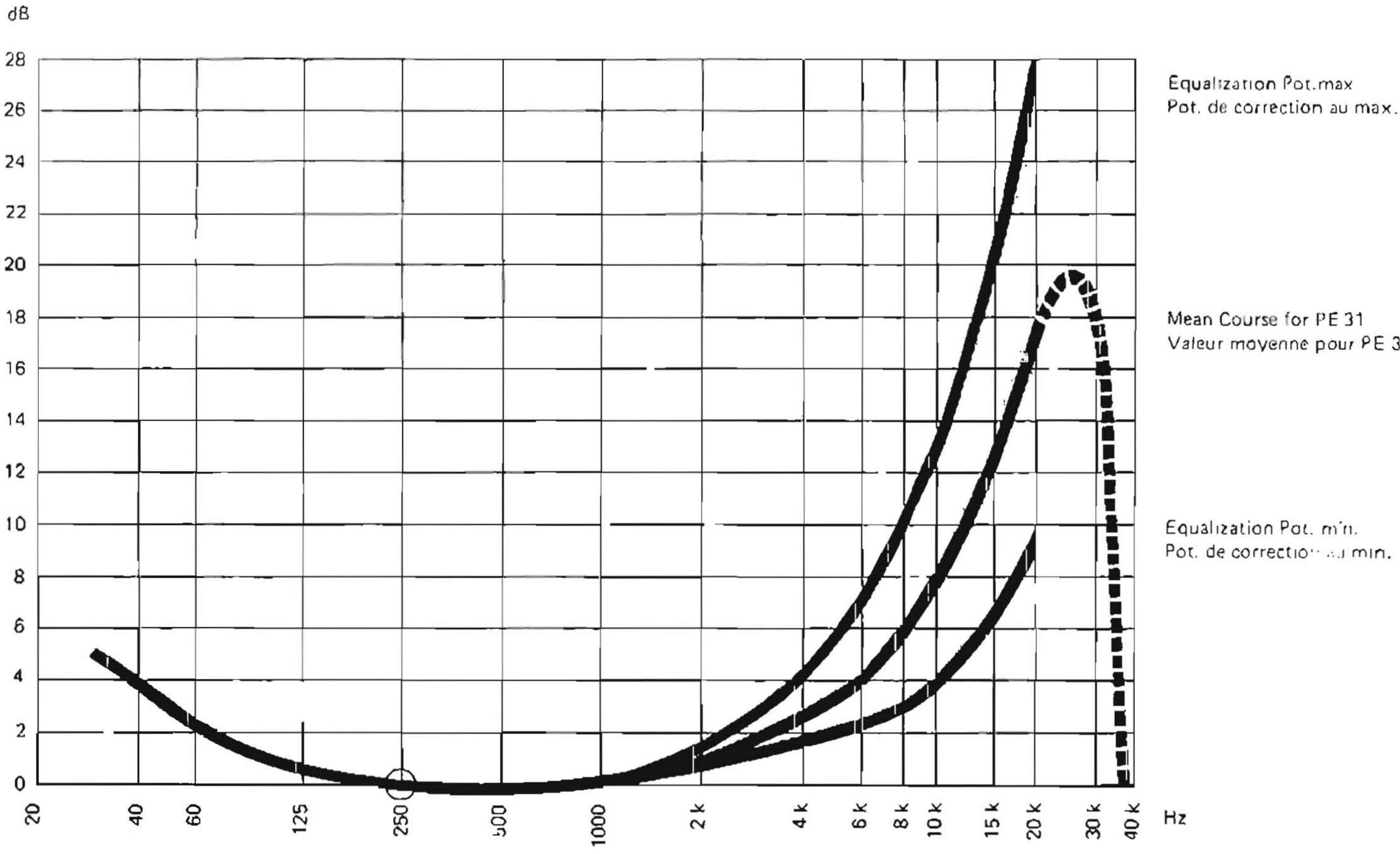
Frequency Characteristic, Record Amplifier 7 1/2 ips
Courbe de réponse de l'ampli d'enregistrement à 7 1/2 in/s

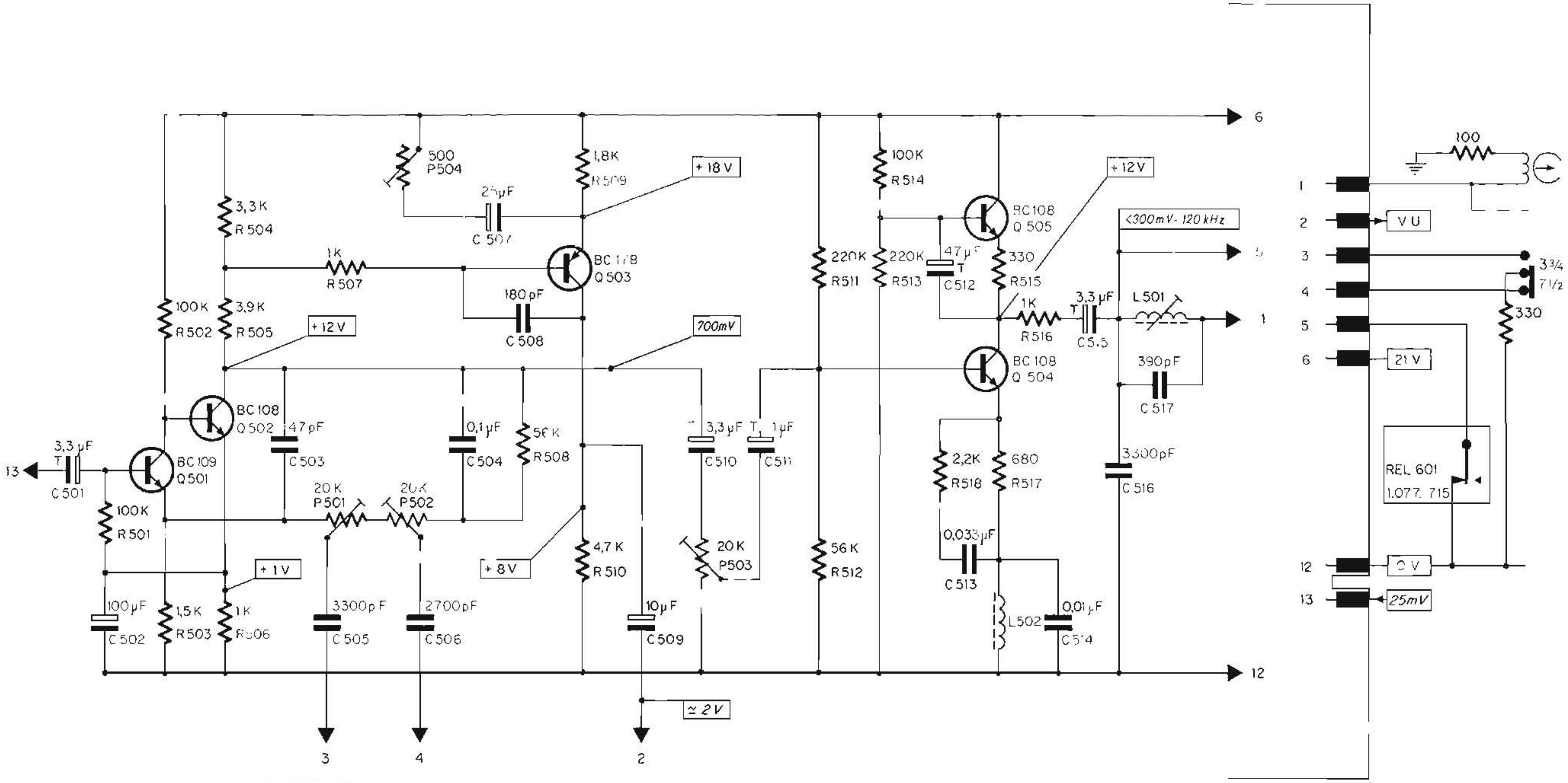
Test Set-up: (pull oscillator out before measuring)
Dispositif de mesure: (retirer l'oscillateur avant la mesure)

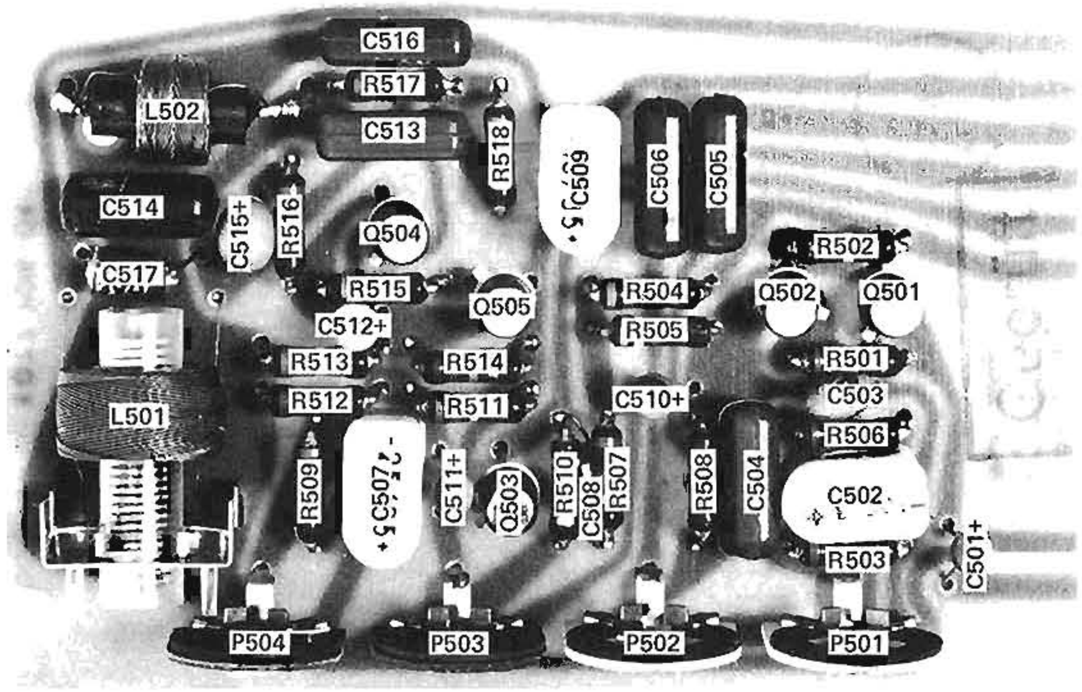


Frequency Characteristic, Record Amplifier 3 3/4 ips
Courbe de réponse de l'ampli d'enregistrement à 3 3/4 in/s

Test Set-up as above
Dispositif de mesure comme ci-dessus







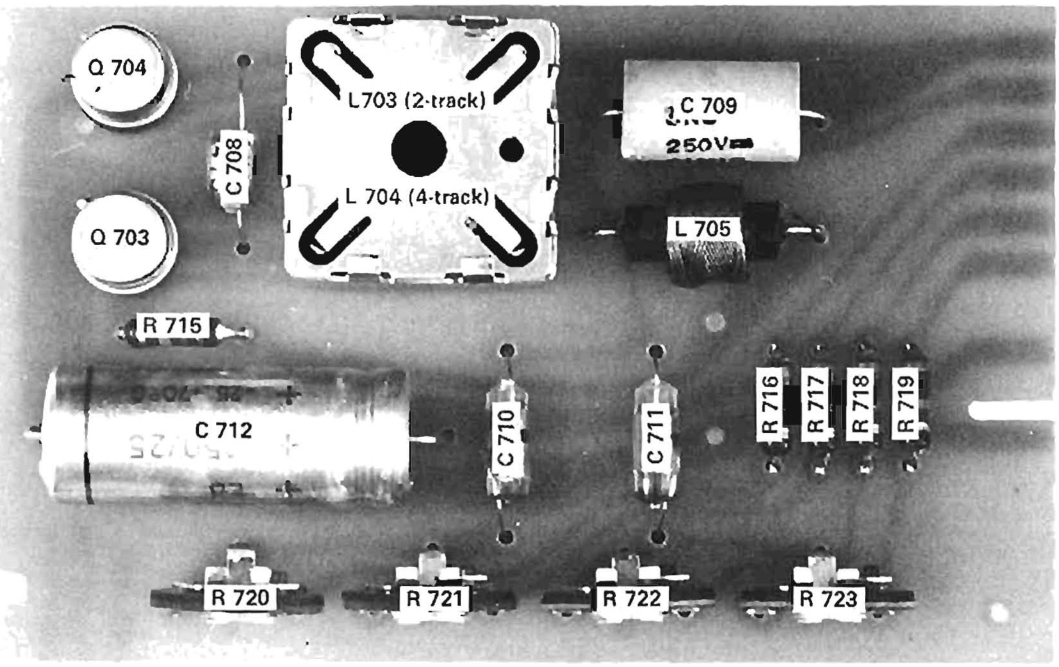
Record Amplifier
Amplificateur d'enregistrement 1.077.705

Diag. 5

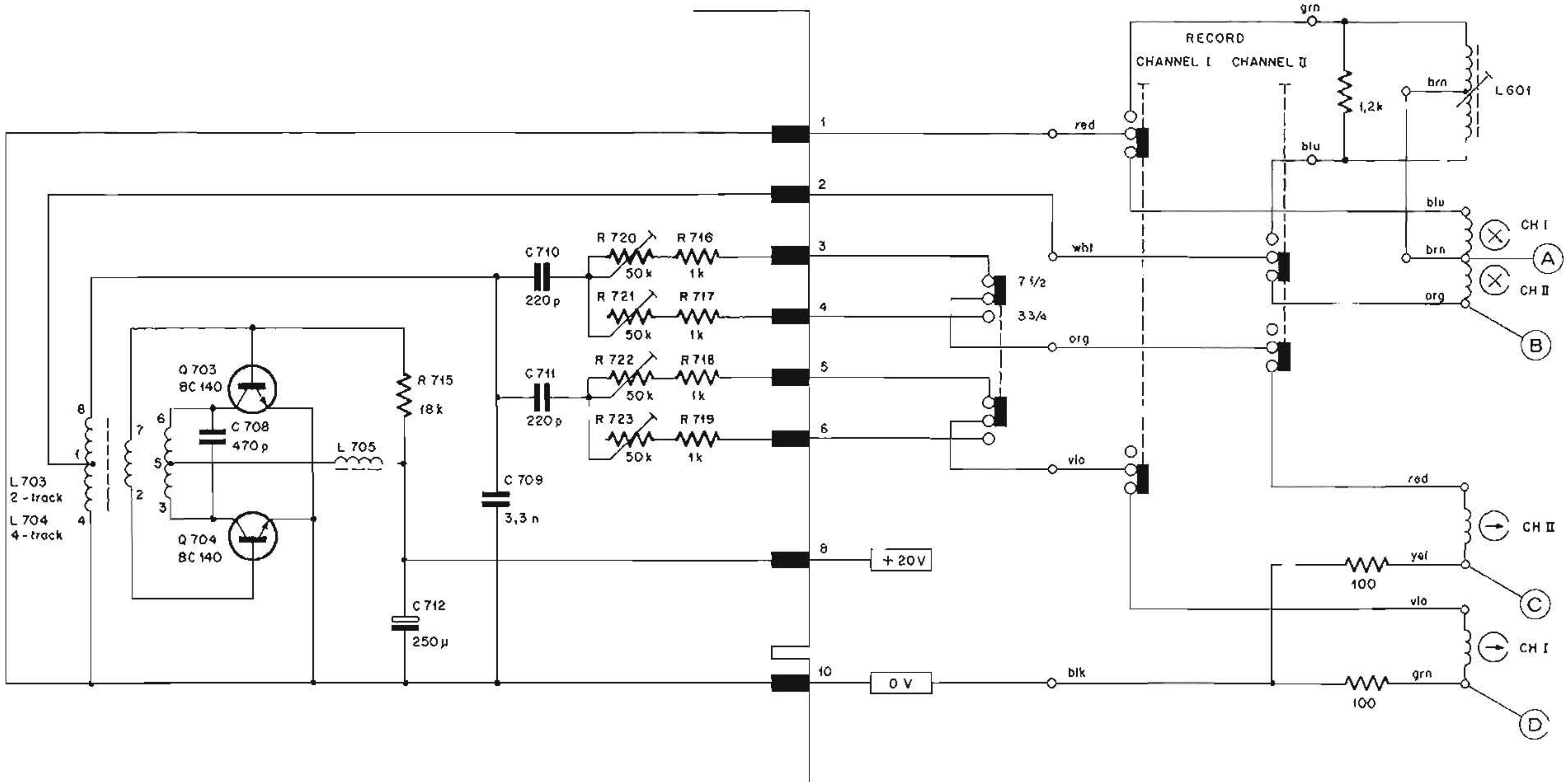
Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification :
1/8 W – 5 %

* * Commercial types
* * Type d'usage courant

| Identification Position | | Part Name Désignation | | Type / Remarks Type / Remarques | | Specifications Spécifications | Order Number Numéro de commande |
|---|---|---|---|---|---|---|---|
| | | Record Amplifier<br>Amplificateur d'enregistrement | | Board assembled | plaquette complète | | 1.077.705 |
| Q 501 | | Transistor | | BC 109 B, BC 149 B | | | * * |
| Q 502 | | Transistor | | BC 108 B, BC 148 B | | | * * |
| Q 503 | | Transistor | | BC 178 A, BC 158 A | | | * * |
| Q 504 | Q 505 | Transistor | | BC 108 B, BC 148 B | | | * * |
| P 501 | P 502 | Trim-Potentiometer | pot. ajustable | Ruwido P 76 K | | 20 k – 10 % – 0.15 W | * * |
| P 503 | | Trim-Potentiometer | pot. ajustable | Ruwido P 76 K | | 20 k – 20 % – 0.15 W | * * |
| P 504 | | Trim-Potentiometer | pot. ajustable | Ruwido P 76 K | | 500 – 20 % – 0.15 W | * * |
| R 501 | R 502 | Resistor | résistance | carbon film | à couche | 100 k | * * |
| R 503 | | Resistor | résistance | carbon film | à couche | 1.5 k | * * |
| R 504 | | Resistor | résistance | carbon film | à couche | 3.3 k | * * |
| R 505 | | Resistor | résistance | carbon film | à couche | 3.9 k | * * |
| R 506 | | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 507 | | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 508 | | Resistor | résistance | carbon film | à couche | 56 k | * * |
| R 509 | | Resistor | résistance | carbon film | à couche | 1.8 k | * * |
| R 510 | | Resistor | résistance | carbon film | à couche | 4.7 k | * * |
| R 511 | R 513 | Resistor | résistance | carbon film | à couche | 220 k | * * |
| R 512 | | Resistor | résistance | carbon film | à couche | 56 k | * * |
| R 514 | | Resistor | résistance | carbon film | à couche | 100 k | * * |
| R 515 | | Resistor | résistance | carbon film | à couche | 330 | * * |
| R 516 | | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 517 | | Resistor | résistance | carbon film | à couche | 680 | * * |
| R 518 | | Resistor | résistance | carbon film | à couche | 2.2 k | * * |
| C 501 | C 510 | Capacitor | condensateur | tantalum | au tantale | 3.3 $\mu$F – 15 V | * * |
| C 502 | | Capacitor | condensateur | electrolytic | électrolytique | 100 $\mu$F – 3 V | * * |
| C 503 | | Capacitor | condensateur | ceramic | céramique | 47 pF – 10 % – 50 V | * * |
| C 504 | | Capacitor | condensateur | polyester | au polyester | 0.1 $\mu$F – 10 % – 100 V | * * |
| C 505 | | Capacitor | condensateur | polyester | au polyester | 3300 pF – 10 % – 400 V | * * |
| C 506 | | Capacitor | condensateur | polyester | au polyester | 2700 pF – 10 % – 400 V | * * |
| C 507 | | Capacitor | condensateur | electrolytic | électrolytique | 25 $\mu$F – 25 V | * * |
| C 508 | | Capacitor | condensateur | polystyrene | au polystyrène | 180 pF – 10 % – 160 V | * * |
| C 509 | | Capacitor | condensateur | electrolytic | électrolytique | 10 $\mu$F – 35 V | * * |
| C 511 | | Capacitor | condensateur | tantalum | au tantale | 1 $\mu$F – 15 V | * * |
| C 512 | | Capacitor | condensateur | tantalum | au tantale | 47 $\mu$F – 3 V | * * |
| C 513 | | Capacitor | condensateur | polyester | au polyester | 0.033 $\mu$F – 10 % – 250 V | * * |
| C 514 | | Capacitor | condensateur | polyester | au polyester | 0.01 $\mu$F – 10 % – 160 V | * * |
| C 515 | | Capacitor | condensateur | tantalum | au tantale | 3.3 $\mu$F – 30 V | * * |
| C 516 | | Capacitor | condensateur | polyester | au polyester | 3300 pF – 10 % – 400 V | * * |
| C 517 | | Capacitor | condensateur | polystyrene | au polystyrène | 390 pF – 5 % – 160 V | * * |
| L 501 | | Choke Coil | bobine d'arrêt | assembled | complète | | 1.077.750 |
| L 502 | | Choke Coil MPX | bobine d'arrêt MPX | assembled | complète | | 1.077.707 |



Oscillator
Oscillateur 1.077.712



Position "Record - Stereo", voltages measured against ground (0V)
Position "enregistrement stéréo", tensions par rapport à la masse (0V)

| Test points<br>Points de mesure | 2 - Track<br>2 - pistes | 4 - Track<br>4 pistes |
|---|---|---|
| Ⓐ | approx. 22V/120 kHz | approx. 18V/120 kHz |
| Ⓑ | approx. 44V/120 kHz | approx. 36V/120 kHz |
| Ⓒ + Ⓓ | 500 mV/120 kHz<br>50 mV/ 1 kHz* | 400 mV/120 kHz<br>40 mV/ 1 kHz* |

* AF - Test (oscillator pulled out), full modulation
* mesure BF (oscillateur retiré), modulation à 0 dB

Test values Ⓒ and Ⓓ depend on type and speed of tape; they are to be considered nominal.

Les tensions aux points Ⓒ et Ⓓ diffèrent suivant le type et la vitesse de la bande; les valeurs indiquées sont nominales.

**Oscillator**
**Oscillateur**
**1. 077. 712**

**Diag. 6a**

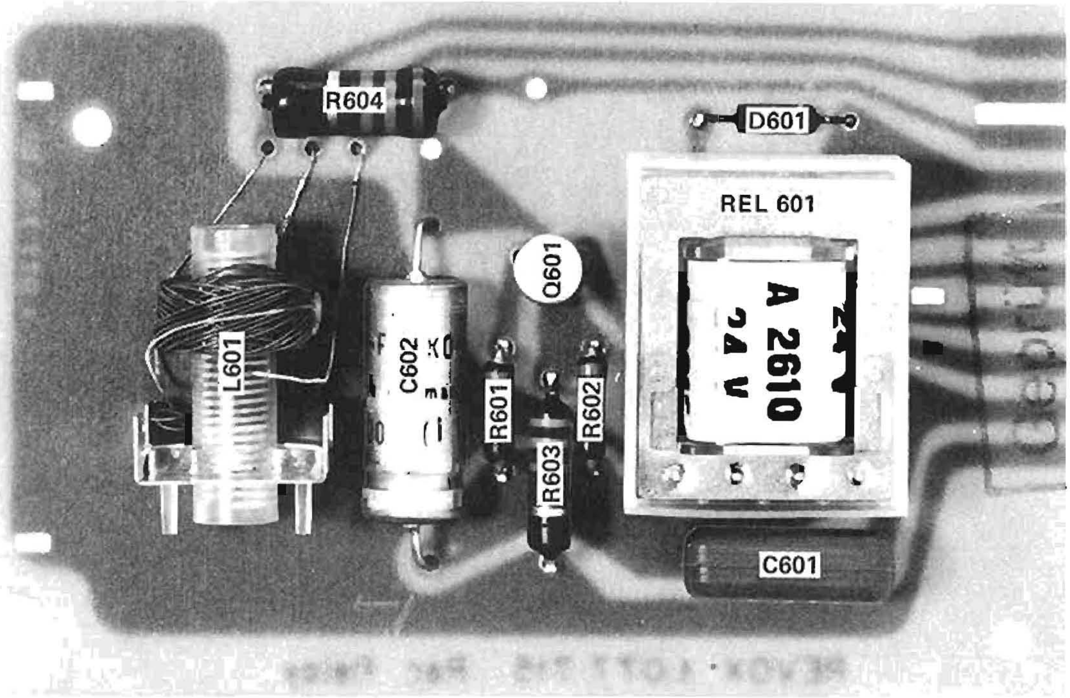
Unspecified carbon film resistors:
1/8 W – 5 %

Résistances à couche sans spécification:
1/8 W – 5 %

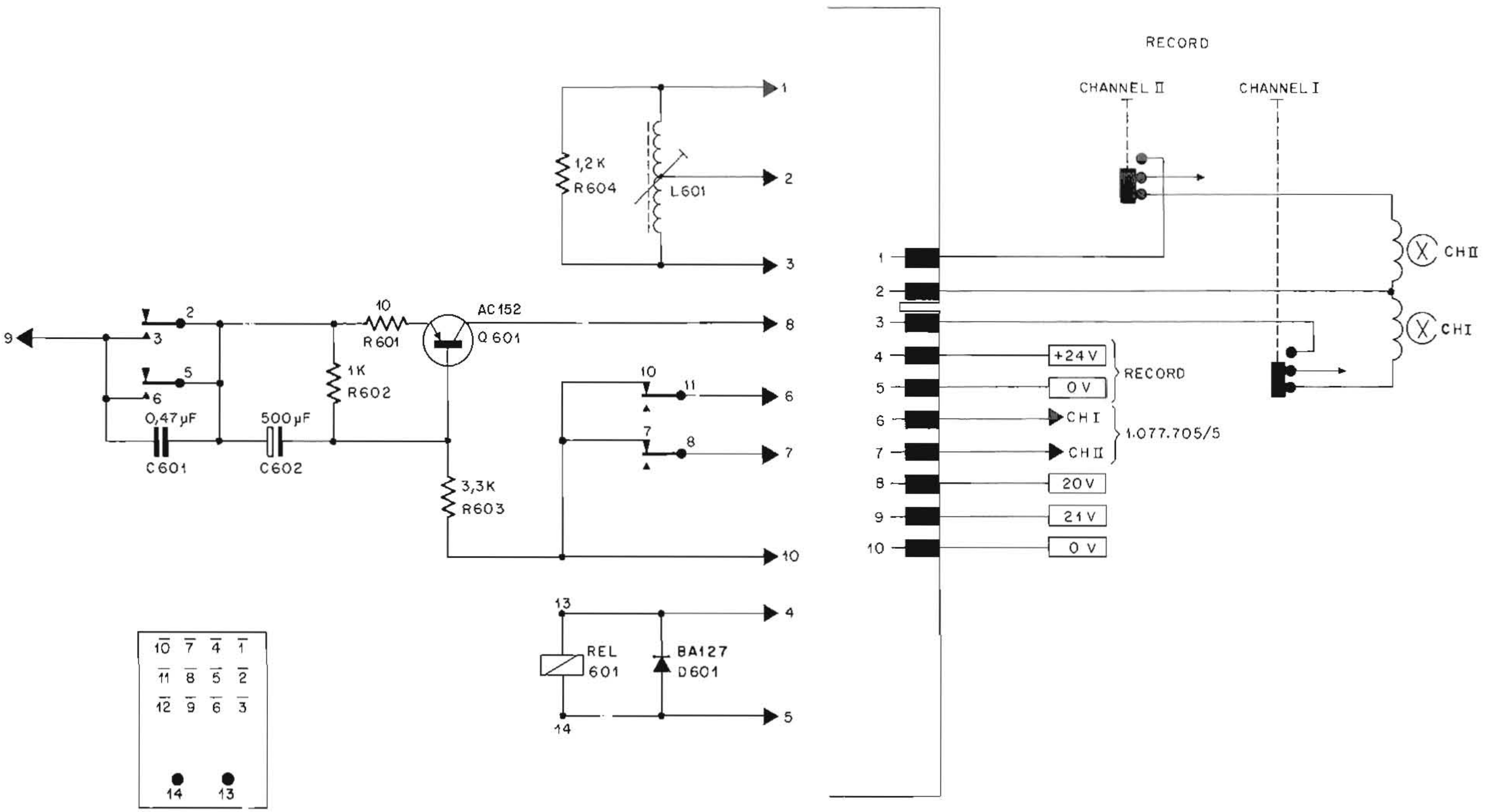
**Commercial types

**Type d'usage courant

| Identification Position | Part Name Désignation | | Type/Remarks Type/Remarques | | Specifications Spécifications | Order Number Numéro de commande |
|---|---|---|---|---|---|---|
| | **Oscillator Board** | **Plaquette oscillateur** | 2-track, assembled | 2 pistes, complète | red dot on oscillator coil<br>point rouge sur bobin. oscill. | 1.077.712 |
| | | | 4-track, assembled | 4 pistes, complète | yellow dot on oscillator coil<br>point jaune sur bobin. oscill. | 1.077.731 |
| Q 703 – Q 704 | Transistor | | BC 140 - 10 | | | ** |
| R 715 | Resistor | résistance | carbon film | à couche | 18 k | ** |
| R 716 – R 719 | Resistor | résistance | carbon film | à couche | 1 k | ** |
| R 720 – R 723 | Trim-potentiometer | pot. ajustable | carbon type | au carbone | 50 k – 20 % – 0,15 W | ** |
| C 708 | Capacitor | condensateur | polystyrol | au polystyrol | 470 pF – 5 % – 160 V | ** |
| C 709 | Capacitor | condensateur | polystyrene | au polystyrène | 3,3 nF – 1 % – 125 V | ** |
| C 710 – C 711 | Capacitor | condensateur | polystyrol | au polystyrol | 220 pF – 5 % – 160 V | ** |
| C 712 | Capacitor | condensateur | electrolytic | électrolytique | 250 µF – 25 V | ** |
| L 703 | Oscillator coil | bobinage oscillateur | 2-track, assembled | 2 pistes, complète | | 1.022.110 |
| L 704 | Oscillator coil | bobinage oscillateur | 4-track, assembled | 4 pistes, complète | | 1.022.112 |
| L 705 | Choke coil | bobine d'arrêt | assembled | complète | | 1.077.707 |



Record Relay
Relais d'enregistrement 1.077. 715



Record Relay
Relais d'enregistrement

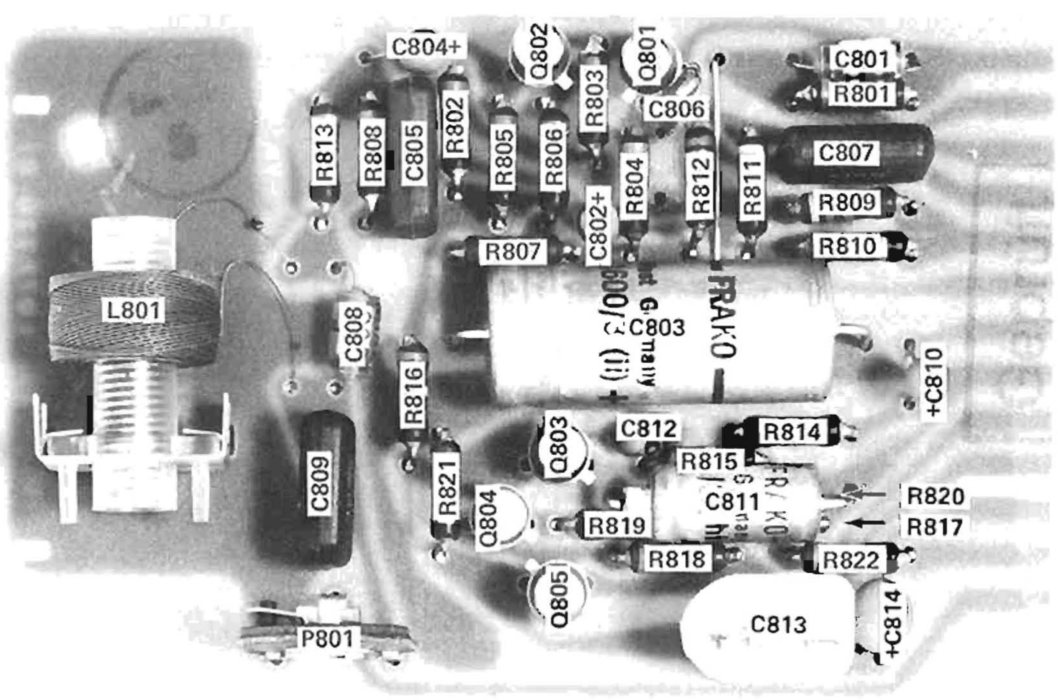
1.077.715

Diag. 7

Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification·
1/8 W – 5 %

• • Commercial types
• • Type d'usage courant

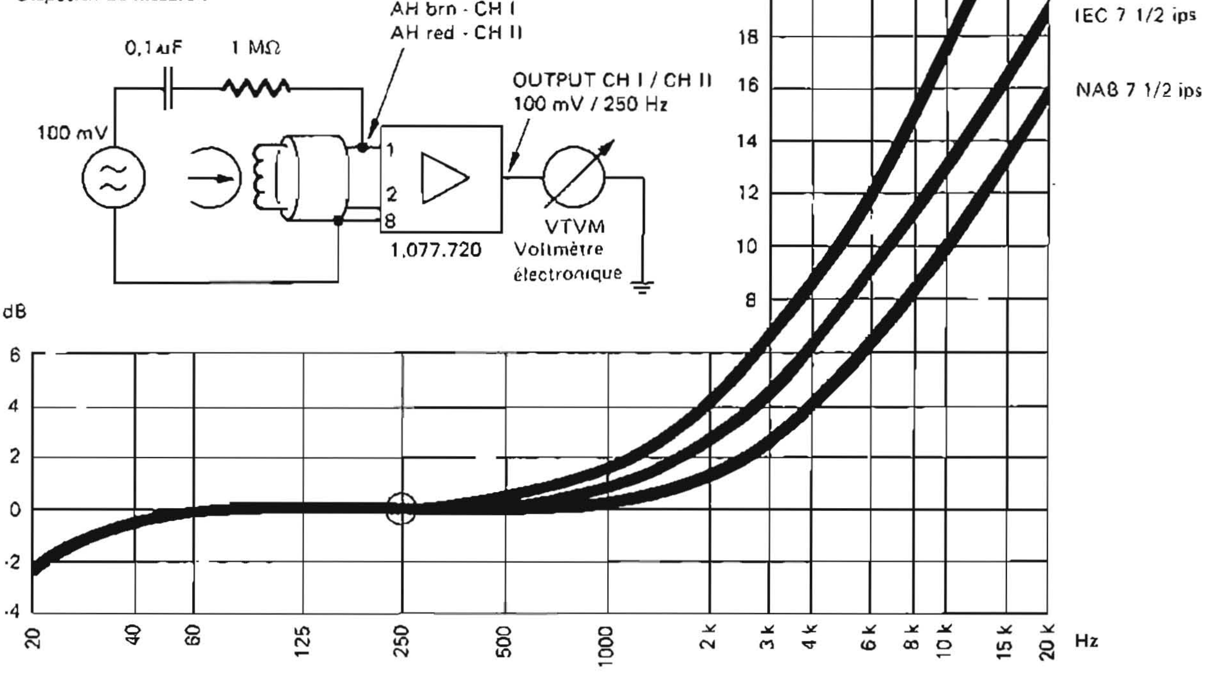
| Identification Position | Part Name Désignation | | Type / Remarks Type / Remarques | | Specifications Spécifications | Order Number Numéro de commande |
|---|---|---|---|---|---|---|
| | **Record Relay** | **Relais d'enregistrement** | Board assembled | plaquette complète | | 1.077.715 |
| Q 601 | Transistor | | AC 152 | | | * * |
| D 601 | Si-Diode | diode au silicium | BA 127 | | 50 V – 100 mA | * * |
| R 601 | Resistor | résistance | carbon film | á couche | 10 | * * |
| R 602 | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 603 | Resistor | résistance | carbon film | à couche | 3.3 k – 10 % – 0,3 W | * * |
| R 604 | Resistor | résistance | carbon film | à couche | approx. 1.2 k – 0.5 W | * * |
| C 601 | Capacitor | condensateur | polyester | au polyester | 0.47 μF – 20 % – 100 V | * * |
| C 602 | Capacitor | condensateur | electrolytic | électrolytique | 500 μF – 3 V | * * |
| REL 601 | Relay | relais | ITT PZ 4/A 2 610 ( 24 ) | | | 56. 04.0121 |
| L 601 | Dummy Head | bobine de charge fictive | assembled complète | | | 1.077.755 |

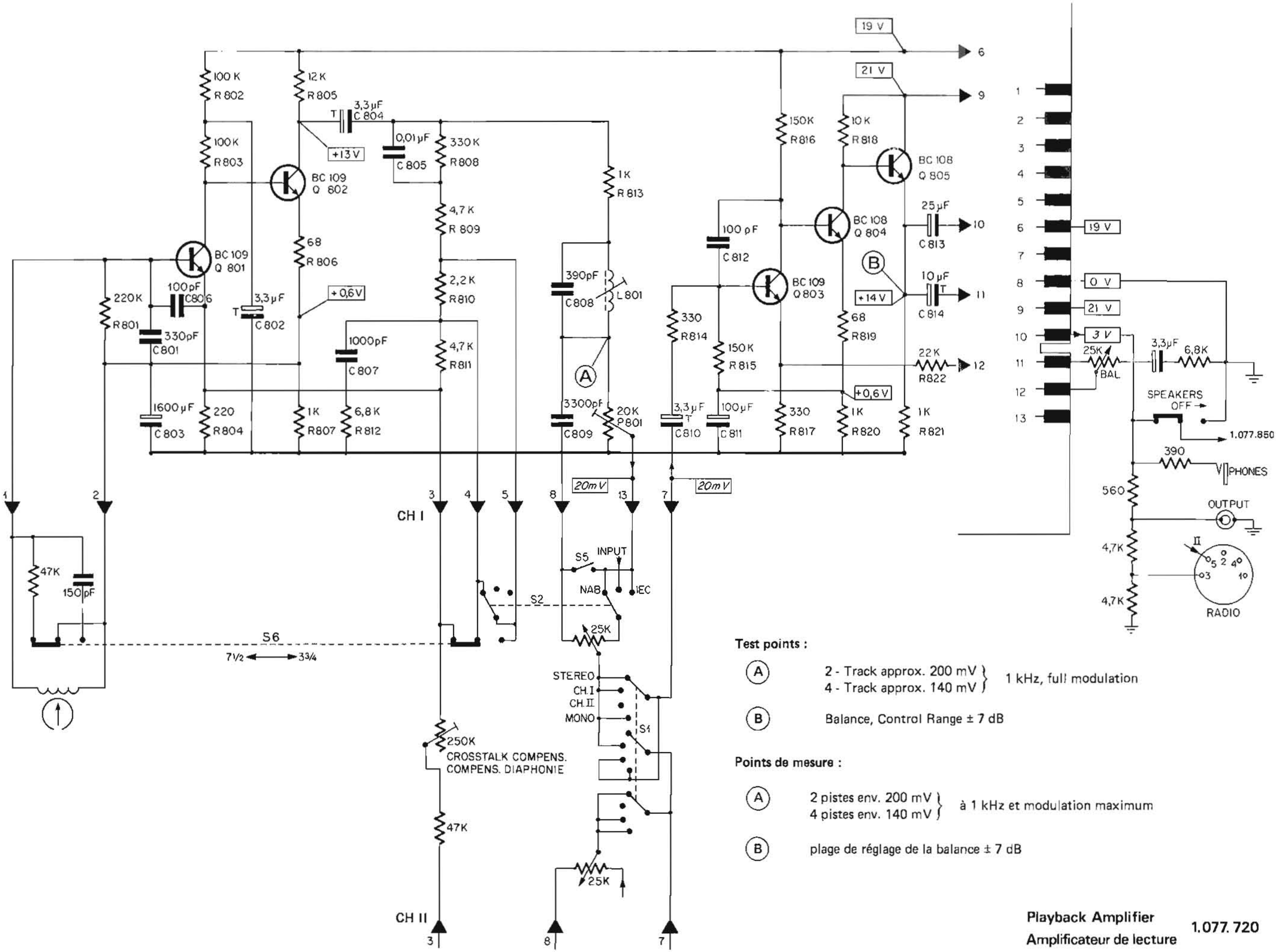


## Playback and Drive Amplifier
## Amplificateurs de lecture et de ligne 1.077. 720

Frequency Characteristic, Playback Amplifier ( current driven )
Courbe de réponse de l'ampli de lecture ( générateur à courant constant )

Test Set-up :
Dispositif de mesure :





**Test points :**

| | | |
|---|---|---|
| Ⓐ | 2 - Track approx. 200 mV<br>4 - Track approx. 140 mV | 1 kHz, full modulation |
| Ⓑ | Balance, Control Range ± 7 dB | |

**Points de mesure :**

| | | |
|---|---|---|
| Ⓐ | 2 pistes env. 200 mV<br>4 pistes env. 140 mV | à 1 kHz et modulation maximum |
| Ⓑ | plage de réglage de la balance ± 7 dB | |

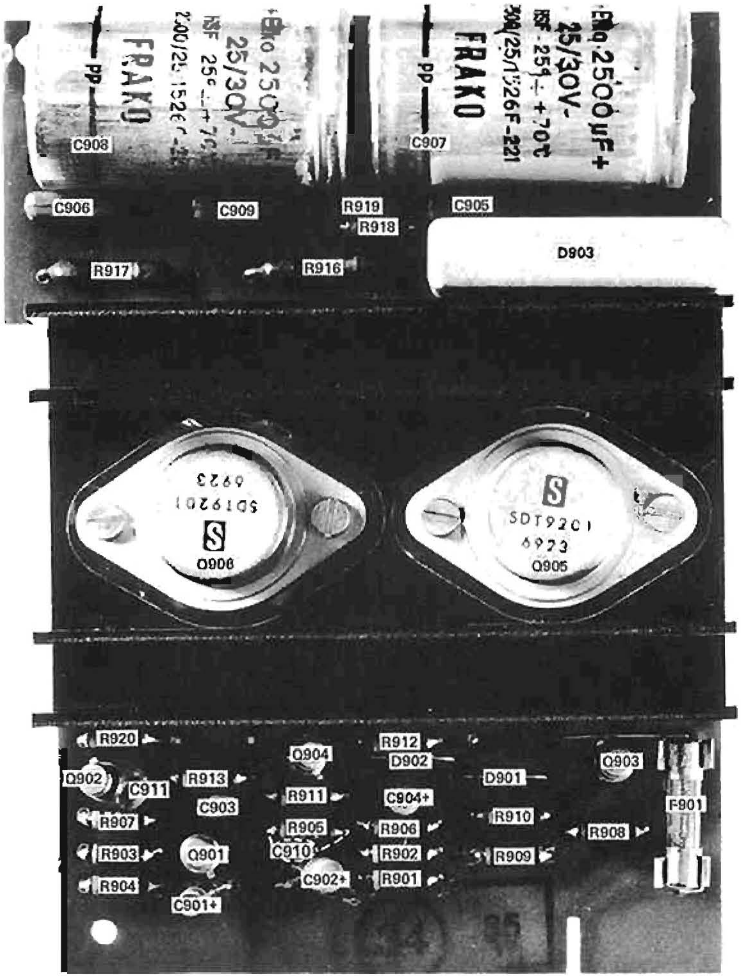
**Playback Amplifier** 1.077. 720
**Amplificateur de lecture**

**Diag. 8**

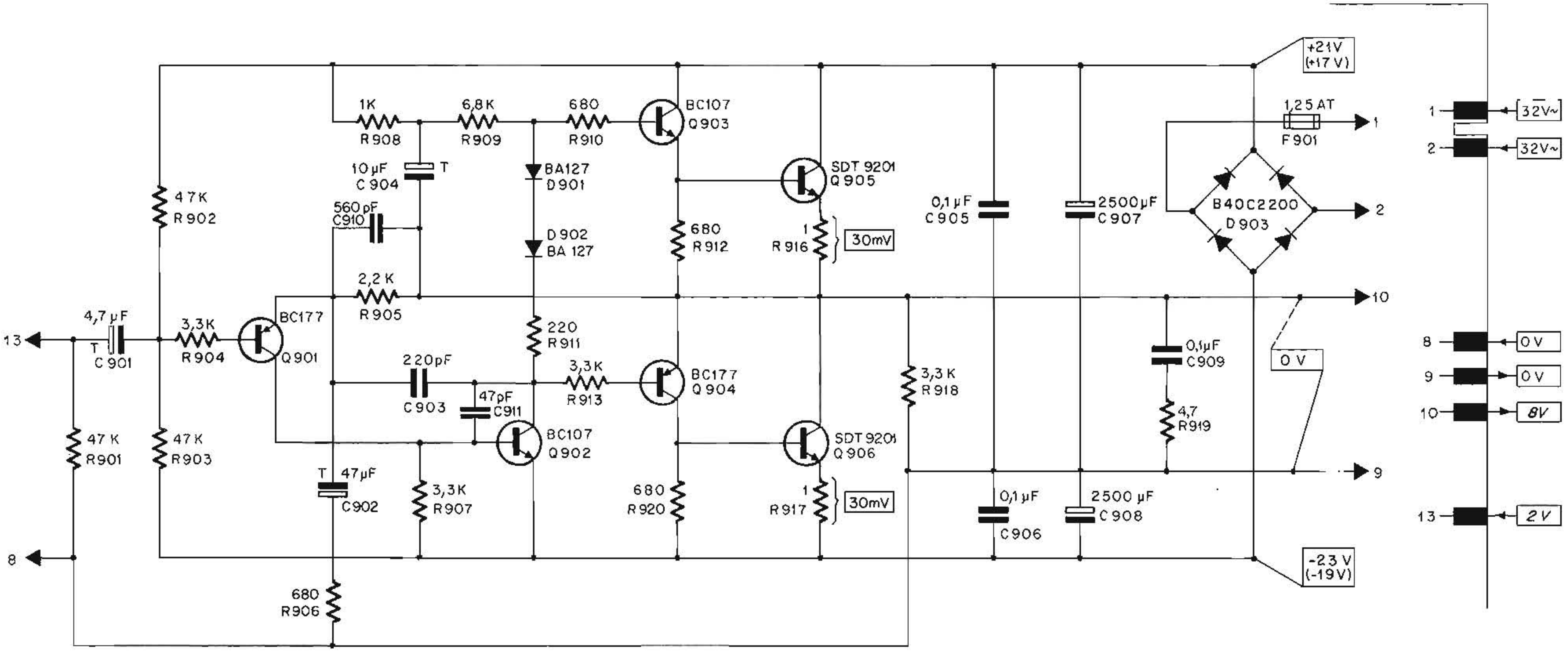
Unspecified carbon film resistors :
1/8W – 5 %
Résistance à couche sans spécification :
1/8 W – 5 %

* * Commercial types
* * Type d'usage courant

| Identification<br>Position | Part Name<br>Désignation | Type / Remarks<br>Type / Remarques | Specifications<br>Spécifications | Order Number<br>Numéro de commande |
|---|---|---|---|---|
| | **Playback Amplifier**<br>**Amplificateur de reproduction** | Board assembled plaquette complète | | 1.077.720 |
| Q 801 Q 802 | Transistor | BC 109 C, BC 149 C | | * * |
| Q 803 | Transistor | BC 109 B, BC 149 B | | * * |
| Q 804 Q 805 | Transistor | BC 108 B, BC 148 B | | * * |
| R 801 | Resistor résistance | carbon film à couche | 220 k | * * |
| R 802 R 803 | Resistor résistance | carbon film à couche | 100 k | * * |
| R 804 | Resistor résistance | carbon film à couche | 220 | * * |
| R 805 | Resistor résistance | carbon film à couche | 12 k | * * |
| R 806 | Resistor résistance | carbon film à couche | 68 | * * |
| R 807 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 808 | Resistor résistance | carbon film à couche | 330 k | * * |
| R 809 R 811 | Resistor résistance | carbon film à couche | 4.7 k | * * |
| R 810 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 813 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 814 | Resistor résistance | carbon film à couche | 330 | * * |
| R 815 | Resistor résistance | carbon film à couche | 150 k | * * |
| R 816 | Resistor résistance | carbon film à couche | 150 k | * * |
| R 817 | Resistor résistance | carbon film à couche | 330 | * * |
| R 818 | Resistor résistance | carbon film à couche | 10 k | * * |
| R 819 | Resistor résistance | carbon film à couche | 68 | * * |
| R 820 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 821 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 822 | Resistor résistance | carbon film à couche | 22 k | * * |
| P 801 | Trim-Potentiometer pot. ajustable | Ruwido P 76 K | 20 k – 20 % – 0.15 W | * * |
| C 801 | Capacitor condensateur | Polystyrol au polystyrol | 330 pF – 5 % – 160 V | * * |
| C 802 | Capacitor condensateur | tantalum au tantale | 3.3 μF – 15 V | * * |
| C 803 | Capacitor condensateur | electrolytic électrolytique | 1600 μF – 3 V | * * |
| C 804 | Capacitor condensateur | electrolytic électrolytique | 3.3 μF – 35 V | * * |
| C 805 | Capacitor condensateur | polyester au polyester | .01 μF – 5 % – 160 V | * * |
| C 806 C 812 | Capacitor condensateur | polystyrene au polystyrène | 100 pF – 10 % – 160 V | * * |
| C 807 | Capacitor condensateur | polyester au polyester | 1000 pF – 10 % – 400 V | * * |
| C 808 | Capacitor condensateur | polystyrene au polystyrène | 390 pF – 5 % – 160 V | * * |
| C 809 | Capacitor condensateur | polyester au polyester | 3300 pF – 10 % – 400 V | * * |
| C 810 | Capacitor condensateur | tantalum au tantale | 3.3 μF – 15 V | * * |
| C 811 | Capacitor condensateur | electrolytic électrolytique | 100 μF – 3 V | * * |
| C 813 | Capacitor condensateur | electrolytic électrolytique | 25 μF – 25 V | * * |
| C 814 | Capacitor condensateur | tantalum au tantale | 10 μF – 15 V | * * |
| L 801 | Choke Coil bobine | assembled complète | | 1.077.750 |



**Loudspeaker Amplifier**
**Amplificateur de haut-parleur** 1.077. **850**



Loudspeaker Amplifier
Amplificateur de haut-parleur

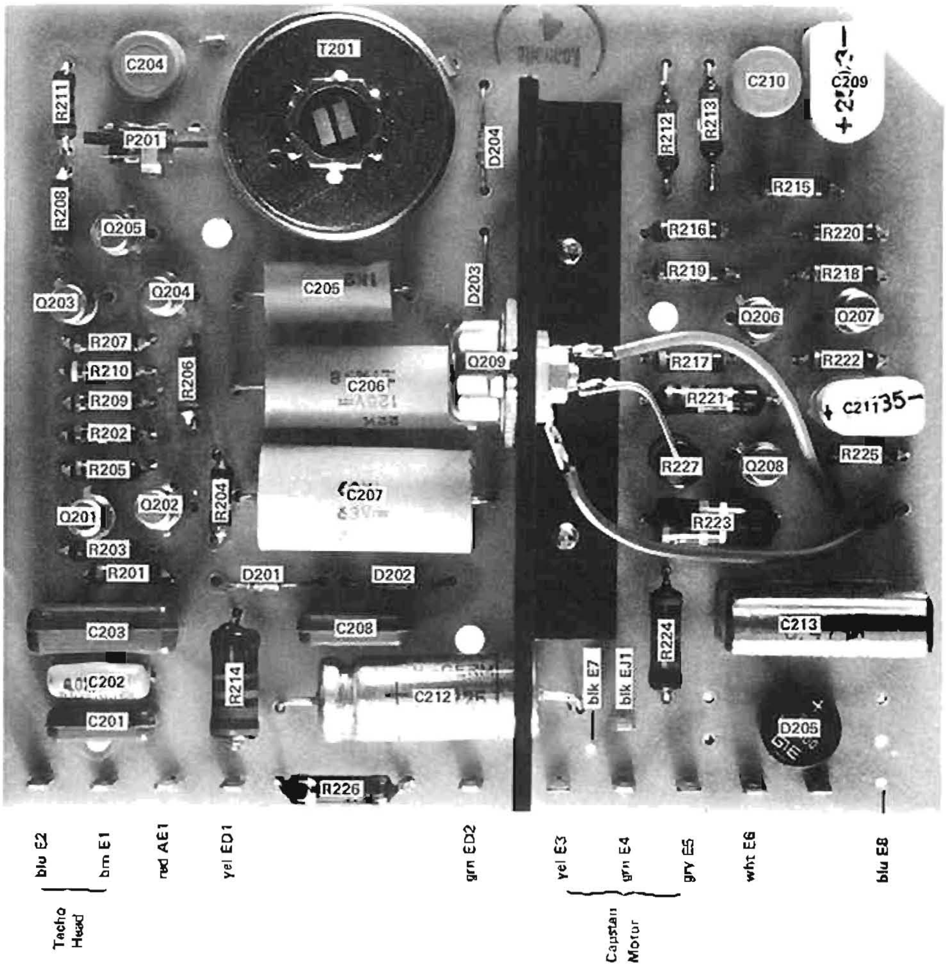
1.077.850

Diag. 9

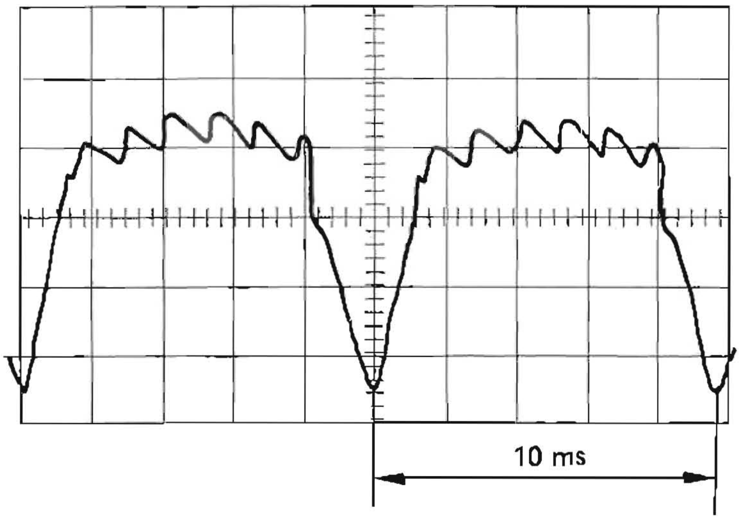
Unspecified carbon film resistors :
1/8 W – 5 %
Résistance à couche sans spécification :
1/8 W – 5%

* * Commercial types
* * Type d'usage courant

| Identification Position | Part Name Désignation | | Type / Remarks Type / Remarques | | Specifications Spécifications | Order Number Numéro de commande |
|---|---|---|---|---|---|---|
| | **Loudspeaker Amplifier**<br>**Amplificateur de haut-parleur** | | Board assembled | plaquette complète | | 1.077.850 |
| Q 901 | Transistor | | BC 177 A, BC 157 A | | | * * |
| Q 902 | Transistor | | BC 107 A/B, BC 147 A/B | | | * * |
| Q 903 | Transistor | | BC 107 A/B | | | * * |
| Q 904 | Transistor | | BC 177 A | | | * * |
| Q 905 Q 906 | Transistor | | SDT 9201 | | | * * |
| D 901 D 902 | Si-Diode | diode au silicium | BA 127 | | 50 V – 100 mA | * * |
| D 903 | Si-Rectifier | redresseur au silicium | B 40 C 2200 | | | * * |
| R 901 – R 903 | Resistor | résistance | carbon film | à couche | 47 k | * * |
| R 904 | Resistor | résistance | carbon film | à couche | 3.3 k | * * |
| R 905 | Resistor | résistance | carbon film | à couche | 2.2 k | * * |
| R 906 | Resistor | résistance | carbon film | à couche | 680 | * * |
| R 907 | Resistor | résistance | carbon film | à couche | 3,3 k | * * |
| R 908 | Resistor | résistance | carbon film | à couche | 1 k | * * |
| R 909 | Resistor | résistance | carbon film | à couche | 6.8 k | * * |
| R 910 | Resistor | résistance | carbon film | à couche | 680 | * * |
| R 911 | Resistor | résistance | carbon film | à couche | 220 | * * |
| R 912 R 920 | Resistor | résistance | carbon film | à couche | 680 | * * |
| R 913 | Resistor | résistance | carbon film | à couche | 3.3 k | * * |
| R 916 R 917 | Resistor | résistance | wire | bobinée | 1 – 10 % – 1 W | * * |
| R 918 | Resistor | résistance | carbon film | à couche | 3.3 k | * * |
| R 919 | Resistor | résistance | carbon film | à couche | 4.7 k | * * |
| C 901 | Capacitor | condensateur | tantalum | au tantale | 4.7 µF – 10 V | * * |
| C 902 | Capacitor | condensateur | tantalum | au tantale | 47 µF – 3 V | * * |
| C 903 | Capacitor | condensateur | ceramic | céramique | 220 pF – 10 % – 50 V | * * |
| C 904 | Capacitor | condensateur | tantalum | au tantale | 10 µF – 15 V | * * |
| C 905 C 906 | Capacitor | condensateur | polyester | au polyester | 0.1 µF – 20 % – 100 V | * * |
| C 907 C 908 | Capacitor | condensateur | electrolytic | électrolytique | 2500 µF – 25 V | * * |
| C 909 | Capacitor | condensateur | polyester | au polyester | .1 µF – 20 % – 100 V | * * |
| C 910 | Capacitor | condensateur | ceramic | céramique | 560 pF – 10 % – 50 V | * * |
| C 911 | Capacitor | condensateur | ceramic | céramique | 47 pF – 10 % – 50 V | * * |
| F 901 | Fuse | fusible | 5 x 20 slo-blo | retardé | 1.25 A | * * |



**Speed Control** 1.077. **725**
**Régulation de vitesse**

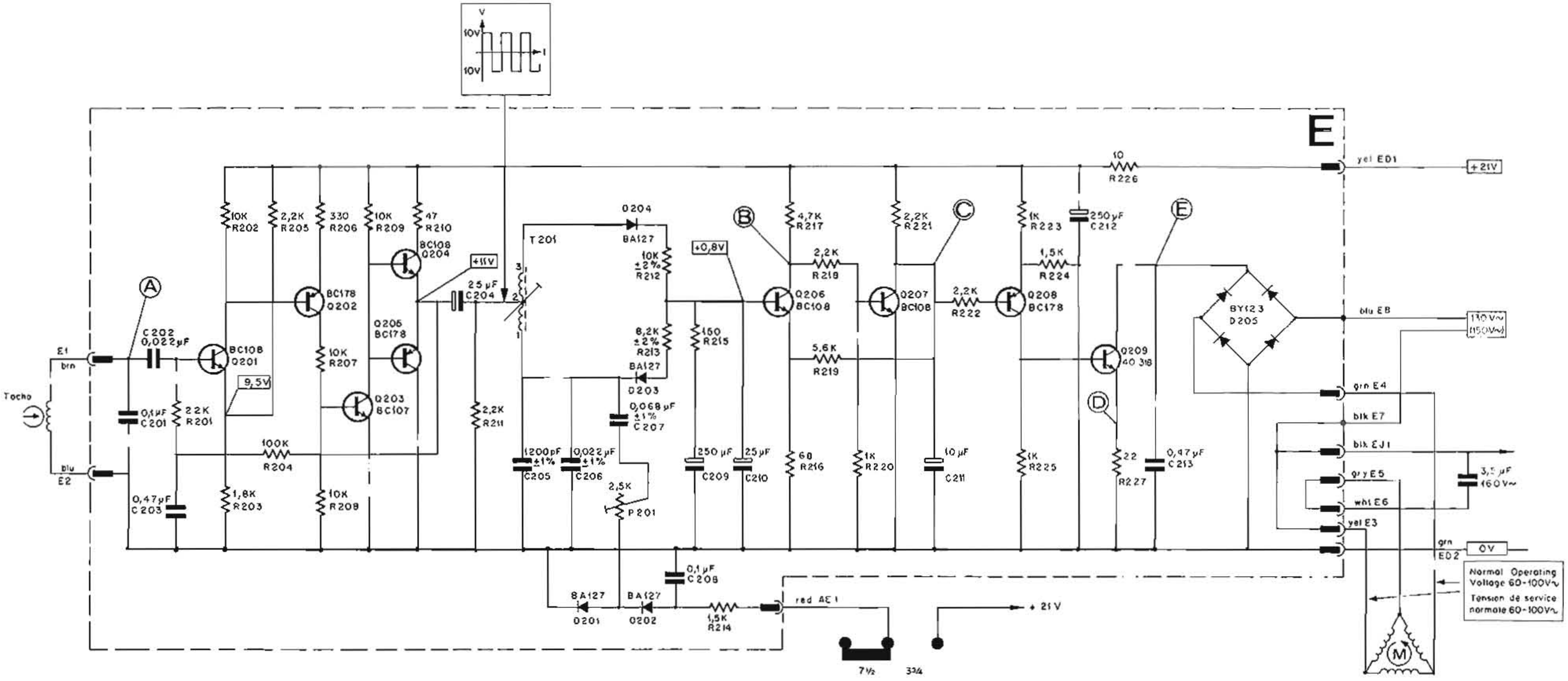


**Speed adjustment referred to 50 Hz line frequency**

Curve shape at test point D (Position PLAY, tape loaded)
Superposed oscillation (800, resp. 1600 Hz) must remain steady with respect to basic oscillation (see also 6.2.3)

**Réglage du nombre de tours basé sur la fréquence du réseau à 50 Hz**

Allure de la courbe au point de mesure D (pendant le défilement de la bande, position lecture). L'oscillation superposée (800 ou 1600 Hz) ne doit pas se déplacer par rapport à l'oscillation de base (voir également 6.2.3)



**Test points :**
**Points de mesure :**

Ⓐ 35 – 50 $mV_{eff}$ (800 Hz = 3 3/4 ips)

Voltages in volts, measured against ground (0V) with a 20 kΩ / V DC - meter

Tensions en volts mesurées par rapport à la masse (0V) avec un voltmètre DC de 20 kΩ / V de résistance interne

| Ⓑ | Ⓒ | Ⓓ | Ⓔ | |
|---|---|---|---|---|
| 7,5 | 0,4 | 3 | 5 | Start (full voltage on motor, Q209 saturated)<br>Démarrage (toute la tension au moteur, Q209 saturé) |
| 2 | 10 | 1 | 80 | Operation (nominal values, depend on motor loading)<br>Marche (valeurs nominales dépendant de la charge du moteur) |
| 0,8 | 15 | 0 | 200 | Speed higher than nominal (no voltage on motor, Q209 cut off)<br>Vitesse supérieure à la vitesse nominale (pas de tension au moteur, Q209 bloqué) |

**Speed Control**
**Régulation de vitesse**

**1.077.725**

**Diag. 10**

Unspecified carbon film resistors:
1/8 W – 5 %
Résistance à couche sans spécification:
1/8 W – 5 %

* * Commercial Types
* * Type d'usage courant

| Identification<br>Position | Part Name<br>Désignation | Type / Remarks<br>Type / Remarques | Specifications<br>Spécifications | Order Number<br>Numéro de commande |
|---|---|---|---|---|
| | **Speed Control** **Régulation de vitesse** | Board assembled plaquette complète | | 1.077.725 |
| Q 201 Q 204 | Transistor | BC 108 A/B, BC 148 A/B | | * * |
| Q 202 Q 205 | Transistor | BC 178 A, BC 158 A | | * * |
| Q 203 | Transistor | BC 107 A, BC 147 A | | * * |
| Q 206 Q 207 | Transistor | BC 108 A/B, BC 148 A/B | | * * |
| Q 208 | Transistor | BC 178 A, BC 158 A | | * * |
| Q 209 | Transistor | 40 318 (RCA) | | * * |
| D 201 – D 204 | Si-Diode diode au silicium | BA 127 | 50 V – 100 mA | * * |
| D 205 | Si-Rectifier redresseur au silicium | BY 123, B 280 C 800 | 280 V – 800 mA | * * |
| R 201 | Resistor résistance | carbon film à couche | 22 k | * * |
| R 202 | Resistor résistance | carbon film à couche | 10 k | * * |
| R 203 | Resistor résistance | carbon film à couche | 1.8 k | * * |
| R 204 | Resistor résistance | carbon film à couche | 100 k | * * |
| R 205 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 206 | Resistor résistance | carbon film à couche | 330 | * * |
| R 207 – R 209 | Resistor résistance | carbon film à couche | 10 k | * * |
| R 210 | Resistor résistance | carbon film à couche | 47 | * * |
| R 211 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 212 | Resistor résistance | metal film, TC/CT: $10^{-4}/°C$ film métallique | 10 k – 2% – .3 W | 57. 33.3103 |
| R 213 | résistance | metal film, TC/CT: $10^{-4}/°C$ film métallique | 8.2 k – 2 % – .3 W | 57. 33.3822 |
| R 214 | Resistor résistance | carbon film à couche | 1.5 k – 10 % – .5 W | * * |
| R 215 | Resistor résistance | carbon film à couche | 150 | * * |
| R 216 | Resistor résistance | carbon film à couche | 68 | * * |
| R 217 | Resistor résistance | carbon film à couche | 4.7 k | * * |
| R 218 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 219 | Resistor résitance | carbon film à couche | 5.6 k | * * |
| R 220 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 221 | Resistor résistance | carbon film à couche | 2.2 k – 5 % – .3 W | * * |
| R 222 | Resistor résistance | carbon film à couche | 2.2 k | * * |
| R 223 | Resistor résistance | carbon film à couche | 1 k – 5 % – .5 W | * * |
| R 224 | Resistor résistance | carbon film à couche | 1.5 k – 5 % – .3 W | * * |
| R 225 | Resistor résistance | carbon film à couche | 1 k | * * |
| R 226 | Resistor résistance | carbon film à couche | 10 – 10 % – .3 W | * * |
| R 227 | Resistor résistance | carbon film à couche | 22 – 10 % – .5 W | * * |
| P 201 | Trim-Potentiometer pot. ajustable | Ruwido P76K, T-film / à couche T | 2.5 k – 20% – .15 W | * * |
| C 201 C 208 | Capacitor condensateur | polyester au polyester | .1 μF – 20 % – 100 V | * * |
| C 202 | Capacitor condensateur | polyester au polyester | .022 μF – 20 % – 250 V | * * |
| C 203 | Capacitor condensateur | polyester au polyester | .47 μF – 20 % – 100 V | * * |
| C 204 | Capacitor condensateur | electrolytic électrolytique | 25 μF – 25 V | * * |
| C 205 | Capacitor condensateur | polystyrene au polystyrène | 1200 pF – 1 % – 500 V | 59. 23.5122 |
| C 206 | Capacitor condensateur | polystyrene au polystyrène | .022 μF – 1 % – 125 V | 59. 23.1223 |
| C 207 | Capacitor condensateur | polystyrene au polystyrène | .068 μF – 1 % – 63 V | 59. 23.0683 |
| C 209 | Capacitor condensateur | electrolytic électrolytique | 250 μF – 3 V | * * |
| C 210 | Capacitor condensateur | electrolytic électrolytique | 25 μF – 25 V | * * |
| C 211 | Capacitor condensateur | electrolytic électrolytique | 10 μF – 35 V | * * |
| C 212 | Capacitor condensateur | electrolytic électrolytique | 250 μF – 25 V | * * |
| C 213 | Capacitor condensateur | MP au papier métallisé | .47 μF – 150 V | * * |
| T 201 | Discriminator Coil bobine du discriminateur | | | 1.077.765 |

# 11. REPLACEMENT PARTS LIST

The replacement parts list is divided into following columns :

| | |
|---|---|
| **INDEX** | The index number matches the one on the illustration<br>Take note of the letters referring to said illustration. |
| **QUANTITY ( QTY )** | Indicates the number of parts in the assembly. |
| **PART NAME** | The short designation, obligatory, is to be included when writing orders. |
| **ORDER NUMBER** | Use these part numbers only on all orders. |

Note :

**All Orders Must be with Order Number and PART NAME.**

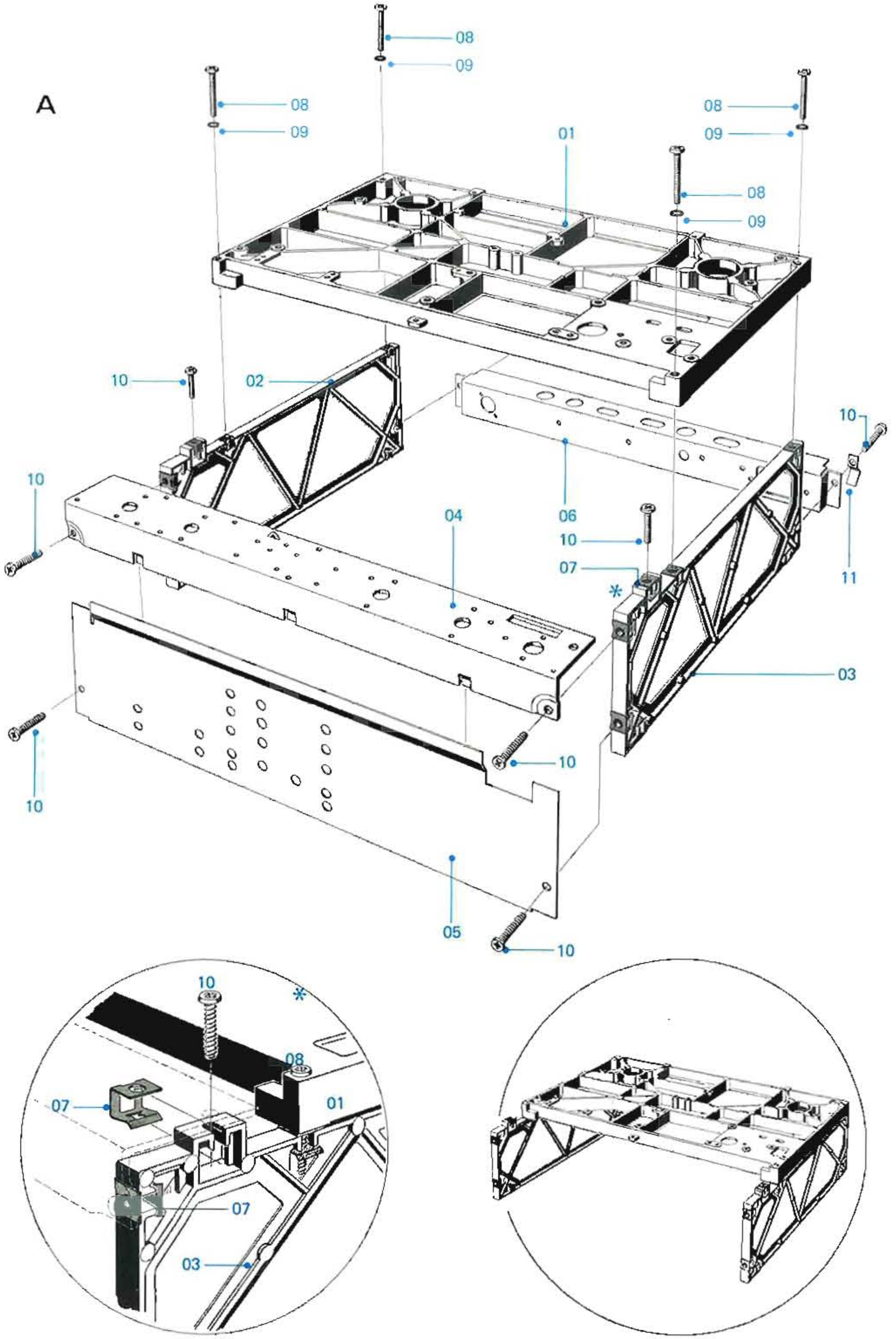
In - production changes are noted on separate sheets ( e. g. PL 6a ).
Red index numbers designate these separate sheets.

Check the separate sheets when ordering, please.

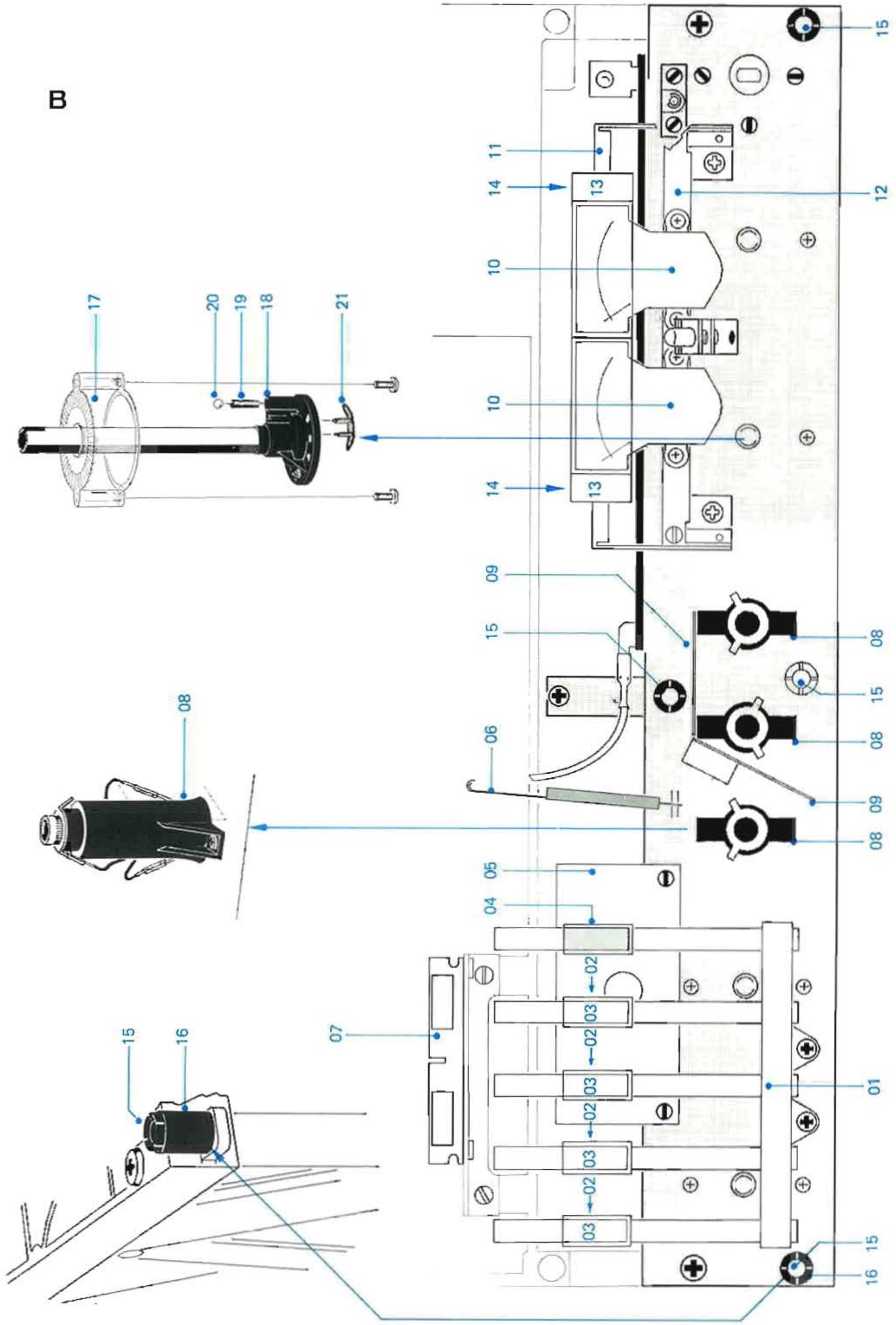
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| | 1 | **Carrying case, assembled** | 1.077.831 |
| | 1 | Cover, case, assembled | 1.077.834 |
| | 1 | Side, left, with loudspeaker | 1.077.832 |
| | 1 | Side, right, with loudspeaker | 1.077.833 |
| | 4 | Loudspeakers | 71. 01.0102 |
| | 1 | Handle, carrying, assembled | 1.077.805 |
| | 1 | Fastener, handle | 1.077.800 - 08 |
| | 1 | Cover, voltage selector, with frame | 1.077.806 |
| | 1 | Cover, plastic " connections " | 1.077.800 - 01 |
| | 1 | Cover, plastic " air access " | 1.077.800 - 06 |
| | 4 | Support, rubber, case fastening | 1.077.800 - 20 |
| | | Lock | |
| | 1 | Case lock | 33. 01.0104 |
| | 1 | Key | 33. 01.0106 |
| | | **Fastenings, carrying case** | |
| | 4 | Screw, sheet metal | 20. 21.7311 |
| | 4 | Washer | 23. 01.3043 |
| | 4 | Foot, case | 1.077.831 - 02 |
| | 1 | **Cabinet, walnut, assembled** | 1.077.800 |
| | | **Feet, for vertical operation** | |
| | 2 | Rail, plastic, less feet | 1.077.800 - 03 |
| | 4 | Foot, rubber | 1.077.800 - 04 |
| | | **Fastenings, walnut cabinet** | |
| | 4 | Screw, sheet metal | 20. 21.7310 |
| | 4 | Washer | 1.010.007 - 23 |
| | 1 | Disconnector, protectiv | 1.077.845 |
| | 1 | Installation unit, sheet metal incl. fasteners | 1.077.840 |
| | 3 | Fastener | 1.040.255 |
| | 4 | Screw, sheet metal | 20. 21.7308 |
| | 1 | Cover, plexiglass | 1.077.860 - 01 |

| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **A** | | Chassis | |
| 01 | 1 | Chassis, tape drive | 1.077.100 - 01 |
| 02 | 1 | Frame, left | 1.077.100 - 02 |
| 03 | 1 | Frame, right | 1.077.100 - 03 |
| 04 | 1 | Chassis, switch board | 1.077.430 - 01 |
| 05 | 1 | Panel, shield | 1.077.114 |
| 06 | 1 | Rail, terminal | 1.077.550 - 01 |
| 07 | 16 | Snapnut | 22. 16.2021 |
| 08 | 4 | Screw, sheet metal | 20. 21.7312 |
| 09 | 4 | Washer | 1.010.008 - 23 |
| 10 | 8 | Screw, sheet metal | 20. 21.7308 |
| 11 | 2 | Bracket, double angle | 1.077.100 - 18 |
| | | Plastic Cover, Knobs | |
| | 1 | Cover, drive | 1.077.600 |
| | | Cover, drive, for MK III | 1.077.650 |
| | 1 | Panel, front, with lid | 1.077.603 |
| | | Panel, front, VU-port bridged | 1.077.604 |
| | | Panel, front, for MK III | 1.077.652 |
| | 1 | Lid, assembled | 1.077.609 |
| | | Lid, for MK III | 1.077.660 |
| | 2 | Spring, lid | 1.077.603 - 01 |
| | 1 | Cover, head | 1.077.665 |
| | 4 | Knob, rotary, gray | 1.077.632 |
| | 4 | Skirt, knob, clear | 1.077.625 - 01 |
| | | Skirt, knob, for MK III | 1.077.626 - 01 |
| | 1 | Knob, switch, POWER | 1.077.635 |
| | | Knob, switch, POWER, for MK III | 1.077.636 |

**A**

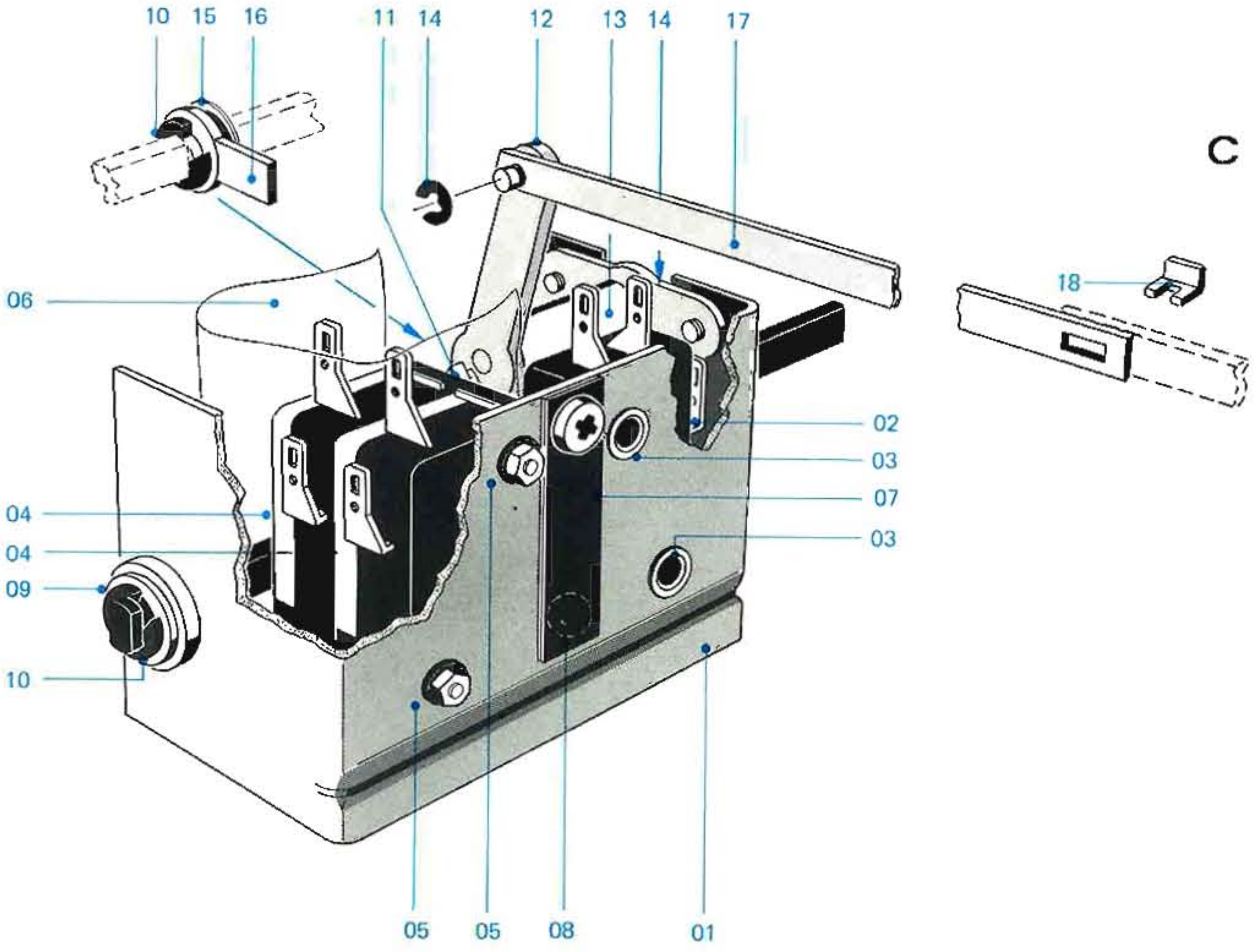


| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **B** | | Push Button, Unit | |
| 01 | 1 | Bearing strip, push button ( incl. 5 bars ) | 1.077.490 |
| 02 | 5 | Bracket, plastic ( clear ) | 1.077.490 - 04 |
| 03 | 4 | Push button, gray | 1.077.490 - 05 |
| 04 | 1 | Push button, red | 1.077.490 - 06 |
| 05 | 1 | Shield plate | 1.077.100 - 14 |
| 06 | 1 | Spring, tension, tape lift | 1.077.100 - 11 |
| 07 | 1 | Bar switch, " Speakers Off " " Reel Motors Off ", assembled | 1.077.355 - 03 |
| | | Socket | |
| 08 | 3 | Socket, Jack, assembled | 1.077.500 |
| 09 | 2 | Shield plate | 1.077.430 - 06 |
| | | VU - Meter | |
| 10 | 2 | VU-Meter | 1.077.470 - 03 |
| | | VU-Meter for MK III | 1.077.470 - 04 |
| 11 | 1 | Bracket | 1.077.485 |
| 12 | 1 | Support | 1.077.470 - 01 |
| 13 | 2 | Push button, red | 1.077.475 - 01 |
| 14 | 2 | Switch, slide, with push button | 1.077.475 |
| | 1 | Lamp socket for MK III | 1.077.471 |
| 15 | 7 | Socket, plug, assembled | 1.077.115 |
| 16 | 7 | Sleeve, spring | 1.077.100 - 21 |
| | | Switch, Board | |
| 17 | 1 | Housing, switch ( Before / after tape switch ) | 1.011.300 - 01 |
| 17 | 1 | Housing, switch ( Playback mode switch ) | 1.011.400 - 01 |
| 17 | 2 | Housing, switch ( Input selector ) | 1.011.500 - 01 |
| 18 | 4 | Rotor, incl. hollow shaft | 1.011.180 |
| 19 | 4 | Spring, compression ( indexing ) | 1.011.200 - 04 |
| 20 | 4 | Ball ( indexing ) | 41. 01.0130 |
| 21 | 13 | Contact | 1.010.001 - 55 |



| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| C | | **Switch, Power** | |
| 01 | 1 | Switch, power, assembled | 1.077.440 |
| 02 | 1 | Micro-switch ( tape tension ) | 55. 01.0124 |
| 03 | 2 | Rivet, tubular | 28. 21.1415 |
| 04 | 2 | Micro-switch ( line ) | 55. 01.0125 |
| 05 | 4 | Bushing, insulation | 1.077.440 - 08 |
| 06 | 1 | Foil, insulation | 1.077.440 - 05 |
| 07 | 2 | Spring, flat | 1.077.440 - 03 |
| 08 | 1 | Ball | 41. 01.0160 |
| 09 | 2 | Bearing, plastic | 1.077.450 - 04 |
| 10 | 4 | Clip, retaining Ø 4 mm | 24. 16.3040 |
| 11 | 1 | Cam, switch ( white plastic ) with bushing | 1.077.450 |
| 12 | 1 | Lever | 1.077.460 |
| 13 | 1 | Bearing | 1.077.455 |
| 14 | 2 | Ring, retaining Ø 2.3 mm | 24. 16.3023 |
| 15 | 1 | Washer, tap, hard paper | 1.077.440 - 04 |
| 16 | 1 | Stop ( turn limiting ) | 1.077.445 - 02 |
| 17 | 1 | Bar | 1.077.430 - 04 |
| 18 | 1 | Link, connecting | 1.077.430 - 03 |
| | | **Rail, Connector** | |
| 01 | 1 | Rail, connector, with power cable and remote control cabling | 1.077.550 |
| 02 | 1 | Enclosure, protective disconnector | 1.077.555 |
| 03 | 1 | Socket, instrument | 54. 04.0103 |
| 04 | 3 | Socket, twin, Cinch | 54. 02.0293 |
| 05 | 2 | Socket, loudspeaker | 54. 02.0301 |
| 06 | 1 | Socket, 5 - pole RADIO | 54. 02.0310 |
| 07 | 1 | Socket, 10 - pole, REMOTE CONTROL | 54. 02.0315 |
| 08 | 1 | Plug, dummy, remote control, assembled | 1.077.570 |

C



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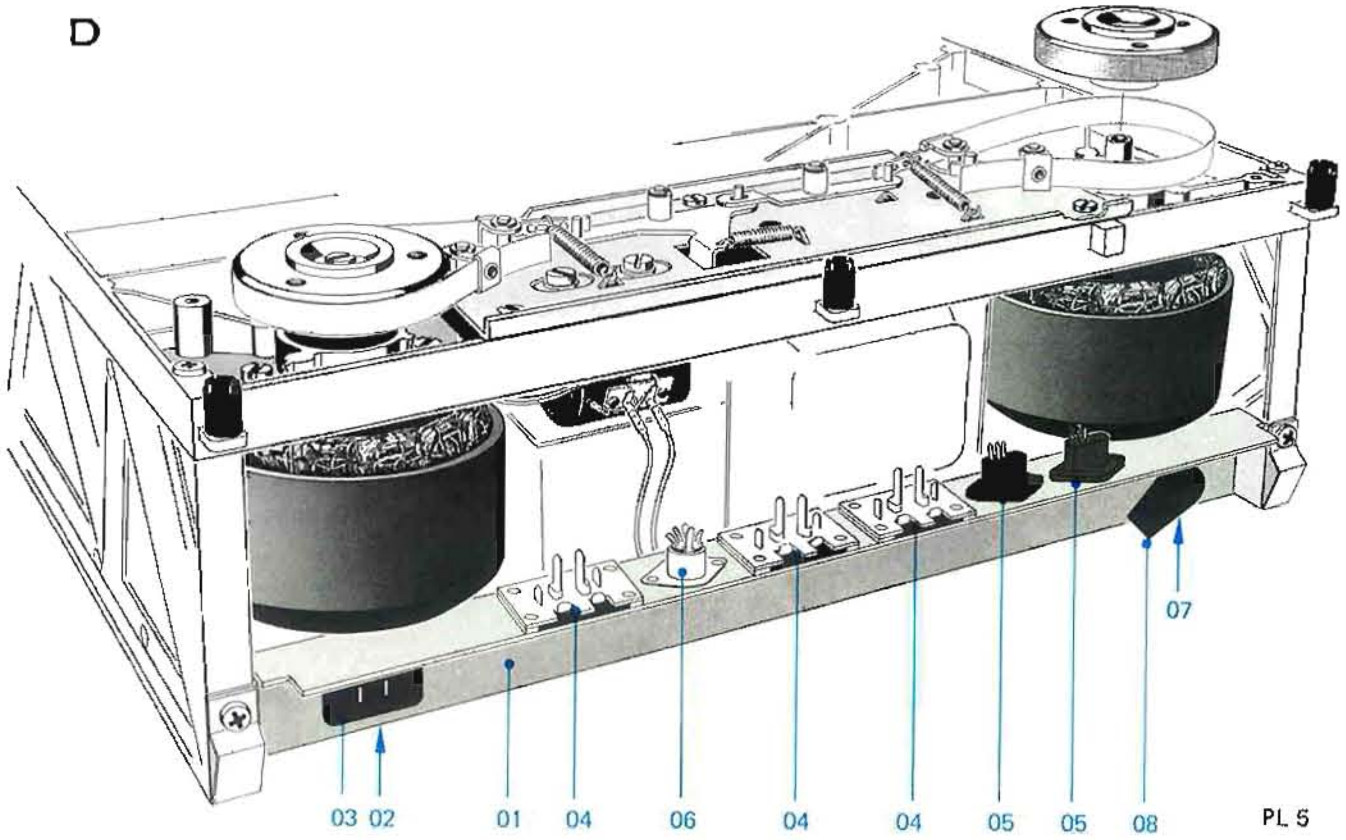
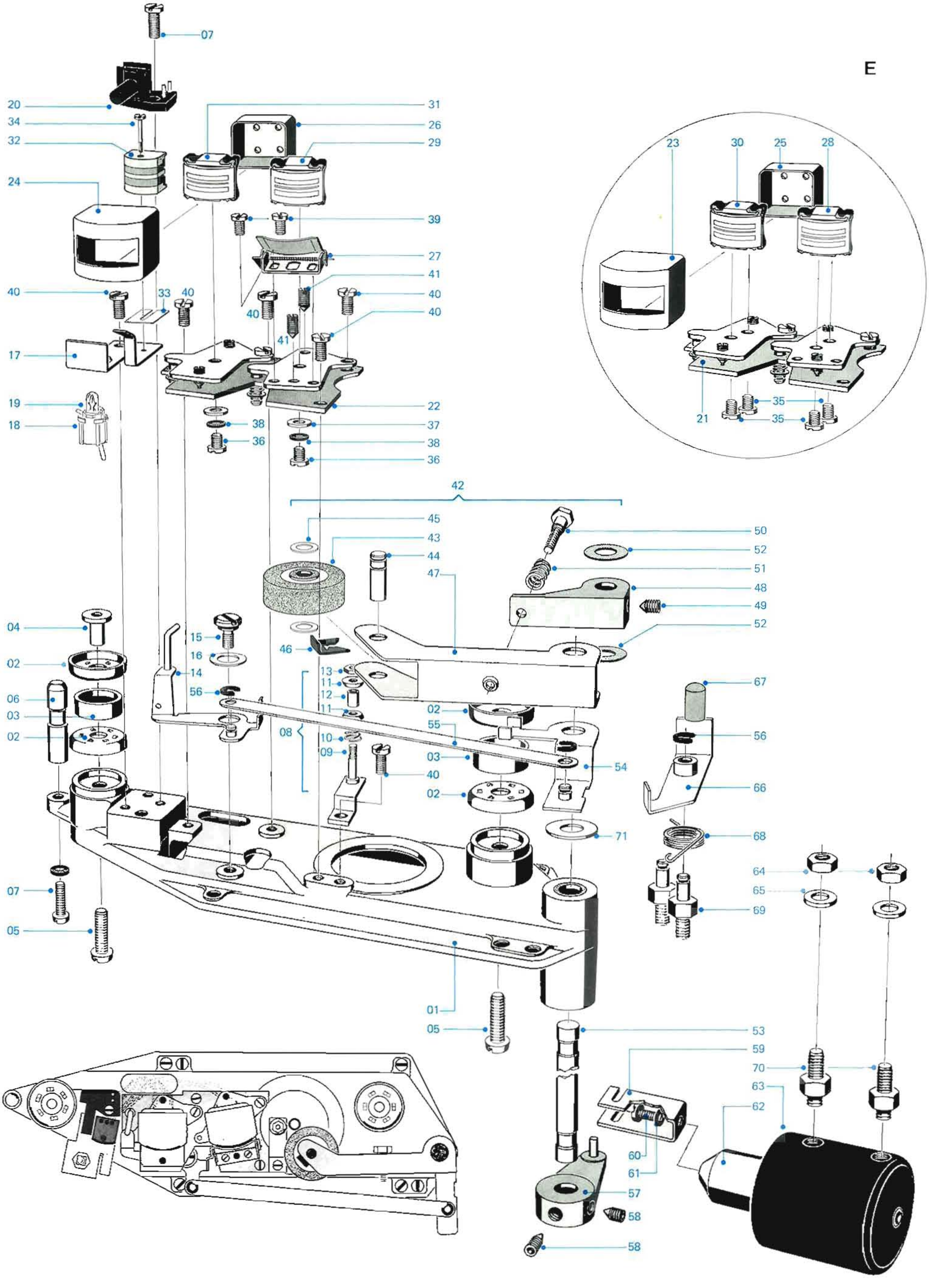


| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **E** | | Drive, Tape & Headblock | |
| 01 | 1 | Chassis, cast, tape drive, with pressure lever sintered bearings | 1.077.125 |
| 02 | 4 | Cup, tape guide | 1.736.222 - 04 |
| 03 | 2 | Collar, tape guide | 1.736.222 - 05 |
| 04 | 2 | Bushing, threaded | 1.077.120 - 02 |
| 05 | 4 | Screw M 4 x8 | 21. 01.0455 |
| 06 | 1 | Post, tape guide | 1.077.120 - 01 |
| 07 | 2 | Screw M 3 x 8 | 21. 01.0355 |
| 08 | 1 | Guide, tape, assembled | 1.077.145 |
| 09 | 1 | Bracket, assembly | 1.077.150 |
| 10 | 1 | Spring, compression | 1.077.145 - 03 |
| 11 | 2 | Disc , guide | 1.077.145 - 01 |
| 12 | 1 | Sleeve, spacer | 1.077.145 - 02 |
| 13 | 1 | Nut, hex M 3 | 22. 01.5030 |
| 14 | 1 | Lever, tape lift, assembled | 1.077.175 |
| 15 | 1 | Screw , spec | 1.077.120 - 03 |
| 16 | 1 | Washer | 1.077.120 - 04 |
| 17 | 1 | Bracket | 1.077.133 |
| 18 | 1 | Socket, lamp | 53. 04.0102 |
| 19 | 1 | Lamp ( 24 V, 30 mA ), | 51. 02.0140 |
| 20 | 1 | Resistor, photoelectric ( end-of-tape switch ) | 1.077.135 |
| 21 | 1 | Base plate, assembled ( 2 - hole head-fastening ) | 1.077.156 |
| 22 | 1 | Base plate, assembled ( 1 - hole head-fastening ) | 1.077.157 |
| 23 | 2 | Housing, shield, ext ( 2 - hole head-fastening ) | 1.077.155 - 03 |
| 24 | 2 | Housing, shield, ext ( 1 - hole head-fastening ) | 1.077.155 - 05 |
| 25 | 2 | Housing, shield, int ( 2 - hole head-fastening ) | 1.077.155 - 04 |
| 26 | 2 | Housing, shield, int ( 1 - hole head-fastening ) | 1.077.155 - 06 |
| 27 | 1 | Lid, shield, playback head, assembled | 1.077.165 |
| 28 | 1 | Head, playback, 2 - track, ( 2 - hole head-fastening ) | 1.116.026 |
| | 1 | Head, playback, 4 - track, ( 2 - hole head-fastening ) | 1.116.046 |
| 29 | 1 | Head, playback, 2 - track, ( 1 - hole head-fastening ) | 1.116.027 |
| | 1 | Head, playback, 4 - track, ( 1 - hole head-fastening ) | 1.116.047 |
| 30 | 1 | Head, record, 2 - track, ( 2 - hole head-fastening ) | 1.116.021 |
| | 1 | Head, record, 4 - track, ( 2 - hole head-fastening ) | 1.116.041 |
| 31 | 1 | Head, record, 2 - track, ( 1 - hole head-fastening ) | 1.116.022 |
| | 1 | Head, record, 4 - track, ( 1 - hole head-fastening ) | 1.116.042 |
| 32 | 1 | Head, erase, 2 - track | 89. 01.0301 |
| | 1 | Head, erase, 4 - track | 89. 01.0302 |
| 33 | 1 | Shim, 4 - track head | 1.077.131 - 01 |
| | 1 | 0.1 mm shim, brass for elevation adjustment of erase head | 1.010.006 - 23 |

E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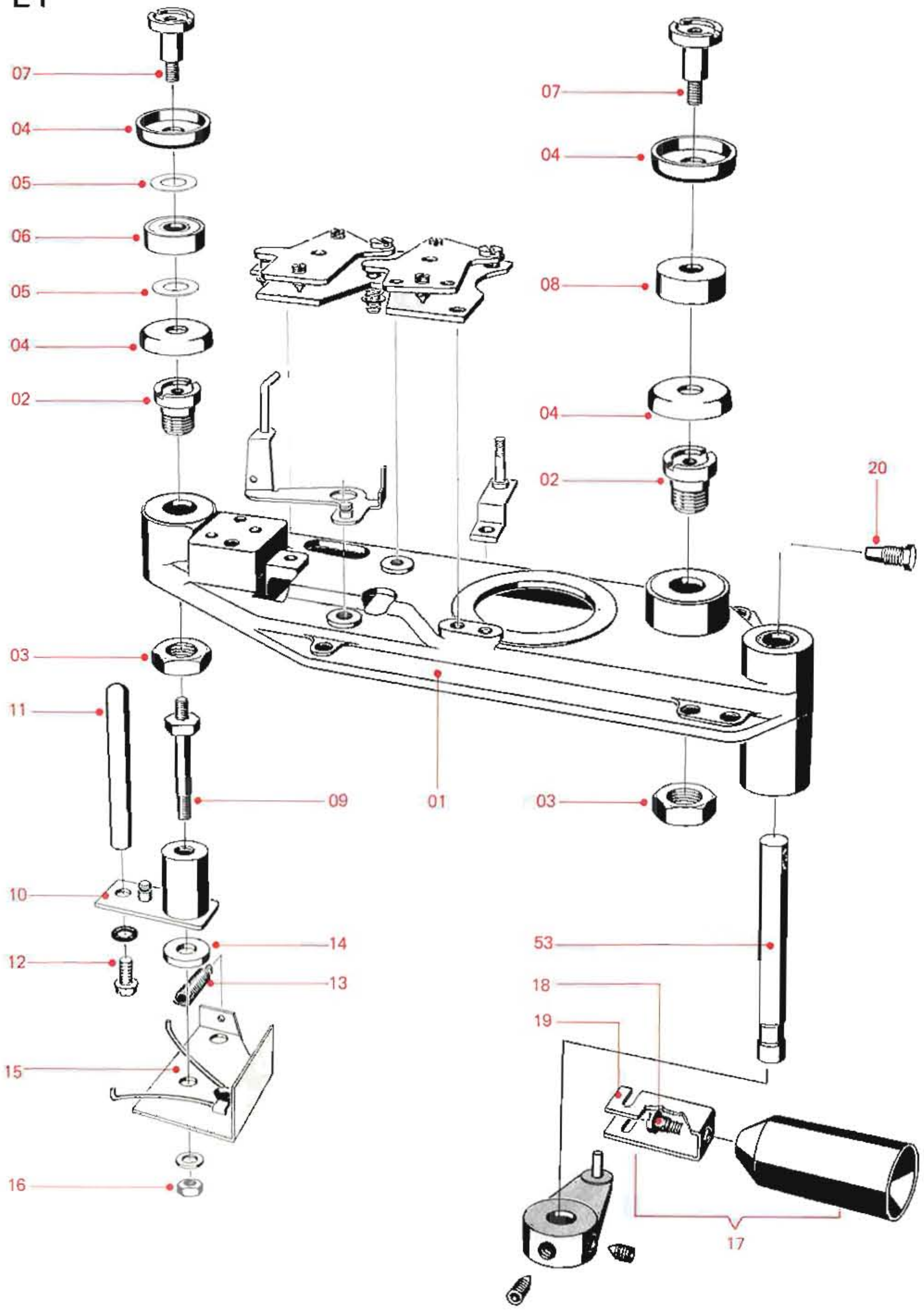
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| E | | | |
| 34 | 1 | Screw, spec ( erase head fastening ) | 1.077.130 - 02 |
| 35 | 4 | Screw, spec ( Rec / Play head fastening, 2 - hole ) | 21. 99.0114 |
| 36 | 2 | Screw, spec ( Rec / Play head fastening, 1 - hole ) | 21. 99.0118 |
| 37 | 4/2 | Washer, head fastening | 23. 01.1032 |
| 38 | 4/2 | Washer, securing, head fastening | 24. 16.1030 |
| 39 | 2 | Screw M 2 x 3, screen lid | 21. 01.0201 |
| 40 | 7 | Screw M 3 x 6 | 21. 01.0354 |
| 41 | 4 | Setscrew M 3 x 6 | 21. 18.6354 |
| | | | |
| 42 | 1 | Lever, pressure,assembled with pressure roller | 1.077.305 |
| 43 | 1 | Pressure roller | 1.077.312 |
| 44 | 1 | Shaft | 1.077.305 - 05 |
| 45 | 2 | Washer, teflon | 1.736.200 - 04 |
| 46 | 1 | Snap | 1.736.200 - 03 |
| 47 | 1 | Lever, pressure, stripped | 1.077.305 - 02 |
| 48 | 1 | Lever | 1.077.305 - 01 |
| 49 | 2 | Setscrew, spec | 1.077.305 - 06 |
| 50 | 1 | Screw, hex head, M 4 x 14 | 1.077.305 - 07 |
| 51 | 1 | Spring, compression | 1.077.305 - 04 |
| 52 | 2 | Washer, hard paper | 1.736.502 - 12 |
| 53 | 1 | Shaft | 1.077.305 - 03 |
| 54 | 1 | Lever | 1.077.320 |
| 55 | 1 | Link | 1.077.100 - 10 |
| 56 | 2 | Clip Ø 3.2 mm | 24. 16.3032 |
| 57 | 1 | Lever | 1.077.325 |
| 58 | 2 | Setscrew, spec | 1.077.325 - 03 |
| 59 | 1 | Clevis | 1.077.330 - 01 |
| 60 | 1 | Screw M 3 x 6 | 21. 01.0354 |
| 61 | 1 | Washer, lock | 24. 16.1030 |
| 62 | 1 | Plunger | 1.077.330 |
| 63 | 1 | Solenoid, assembled | 1.014.700* |
| 64 | 1 | Nut, hex M 4 | 22. 01.8040 |
| 65 | 1 | Washer | 23. 01.3043 |
| 66 | 1 | Lever, trip, with knob | 1.077.340 |
| 67 | 1 | Knob, trip lever | 1.736.790 - 02 |
| 68 | 1 | Spring, helical | 1.077.100 - 08 |
| 69 | 2 | Bolt | 1.077.100 - 07 |
| 70 | 2 | Bolt, threaded | 1.736.375 - 01 |
| 71 | 1 | Washer | 1.736.502 - 04 |

* from S37751 and G41228

| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **E 1** | | Feeler | |
| 01 | 1 | Chassis, cast, tape drive, with pressure lever sintered bearings | 1.077.126 |
| 02 | 2 | Sleeve, threaded | 1.077.121 - 01 |
| 03 | 2 | Nut, hex | 22. 99.0103 |
| 04 | 4 | Cap, guiding | 1.077.121 - 02 |
| 05 | 2 | Washer | 1.077.121 - 03 |
| 06 | 1 | Bearing, ball | 41. 99.0102 |
| 07 | 2 | Screw, shoulder | 1.077.121 - 05 |
| 08 | 1 | Ring, plain | 1.077.121 - 04 |
| 09 | 1 | Stud, threaded | 1.077.121 - 06 |
| 10 | 1 | Feeler, assembled | 1.077.185 |
| 11 | 1 | Bolt, guiding | 1.077.185 - 04 |
| 12 | 1 | Screw, machine, slotted head M 3 x 6 | 21. 01.0354 |
| 13 | 1 | Spring, tension | 1.062.210 - 06 |
| 14 | 1 | Washer | 1.077.121 - 07 |
| 15 | 1 | Bracket (angle), with spring | 1.077.180 |
| 16 | 1 | Nut, hex | 22. 01.8040 |
| 17 | 1 | Plunger, complet | 1.077.331 * |
| 18 | 1 | Screw, collared | 1.077.331 - 02 |
| 19 | 1 | Clevis | 1.077.331 - 01 |
| 20 | 1 | Screw, hex, head dog point | 1.077.305 - 08 |
| 53 | 1 | Shaft with hole | 1.077.305 - 03 |

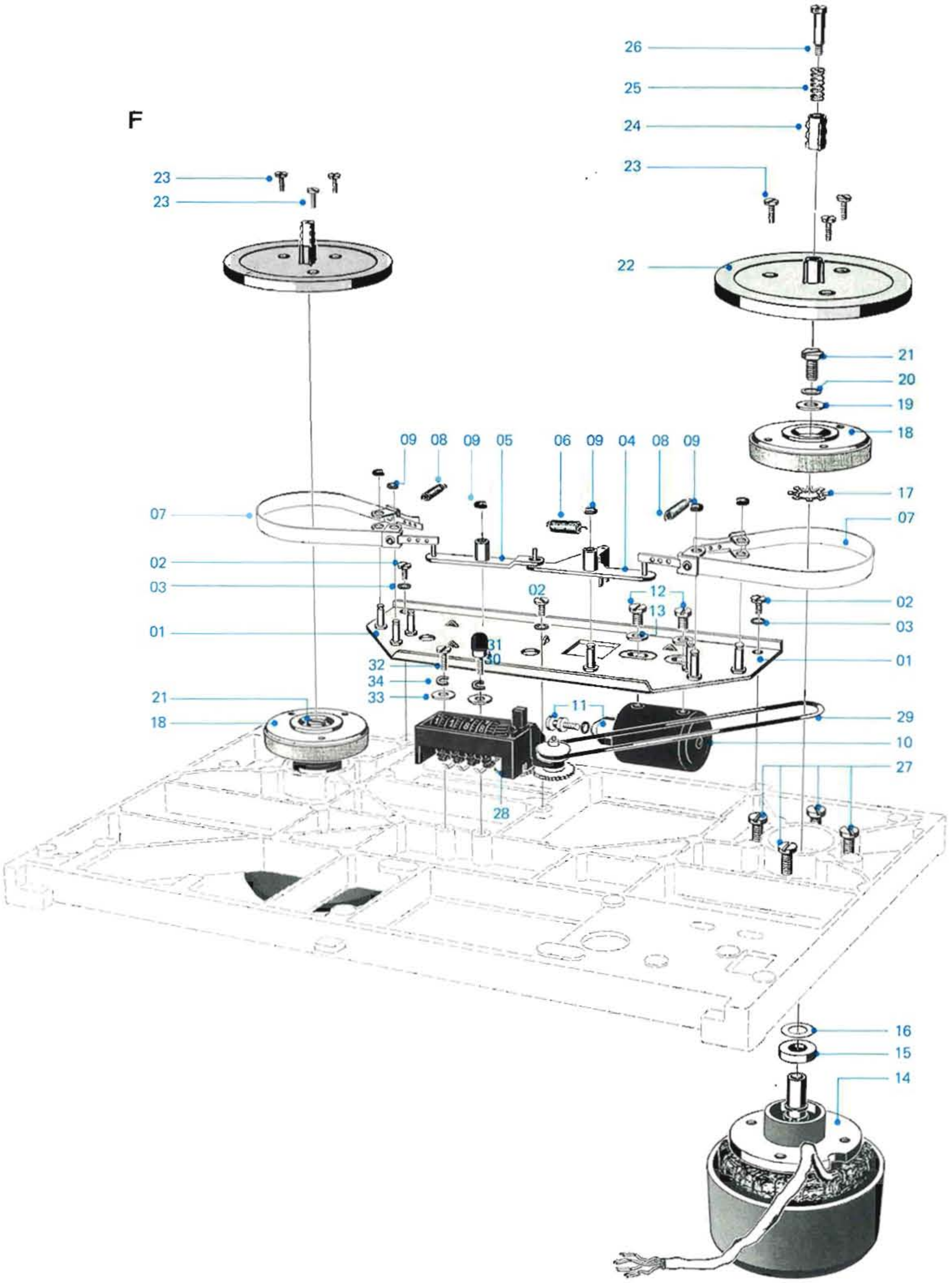
* from S 37751 and G 41228

**E 1**



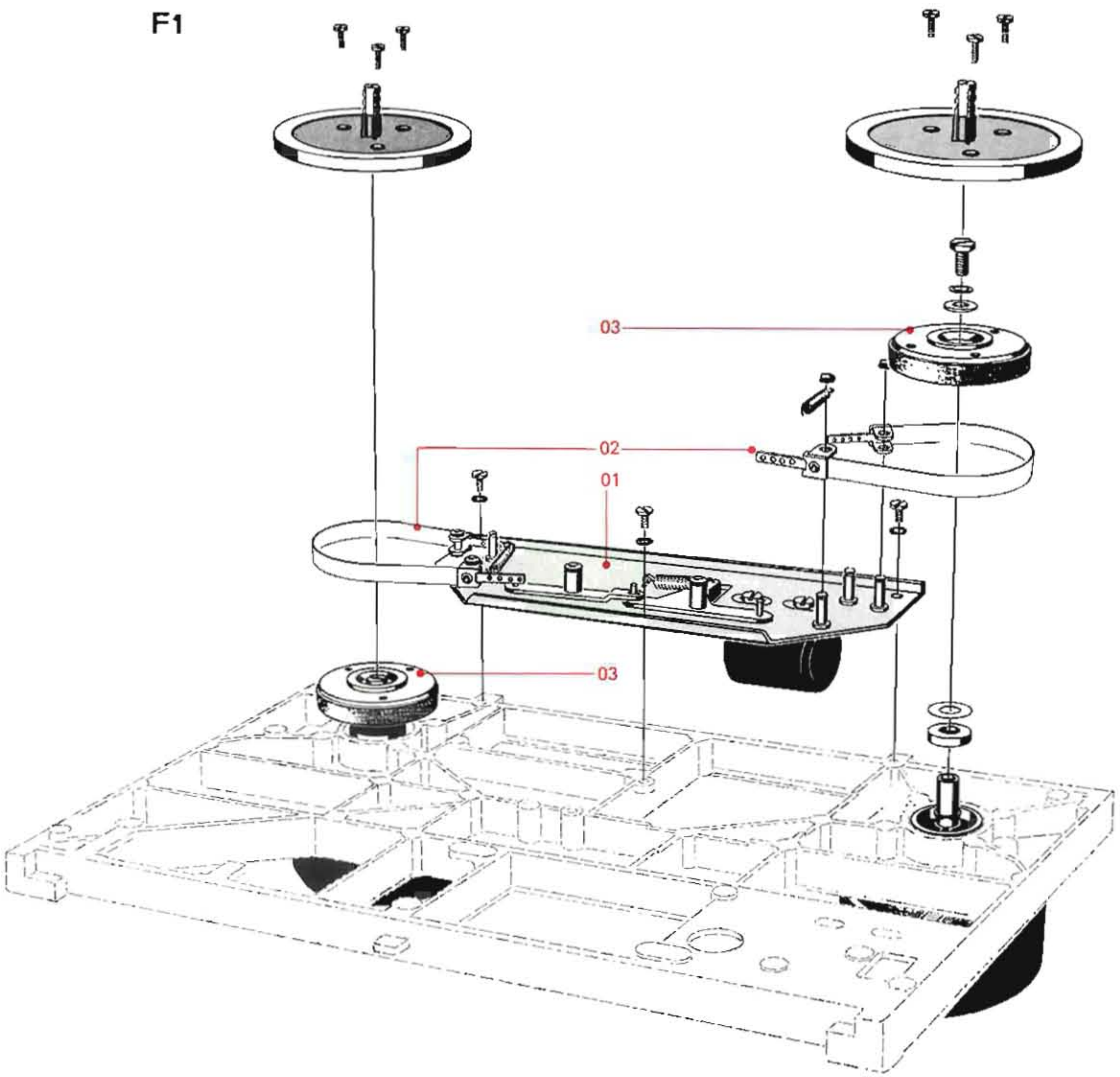
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **F** | | Brake System | |
| 01 | 1 | Chassis, brake | 1.077.405 |
| 02 | 3 | Screw M 3 x 6 | 21. 01.0354 |
| 03 | 3 | Washer, lock | 24. 99.0105 |
| 04 | 1 | Lever, brake | 1.077.410 |
| 05 | 1 | Lever, brake | 1.077.415 |
| 06 | 1 | Spring, helical | 1.062.210 - 06 |
| 07 | 2 | Band, brake | 1.077.420 |
| 08 | 2 | Spring, helical, brake | 1.077.100 - 13 |
| 09 | 6 | Clip, re taining Ø 3.2 mm | 24. 16.3032 |
| 10 | 1 | Solenoid ( without plunger ) | 1.014.705 |
| 11 | 1 | Plunger, with collar screw & retainer | 1.014.708 |
| 12 | 2 | Screw M 4 x 5 ( length 5 mm max ! ) | 21. 01.0453 |
| 13 | 2 | Washer | 24. 99.0106 |
| 14 | 2 | Motor, reel ( see G - motor, reel ) | 1.077.280 |
| 15 | 2 | Spacer | 1.077.100 - 06 |
| 16 | 2 | Washer, height adjustment ( according to need ) | 1.736.502 - 04 |
| 17 | 2 | Washer, star | 24. 16.6080 |
| 18 | 2 | Drum, brake, with lining & star washer | 1.077.560 |
| | | Lining, brake ( by the meter ) | 89. 01.0155 |
| 19 | 2 | Washer | 23. 01.3043 |
| 20 | 2 | Spring, belleville | 37. 01.0103 |
| 21 | 2 | Screw, hex head M 4 x 8 | 21. 01.4455 |
| 22 | 2 | Turntable, metal | 1.077.564 |
| | | | |
| 23 | 6 | Screw M 3 x 8, Ni-plated | 21. 02.0355 |
| 24 | 2 | Shaft section, 3 - prong | 1.077.568 - 03 |
| 25 | 2 | Spring, compression | 1.736.794 - 03 |
| 26 | 2 | Screw, shoulder | 1.077.568 - 02 |
| 27 | 8 | Screw M 4 x 8 | 21. 01.0455 |
| 28 | 1 | Counter | 1.077.100 - 09 |
| 29 | 1 | O - Ring | 31. 99.0106 |
| 30 | 1 | Bolt, threaded | 1.077.100 - 19 |
| 31 | 1 | Cap, rubber | 1.077.100 - 20 |
| 32 | 1 | Screw M 3 x 8 | 21. 01.0355 |
| 33 | 2 | Washer, flat | 23. 01.2032 |
| 34 | 2 | Washer, lock, helical | 24. 99.0107 |

**F**



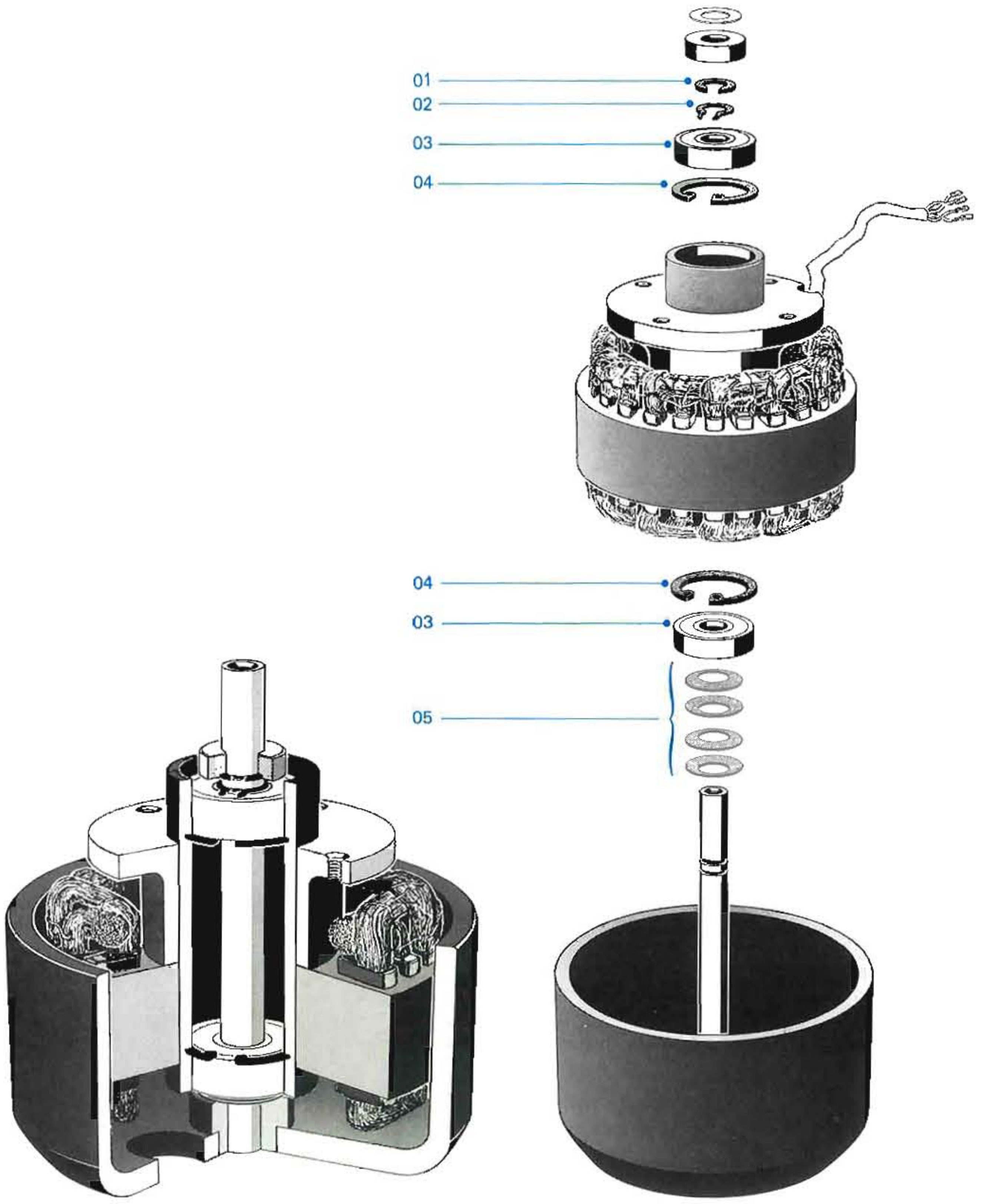
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **F1** | | **Modified Brake System** | |
| 01 | 1 | Chassis | 1.077.405 |
| 02 | 2 | Band | 1.077.421 |
| 03 | 2 | Drum, complete with lining and star washer | 1.077.561 |
| | | Brake lining per yard (selfadhesive cotton-tape.<br>To cure adhesive, bake for one hour at 340° F<br>(150° C) after installation) | 89. 01.0159 |

F1



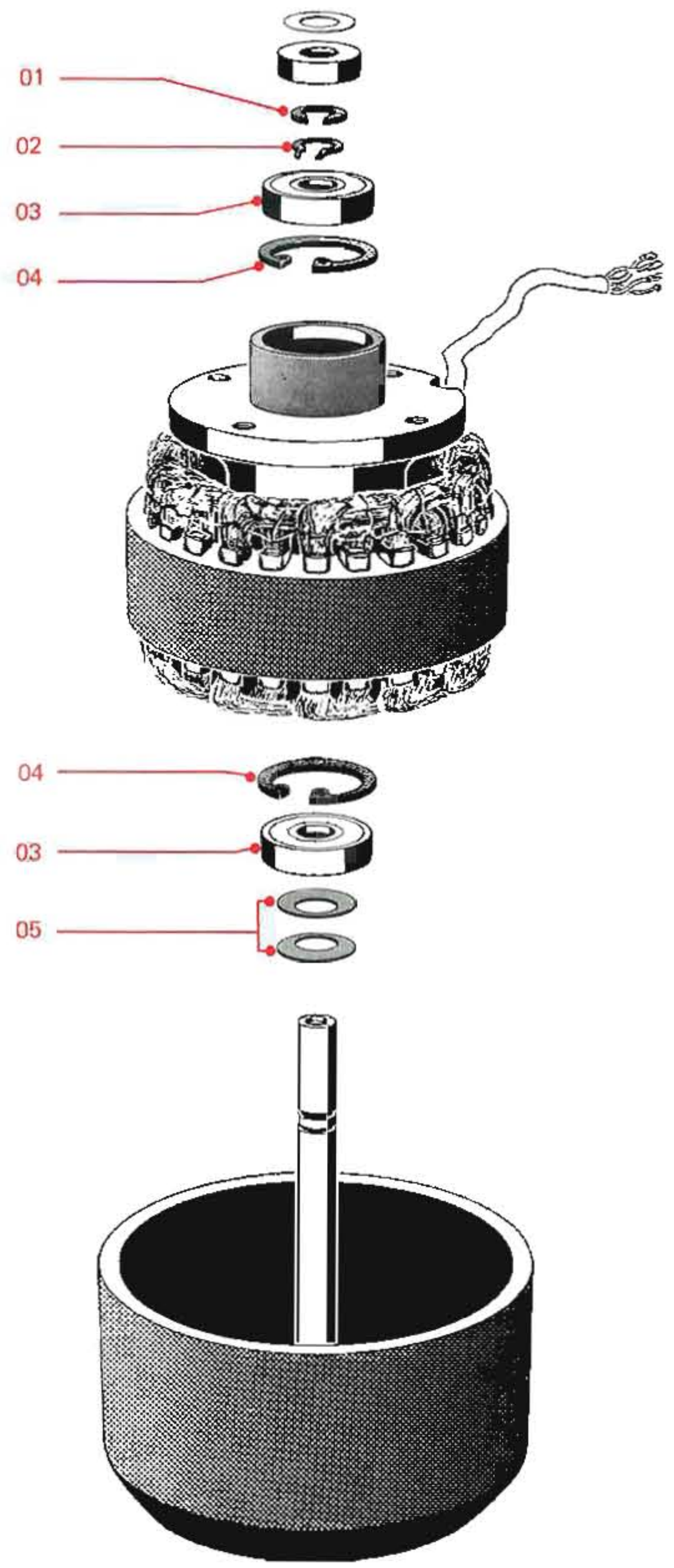
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| G | | Motor, Reel | |
| | | In case of a defective stator, rotor, or shaft, exchange motor.<br>( See also F - Brake System ). | |
| | 1 | Motor, reel, assembled | 1.077.280 |
| 01 | 1 | Clip, spring | 24. 99.0111 |
| 02 | 1 | Ring, retaining, external Ø 8 mm | 24. 16.5080 |
| 03 | 2 | Bearing. ball EL8 608 | 41. 02.0106 |
| 04 | 2 | Ring, retaining, ( internal Ø 22 mm ) | 24. 16.4220 |
| 05 | 4 - 6 | Spring, belleville put in only enough springs till axial play is taken up | 37. 02.0103 |

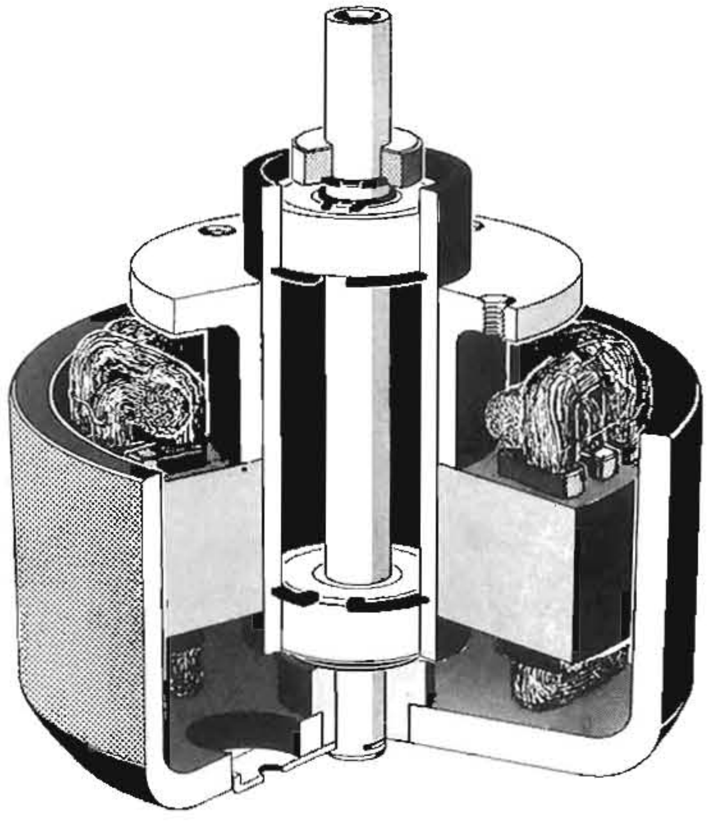
G



| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **G 1** | | Motor, Reel | |
| | | In case of a defective stator, rotor, or shaft, exchange motor.<br>(See also F — Brake System). | |
| | 1 | Motor, reel, assembled | 1.021.200 |
| 01 | 1 | Clip, spring | 24.99.0111 |
| 02 | 1 | Ring, retaining, external ( ϕ 8 mm) | 24.16.5080 |
| 03 | 2 | Bearing, ball EL 8 608 | 41.99.0105 |
| 04 | 2 | Ring, retaining, (internal ϕ 22 mm) | 24.16.4220 |
| 05 | 2 | Spring, belleville | 37.02.0206 |

## G 1



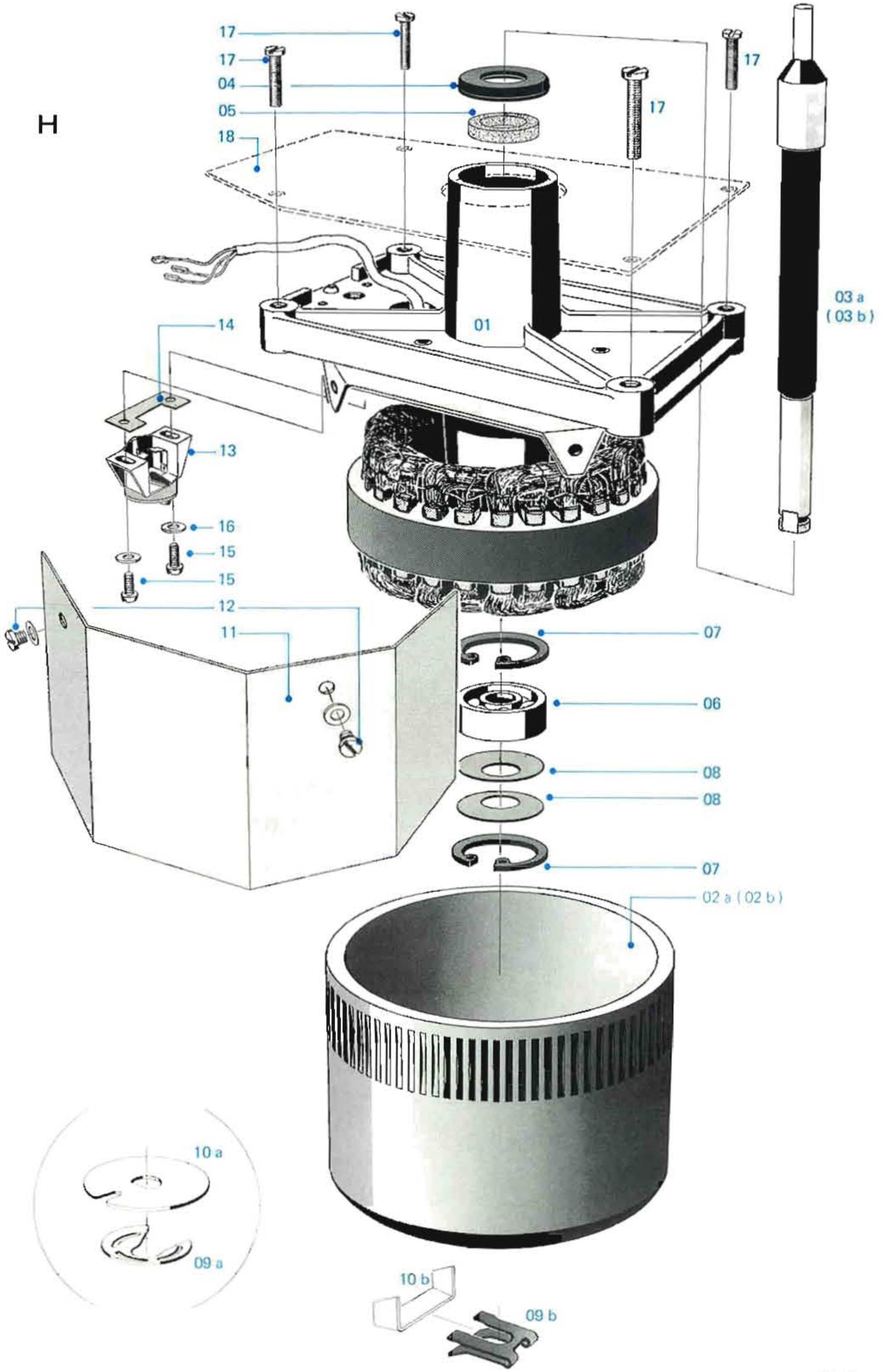


On reel motors of the type 1.021.200 the shaft lock must not be removed.

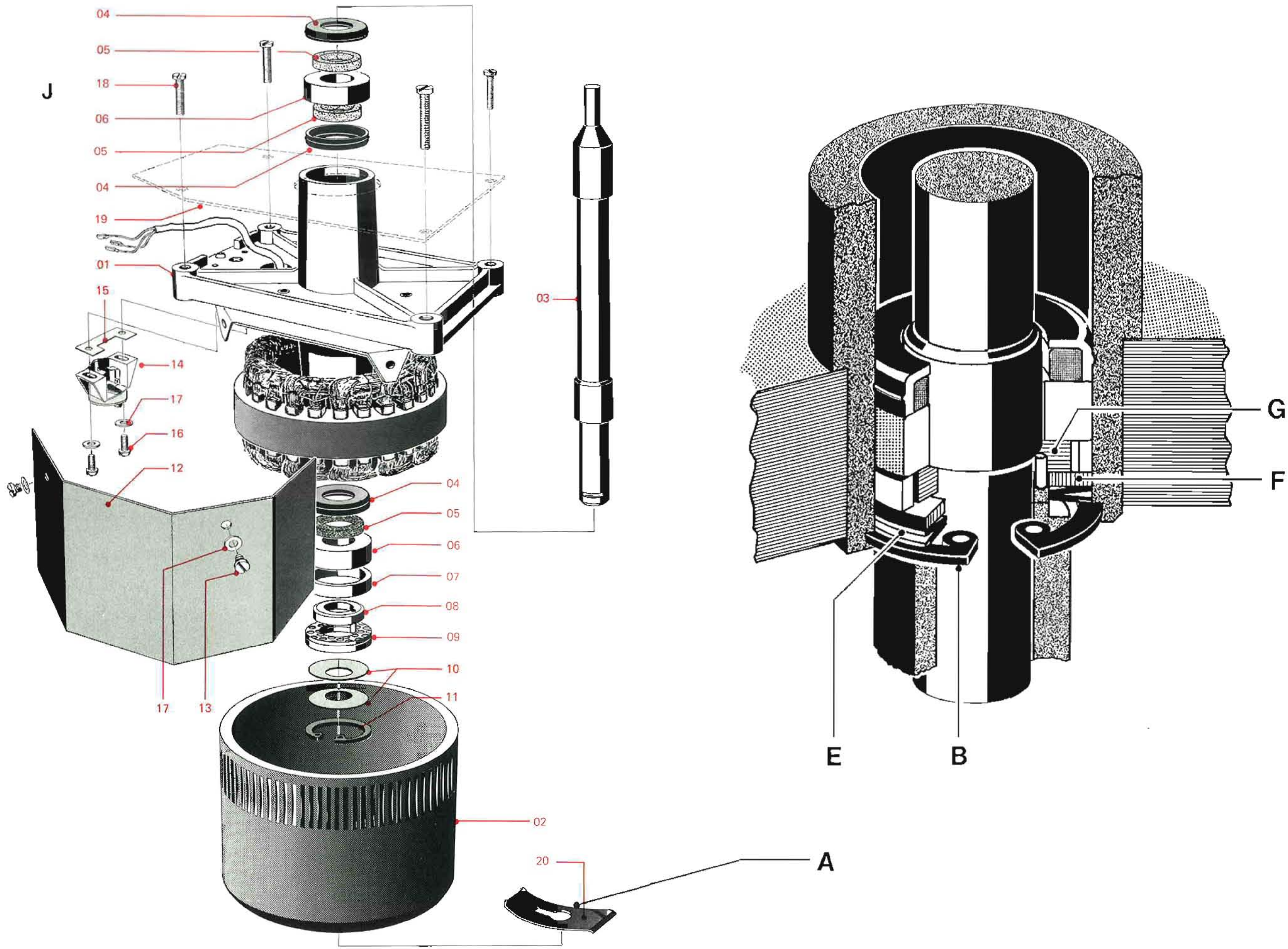
| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| H | | Motor, Capstan | |
| 01 | 1 | Motor, capstan, assembled | 1.077.200 |
| 02 a * | 1 | Rotor | 1.077.200 - 06 |
| 02 b * | | Rotor | 1.021.103 |
| 03 a * | 1 | Shaft, capstan | 1.077.200 - 09 |
| 03 b * | | Shaft, capstan | 1.077.200 - 01 |
| 04 | 2 | Cap, plastic | 1.077.220 - 02 |
| 05 | 2 | Ring, felt | 1.077.220 - 01 |
| 06 | 1 | Bearing, ball | 41. 99.0101 |
| 07 | 2 | Ring, retaining, internal | 24. 16.4220 |
| 08 | 2 | Spring, belleville | 37. 02.0106 |
| 09 a * | 1 | Clip, shaft | 24. 99.0112 |
| 09 b * | | Clip, shaft | 22. 16.6104 |
| 10 a * | 1 | Device, no-turn | 1.077.200 - 08 |
| 10 b * | | Device, no-turn | 1.077.200 - 05 |
| 11 | 1 | Shield | 1.077.200 - 03 |
| 12 | 2 | Screw (M3 x 4) | 21. 01.0352 |
| 13 | 1 | Head, pick-up | 1.077.240 |
| 14 | 1 | Washer, antivibration | 1.077.200 - 04 |
| 15 | 2 | Screw (M3 x 6) | 21. 99.0117 |
| 16 | 2 | Washer, plain | 23. 01.1032 |
| 17 | 4 | Screw (M4 x 30) | 21. 01.0464 |
| 18 | 1 | Plate, screening | 1.077.100 - 22 |

* Suffix a or b denotes matching shaft, rotor and no-turn device

Bend down lip when using new capstan shaft and no-turn decive 10a on old rotors.



| INDEX | QTY | PART NAME | ORDER NUMBER |
|---|---|---|---|
| **J** | | **Capstan motor with sleeve bearings** | |
| | | Modification effective from serial No. S 60483 and G 78003 | |
| 01 | 1 | Motor, capstan, assembled | 1.021.101 |
| 02 | 1 | Rotor | 1.021.161 |
| 03 | 1 | Shaft, capstan | 1.021.160.12 |
| 04 | 3 | Cap, plastic | 1.077.220–02 |
| 05 | 3 | Ring, felt | 1.077.220–01 |
| 06 | 2 | Bearing, sleeve must not be removed | |
| 07 | 1 | Ring, spacer | 1.021.160–08 |
| 08 | 1 | Bearing, thrust | 1.021.162 |
| 09 | 1 | Washer, low-friction | 1.021.160–09 |
| 10 | 2 | Spring, belleville | 37.02.0106 |
| 11 | 1 | Ring, retaining, internal | 24.16.4220 |
| 12 | 1 | Shield | 1.077.200–03 |
| 13 | 2 | Screw (M3 x 4) | 21.01.0352 |
| 14 | 1 | Head, pick-up | 1.077.240 |
| 15 | 1 | Washer, antivibration | 1.077.200–04 |
| 16 | 2 | Screw (M3 x 6) | 21.99.0117 |
| 17 | 4 | Washer, plain | 23.01.1032 |
| 18 | 4 | Screw (M4 x 30) | 21.01.0484 |
| 19 | 1 | Plate, screening | 1.077.100–22 |
| 20 | 1 | Clip, shaft | 1.021.160–10 |
| | | **7,5/15 ips Recorder:** | |
| | | Motor, capstan, assembled, 7,5/15 ips | 1.021.165 |
| | | shaft, capstan 7,5/15 ips | 1.021.165.05 |


J
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# 12.1. REVOX A77- DOLBY

## 12.1.1. Introduction

The DOLBY B Type Noise Reduction System is based on the same principles as the professional DOLBY A System, but is simplified and economical to permit its application in consumer tape recorders. The system is designed to reduce tape hiss by increasing the level of low-level signals in a variable range of high frequencies during recording, and automatically reducing the level during playback of the same locations in the program. Although no change is then heard in the original signal, the attenuation during playback results in a reduction of tape hiss. The amount of noise reduction achieved is approximately 10 dB (DIN weighting).

The basic Dolby B circuit can be switched to make it operate in either the "record" or "play" mode. For many applications, therefore, it is possible to work with one switchable record-play processor per channel. However, in order to allow simultaneous recording and monitoring of Dolby-processed tapes and track-to-track transfer of Dolby recordings, the Dolby version of the Revox A77 is equipped with separate recording and playback processors for each channel.

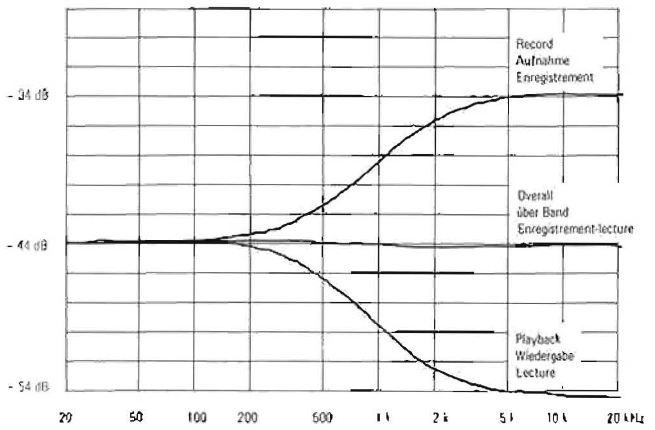
Because of the limited space available in the Revox A77, the plug-in power amplifiers cannot be accomodated in the Dolby version.

In order to realize the full subjective improvement in signal-to-noise ratio which the Dolby System can provide, it is essential that noise and hum in the program and other components used be substantially below the level of the tape hiss, since these noises, like all sounds of any kind which are part of the original program, will not be reduced or audibly affected in any other way by the Dolby System. Because the Dolby B System reduces noise only above 200 Hz, it is particularly important that low-frequency noise and hum be as low as possible. To avoid amplitude distortion when working with the Dolby System, the tape recorder must have a very linear frequency response.

## 12.1.2. Circuit Operation
### Record Processor 1.077.853

In addition to the actual processor, this printed circuit board also contains amplifiers and filters for each channel plus a calibration oscillator which is common to both channels. This oscillator is coupled to the input of each channel by separate 1 Mohm resistors. Power is supplied to the oscillator when the front panel switch is set to the "calibrate" position. The oscillator level is adjustable by means of potentiometer P 103 r which is pre-set at the factory. The oscillator frequency is approximately 800 Hz.

The signal at input 5(11) is amplified by Q1, Q2 from 9 mV to 200 mV.



Low-level Frequency Response Characteristics of Record and Play Processors

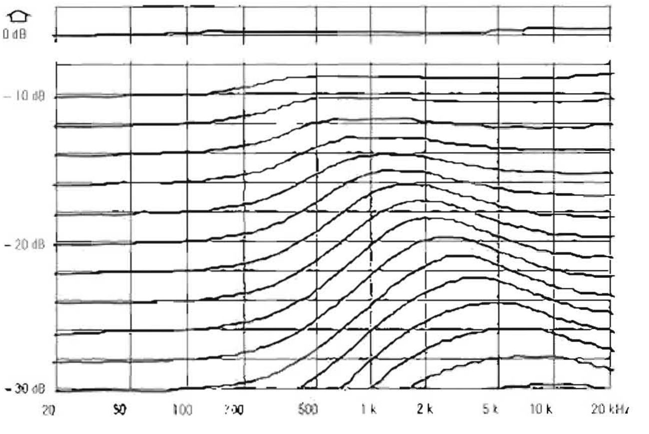
Fig. 12.1.-1.

From there it passes through the filter formed by L1, L2, C3—C7 which is intended to suppress interference from multiplex signals when recording stereo FM broadcasts. Furthermore, any unwanted signals above 20 kHz (e.g., residual bias and erase oscillator signals) are sufficiently attenuated by the active low pass filter built around transistor Q4 that they cannot upset the operation of the dynamic filter section of the noise reduction circuit. If the multiplex filter with its cut-off frequency of 14.5 kHz is not required, it may be disabled by a relay which operates on both channels. The audio signal at the output of the low pass filter Q4 is divided into a main channel and a side channel.

The main channel feeds the signal via R42 and the emitter follower Q9 directly to the output 1 (13).

In the side channel, the signal passes through the dynamic high pass filter formed by C11, R19, C12 and the drain-source path of FET Q5. When low-level signals are present, the FET is non-conductive and has a high drain-source resistance, so that only the first section of the filter C11, R 19 controls the response of the side chain. The output from this filter is then amplified by Q6, Q7 and recombined with the main signal at Q9 via the resistor R 41.

The gain of the side chain is so adjusted that at — 40 VU, the combined signal at the output of Q9 is increased by 10 dB at 5 kHz. The graphs in Figure 12.1.—1. show the frequency response for low-level signals. The side-chain output signal is also fed to transistor Q8 where it is amplified, and then rectified and smoothed by the non-linear integrator D4, D5, R34, R36, C20, C21, the resulting D.C. voltage being returned to the gate of FET Q5.



Record Processor Characteristics

Fig. 12.1.-2.

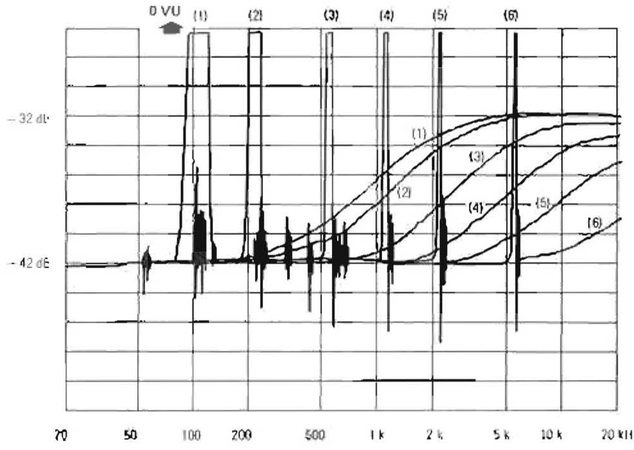
If a higher audio signal causes the D.C. voltage on the gate to exceed the bias point of the source — which is set with P 101 r(law control) — the drain-source path will become conductive. This then results in a change of the turn-over frequency of the second high pass branch formed by C12 and the drain-source resistance. With increasing input level, the proportion of the side channel signal added to the main-channel signal will become smaller, resulting in a frequency characteristic as shown in Figure 12.1.—2.

At 0 VU, the side channel component has become so small that the main signal will appear practically unaltered at the output, that is, it has a linear frequency characteristic.

The variable filter action is shown in Figure 12.1.—3. It shows the amplitude characteristics of test signals at different frequencies and at a low level (—42 VU, which is below the threshold of the compressor) in the presence of 0 VU signals of various frequencies which drive the compressor into gain reduction. When comparing this with a filter of fixed bandwidth, one will note that marked noise reduction is obtained at high frequencies in the presence of high-level signals of lower frequency.

A two-stage non-linear integrator is used in the side chain to avoid the generation of modulation products on transients.

For small signal level variations, diode D5 is non-conducting, so that the time constant of the RC combination R39, C24, provides considerable smoothing effect. On a sudden increase, however, D5 becomes conductive and quickly lowers the gain of the side chain. For large amplitude transients, the attack time will be reduced to 1.5 milliseconds, approximately. To avoid overshoots in the output during this interval, two clipping diodes D2, D3, are provided which respond to extreme transients only until the side chain has returned to its original operating point. As a result, the signal appearing at the output consists of a large amplitude undistorted main signal mixed with a small amplitudeclipped side chain signal. The distortion of the output signal is therefore small, and as the effect lasts for so short a time, inaudible.



Low-level Frequency Response Characteristics of Record Processor under High-level Signal Conditions

Fig. 12.1.-3.

To prevent the erase oscillator from interfering with the control circuit, the gain of Q8 is greatly reduced at the frequency of the erase oscillator by the parallel resonant circuit L3, C22. Capacitors C19 and C20 give additional attenuation.

Playback Processor 1.077.852

The same basic circuit is used for the playback processor, but instead of the side chain being fed from the input, it is fed from the output. Furthermore, the phase of the output signal ( and hence of the side chain signal ) is opposite to that of the input so that the side chain forms a negative feedback element, and produces replay characteristics which are complementary to the record characteristics.

The playback processors for both channels are contained on one plug-in printed circuit board. In addition, this board contains the VU meter amplifier Q9, used for matching the the 100 m V levels to the VU meters. Potentiometer P 103 p adjusts the gain of that stage.

The signal arrives from input 9 ( 13 ) and is amplified by Q1, Q2, Q3 from 40 mV to the Dolby Level of 100 mV. The voltage divider formed by R14, R15, matches the output signal to the A77 internal operating level of 9 mV which then appears at point 11 (14).

In order to be able to work without Dolby noise reduction, the side chain signals can be shorted out by Q4,in the playback processor and by Q3 in the record processor. Both devices are activated by the Dolby "In- Out-" switch ㊿ on the front panel of the recorder.

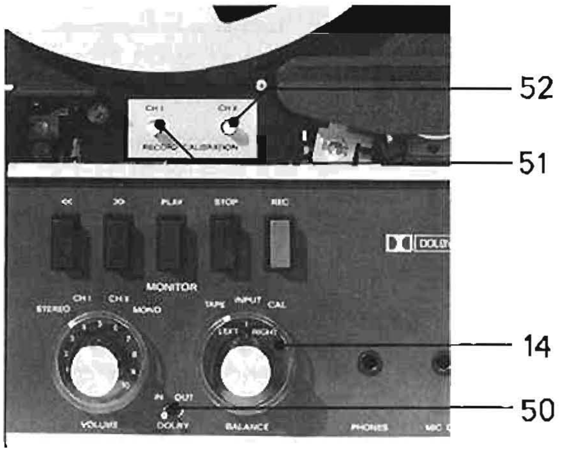


Fig. 12.1.-4.

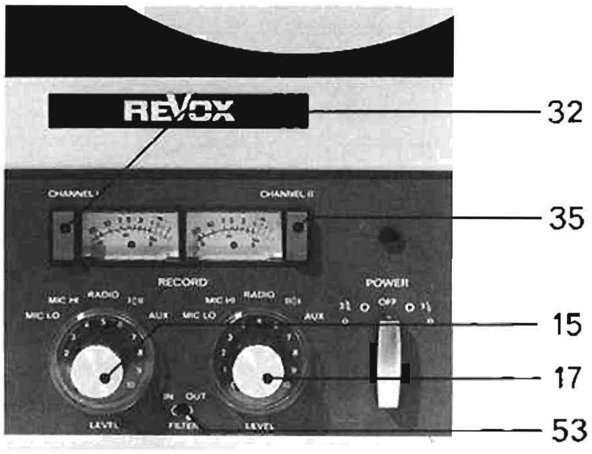


Fig. 12.1.-5.

## 12.1.3. Use of the Dolby Circuit in the Tape Recorder

To achieve correct performance both the record and playback sections must work at identical levels, that is, the tape recorder must have unity gain and a very linear frequency response from the output of the record processor to the input of the playback processor. All Dolby-encoded tapes must be recorded with the operation of the noise reduction circuitry referred to an absolute level of tape flux. Because the same flux level is also standardized for playback, interchangeability of Dolby-encoded tapes is assured. The standard tape flux is 185 nWb/m which corresponds to the Ampex Reference Level on Ampex calibration tapes with NAB equalization.

Any change in gain between the output of the record processor and the tape would be equivalent to a shift in the processor's characteristics. Differences in tape sensitivity must therefore be balanced out, using the RECORD CALIBRATION (51) /(52) control provided on the front panel for this adjustment.

⑭ on/off-tape monitor selector

⑮ Record volume control Ch I

⑰ Record volume control Ch II

㉜ Record pre-selector Ch I

㉟ Record pre-selector Ch II

㊿ DOLBY IN/OUT
Switch to activate or to deactivate the DOLBY noise reduction circuits.

RECORD CALIBRATION

(51) Record Calibration for Channel I

(52) Record Calibration for Channel II

(53) FILTER IN/OUT
Switch for turning the multiplex filter on or off.

### Adjustment of REC CAL Control

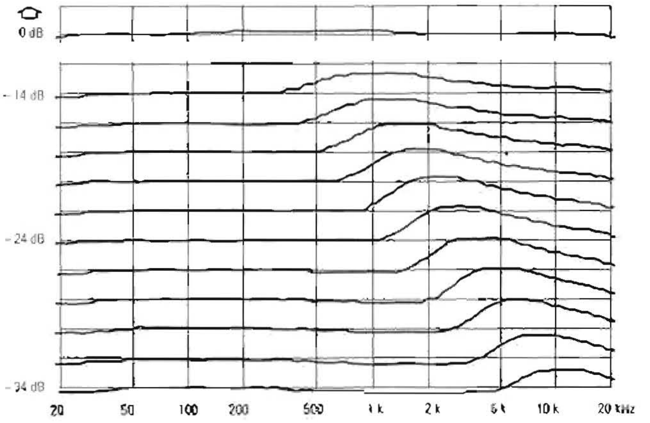
1. Load the recorder with tape of the kind to be used.
2. Set record level controls ⑮/ ⑰ to zero.
3. Turn selector switch ⑭ to CAL.
4. Set the recorder to RECORD.
5. Adjust REC CAL controls (51) / (52) until each meter reads 0 VU.
6. Return selector switch ⑭ to INPUT or TAPE.

Be careful not to accidentally select the CAL position during source-tape switching while recording, or the calibration oscillator tone will be superimposed upon the signal being recorded.

### Index Numbers

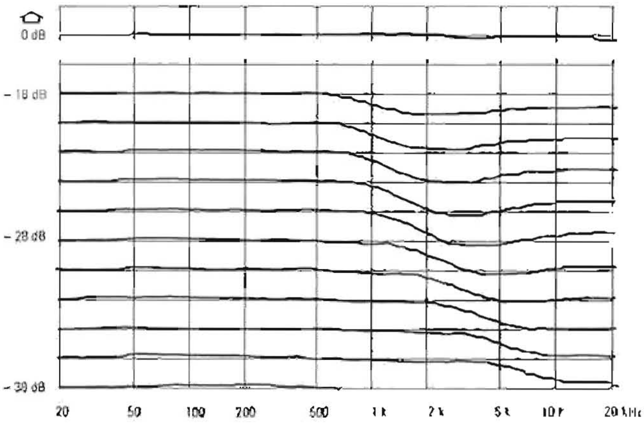
The index numbers 50 to 53 are used for identifying the additional operating controls on the DOLBY equipped REVOX A77 tape recorder. All other index numbers make reference to the operating instructions for the standard version except for the following changes:

| Standard Recorder | DOLBY Version |
|---|---|
| Button Speakers off ㊶ | omitted |
| Button Reel Motors off ㊷ | omitted |
| Monitor selector ⑭: | |
| – Position NAB | corresponds to TAPE |
| – Position IEC | replaced by Calibrate (new function) |



Mismatch Response: 2 dB Gain Between Record and Play Processors

Fig. 12.1.-6.



Mismatch Response: 2 dB Loss Between Record and Play Processors

Fig. 12.1.-7.

### 12.1.4. Matching and Mismatching

The frequency response of a record/playback processor chain connected in series hould be within a tolerance of ± 1 dB. Typically, deviations much smaller than this are achieved. Although mismatching may arise from a number of causes, most commonly it is the result of incorrect adjustment of the signal channel between the record and playback processors for unity gain, either on a wide-band basis or at high frequencies. The effect of such gain errors (wideband) are shown in Figures 12.1.-6. and 12.1.-7. Under dynamic program conditions, response deviations of this magnitude are inaudible.

Other sources of error are incorrect alignment or a build-up of component tolerances. Individual variations in FET's are mainly responsible for errors in the processor characteristics.

It can be seen that the region most sensitive to mismatch is that at a level of about −25 VU; the error will be less at higher and lower levels.

**Basic Printed Circuit Board 1.077.854**
This board carries both plug-in processors and all of the required interconnections. Also on this board is a Zener diode to derive the + 7.2 V from the 21 V supply and an RC combination to filter out any hum in the + 27 V supply for the relay in the record processor.

All interconnections between the switch board and the printed circuit cards carrying the calibration potentiometers, the power supply, the VU meters and the switches "Dolby in/out", "Filter in/out" and "Calibration" are either soldered or plugged onto this board.

**Calibration Potentiometer Board 1.077.342**
Two potentiometers are mounted on this board for individual front panel adjustment of both record channels to match them to tapes of different sensitivity.

**Switchboard 1.077.426**
This differs from the corresponding board in the standard version of the A77 in that it carries the pluggable inputs and outputs for the Dolby processor. The NAB/IEC switch has been modified to carry the function of switching the VU meters for metering level from the tape as well as the signal from the record amplifier which is normally metered during recording. Equalization characteristics remain NAB in all three positions of the monitor selector (Tape-Input-Calibration).

**Power Transformer 1.077.524**
The transformer differs from the standard version in that the wire of the winding for the regulated 21 V supply has been changed from 0.5 mm diameter to 0.9 mm. Both 32 V windings for the power amplifiers have been omitted.

**Reel Motors Off Switch**
This switch had to be omitted and the two record calibration potentiometers are installed in its place.

**VU Meter Level**
VU calibration is effected on the DOLBY playback board. The calibration controls in the A77 record amplifiers are disabled.

Reproducer Test Tapes NAB 7 1/2 ips for
REVOX A77 Dolby 50/3180 µsec
(recording of Nov.30 1971)

The tapes contain the following frequencies and levels:

| | | |
|---|---|---|
| 1 kHz | 30 s | AMPEX Operating Level |
| 1 kHz | 8 s | – 10 dB |
| 10 kHz | 60 s | – 10 dB |

Frequency response test section: all levels – *20 dB 8 sec.*

1k, 40, 63, 125, 250, 500, 1k, 2k, 4k, 6,3k,
8k, 10k, 12,5k, 14k, 16k, 18k

1k – 10 dB

DIN 19 S (70 µsec) Standard Test Tape issue 1970, No. 560B was used as the frequency response reference. An Ampex Test Tape (Nov. 71) was used as a level reference.

To obtain the correct frequency response the following correction factors were used (70 µsec. to 50/3180 µsec).

| | | |
|---|---|---|
| 40 | Hz | + 3,6 dB |
| 60 | | + 1,8 |
| 125 | | + 0,1 |
| 250 | | – 0,4 |
| 500 | | – 0,2 |
| 1 | k | 0 |
| 2 | | + 0,7 |
| 4 | | + 1,7 |
| 6,3 | | + 2,1 |
| 8 | | + 2,3 |
| 10 | | + 2,4 |
| 12 | | + 2,5 |
| 15 | | + 2,5 |

The DIN Standard Test Tape was used because the Ampex tape contains different frequencies and it does not extend beyond 15 kHz.

REVOX A77 with DOLBY Noise Reduction System, Additional Technical Data

All measurements taken with REVOX 601 tape, DOLBY electronics switched on.

2-Track Version *( values for the 4-Track Version are shwon in parenthesis)*

Signal to Noise Ratio, off tape, weighted as per CCIT:

At 7 1/2 ips. better than 67 dB *(65 dB)*
At 3 3/4 ips. better than 64 dB *(62 dB)*

Weighted as per ASA A:

At 7 1/2 ips. better than 70 dB *(67 dB)*
At 3 3/4 ips. better than 67 dB *(65 dB)*

Distortion measured off tape, 500 Hz
Peak Level (assumed to be +6 VU)

At 7 1/2 ips. better than 1.0 % *(1.5 %)*
At 3 3/4 ips. better than 1.5 % *(2.0 %)*

Operating Level 0 dB (100 %):

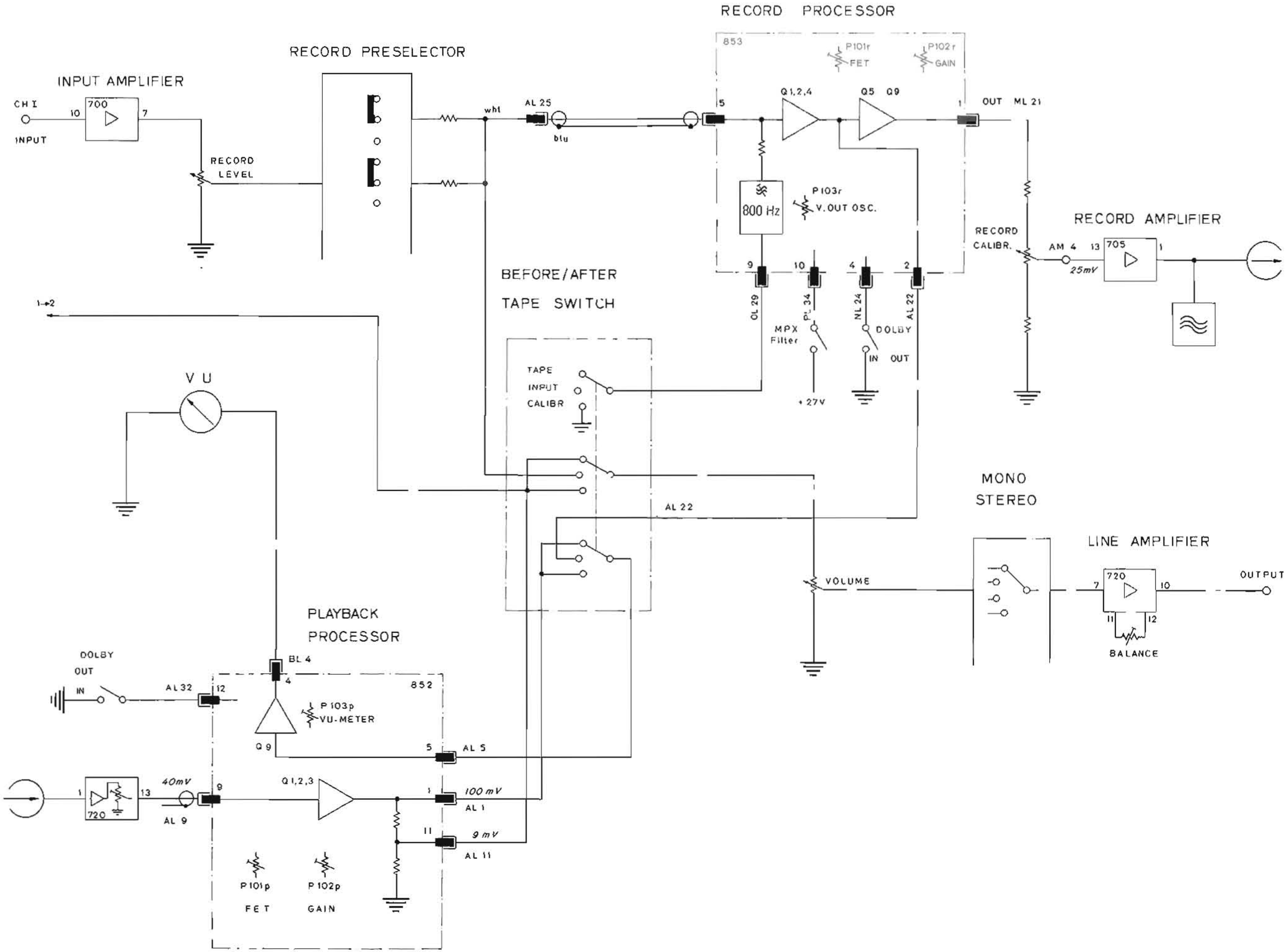
At 7 1/2 ips. better than 0.5 % *(0.5 %)*
At 3 3/4 ips. better than 0.5 % *(1.0 %)*

All other performance data are identical with the data for the standard version of the A77 recorder.

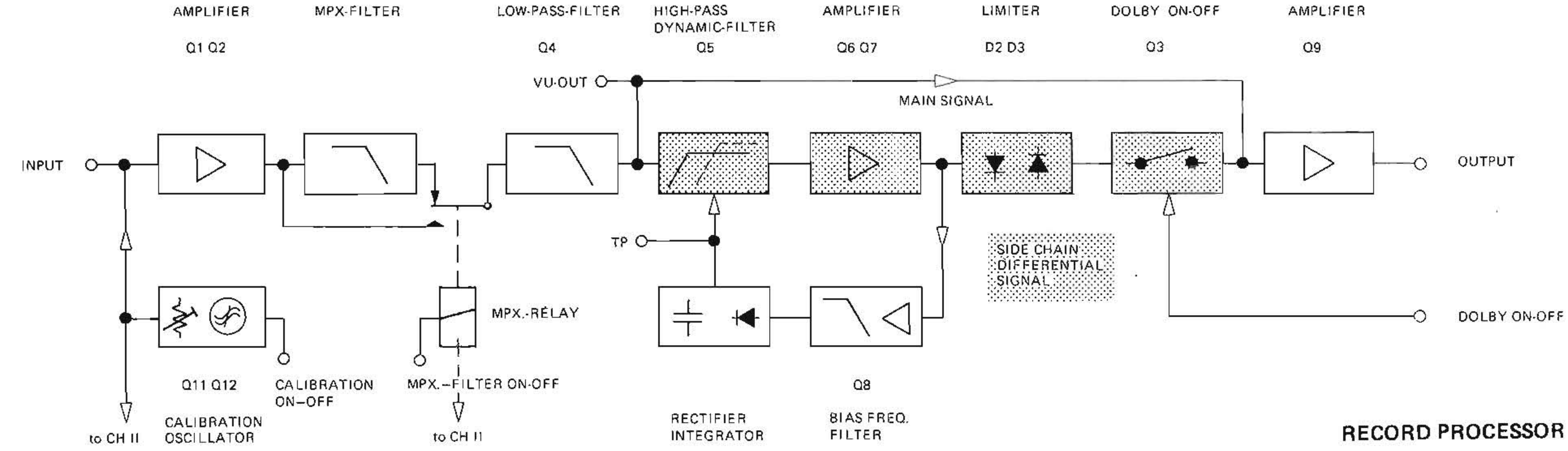
ALIGNMENT INSTRUCTIONS REVOX A 77 DOLBY

| Item | Operation | Alignment Procedure | Test Equipment | Tape Speed ips | Frequency | Voltage | Testpoint | Where to adjust |
|---|---|---|---|---|---|---|---|---|
| 1. | Adjustment of regulated Voltage | Adjust exactly to nominal 21 volts | Multimeter | 7.5 | | + 21 V DC | Yellow wire ED 1 | P 106 |
| 2. | Adjustment of Tacho Head (S.M. 6.2.1.) | Alter head position to obtain specified tacho voltage | Electronic Voltmeter | 3.75 | | 40 m V AC | E1 – E2 | mounting screws of tacho-head |
| 3. | Bias-Filter record (S.M. 6.4.3.) | Adjust for minimum voltage | Electronic Voltmeter | 7.5 | 120 kHz | < 300 mV | see fig. 6.4.–63/64 | L 501 |
| 4. | Bias-Filter, replay (S.M. 6.4.4.) | Adjust for minimum voltage | Electronic Voltmeter | 7.5 | 120 kHz | < 50 mV | Wiper P 801 | L 801 |
| 5. | Motor Speed (S.M. 6.2.2.) | Adjust tacho frequency (measure over at least 10 sec.) | Digital Counter | 7.5<br>3.75 | 1601 Hz<br>800 Hz | 10 V | Pin 2 on T 201 | T 201<br>P 201 |
| 6. | Oscillator and Bias adjust | As per Service Manual 6.4. | Electr.Voltmeter | 7.5 | 120 kHz | 2 Track 21 VAC | HB3–HB6 | blue & orange wire |
| | | Adjust dummy load | Digital Counter | 7.5 | 120 kHz ± 5 kHz | | HB3–HB6 | |
| | | | Digital Counter | 7.5 | 120 kHz ± 5 kHz | | HB3–HB6 | Dummy load L 601 |
| 7. | DOLBY record adjustments | Turn FET-bias off, set gain control to minimum amplification | | | | | | P 101 r (CH I, CH II)<br>P 102 r (CH I, CH II) |
| | DOLBY "OUT" | DOLBY switch ㊿ in position "OUT" | | | | | | |
| | | Connect Audio Generator to "AUX" inputs, | T19 | | 5 kHz | ∿ 0.45 mV | | Generator |
| | | Adjust level on Generator | T 19 VTVM | | 5 kHz | 3 mV | P1, P2 | Generator |
| | | Adjust level on Generator | T 19 VTVM | | 5 kHz | 2.6 mV | P3, P4 | Generator |
| | DOLBY "IN" | DOLBY switch in pos. "IN", measure voltage rise on DOLBY output | T 19 VTVM | | 5 kHz | ∿ 7 mV (+8 dB) | P3, P4 | |
| | | Level adjustment | T 19 VTVM | | 5 kHz | 8.2 mV (+10 dB) | P3, P4 | P 102 r |
| | | Level reduction by 2 dB | T 19 VTVM | | 5 kHz | –2 dB | P3, P4 | P 101 r |
| 8. | DOLBY replay adjustments | Turn FET bias off, Set gain control to min. amplification. | | | | | | P 101 p (CH I, CH II)<br>P 102 p (CH I, CH II) |
| | DOLBY "OUT" | DOLBY switch ㊿ in pos. "OUT" | | | | | | |
| | | Connect Audio Generator to DOLBY inputs (with test clips). | T 19 | | 5 kHz | | P5, P6 | |
| | | Adjust level on generator | T 19 VTVM | | 5 kHz | 7.6 mV | P7, P8 | |
| | DOLBY "IN" | DOLBY switch ㊿ in pos. "IN" | | | | | | |
| | | Adjust level reduction on DOLBY outputs | T 19 VTVM | | 5 kHz | –10 dB<br>= 2.4 mV | P7, P8 | P 102 p |
| | | Level increase by 2 dB | T 19 VTVM | | 5 kHz | + 2 dB<br>= 3 mV | P7, P8 | P 101 r |
| 9. | VU-Meter calibration | Connect Audio Generator to "AUX" inputs, | T 19 or generator | | 1 kHz | ∿ 13 mV | | |
| | | Adjust generator output level | | | 1 kHz | 100 mV | P1, P2 | |
| | | Calibrate VU-meters | | | 1 kHz | 0 VU | | P 103 p |
| 10. | Balance Adjustment | | | | | | | |
| 11. | Playback head azimuth adjustment | As per Service Manual sections 6.3.1. and 6.3.2. | DOLBY reference tape | | | | | |
| 12. | Playback level off test tape | Playback level calibration | VU-Meter | 7.5 | | 185 nWb/m<br>= 0 VU | | P 801<br>print 077.720 |
| 13. | Frequency response check | As per Service Manual 6.3.4. and additional instructions. | | | | | | |
| 14. | Record head azimuth adjustment | "REC. CAL" pot-meters (51)/(52) fully ccw. | | | | | | |
| | | T19 generator level (∿13 mV) adjusted for 0 VU indication. | | | 10 kHz | VU = 0 dB | | |
| | | Reduce generator level –20 dB<br>Adjust azimuth as per S.M. 6.5.3. | | | 10 kHz | –20 dB | | |
| 15. | RF Bias Adjustment | As per Service Manual 6.5.2.<br>△ U for Scotch 207 | T19 | 7.5<br>3.75 | | 4 dB<br>5 dB | OUTPUT<br>CH I, CH II | |

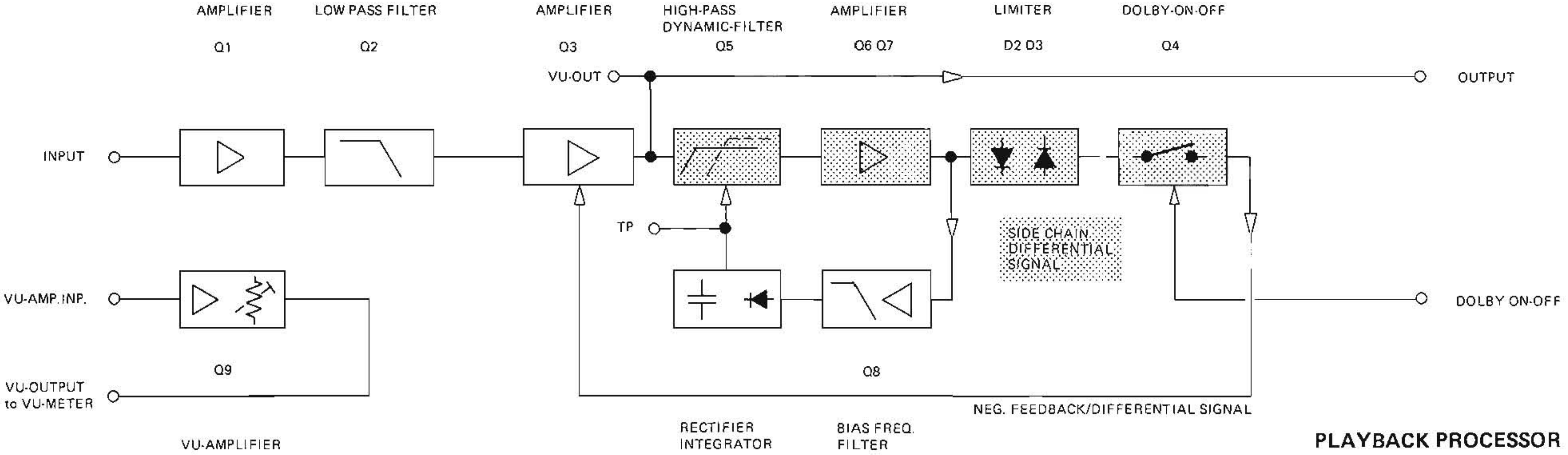
|  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|
| 16. | Record Level and calibration oscillator adjustments | Depress button –6 dB on T19, position "INPUT"<br>T19 Adjust generator to read –1 dB on both VU-Meters<br>"REC CAL" potmeters (51)/(52) fully ccw, increase generator level,<br>Monitor selector ⑭ in position "TAPE"<br>Switch to record and adjust "RECORD LEVEL" to read 0 dB on VU-Meter,<br>Reduce Generator Level<br>Raise record level<br>"REC.LEVEL" Potmeter fully ccw, turn monitor selector ⑭ to position "CAL" and adjust calibration oscillator | T19<br>VU Meter<br>Generator<br>VU Meter<br>Generator<br>VU-Meter<br>VU-Meter |  | 1 kHz | -1 dB<br>+10 dB<br>0 dB<br>–10 dB<br>0 dB<br>0 dB |  | "REC.LEVEL" Potmeter ⑮/⑰<br>"REC.CAL" potmeter (51)/(52)<br>P 103 r |
| 17. | Checking the DOLBY Frequency Response | Reduce T19 generator level by 20 dB,<br>Turn DOLBY switch ㊿ to position "IN"<br>Frequency response tolerances<br>Level difference Mono-Stereo<br>Attenuation of MPX-filter | T19<br>T 19 VTVM | 7.5<br>3.75 | 30–20000 Hz<br>50–15000 Hz<br>30–16000 Hz<br>50–10000 Hz<br>10 kHz<br>18 kHz | –20 dB<br>+ 2/–3 dB<br>± 1,5 dB<br>+ 2/–3 dB<br>± 1,5 dB<br>< 0.5 dB<br>– 25 dB | OUTPUT<br>OUTPUT<br>OUTPUT<br>OUTPUT<br>OUTPUT<br>OUTPUT |  |
| 18. | Checking the Output Level | T19 generator at 1 kHz<br>Adjust record level to 0 VU<br>Measure output level (radio output)<br>Level difference Mono-Stereo | T 19<br>T 19 VTVM |  | 1 kHz | 560mV – 1dB<br>< 1 dB | Radio Output |  |
| 19. | Distortion Measurement | Measure 3rd harmonic<br>Values independent of DOLBY switch position | T19 distortion analyzer | 7.5<br>3.75<br>7.5<br>3.75 | 1.5 kHz<br>1.5 kHz<br>1.5 kHz<br>1.5 kHz | + 6 dB<br>+ 6 dB<br>0 VU<br>0 VU | 1.5 %<br>2 %<br>0.5 %<br>1 % |  |
| 20. | Noise measurement off tape weighted/unweighted | DOLBY-switch ㊿ position "IN"<br>DOLBY-switch ㊿ position "OUT"<br>weighting characteristics as per CCIT (values as per ASA A, see additional technical data) | T19 | 3.75<br>7.5<br>3.75<br>7.5 | unweighted<br>weighted<br>unweighted<br>weighted<br>unweighted<br>weighted<br>unweighted<br>weighted | 4-track<br>–53 dB<br>–62 dB<br>–56 dB<br>–65 dB<br>–52 dB<br>-53 dB<br>–55 dB<br>–56 dB | 2-track<br>–64 dB<br>–67 dB |  |
| 21. | Amplifier noise (without tape) weighted/unweighted | Recorder in "PLAY" mode, all noise readings with reference to +6 VU,<br>Tolerances:<br>Monitor selector ⑭ in position "INPUT" |  | 7.5<br>3.75 | unweighted<br>weighted<br>unweighted<br>weighted | > 58 dB<br>> 68 dB<br>> 58 dB<br>> 64 dB<br>> 75 dB |  |  |
| 22. | Crosstalk rejection MONO | As per S.M. 6.6.5., adjust trimpot P305, if values differ between DOLBY IN and DOLBY OUT. |  |  |  |  |  |  |
| 23. | Crosstalk rejection STEREO | As per S.M. 6.6.6. |  |  |  |  |  |  |
| 24. | Erase efficiency | As per S.M. 6.6.4. |  |  |  |  |  |  |
| 25. | Final check | MONO-STEREO switch, track to track transfer, input sensitivity, noise voltage, S/N ratio in pos. "MICRO" (> 45 dB)<br>mechanical inspection |  |  |  |  |  |  |



Function Diagram A77 DOLBY

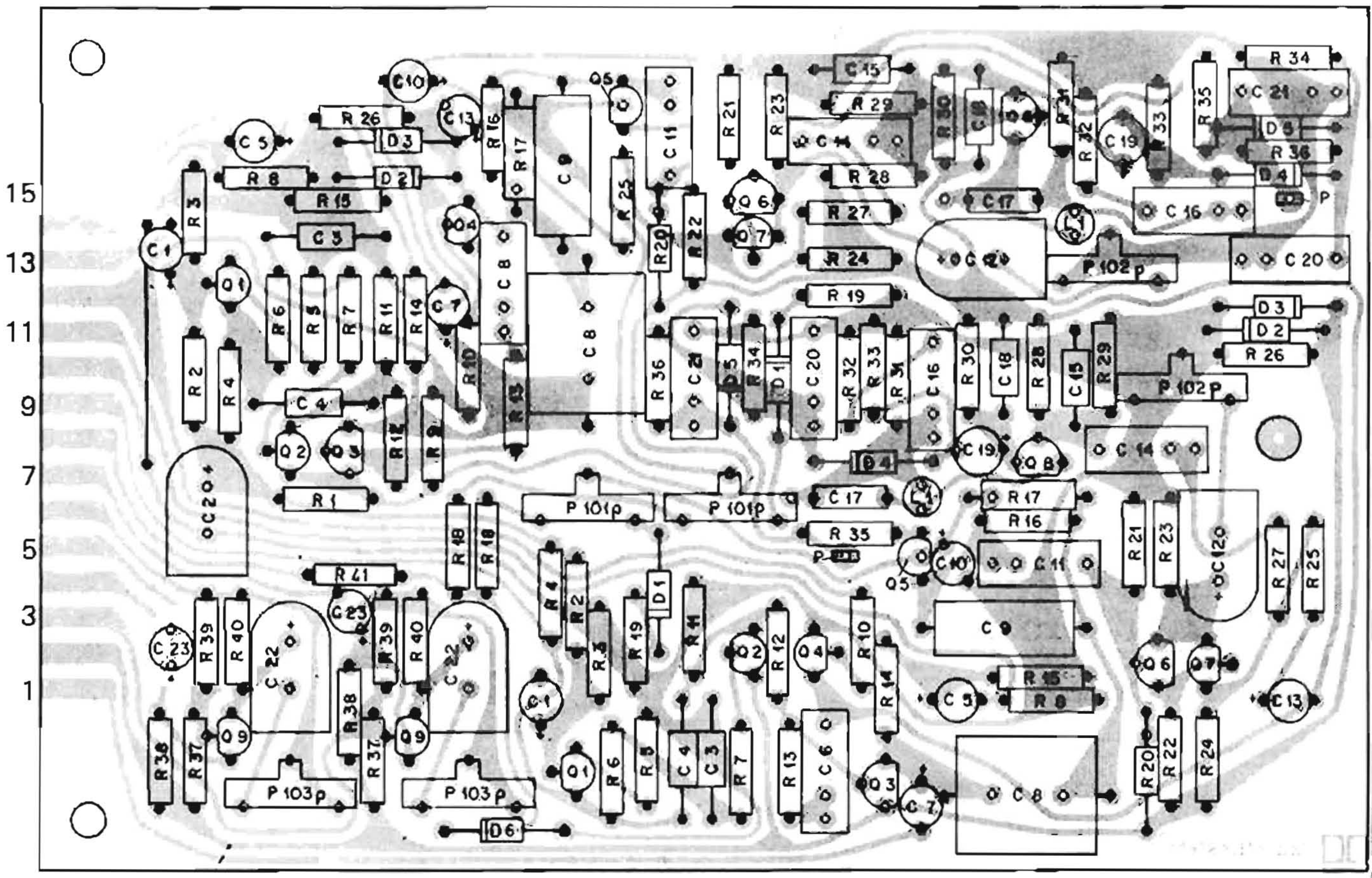


**RECORD PROCESSOR**

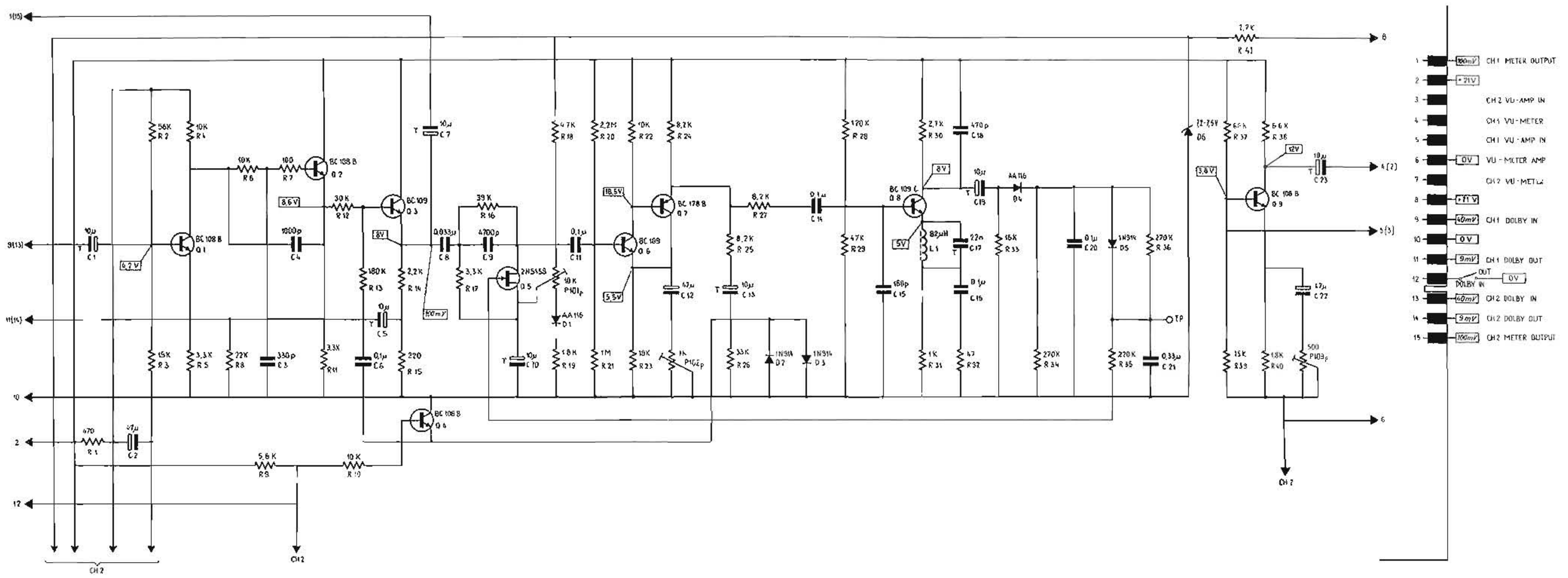


**PLAYBACK PROCESSOR**

# Block Diagram A77 DOLBY



Playback Processor     1.077.852



Playback Processor 1.077.852

Unspezified carbon film resistors: 1/8 W – 5 %

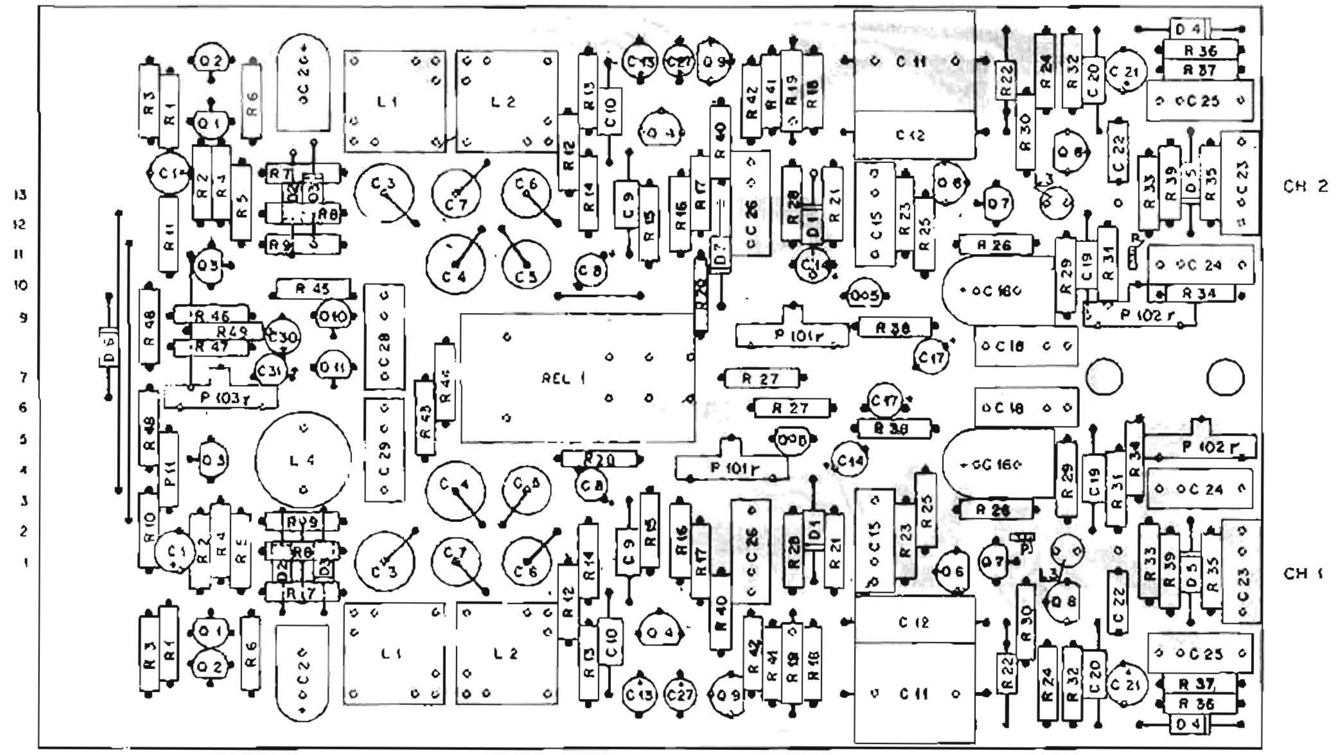
* * Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| | Playback<br>Processor<br>1.077.852 | assembled | | 1.077.852 |
| C 1 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| C 2 | Capacitor | elektrolytic | 47 µF – 100% – 25V | * * |
| C 3 | Capacitor | polystyrene | 330 pF – 5% – 63V | * * |
| C 4 | Capacitor | polystyrene | 1 nF – 5% – 25V | * * |
| C 5 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| C 6 | Capacitor | polyester | 0.1 µF – 20% – 160V | * * |
| C 7 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| C 8 | Capacitor | polystyrene | 33 nF – 1% – 63V | * * |
| C 9 | Capacitor | polystyrene | 4.7 µF – 1% – 63V | * * |
| C 10 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| C 11 | Capacitor | polyester | 0.1 µF – 20% – 160V | * * |
| C 12 | Capacitor | electrolytic | 47 µF – 100% – 25V | * * |
| C 13 | Capacitor | tantalum | 10 µF – 50% – 25V | * * |
| C 14 | Capacitor | polyester | 0.1 µF – 20% – 160V | * * |
| C 15 | Capacitor | polystyrene | 150 pF – 5% – 63V | * * |
| C 16 | Capacitor | polyester | 0.1 µF – 5% – 100V | * * |
| C 17 | Capacitor | polyester | 22 nF – 5% – 250V | * * |
| C 18 | Capacitor | polystyrene | 470 pF – 5% – 63V | * * |
| C 19 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| C 20 | Capacitor | polyester | 0.1 µF – 20% – 160V | * * |
| C 21 | Capacitor | polyester | 0.33 µF – 20% – 63V | * * |
| C 22 | Capacitor | elektrolytic | 47 µF – 10% – 25V | * * |
| C 23 | Capacitor | tantalum | 10 µF – 50% – 16V | * * |
| D 1 | Ge – Diode | AA 116 | | * * |
| D 2 | Si – Diode | 1N 914 | | * * |
| D 3 | Si – Diode | 1N 914 | | * * |
| D 4 | Ge – Diode | AA 116 | | * * |
| D 5 | Si – Diode | 1N 914 | | * * |
| D 6 | Z – Diode | | 7.5 V – 5 % – 0.4 W | * * |
| P 1 | Flat – Connector | | | 54.02.0320 |
| P 101 | Trim – Potentiometer | | 10 k – 20% – 0.15 W | * * |
| P 102 | Trim – Potentiometer | | 1 k – 20% – 0.15 W | * * |
| P 103 | Trim – Potentiometer | | 500 – 20% – 0.15 W | * * |
| Q 1 | Transistor | BC 108 B | | * * |
| Q 2 | Transistor | BC 108 B | | * * |
| Q 3 | Transistor | BC 109 C | | * * |
| Q 4 | Transistor | BC 108 B | | * * |
| Q 5 | Transistor | 2N 5458 | | * * |
| Q 6 | Transistor | BC 109 C | | * * |
| Q 7 | Transistor | BC 178 B | | * * |
| Q 8 | Transistor | BC 109 C | | * * |
| Q 9 | Transistor | BC 108 B | | * * |

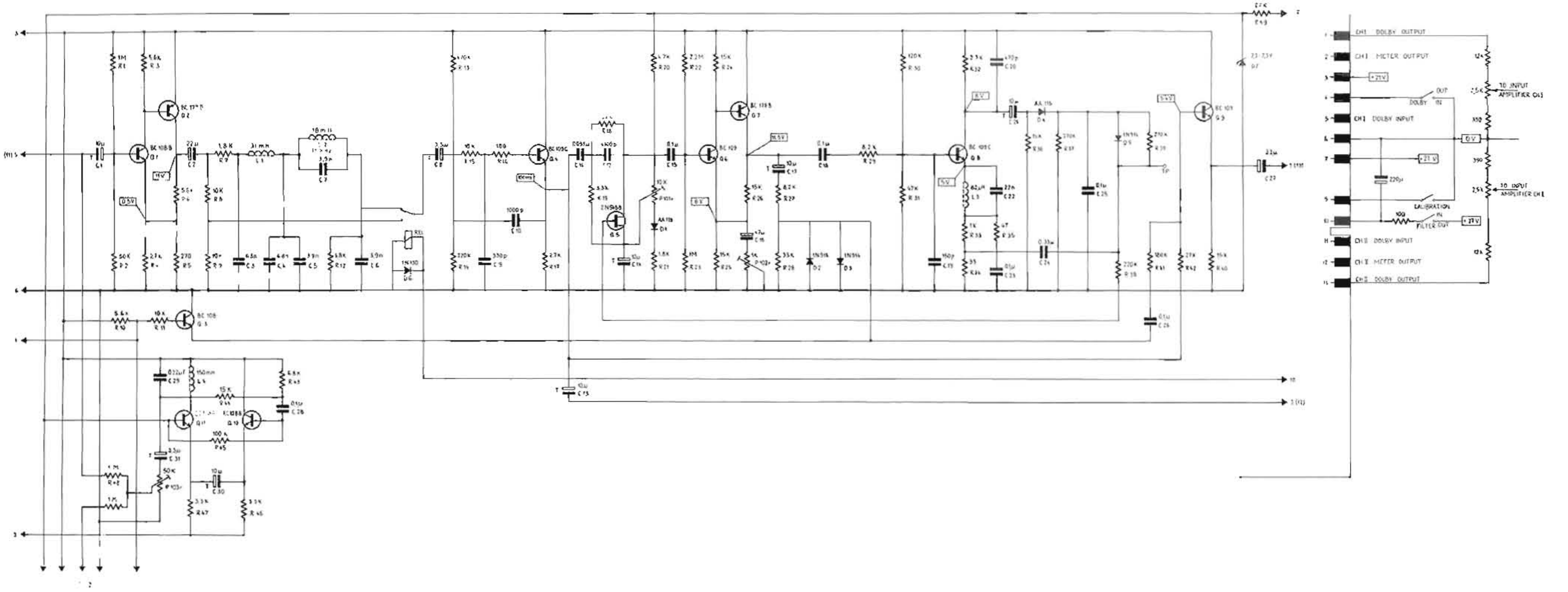
Unspezified carbon film resistors: 1/8 W – 5 %

* * Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| R 1 | Resistor | carbon film | 470 | * * |
| R 2 | Resistor | carbon film | 56 k | * * |
| R 3 | Resistor | carbon film | 15 k | * * |
| R 4 | Resistor | carbon film | 10 k | * * |
| R 5 | Resistor | carbon film | 3.3 k | * * |
| R 6 | Resistor | carbon film | 10 k | * * |
| R 7 | Resistor | carbon film | 100 | * * |
| R 8 | Resistor | carbon film | 22 k | * * |
| R 9 | Resistor | carbon film | 5.6 k | * * |
| R 10 | Resistor | carbon film | 10 k | * * |
| R 11 | Resistor | carbon film | 3.3 k | * * |
| R 12 | Resistor | carbon film | 33 k | * * |
| R 13 | Resistor | carbon film | 180 k | * * |
| R 14 | Resistor | carbon film | 2.2 k | * * |
| R 15 | Resistor | carbon film | 220 | * * |
| R 16 | Resistor | carbon film | 39 k | * * |
| R 17 | Resistor | metal film | 3.3 k – 1% – 0.33 W | * * |
| R 18 | Resistor | carbon film | 4.7 k | * * |
| R 19 | Resistor | carbon film | 1.8 k | * * |
| R 20 | Resistor | carbon film | 2.2M – 5% – 0.25 W | * * |
| R 21 | Resistor | carbon film | 1 M | * * |
| R 22 | Resistor | carbon film | 10 k | * * |
| R 23 | Resistor | carbon film | 10 k | * * |
| R 24 | Resistor | carbon film | 8.2 k | * * |
| R 25 | Resistor | carbon film | 8.2 k | * * |
| R 26 | Resistor | carbon film | 33 k | * * |
| R 27 | Resistor | carbon film | 8.2 k | * * |
| R 28 | Resistor | carbon film | 120 k | * * |
| R 29 | Resistor | carbon film | 47 k | * * |
| R 30 | Resistor | carbon film | 2.7 k | * * |
| R 31 | Resistor | carbon film | 1 k | * * |
| R 32 | Resistor | carbon film | 47 k | * * |
| R 33 | Resistor | carbon film | 15 k | * * |
| R 34 | Resistor | carbon film | 270 k | * * |
| R 35 | Resistor | carbon film | 220 k | * * |
| R 36 | Resistor | carbon film | 270 k | * * |
| R 37 | Resistor | carbon film | 68 k | * * |
| R 38 | Resistor | carbon film | 5.6 k | * * |
| R 39 | Resistor | carbon film | 15 k | * * |
| R 40 | Resistor | carbon film | 1.8 k | * * |
| R 41 | Resistor | carbon film | 2.5 k | * * |
| L 1 | HF – choke | | 82 µH – 5% | 62.02.4820 |



Record Processor 1.077.853



Record Processor 1.077.853

Unspezified carbon film resistors. 1/8 W – 5 %

** Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| | Record Processor 1.077.853 | assembled | | 1.077.853 |
| C 1 | Capacitor | tantalum | 10 μF – 50% – 25V | * * |
| C 2 | Capacitor | elektrolytic | 22 μF – 100% – 25V | * * |
| C 3 | Capacitor | polystyrene | 6.8 nF – 2% – 63V | * * |
| C 4 | Capacitor | polystyrene | 6.8 nF – 2% – 63V | * * |
| C 5 | Capacitor | polystyrene | 3.9 nF – 2% – 63V | * * |
| C 6 | Capacitor | polystyrene | 3.9 nF – 2% – 63V | * * |
| C 7 | Capacitor | polystyrene | 3.9 nF – 2% – 63V | * * |
| C 8 | Capacitor | tantalum | 3.3 μF – 50% – 16V | * * |
| C 9 | Capacitor | polystyrene | 330 pF – 5% – 25V | * * |
| C 10 | Capacitor | polystyrene | 1 nF – 5% – 25V | * * |
| C 11 | Capacitor | polystyrene | 33 nF – 1% – 63V | * * |
| C 12 | Capacitor | polystyrene | 4.7 nF – 1% – 63V | * * |
| C 13 | Capacitor | tantalum | 10 μF – 50% – 16V | * * |
| C 14 | Capacitor | tantalum | 10 μF – 50% – 16V | * * |
| C 15 | Capacitor | polyester | 0.1 μF – 20% – 160V | * * |
| C 16 | Capacitor | elektrolytic | 47 μF – 100% – 25V | * * |
| C 17 | Capacitor | tantalum | 10 μF – 50% – 16V | * * |
| C 18 | Capacitor | polyester | 0.1 μF – 20% – 160V | * * |
| C 19 | Capacitor | polystyrene | 150 pF – 5% – 25V | * * |
| C 20 | Capacitor | polystyrene | 470 pF – 5% – 25V | * * |
| C 21 | Capacitor | tantalum | 10 μF – 50% – 25V | * * |
| C 22 | Capacitor | polyester | 22 nF – 5% – 250V | * * |
| C 23 | Capacitor | polyester | 0.1 μF – 5% – 100V | * * |
| C 24 | Capacitor | polyester | 0.33 μF – 20% – 63V | * * |
| C 25 | Capacitor | polyester | 0.1 μF – 20% – 160V | * * |
| C 26 | Capacitor | polyester | 0.1 μF – 20% – 160V | * * |
| C 27 | Capacitor | tantalum | 3.3 μF – 50% – 16V | * * |
| C 28 | Capacitor | polyester | 0.1 μF – 20% – 160V | * * |
| C 29 | Capacitor | polyester | 0.22 μF – 20% – 100V | * * |
| C 30 | Capacitor | tantalum | 10 μF – 50% – 16V | * * |
| C 31 | Capacitor | tantalum | 3.3 μF – 50% – 16V | * * |
| D 1 | Ge – Diode | AA 116 | | * * |
| D 2 | Si – Diode | 1N 914 | | * * |
| D 3 | Si – Diode | 1N 914 | | * * |
| D 4 | Ge – Diode | AA 116 | | * * |
| D 5 | Si – Diode | 1N 914 | | * * |
| D 6 | Si – Diode | 1N 4448 | | * * |
| D 7 | Z – Diode | | 7.5 V – 5% – 0.4 W | * * |
| P 1 | Flat – connector | | | 54.02.0320 |
| K 1 | Relay | | 24 V – 0.3 A | 56.04.0126 |

Unspezified carbon film resistors. 1/8 W – 5 %

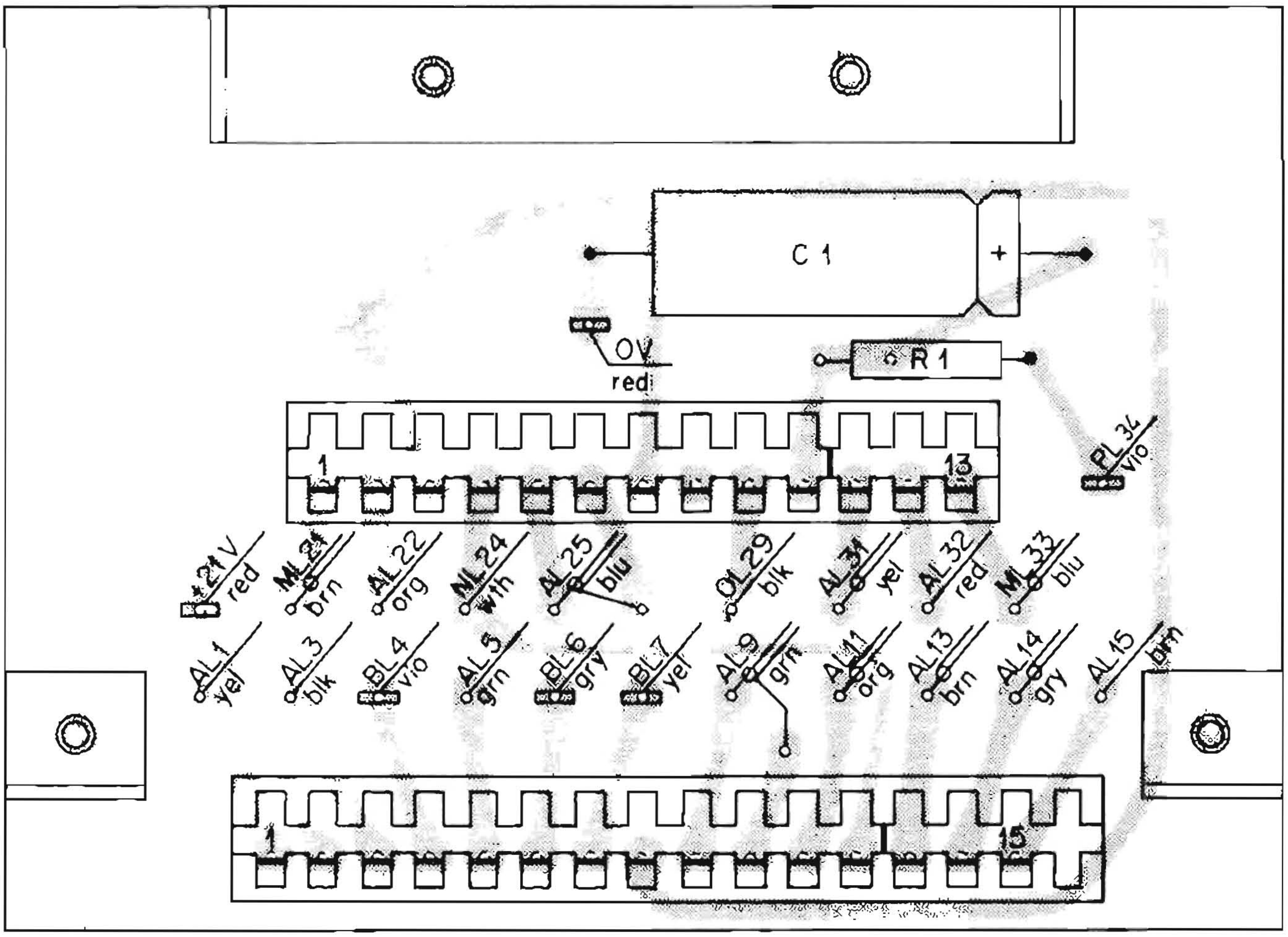
** Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| L 1 | Filter choke | | 31 mH – assembled | 1.022.134 |
| L 2 | Filter choke | | 18 mH – assembled | 1.022.133 |
| L 3 | HF – choke | | 82 μF – 5 % | 62.02.4820 |
| L 4 | HF – choke | | 150 mH – 5 % | 62.02.3154 |
| P 101 | Trim – Potentiometer | | 10k – 20% – 0.15W | * * |
| P 102 | Trim – Potentiometer | | 1k – 20% – 0.15W | * * |
| P 103 | Trim – Potentiometer | | 50k – 20% – 0.15W | * * |
| Q 1 | Transistor | BC 108 B | | * * |
| Q 2 | Transistor | BC 178 B | | * * |
| Q 3 | Transistor | BC 108 B | | * * |
| Q 4 | Transistor | BC 109 C | | * * |
| Q 5 | Transistor | 2N 5458 | | * * |
| Q 6 | Transistor | BC 109 C | | * * |
| Q 7 | Transistor | BC 178 B | | * * |
| Q 8 | Transistor | BC 109 C | | * * |
| Q 9 | Transistor | BC 109 C | | * * |
| Q 10 | Transistor | BC 108 B | | * * |
| Q 11 | Transistor | BC 108 B | | * * |
| R 1 | Resistor | carbon film | 1 M | * * |
| R 2 | Resistor | carbon film | 56 k | * * |
| R 3 | Resistor | carbon film | 5.6 k | * * |
| R 4 | Resistor | carbon film | 2.7 k | * * |
| R 5 | Resistor | carbon film | 270 | * * |
| R 6 | Resistor | carbon film | 5.6 k | * * |
| R 7 | Resistor | carbon film | 1.8 k | * * |
| R 8 | Resistor | carbon film | 10 k | * * |
| R 9 | Resistor | carbon film | 10 k | * * |
| R 10 | Resistor | carbon film | 5.6 k | * * |
| R 11 | Resistor | carbon film | 10 k | * * |
| R 12 | Resistor | carbon film | 1.8 k | * * |
| R 13 | Resistor | carbon film | 470 k | * * |
| R 14 | Resistor | carbon film | 220 k | * * |
| R 15 | Resistor | carbon film | 10 k | * * |
| R 16 | Resistor | carbon film | 100 | * * |
| R 17 | Resistor | carbon film | 2.7 k | * * |
| R 18 | Resistor | carbon film | 39 k | * * |
| R 19 | Resistor | carbon film | 3.3 k – 1% – 0.33W | * * |
| R 20 | Resistor | carbon film | 4.7 k | * * |
| R 21 | Resistor | carbon film | 1.8 k | * * |
| R 22 | Resistor | carbon film | 2.2 M | * * |
| R 23 | Resistor | carbon film | 1 M | * * |
| R 24 | Resistor | carbon film | 15 k | * * |
| R 25 | Resistor | carbon film | 15 k | * * |

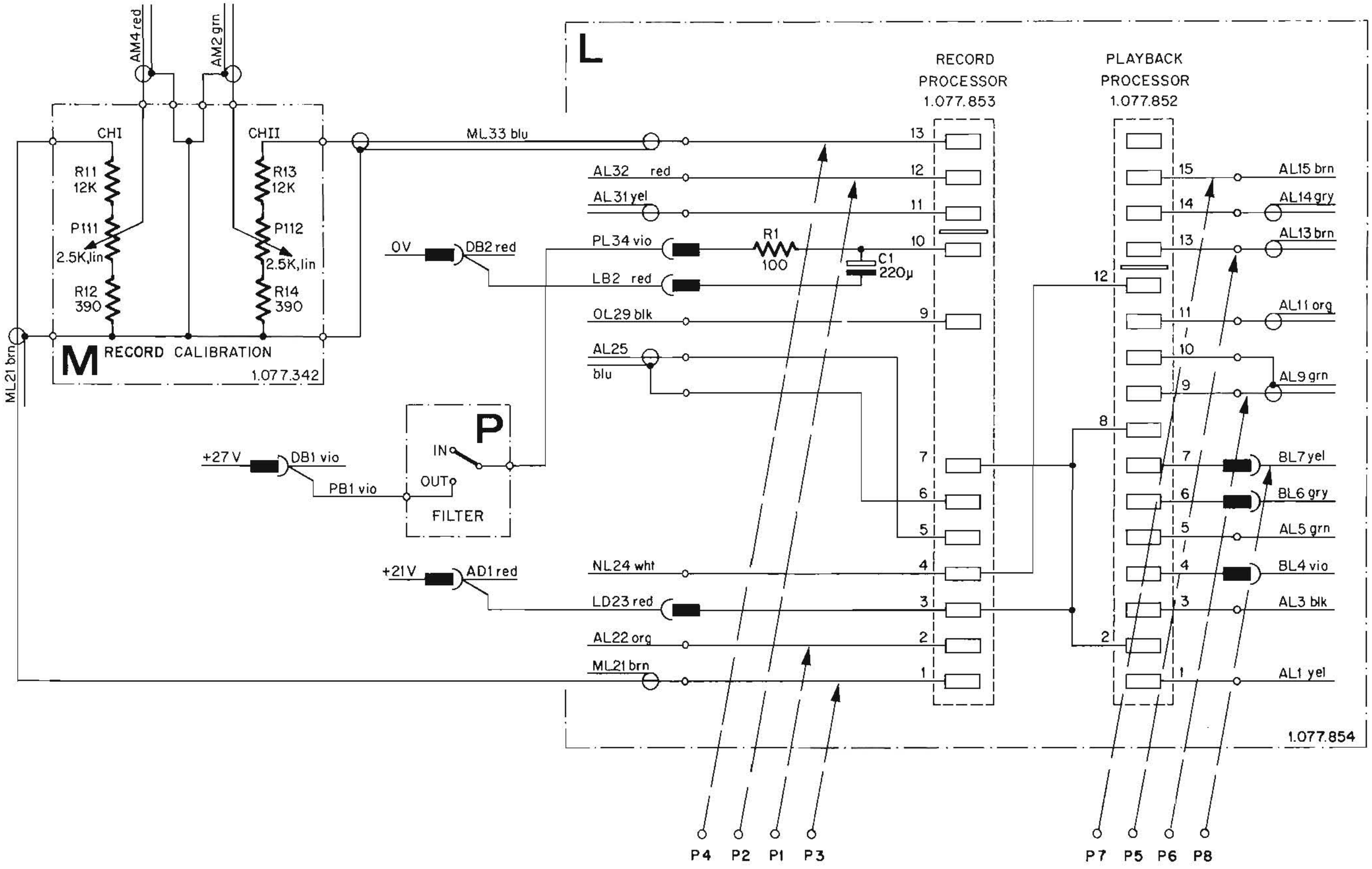
Unspezified carbon film resistors:
1/8 W — 5 %

**
Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| R 26 | Resistor | carbon film | 15 k | * * |
| R 27 | Resistor | carbon film | 8.2 k | * * |
| R 28 | Resistor | carbon film | 33 k | * * |
| R 29 | Resistor | carbon film | 8.2 k | * * |
| R 30 | Resistor | carbon film | 120 k | * * |
| R 31 | Resistor | carbon film | 47 k | * * |
| R 32 | Resistor | carbon film | 2.7 k | * * |
| R 33 | Resistor | carbon film | 1 k | * * |
| R 34 | Resistor | carbon film | 33 | * * |
| R 35 | Resistor | carbon film | 47 | * * |
| R 36 | Resistor | carbon film | 15 k | * * |
| R 37 | Resistor | carbon film | 270 k | * * |
| R 38 | Resistor | carbon film | 220 k | * * |
| R 39 | Resistor | carbon film | 270 k | * * |
| R 40 | Resistor | carbon film | 15 k | * * |
| R 41 | Resistor | carbon film | 180 k | * * |
| R 42 | Resistor | carbon film | 27 k | * * |
| R 43 | Resistor | carbon film | 6.8 k | * * |
| R 44 | Resistor | carbon film | 15 k | * * |
| R 45 | Resistor | carbon film | 100 k | * * |
| R 46 | Resistor | carbon film | 3.3 k | * * |
| R 47 | Resistor | carbon film | 3.3 k | * * |
| R 48 | Resistor | carbon film | 1 M | * * |
| R 49 | Resistor | carbon film | 2.7 k | * * |



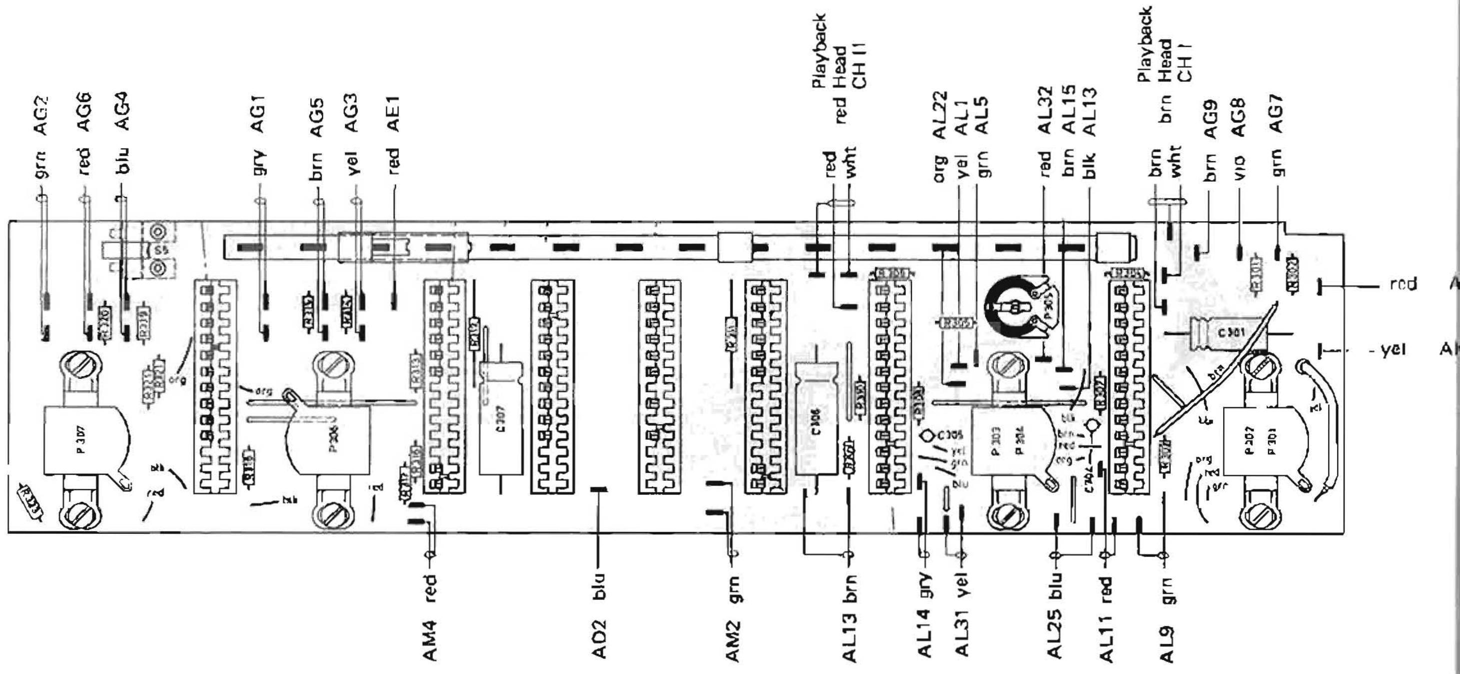
Interconnection 1.077.854



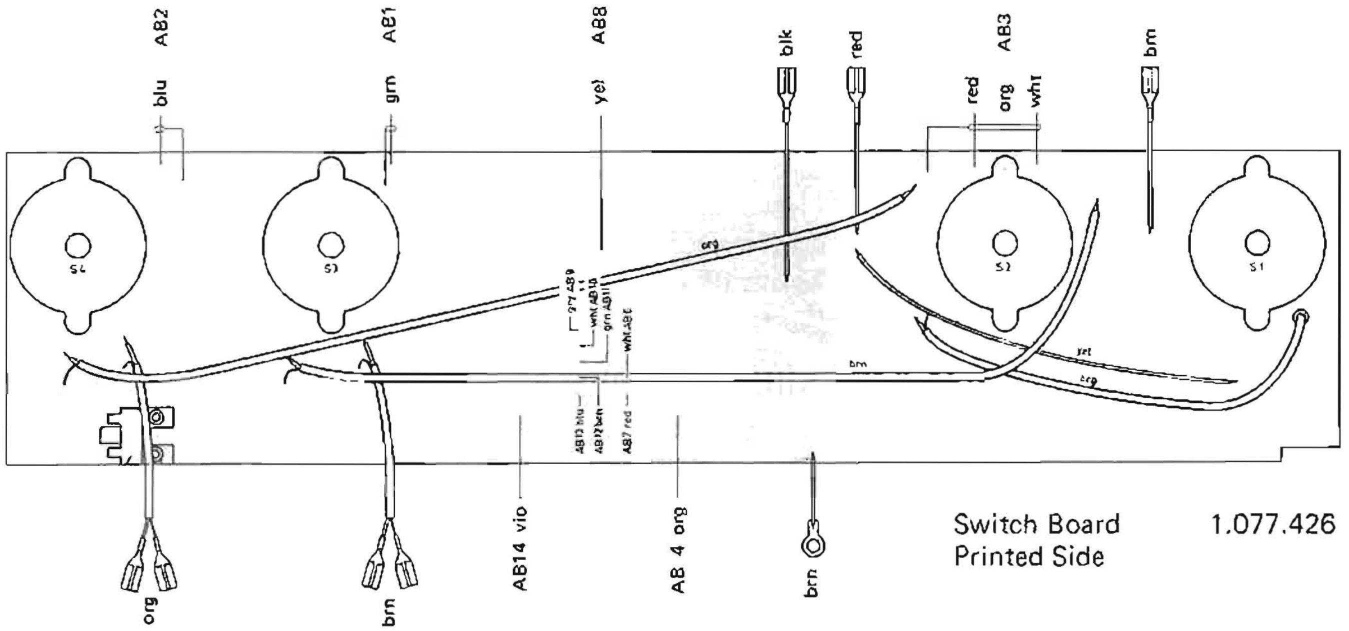
Interconnection 1.077.854

| | |
|---|---|
| Unspezified carbon film resistors·<br>1/8 W – 5 % | **<br>Commercial types |

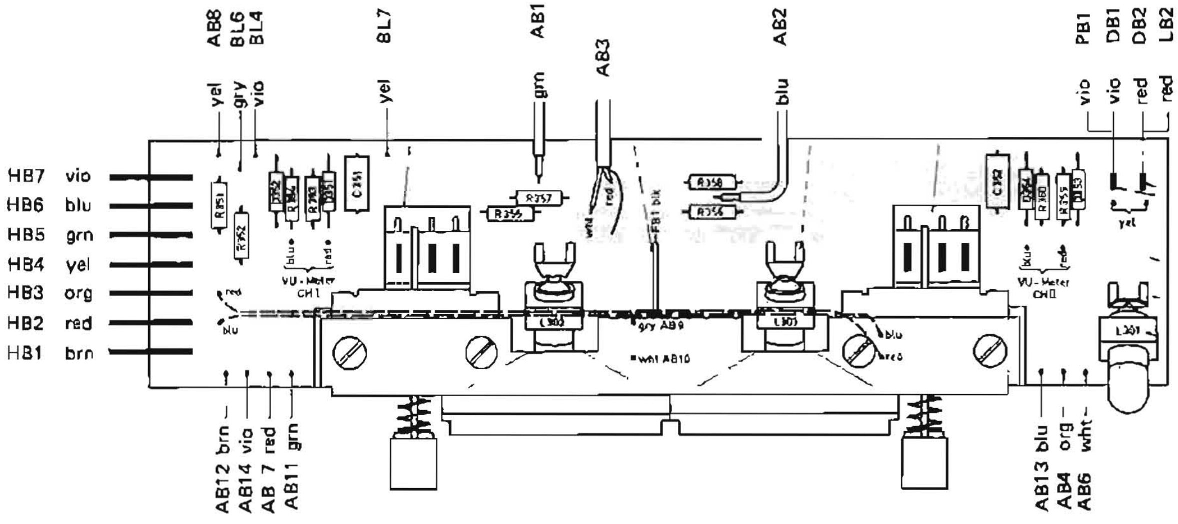
| IDENTIFI-CATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| | Interconnection<br>1.077.854 | assembled | | 1.077.854 |
| | Connector | for 1.077.853 | | 1.012.134 |
| | Connector | for 1.077.852 | | 1.012.166 |
| | Coding Piece | 2 pieces | | 1.077.435.–10 |
| | Flat-Connector | 6 pieces | | 54.02.0320 |
| C1 | Capacitor | elektrolytic | | * * |
| R1 | Resistor | carbon film | 100 – 5% – 0.33 W | * * |



Switch Board 1.077.426
Part Side



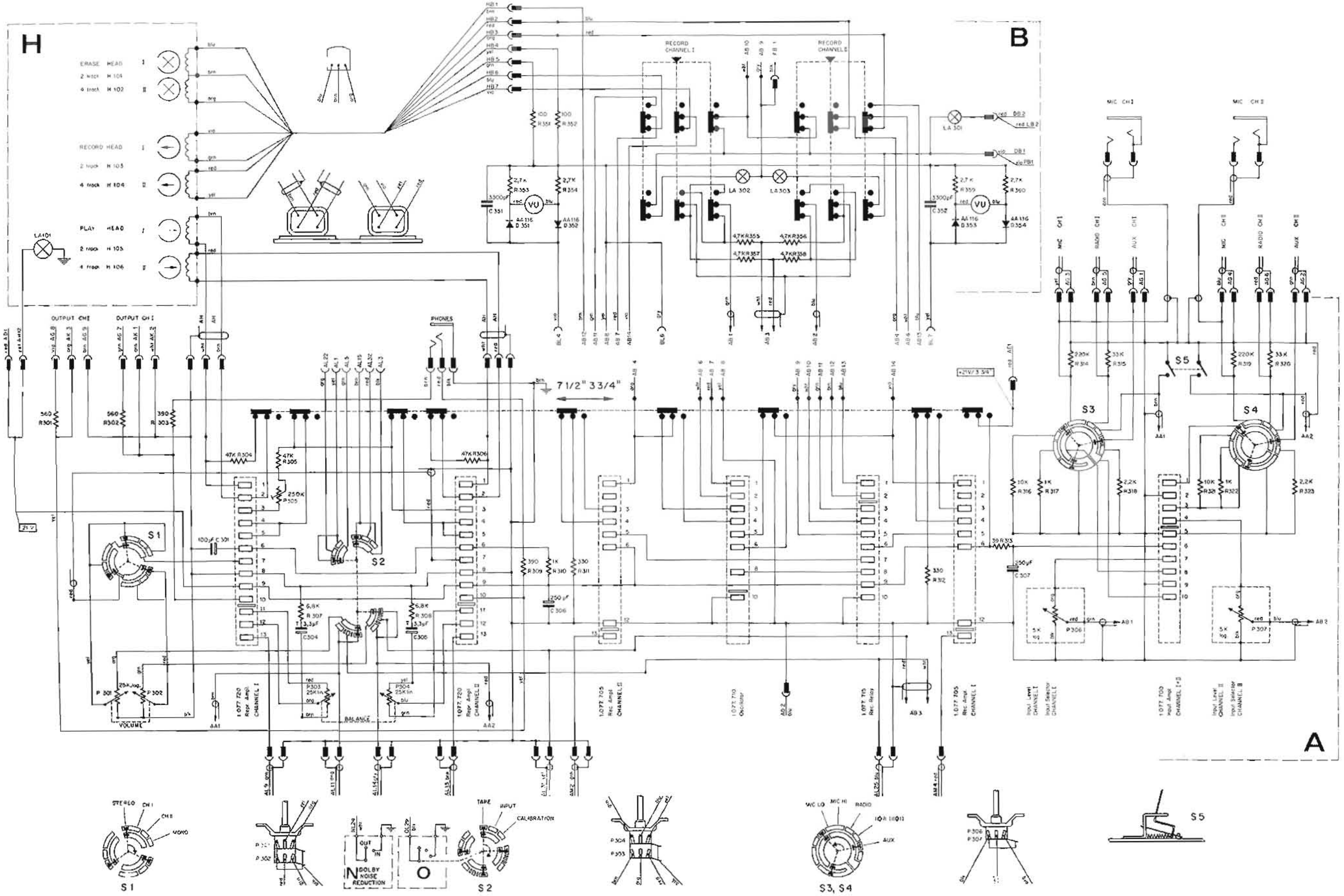
Switch Board 1.077.426
Printed Side



VU-Meter Board 1.077.468

01

12



Switch Board 1.077.426

VU-Meter Board 1.077.468

Unspezified carbon film resistors: 1/8 W – 5 %

* * Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| | VU-Meter Board | assembled | | 1.077.468 |
| | VU-Meter | 2 pieces | | 1.077.470-02 |
| L 301 – L 303 | Lamp Socket | | | 1.077.480-02 |
| L 301 | Spring Contact | | | 1.077.480-03 |
| L 302, L 303 | Spring Contact | | | 1.077.480-04 |
| L 301 – L 303 | Lamp | | 36 V – 50 mA | 51.02.0104 |
| D 351 | Ge – Diode | AA 116 | | * * |
| D 352 | Ge -- Diode | AA 116 | | * * |
| D 353 | Ge – Diode | AA 116 | | * * |
| D 354 | Ge – Diode | AA 116 | | * * |
| R 351 | Resistor | carbon film | 100 | * * |
| R 352 | Resistor | carbon film | 100 | * * |
| R 353 | Resistor | carbon film | 2.7 k | * * |
| R 354 | Resistor | carbon film | 2.7 k | * * |
| R 355 | Resistor | carbon film | 4.7 k | * * |
| R 356 | Resistor | carbon film | 4.7 k | * * |
| R 357 | Resistor | carbon film | 4.7 k | * * |
| R 358 | Resistor | carbon film | 4.7 k | * * |
| R 359 | Resistor | carbon film | 2.7 k | * * |
| R 360 | Resistor | carbon film | 2.7 k | * * |
| C 351 | Capacitor | polyester | 3300 pF – 400 V | * * |
| C 352 | Capacitor | polyester | 3300 pF – 400 V | * * |

Unspezified carbon film resistors: 1/8 W – 5 %

* * Commercial types

| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
|---|---|---|---|---|
| | Switch Board | assembled | | 1.077.426 |
| | Connector | 1 piece (for 1.077.700) | | 1.077.435-05 |
| | Connector | 2 pieces (for 1.077.705) | | 1.077.435-03 |
| | Connector | 1 piece (for 1.077.715) | | 1.077.435-06 |
| | Connector | 1 piece (for 1.077.710) | | 1.077.435-04 |
| | Connector | 2 pieces (for 1.077.720) | | 1.077.435-02 |
| | Coding Piece | 7 pieces | | 1.077.435-10 |
| | Switch Slide | | | 1.077.435-07 |
| S 1 | Circuit Board Switch, 4/9 | Playback mode switch, assembled | | 1.011.400 |
| S 2 | Circuit Board Switch, 3/10 | Before/After-tape switch, assembled | | 1.011.300 |
| S 3 | Circuit Board Switch, 5/8 | Input selector, assembled | | 1.011.500 |
| S 4 | Circuit Board Switch, 5/8 | Input selector, assembled | | 1.011.500 |
| S 5 | Playback Cut-Off Switch | assembled | | 1.077.437 |
| P 301 | Potentiometer | Volume, assembled | | 1.077.430-09 |
| P 302 | Potentiometer | Volume, assembled | | 1.077.430-09 |
| P 303 | Potentiometer | Balance, assembled | | 1.077.430-08 |
| P 304 | Potentiometer | Balance, assembled | | 1.077.430-08 |
| P 305 | Trim-Potentiometer | Ruwido S 76 K | 250 k – 20% – 0.15W | * * |
| P 306 | Potentiometer | Input Level, assembled | | 1.077.430-07 |
| P 307 | Potentiometer | Input Level, assembled | | 1.077.430-07 |
| C 301 | Capacitor | elektrolytic | 100 $\mu$F – 25 V | * * |
| C 304 | Capacitor | tantalum | 3,3 $\mu$F -- 15 V | * * |
| C 305 | Capacitor | tantalum | 3,3 $\mu$F – 15 V | * * |
| C 306 | Capacitor | electrolytic | 250 $\mu$F – 25 V | * * |
| C 307 | Capacitor | electrolytic | 250 $\mu$F – 25 V | * * |

|  |  |  | Unspezified carbon film resistors: 1/8 W — 5 % | * * Commercial types |
|---|---|---|---|---|
| IDENTI-FICATION | PART NAME | TYPE / REMARKS | SPECIFICATIONS | ORDER NUMBER |
| R 301 | Resistor | carbon film | 560 | * * |
| R 302 | Resistor | carbon film | 560 | * * |
| R 303 | Resistor | carbon film | 390 | * * |
| R 304 | Resistor | carbon film | 47 k | * * |
| R 305 | Resistor | carbon film | 47 k | * * |
| R 306 | Resistor | carbon film | 47 k | * * |
| R 307 | Resistor | carbon film | 6.8 k | * * |
| R 308 | Resistor | carbon film | 6.8 k | * * |
| R 309 | Resistor | carbon film | 390 | * * |
| R 310 | Resistor | carbon film | 1 k | * * |
| R 311 | Resistor | carbon film | 330 | * * |
| R 312 | Resistor | carbon film | 330 | * * |
| R 313 | Resistor | carbon film | 39 | * * |
| R 314 | Resistor | carbon film | 220 k | * * |
| R 315 | Resistor | carbon film | 33 k | * * |
| R 316 | Resistor | carbon film | 10 k | * * |
| R 317 | Resistor | carbon film | 1 k | * * |
| R 318 | Resistor | carbon film | 2.2 k | * * |
| R 319 | Resistor | carbon film | 220 k | * * |
| R 320 | Resistor | carbon film | 33 k | * * |
| R 321 | Resistor | carbon film | 10 k | * * |
| R 322 | Resistor | carbon film | 1 k | * * |
| R 323 | Resistor | carbon film | 2.2 k | * * |